SIEMENS

Industrial Controls

Motor management and control devices SIMOCODE pro - Communication

Function Manual

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Legal information

Warning notice system

This manual contains notices you have to observe in order to ensure your personal safety, as well as to prevent damage to property. The notices referring to your personal safety are highlighted in the manual by a safety alert symbol, notices referring only to property damage have no safety alert symbol. These notices shown below are graded according to the degree of danger.

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

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

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

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The product/system described in this documentation may be operated only by **personnel qualified** for the specific task in accordance with the relevant documentation, in particular its warning notices and safety instructions. Qualified personnel are those who, based on their training and experience, are capable of identifying risks and avoiding potential hazards when working with these products/systems.

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We have reviewed the contents of this publication to ensure consistency with the hardware and software described. Since variance cannot be precluded entirely, we cannot guarantee full consistency. However, the information in this publication is reviewed regularly and any necessary corrections are included in subsequent editions.

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1 Introduction

1.1 Important notes

Scope of application

This manual is applicable to the listed SIMOCODE pro system components. It contains a description of the components applicable at the time of printing the manual. SIEMENS reserves the right to include updated information about new components or new versions of components in a Product Information.

Manual Collection

A Manual Collection (https://support.industry.siemens.com/cs/document/109743951), a collection of the following five SIMOCODE pro manuals is at your disposal in Industry Online Support:

- SIMOCODE pro - 1 Getting Started
- SIMOCODE pro - 2 System Manual
- SIMOCODE pro - 3 Parameterization
- SIMOCODE pro - 4 Applications
- SIMOCODE pro - 5 Communication

SIMOCODE pro response tables

Specific responses (deactivated, signaling, warning, tripping) can be parameterized for various SIMOCODE pro functions, such as overload. These are always displayed in tabular form:

- "X" = Applicable
- "—" = Not applicable
- Default values are marked "d" for "default" in parentheses.

Response	Function 1	Function 2	Function 3
Tripping	—	X (d)	X
Warning	X (d)	X	—
Signaling	X	X	—
Deactivated	X	X	X (d)
Delay	0 ... 25.5 s (default: 0)	—	—

Brief description of the responses:

- Tripping: The contactor controls QE* are tripped. A fault message is generated which is available as a diagnosis via PROFIBUS DP. The fault message and the device-internal signal remain on until the appropriate length of time has elapsed or the cause of the fault has been eliminated and acknowledged.
- Warning: In addition to the device-internal signal, a warning signal is generated that is available as diagnostics via the communication bus.
- Signaling: Only a device-internal signal is generated, which can be further processed as required.
- Deactivated: The appropriate function is switched off, no signals are generated.

A delay time can also be set for specific responses.

Further information

Please read the operating instructions of the respective components. You can find the operating instructions for SIMOCODE pro at Operating instructions (https://www.siemens.com/sirius/manuals).

You will find further information on the Internet:

- SIMOCODE pro (https://www.siemens.com/simocode)
- Information and Download Center (https://www.siemens.com/sirius/infomaterial)
- Siemens Industry Online Support (SIOS) (https://www.siemens.com/sirius/support)
- Certificates (https://www.siemens.com/sirius/approvals)

Technical Assistance

Support Request (https://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

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The products described here have been developed to carry out safety-related functions as part of a complete plant or machine. In general, a complete safety system consists of sensors, evaluation units, signaling devices and methods for safe tripping. The manufacturer is responsible for ensuring safe functioning of the complete plant or machine. Siemens AG, its subsidiaries, and associated companies (hereinafter referred to as "Siemens") are not in a position to guarantee every characteristic of a complete plant or machine not designed by Siemens.

Siemens also denies all responsibility for any recommendations that are made or implied in the following description. No new guarantee, warranty, or liability claims above those standard to Siemens can be derived from the following description.

Recycling and disposal

For environmentally friendly recycling and disposal of your old device, please contact a company certified for the disposal of electronic waste and dispose of the device in accordance with the regulations in your country.

1.2 Security information

Siemens provides products and solutions with industrial security functions that support the secure operation of plants, systems, machines and networks.

In order to protect plants, systems, machines and networks against cyber threats, it is necessary to implement – and continuously maintain – a holistic, state-of-the-art industrial security concept. Siemens’ products and solutions only form one element of such a concept.

Customer is responsible to prevent unauthorized access to its plants, systems, machines and networks. Systems, machines and components should only be connected to the enterprise network or the internet if and to the extent necessary and with appropriate security measures (e.g. use of firewalls and network segmentation) in place.

Additionally, Siemens’ guidance on appropriate security measures should be taken into account. For more information about industrial security, please visit:
https://www.siemens.com/industrialsecurity

Siemens’ products and solutions undergo continuous development to make them more secure. Siemens strongly recommends to apply product updates as soon as available and to always use the latest product versions. Use of product versions that are no longer supported, and failure to apply latest updates may increase customer’s exposure to cyber threats.

To stay informed about product updates, subscribe to the Siemens Industrial Security RSS Feed under:
https://www.siemens.com/industrialsecurity

1.3 Current information about operational safety

Important note for maintaining operational safety of your system

DANGER

Hazardous Voltage

Can Cause Death, Serious Injury or Risk of Property Damage

Please take note of our latest information!

Systems with safety-related characteristics are subject to special operational safety requirements on the part of the operator. The supplier is also obliged to comply with special product monitoring measures. For this reason, we publish a special newsletter containing information on product developments and features that are (or could be) relevant to operation of safety-related systems. By subscribing to the appropriate newsletter in the Industry newsletter system (https://www.industry.siemens.com/newsletter), you will ensure that you are always up-to-date and able to make changes to your system, when necessary. Sign on to the following newsletter under "Products & Solutions":

- Control Components and System Engineering News
- Safety Integrated Newsletter.

Communication 2

2.1 PROFIBUS communication

2.1.1 Definitions

PROFIBUS DP

PROFIBUS bus system with the DP protocol (decentralized peripherals). The main task of PROFIBUS DP is to manage the fast, cyclic data exchange between the central DP master and the I/O devices.

PROFIBUS DPV1

PROFIBUS DPV1 is an extension of the DP protocol. It enables acyclic data exchange of parameter, diagnostic, receive and test data.

DP master

A master with characteristics to EN 50 170, Volume 2, PROFIBUS with the DP protocol is referred to as the DP master.

Class 1 master

A Class 1 master is an active station on PROFIBUS DP. It is characteristically used for cyclic data exchange with other stations. Typical Class 1 masters include PLCs with a PROFIBUS DP connection.

Class 2 master

A class 2 master is an optional station on the PROFIBUS DP.
Typical class 2 masters include:

- PC / PG devices with the SIMOCODE ES software
- SIMATIC PDM (PCS7)
- PC with SIMATIC powercontrol software (power management).

DPV1 slave

A slave operated on the PROFIBUS with the PROFIBUS DP protocol that behaves in accordance with EN 50 170, Volume 2, PROFIBUS is referred to as a DPV1 slave.

GSD

Device master data (GSD) contains DP slave descriptions in a standardized format. The use of device master data simplifies the configuration of the DP slave in a DP master system.

OM SIMOCODE pro

OM SIMOCODE pro (object manager) is used instead of GSD to integrate SIMOCODE pro into STEP7.
OM SIMOCODE pro enables the use of SIMOCODE ES (if it is installed) for parameterization within STEP7.

SIMATIC PDM

Software package for the configuration, parameterization, commissioning and maintenance of devices (e.g. transducers, controllers, SIMOCODE) and for configuring networks and PCs.

SIMOCODE pro S7 slave

A SIMOCODE pro S7 slave is a slave which is fully integrated into STEP7. It is connected via OM SIMOCODE pro. It supports the S7 model (diagnosis interrupts, hardware interrupts).

Writing data

Writing data means that data is transmitted to the SIMOCODE pro system.

Reading data

Reading data means that data is transmitted from the SIMOCODE pro system.

PROFIsafe

PROFIsafe is a safety profile developed and tested according to IEC 61508 for the widely used field bus protocols PROFIBUS and PROFINET. The PROFIsafe profile defines how failsafe protective devices (e.g. EMERGENCY OFF pushbutton) will be connected to programmable controllers by means of PROFIBUS.

2.1.2 Data transfer

Options for data transfer

The following figure shows the data transfer options:

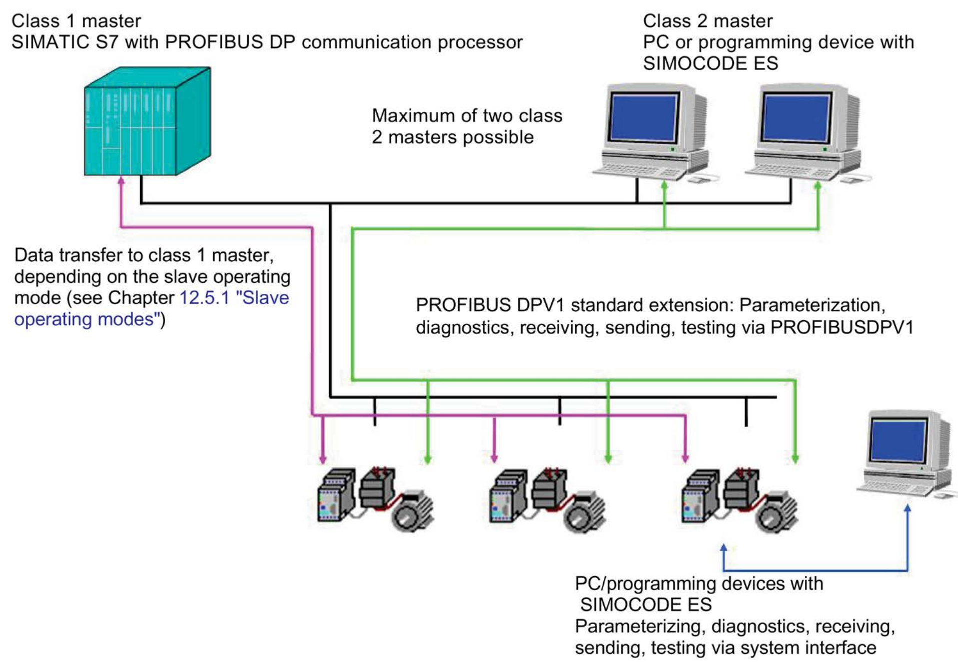


Figure 2-1 Options for data transfer

Communication principle

The following figure shows the communication principle and the way data is transmitted depending on the master and slave operating modes:

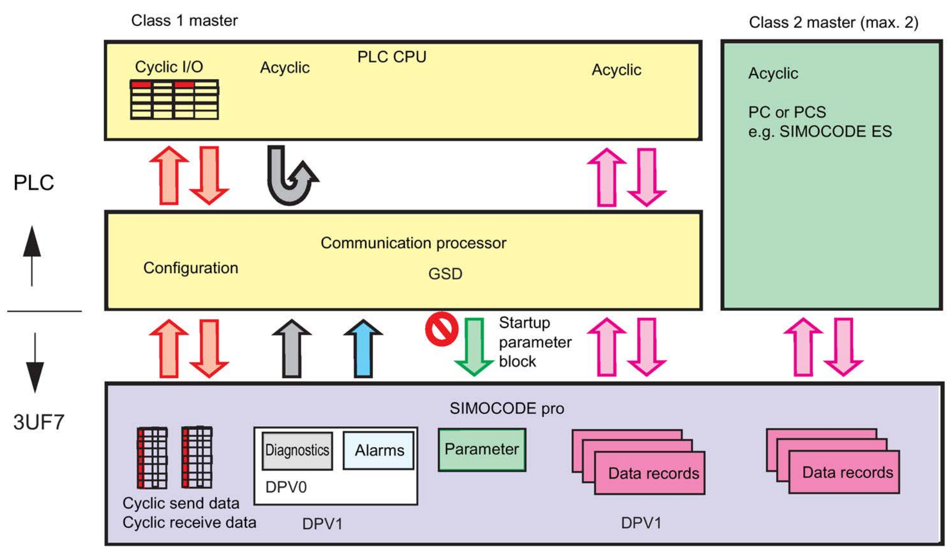


Figure 2-2 Communication principle

2.1.3 Fail-safe data transfer via PROFIBUS / PROFIsafe

SIMOCODE pro V as from version ***E07*** in conjunction with a fail-safe control (F-CPU) and the SIMOCODE pro expansion module DM-F PROFIsafe supports fail-safe shutdown of motors by means of data transmission via the PROFIsafe profile.

You will find more information on using this function in the manual SIMOCODE pro fail-safe digital modules (https://support.automation.siemens.com/WW/view/en/50564852).

2.1.4 Telegram description and data access

2.1.4.1 Cyclic data

Cyclic data is exchanged between the PROFIBUS DP master and the DP slave once every DP cycle. The PROFIBUS DP master module sends the control data to SIMOCODE pro. SIMOCODE pro responds by sending the message data to the master module.

The program of the PLC accesses the following cyclically:

- send data at the inputs
- receive data at the outputs.

The length of the cyclic data which is to be transferred is set when SIMOCODE pro is integrated into the DP master system. This is achieved by selecting the basic type which in turn determines the structure and the length of the cyclic data.

The following basic types are available:

- Cyclic data from the PROFIBUS DP master to SIMOCODE pro
- Cyclic data from SIMOCODE pro to the PROFIBUS DP master.

Table 2- 1 Cyclic data from the PROFIBUS DP master to SIMOCODE pro:

Designation	Length	Designation	Information
Basic type 1	4 bytes of receive data	Cyclic receive - bits 0.0 to 1.7	BU SIMOCODE pro S, pro V
		Cyclic receive - analog value	
Basic type 2	2 bytes of receive data	Cyclic receive - bits 0.0 to 1.7	BU SIMOCODE pro C, pro S, or pro V
PROFIsafe	5 bytes of receive data	1 bit net data, assigned permanently to the relay enabling circuits	BU SIMOCODE pro V

Table 2- 2 Cyclic data from SIMOCODE pro to the PROFIBUS DP master:

Designation	Length	Designation	Information
Basic type 1	10 bytes of send data	Cyclic send - bits 0.0 to 1.7	BU SIMOCODE pro S, pro V
		Cyclic send – analog input 1 to 4	
Basic type 2	4 bytes of send data	Cyclic send - bits 0.0 to 1.7	BU SIMOCODE pro C, pro S and pro V
		Cyclic Send – analog input 1	BU SIMOCODE pro V
PROFIsafe	4-byte inputs	No user data	

The cyclic data content (digital / analog information) is set by parameterization, e.g. with the SIMOCODE ES software.

The cyclic I/O data is already preset when the type of application (control function) is selected when the "SIMOCODE ES" parameterization software is launched (see Chapter Assignment of cyclic receive and send data for predefined control functions (Page 130)).

2.1.4.2 Diagnostics data and alarms

Diagnostic data and interrupts - overview

Diagnostics data contains important information about the status of SIMOCODE pro. This information simplifies troubleshooting.
Unlike cyclic data, the diagnostics data is only transmitted to the master module if it changes. PROFIBUS DP differentiates between:

- Standard diagnostics
- Status information
- Channel-related diagnostics
- DPV1 process and diagnostic interrupts.

Configuring diagnostic response

In SIMOCODE pro, you can set which diagnostic events trigger the transmission of diagnostics data or interrupts to the PLC:

- Diagnostics for device faults, e.g. parameterization errors, hardware faults
- Diagnostics for process faults:
  In the case of events identified as "S" in the column headed "DP diagnostics" in the "Data record 92 - Diagnostics" table, the diagnostics data or interrupts are transferred to the PLC.
- Diagnostics for process warnings:
  In the case of events identified as "W" in the column headed "DP diagnostics" in the "Data record 92 - Diagnostics" table, the diagnostics data or interrupts are transferred to the PLC.
- Diagnostics for process events:
  In the case of events identified as "M" in the column headed "DP diagnostics" in the "Data record 92 - Diagnostics" table, the diagnostics data or interrupts are transferred to the PLC.

Setting with SIMOCODE ES

Set the response in dialog **Device Parameters > Bus Parameters >Diagnosis** .

2.1.4.3 Structure of the slave diagnostics

Standard diagnostics/extended diagnostics

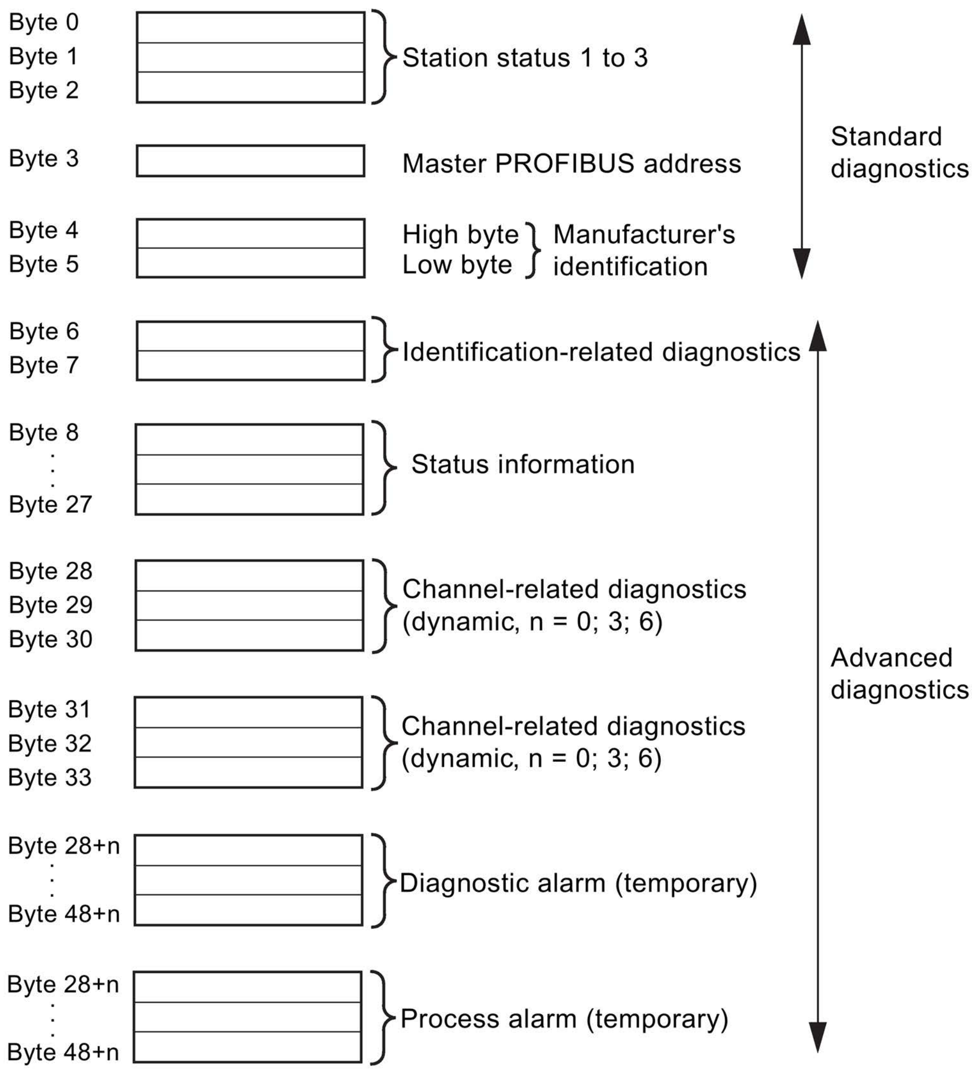


Figure 2-3 Structure of the slave diagnostics

The diagnostics telegram has a maximum length of 62 bytes.

Station status - definition

The station status provides an overview of the state of a DP slave.

Station status 1

Table 2- 3 Structure of station status 1 (byte 0)

Bit	Meaning	Cause / corrective measure
0	The DP master cannot address the DP slave.	Check the following: • Is the correct PROFIBUS address set on the DP slave? • Is the bus connection plug connected? • Is the DP slave connected to the power supply? • Is the RS485 repeater correctly configured?
1	The DP slave is not yet ready for the data transfer.	The DP slave is still starting up. Wait until the startup is completed.
2	The configuration data transferred from the DP master to the DP slave does not match the DP slave configuration.	Check that the correct station type and the correct DP slave configuration have been entered in the configuring software.
3	External diagnostics data exists (group diagnostics indication).	Evaluate the identifier-related diagnostics, the status information and / or the channel-related diagnostics. Bit 3 is reset as soon as all faults have been rectified. The bit will be set again when there is a new diagnostics message in the bytes of the aforementioned diagnostics.
4	The function you requested is not supported by the DP slave.	Check the configuration.
5	The DP master cannot interpret the response from the DP slave.	Check the bus configuration.
6	The DP slave type does not match the software configuration.	Enter the correct station type in the configuring software.
7	The DP slave has been parameterized by another DP master (not by the DP master which has access to the DP slave at the moment).	The bit is always 1, for example, if you access the DP slave with the PG or another DP master. The "Master PROFIBUS address" diagnostic byte contains the PROFIBUS address of the DP master that assigned parameters to the DP slave.

Station status 2

Table 2- 4 Structure of station status 2 (byte 1)

Bit	Meaning
0	The DP slave must be parameterized again.
1	A diagnostic message is pending. The DP slave will not operate until the fault is rectified (static diagnostics message).
2	The bit is always "1" when the DP slave with this PROFIBUS address is configured.
3	Response monitoring is enabled for this DP slave.
4	The DP slave has received a "FREEZE" control command. 1)
5	The DP slave has received a "SYNC" control command. 1)
6	0: Bit is always "0".
7	The DP slave is deactivated, i.e. it is decoupled from the current processing.
1) Bit is updated only if another diagnostic message also changes.	

Station status 3

Station status 3 is not relevant for the slave diagnostics.

Table 2- 5 Structure of station status3

Bit	Meaning
0 to 7	Bits are always "0".

Master PROFIBUS address - definition

The PROFIBUS address of this DP master (class 1 master) is stored in the "Master PROFIBUS address" diagnostic byte,

- that has parameterized the DP slave and
- that has read and write access to the DP slave

The master PROFIBUS address is stored in byte 3 of the slave diagnostics.

Manufacturer's ID - definition

A code is stored in the manufacturer's identification which describes the DP slave type.

Table 2- 6 Structure of the manufacturer ID

Byte 4	Byte 5	Manufacturer ID for
80_H	FD_H	SIMOCODE pro

Identifier-related diagnostics - definition

Identifier-related diagnostics begins at byte 6 and is 2 bytes long.

Identifier-related diagnostics - configuration

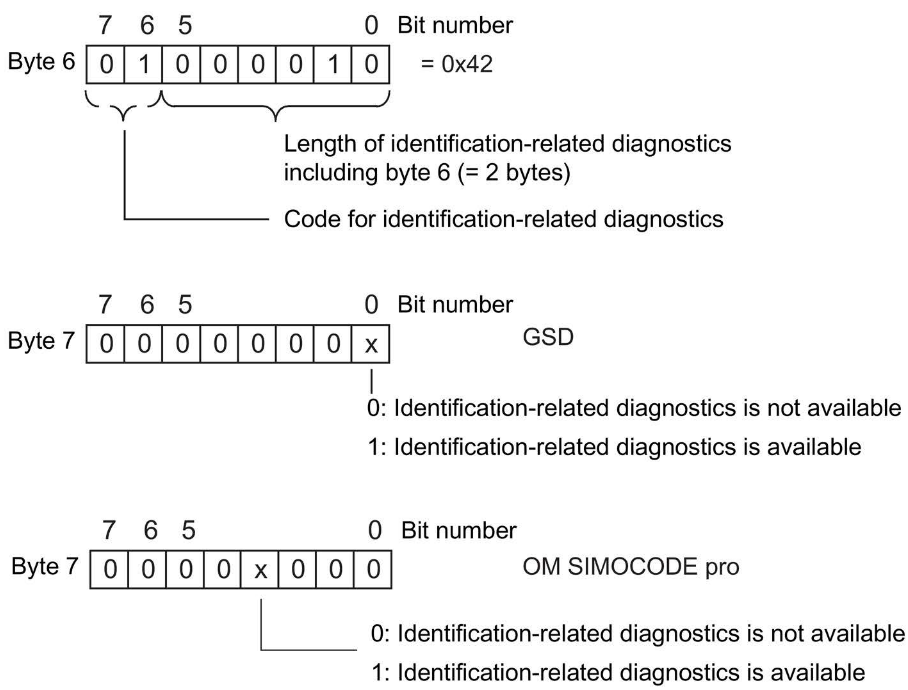


Figure 2-4 Configuration of identifier-related diagnostics

Status information - definition

The status information communicates the detailed status of SIMOCODE pro.

If SIMOCODE pro is operated downstream from a Y-Link (module for connecting single-channel DP slaves to S7-400H), the so-called H_STATUS is also signaled (see Fig. "Structure of H_STATUS").

Status information - configuration

The status information is configured as follows:

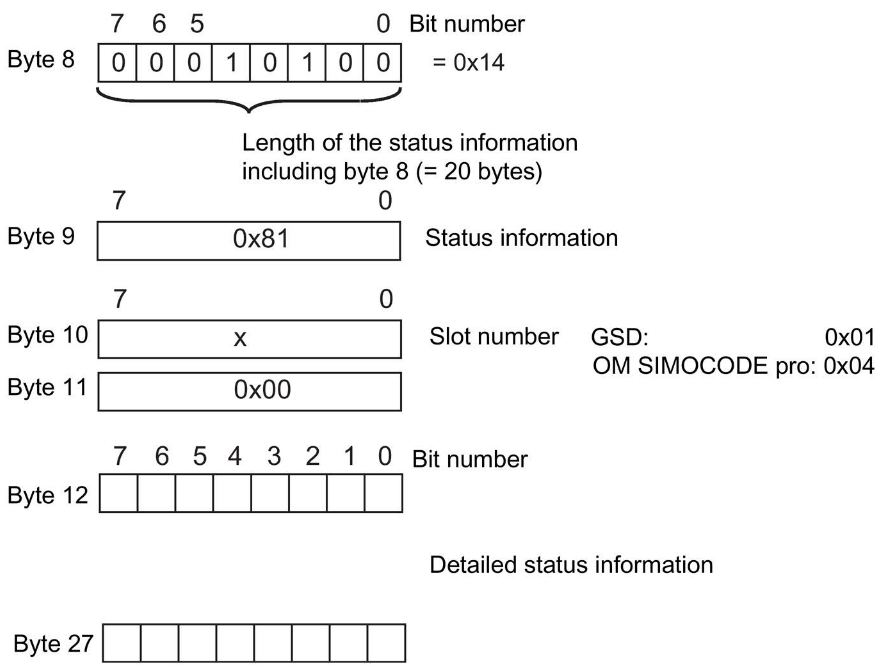


Figure 2-5 Configuration of status messages

You will find the detailed messages in Chapter Detailed messages of the slave diagnostics (Page 156).

The H_STATUS has the following structure:

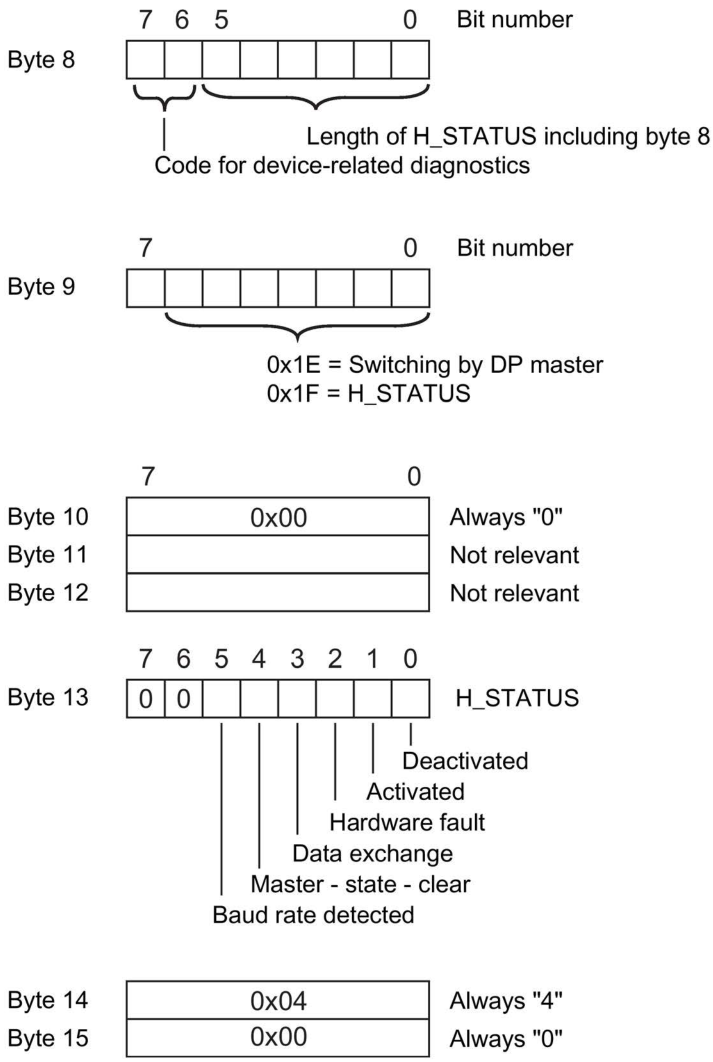


Figure 2-6 Structure of H_STATUS

Channel-related diagnostics - definition

Channel-related diagnostics is a detailed version of the identifier-related diagnostics. It supplies information about the device faults of SIMOCODE pro.

Channel-related diagnostics - configuration

Channel-related diagnostics is configured as follows:

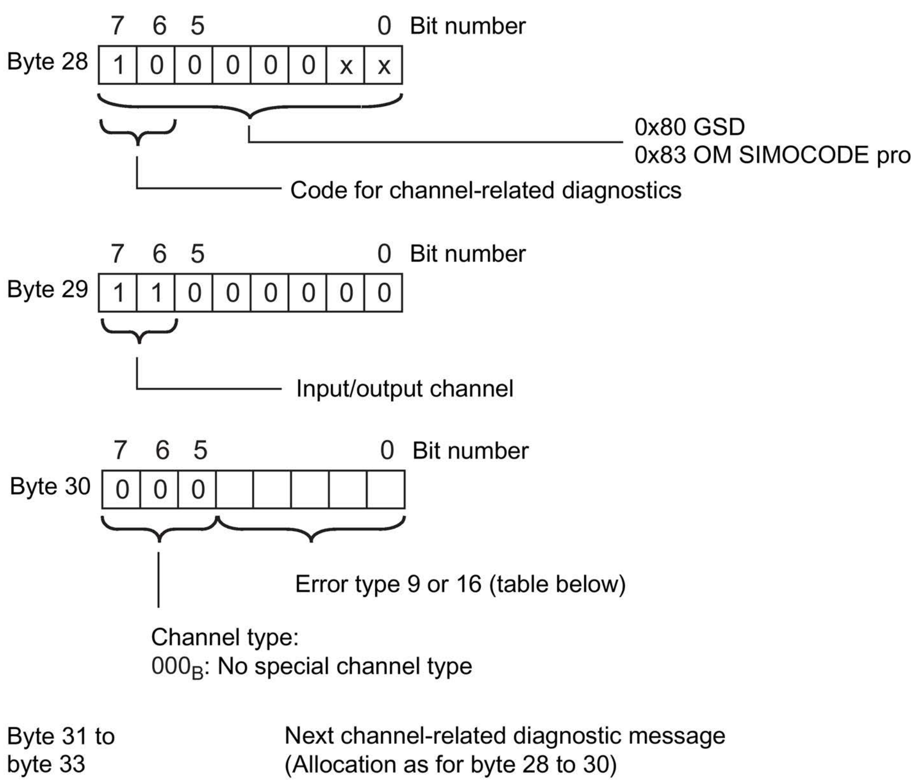


Figure 2-7 Configuration of the channel-related diagnostics

The block for the channel-related diagnostics, which has a length of 3 bytes, is either missing (if there is no channel-related diagnostics) or is available once or twice.

Fault types

The diagnostic message is output on channel 0.

Table 2- 7 Fault types

No.	Fault type	Meaning / cause	
F9	01001: Error	• Internal fault / device fault • Error during self-test	Precise information: See Chapter Data record 92 - Device diagnostics (Page 169).
F16	10000: Parameterization error	• Incorrect parameter value	

Interrupts - diagnostic interrupt

Device faults or parameter errors are interrupt sources for diagnostic interrupts.

As soon as SIMOCODE pro sets a diagnostic interrupt, the OB 82 diagnostic interrupt will be started in the SIMATIC S7.

Diagnosis interrupt - structure

The diagnostic interrupt has the following structure:

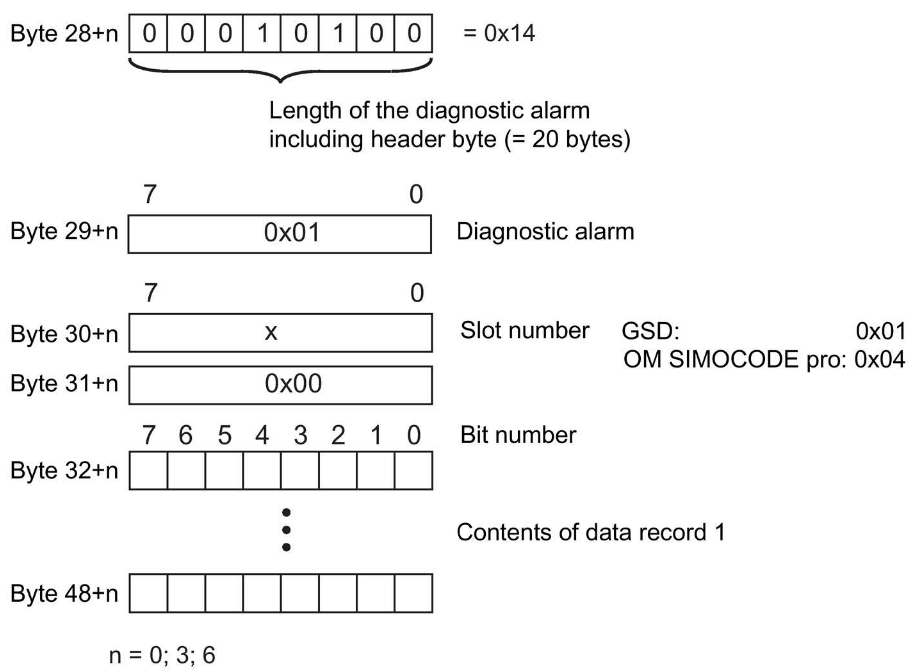


Figure 2-8 Structure of the diagnostic interrupt

The first byte of the block for diagnostic interrupt can be shifted by 3 or 6 bytes depending on the number of blocks for channel-related diagnostics.

You will find a description of the information contained in data record 1 in Chapter Detailed messages of the slave diagnostics (Page 156).

Interrupts - hardware interrupt

Process faults, warnings, and status information are interrupt sources for hardware interrupts.

As soon as SIMOCODE pro sets a hardware interrupt, the hardware interrupt OB 40 will be started in the SIMATIC S7.

Hardware interrupt - structure

The hardware interrupt has the following structure:

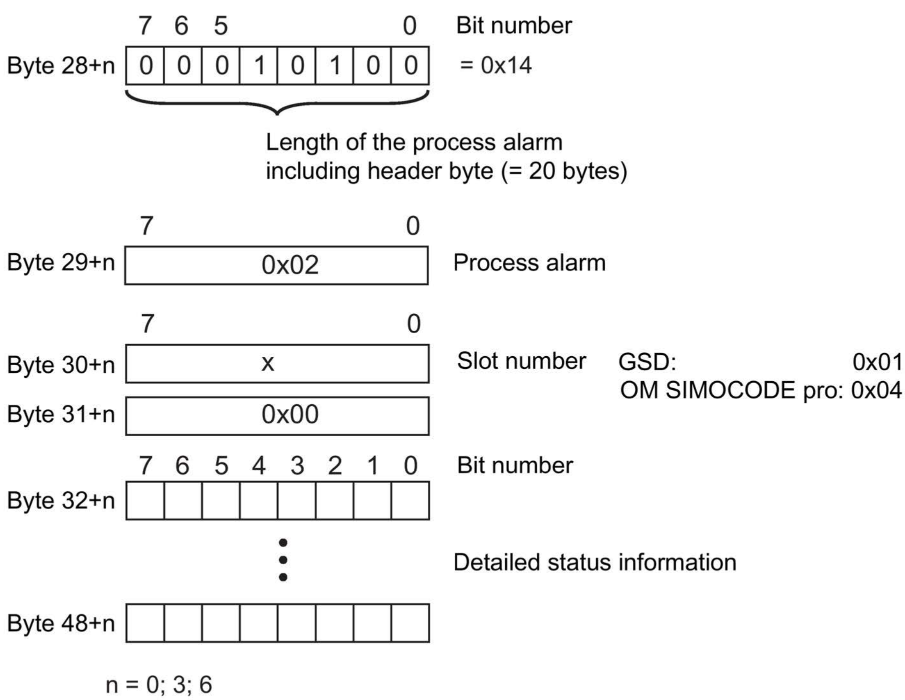


Figure 2-9 Structure of the hardware interrupt

The first byte of the block for hardware interrupts can be shifted by 3 or 6 bytes depending on the number of blocks for channel-related diagnostics.

The detailed messages can be found in Chapter "Detailed messages of the slave diagnostics" in Chapter Detailed messages of the slave diagnostics (Page 156).

2.1.5 Integration of SIMOCODE pro in DP master systems

2.1.5.1 Slave operating modes

The following table shows an overview of the slave operating modes with which SIMOCODE pro can be operated on the class 1 master:

Table 2- 8 Slave operating modes of SIMOCODE pro

SIMOCODE pro integrated as	**Class 1 master**		
	Non-vendor-specific DP master, without DPV1 interrupts	**Non-vendor-specific DP master, with DPV1 interrupts**	**S7 master**
DPV1 slave via GSD	• Cyclic data exchange • Standard diagnostics • Status information • Parameterization during starting (SIMOCODE pro C basic unit only) • Acyclic writing and reading of DPV1 data records (if supported by the master)	• Cyclic data exchange • Standard diagnostics • Status information • Hardware and diagnostic interrupts • Parameterization during starting (SIMOCODE pro C basic unit only) • Acyclic reading and writing of DPV1 data records	• Cyclic data exchange • Standard diagnostics • Status information • Hardware and diagnostic interrupts • Parameterization during starting (SIMOCODE pro C basic unit only) • Acyclic reading and writing of DPV1 data records
S7 slave via OM SIMOCODE pro	—	—	• Cyclic data exchange • Standard diagnostics • Hardware and diagnostic interrupts • Parameterization during startup • Acyclic reading and writing of DPV1 data records

2.1.5.2 Preparing the data transfer

The precondition for communication with a master class 1 (PLC) is integration according to table "Slave modes of SIMOCODE pro" and the setting for the PROFIBUS DP address.

You will find information about setting the address in Chapter "Setting the PROFIBUS DP address" in Chapter "Commissioning and service" in the system manual.

2.1.5.3 Integration of SIMOCODE pro as a DPV1 slave via GSD in the configuring software

SIMOCODE pro is integrated into your system as a standard slave via the GSD file.

You can download the GSD file from GSD file (https://www.siemens.com/profibus-gsd) (switching devices).

The following GSD files are available for SIMOCODE pro C:

- SI0180FD.GSG (German)
- SI0180FD.GSE (English).
- SI0180FD.GSF (French).

The following GSD files are available for SIMOCODE pro S:

- SI0181A7.GSG (German)
- SI0181A7.GSE (English)
- SI0181A7.GSF (French).

The following GSD files are available for SIMOCODE pro V:

- SI1180FD.GSG (German)
- SI1180FD.GSE (English)
- SI1180FD.GSF (French).

Note

If you want to utilize the complete functionality of SIMOCODE pro (e.g. time stamping), your configuration tool must support GSD files - Rev. 5 such as STEP7 V5.3 and higher.

The following table describes how to integrate the GSD file in SIMATIC S7 and SIMOCODE pro from the hardware catalog.

Table 2- 9 Integration of SIMOCODE pro as a DPV1 slave via GSD in the configuring software

Step	STEP7, V5.1+SP2 and higher
1	Start STEP7 and select "Options" > "Install New GSD File" in HW Config.
2	In the dialog box that then opens, select the GSD file to be installed and confirm with "OK" → the field device will be displayed in the hardware catalog in the "PROFIBUS DP" directory under "Other field devices > Switching devices > SIMOCODE pro."
3	Enter "SIMOCODE pro C", "SIMOCODE pro S" or "SIMOCODE pro V" on the PROFIBUS.
4	For SIMOCODE pro S and SIMOCODE pro V only. SIMOCODE pro S and SIMOCODE pro V can be integrated into two basic types (basic type 1 or basic type 2) (see Chapter Cyclic data (Page 17)). The default setting is basic type 2. If you wish to use "basic type 1," delete the default "basic type 2" module and insert "basic type 1" instead. Only in conjunction with the fail-safe digital module DM-F PROFIsafe: Insert the "PROFIsafe" module in the second position in addition to "Basic type 1" or "Basic type 2." You will find more information about using the DM-F PROFIsafe in the manual SIMOCODE pro fail-safe digital modules (https://support.automation.siemens.com/WW/view/en/50564852).
5	Check the set DP interrupt mode (DPV0 or DPV1) as well as the enable of the DPV-1 interrupts on the properties page of the DP slave. These settings influence the evaluation of the diagnostics data and interrupts (see Chapter Evaluating diagnostics data (Page 34) and Chapter "Timestamping" in the operating manual (standard functions)).
6	For SIMOCODE pro C only: It is possible to set the device parameters, which are automatically transmitted to SIMOCODE pro during every startup, in the object properties of the DP slave under "Parameterization > Device-specific parameters" (see Chapter Parameter data during startup (Page 40)).

2.1.5.4 Integration of SIMOCODE pro as a SIMATIC PDM object (DPV1 slave via GSD) in STEP7 HW Config

SIMOCODE pro can be integrated as a PDM object into the STEP7 HW Config when version 6.0 + SP1 or higher of the SIMATIC PDM (Process Device Manager) is installed. This requires the PDM option "Integration in STEP7."

The following table describes how you can insert SIMOCODE pro as a PDM object in the STEP7 HW Config from the hardware catalog.

Table 2- 10 SIMOCODE pro as a SIMATIC PDM object (DPV1 slave via GSD) in STEP7 HW Config

Step	STEP7, V5.1+SP2 and higher
1	Start STEP7 and open the "HW Config."
2	To integrate SIMOCODE pro as a PDM object, navigate to the "PROFIBUS DP > Switching Devices" directory in the hardware catalog.
3	Enter "SIMOCODE pro C (PDM)," "SIMOCODE pro S (PDM)," or "SIMOCODE pro V (PDM)" on the PROFIBUS. For SIMOCODE pro S and SIMOCODE pro V only. SIMOCODE pro S and SIMOCODE pro V can be integrated into two basic types (basic type 1 or basic type 2) (see Chapter Cyclic data (Page 17)). The default setting is basic type 2. If you wish to use "basic type 1," delete the default "basic type 2" module and insert "basic type 1" instead. Only in conjunction with the fail-safe digital module DM-F PROFIsafe: Insert the "PROFIsafe" module in the second position in addition to "Basic type 1" or "Basic type 2." You will find more information about using the DM-F PROFIsafe in the manual SIMOCODE pro fail-safe digital modules (https://support.automation.siemens.com/WW/view/en/50564852).
4	Check the set DP interrupt mode (DPV0 or DPV1) as well as the enable of the DPV-1 interrupts on the properties page of the DP slave. These settings influence the evaluation of the diagnostics data and interrupts (see Chapter Evaluating diagnostics data (Page 34) and Chapter "Timestamping" (standard functions) in the operating manual).
5	Start SIMATIC PDM to create the device parameters by double clicking on the slave symbol (see Chapter Parameter data during startup (Page 40)).

2.1.5.5 Integration of SIMOCODE pro as an S7 slave via OM SIMOCODE pro

The "OM SIMOCODE pro" software must be installed to utilize the advantages of SIMOCODE ES and parameterize SIMOCODE pro from the STEP7 HW Config.
OM SIMOCODE pro is included in the scope of supply of the "SIMOCODE ES Premium" software.

Install the software accordingly.

The following table describes how to insert SIMOCODE pro into STEP7 HW Config from the hardware catalog.

Table 2- 11 Integration of SIMOCODE pro as an S7 slave via OM SIMOCODE pro

Step	STEP7
1	Start STEP7 and open the "HW Config."
2	To integrate SIMOCODE pro as an S7 slave, navigate through the hardware catalog to directory "PROFIBUS DP → Switching Devices → Motor Management System"
3	Enter SIMOCODE pro C, SIMOCODE pro S, SIMOCODE pro V (basic type 1) or SIMOCODE pro S, SIMOCODE pro V (basic type 2) on the PROFIBUS. For SIMOCODE pro S and SIMOCODE pro V only. SIMOCODE pro S and SIMOCODE pro V can be integrated into two basic types (basic type 1 or basic type 2) (see Chapter Cyclic data (Page 17)). Enter the desired basic type "Basic type 1" or "Basic type 2" as the module. Only in conjunction with the fail-safe digital module DM-F PROFIsafe: Enter the desired basic type "Basic type 1 - PROFIsafe" or "Basic type 2 - PROFIsafe" as the module. You will find more information about using the DM-F PROFIsafe in the manual SIMOCODE pro fail-safe digital modules (https://support.automation.siemens.com/WW/view/en/50564852).
4	Start the SIMOCODE ES software to generate the device parameters with the "Parameters" button under "Parameters" in the object properties of slot 4 of this S7 slave. The created parameters are incorporated in STEP7 and automatically transmitted to SIMOCODE pro during startup (see Chapter Parameter data during startup (Page 40)).

If SIMOCODE pro has been integrated as an S7 slave, you can utilize the routing functionality provided by SIMOCODE ES Premium.

A prerequisite for the availability of this function is that an online connection can be established (for example via Industrial Ethernet) between the PC on which SIMOCODE ES is installed and the SIMATIC controller that supports routing.

In this manner, you can use routing to access all SIMOCODE pro devices connected to the controller.

2.1.5.6 Compatibility of SIMOCODE pro S and SIMOCODE pro V

SIMOCODE pro S and SIMOCODE pro C each have their own gsd file (see Integration of SIMOCODE pro as a DPV1 slave via GSD in the configuring software (Page 29)).

It is nevertheless possible to replace a SIMOCODE pro C basic unit with a SIMOCODE pro S basic unit.

SIMOCODE pro S basic units can be addressed with unchanged functionality by configuring with a SIMOCODE pro C gsd file. SIMOCODE pro C parameter settings using output 3 of the basic unit are changed in such a way when using SIMOCODE pro S that output 1 of the multifunction module is used instead of output 3 of the basic unit.

For configurations that use the new functions of the SIMOCODE pro S multifunction module (additional inputs and outputs, ground fault detection, temperature measurement), configuring using the SIMOCODE pro S gsd file is absolutely necessary.

The same applies when integrating into STEP 7 via the Object Manager of SIMOCODE pro C.

2.1.6 Evaluating diagnostics data

2.1.6.1 Evaluating diagnostics data

The way in which the diagnostics data is read out depends in which DP master system you have integrated SIMOCODE pro and the method of integration used (see Chapter Integration of SIMOCODE pro as a DPV1 slave via GSD in the configuring software (Page 29)).

2.1.6.2 SIMOCODE pro integrated with GSD

DP master with DPV1 interrupt support (DPV1 interrupt mode) (e.g. all later SIMATIC S7-300 / 400 DP master systems)

In a DP master system with DPV1 interrupt support, the diagnostics data is transferred and evaluated by means of diagnostic and hardware interrupts.

These interrupts must be enabled in the PROFIBUS configuring tool for this purpose (diagnostic interrupts, hardware interrupts).

Using the configuring tool, you can define the DP interrupt mode in which the integration took place in the DP slave properties and specify whether interrupts are enabled. In SIMATIC STEP7, this is carried out in HW Config via the properties of the DP slave.

- Behavior and sequence in STEP7: Behavior and sequence in STEP7A diagnosis interrupt (OB 82) is triggered in the CPU every time a new device fault is diagnosed, whereas a hardware interrupt (OB 40) is triggered every time a new process fault / warning / status information is diagnosed. If OB 82 or OB 40 has not been programmed, the CPU switches to "STOP" mode.
- Interrupts from a DPV1 slave, received with STEP7: The interrupt is read directly in OB 82 or OB 40 with SFB 54 "RALRM." The data range addressed with SFB 54 by means of the "AINFO" parameter contains the interrupt information described in Section "Diagnostic interrupt - structure" and in the Section "Hardware interrupt - structure." The first byte which is read corresponds to byte 28.

Note

The interface of SFB 54 "RALRM" is identical to the interface of FB "RALRM" as defined in the "PROFIBUS Guideline PROFIBUS Communication and Proxy Function Blocks according to IEC 61131-3" standard.

You will find further information about SFB 54 in the STEP7 online help.

DP master without DPV1 interrupt support (DPV0 interrupt mode) (e.g. all later SIMATIC S7-300 / 400 DP master systems)

SIMOCODE pro diagnostics data can be evaluated via device-specific diagnostics (status information) and channel-related diagnostics (as part of extended diagnostics, see Chapter Structure of the slave diagnostics (Page 19)) in DP master systems without DPV1 interrupt support.

Using the configuring tool, you can define the DP interrupt mode in which the integration took place in the DP slave properties.

Device-specific diagnostics contain detailed information about faults, warnings and status information which are recorded by the process via SIMOCODE pro. Information concerning hardware faults is transmitted via channel-related diagnostics.

- Behavior and sequence in STEP7: OB 82 is started in the CPU every time a new device or process fault / warning / status information is diagnosed. If OB 82 has not been programmed, the CPU switches to "STOP" mode.
- Readout of the slave diagnostics data with STEP7: You can determine which DP slave has supplied diagnostics data by evaluating the start information in OB 82 ("OB82_MDL_ADDR" variable). OB82_MDL_ADDR corresponds here to the diagnostics address of the slave that is configured in HW Config. The diagnostics data itself is read, for instance, in the cyclic part of the user program with SFC 13 "DPNRM_DG." The diagnostics data that is read with SFC 13 has the structure described in Chapter Structure of the slave diagnostics (Page 19). For further information on SFC 13, please refer to the STEP7 Online Help system.

2.1.6.3 Integration of SIMOCODE pro in SIMATIC S7 with OM SIMOCODE ES

Diagnostic interrupt/hardware interrupt

The diagnostics data concerning diagnosis alarms and process interrupts is transmitted and evaluated during the integration of SIMOCODE pro as an S7 slave.

DP masters operated in DP mode "DPV1" (e.g. all later SIMATIC S7-300/400 DP master systems)

Behavior and sequence in STEP7:

Behavior and sequence in STEP7A diagnosis interrupt (OB 82) is triggered in the CPU every time a new device fault is diagnosed, whereas a hardware interrupt (OB 40) is triggered every time a new process fault / warning / status information is diagnosed. If OB 82 or OB 40 has not been programmed, the CPU switches to "STOP" mode.

Interrupts from a DPV1 slave, received with STEP7:

The interrupt is read directly in OB 82 or OB 40 with SFB 54 "RALRM."

The data range addressed with SFB 54 by means of the "AINFO" parameter contains the interrupt information described in Section "Structure of the slave diagnostics (Page 19)". The first byte which is read corresponds to byte 28.

You will find further information on SFB 54 in the STEP7 online help.

DP masters operated in DP mode "S7-compatible" (e.g. all early SIMATIC S7-300/400 DP master systems)

Behavior and sequence in STEP7:

Behavior and sequence in STEP7A diagnosis interrupt (OB 82) is triggered in the CPU every time a new device fault is diagnosed, whereas a hardware interrupt (OB 40) is triggered every time a new process fault / warning / status information is diagnosed. If OB 82 or OB 40 has not been programmed, the CPU switches to "STOP" mode.

You will find information about the device fault in the start information of OB 82 in the "OB82_MDL_DEFECT" variable. The start information of OB 40 contains the "OB40_POINT_ADDR" variable, which in turn contains the data of the hardware interrupt that is described in bytes 32 to 35 (see Section "Structure of the slave diagnostics (Page 19)"). Reading the entire diagnosis can then be initiated, for example, from OB 40, while the complete diagnostic record 92 is being read in the cyclic user program with the SFC 52 "RD_REC", for example.

You will find further information on SFB 59 in the STEP7 online help.

2.1.7 Data records

Records - general information

Data records contain additional information about the DP slave that can be read and, in some cases, written.

Access is effected via acyclic DPV1 services for reading and writing these records. Operation, monitoring, and parameterization is possible, for example, by SIMOCODE pro.

You can use these services as long as they are supported by your DP master. You will find an overview of the records provided by SIMOCODE pro in Chapter PROFIBUS data records (Page 160).

Unlike when cyclic I/O data is accessed, special function blocks must be called in the PLC to access DPV1 data records in the user program.

Access to data records in STEP7

Read and write access to the data records takes with the system function blocks SFB 52 "RDREC" and SFB 53 "WRREC".

You will find further information about SFB and SFC in the STEP7 online help.

2.1.8 Parameterization via PROFIBUS

2.1.8.1 SIMOCODE ES Premium

With SIMOCODE ES Premium you can parameterize all the SIMOCODE pro devices which are connected to the same PROFIBUS DP network from a central location. Parameter data which has been previously created with the software can therefore be transmitted directly to SIMOCODE pro via PROFIBUS DP.

Note

A PC with a system connection for PROFIBUS (e.g. SIMATIC NET CP 5612 (PCI) or CP 5622 (PCI-Express)) is required to execute online functions via PROFIBUS DP, e.g. transfer of SIMOCODE pro parameters.

The system connections for PROFIBUS mentioned above are operated in conjunction with SIMOCODE ES Premium as master class 2 and use acyclic DPV1 communication functions for communication with SIMOCODE pro.

If SIMOCODE pro has been integrated as an S7 slave, you can utilize the routing functionality provided by SIMOCODE ES Premium. A prerequisite for the availability of this function is that an online connection can be established (for example via Industrial Ethernet) between the PC on which SIMOCODE ES is installed and the SIMATIC controller that supports routing. In this manner, you can use routing to access all SIMOCODE pro devices connected to the controller.

Note

The startup parameter block (Device Parameters > Bus Parameters) must always be set for this form of parameterization to avoid the device parameters from being overwritten by any existing parameter data during startup.

2.1.8.2 SIMATIC PDM

The standard version of SIMATIC PDM (PDM Basic) is available to you for parameterizing functionality comparable to that of SIMOCODE ES Professional via PROFIBUS for SIMOCODE pro.

The PDM options "Integration in STEP7" provides the following functions in addition:

- "Offline saving" of SIMOCODE pro parameter data in the STEP7 project and manual transmission (no automatic transfer of parameter data during startup!)
- "Routing via S7 stations." Example: Parameterization of all SIMOCODE pro devices from a central engineering station, together with hardware components which provide a data record gateway (CP443-5 Extended, IE / PB link), beyond the boundaries of different networks where required.

Note

The startup parameter block (Device parameters > Bus parameters) must always be set for this form of parameterization to avoid the device parameters from being overwritten by any existing parameter data during startup.

You will find further information about SIMATIC PDM in the Manual SIMATIC Process Control System PCS 7 SIMATIC PDM (https://support.automation.siemens.com/WW/view/en/57355963).

2.1.8.3 Parameter data during startup

Parameter data is transferred to the unit on the PROFIBUS DP each time SIMOCODE pro is started up.

Either standard parameters only or standard and device-specific parameters (SIMOCODE pro parameters) are transferred, depending on the master module used and the type of integration into the DP master system. The parameters are stored in the PLC or the DP master and automatically transferred to the DP slave when the system is started up.

You can set the device-specific parameters

- with the configuration tool with loaded GSD (SIMOCODE pro C basic unit only), e.g. with STEP7-HW Config. This option is available for SIMOCODE pro C. The SIMOCODE pro parameters are created by configuring the device-specific parameters on the slave properties page.
- in the SIMOCODE ES software with integration of SIMOCODE pro into STEP7-HW Config as an S7 slave via OM SIMOCODE pro. This option is available for SIMOCODE pro C, SIMOCODE pro S, and SIMOCODE pro V. You can start the SIMOCODE ES software for easy configuration of the parameterization from STEP7 HW Config using the button in the "Parameter" tab in the object properties of slot 4.

Note

To allow device parameterization during startup, the startup parameter block (Device parameters > Bus parameters) must not be set.

SIMOCODE pro is then parameterized with the device-specific parameters stored in the DP master. Any parameters already in the device will be overwritten.

2.1.9 Timestamping/time synchronization

See Chapter "Timestamping" (standard functions) in the manual Parameterizing SIMOCODE pro (https://support.industry.siemens.com/cs/ww/en/view/109743958).

2.2 PROFINET communication

2.2.1 Definitions

GSD file

The properties of a PROFINET devices are described in a GSD (General Station Description) file that contains all the necessary information for the configuration. Just as with PROFIBUS, you can link a PROFINET device into an automation system using a GSD file: PROFINET GSD (https://www.siemens.com/profinet-gsd)

In the case of PROFINET IO, the GSD file is in XML format. The structure of the GSD file conforms to ISO 15734, the worldwide standard for device descriptions.

Device name

Before an IO device can be addressed by an IO controller, it must have a device name because the IP address is permanently assigned to the device name. In the case of PROFINET, this method was chosen because names are easier to handle than complex IP addresses.

Assignment of a device name for a specific IO device is comparable to setting the PROFIBUS address on a DP slave.

An IO device does not have a device name when it is delivered. It can only be addressed by an IO controller once a device name has been assigned to it, e.g. for transmission of the configuration data (including the IP address) during startup or for exchanging useful data in cyclic operation.

IO Device

Distributed field device assigned to one of the IO controllers.

As a field device, the SIMOCODE pro V PN basic unit functions as a PROFINET-IO device.

IP address

To enable a PROFINET device to be addressed as a node on Industrial Ethernet, this device also requires an IP address that is unique within the network. The IP address is made up of 4 decimal numbers with a range of values from 0 through 255. The decimal numbers are separated by a decimal point.

The IP address is made up of

- The address of the (sub)net and
- The address of the node (generally called the host or network node)

MAC address

Each PROFINET device is assigned a globally unique device identifier at the factory. This 6-byte long device identifier is the MAC address.

The MAC address is divided up as follows:

- 3 bytes manufacturer's ID and
- 3 bytes device identifier (consecutive number).

The MAC address can generally be read from the front on the device, e.g.: 08-00-06-6B-80-C0

OPC Unified Architecture (UA)

OPC Unified Architecture (UA) is the next generation technology of the OPC Foundation for safe and reliable data transfer and defines access to industrial communication networks.

OPC UA client

An OPC UA client is a user program that accesses process data via the OPC UA interface. Access to the process data is made possible by the OPC UA server.

OPC UA server

The OPC server provides the OPC client with a wide range of functions with which it can communicate via industrial networks. SIMOCODE pro V PN provides extensive process data via OPC UA.

PROFINET

Within the context of Totally Integrated Automation (TIA), PROFINET is the systematic development of the following systems:

- PROFIBUS DP, the established fieldbus
- Industrial Ethernet, the communications bus for the cell level.

Experiences from both systems have been and are being integrated in PROFINET. PROFINET was defined as an Ethernet-based automation standard of PROFIBUS International (PROFIBUS Nutzerorganisation e. V.).

PROFINET IO controller

Device via which the connected IO devices are addressed. That means the IO controller exchanges input and output signals with assigned field devices. The IO controller is often the controller on which the automation program runs.

PROFINET IO Supervisor

PG/PC for commissioning and diagnostics.

2.2.2 Data security in automation

Introduction

The topic of data security and access protection (security) is becoming more and more important in industrial environments. Increased networking of entire industrial plants, vertical integration and networking of the levels within a company, and new technologies, such as remote maintenance, are resulting in more increased requirements for protection of the industrial plant. Security is the generic term for all protection measures

- Loss of confidentiality due to unauthorized accessing of data
- Loss of integrity due to data manipulation
- Loss of availability due to destruction of data

To provide protection from manipulation in sensitive plant and production networks, it is not enough to apply data security solutions for offices to industrial applications without any adaptation.

Requirements

The special requirements of communication in an industrial environment
(e.g. communication in real time) result in additional requirements for security in industrial use:

- Protection against interaction between automated cells
- Protection of network segments
- Protection from unauthorized access
- Scalability of the security functionality
- No influence on the network structure.

Threats

Threats can arise from external and internal manipulation. Loss of data security is not always caused by deliberate actions.

Internal threats arise due to:

- Technical faults
- Operating errors
- Errors in programs.

This internal hazards are compounded by external threats. The external hazards do not differ from the known threats in the office environment:

- Computer viruses and computer worms
- Trojan horses
- Unauthorized access
- Password phishing.

Password phishing means attempting to get a user to divulge access data and passwords by masquerading as a different identity in an e-mail.

Precautions

The most important precautions against manipulation and loss of data security in an industrial environment are:

- Filtering and verification of data traffic through virtual private networks (VPN). A virtual private network is used to exchange private data in a public network (e.g. the Internet). The most common VPN technology is IPsec. IPsec is a collection of protocols based on the IP protocol at the network layer.
- Segmentation into protected automation cells. The aim of this concept is to protect devices in the network through security modules. A group of protected devices forms a protected automation cell. Only security modules in the same group or the device protected by you can be interchanged.
- Authentication (identification) of the networked devices. The security modules identify themselves to each other via a secure (encrypted) channel using authentication procedures. This prevents access to a protected segment by unauthorized persons from outside.
- Encryption of the data traffic. The confidentiality of the data is ensured by encrypting the data traffic. For this purpose, every security module is given a VPN certificate which includes the encryption key.

Guidelines on information security in industrial automation

VDI guideline

The VDI/VDE Association of German Engineers "Measurement and Automation" has published with the VDI guideline "VDI/VDE 2182 Sheet 1, IT Security for Industrial Automation - General Model" a guideline in implementation of a security architecture in the industrial environment. The guideline is found under "VDI guidelines" on the VDI home page: VDI guidelines (http://www.vdi.eu/engineering/vdi-standards)

PROFINET Security Guideline

The PROFIBUS & PROFINET user organization supports you with building up safety standards in your company with the PROFINET Security Guideline. These guidelines are found under downloads on the home page of the PROFIBUS & PROFINET user organization: PI - PROFIBUS & PROFINET International Home (http://www.profibus.com)

Security information

See Security information (Page 10).

2.2.3 Data transfer

Options for data transfer

The following figure shows an overview of the communication functions supported by SIMOCODE, which are described in the following sections:

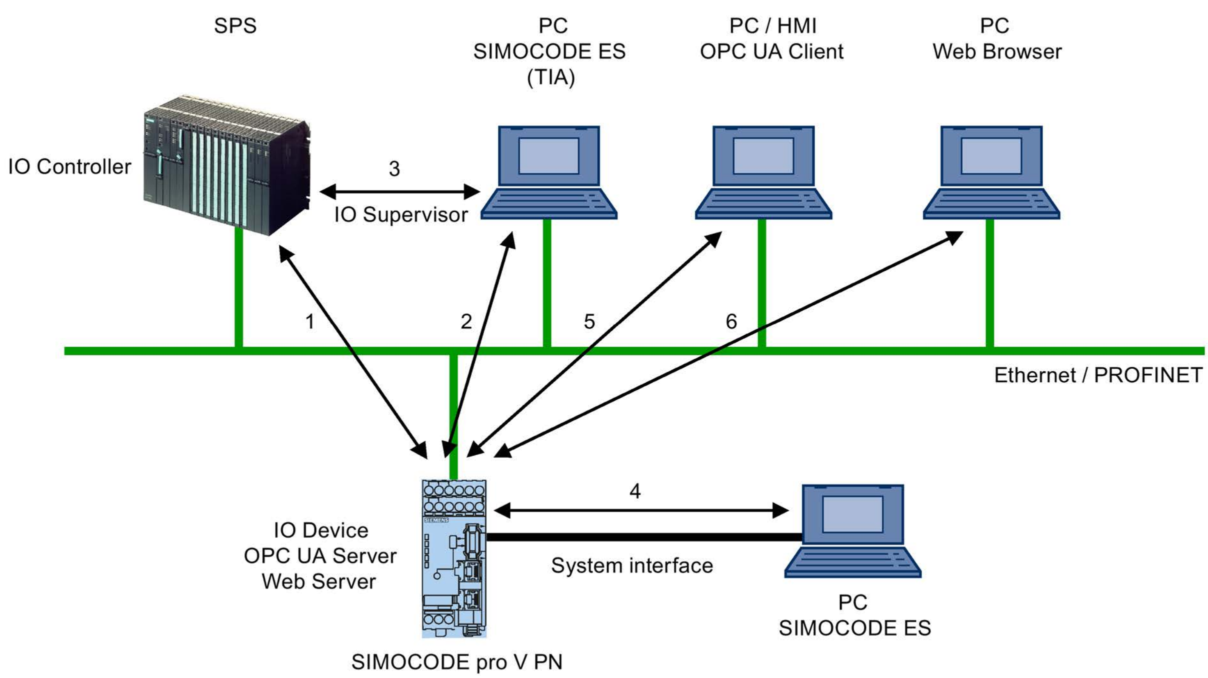


Figure 2-10 Communication functions using the example of SIMOCODE pro V PN

1 Communication between PLC (IO controller) and SIMOCODE pro (IO device) via PROFINET / Ethernet

2 Communication between PC with parameterization software SIMOCODE ES and SIMOCODE pro via PROFINET

3 Communication between PC with parameterization software SIMOCODE ES Premium and SIMOCODE pro via SIMATIC S7 (SIMOCODE pro integrated into SIMOCODE ES (TIA-Portal))

4 Communication between PC parameterization software SIMOCODE and SIMOCODE pro via the SIMOCODE pro system interface (point-to-point via RS 232 or USB)

5 Communication between PC or HMI with OPC UA Client and SIMOCODE pro via Ethernet/OPC UA

6 Communication between PC with a web browser and SIMOCODE pro via TCP/IP and HTTP

2.2.4 Communication via PROFINET IO

SIMOCODE pro V PN provides communication functions via PROFINET IO with the following properties:

- Integrated switch with 2 ports

With the integrated 2-port switch, it is possible to build PROFINET bus and ring topologies without additional switches.

The integrated 2-port switch supports functions for port diagnostics if this functions are used by the automation system.

- Device replacement without removable medium/programming device

This is a function that permits replacement of a device (e.g. in case of a device defect) by a new device with factory settings without the help of PCs or programming devices without a memory module.

- Shared device

Shared device is the function with which an IO device is used simultaneously by two or more IO controllers.

This function can be used in conjunction with the fail-safe DM-F PROFIsafe digital module. An automation system communicates with SIMOCODE pro via PROFINET IO and performs the standard control tasks while a second fail-safe automation system via PROFINET IO can be used for safety-related tripping using the PROFIsafe profile.

Use of this function depends on whether the automation system supports the function. It is configured using the configuration tool of the automation system,
e.g. with STEP 7 HW Config.

- Media redundancy

SIMOCODE pro V PN supports media redundancy according to the Media Redundancy Protocol (MRP). This function is configured using the configuration tool of the automation system, e.g., HW Config with STEP 7.

- System redundancy

Product version *E05* and higher of SIMOCODE pro V PN supports a redundant-system connection with two S7-400H CPUs. This provides for a communication link (Application Relation) between each IO device and each of the two H CPUs. The communication link can be set up by means of a freely selectable topological connection.

This function is configured using the configuration tool of the automation system,
e.g., HW Config with STEP 7.

- RT communication

As a motor management system, SIMOCODE pro V PN does not have any time-critical communication functions itself but it does support PROFINET hardware RT used. The integrated 2-port switch can therefore be used to forward RT data.

- Support for PROFIenergy

PROFIenergy, a protocol defined by the PROFINET User Organization, lays the foundations for a vendor-neutral, universal system for flexible, short-term, and intelligent shutdown of individual loads or whole production units.

SIMOCODE pro V PN supports the functions defined in the protocol in the form of a switchgear with switching and measuring functions

You will find more information in the system manual "SIMATIC PROFINET System Description" (see System manual SIMATIC PROFINET System Description (https://support.industry.siemens.com/cs/ww/en/view/19292127)).

2.2.5 Integration of SIMOCODE pro into the automation system (PLC)

I/O configurations

SIMOCODE pro V PN supports a number of I/O configurations which define the structure and length of the I/O data that are cyclically transferred between the IO controller (PLC) and the IO device (SIMOCODE pro). In the case of SIMOCODE pro, these configurations are termed **Basic types**.

Cyclic data to SIMOCODE pro V (PN)

The following basic types are available:

- Basic type 1, 4 bytes:

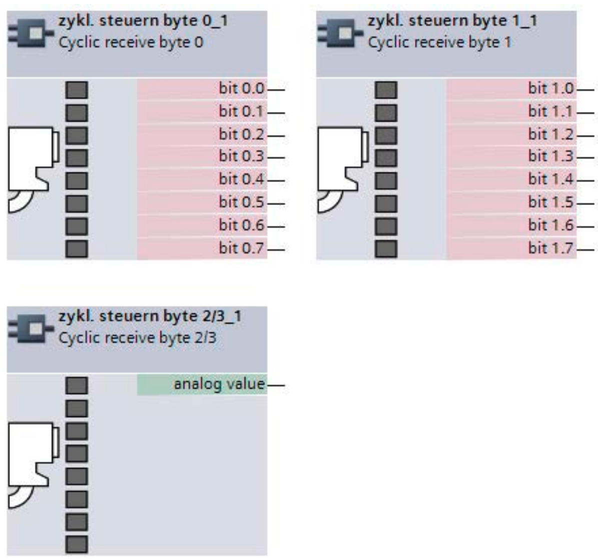


Figure 2-11 Cyclic data to SIMOCODE pro, basic type 1, 4 bytes

- Basic type 2, 2 bytes:

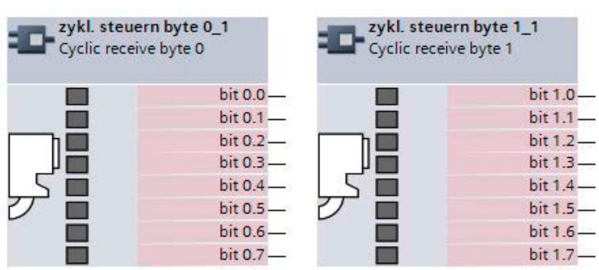


Figure 2-12 Cyclic data to SIMOCODE pro, basic type 2, 2 bytes

- Basic type 3, 6 bytes

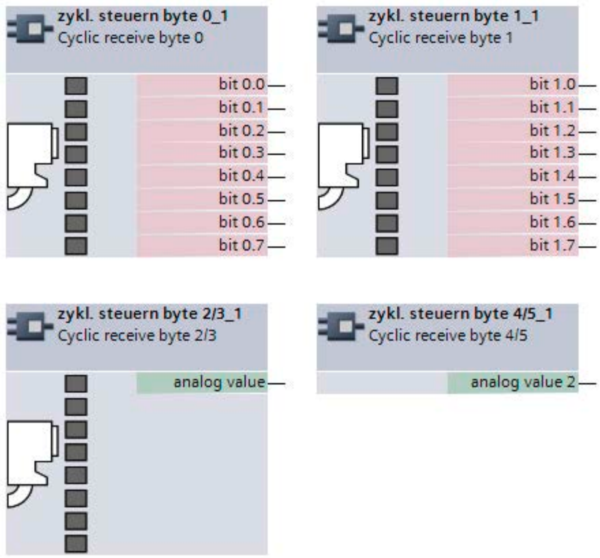


Figure 2-13 Cyclic data to SIMOCODE pro, basic type 3, 6 bytes

- PROFIsafe, 1 F-DO

Permanently assigned to the fail-safe relay enable circuits of the DM-F PROFIsafe, length 5 bytes.

Cyclic data from SIMOCODE pro V (PN)

- Basic type 1, 10 bytes

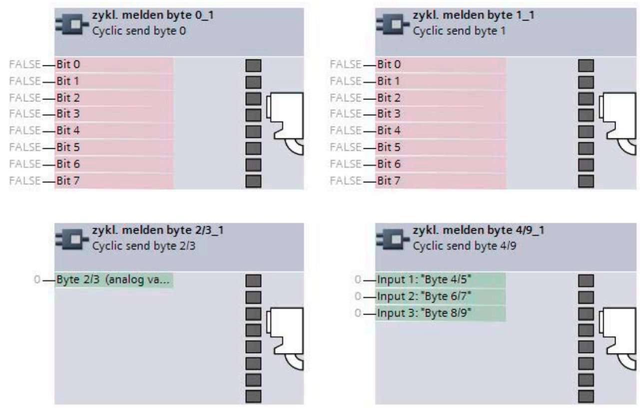


Figure 2-14 Cyclic data from SIMOCODE pro, basic type 1, 10 bytes

- Basic type 2, 4 bytes

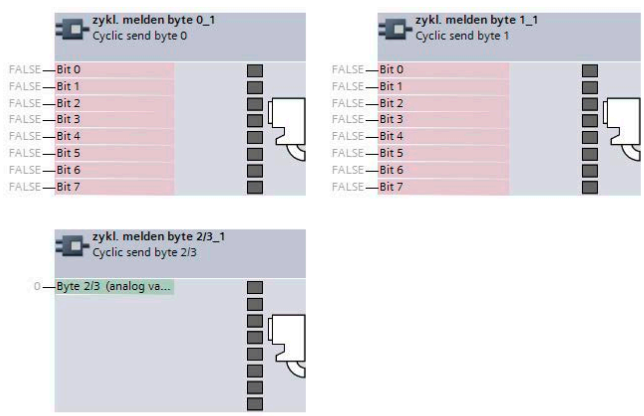


Figure 2-15 Cyclic data from SIMOCODE pro, basic type 2, 4 bytes

- Basic type 3, 20 bytes

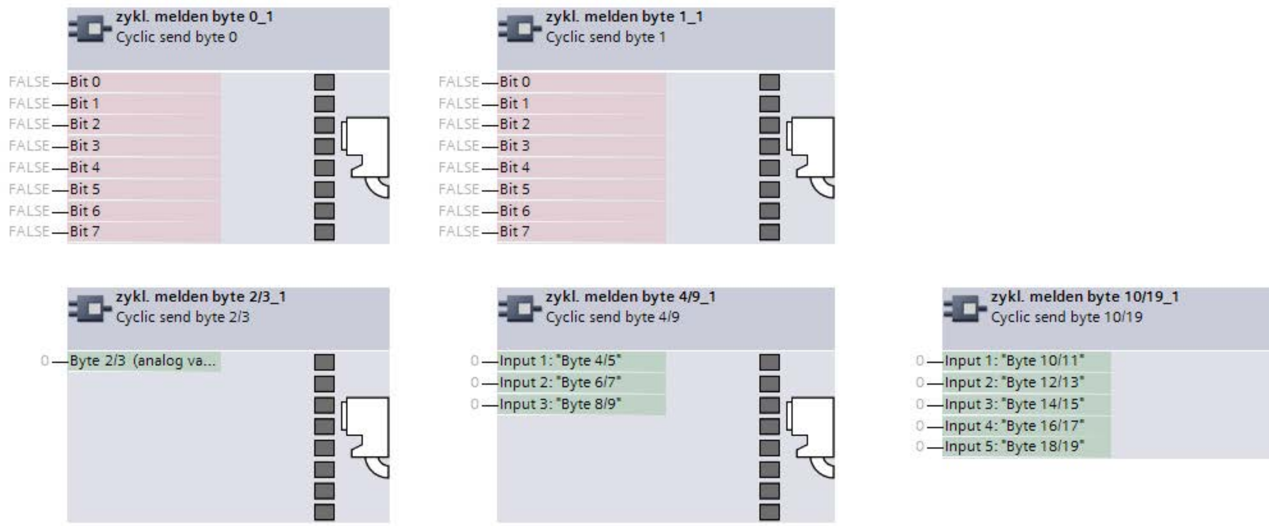


Figure 2-16 Cyclic data from SIMOCODE pro, basic type 3, 20 bytes

- PROFIsafe

No useful data, length 4 bytes.

2.2.6 Integration of SIMOCODE pro V PN via GSD

Using the GSD, integration into the PROFINET-IO system and device diagnostics are possible. For parameterization of the device function of SIMOCODE pro, use the SIMOCODE ES software.

Integrate the GSD for SIMOCODE pro V PN into the configuration tool of your automation system (e.g. STEP 7 HW Config). The GSD is available for downloading at the following link: PROFINET GSD (https://www.siemens.com/profinet-gsd)

After installation of the GSD, you will find SIMOCODE pro V PN in the hardware catalog of STEP7 V5 under "Hardware Catalog → Additional Field Devices → PROFINET IO → Switching Devices → Siemens AG → Motor Management System." Insert the SIMOCODE pro V (PN) into the PROFINET IO system.

After insertion of SIMOCODE pro V (PN), configure one of the three possible basic types in Slot 1 of the IO device inserted in this way (see figures about "Cyclic data to SIMOCODE pro" and "Cyclic data of SIMOCODE pro").

If SIMOCODE pro V PN is used in conjunction with the fail-safe DM-F PROFIsafe digital module, additionally configure the I/O configuration for PROFIsafe in Slot 2.

2.2.7 Integration of SIMOCODE pro V PN in SIMATIC STEP 7 V5 via OM SIMOCODE pro

Integration of SIMOCODE pro V PN in SIMATIC STEP 7 V5 via OM SIMOCODE pro

In addition to integration via GSD, with SIMATIC S7 controllers from Siemens it is possible to integrate SIMOCODE pro V PN in STEP 7 V5 using the "Object Manager (OM) SIMOCODE pro V PN" software in STEP 7 as part of Totally Integrated Automation (TIA).

The advantage is that the SIMOCODE ES parameterization software can be called directly from STEP 7 HW Config and can be used for developing SIMOCODE pro V PN device parameters.

The SIMOCODE pro device parameters are stored in the STEP 7 project. After transmission of the hardware configuration, the device parameters are available in the form of start-up parameter data records in the CPU and are automatically transmitted during start-up.

The necessary OM SIMOCODE pro V PN software is part of SIMOCODE ES. During installation of SIMOCODE ES, select the "Integration in STEP 7" installation option to use the described function.

When the hardware is being configured, SIMOCODE pro V PN is integrated by selecting SIMOCODE pro in the hardware catalog from STEP 7 HW Config under "PROFINET IO → Switching Devices → Motor Management System".

Insert the SIMOCODE pro V PN into the PROFINET IO system.

Select one of the three possible basic types (see Integration of SIMOCODE pro into the automation system (PLC) (Page 48), figures "Cyclic data to SIMOCODE pro" and "Cyclic data from SIMOCODE pro").

Note

Changing the slot

It is only possible to change the slot by selecting another SIMOCODE type!

When using SIMOCODE pro V PN in conjunction with the fail-safe DM-F PROFIsafe digital module, select the relevant configuration with PROFIsafe.

Module replacement without exchangeable medium/PC

Note

Precondition for module replacement without exchangeable medium/PC

The use of this function depends whether the IO controller and the neighboring IO devices support this function.

Assuming SIMOCODE pro in STEP 7 V5 has been integrated and parameterized using OM SIMOCODE pro, the IO controller can automatically restore the device name, the IP configuration, and then the complete device parameterization performed with SIMOCODE ES of the replaced device.

Note

Do not use a memory module or initialization module!

To use this function, you do not have to and indeed must not use of a memory module or an initialization module!

For further information, see Chapter "Restoring factory settings" in SIMOCODE pro – System Manual (https://support.industry.siemens.com/cs/ww/en/view/109743957).

2.2.8 Configuring SIMOCODE pro V PN ports

Configuring the ports

SIMOCODE pro V PN has two RJ45 ports labeled 1 and 2 on the front. In the configuration tool of the automation system (e.g. STEP 7 HW Config), the settings for topology, diagnostics and other options of the two ports X1P1 and X1P2 are defined.

2.2.9 Configuration of further properties of SIMOCODE pro V PN as an IO device

Device name and IP parameters

The precondition for PROFINET IO communications is setting and configuring the IO device name and IP parameters.

The device name and the IP parameters can be assigned in different ways:

- Assigning device names using the configuration tool of the automation system
- Configure device names with SIMOCODE ES parameterization software and download to the device.

Assigning device names using the configuration tool of the automation system

The device name is assigned during the commissioning phase by the configuration tool of the automation system (e.g. STEP 7) or with the SIMOCODE ES configuration software and transmitted into the IO device via Ethernet. For transmission, the basic unit must be connected and accessible via the Ethernet interface. Using the MAC address (e.g. 00-0E-8C-BD-1F-27) printed on the front of the basic unit, the device can be accessible via LAN. In this case, the "Overwrite device name in device" parameter set with the SIMOCODE ES parameterization software under "PROFINET Parameters → Station" must not be active.

1. Device is given a technological name as part of configuration by the user (device name here: Motor-1). STEP 7 automatically assigns an IP parameter
2. The user assigns the device name to an IO device based on the MAC address and transfers this in the Online & Diagnostic functions of SIMOCODE ES (TIA Portal)
3. The user loads the configuration into the IO controller
4. IO controller assigns the IP parameters during start-up based on the device name

Configuring device names with SIMOCODE ES parameterization software and downloading to the device

In this case, the device name must be configured under "PROFINET Parameters → Station" and the "Overwrite device name in device" parameter must be active.

Note

Transferring the device parameters

It is always possible to transfer the device parameters via the system interface.

If the PROFINET IO device name has already been configured in a different way, the device parameters can be transferred via PROFINET, too.

Note

Assignment of the device name

The device name can be assigned with the "SIMOCODE ES" parameterization software in the Online & Diagnostic Functions. This function is not identical with parameterization with the "PROFINET parameter" dialog box. Unlike in this dialog box, under "PROFINET Parameters → Station," the "Overwrite device name in device" parameter must **not** be active.

Note

Changing the device name

Every change to the device name with SIMOCODE ES in the "PROFINET Parameters" dialog box requires a restart of the communication interface. A new start interrupts all Ethernet and PROFINET links and reestablishes them afterward.

---

1. Device is given a technological name (device name here: Motor-1)
2. Configuration is loaded into the IO controller
3. Configuration of device names and IP parameters with SIMOCODE ES:
   a) Device name "Motor-1" is configured with SIMOCODE ES and is transferred into the device via the system interface / PROFINET
   b) Device name and IP parameter are configured with SIMOCODE ES and are transferred into the device via the system interface / PROFINET

Transferring IP parameters

The IP parameters, consisting of IP address, subnet mask, and router can also be assigned in various ways and transferred to the IO Device.

Possibilities for this are:

- The IO Controller assigns the IP parameters to the IO Device. In this case, the "Overwrite IP parameters in device" parameter set with the SIMOCODE ES parameterization software under "PROFINET Parameters → IP Parameters" must **not** be active.

> **Note**
>
> **Deleting IP parameters**
>
> IP parameters assigned by the IO controller are stored non-retentively in the device, i.e. they are deleted again when the supply voltage is switched off.

- The IP parameters are configured with SIMOCODE ES parameterization software and transferred to the device. In this case, the "Overwrite IP parameters in device" parameter under "PROFINET Parameters → IP Parameters" must be active.

> **Note**
>
> **Transferring the device parameters**
>
> It is always possible to transfer the device parameters via the system interface.
>
> If the PROFINET IO device name has already been configured in a different way, the device parameters can be transferred via PROFINET, too.

> **Note**
>
> **Assigning the IP parameters**
>
> The IP parameters can be assigned with the "SIMOCODE ES" parameterization software in the Online & Diagnostic Functions. This function is not identical with the parameterization of the IP parameters with the "PROFINET Parameters" dialog box. Unlike in this dialog box, under "PROFINET Parameters → IP Parameters," the "Overwrite IP parameters in device" parameter must **not** be active.

> **Note**
>
> **Restarting the communication interface**
>
> Every change to the IP parameter with SIMOCODE ES in the "PROFINET Parameters" dialog box requires a restart of the communication interface.
>
> A new start of the communication interface interrupts all Ethernet and PROFINET links and reestablishes them afterward.

2.2.10 Identification data for PROFINET IO

Brief description of the identification data

Identification data are information that is stored in the PROFINET IO device and supports the user with the following activities:

- Checking the system configuration
- Locating modified system hardware
- Troubleshooting a system.

With the identification data, SIMOCODE pro V PN can be uniquely identified online.

The identification data can be edited with the configuration tool of the automation system (e.g. STEP 7) and with SIMOCODE ES and transferred to the device or read out of the device.

In STEP 7, the identification data are displayed on the "Module status" and "Properties ..." tab cards and loaded into the modules with "Load module identification data ..." with menu item "Target System." It is possible to transfer data already in the device into the configuration with "Load module identification data into the programming device" when configuring via GSD file (see STEP 7 Online Help on this function).

You can also assign the identification data with SIMOCODE ES. You will find this under "Identification." Only I&M 1 to I&M 3 can be changed.

The following identification data records are supported:

- I&M 0: Identification (device identification); read only
- I&M 1: Tag (plant identifier, location designation)
- I&M 2: Installation Date
- I&M 3: Descriptor (comment).

2.2.11 Shared device

Shared device provision

PROFINET IO provides the shared device function. Shared device enables access by two IO controllers to one IO device. Input and output data can be flexibly assigned to different IO controllers.

This function can only be used in conjunction with the fail-safe DM-F PROFIsafe expansion module. While one controller accesses the standard I/O data via an IO controller and performs the routine control, the fail-safe program is processed in a separate, fail-safe controller that is responsible for safety-related tripping via PROFIsafe.

Shared device configuration

The I/O data is assigned to the IO controllers in the configuration tool of the automation system (e.g. STEP 7 HW Config).

Note

Shared device function

The system redundancy function is not available when the "Shared Device Function" is used.

2.2.12 Media redundancy

Media redundancy support

The media redundancy protocol manages a redundant network. The data that are exchanged between IO controller and IO device are transmitted via two different paths.

If both Ethernet ports are used, the function enables communication to be maintained even if one of the two transmission channels fails.

Settings for media redundancy

In the configuration tool of the automation system (e.g. STEP 7 HW Config), the settings for media redundancy in the properties of Slot X1 of the relevant PN-IO devices. In particular, the MRP domain is assigned and the role is defined that will be taken over in the MRP by the device. SIMOCODE pro V PN supports ring redundancy in the role as a client.

Information material for media redundancy

You will also find useful information about "Ring redundancy with the Media Redundancy Protocol (MRP)" under Ring redundancy with the Media Redundancy Protocol (MRP) (https://support.industry.siemens.com/cs/ww/en/view/109739614)

2.2.13 System redundancy

System redundancy with H CPUs

The redundant-system connection via PROFINET provides a communication link (Application Relation) between each SIMOCODE pro V PN IO device and each of the two H CPUs. The communication link can be set up by means of a freely selectable topological connection, i.e. the topology of a plant does not indicate whether or not SIMOCODE pro PN is interfaced via a redundant-system connection. In addition to operation as a redundant system, the SIMOCODE pro V PN can also be operated on H CPUs as a so-called "non-redundant IO device". In this mode, only one of the two CPUs establishes a communication link to the IO device. The disadvantage of operating an IO device as a 126non-redundant device is that it will fail in the event of failure of the CPU to which it is linked.

Note

Firmware version of the H CPU

System redundancy is supported with H CPU firmware version V6.0.3 and higher.

SIMOCODE pro V PN with system redundancy

The diagram below illustrates a configuration with two redundant-system SIMOCODE pro V PN basic units. This topology offers particular advantages. The entire system can remain in operation if a line break occurs anywhere in the configuration. One of the two SIMOCODE pro V PN communication links always remains operational. The SIMOCODE pro V PN units then function like non-redundant devices.

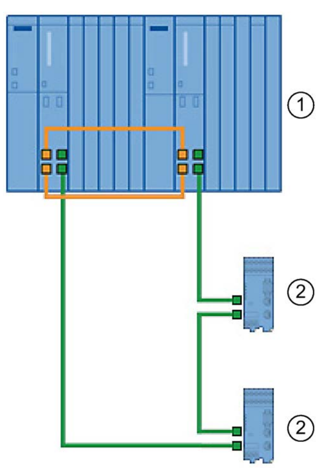


Figure 2-17 S7-400 H system with redundant I/Os

① S7-400H system

② SIMOCODE pro V PN as a redundant IO device

PN/IO with non-redundant I/Os

The following diagram illustrates an example of a topographical configuration with one switch. Two IO devices are connected as non-redundant units and the other three IO devices as redundant-system units.

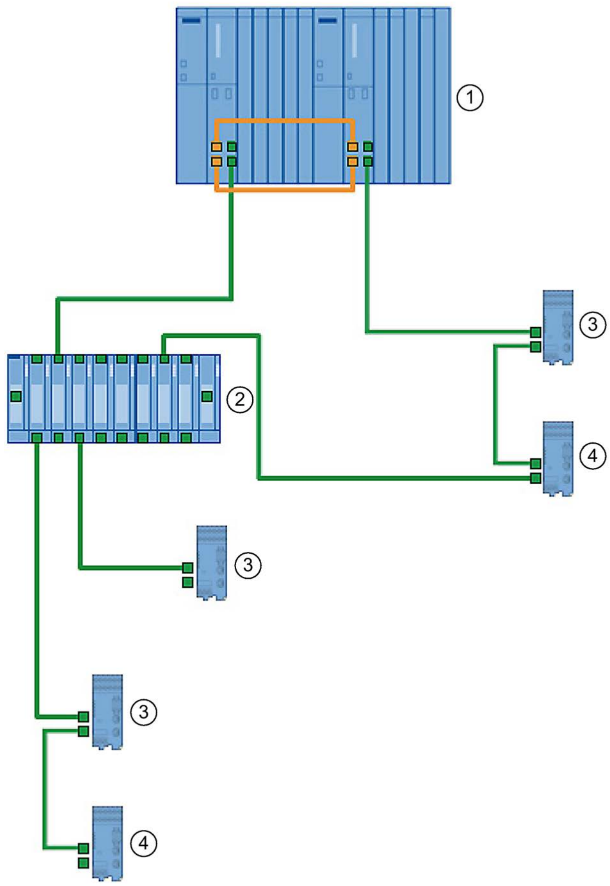


Figure 2-18 S7-400 H system with redundant and non-redundant I/Os

① S7-400H system

② SCALANCE (e.g. X400)

③ SIMOCODE pro as a redundant IO device

④ SIMOCODE pro as a non-redundant IO device

Maximum number of IO devices

You can connect a maximum number of 256 IO devices to the two integrated PN/IO interfaces. The station numbers range from 1 to 256 and must be unique at both the PN/IO interfaces, i.e. they must not be assigned to a station more than once.

Configuring system redundancy with PROFINET IO

Requirements

In the example below, you will configure a redundant-system PROFINET configuration with redundant I/Os as discussed in diagram "S7-400 H system with redundant I/Os" in the previous chapter.

The PROFIBUS elements have been excluded from this example. Please refer to manual Fault-tolerant S7-400H systems (https://support.automation.siemens.com/WW/view/en/1186523) for basic instructions on configuring H systems.

Procedure

Set up a new H station in the SIMATIC Manager and open "HW Config" for the station.

1. Insert a rack 400 (e.g. UR2-H) for redundant controllers.
2. Insert a CPU 400-H PN/DP (e.g. CPU 4174-5H PN/DP).
3. Network the Ethernet interface in the normal way and set the IP parameters.
4. Configure a power supply module and the H-Sync modules.
5. Copy the station that you have set up: To do this, select the station and then select command Edit → Copy followed by command Edit → Paste.
6. Configure SIMOCODE pro V PN as a redundant IO device by dragging the IO devices in the normal way to one of the two IO systems. The modules will be connected as redundant units (to both PROFINET lines) as standard.

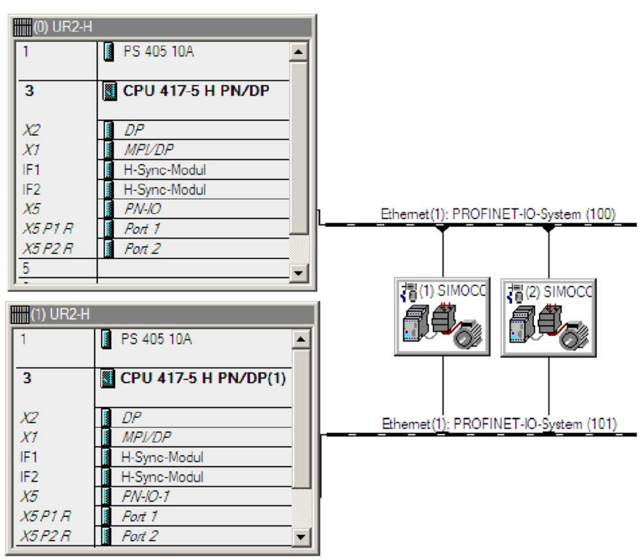


Figure 2-19 SIMOCODE pro V PN as a redundant I/O unit in HW Config

There are two methods by which you can connect SIMOCODE pro V PN as a non-redundant IO device:

- Configure a SIMOCODE pro V PN as a redundant IO device as described above and then navigate to the tab card labeled "Redundancy" in the module properties dialog. By activating the checkbox, you can assign the IO device to a single IO system and thus to a single CPU.

Figure 2-20 "Redundancy" tab card in module properties screen

Configure the SIMOCODE pro V PN specifically as a non-redundant IO at the relevant IO system.

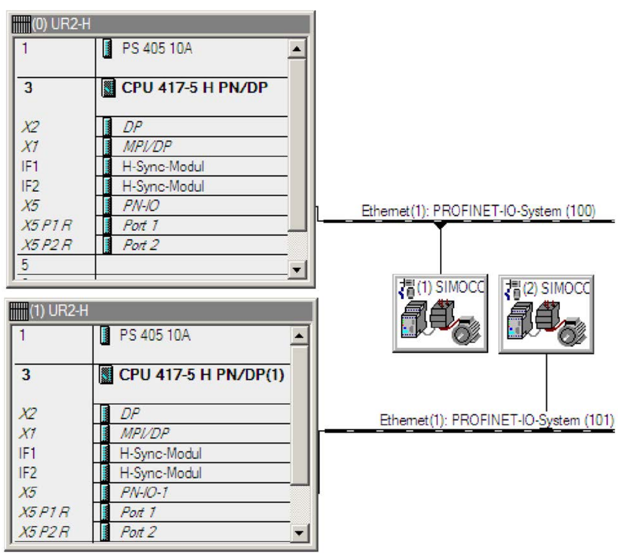


Figure 2-21 SIMOCODE pro V PN connected as a non-redundant device

Note

H systems and separate subnets

IO devices are connected as redundant units only if the two PROFINET I/O systems of the H system are in the same subnet. As an alternative, each CPU can be networked with a different subnet. In this case, the IO devices will always be connected as non-redundant units.

Note

Shared device function

The system redundancy function is not available when the "Shared Device Function" is used.

Note

Product version of SIMOCODE pro V PN basic unit

System redundancy is supported by product version *E05* and higher of SIMOCODE pro V PN with firmware version V1.2.

Possible topologies

You can also combine PROFINET-based system redundancy with other PROFINET functions.

System redundancy with media redundancy:

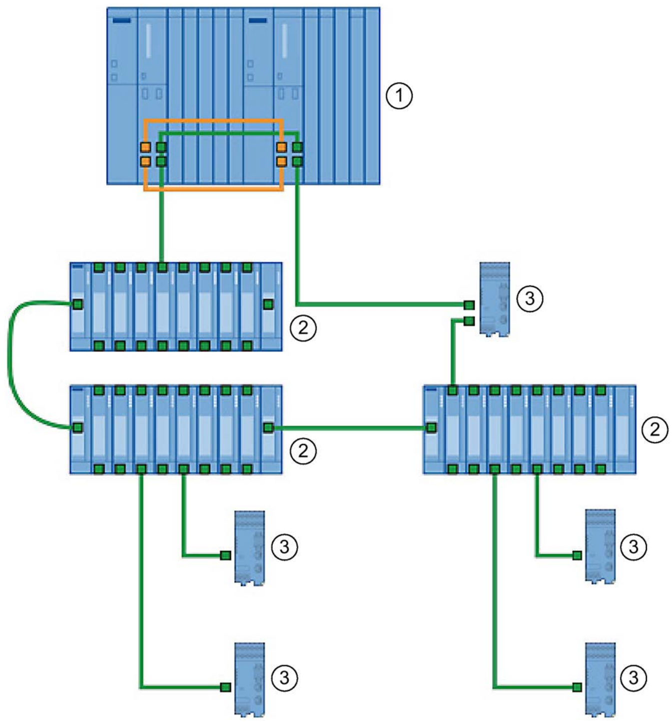


Figure 2-22 Sample configuration for system redundancy with MRP

① S7-400H system

② SCALANCE X400 (non-redundant IO device)

③ SIMOCODE pro V PN (non-redundant/redundant-system IO device)

④ SIMOCODE pro V PN (MRP, non-redundant/redundant-system IO device)

Note

Response monitoring time of IO devices

RT communication is interrupted (station failure) if the reconfiguration time setting of the ring is higher than the response monitoring time setting of the IO devices.

For this reason, make sure that the response monitoring time of the IO devices is set to a high enough value. This also applies to IO devices configured with MRP outside the ring.

2.2.14 Diagnostics

Diagnosis - Overview

When an error occurs, the defective IO device generates a diagnostics alarm and sends it to the IO controller. To respond to errors with a defined (programmed) response, this alarm calls a corresponding part in the user program (e.g. in the case of SIMATIC S7: organization block OB 82 for the diagnostics alarm).

SIMOCODE pro V PN provides the diagnostics as channel diagnostics data records. Channel diagnostics data records are generated as an alarm for

- Selected messages (see Chapter Data record 92 - Device diagnostics (Page 238), PNIO diagnostics column, marked with "1")
- Warnings
- Faults
- Device faults.

Diagnostic status

The channel diagnostics is transmitted with different diagnostics states:

- Maintenance required:
- Maintenance demand (maintenance requested):

All SIMOCODE pro monitoring functions with "warn" configured as their response are transmitted with this diagnostics status.

- Failure:

All SIMOCODE pro monitoring functions with "trip" configured as their response are transmitted with this diagnostics status.

Configuring the diagnostics response

The diagnostics response is configured with the SIMOCODE ES configuration software. The global enable of the diagnostics can be set for the following events under "PROFINET Parameters → Diagnostics":

Diagnostics for process events

Selected diagnostics events are transmitted with the "maintenance required" diagnostics status.

See also Chapter Data record 92 - Device diagnostics (Page 238), diagnostics events marked "1" in the "PNIO diagnostics" column.

Diagnostics for process warnings

All SIMOCODE pro monitoring functions in which the response has been configured with "warn" are transmitted with the "maintenance demand" diagnostics status.

Diagnostics for process faults

All SIMOCODE pro monitoring functions with "trip" configured as their response are transmitted with the "fault" diagnostics status.

Diagnostics for device faults

Diagnostics events that can occur in connection with defective hardware or incorrect parameterization are also transmitted with the "fault" diagnostics status.

The response of the different monitoring functions can be configured individually. Depending on the function, the following can be selected by configuration:

- Deactivated: There is no response. No diagnostics are produced.
- Signaling: The diagnostics event is entered in data record 92 and is displayed in the "Faults/Warnings/Events" online dialog box of SIMOCODE ES. No diagnostics alarm is triggered.
- Warning: A diagnostics alarm is generated with the "maintenance demand" diagnostics status.
- Tripping: A diagnostics alarm is generated with the "fault" diagnostics status.

Evaluating diagnostics with SIMATIC S7 300/400 and STEP 7 V5

Diagnostics with STEP 7 HW Config

In the online display of STEP 7 HW Config, after selection of the corresponding module (in this case: SIMOCODE pro V PN), the status of the module is determined with the "module status" function.

The following statuses are represented in the overview:

Table 2- 12 Module statuses in diagnostics with STEP 7 HW Config

Symbol representation in HW Config Online	Status in HW Config Online	Possible cause with SIMOCODE
	Module does not exist	SIMOCODE shut down or not accessible on the bus
	Module defective	Fault is pending
	Maintenance required	Warning is pending
	Maintenance required	Event it pending
OK	OK	None

The detailed diagnostics is displayed as follows on the "IO device diagnostics" tab card under "Channel-specific diagnostics":

Table 2- 13 Detailed diagnostics with STEP 7 HW Config

Slot	Channel No.	Error
1: I/O module	0	Error text, e.g. "Execution of ON command"

Diagnostics in the STEP 7 user program

With PROFINET IO, you can perform diagnostics in the user program via system function modules.

Possibilities of diagnostics evaluation in the S7 user program:

PROFINET IO uses a non-manufacturer-specific structure for data records with diagnostics information. Diagnostics information are only formed for defective components. Two ways in which you can evaluate the diagnostics of SIMOCODE pro V PN via PROFINET are shown below.

You will find more information and detailed examples in the programming manual "PROFINET IO - from PROFIBUS DP to PROFINET IO" (https://support.automation.siemens.com/WW/view/en/19289930), Chapter 8 "Diagnostics in the STEP 7 User Program."

Evaluating diagnostics alarms with SFB 54 "RALRM" in OB 82

SIMOCODE pro V PN as a diagnostics-capable IO device detects both internal faults (e.g. of hardware components) and events relating to the motor feeder and generates a diagnostics alarm to which you can respond using an alarm OB.

Initial information on the cause and class of the error is already available, based on the OB number and start information for the fault event.

You can then obtain detailed information on the error event in this error OB with the SFB 54 "RALRM" (read supplementary alarm information).

Note

STEP 7 online help

You will find a detailed explanation of SFB 54 "RALRM" in the STEP 7 Online Help.

Alarm processing

On process warnings, process faults, and device faults, SIMOCODE pro V PN makes diagnostic interrupt requests to the CPU (on both the raised and the cleared event). The precondition is that the diagnostics response has been enabled for these events in the device parameterization (see Section "Configuring the diagnostics response" above).

The operating system calls the OB 82 based on the diagnostics request. The local variables of OB 82 contain the logical base address and four bytes of diagnostics data about the SIMOCODE pro V PN device in question.

If you have not programmed OB 82, the CPU will switch to the "STOP" status.

Reading diagnostics data records with SFB 52 "RDREC" in OB 1

With SFB 52 "RDREC," you read the data record with number INDEX from the SIMOCODE pro V PN IO Device addressed by means of ID. ID contains the logical address with which SIMOCODE pro V PN was configured in STEP 7 HW Config.

Example:

If you want to obtain diagnostic information with the 0xE00A diagnostics data record for the pending faults from SIMOCODE pro V PN at the device level, INDEX = W#16#E00A.

With the MLEN variable, you specify the maximum number of bytes to be read. For this reason, you select the target area RECORD to be at least the same size as MLEN.

The "true" value of the VALID output parameter indicates that the data record has been successfully transferred to the target area RECORD. In this case, the output parameter LEN has the length of the read data in bytes.

If an error occurs during data record transmission, this will be displayed in the "ERROR" output parameter. In case of an error, "ERROR = true" is set and the error data will be contained in the "STATUS" output parameter.

Note

STEP 7 online help

You will find a detailed explanation of SFB 52 "RDREC" in the STEP 7 Online Help.

Note

Complete diagnostics information from SIMOCODE pro V PN

Note that reading the diagnostics data records 0xCXXX only ever provides the pending diagnostics.

You can evaluate the complete diagnostics information of SIMOCODE pro V PN by reading data record 92 (0x005C).

You will find more information and detailed examples in Chapter 8 of the programming manual "PROFINET IO - from PROFIBUS DP to PROFINET IO" (https://support.automation.siemens.com/WW/view/en/19289930).

Addressing levels

PROFINET IO defines different addressing levels via which diagnostics information of the IO devices can be accessed. You will find more information in Chapter 5 of the programming manual "PROFINET IO - from PROFIBUS DP to PROFINET IO" (https://support.automation.siemens.com/WW/view/en/19289930).

Diagnostics information from SIMOCODE pro V PN is evaluated at the addressing level for the slot.

Overview of the diagnostics data records

Table 2- 14 Diagnostics data records at slot level

Diagnostics data record No.	Diagnostic status
0xC010	Maintenance required
0xC011	Maintenance demand
0xC00A	Fault
0xC00C	All (maintenance required, maintenance demand, fault)

Example:

- Reading the diagnostics data record 0xC00C provides all pending diagnostics information (maintenance required, maintenance demand, fault).
- Reading the diagnostics data record 0xC011 provides all pending diagnostics information with the "maintenance demand" diagnostics status at slot level.

Structure of the diagnostics data records

Data blocks, diagnostics data records

In the following description, the main structure of the diagnostics data records at slot level (0xC010, 0xC011, 0xC00A) is described with the individual data blocks:

Table 2- 15 Data blocks, diagnostics data records

BlockType	2 bytes
BlockLength	2 bytes
BlockVersion	2 bytes
API (Application Process Identifier)	4 bytes
SlotNumber	2 bytes
SubslotNumber	2 bytes
ChannelNumber	2 bytes
ChannelProperties	2 bytes
USI (User Structure Identifier)	2 bytes
Number of repeats = number of entries	
ChannelNumber	2 bytes
ChannelProperties	2 bytes
ChannelErrorType	2 bytes

Data block "BlockType"

Table 2- 16 Data block "BlockType"

BlockType	Meaning
0x0010	Diagnostics data record
0x0001	Alarm transport channel 1
0x0002	Alarm transport channel 2

Data block "BlockLength"

In the "BlockLength" data field, the number of the following bytes of the diagnostics data record is coded. This is the length of the diagnostics data record without the number of bytes for the data fields "BlockType" and "BlockLength," which each have a length of 2 bytes.

Data block "BlockVersion"

Table 2- 17 Data block "BlockVersion"

BlockVersion	Value	Meaning
BlockVersionHigh	0x01	First value of the version number, 0x01
BlockVersionLow	0x01	Version number, always 0x01 in the case of SIMOCODE pro

Data block "API"

API (Application Process Identifier): SIMOCODE pro uses the standard API 0.

Data blocks "SlotNumber," "SubslotNumber"

As a compact PROFINET IO Device, SIMOCODE pro V PN has the following structure:

Table 2- 18 Data blocks "SlotNumber," "SubslotNumber"

Designation	SlotNumber	SubslotNumber
Head module - Interface - Port 1 - Port 2	0x0000	0x0001 0x8000 0x8001 0x8002
I/O module	0x0001	0x0001
PROFIsafe [1)]	0x0002	0x0001

1) Only in conjunction with fail-safe DM-F PROFIsafe expansion module

Data block "ChannelNumber"

Table 2- 19 ChannelNumber

ChannelNumber	Meaning
0x0000 - 0x7FFF	Manufacturer-specific
0x8000	Submodule

Data block "ChannelProperties"

Table 2- 20 ChannelProperties

<table>
<tr><td>15</td><td>14</td><td>13</td><td>12</td><td>11</td><td>10</td><td>9</td><td>8</td><td>7</td><td>6</td><td>5</td><td>4</td><td>3</td><td>2</td><td>1</td><td>0</td></tr>
<tr><td colspan="3" rowspan="5">.Direction</td><td colspan="2" rowspan="4">.Specifier</td><td colspan="2" rowspan="3">.Qualifier</td><td rowspan="2">.Acc.</td><td colspan="8">.Type</td></tr>
<tr><td colspan="8"></td></tr>
<tr><td colspan="9"></td></tr>
<tr><td colspan="11"></td></tr>
<tr><td colspan="13"></td></tr>
</table>

Data block "ChannelProperties.Type (Bit 0 -7)"

Table 2- 21 ChannelProperties.Type (Bit 0 - 7)

Value	Meaning
0	If ChannelNumber has the value 0x8000
1	1 bit
2	2 bits
3	4 bits
4	8 bits
5	16 bits
6	32 bits
7	64 bits

Data block "ChannelProperties.Accumulative (bit 8)"

Table 2- 22 ChannelProperties.Accumulative (bit 8)

Value	Meaning
0	No channel error group signal
1	Channel error group signal (more than one channel affected)

Combination of ChannelProperties.Qualifier (bit 9/10) and ChannelProperties.Specifier (bit 11/12)

Maintenance Required Bit 9	Maintenance Demanded Bit 10	Specifier Bit 12/11	Meaning	Diagnostics in user programs SIMATIC S7 300 and SIMATIC S7 400
0	0	00	All lower-level diagnostics are no longer pending	Evaluation of diagnostic interrupts with SFB54 in the OB82
		01	Diagnostics active	Evaluation of diagnostic interrupts with SFB54 in the OB82 read data records with SFB52
		10	Diagnostics no longer active	Evaluation of diagnostic interrupts with SFB54 in the OB82
		11	Status signal - only possible for manufacturer-specific errors	Evaluation of diagnostic interrupts with SFB54 in the OB82
0	1	00	Reserved	-
		01	Maintenance required is active	Evaluation of diagnostic interrupts with SFB54 in the OB82 read data records with SFB52
		10	Maintenance required no longer active	Evaluation of diagnostic interrupts with SFB54 in the OB82
		11	Maintenance required no longer active - all others still active	

Combination of ChannelProperties.Qualifier (bit 9/10) and ChannelProperties.Specifier (bit 11/12) (continued)

Maintenance Required Bit 9	Maintenance Demanded Bit 10	Specifier Bit 12/11	Meaning	Diagnostics in user programs SIMATIC S7 300 and SIMATIC S7 400
1	0	00	Reserved	-
		01	Maintenance demand is active	Evaluation of diagnostic interrupts with SFB54 in the OB82 read data records with SFB52
		10	Maintenance demand no longer active	Evaluation of diagnostic interrupts with SFB54 in the OB82
		11	Maintenance demand no longer active - all others still active	
1	1	00	Reserved	-
		01	Graded diagnostics is active	Evaluation of diagnostic interrupts with SFB54 in the OB82 read data records with SFB52
		10	Graded diagnostics no longer active	Evaluation of diagnostic interrupts with SFB54 in the OB82
		11	Graded diagnostics no longer active - all others still active	

Data block "ChannelProperties.Specifier (Bit 11/12)"

Table 2- 23 ChannelProperties.Specifier (bit 11/12)

Value	Meaning	Diagnostics in user programs SIMATIC S7 300 and SIMATIC S7 400
00	Reserved	-
01	Pending diagnostics	Evaluation of diagnostic interrupts with SFB54 in the OB82 read data records with SFB52
10	Cleared event and no further events	Evaluation of diagnostic interrupts with SFB54 in the OB82
11	Cleared events, but other events remain	

Data block "ChannelProperties.Direction (bits 13 - 15)"

Table 2- 24 ChannelProperties.Direction (bit 13 - 15)

Value	Meaning
000	Manufacturer-specific
001	Input
010	Output
011	Input/Output
100 - 111	Reserved

Data block "ChannelErrorType"

The ChannelErrorType does not indicate the "Fault" status. For this purpose, there is the PNIO diagnostics status for the raised alarm: Maintenance Required, Maintenance Demanded, Failure.

Table 2- 25 ChannelErrorType

ChannelErrorType	Meaning
0x0009	Error 1)
0x0010	Parameterization error 1)
Error of the PROFINET interface	
0x8000	Data transmission not possible
0x8001	Incorrect neighborhood
0x8002	Loss of redundancy
0x8003	Loss of synchronization (bus end)
0x8004	Loss of clock synchronization (device end)
0x8005	Slave-to-slave traffic connection error
0x8008	Error in network component
0x8009	Timebase error
Device diagnostics	
0x1000	Execution ON command
0x1001	Execution stop command
0x1002	Feedback (FB) ON
0x1003	Feedback (FB) OFF
0x1004	Stalled positioner
0x1005	Double 0
0x1006	Double 1
0x1007	End position
0x1008	Antivalence
0x100A	Cold start (TPF)
0x100B	Power failure (UVO)
0x100C	Operational protection OFF (OPO)
0x1021	Unbalance
0x1022	Overload
0x1023	Overload + Loss of phase
0x1024	Thermistor overload
0x1025	Thermistor short circuit
0x1026	Thermistor open circuit
0x1027	Internal ground fault
0x1028	EM/EM+ External ground fault
0x1029	EM+ open circuit
0x1030	TM2 out of range
0x102A	EM+ short circuit
0x102B	TM1 trip level T>

ChannelErrorType	Meaning
0x102C	TM1 sensor error
0x102D	TM1 out of range
0x102E	TM2 trip level T>
0x102F	TM2 sensor error
0x1040	Trip level I>
0x1041	Trip level I<
0x1042	Trip level P>
0x1043	Trip level P<
0x1045	Trip level cos phi<
0x1047	Trip level U<
0x1048	AM1 trip level 0/4-20mA>
0x1049	AM1 trip level 0/4-20mA<
0x104A	AM2 trip level 0/4-20mA>
0x104B	AM2 trip level 0/4-20mA<
0x104C	Stalled rotor
0x1055	Test trip
0x1057	Number of starts>
0x105B	AM1 open circuit
0x105C	AM2 open circuit
0x105D	DM-F safety-related tripping
0x1061	DM-F wiring
0x1062	DM-F cross circuit
0x1070	External fault 1
0x1071	External fault 2
0x1072	External fault 3
0x1073	External fault 4
0x1074	External fault 5
0x1075	External fault 6

1) Further details of the cause of error can be obtained by reading data record 92 "Device diagnostics."

Data block "User Structure Identifier (USI)"

Table 2- 26 User Structure Identifier (USI)

USI	Meaning
0x0000 - 0x7FFF	Manufacturer-specific diagnostics
0x8000	Channel diagnostics
0x8002	Extended channel diagnostics
0x9000 - 0x9FFF	Profile-specific

Example of the diagnostics data records

The following example shows the content of the data record 0xC010 with the pending fault "execution of ON command":

Table 2- 27 Content of data record 0xC010 for the pending fault "execution ON command"

BlockType	0x0010: Diagnostics data record
BlockLength	0x0016: Block length 22 bytes
BlockVersion	0x0101: always 0x0101 in the case of SIMOCODE
API	0x00000000: always 0 in the case of SIMOCODE
SlotNumber	0x0001: Slot 1 - I/O address
SubslotNumber	0x0001: Sub-slot 1
ChannelNumber	0x8000: Submodule
ChannelProperties	0x0800: Pending diagnostics
USI (User Structure Identifier)	0x8000: Channel diagnostics
ChannelNumber	0x0000: always 0 in the case of SIMOCODE
ChannelProperties	0x6804: Pending diagnostics
ChannelErrorType	0x1000: Execution ON command

2.2.15 Data records

Reading and writing data records in the STEP7 user program

With SFB 52 "RDREC," you read the data record with number INDEX from the SIMOCODE pro V PN IO Device addressed by means of ID.

ID contains the logical address with which SIMOCODE pro V PN was configured in STEP 7 HW Config.

Example:

SIMOCODE pro V PN was configured in STEP 7 HW Config with basic type 2 (I address 0 / O address 0).

You want to read data record 94 - measured values.

SFB "RDREC"

INDEX:	W#16#005E	Data record 94 - measured values (0x005E)
ID:	DW#16#0	Logical address 0
LEN:	W#16#00AC	Data record length 172 bytes (0x00AC)

With SFB 53 "WRREC," you read the data record with number INDEX into the SIMOCODE pro V PN IO device addressed by means of ID.

ID contains the logical address with which SIMOCODE pro V PN was configured in STEP 7 HW Config.

Example:

SIMOCODE pro V PN was configured in STEP 7 HW Config with basic type 2 (I address 16 / O address 16).

You want to write data record 95 - service data/statistical data (data record length 148 bytes (0x0094)).

SFB "WRREC"

INDEX:	W#16#005F	Data record 95 - service data/statistical data (0x005F)
ID:	DW#16#F	Logical address 16
LEN:	W#16#0094	Data record length 148 bytes (0x0094C)

Note

STEP 7 online help

You will find a detailed explanation of SFB 52 "RDREC" in the STEP 7 Online Help.

An overview of the data records is provided in Chapter PROFINET data records (Page 231).

2.2.16 PROFIenergy

PROFIenergy - definition

PROFIenergy, a protocol defined by the PROFINET User Organization, lays the foundations for a vendor-neutral, universal system for flexible, short-term, and intelligent shutdown of individual loads or whole production units.

PROFIenergy - functions supported

With the PROFIenergy data record index 0x80A0, SIMOCODE pro V PN supports the following PROFIenergy functions of device class type 3 "Switching and measuring devices without their own energy-saving level":

Table 2- 28 PROFIenergy - functions supported

Service	Service-ID	Meaning
Start_Pause	0x01	Switching off the motor in "remote" mode
End_Pause	0x02	Possible to switch on the motor again
Query_Modes - list of modes - get mode	0x03	Energy-saving modes - Query the supported energy-saving modes - Read out the energy-saving mode
PEM_Status	0x04	Read out of the PROFIenergy status
PE_Identify	0x05	Read out of the supported PROFIenergy services
Query_Measurement - get measurement list - get measurement values	0x10	Measured values - Query the list of supported measured values - Read out the supported measured values

Start_Pause

The "Start_Pause" command result in direct shutdown of the motor and activation of the OFF command. This command only affects the control station PLC/PCS [PN] on the precondition that the commands of this control station are enabled in the relevant mode. It therefore only has an effect if the control commands of this control station are also active. The "PE command Start_Pause pending" status is output.

If the motor is already switched off, the "PE energy-saving mode active" status is output. In this status, the LED "device" flashes green on the basic unit.

Note

Command "Start_Pause"

Use of this function is not meaningful in conjunction with the "overload" control function because this does not need any control station for routine switch-off and switch-on.

Minimum pause time

A pause time is transferred with the "Start_Pause" command. SIMOCODE pro V PN executes this command if the pause time is greater than the minimum pause time configured in the device. The minimum pause time of the motor is configured with the SIMOCODE ES software under "PROFIenergy." The minimum pause time is preset to the smallest possible value 0.1 s. You can increase the minimum pause time if executing the command in longer pauses is convenient for technological reasons.

End_Pause

The "End_Pause" command results in the stop command being canceled at the PLC/PCS control station and the motor being switched on again via enabled control stations.

Note

Command "End_Pause"

The command to switch on has to be output again because subsequent automatic switch-on is not performed.

Note

Switching on the motor in the paused condition

If the PLC/PCS control station is disabled, the motor can also be switched on in the paused condition.

Query_Measurement

Depending on the use of the current measuring or the current-voltage measuring module, the following measured values are supported:

Table 2- 29 Query_Measurement

Measurement-ID	PROFIenergy identifier	SIMOCODE pro identifier	Unit
4	Voltage (a-b)	Voltage U_L12 V	V
5	Voltage (b-c)	Voltage U_L31 V	V
6	Voltage (c-a)	Voltage U_L31 V	V
7	Current (a)	Phase current I_L1 A	A
8	Current (b)	Phase current I_L2 A	A
9	Current (c)	Phase current I_L3 A	A
33	Current average (abc)	Average phase current I_L A	A
34	Active power (total)	Active power P	W
36	Apparent power (total)	Apparent power S	VA
37	Power factor (total)	Cos phi	-
200	Active energy import (total)	Energy W	Wh

Function blocks for SIMATIC S7

The application description "Saving Energy with SIMATIC S7 and ET200 S" (http://support.automation.siemens.com/WW/view/en/41986454), which also contains an example program for using PROFIenergy functions, is available on the Internet service portal of Siemens AG, Industry Automation and Drives Technologies. You can also make use of the blocks from the example to implement PROFIenergy functions in conjunction with SIMOCODE pro V PN.

In the application description in Chapter 4.2 "FB 815 PE_START_END functionality," you will find the description of the block with which the "PE_START_Pause" or "PE_END_Pause" commands can be directly transferred to an IO device.

With the FB 815 "PE_START_END" function block, you can transfer the "START_Pause" or "END_Pause" commands directly to SIMOCODE pro V PN.

For use of further functions, in Chapter 4.3 "FB 816 PE_CMD functionality" you will find a universal function block with which you can transfer further commands of the PROFIenergy profile (e.g. Query_Modes, PEM_Status, PE_Identify, Query_Measurement).

You will also find the structure of the command and response data of the FB 816 in Chapter 4.4 "Response Data" of the application description "Saving Energy with SIMATIC S7 and ET200 S."

2.2.17 Further communication functions via Ethernet

OPC basics

The OPC Foundation (an interest group of renowned manufacturers for definition of standard interfaces) has defined numerous software interfaces over the past years to standardize the flow of information from the process level to the management level. In the past, the various OPC specifications have been drawn up in line with the different requirements within an industrial application.

Based on the experience of these classic OPC interfaces, the OPC Foundation has defined a new platform with the name OPC Unified Architecture (UA). The aim of this new standard is generic description and standardized access to all information that has to be exchanged between systems and/or applications.

What is OPC?

In the past, OPC was a collection of software interfaces for data exchange between PC applications and process devices. These software interfaces were defined according to the rules of Microsoft COM (component object model) and can therefore be easily integrated on Microsoft operating systems. COM or DCOM (Distributed COM) provides the functionality of interprocess communication and organizes information exchange between applications, including across computer boundaries (DCOM).

An OPC client (COM client) can therefore exchange information with an OPC server (COM server) using mechanisms of the Microsoft operating system.

The OPC server provides process information of a device at its interface. The OPC client connect to the server and can access the data offered.

The consequence of using COM or DCOM is that the OPC server and clients can only run on a Windows PC or in the local area network and usually have to implement communication with the corresponding automation system via proprietary protocols. This practice, in particular, results in additional communication and software layers that increase the configuration effort and complexity.

To resolve the above restrictions in practice and to meet the additional requirements, the OPC Foundation has defined a new platform with the name OPC Unified Architecture, which provides a standardized basis for exchanging information between components and systems. OPC-UA will also be available as an IEC 62541 standard and will thus form the basis for other international standards.

To summarize, OPC-UA offers the following features:

- Use of open and non-platform-specific protocols for network communication.
- Internet access and communication through firewalls.
- Integrated access control and security mechanisms at the protocol and application level.

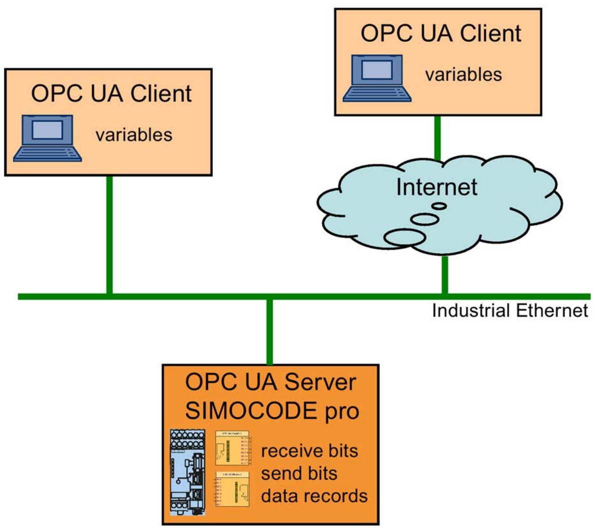


Figure 2-23 Block diagram of OPC-UA

Configuring the SIMOCODE pro V PN OPC UA server - Requirements

Activating the OPC UA server

In the default setting, the OPC UA server is **not** active. For activation, the parameter "PROFINET Parameters → OPC UA Server Activated" must be set.

Note

Restarting the communication interface

Each change to the "Activate OPC UA server" parameter requires that the communication interface be restarted.

A new start of the communication interface interrupts all Ethernet and PROFINET links and reestablishes them afterward.

Note

Firmware version of SIMOCODE pro V PN basic unit

OPC UA is supported by SIMOCOCE pro V PN from firmware version V1.2.2.

Setting the IP parameters

To enable a link to be established via OPC-UA, SIMOCODE pro V PN must have valid IP parameters.

Example of the URL of the SIMOCODE pro V PN-OPC UA server:

opc.tcp://192.168.0.2:4840, where 192.168.0.2 is the IP address of SIMOCODE pro V PN.

The IP parameters, consisting of IP address, subnet mask, and router can be configured with SIMOCODE ES and transferred to the device.

If SIMOCODE pro V PN does not obtain these parameters in another way (e.g. from the controller via PROFINET IO), the "Overwrite IP parameters in device" parameter must be activated under "PROFINET Parameters → IP Parameters."

Note

If the IP parameters are changed during an active OPC-UA connection under "Online access → Accessible nodes → Online & Diagnostics → Functions → Assign IP address", then a restart is necessary with Commissioning → Command → Restart/Cold start.

Connecting to the SIMOCODE pro OPC UA server

Introduction

An OPC UA client can access process values in the hierarchical namespace of the SIMOCODE pro V PN-OPC UA server.

To enable this, the OPC UA server and the OPC UA client authorize each other by exchanging certificates. You can additionally encrypt the data traffic.

The SIMOCODE pro V PN-OPC UA server classes every certificate of an OPC UA client as "trustworthy" by default.

Note

Configuring the connection on the client side

You can obtain information directly from the manufacturer of the software that is to access the data of the SIMOCODE pro V PN-OPC UA server via OPC UA.

Supported OPC UA services of the SIMOCODE pro V PN OPC UA server

SIMOCODE pro V PN supports the following OPC UA services:

- SecurityPolicy:
  - None
  - Basic128Rsa15
- MessageSecurityMode:
  - None
  - Sign&Encrypt.

Explanation of security settings:

The following table shows the security functions supported by the SIMOCODE pro V PN-OPC UA server, which have to be set in the connection configuration of the OPC UA client:

Table 2- 30 Security functions that have to be set in the connection configuration of the OPC UA client

Security Policy	MessageSecurityMode
None 1)	None
Basic128Rsa152	SignAndEncrypt 2)

1) Exchange of certificates is deactivated

2) The data packets are signed and encrypted with the certificates.

Note

When using the MessageSecurityMode "SignAndEncrypt", the connection timeout effective in the OPC UA Client must be set to at least 15 s.

DANGER

Unsecured connection between the client and the server possible!

Use the setting "none" for test purposes only.

During productive operation, use the following settings for secure communication between the client and server:

- Security Policy: Basic128Rsa15
- Message Security Mode: SignAndEncrypt.

Note

Requirement for certificate exchange in SIMOCODE pro V PN

The precondition for certificate exchange in SIMOCODE pro V PN is the presence of a valid time (see Section "Time-of-day synchronization by the NTP procedure" below).

Access to SIMOCODE pro V PN-OPC UA variables

The OPC-UA server integrated into SIMOCODE pro V PN provides the following structured objects in its address space to which the client can have read access and, in some case, write access. The precondition for write access is a secure connection with Security Policy "Basic128Rsa15" and Message Security Mode "SignAndEncrypt."

Table 2- 31 Access to SIMOCODE pro V PN-OPC UA variables

Tag	Designation	Read / write
Diagnostics	Device diagnostics	Read
Diagnostic events		
Diagnostic status		
Diagnostic trips		
Diagnostic warnings		
Measured values	Measured values	Read
Statistics	Display and statistical data	Read
Acyclic receive	Receive data (OPC UA Receive)	Read / write
Analog value	Analog value	
Bit 0.0 - 1.7	Digital receive data	
Acyclic send	Send data (OPC UA Send)	Read
Bit 0.0 - 1.7 1)	Digital send data	

1) The current assignment of the OPC UA send data is displayed as it was configured in SIMOCODE pro V PN.

You will find a detailed description of each variable in Chapter OPC UA variables (Page 209)

Write access is only possible via a secure connection.

Table 2- 32 Quantities and update interval

Maximum number of clients	Max. 2
Maximum number of monitored terms	160
Maximum number of subscriptions	2
Shortest update interval for subscriptions	100 ms

Configuring the OPC UA receive and send data with SIMOCODE ES

OPC UA Receive

The bit information that is to be transferred via OPC UA Receive to SIMOCODE pro is also assigned by configuring with SIMOCODE ES.

OPC-UA variables (write):

- Receive data byte 0, bits 0-7
- Receive data byte 1, bits 0-7
- Receive data byte 2/3

Data to SIMOCODE pro V PN:

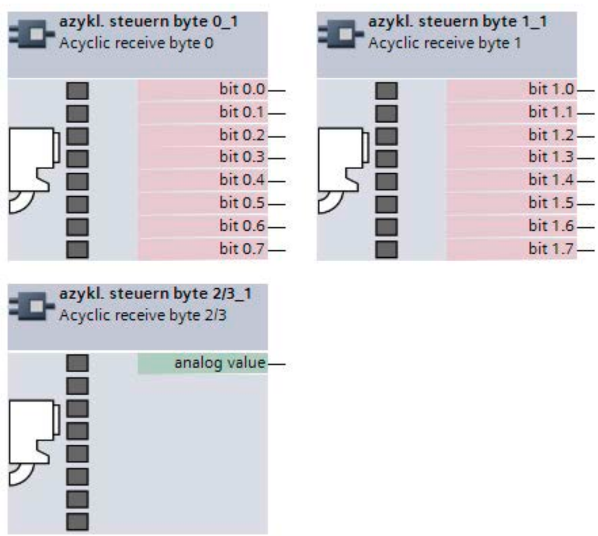


Figure 2-24 OPC UA Receive 0, 1, 2/3 function blocks

Example:

The motor is to be switched on and off via the control station "PC/OPC UA."

OPC UA - Acyclic receive - Bit 0.0 → Motor ON<

OPC UA - Acyclic receive - Bit 0.1 → Motor OFF

OPC UA - Acyclic receive - Bit 0.2 → Motor ON>

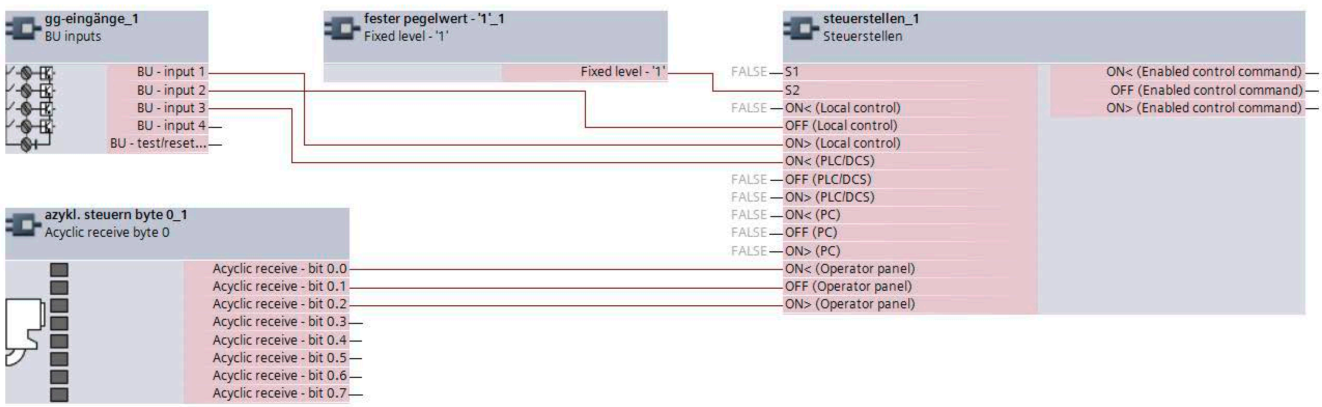


Figure 2-25 Example of OPC UA motor control

Note

Write access

Write access is only possible if a secure connection is used with Security policy "Basic128Rsa15" and with Message security mode "SignAndEncrypt."

Note

Non-maintained command mode

Do **not** use the "non-maintained command mode" for motor control with OPC UA!

Connection monitoring

The OPC UA connection is monitored over time. The monitoring time is set by the OPC UA client and is in the range of 10 s to 100 s. If the OPC UA connection is terminated, the OPC UA control variables set by this OPC client will be deleted in SIMOCODE pro only after this time has expired. In SIMOCODE pro, no fault is triggered.

If failure of the OPC UA connection of SIMOCODE pro is to be monitored, this can be done as follows:

WARNING
The drive cannot be controlled.
Can result in death, serious injury, or property damage.
If the connection is interrupted, the drive cannot be controlled while the OPC-UA connection monitoring time is active.
Take suitable safety measures to avoid personal injury or property damage.

Example:

Makes sure that Bit 0.7 is set statically at the client end. If the connection is interrupted, this will activate the "PLC/PCS" fault in "remote" mode (mode selector S1=1, S2=1).

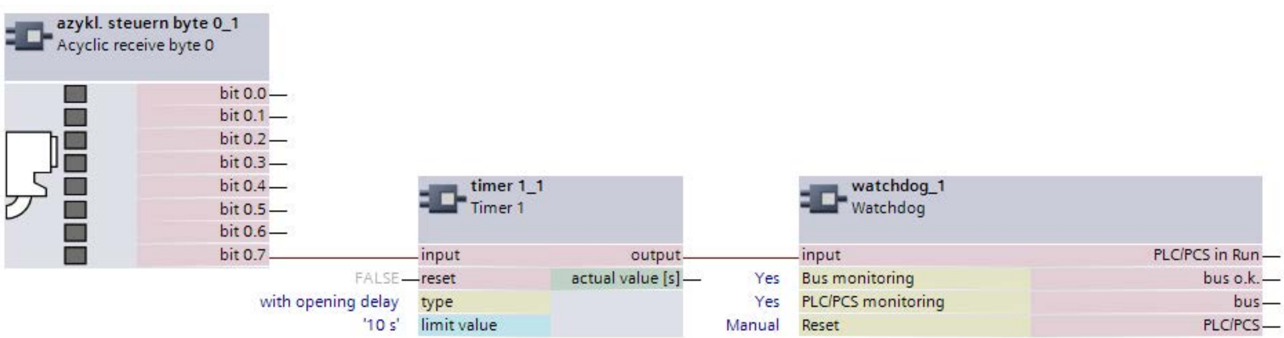


Figure 2-26 Example of connection monitoring

OPC UA send

The bit information that is to be transferred to the client via OPC UA Send is also defined by configuring with SIMOCODE ES.

OPC-UA variables (read):

- Send data byte 0, bits 0-7
- Send data byte 1, bits 0-7

Data from SIMOCODE PRO V PN:

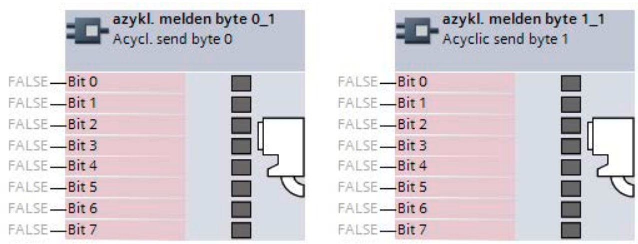


Figure 2-27 OPC UA Send 0, 1 function blocks

Example:

The feedback of the switching state of the motor is transferred to the client via OPC UA. When selecting the variables in the OPC UA client, the assigned status signals are then as follows:

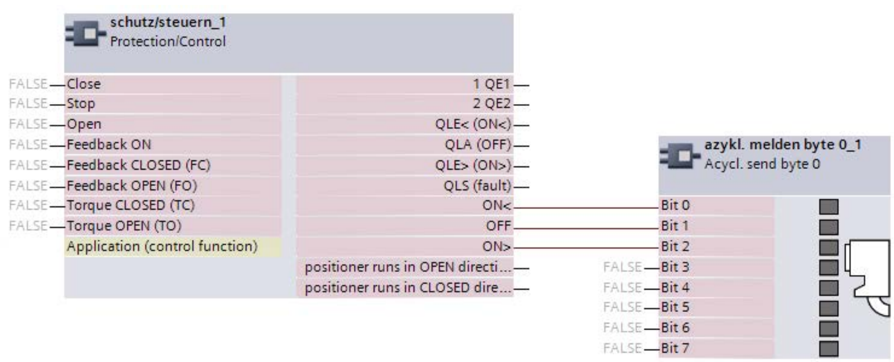


Figure 2-28 Configuration of OPC UA Send in SIMOCODE ES

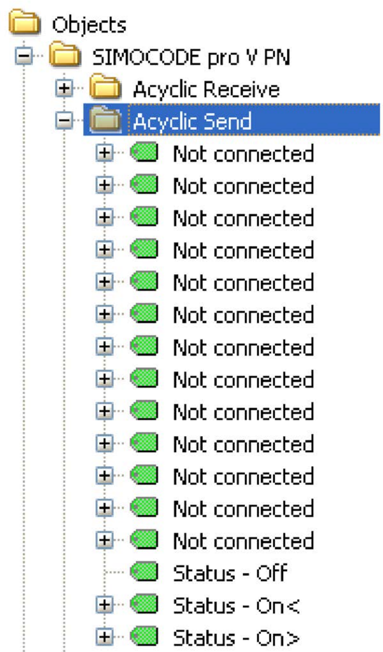


Figure 2-29 Representation in the object directory of the SIMOCODE pro V PN-OPC UA server (see also table below)

Configuration of OPC UA Send in SIMOCODE ES	Representation in the object directory of the SIMOCODE pro V PN-OPC UA server
OPC UA Send - Bit 0.0: "Status ON<"	Acyclic Send → Status - On <
OPC UA Send - Bit 0.1: "Status Off"	Acyclic Send → Status - Off
OPC UA Send - Bit 0.2: "Status ON>"	Acyclic Send → Status - On >
...	...
OPC UA Send - Bit 0.3: "Not connected"	Acyclic Send → Not connected
OPC UA Send - Bit 1.7: "Not connected"	Acyclic Send → Status - On <

Note

Restarting the communication interface

Each change to the configuration of the OPC UA send data requires that the communication interface be restarted.

A new start of the communication interface interrupts all Ethernet and PROFINET links and reestablishes them afterward.

Web diagnostics (web server)

SIMOCODE pro V PN offers you with the web diagnosis the possibility of calling the following information of the motor feeder from a PG/PC using an HTTP client:

- Status information
- Faults, warnings, events
- Measured values
- Service and statistical data
- Error buffer, error protocol.

The following functions for controlling the motor feeder is available for authorized users after log-on with user name and password:

- Receive (switching the motor on and off, not available in non-maintained command mode)
- Acknowledging faults
- Execution of the test function.

Number of web server connections: One connection is supported.

Web diagnostics are available in Chinese, Russian, English and German.

Activating the web server:

The default setting of the web server is "not active." To activate it, the "PROFINET Parameters →Web Server Activated" parameter must be active.

Note

Restarting the communication interface

Each change to the configuration of the web server requires that the communication interface be restarted.

A new start of the communication interface interrupts all Ethernet and PROFINET links and reestablishes them afterward.

Setting the IP parameters:

To enable a link to be established via the web, SIMOCODE pro V PN must have valid IP parameters. You can find out how to make these settings in Chapter Configuration of further properties of SIMOCODE pro V PN as an IO device (Page 54).

Configuration of the user name and password:

If the functions are to be used to control the motor feeder, a user must additionally be configured with the user name and password. User name and password must not contain any blanks. Configuration is performed under
"PROFINET Parameters → OPC UA server / web server"

Note

Control station PC/OPC UA

The control via the web uses the SIMOCODE pro control station PC/OPC UA [HMI], for which the configured enabled commands are then active.

Web browser

For access to the HTML pages in the SIMOCODE pro V PN, you need a web browser.

The following web browsers are suitable for communication with SIMOCODE pro etc.:

- Internet Explorer (recommended version: Version 11)
- Firefox (recommended version: Version 56)
- Google Chrome (recommended version: Version 62)
- Opera (recommended version: Version 49.0)

Note

Connection to a web client

Connection to a web client is supported.

Settings of the web browser for access to the information

Check the following settings, which are a precondition for access to the information made available via the web:

- To load the diagnostics data, Javascript must be activated in the Internet browser.
- The browser must support frames.
- Cookies must be permitted.
- The browser should be set in such a way that whenever it accesses a page, it automatically loads the current data from the server.

In the Internet Explorer, you will find these settings with menu "Tools" → "Internet Options" → "General" tab card → "Temporary Internet Files" group box → "Settings" button.

To use a firewall in your PG/PC, the following port must be enabled for use of the web diagnostics: "http Port 80/TCP" or, in the case of secure connections, "https Port 443/TCP".

Logging on to the web server

You can only use functions for controlling the motor feeder after you have logged on to the web server with user name and password. Only then are the buttons with a controlling function active.

The log-on dialog box is only available via a secure https connection.

Certificates:

To enable the web browser to access the web server via an https connection, certificates are mutually exchanged. On each change of the SIMOCODE pro V PN IP address, a unique certificate with a validity of five years is created for this purpose.

You can also install a CA certificate with a validity up to 2037 via the integrated web server as follows: Click the "Download certificate" link in the header of the home page and open or install the CA certificate.

Note

Installing the SIMOCODE pro CA certificate

You only have to install the SIMOCODE pro CA certificate once for the web client inquestion and it then applies to all SIMOCODE pro V PN devices.

If you do not install the CA certificate, the web browser will signal a certificate error when the connection is established to SIMOCODE pro V PN.

Time-of-day synchronization by the NTP procedure

SIMOCODE pro V PN has a non-battery-backed realtime clock that can be synchronized via the NTP procedure.

Network Time Protocol (NTP) is the implementation of a TCP/IP protocol for time synchronization in network. The NTP procedure uses hierarchical time synchronization, that is, an external clock (e.g. SICLOCK TM or a PC in the network) is used for synchronization.

The device transmits time-of-day queries to the configured NTP server at configured time intervals. Using the responses of the server, the time of day of the non-battery-backed clock is synchronized in SIMOCODE pro. This ensures that a synchronized time of day is available shortly after the supply voltage is switched on.

The NTP synchronization is configured with the SIMOCODE ES configuration software under "PROFINET Parameters → NTP procedure/synchronization."

The following settings are also made:

- NTP server address: Enter the NTP server address when the "Activate NTP synchronization" checkbox is selected.

  Note

  Adoption of the NTP server address

  The NTP server address is not adopted until the device has been restarted after the supply voltage has been switched off and on again.

- Cyclic update interval: Time interval in seconds at which synchronization of the time of day with the NTP server is performed
- Time shift: Time difference in minutes between UTC time (UTC = Universal Time Coordinated) and the time in the device.

Examples:

- Time shift for CET (Central European Time): +60 min
- Time shift for CST (Central Standard Time, North America): -360 min.

If an NTP server address has not been configured or a server was not found on the network, you can also set the time of day using SIMOCODE ES. To do this, proceed as follows:

Mark the relevant SIMOCODE device in the project navigation window and then select "Connect online" to establish a direct connection to the device. Expand the list of device settings by clicking on the arrow on the left of the SIMOCODE device: You can now select "Commissioning → Set time (= PC time in UTC)" to download the time of day of your PC to the SIMOCODE device.

Note

Command execution

Commands are executed immediately.

If a valid time of day is available (either synchronized by NTP or set via SIMOCODE ES), the entries in the error buffer / error protocol (i.e. log) will be additionally displayed with the time of day. In addition, the "Clock set (NTP)" and "Clock synchronized (NTP)" messages are displayed.

Note

Access using OPC UA

A valid time of day is necessary to be able to use the "Sign" and "SignAndEncrypt" OPC-UA Security Modes.

Simple Network Management Protocol (SNMP)

SNMP is a network protocol for monitoring and controlling network elements (e.g. switches).

SIMOCODE pro V PN supports the Ethernet service SNMP. MIB-2 (RFC1213) is supported. R/W objects can be changed with SNMP tools and are stored in the basic unit.

After replacement with a new basic unit from the factory or a basic unit that has undergone a general reset, the R/W objects will be in the factory settings.

2.3 Modbus communication

2.3.1 Modbus RTU communication

2.3.1.1 Modbus RTU - general

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).

2.3.1.2 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.

2.3.1.3 Assignment of SIMOCODE data to Modbus addresses with Modbus RTU

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).

2.3.1.4 Modbus RTU data transfer

Principle of Modbus RTU 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.

Data transfer options with Modbus RTU

The following figure shows the data transfer options:

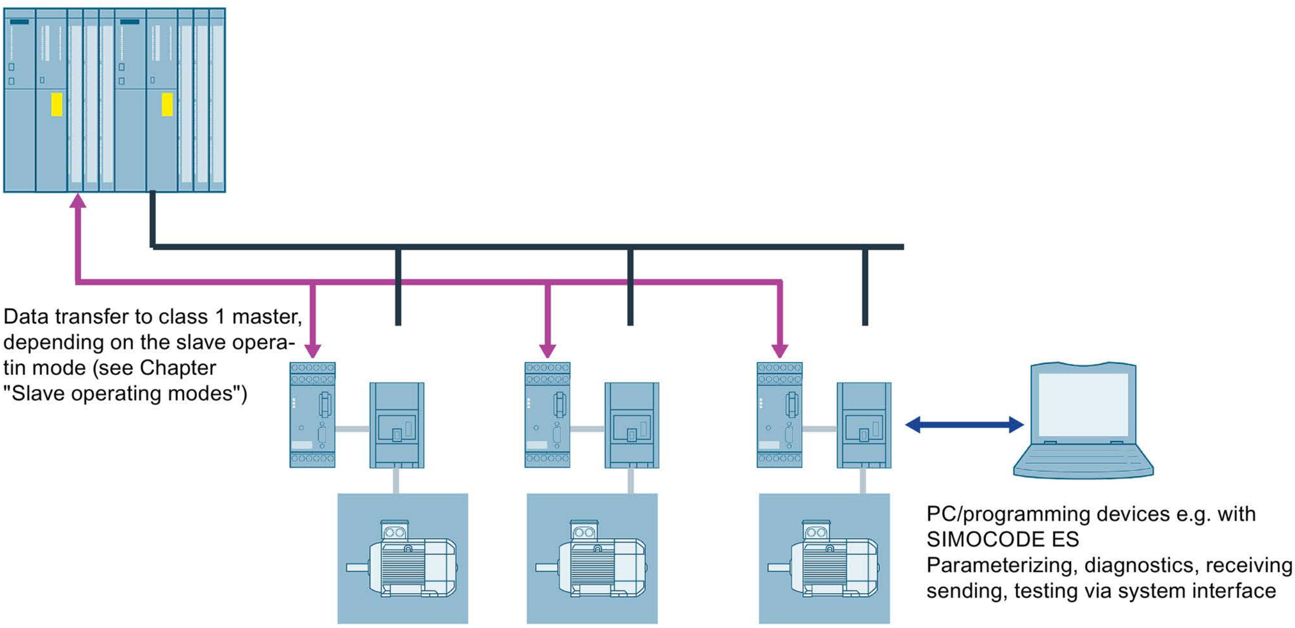


Figure 2-30 Options for data transfer

2.3.1.5 Modbus RTU telegram format

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 Modbus RTU error codes (Page 110).

2.3.1.6 Modbus RTU function codes

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 RTU data tables (Page 285)).

Table 2- 33 Overview of the function codes

Function code (decimal/hexadecimal)	Designation according to Modbus specification
01 / 0x01 (Page 101)	Read Coils
02 / 0x02 (Page 101)	Read Discrete Inputs
03 / 0x03 (Page 102)	Read Holding Registers
04 / 0x04 (Page 102)	Read Input Registers
05 / 0x05 (Page 103)	Write Single Coil
06 / 0x06 (Page 104)	Write Single Register
15 / 0x0F (Page 105)	Write Multiple Coils
16 / 0x10 (Page 106)	Write Multiple Registers
23 / 0x17 (Page 107)	Read/Write Multiple Registers
43 / 0x2B (Page 109)	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 RTU data tables (Page 285)).

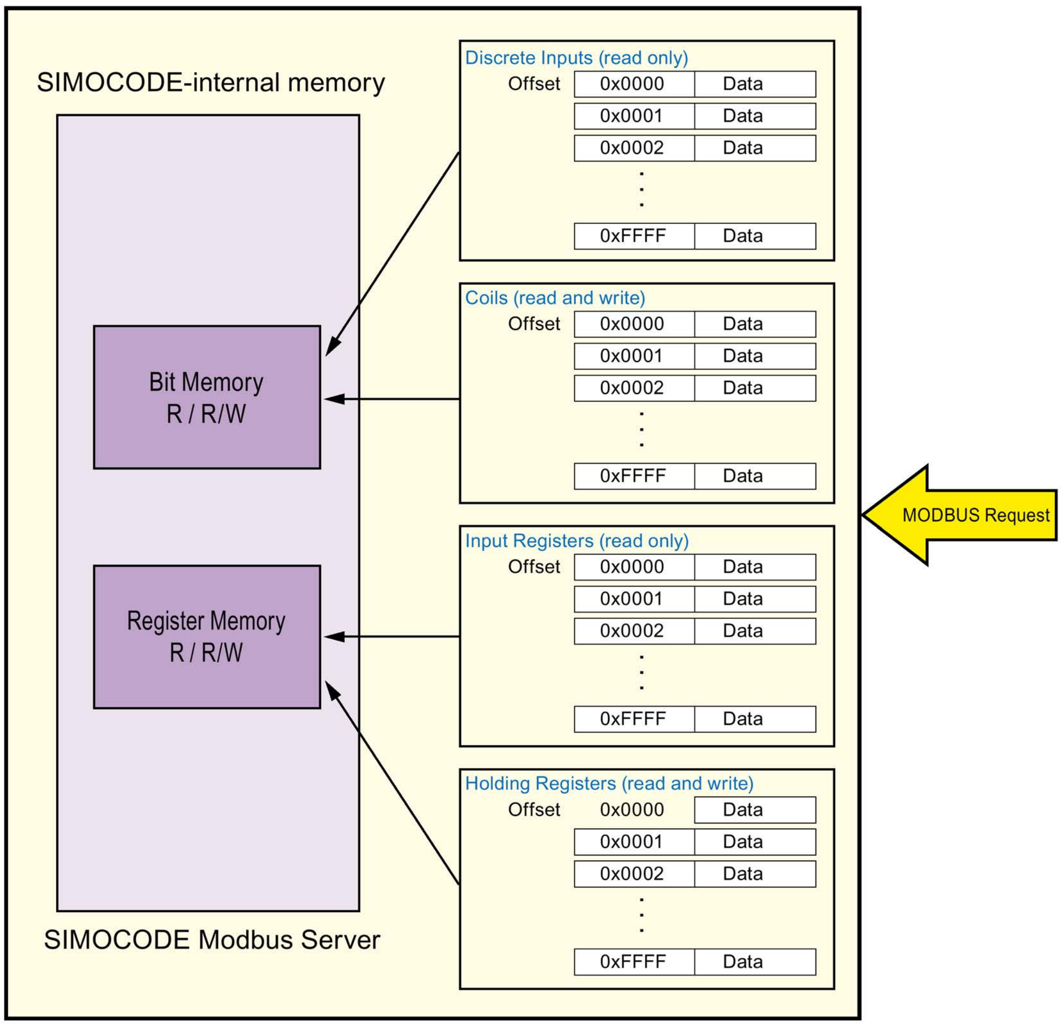


Figure 2-31 Memory areas used in SIMOCODE pro

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 290) 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

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	0x8007	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.

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 RTU data tables (Page 285), "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 RTU data tables (Page 285)) 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....

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 RTU data tables (Page 285), "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.

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 RTU data tables (Page 285), "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 Chapter "Example circuits" in the manual SIMOCODE pro - application examples (https://support.industry.siemens.com/cs/ww/en/view/109743959)):

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....

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 RTU data tables (Page 285), "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....

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 register memory area is expected as the start address. The selected address must be designated as writable (see the tables in Section Modbus RTU data tables (Page 285), "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	Nx2bytes	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.

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 2- 34 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	

2.3.1.7 Modbus RTU error codes

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....

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 Modbus RTU function codes (Page 99)).
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.

2.4 EtherNet/IP communication

2.4.1 Important notes

Note

Trademarks

This chapter makes reference to technologies with names protected by the Open DeviceNet Vendor Association (ODVA).

The ODVA technologies referred to in this manual are as follows:

- EtherNet/IP (EtherNet Industrial Protocol, often referred to as EIP) ™
- CIP (Common Industrial Protocol) ™

Further information about ODVA and technologies protected by ODVA can be found on the ODVA website (odva.org (http://www.odva.org)).

2.4.2 Definitions

EDS file

The properties of the EtherNet/IP device are described in an EDS file (EDS = Electronic Data Sheet) containing all the information required to integrate the device into an EtherNet/IP system.

You can find the EDS file in Industry Online Support at Generating an EDS file (https://support.industry.siemens.com/cs/ww/en/view/109741009).

IP address

To enable a PROFINET device to be addressed as a node on Industrial Ethernet, this device also requires an IP address that is unique within the network. The IP address is made up of 4 decimal numbers with a range of values from 0 through 255. The decimal numbers are separated by a decimal point.

The IP address is made up of

- The address of the (sub)net and
- The address of the node (generally called the host or network node)

Connection

Logical connection between two devices Various methods of connecting devices are described below. Two devices can be interlinked by more than one connection.

Scanner

The device which initiates a connection or a request. It can be regarded as the "master".

Adapter

The device which receives the connection or service request. A scanner can normally be integrated in a network with multiple adapters.

Assembly

A predefined collection of data stored in the adapter. Each data collection is identified by a unique instance number. It is further identified by size and type. Three types of assembly are those which generate (data to be sent), consume (data to be received) and configure (information required to parameterize the device).

MAC address

The MAC address can generally be read from the front on the device,
e.g.: 08-00-06-6B-80-C0.

CIP

Message-based application protocol. This protocol implements a relative path for sending a message from the modules that generate the message in one system to the modules that consume the message. CIP operates with a generator-consumer model rather than a source-destination model (master/slave). With a generator-consumer model, the volume of network traffic is lower and transmission times shorter.

EIP

Abbreviation for EtherNet/IP.

Requested Packet Interval (RIP)

EtherNet/IP devices normally generate or consume data on the basis of an RPI value (Requested Packet Interval). Generating devices transmit data packets in predefined time intervals on the basis of RPI, while consumer devices wait for data packets at a specific RPI.

2.4.3 Data security in automation

See Data security in automation (Page 43).

2.4.4 Data transmission

Key statement

The following figure shows an overview of the EtherNet/IP communication functions supported by SIMOCODE pro which are described in more detail in the following sections:

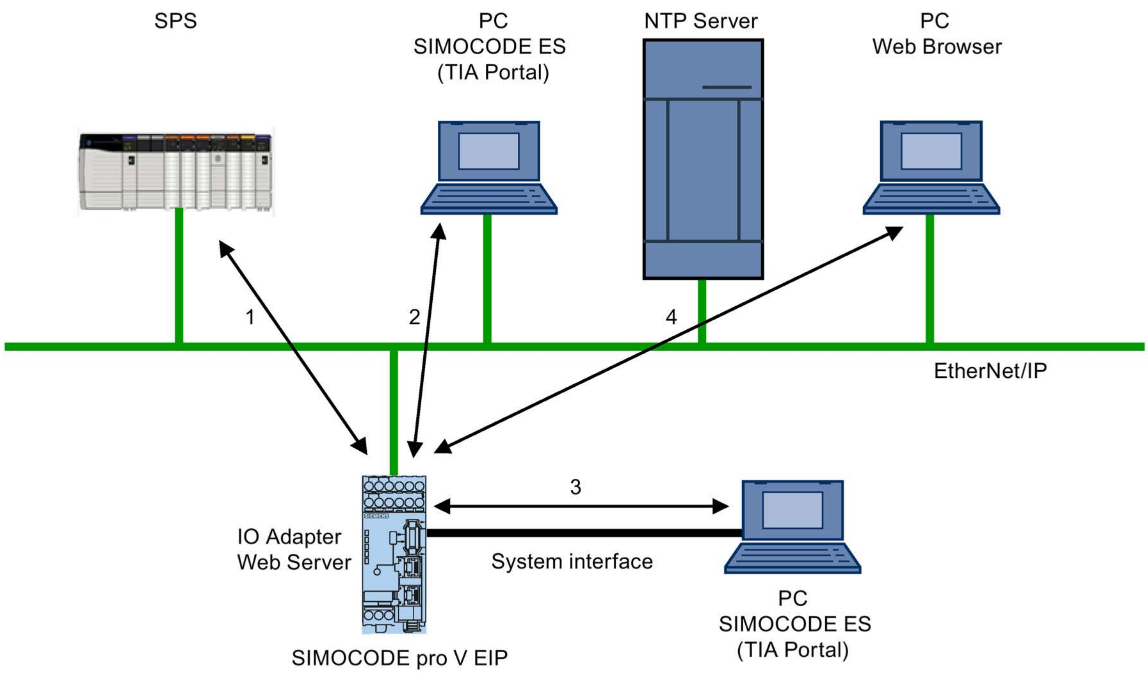


Figure 2-32 EtherNet/IP communication functions

1 Communication between PLC (I/O scanner) and SIMOCODE pro (I/O adapter) via EtherNet/IP

2 Communication between PC with parameterization software SIMOCODE ES (TIA Portal) and SIMOCODE pro via Ethernet

3 Communication between PC with parameterization software SIMOCODE ES (TIA Portal) and SIMOCODE pro via the SIMOCODE pro system interface (point-to-point via USB)

4 Communication between PC with web browser and SIMOCODE pro via Ethernet (TCP/IP); transmission of time of day via NTP from a PC with NTP server to the SIMOCODE pro V EIP devices

2.4.5 Electronic Data Sheet (EDS) file

Integrating SIMOCODE pro EIP using an EDS file

SIMOCODE pro V EIP can be integrated into an automation system by means of an EDS file (see also Definitions (Page 111)). This can be downloaded from Siemens Industry Online Support via the following link:

EDS file (https://support.industry.siemens.com/cs/ww/en/view/109741009)

The EDS file contains various information such as:

- Product symbol
- Manufacturer and device names
- Available cyclic data.

Note

Integration in Rockwell Studio 5000

To facilitate integration of SIMOCODE pro EIP into Rockwell Studio 5000, a function example and an add-on instruction for Studio 5000 are also provided on the Siemens Industry Online Support webpage mentioned above.

2.4.6 Setting up the IP address

NOTICE
Precondition for communication with the device The setting of IP parameters is a precondition for communication with the device. These parameters are the IP address, the subnet mask, the gateway address and the (Profinet) device name (optional).

IP parameters can be assigned by various methods:

- Using the SIMOCODE ES (TIA Portal) parameterization software
- Using a BOOTP/DHCP tool.

Assigning the IP address with the SIMOCODE ES parameterization software

Procedure:

- Start SIMOCODE ES (TIA Portal)
- Enter a project name under option "Create new project" and click on "Create"
- Switch to the project view.
- Click on the line "Online access" in the "Project navigation" window. You can choose between the following online access options:
  - COM <x> [SIRIUS PtP] - if the device is connected to the PC via the system interface
  - Intel(R) Gigabit Network Connection (or comparable designation) - if the device is connected to the PC via Ethernet.
- Click "Show accessible nodes"
- Double-click on the relevant device to select it from the list. To do this, you will need the MAC address attached to the front of the device.
- Assign
  - the IP address and set the subnet mask under Parameters → Ethernet parameters → IP address when connecting via the system interface
  - the IP address and set the subnet mask under Online & Diagnostics → Functions → IP address when connecting via Ethernet
- Download the IP address and the subnet mask to the device.
- You can also assign a device name if you want to. The main purpose of doing so is to give the device a clear, symbolic name that will be displayed in the project navigation window. However, a device name is not essential for communication with the device.

Assigning the IP address with a BOOTP/DHCP tool

Procedure:

- Start the BOOTP/DHCP server tool (e.g. from the Rockwell Studio 5000 package)
- Set the subnet mask of your network and, if applicable, the gateway address in the tool network settings; all of the devices that transmit BOOTP or DHCP messages into the network are displayed under "Request History" in the tool.
- Select the relevant device from this list. To do this, you will need the MAC address of the device: this is attached to the front panel of the SIMOCODE device.
- By clicking on button "Add to Relation List", you can assign an IP address, a host name and (if necessary) a description to the device. After the IP address has been assigned, the device with appear in the "Relation List", the list of all devices in this network segment with a valid IP address.
- After the IP address has been successfully assigned, deactivate the BOOTP/DHCP mechanism in the SIMOCODE device by selecting the device and clicking on the button labeled "Disable BOOTP/DHCP".

Note

Behavior of SIMOCODE pro if BOOTP/DHCP is not deactivated in the SIMOCODE device

If you do not deactivate the BOOTP/DHCP mechanism in the SIMOCODE device, it will restart after the next Power ON without a valid IP address and start sending BOOTP/DHCP messages again.

2.4.7 Parameterizing the device

Parameterization with SIMOCODE ES (TIA Portal)

SIMOCODE ES (TIA Portal) can access the device via the system interface and via Ethernet.

The "Getting Started" videos are useful for first-time users of SIMOCODE ES (TIA Portal). These can be found in Industry Online Support at:

Guided Tour (https://www.industry.siemens.com/topics/global/en/tia-portal/tia-portal-framework/tabcardpages/Pages/guided-tour.aspx)

Further guidance for working with the TIA Portal software can be found on the Internet at:

- Tutorial Center (https://support.industry.siemens.com/cs/ww/en/view/106656707) and
- TIA Portal - An overview of the most important documents and links - Visualization (https://support.industry.siemens.com/cs/ww/en/view/90939751)

Procedure for handling IP parameters

The IP parameters, consisting of IP address, subnet mask, and router can be assigned in various ways and transferred to the IO device as described in Chapter Setting up the IP address (Page 114).

Please note the following points relating to the SIMOCODE ES parameterization software:

- If the IP parameters are managed and assigned to the device via a BOOTP/DHCP tool, the "Overwrite IP parameters in device" parameter set in the SIMOCODE ES parameterization software under "PROFINET Parameters → IP Parameters" must not be active. This ensures that no changes are made to previously set IP parameters when parameters are downloaded.
- If IP parameters are configured and downloaded to the device with the SIMOCODE ES parameterization software, the "Overwrite IP parameters in device" parameter under "PROFINET Parameters → IP Parameters" must be active. This ensures that IP parameter settings are also written to the device when parameters are downloaded.

Note

Resetting the IP address and reactivating the BOOTP function

In order to restart the BOOTP/DHCP function after the IP address has been permanently assigned, "Activate BOOTP/DHCP" (Parameters → Ethernet parameters) must be checked.

Note

Restarting the communication interface

Every change to the IP parameters with SIMOCODE ES in the "Ethernet Parameters" dialog box requires a restart of the communication interface.

A restart of the communication interface briefly interrupts all Ethernet and EtherNet/IP links and reestablishes them afterward.

See also

TIA Portal Information Center (https://support.industry.siemens.com/cs/media/65601780_TIA_Portal_InformationCenter_web/start.htm#/en/default/index)

2.4.8 Integrating SIMOCODE pro into the automation system (PLC)

I/O configurations

SIMOCODE pro V PN supports a number of I/O configurations which define the structure and length of the I/O data that are cyclically exchanged between the EtherNet/IP scanner (PLC) and the adapter (SIMOCODE pro). These configurations are referred to as "basic types" and can be selected on the basis of the chosen assembly instances when the device is integrated in Studio 5000.

The data that are exchanged with the EtherNet/IP scanner can be set by means of function blocks such as, for example, "Cyclic receive byte 0" or "Cyclic send byte 0" in the SIMOCODE ES software. Detailed information about the relationship between SIMOCODE ES function blocks and assembly instances can be found in Chapter Assembly object (Page 323).

Overview of the cyclic data available with SIMOCODE pro V EtherNet/IP:

	Input data length	Input assembly	Output data length	Output assembly
Basic Type 1	10 byte	150	4 bytes	100
Basic Type 2	4 bytes	151	2 bytes	101
Basic Type 3	20 bytes	152	6 bytes	102
Basic Type 4	488 bytes	153	6 bytes	102

2.4.9 Integration and commissioning in Rockwell Studio 5000

Sequence of steps for integrating by means of an EDS file

1. Connect the device to the control system via an Ethernet cable
2. Using the EDS wizard, register the SIMOCODE EDS file in Studio 5000
3. Add a new module to the Ethernet network of the communication card (e.g. 1756-EN2TR)
4. Select the Siemens SIMOCODE 3UF7 device in the "Select Module Type" window
5. The IP address assigned to the device, a symbolic name and the length of cyclic data ("Module Definition → Connections") are set in the "New Module" window. The default connection is basic type 1. It is possible to alter the default RPI (requested packet interval) time on the "Connection" tab.

Predefined device connections:

	Input data	Output data
SIMOCODE Basic Type 1	10 byte	4 bytes
SIMOCODE Basic Type 2	4 bytes	2 bytes
SIMOCODE Basic Type 3	20 bytes	6 bytes
SIMOCODE Basic Type 4	488 bytes	6 bytes
Basic Overload	1 byte	1 byte
Extended Overload	1 byte	1 byte

Sequence of steps for integrating by means of a generic Ethernet module

1. Connect the device to the control system via an Ethernet cable
2. Add a new generic Ethernet module to the Ethernet network of the communication card (e.g. 1756-EN2TR)
3. Enter the symbolic name and the IP address of the SIMOCODE pro EIP device. The IP address must match the IP address parameterized via BOOTP/DHCP or SIMOCODE ES.
4. Enter the connection parameters in the "Assembly Instance" and "Size" boxes on the screen. It is possible to alter the default RPI (requested packet interval) time on the "Connection" tab.

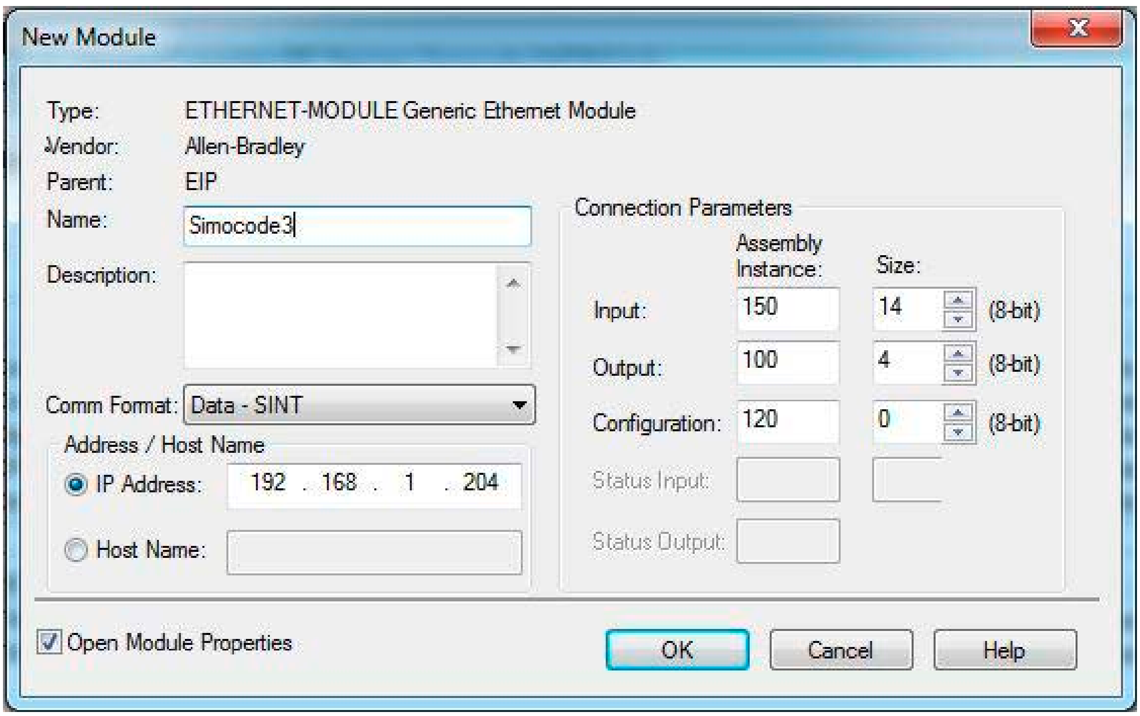


Figure 2-33 Adding a new generic Ethernet module in Studio 5000

2.4.10 Ethernet/IP Device Level Ring functionality

The SIMOCODE pro V EIP device has two RJ45 sockets with an integral switch. It is therefore possible to create ring structures from lines with Ethernet/IP. When a ring structure is implemented, SIMOCODE pro V EIP supports the Device Level Ring (DLR) mechanism which ensures that communication is maintained even when the ring is interrupted.

The advantages of a DLR are as follows:

- Simple installation using the two integral RJ45 ports.
- A single error in the communication chain does not result in restricted access to individual nodes.
- Communication can be restored quickly after a single error has occurred.

SIMOCODE pro V EIP functions as a "ring node" within the DLR.

For a DLR to function properly, it must also contain a "supervisor node" (e.g. a control system / a switch with supervisor node functionality).

A DLR network is configured by means of the "supervisor node" parameters ("Enable Supervisor Node"; "Beacon Time"; "Beacon TimeOut"). No parameter settings for DLR need to be set in the SIMOCODE pro V EIP devices.

There should be fewer than 50 ring node devices within a DLR network in order to keep the communication restore time within acceptable limits.

2.4.11 Web diagnostics (web server)

SIMOCODE pro V EIP offers you with the web diagnosis the possibility of calling the following information of the motor feeder from a PG/PC using an HTTP client:

- Status information
- Faults, warnings, events
- Measured values
- Service and statistical data
- Error buffer, error protocol

Web diagnostics are available in Chinese, Russian, English and German.

Activating the web server:

The default setting of the web server is "not active." To activate it, the "Ethernet Parameters →Web Server Activated" parameter must be active.

Note

Restarting the communication interface

Each change to the configuration of the web server requires that the communication interface be restarted.

A new start of the communication interface interrupts all Ethernet and PROFINET links and reestablishes them afterward.

Setting the IP parameters:

To enable a link to be established via the web, SIMOCODE pro V EIP must have valid IP parameters. You can find out how to make these settings in Chapter Setting up the IP address (Page 114).

Web browser

For access to the HTML pages in the SIMOCODE pro V EIP, you need a web browser.

The following web browsers are suitable for communication with SIMOCODE pro etc.:

- Internet Explorer (recommended version: Version 11)
- Firefox (recommended version: Version 49)
- Google Chrome (recommended version: Version 54)

Note

Connection to a web client

Connection to a web client is supported.

Settings of the web browser for access to the information

Check the following settings, which are a precondition for access to the information made available via the web:

- To load the diagnostics data, Javascript must be activated in the Internet browser.
- The browser must support frames.
- Cookies must be permitted.
- The browser should be set in such a way that whenever it accesses a page, it automatically loads the current data from the server.

In the Internet Explorer, you will find these settings with menu "Tools" → "Internet Options" → "General" tab card → "Temporary Internet Files" group box → "Settings" button.

To use a firewall in your PG/PC, the following port must be enabled for use of the web diagnostics: "http Port 80/TCP" or, in the case of secure connections, "https Port 443/TCP".

2.4.12 Time-of-day synchronization by the NTP procedure

SIMOCODE pro V EIP has a non-battery-backed realtime clock that can be synchronized via the NTP procedure.

Network Time Protocol (NTP) is the implementation of a TCP/IP protocol for time synchronization in networks. The NTP procedure uses hierarchical time synchronization, that is, an external clock (e.g. SICLOCK TM or a PC in the network) is used for synchronization.

The device transmits time-of-day queries to the configured NTP server at configured time intervals. Using the responses of the server, the time of day of the non-battery-backed clock is synchronized in SIMOCODE pro. This ensures that a synchronized time of day is available shortly after the supply voltage is switched on.

The NTP synchronization is configured with the "SIMOCODE ES (TIA Portal)" configuration software under "EtherNet/IP Parameters → NTP procedure/synchronization."

The following settings are also made:

- NTP server address: Enter the NTP server address when the "Activate NTP synchronization" checkbox is selected.

Note

Adoption of the NTP server address

The NTP server address is not accepted until the device has been restarted or after the supply voltage has been switched off and on again.

- Cyclic update interval: Time interval in seconds at which synchronization of the time of day with the NTP server is performed
- Time shift: Time difference in minutes between UTC time (UTC = Universal Time Coordinated) and the time in the device.

Examples:

- Time shift for CET (Central European Time): +60 min
- Time shift for CST (Central Standard Time, North America): -360 min.

If an NTP server address has not been configured or a server was not found on the network, you can also set the time of day using SIMOCODE ES. To do this, proceed as follows:

Mark the relevant SIMOCODE device in the project navigation window and then select "Connect online" to establish a direct connection to the device. Expand the list of device settings by clicking on the arrow on the left of the SIMOCODE device: You can now select "Commissioning → Command → Set time (= PC time in UTC)" to download the time of day of your PC to the SIMOCODE device.

If a valid time of day is available (either synchronized by NTP or set via SIMOCODE ES), the entries in the error buffer/error protocol (i.e. log) will be additionally displayed with the time of day. In addition, the "Clock set (NTP)" and "Clock synchronized (NTP)" messages are displayed.

2.4.13 Simple Network Management Protocol (SNMP)

SNMP is a network protocol for monitoring and controlling network elements (e.g. switches).

SIMOCODE pro V EIP supports the Ethernet service SNMP. MIB-2 (RFC1213) is supported. R/W objects can be changed with SNMP tools and are stored in the basic unit.

After replacement with a new basic unit from the factory or a basic unit that has undergone a general reset, the R/W objects will be in the factory settings.

Tables, data records

3

3.1 Tables general

3.1.1 Active control stations, contactor controls, lamp controls and status information for the control functions

Table 3- 1 Active control stations of control functions

Designation / control function	Control station				
	ON <<	ON <	OFF	ON >	ON >>
Overload 1) 2) 3)	-	-	-	-	-
Direct starter (direct-on-line starter) 1) 2) 3)	-	-	OFF	ON	-
Reversing starter 1) 2) 3)	-	CCW	OFF	CW	-
Circuit breaker 1) 2) 3)	-	-	OFF	ON	-
Star-delta starter 2) 3)	-	-	OFF	ON	-
Star-delta reversing starter 3)	-	CCW	OFF	CW	-
Dahlander starter 3)	-	-	OFF	SLOW	FAST
Dahlander reversing starter 3)	CCW-FAST	CCW-SLOW	OFF	CW-SLOW	CW-FAST
Pole-changing starter 3)	-	-	OFF	SLOW	FAST
Pole-changing reversing starter 3)	CCW-FAST	CCW-SLOW	OFF	CW-SLOW	CW-FAST
Solenoid valve 3)	-	-	CLOSED	OPEN	-
Positioner 1 3)	-	CLOSED	Stop	OPEN	-
Positioner 2 3)	-	CLOSED	Stop	OPEN	-
Positioner 3 3)	-	CLOSED	Stop	OPEN	-
Positioner 4 3)	-	CLOSED	Stop	OPEN	-
Positioner 5 3)	-	CLOSED	Stop	OPEN	-
Soft starter 2) 3)	-	-	OFF	ON	-
Soft starter with reversing contactor 3)	-	CCW	OFF	CW	-

Table 3- 2 Contactor control with control functions

Designation / control function	Contactor control				
	QE1	QE2	QE3	QE4	QE5
Overload 1) 2) 3)	-	-	Active	-	-
Direct-on-line starter 1) 2) 3)	ON	-	-	-	-
Reversing starter 1) 2) 3)	CW	CCW	-	-	-
Circuit breaker 1) 2) 3)	ON pulse	-	OFF pulse	-	-
Star-delta starter 2) 3)	Star contactor	Delta contactor	Line contactor	-	-
Star-delta reversing starter 3)	Star contactor	Delta contactor	RIGHT line contactor	LEFT line contactor	-
Dahlander starter 3)	FAST	SLOW	Star contactor FAST	-	-
Dahlander reversing starter 3)	CW-FAST	CW-SLOW	Star contactor FAST	CCW-SLOW	CCW-FAST
Pole-changing starter 3)	FAST	SLOW	-	-	-
Pole-changing reversing starter 3)	CW-FAST	CW-SLOW	-	CCW-SLOW	CCW-FAST
Solenoid valve 3)	OPEN	-	-	-	-
Positioner 1 3)	OPEN	CLOSED	-	-	-
Positioner 2 3)	OPEN	CLOSED	-	-	-
Positioner 3 3)	OPEN	CLOSED	-	-	-
Positioner 4 3)	OPEN	CLOSED	-	-	-
Positioner 5 3)	OPEN	CLOSED	-	-	-
Soft starter 2) 3)	ON line contactor	-	Reset	ON command	-
Soft starter with reversing contactor 3)	RIGHT line contactor	LEFT line contactor	Reset	ON command	-

Table 3- 3 Lamp control with control functions

Designation / control function	Lamp control				
	QLE << (ON <<)	QLE < (ON <)	QLA (OFF)	QLE < (ON >)	QLE >> (ON >>)
Overload [1) 2) 3)]	-	-	-	-	-
Direct-on-line starter [1) 2) 3)]	-	-	OFF	ON	-
Reversing starter [1) 2) 3)]	-	CCW	OFF	CW	-
Circuit breaker [1) 2) 3)]	-	-	OFF	ON	-
Star-delta starter [2) 3)]	-	-	OFF	ON	-
Star-delta reversing starter [3)]	-	CCW	OFF	CW	-
Dahlander starter [3)]	-	-	OFF	SLOW	FAST
Dahlander reversing starter [3)]	CCW-FAST	CCW-SLOW	OFF	CW-SLOW	CW-FAST
Pole-changing starter [3)]	-	-	OFF	SLOW	FAST
Pole-changing reversing starter [3)]	CCW-FAST	CCW-SLOW	OFF	CW-SLOW	CW-FAST
Solenoid valve [3)]	-	-	CLOSED	OPEN	-
Positioner 1 [3)]	-	CLOSED	Stop	OPEN	-
Positioner 2 [3)]	-	CLOSED	Stop	OPEN	-
Positioner 3 [3)]	-	CLOSED	Stop	OPEN	-
Positioner 4 [3)]	-	CLOSED	Stop	OPEN	-
Positioner 5 [3)]	-	CLOSED	Stop	OPEN	-
Soft starter [2) 3)]	-	-	OFF	ON	-
Soft starter with reversing contactor [3)]	-	CCW	OFF	CW	-

1) SIMOCODE pro C

2) SIMOCODE pro S

3) SIMOCODE pro V

3.2 Assignment of cyclic receive and send data for predefined control functions

3.2.1 Overload relay

Table 3- 4 Assignment of cyclic receive / send data, overload relay

Cycl. receive data	
Bit 0.0	Not connected
Bit 0.1	Not connected
Bit 0.2	Not connected
Bit 0.3	Further function blocks → Standard functions → Test / Reset → Test1 - Input
Bit 0.4	Further function blocks → Standard functions → Emergency start → Emergency start - Input
Bit 0.5	Not connected
Bit 0.6	Further function blocks → Standard functions → Test / Reset → Reset1 - Input
Bit 0.7	Not connected
Bit 1.0	Not connected
Bit 1.1	Not connected
Bit 1.2	Not connected
Bit 1.3	Not connected
Bit 1.4	Not connected
Bit 1.5	Not connected
Bit 1.6	Not connected
Bit 1.7	Not connected
Byte 2/3 *) (analog value)	Not connected
Cycl. send data	
Bit 0.0	Not connected
Bit 0.1	Not connected
Bit 0.2	Not connected
Bit 0.3	Event - Prewarning overload (I>115 %)
Bit 0.4	Not connected
Bit 0.5	Not connected
Bit 0.6	Status - General fault
Bit 0.7	Status - general warning
Bit 1.0	Not connected
Bit 1.1	Not connected
Bit 1.2	Not connected
Bit 1.3	Not connected
Bit 1.4	Not connected
Bit 1.5	Not connected
Bit 1.6	Not connected
Bit 1.7	Not connected
Byte 2/3 (analog value)	Maximum current I_max
Byte 4/5 *) (analog value)	Not connected
Byte 6/7 *) (analog value)	Not connected
Byte 8/9 *) (analog value)	Not connected

*) for SIMOCODE pro V / pro S, basic type 1 only

3.2.2 Direct starter

Table 3- 5 Assignment of cyclic receive / send data, direct starter (direct-on-line starter)

Cycl. receive data	
Bit 0.0	Not connected
Bit 0.1	Device parameters → Motor control → Control stations → PLC/PCS [DP] → OFF
Bit 0.2	Device parameters → Motor control → Control stations → PLC/PCS [DP] → ON
Bit 0.3	Further function blocks → Standard functions → Test / Reset → Test1 - Input
Bit 0.4	Further function blocks → Standard functions → Emergency start → Emergency start - Input
Bit 0.5	Device parameters → Motor control → Control stations → Mode selector S1
Bit 0.6	Further function blocks → Standard functions → Test / Reset → Reset 1 - Input
Bit 0.7	Not connected
Bit 1.0	Not connected
Bit 1.1	Not connected
Bit 1.2	Not connected
Bit 1.3	Not connected
Bit 1.4	Not connected
Bit 1.5	Not connected
Bit 1.6	Not connected
Bit 1.7	Not connected
Byte 2/3 *) (analog value)	Not connected
Cycl. send data	
Bit 0.0	Not connected
Bit 0.1	Status - Off
Bit 0.2	Status - ON>
Bit 0.3	Event - Prewarning overload (I>115 %)
Bit 0.4	Not connected
Bit 0.5	Status - Remote mode
Bit 0.6	Status - General fault
Bit 0.7	Status - general warning
Bit 1.0	Not connected
Bit 1.1	Not connected
Bit 1.2	Not connected
Bit 1.3	Not connected
Bit 1.4	Not connected
Bit 1.5	Not connected
Bit 1.6	Not connected
Bit 1.7	Not connected
Byte 2/3 (analog value)	Maximum current I_max
Byte 4/5 *) (analog value)	Not connected
Byte 6/7 *) (analog value)	Not connected
Byte 8/9 *) (analog value)	Not connected

*) for SIMOCODE pro V / pro S, basic type 1 only

3.2.3 Reversing starter

Table 3- 6 Assignment of cyclic receive / send data, reversing starter

Cyclic receive data	
Bit 0.0	Device parameters → Motor control → Control stations → PLC/PCS [DP] → ON
Bit 0.1	Device parameters → Motor control → Control stations → PLC/PCS [DP] → OFF
Bit 0.2	Device parameters → Motor control → Control stations → PLC/PCS [DP] → ON
Bit 0.3	Further function blocks → Standard functions → Test / Reset → Test1 - Input
Bit 0.4	Further function blocks → Standard functions → Emergency start → Emergency start - Input
Bit 0.5	Device parameters → Motor control → Control stations → Mode selector S1
Bit 0.6	Further function blocks → Standard functions → Test / Reset → Reset1 - Input
Bit 0.7	Not connected
Bit 1.0	Not connected
Bit 1.1	Not connected
Bit 1.2	Not connected
Bit 1.3	Not connected
Bit 1.4	Not connected
Bit 1.5	Not connected
Bit 1.6	Not connected
Bit 1.7	Not connected
Byte 2/3 *) (analog value)	Not connected
Cyclic send data	
Bit 0.0	Status - ON<
Bit 0.1	Status - Off
Bit 0.2	Status - ON>
Bit 0.3	Event - Prewarning overload (I>115 %)
Bit 0.4	Status - Interlocking time active
Bit 0.5	Status - Remote mode
Bit 0.6	Status - General fault
Bit 0.7	Status - general warning
Bit 1.0	Not connected
Bit 1.1	Not connected
Bit 1.2	Not connected
Bit 1.3	Not connected
Bit 1.4	Not connected
Bit 1.5	Not connected
Bit 1.6	Not connected
Bit 1.7	Not connected
Byte 2/3 (analog value)	Maximum current I_max
Byte 4/5 *) (analog value)	Not connected
Byte 6/7 *) (analog value)	Not connected
Byte 8/9 *) (analog value)	Not connected

*) for SIMOCODE pro V / pro S, basic type 1 only

3.2.4 Molded-case circuit breaker (MCCB)

Table 3- 7 Assignment of cyclic receive / send data, molded-case circuit breaker (MCCB)

Cyclic receive data	
Bit 0.0	Not connected
Bit 0.1	Device parameters → Motor control → Control stations → PLC/PCS [DP] → OFF
Bit 0.2	Device parameters → Motor control → Control stations → PLC/PCS [DP] → ON
Bit 0.3	Further function blocks → Standard functions → Test / Reset → Test1 - Input
Bit 0.4	Further function blocks → Standard functions → Emergency start → Emergency start - Input
Bit 0.5	Device parameters → Motor control → Control stations → Mode selector S1
Bit 0.6	Further function blocks → Standard functions → Test / Reset → Reset 1 - Input
Bit 0.7	Not connected
Bit 1.0	Not connected
Bit 1.1	Not connected
Bit 1.2	Not connected
Bit 1.3	Not connected
Bit 1.4	Not connected
Bit 1.5	Not connected
Bit 1.6	Not connected
Bit 1.7	Not connected
Byte 2/3 *) (analog value)	Not connected
Cyclic send data	
Bit 0.0	Not connected
Bit 0.1	Status - Off
Bit 0.2	Status - ON>
Bit 0.3	Event - Prewarning overload (I>115 %)
Bit 0.4	Not connected
Bit 0.5	Status - Remote mode
Bit 0.6	Status - General fault
Bit 0.7	Status - general warning
Bit 1.0	Not connected
Bit 1.1	Not connected
Bit 1.2	Not connected
Bit 1.3	Not connected
Bit 1.4	Not connected
Bit 1.5	Not connected
Bit 1.6	Not connected
Bit 1.7	Not connected
Byte 2/3 (analog value)	Maximum current I_max
Byte 4/5 *) (analog value)	Not connected
Byte 6/7 *) (analog value)	Not connected
Byte 8/9 *) (analog value)	Not connected

*) for SIMOCODE pro V / pro S, basic type 1 only

3.2.5 Star-delta starter

Table 3- 8 Assignment of cyclic receive / send data, star/delta starter

Cyclic receive data	
Bit 0.0	Not connected
Bit 0.1	Device parameters → Motor control → Control stations → PLC/PCS [DP] → OFF
Bit 0.2	Device parameters → Motor control → Control stations → PLC/PCS [DP] → ON
Bit 0.3	Further function blocks → Standard functions → Test / Reset → Test1 - Input
Bit 0.4	Further function blocks → Standard functions → Emergency start → Emergency start - Input
Bit 0.5	Device parameters → Motor control → Control stations → Mode selector S1
Bit 0.6	Further function blocks → Standard functions → Test / Reset → Reset 1 - Input
Bit 0.7	Not connected
Bit 1.0	Not connected
Bit 1.1	Not connected
Bit 1.2	Not connected
Bit 1.3	Not connected
Bit 1.4	Not connected
Bit 1.5	Not connected
Bit 1.6	Not connected
Bit 1.7	Not connected
Byte 2/3 *) (analog value)	Not connected
Cycl. send data	
Bit 0.0	Not connected
Bit 0.1	Status - Off
Bit 0.2	Status - ON
Bit 0.3	Event - Prewarning overload (I>115 %)
Bit 0.4	Status - Change-over pause active
Bit 0.5	Status - Remote mode
Bit 0.6	Status - General fault
Bit 0.7	Status - general warning
Bit 1.0	Not connected
Bit 1.1	Not connected
Bit 1.2	Not connected
Bit 1.3	Not connected
Bit 1.4	Not connected
Bit 1.5	Not connected
Bit 1.6	Not connected
Bit 1.7	Not connected
Byte 2/3 (analog value)	Maximum current I_max
Byte 4/5 *) (analog value)	Not connected
Byte 6/7 *) (analog value)	Not connected
Byte 8/9 *) (analog value)	Not connected

*) for SIMOCODE pro V / pro S, basic type 1 only

3.2.6 Star-delta reversing starter

Table 3- 9 Assignment of cyclic receive / send data, star/delta reversing starter

Cyclic receive data	
Bit 0.0	Device parameters → Motor control → Control stations → PLC/PCS [DP] → ON <
Bit 0.1	Device parameters → Motor control → Control stations -> PLC/PCS [DP] -> OFF
Bit 0.2	Device parameters → Motor control → Control stations → PLC/PCS [DP] → ON >
Bit 0.3	Further function blocks → Standard functions → Test / Reset → Test1 - Input
Bit 0.4	Further function blocks → Standard functions → Emergency start → Emergency start - Input
Bit 0.5	Device parameters → Motor control → Control stations → Mode selector S1
Bit 0.6	Further function blocks → Standard functions → Test / Reset → Reset 1 - Input
Bit 0.7	Not connected
Bit 1.0	Not connected
Bit 1.1	Not connected
Bit 1.2	Not connected
Bit 1.3	Not connected
Bit 1.4	Not connected
Bit 1.5	Not connected
Bit 1.6	Not connected
Bit 1.7	Not connected
Byte 2/3 *) (analog value)	Not connected
Cyclic send data	
Bit 0.0	Status - ON<
Bit 0.1	Status - Off
Bit 0.2	Status - ON>
Bit 0.3	Event - Prewarning overload (I>115 %)
Bit 0.4	Status - Change-over pause active
Bit 0.5	Status - Remote mode
Bit 0.6	Status - General fault
Bit 0.7	Status - general warning
Bit 1.0	Not connected
Bit 1.1	Not connected
Bit 1.2	Not connected
Bit 1.3	Status - Interlocking time active
Bit 1.4	Not connected
Bit 1.5	Not connected
Bit 1.6	Not connected
Bit 1.7	Not connected
Byte 2/3 (analog value)	Maximum current I_max
Byte 4/5 *) (analog value)	Not connected
Byte 6/7 *) (analog value)	Not connected
Byte 8/9 *) (analog value)	Not connected

*) for SIMOCODE pro V / pro S, basic type 1 only

3.2.7 Dahlander starter

Table 3- 10 Assignment of cyclic receive / send data, Dahlander starter

Cyclic receive data	
Bit 0.0	Device parameters → Motor control → Control stations → PLC/PCS [DP] → ON >>
Bit 0.1	Device parameters → Motor control → Control stations → PLC/PCS [DP] → OFF
Bit 0.2	Device parameters → Motor control → Control stations → PLC/PCS [DP] → ON >
Bit 0.3	Further function blocks → Standard functions → Test / Reset → Test1 - Input
Bit 0.4	Further function blocks → Standard functions → Emergency start → Emergency start - Input
Bit 0.5	Device parameters → Motor control → Control stations → Mode selector S1
Bit 0.6	Further function blocks → Standard functions → Test / Reset → Reset 1 - Input
Bit 0.7	Not connected
Bit 1.0	Not connected
Bit 1.1	Not connected
Bit 1.2	Not connected
Bit 1.3	Not connected
Bit 1.4	Not connected
Bit 1.5	Not connected
Bit 1.6	Not connected
Bit 1.7	Not connected
Byte 2/3 *) (analog value)	Not connected
Cyclic send data	
Bit 0.0	Status - ON>>
Bit 0.1	Status - Off
Bit 0.2	Status - ON>
Bit 0.3	Event - Prewarning overload (I>115 %)
Bit 0.4	Status - Change-over pause active
Bit 0.5	Status - Remote mode
Bit 0.6	Status - General fault
Bit 0.7	Status - General warning
Bit 1.0	Not connected
Bit 1.1	Not connected
Bit 1.2	Not connected
Bit 1.3	Not connected
Bit 1.4	Not connected
Bit 1.5	Not connected
Bit 1.6	Not connected
Bit 1.7	Not connected
Byte 2/3 (analog value)	Maximum current I_max
Byte 4/5 *) (analog value)	Not connected
Byte 6/7 *) (analog value)	Not connected
Byte 8/9 *) (analog value)	Not connected

*) for SIMOCODE pro V / pro S, basic type 1 only

3.2.8 Dahlander reversing starter

Table 3- 11 Assignment of cyclic receive / send data, Dahlander reversing starter

Cyclic receive data	
Bit 0.0	Device parameters → Motor control → Control stations → PLC/PCS [DP] → ON >>
Bit 0.1	Device parameters → Motor control → Control stations → PLC/PCS [DP] → OFF
Bit 0.2	Device parameters → Motor control → Control stations → PLC/PCS [DP] → ON >
Bit 0.3	Further function blocks → Standard functions → Test / Reset → Test1 - Input
Bit 0.4	Further function blocks → Standard functions → Emergency start → Emergency start - Input
Bit 0.5	Device parameters → Motor control → Control stations → Mode selector S1
Bit 0.6	Further function blocks → Standard functions → Test / Reset → Reset 1 - Input
Bit 0.7	Not connected
Bit 1.0	Device parameters → Motor control → Control stations → PLC/PCS [DP] → ON <<
Bit 1.1	Not connected
Bit 1.2	Device parameters → Motor control → Control stations → PLC/PCS [DP] → ON <
Bit 1.3	Not connected
Bit 1.4	Not connected
Bit 1.5	Not connected
Bit 1.6	Not connected
Bit 1.7	Not connected
Byte 2/3 *) (analog value)	Not connected
Cyclic send data	
Bit 0.0	Status - ON>>
Bit 0.1	Status - Off
Bit 0.2	Status - ON>
Bit 0.3	Event - Prewarning overload (I>115 %)
Bit 0.4	Status - Change-over pause active
Bit 0.5	Status - Remote mode
Bit 0.6	Status - General fault
Bit 0.7	Status - General warning
Bit 1.0	Status - ON<<
Bit 1.1	Not connected
Bit 1.2	Status - ON<
Bit 1.3	Status - Interlocking time active
Bit 1.4	Not connected
Bit 1.5	Not connected
Bit 1.6	Not connected
Bit 1.7	Not connected
Byte 2/3 (analog value)	Maximum current I_max
Byte 4/5 *) (analog value)	Not connected
Byte 6/7 *) (analog value)	Not connected
Byte 8/9 *) (analog value)	Not connected

*) for SIMOCODE pro V / pro S, basic type 1 only

3.2.9 Pole-changing starter

Table 3- 12 Assignment of cyclic receive / send data, pole-changing starter

Cyclic receive data	
Bit 0.0	Device parameters → Motor control → Control stations → PLC/PCS [DP] → ON >>
Bit 0.1	Device parameters → Motor control → Control stations → PLC/PCS [DP] → OFF
Bit 0.2	Device parameters → Motor control → Control stations → PLC/PCS [DP] → ON >
Bit 0.3	Further function blocks → Standard functions → Test / Reset → Test1 - Input
Bit 0.4	Further function blocks → Standard functions → Emergency start → Emergency start - Input
Bit 0.5	Device parameters → Motor control → Control stations → Mode selector S1
Bit 0.6	Further function blocks → Standard functions → Test / Reset → Reset 1 - Input
Bit 0.7	Not connected
Bit 1.0	Not connected
Bit 1.1	Not connected
Bit 1.2	Not connected
Bit 1.3	Not connected
Bit 1.4	Not connected
Bit 1.5	Not connected
Bit 1.6	Not connected
Bit 1.7	Not connected
Byte 2/3 *) (analog value)	Not connected
Cyclic send data	
Bit 0.0	Status - ON>>
Bit 0.1	Status - Off
Bit 0.2	Status - ON>
Bit 0.3	Event - Prewarning overload (I>115 %)
Bit 0.4	Status - Change-over pause active
Bit 0.5	Status - Remote mode
Bit 0.6	Status - General fault
Bit 0.7	Status - general warning
Bit 1.0	Not connected
Bit 1.1	Not connected
Bit 1.2	Not connected
Bit 1.3	Not connected
Bit 1.4	Not connected
Bit 1.5	Not connected
Bit 1.6	Not connected
Bit 1.7	Not connected
Byte 2/3 (analog value)	Maximum current I_max
Byte 4/5 *) (analog value)	Not connected
Byte 6/7 *) (analog value)	Not connected
Byte 8/9 *) (analog value)	Not connected

*) for SIMOCODE pro V / pro S, basic type 1 only

3.2.10 Pole-changing reversing starter

Table 3- 13 Assignment of cyclic receive / send data, pole-changing reversing starter

Cyclic receive data	
Bit 0.0	Device parameters → Motor control → Control stations → PLC/PCS [DP] → ON >>
Bit 0.1	Device parameters → Motor control → Control stations → PLC/PCS [DP] → OFF
Bit 0.2	Device parameters → Motor control → Control stations → PLC/PCS [DP] → ON >
Bit 0.3	Further function blocks → Standard functions → Test / Reset → Test1 - Input
Bit 0.4	Further function blocks → Standard functions → Emergency start → Emergency start - Input
Bit 0.5	Device parameters → Motor control → Control stations → Mode selector S1
Bit 0.6	Further function blocks → Standard functions → Test / Reset → Reset 1 - Input
Bit 0.7	Not connected
Bit 1.0	Device parameters → Motor control → Control stations → PLC/PCS [DP] → ON <<
Bit 1.1	Not connected
Bit 1.2	Device parameters → Motor control → Control stations → PLC/PCS [DP] → ON <
Bit 1.3	Not connected
Bit 1.4	Not connected
Bit 1.5	Not connected
Bit 1.6	Not connected
Bit 1.7	Not connected
Byte 2/3 *) (analog value)	Not connected
Cyclic send data	
Bit 0.0	Status - ON>>
Bit 0.1	Status - Off
Bit 0.2	Status - ON>
Bit 0.3	Event - Prewarning overload (I>115 %)
Bit 0.4	Status - Change-over pause active
Bit 0.5	Status - Remote mode
Bit 0.6	Status - General fault
Bit 0.7	Status - general warning
Bit 1.0	Status - ON<<
Bit 1.1	Not connected
Bit 1.2	Status - ON<
Bit 1.3	Status - Interlocking time active
Bit 1.4	Not connected
Bit 1.5	Not connected
Bit 1.6	Not connected
Bit 1.7	Not connected
Byte 2/3 (analog value)	Maximum current I_max
Byte 4/5 *) (analog value)	Not connected
Byte 6/7 *) (analog value)	Not connected
Byte 8/9 *) (analog value)	Not connected

*) for SIMOCODE pro V / pro S, basic type 1 only

3.2.11 Solenoid valve

Table 3- 14 Assignment of cyclic receive/send data, solenoid valve

Cyclic receive data	
Bit 0.0	Not connected
Bit 0.1	Device parameters → Motor control → Control stations → PLC/PCS [DP] → Close
Bit 0.2	Device parameters → Motor control → Control stations → PLC/PCS [DP] → Open
Bit 0.3	Further function blocks → Standard functions → Test / Reset → Test1 - Input
Bit 0.4	Not connected
Bit 0.5	Device parameters → Motor control → Control stations → Mode selector S1
Bit 0.6	Further function blocks → Standard functions → Test / Reset → Reset 1 → Input
Bit 0.7	Not connected
Bit 1.0	Not connected
Bit 1.1	Not connected
Bit 1.2	Not connected
Bit 1.3	Not connected
Bit 1.4	Not connected
Bit 1.5	Not connected
Bit 1.6	Not connected
Bit 1.7	Not connected
Byte 2/3 *) (analog value)	Not connected
Cycl. send data	
Bit 0.0	Not connected
Bit 0.1	Status - OFF (CLOSED)
Bit 0.2	Status - ON > (OPEN)
Bit 0.3	Not connected
Bit 0.4	Not connected
Bit 0.5	Status - Remote mode
Bit 0.6	Status - General fault
Bit 0.7	Status - general warning
Bit 1.0	Not connected
Bit 1.1	Not connected
Bit 1.2	Not connected
Bit 1.3	Not connected
Bit 1.4	Not connected
Bit 1.5	Not connected
Bit 1.6	Not connected
Bit 1.7	Not connected
Byte 2/3 (analog value)	Not connected
Byte 4/5 *) (analog value)	Not connected
Byte 6/7 *) (analog value)	Not connected
Byte 8/9 *) (analog value)	Not connected

*) for SIMOCODE pro V / pro S, basic type 1 only

3.2.12 Positioner

Table 3- 15 Assignment of cyclic receive / send data, positioner

Cyclic receive data	
Bit 0.0	Device parameters → Motor control → Control stations → PLC/PCS [DP] → Close
Bit 0.1	Device parameters → Motor control → Control stations → PLC/PCS [DP] → Stop
Bit 0.2	Device parameters → Motor control → Control stations → PLC/PCS [DP] → Open
Bit 0.3	Further function blocks → Standard functions → Test / Reset → Test1 - Input
Bit 0.4	Further function blocks → Standard functions → Emergency start → Emergency start - Input
Bit 0.5	Device parameters → Motor control → Control stations → Mode selector S1
Bit 0.6	Further function blocks → Standard functions → Test / Reset → Reset 1 - Input
Bit 0.7	Not connected
Bit 1.0	Not connected
Bit 1.1	Not connected
Bit 1.2	Not connected
Bit 1.3	Not connected
Bit 1.4	Not connected
Bit 1.5	Not connected
Bit 1.6	Not connected
Bit 1.7	Not connected
Byte 2/3 *) (analog value)	Not connected
Cycl. send data	
Bit 0.0	Status - ON < (CLOSED)
Bit 0.1	Status - OFF (Stop)
Bit 0.2	Status - ON > (OPEN)
Bit 0.3	Event - Prewarning overload (I>115 %)
Bit 0.4	Status - Interlocking time active
Bit 0.5	Status - Remote mode
Bit 0.6	Status - General fault
Bit 0.7	Status - general warning
Bit 1.0	Status - positioner runs in OPEN direction
Bit 1.1	Not connected
Bit 1.2	Status - positioner runs in CLOSED direction
Bit 1.3	Not connected
Bit 1.4	Not connected
Bit 1.5	Not connected
Bit 1.6	Not connected
Bit 1.7	Not connected
Byte 2/3 (analog value)	Maximum current I_max
Byte 4/5 *) (analog value)	Not connected
Byte 6/7 *) (analog value)	Not connected
Byte 8/9 *) (analog value)	Not connected

*) for SIMOCODE pro V / pro S, basic type 1 only

3.2.13 Soft starter

Table 3- 16 Assignment of cyclic receive / send data, soft starter

Cycl. receive data	
Bit 0.0	Not connected
Bit 0.1	Device parameters → Motor control → Control stations → PLC/PCS [DP] → OFF
Bit 0.2	Device parameters → Motor control → Control stations → PLC/PCS [DP] → ON
Bit 0.3	Further function blocks → Standard functions → Test / Reset → Test1 - Input
Bit 0.4	Further function blocks → Standard functions → Emergency start → Emergency start - Input
Bit 0.5	Device parameters → Motor control → Control stations → Mode selector S1
Bit 0.6	Further function blocks → Standard functions → Test / Reset → Reset 1 - Input
Bit 0.7	Not connected
Bit 1.0	Not connected
Bit 1.1	Not connected
Bit 1.2	Not connected
Bit 1.3	Not connected
Bit 1.4	Not connected
Bit 1.5	Not connected
Bit 1.6	Not connected
Bit 1.7	Not connected
Byte 2/3 *) (analog value)	Not connected
Cycl. send data	
Bit 0.0	Not connected
Bit 0.1	Status - Off
Bit 0.2	Status - ON>
Bit 0.3	Event - Prewarning overload (I>115 %)
Bit 0.4	Not connected
Bit 0.5	Status - Remote mode
Bit 0.6	Status - General fault
Bit 0.7	Status - general warning
Bit 1.0	Not connected
Bit 1.1	Not connected
Bit 1.2	Not connected
Bit 1.3	Not connected
Bit 1.4	Not connected
Bit 1.5	Not connected
Bit 1.6	Not connected
Bit 1.7	Not connected
Byte 2/3 (analog value)	Maximum current I_max
Byte 4/5 *) (analog value)	Not connected
Byte 6/7 *) (analog value)	Not connected
Byte 8/9 *) (analog value)	Not connected

*) for SIMOCODE pro V / pro S, basic type 1 only

3.2.14 Soft starter with reversing contactor

Table 3- 17 Assignment of cyclic receive / send data, soft starter with reversing contactor

Cycl. receive data	
Bit 0.0	Device parameters → Motor control → Control stations → PLC/PCS [DP] → ON <
Bit 0.1	Device parameters → Motor control → Control stations → PLC/PCS [DP] → OFF
Bit 0.2	Device parameters → Motor control → Control stations → PLC/PCS [DP] → ON >
Bit 0.3	Further function blocks → Standard functions → Test / Reset → Test1 - Input
Bit 0.4	Further function blocks → Standard functions → Emergency start → Emergency start - Input
Bit 0.5	Device parameters → Motor control → Control stations → Mode selector S1
Bit 0.6	Further function blocks → Standard functions → Test / Reset → Reset 1 - Input
Bit 0.7	Not connected
Bit 1.0	Not connected
Bit 1.1	Not connected
Bit 1.2	Not connected
Bit 1.3	Not connected
Bit 1.4	Not connected
Bit 1.5	Not connected
Bit 1.6	Not connected
Bit 1.7	Not connected
Byte 2/3 *) (analog value)	Not connected
Cycl. send data	
Bit 0.0	Status - ON<
Bit 0.1	Status - Off
Bit 0.2	Status - ON>
Bit 0.3	Event - Prewarning overload (I>115 %)
Bit 0.4	Status - Interlocking time active
Bit 0.5	Status - Remote mode
Bit 0.6	Status - General fault
Bit 0.7	Status - general warning
Bit 1.0	Not connected
Bit 1.1	Not connected
Bit 1.2	Not connected
Bit 1.3	Not connected
Bit 1.4	Not connected
Bit 1.5	Not connected
Bit 1.6	Not connected
Bit 1.7	Not connected
Byte 2/3 (analog value)	Maximum current I_max
Byte 4/5 *) (analog value)	Not connected
Byte 6/7 *) (analog value)	Not connected
Byte 8/9 *) (analog value)	Not connected

*) for SIMOCODE pro V / pro S, basic type 1 only

3.3 Tables, PROFIBUS data records

3.3.1 PROFIBUS tables

3.3.1.1 Abbreviations and specifications

Abbreviations

The following abbreviations are used in the tables:

Table 3- 18 Abbreviations

Abbreviation	Meaning
BU0	SIMOCODE pro S basic unit
BU1	SIMOCODE pro C basic unit
BU2	SIMOCODE Pro V basic unit
BU2+	2nd generation SIMOCODE pro V basic unit (for UM(+))
IM	Current measuring module
UM	1st generation current / voltage measuring module
UM+	2nd generation current / voltage measuring module
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
OP	Operator panel
OPD	Operator panel with display
AM	Analog module
EM	3UF7500 ground-fault module
EM+	3UF7510 ground-fault module
MM	Multifunction module
TM	Temperature module
Th	Thermistor
GF	Group fault, control function
Cycl.	Cyclic
Acycl.	Acyclic
F	Fault
M	Status information
W	Warning

Specifications

The following specifications apply in the tables:

Table 3- 19 Table specifications (example)

Designation	Type	Range	Unit	Information
Reserved	Byte[4] *)			
Cos phi	Byte	0 ... 100	1 %	BU2
Reserved	Byte[5] *)			
Max. current I_max	Word	0 ... 65535	1 % / I_s	BU0, BU1, BU2 **)

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

**) Entry relevant for basic unit 1 and basic unit 2

Parameters that can be changed during operation

Event - PRM error number (bytes):

If parameterization is not possible, the number of the parameter group (PRM group) that caused the error is communicated here.

Byte.Bit	Designation (PRM group)	...
0.0	Reserved	
4.0	Device configuration (12)	Parameter group 12
	⋮	

Figure 3-1 Example for parameter group

3.3.1.2 Socket assignment table - digital

This table contains all assignment numbers (No.) of the sockets (digital). You only need these assignment numbers if you, for example, use a user program to fill data records and write them back.

Table 3- 20 Socket assignment table - digital

No.	Designation	Designation	Information
0	Static level	Not connected	BU0 BU1 BU2(+)
1		Fixed level ,0	BU0 BU1 BU2(+)
2		Fixed level ,1	BU0 BU1 BU2(+)
3		*Reserved*	
4		*Reserved*	
5		*Reserved*	
6		*Reserved*	
7		*Reserved*	
8	Basic unit (BU)	BU - Test / Reset button	BU0 BU1 BU2(+)
9		BU - Input 1	BU0 BU1 BU2(+)
10		BU - Input 2	BU0 BU1 BU2(+)
11		BU - Input 3	BU0 BU1 BU2(+)
12		BU - Input 4	BU0 BU1 BU2(+)
13		*Reserved*	
14		*Reserved*	
15		*Reserved*	
16	Digital module DM	DM1 - Input 1	DM1 MM
17		DM1 - Input 2	DM1 MM
18		DM1 - Input 3	DM1 MM
19		DM1 - Input 4	DM1 MM
20		DM2 - Input 1	DM2
21		DM2 - Input 2	DM2
22		DM2 - Input 3	DM2
23		DM2 - Input 4	DM2
24		DM-FL sensor channel 1 Y12	DM-FL
25		DM-FL sensor channel 1 Y22	DM-FL
26		*Reserved*	
27		*Reserved*	
28		*Reserved*	
29		*Reserved*	
30		*Reserved*	
31		*Reserved*	
32	Operator panel OP / OPD	OP - Test / Reset button	OP OPD
33		OP - Button 1	OP OPD
34		OP - Button 2	OP OPD
35		OP - Button 3	OP OPD

No.	Designation	Designation	Information
36		OP - Button 4	OP OPD
37		*Reserved*	
38		*Reserved*	
39		*Reserved*	
40	DPV1/RS-232 interface (acyclic data)	Acyclic receive data - Bit 0.0	BU0 BU1 BU2(+)
41		Acyclic receive data - Bit 0.1	BU0 BU1 BU2(+)
42		Acyclic receive data - Bit 0.2	BU0 BU1 BU2(+)
43		Acyclic receive data - Bit 0.3	BU0 BU1 BU2(+)
44		Acyclic receive data - Bit 0.4	BU0 BU1 BU2(+)
45		Acyclic receive data - Bit 0.5	BU0 BU1 BU2(+)
46		Acyclic receive data - Bit 0.6	BU0 BU1 BU2(+)
47		Acyclic receive data - Bit 0.7	BU0 BU1 BU2(+)
48		Acyclic receive data - Bit 1.0	BU0 BU1 BU2(+)
49		Acyclic receive data - Bit 1.1	BU0 BU1 BU2(+)
50		Acyclic receive data - Bit 1.2	BU0 BU1 BU2(+)
51		Acyclic receive data - Bit 1.3	BU0 BU1 BU2(+)
52		Acyclic receive data - Bit 1.4	BU0 BU1 BU2(+)
53		Acyclic receive data - Bit 1.5	BU0 BU1 BU2(+)
54		Acyclic receive data - Bit 1.6	BU0 BU1 BU2(+)
55		Acyclic receive data - Bit 1.7	BU0 BU1 BU2(+)
56	PLC/PCS interface PLC [DPV0] (cyclic data)	Cyclic receive data - Bit 0.0	BU0 BU1 BU2(+)
57		Cyclic receive data - Bit 0.1	BU0 BU1 BU2(+)
58		Cyclic receive data - Bit 0.2	BU0 BU1 BU2(+)
59		Cyclic receive data - Bit 0.3	BU0 BU1 BU2(+)
60		Cyclic receive data - Bit 0.4	BU0 BU1 BU2(+)
61		Cyclic receive data - Bit 0.5	BU0 BU1 BU2(+)
62		Cyclic receive data - Bit 0.6	BU0 BU1 BU2(+)
63		Cyclic receive data - Bit 0.7	BU0 BU1 BU2(+)
64		Cyclic receive data - Bit 1.0	BU0 BU1 BU2(+)
65		Cyclic receive data - Bit 1.1	BU0 BU1 BU2(+)
66		Cyclic receive data - Bit 1.2	BU0 BU1 BU2(+)
67		Cyclic receive data - Bit 1.3	BU0 BU1 BU2(+)
68		Cyclic receive data - Bit 1.4	BU0 BU1 BU2(+)
69		Cyclic receive data - Bit 1.5	BU0 BU1 BU2(+)
70		Cyclic receive data - Bit 1.6	BU0 BU1 BU2(+)
71		Cyclic receive data - Bit 1.7	BU0 BU1 BU2(+)
72	Enabled control command	Enabled control command ON<<	Dependent on the control function
73		Enabled control command ON<	
74		Enabled control command - OFF	
75		Enabled control command ON>	
76		Enabled control command ON>>	
77		*Reserved*	

No.	Designation	Designation	Information
78		*Reserved*	
79		*Reserved*	
80	Contactor controls	Contactor controls 1 QE1	Dependent on the control function
81		Contactor controls 2 QE2	
82		Contactor controls 3 QE3	
83		Contactor controls 4 QE4	
84		Contactor controls 5 QE5	
85		*Reserved*	
86		*Reserved*	
87		*Reserved*	
88	Lamp controls	Display - QLE<<(ON<<)	Dependent on the control function
89		Display - QLE<(ON<)	
90		Indication - QLA (OFF)	
91		Display - QLE>(ON>)	
92		Display - QLE>>(ON>>)	
93		Display - QLS (fault)	BU0 BU1 BU2(+)
94		*Reserved*	
95		*Reserved*	
96	Status information - General	Status - General fault	BU0 BU1 BU2(+)
97		Status - General warning	BU0 BU1 BU2(+)
98		Status - Device	BU0 BU1 BU2(+)
99		Status - Bus	BU0 BU1 BU2(+)
100		Status - PLC/PCS	BU0 BU1 BU2(+)
101		Status - Current flowing	IM UM(+)
102		*Reserved*	
103		*Reserved*	
104	Status information - Receive	Status - ON<<	Dependent on the control function
105		Status - ON<	
106		Status - Off	
107		Status - ON>	
108		Status - ON>>	
109		Status - Start active	BU0 BU1 BU2(+)
110		Status - Interlocking time active	All reversing starters and positioners
111		Status - Change-over pause active	Star-delta starter, Dahlander starter, pole-changing starter
112		Status - Runs in open direction	Dependent on the control function
113		Status - Runs in close direction	
114		Status - FC	
115		Status - FO	
116		Status - TC	
117		Status - TO	

No.	Designation	Designation	Information
118		Status - Cold start (TPF)	BU0 BU1 BU2(+)
119		Status - OPO	BU2(+)
120		Status - Remote mode	BU0 BU1 BU2(+)
121	Status information - Protection	Status - Emergency start executed	IM UM(+)
122		Status - Cooling down period active	IM UM(+)
123		Status - Pause time active	IM UM(+)
124	Status information - Miscellaneous	Status - Device check active	BU0 BU1 BU2(+)
125		Status - Phase sequence 1-2-3	UM(+)
126		Status - Phase sequence 3-2-1	UM(+)
127		Status - DM-F enabling circuit	DM-F
128	Events - Protection	Event - Overload operation	IM UM(+)
129		Event - Unbalance	IM UM(+)
130		Event - Overload	IM UM(+)
131		Event - overload + phase failure	IM UM(+)
132		Event - Internal ground fault	IM UM(+)
133		Event - External ground fault	EM MM
134		Event - Warning ext. ground fault	EM MM
135		Event - Thermistor overload	Th
136		Event - Thermistor short-circuit	Th
137		Event - Thermistor open circuit	Th
138		Event - TM warning T>	TM MM
139		Event - TM trip T>	TM MM
140		Event - TM sensor fault	TM MM
141		Event - TM out of range	TM MM
142		Event - EM+ open circuit	EM+ MM
143		Event - EM+ short-circuit	EM+ MM
144	Events - Level monitoring	Event - Warning I>	IM UM(+)
145		Event - Warning I<	IM UM(+)
146		Event - Warning P>	UM(+)
147		Event - Warning P<	UM(+)
148		Event - Warning cos phi<	UM(+)
149		Event - Warning U<	UM(+)
150		Event - Warning 0/4 - 20 mA>	AM
151		Event - Warning 0/4 - 20 mA <	AM
152		Event - Trip I>	IM UM(+)
153		Event - Trip I<	IM UM(+)
154		Event - Trip P>	UM(+)
155		Event - Trip P<	UM(+)
156		Event - Trip cos phi<	UM(+)
157		Event - Trip U<	UM(+)
158		Event - trip 0/4-20 mA>	AM
159		Event - trip 0/4-20 mA<	AM

No.	Designation	Designation	Information
160		Event - Stalled rotor	IM UM(+)
161	Events - Protection	Event - Warning internal ground fault	BU2(+)
162		*Reserved*	
163		Event - No start permitted	BU0 BU1 BU2(+)
164	Events - Level monitoring	Event - No. of starts >	BU0 BU1 BU2(+)
165		Event - Just one start possible	BU0 BU1 BU2(+)
166		Event - Motor operating hours >	BU0 BU1 BU2(+)
167		Event - Motor stop time >	BU0 BU1 BU2(+)
168		Event - Limit 1	BU2(+)
169		Event - Limit 2	BU2(+)
170		Event - Limit 3	BU2(+)
171		Event - Limit 4	BU2(+)
172	Events - Miscellaneous	Event - External fault 1	BU0 BU1 BU2(+)
173		Event - External fault 2	BU0 BU1 BU2(+)
174		Event - External fault 3	BU0 BU1 BU2(+)
175		Event - External fault 4	BU0 BU1 BU2(+)
176		Event - External fault 5	BU2(+)
177		Event - External fault 6	BU2(+)
178		*Reserved*	
179		*Reserved*	
180		Event - Analog module open circuit	AM
181		Event - DM-F safety-related tripping	DM-F
182		Event - DM-F - Test requirement	DM-F
183		*Reserved*	
184	Events - Time stamp function	Event - Timestamping function active + OK	BU2(+)
185		*Reserved*	
186	Events - Miscellaneous	Event - DM-FL safety o.k	DM-FL
187		Event - DM-FP PROFIsafe active	DM-FP
188	Events - System interface	Event - Configured operator panel missing	BU0 BU1 BU2(+)
189		*Reserved*	
190	Warnings - Miscellaneous	Warning - DM-F feedback circuit	DM-F
191		Warning - DM-FL simultaneity	DM-FL
192	Faults - General	Fault - HW fault basic unit	BU0 BU1 BU2(+)
193		Fault - Module fault (e.g. IM, DM)	BU0 BU1 BU2(+)
194		Fault - temporary components (e.g. memory module)	BU0 BU1 BU2(+)
195		Fault - configuration error	BU0 BU1 BU2(+)
196		Fault - Parameterization	BU0 BU1 BU2(+)
197		Fault - Bus	BU0 BU1 BU2(+)
198		Fault - PLC/PCS	BU0 BU1 BU2(+)
199		*Reserved*	

No.	Designation	Designation	Information
200	Faults - Control	Fault - Execution Time ON	Not for overload relays
201		Fault - Execution Time OFF	
202		Fault - feedback (FB) ON	
203		Fault - feedback (FB) OFF	
204		Fault - Stalled positioner	Positioner
205		Fault - Double 0	Solenoid valve / positioner
206		Fault - Double 1	Solenoid valve / positioner
207		Fault - End position	Solenoid valve / positioner
208		Fault - Antivalence	Positioner
209		Fault - Cold start (TPF) fault	BU0 BU1 BU2(+)
210		Fault - power failure (UVO)	BU2(+)
211		Fault - Operational Protection Off (OPO)	BU2(+)
212		*Reserved*	
213		*Reserved*	
214		*Reserved*	
215		*Reserved*	
216	Freely-programmable elements	Truth table 1 3I/1O output	BU0 BU1 BU2(+)
217		Truth table 2 3I/1O output	BU0 BU1 BU2(+)
218		Truth table 3 3I/1O output	BU0 BU1 BU2(+)
219		Truth table 4 3I/1O output	BU0 BU2(+)
220		Truth table 5 3I/1O output	BU2(+)
221		Truth table 6 3I/1O output	BU2(+)
222		Truth table 7 2I/1O output	BU0 BU2(+)
223		Truth table 8 2I/1O output	BU0 BU2(+)
224		Truth table 9 5I/2O output 1	BU2(+)
225		Truth table 9 5I/2O output 2	BU2(+)
226		*Reserved*	
227		*Reserved*	
228		*Reserved*	
229		*Reserved*	
230		*Reserved*	
231		*Reserved*	
232		Timer 1 output	BU0 BU1 BU2(+)
233		Timer 2 output	BU0 BU1 BU2(+)
234		Timer 3 output	BU2(+)
235		Timer 4 output	BU2(+)
236		Counter 1 output	BU0 BU1 BU2(+)
237		Counter 2 output	BU0 BU1 BU2(+)
238		Counter 3 output	BU2(+)
339		Counter 4 output	BU2(+)
240		Signal conditioning 1 output	BU0 BU1 BU2(+)

No.	Designation	Designation	Information
241		Signal conditioning 2 output	BU0 BU1 BU2(+)
242		Signal conditioning 3 output	BU0 BU2(+)
243		Signal conditioning 4 output	BU0 BU2(+)
244		Non-volatile element 1 output	BU0 BU1 BU2(+)
245		Non-volatile element 2 output	BU0 BU1 BU2(+)
246		Non-volatile element 3 output	BU2(+)
247		Non-volatile element 4 output	BU2(+)
248		Flashing 1 output	BU0 BU1 BU2(+)
249		Flashing 2 output	BU0 BU1 BU2(+)
250		Flashing 3 output	BU0 BU1 BU2(+)
251		Flicker 1 output	BU0 BU1 BU2(+)
252		Flicker 2 output	BU0 BU1 BU2(+)
253		Flicker 3 output	BU0 BU1 BU2(+)
254		*Reserved*	
255		*Reserved*	

3.3.1.3 Socket assignment table - analog

This table contains all assignment numbers (No.) of the sockets (analog). You only need these assignment numbers if you, for example, use a user program to fill data records and write them back. All inputs for analog data can only process values of type "Word" (2 bytes). In order to also be able to process values of type "Byte", the following applies:

The byte value is processed as a low byte, the high byte is always 0.

Table 3- 21 Socket assignment table - analog

No.	Designation	Unit	Information
0	Not connected		BU0 BU1 BU2(+)
1	*Reserved*		
2	*Reserved*		
3	*Reserved*		
4	Timer 1 - Actual value	100 ms	BU0 BU1 BU2(+)
5	Timer 2 - Actual value	100 ms	BU0 BU1 BU2(+)
6	Timer 3 - Actual value	100 ms	BU2(+)
7	Timer 4 - Actual value	100 ms	BU2(+)
8	Counter 1 - Actual value		BU0 BU1 BU2(+)
9	Counter 2 - Actual value		BU0 BU1 BU2(+)
10	Counter 3 - Actual value		BU2(+)
11	Counter 4 - Actual value		BU2(+)
12	*Reserved*		
13	*Reserved*		
14	*Reserved*		
15	*Reserved*		
16	Max. current I_max	1 % / Is	IM UM
17	Current I_L1	1 % / Is	IM UM
18	Current I_L2	1 % / Is	IM UM
19	Current I_L3	1 % / Is	IM UM
20	Phase unbalance	1 %	IM UM
21	Ground-fault current	1 mA	UM+
22	Internal ground fault - last trip current	1 mA	UM+
23	Voltage U_min	1 V	UM(+)
24	Voltage U_L1	1 V	UM(+)
25	Voltage U_L2	1 V	UM(+)
26	Voltage U_L3	1 V	UM(+)
27	Cos phi	1 %	UM(+)
28	Frequency	0.01 Hz	UM+
29	*Reserved*		
30	Number of overload trips		IM UM(+)
31	Int. number of overload trips		IM UM(+)
32	Thermal motor model	2 %	IM UM(+)
33	Time to trip	100 ms	IM UM(+)

No.	Designation	Unit	Information
34	Recovery time	100 ms	IM UM(+)
35	Last trip current	1 % / I_e	IM UM(+)
36	TM - Max. temperature	1 K	TM MM
37	TM - Temperature 1	1 K	TM MM
38	TM - Temperature 2	1 K	TM
39	TM - Temperature 3	1 K	TM
40	Permissible starts - Actual value		BU0 BU1 BU2(+)
41	Motor stop time	1 h	BU0 BU1 BU2(+)
42	DM-F - Time until test required	1 week	DM-F
43	Last trip current	1 mA	EM(+) MM
44	AM - Input 1	See 1)	AM
45	AM - Input 2	See 1)	AM
46	*Reserved*		
47	Ground-fault current	1 mA	MMa EM(+)
)48	Acyclic receive data - analog value		BU0 BU1 BU2(+)
49	PLC / PCS receive - analog value 1		BU0 BU2(+)
50	*Reserved*		
51	Number of parameterizations		BU0 BU1 BU2(+)
52	Motor operating hours - H word	1 s	BU0 BU1 BU2(+)
53	Motor operating hours - L word		BU0 BU1 BU2(+)
54	Int. motor operating hours - H word		BU0 BU1 BU2(+)
55	Int. motor operating hours - L word		BU0 BU1 BU2(+)
56	Device operating hours - H word		BU0 BU1 BU2(+)
57	Device operating hours - L word		BU0 BU1 BU2(+)
58	Number of starts - H word		BU0 BU1 BU2(+)
59	Number of starts - L word		BU0 BU1 BU2(+)
60	Int. number of starts CW - H word		BU0 BU1 BU2(+)
61	Int. number of starts CW - L word		BU0 BU1 BU2(+)
62	Int. number of starts CCW - H word		BU0 BU1 BU2(+)
63	Int. number of starts CCW - L word		BU0 BU1 BU2(+)
64	Energy W - H word		UM(+)
65	Energy W - L word	1 kWh	UM(+)
66 ... 69	*Reserved*		
70	Active power P - H word	1 W	BU2(+)
71	Active power P - L word		BU2(+)
72	Apparent power S - H word	1 VA	BU2(+)
73	Apparent power S - L word		BU2(+)
74 ... 85	*Reserved*		
86	Calculator 1 - output		BU2(+)
87 ... 89	*Reserved*		
90	Calculator 2 - output		BU2(+)
91 ... 103	*Reserved*		

No.	Designation	Unit	Information
104 2)	Max. current I_max_10mA	10 mA	
105 2)	Current I_L1_10mA	10 mA	
106 2)	Current I_L2_10mA	10 mA	
107 2)	Current I_L3_10mA	10 mA	
108 2)	Max. current I_max_100mA	100 mA	
109 2)	Current I_L1_100mA	100 mA	
110 2)	Current I_L2_100mA	100 mA	
111 2)	Current I_L3_100mA	100 mA	
...			
255	*Reserved*		

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

2) For SIMOCODE pro S only

Table 3- 22 Socket assignment table - analog in float format

No.	Designation	Unit	Info
0	Not connected		BU0 BU1 BU2(+)
1	*Reserved*		
2	*Reserved*		
3	*Reserved*		
4	Current I_max_A_F	1 A	UM+
5	Current I_avg_A_F	1 A	UM+
6	Current I_L1_A_F	1 A	UM+
7	Current I_L2_A_F	1 A	UM+
8	Current I_L3_A_F	1 A	UM+
9	Active power P_F	1 W	UM+
10	Apparent power S_F	1 VA	UM+
11	Voltage UL1_F	1 V	UM+
12	Voltage UL2_F	1 V	UM+
13	Voltage UL3_F	1 V	UM+
14	Cos phi_F	1 %	UM+
15	Frequency_F	1 Hz	UM+
16	*Reserved*		
...	*Reserved*		
255	*Reserved*		

3.3.1.4 Detailed messages of the slave diagnostics

The following table contains the detailed messages of the slave diagnostics for status information and the hardware interrupt. This information is also contained in data record 92.

Note

Structure of the slave diagnostics

The diagnostic messages listed below are the same as those contained in the hardware interrupts transferred via PROFIBUS. See also Chapter "Structure of the slave diagnostics → Hardware interrupt - Structure" in the SIMOCODE pro – System Manual (https://support.industry.siemens.com/cs/ww/en/view/109743957).

Table 3- 23 Detailed messages of the slave diagnostics

Byte.Bit	Status message		Information
0.0	Faults - control	Fault - execution ON command	BU0 BU1 BU2(+)
0.1		Fault - execution STOP command	BU0 BU1 BU2(+)
0.2		Fault - feedback (FB) ON	BU0 BU1 BU2(+)
0.3		Fault - feedback (FB) OFF	BU0 BU1 BU2(+)
0.4		Fault - stalled positioner	BU2(+)
0.5		Fault - double 0	BU2(+)
0.6		Fault - double 1	BU2(+)
0.7		Fault - end position	BU2(+)
1.0		Fault - antivalence	BU2(+)
1.1		Fault - Cold start (TPF) fault	BU0 BU1 BU2(+)
1.2		Fault - power failure (UVO)	BU2(+)
1.3		Fault - Operational Protection Off (OPO)	BU2(+)
1.4		*Reserved*	
2.0		*Reserved*	
2.1	Faults - Protection	Fault - unbalance	IM UM
2.2		Fault - overload	IM UM
2.3		Fault - overload + phase failure	IM UM
2.4		Fault - int. ground fault	IM UM
2.5		Fault - ext. ground fault	EM
2.6		*Reserved*	
2.7		Fault - thermistor overload	Th
3.0		Fault - thermistor short circuit	Th
3.1		Fault - thermistor open circuit	Th
3.2		*Reserved*	
3.3		Fault - TM trip T>	TM MM
3.4		Fault - TM sensor fault	TM MM
3.5		Fault - TM out of range	TM MM
3.6		Fault - EM+ open circuit	MM EM+

Byte.Bit	Status message		Information
3.7		Fault - EM+ short-circuit	MM EM+
4.0	Trips - level monitoring	Fault - trip I>	IM UM
4.1		Fault - trip I<	IM UM
4.2		Fault - trip P>	UM
4.3		Fault - trip P<	UM
4.4		Fault - trip cos phi<	UM
4.5		Fault - trip U<	UM
4.6		Fault - trip 0/4 - 20 mA>	AM
4.7		Fault - trip 0/4 - 20 mA<	AM
5.0		Fault - stalled rotor	IM UM
5.1		*Reserved*	
5.4		Fault - number of starts >	BU0 BU1 BU2(+)
5.5		*Reserved*	
6.0	Faults - Miscellaneous	Fault - external fault 1	BU0 BU1 BU2(+)
6.1		Fault - external fault 2	BU0 BU1 BU2(+)
6.2		Fault - external fault 3	BU0 BU1 BU2(+)
6.3		Fault - external fault 4	BU0 BU1 BU2(+)
6.4		Fault - external fault 5	BU2(+)
6.5		Fault - external fault 6	BU2(+)
6.6		*Reserved*	
6.7		*Reserved*	
7.0		Fault - analog module open circuit	AM
7.1		Fault - test trip	BU0 BU1 BU2(+)
7.2		DM-F safety-related tripping	DM-FL DM-FP
7.3		Fault - DM-F wiring	DM-FL DM-FP
7.4		Fault - DM-FL cross circuit	DM-FL
8.0	Warnings - Protection	Warning - Overload operation	IM UM
8.1		Warning - Unbalance	IM UM
8.2		Warning - Overload	IM UM
8.3		Warning - Overload + phase failure	IM UM
8.4		Warning - internal ground fault	IM UM
8.5		Warning - external ground fault	EM MM
8.6		*Reserved*	
8.7		Warning - Thermistor overload	Th
9.0		Warning - Thermistor short circuit	Th
9.1		Warning - Thermistor open circuit	Th
9.2		Warning - TM warning T>	TM MM
9.3		*Reserved*	
9.4		Warning - TM sensor fault	TM MM
9.5		Warning - TM out of range	TM MM
9.6		*Reserved*	

Byte.Bit	Status message		Information
10.0	Warnings - Level monitoring	Warning - Warning I>	IM UM
10.1		Warning - Warning I<	IM UM
10.2		Warning - Warning P>	UM
10.3		Warning - Warning P<	UM
10.4		Warning - Warning cos phi<	UM
10.5		Warning - Warning U<	UM
10.6		Warning - warning 0/4 - 20 mA>	AM
10.7		Warning - warning 0/4 - 20 mA>	AM
11.0		Warning - Stalled rotor	IM UM
11.1		*Reserved*	
11.3		Warning - No start permitted	BU0 BU1 BU2(+)
11.4		Warning - Number of starts >	BU0 BU1 BU2(+)
11.5		Warning - Just one start possible	BU0 BU1 BU2(+)
11.6		Warning - Motor operating hours>	BU0 BU1 BU2(+)
11.7		Warning - Motor stop time >	BU0 BU1 BU2(+)
12.0	Warnings - Miscellaneous	Warning - external fault 1	BU0 BU1 BU2(+)
12.1		Warning - external fault 2	BU0 BU1 BU2(+)
12.2		Warning - external fault 3	BU0 BU1 BU2(+)
12.3		Warning - external fault 4	BU0 BU1 BU2(+)
12.4		Warning - external fault 5	BU2(+)
12.5		Warning - external fault 6	BU2(+)
12.6		*Reserved*	
12.7		*Reserved*	
13.0		Warning - Analog module open circuit	BU2(+)
13.1		Warning - DM-F safety-related tripping	
13.2		Warning - Test requirement	DM-FL DM-FP
13.3		*Reserved*	
13.4		*Reserved*	
13.5		*Reserved*	
13.6		Warning - DM-F feedback circuit	DM-FL DM-FP
13.7		Warning - DM-FL	DM-FL
14.0		*Reserved*	
14.1	Status information - Protection	Status - Emergency start executed	IM UM
14.2		Status - Cooling down period active	IM UM
14.3		Status - Pause time active	IM UM
14.4		*Reserved*	
14.5		*Reserved*	
14.6	Status information - Receive	Status - Cold starting (TPF)	BU0 BU1 BU2(+)

Byte.Bit	Status message		Information
14.7		*Reserved*	
15.0	Events - parameterization	Event - startup parameter block active	BU0 BU1 BU2(+)
15.1		Event - Parameter changes not allowed in the current operating state	BU0 BU1 BU2(+)
15.2		Event - Device does not support the required functions	BU0 BU1 BU2(+)
15.3		Event - Wrong parameter	BU0 BU1 BU2(+)
15.4		Event - Wrong password	BU0 BU1 BU2(+)
15.5		Event - Password protection active	BU0 BU1 BU2(+)
15.6		Event - Factory settings	BU0 BU1 BU2(+)
15.7		Event - Parameterization active	BU0 BU1 BU2(+)
17.0		Event - DM-FL configuration mode	DM-FL
17.1		Event - DM FL configuration deviation	DM-FL
17.2		Event - DM-FL waiting for start-up test	DM-FL
17.3		Event - DM FP F PRM error	DM-FP
17.4		*Reserved*	

3.3.2 PROFIBUS data records

3.3.2.1 PROFIBUS data records - general

Data records - Overview

Table 3- 24 Data records - Overview

Data record No.	Description	Read / write
1	S7 system diagnostics (Page 164)	Read
63	Analog value recording (Page 166)	Read
67	Process image output (Page 166)	Read
69	Process image input (Page 167)	Read
72	Error buffer (Page 168)	Read
73	Event memory (Page 168)	Read
92	Device diagnostics (faults, warnings, status information) (Page 169)	Read
94	Measured values (Page 176)	Read
95	Service / statistical data (Page 178)	Read / write
130	Basic device parameters 1 (Page 179) (BU0 BU1 BU2)	Read / write
131	Basic device parameters 2 (Page 186) (BU0 BU1 BU2)	Read / write
132	Extended device parameters 1 (Page 190) (BU2)	Read / write
133	Extended device parameters 2 (Page 197) (BU0 BU2)	Read / write
139	Labeling (Page 201)	Read / write
160	Communication parameters (Page 202)	Read / write
165	Marking (Page 202)	Read / write
202	Acyclic receive (Page 203)	Read / write
203	Acyclic send (Page 204)	Read
224	Password protection (Page 205)	Write

Writing / reading data records

Access to data records via the slot and index

- Slot: Access via slot 1
- Index: Data record number

Writing / reading data records with STEP7

You can access the data records from the user program.

- Writing data records:
  - S7-DPV1 master: by calling SFB 53 "WR_REC" or SFC 58
  - S7 master: by calling SFC58
- Reading data sets:
  - S7-DPV1 master: by calling SFB 52 "RD_REC" or SFC 59
  - S7 master: by calling SFC 59

Further information

You will find further information about the SFBs:

- in Reference Manual System software for the S7-300/400, system and standard functions (https://support.automation.siemens.com/WW/view/en/44240604)
- In the STEP7 online help

Byte arrangements

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

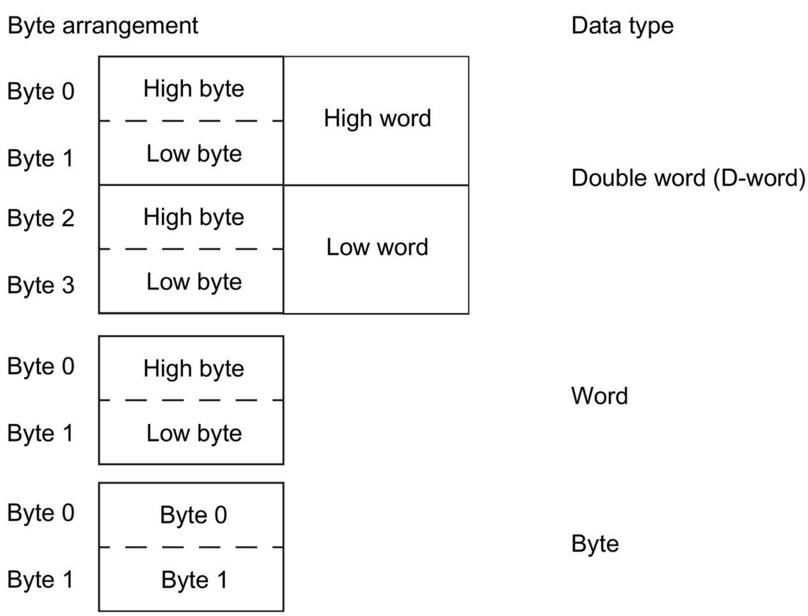


Figure 3-2 Byte arrangement in "big endian" format

Abbreviations

The following abbreviations are used in the tables:

Table 3- 25 Abbreviations

Abbreviation	Meaning
BU0	SIMOCODE pro S basic unit
BU1	SIMOCODE pro C basic unit
BU2	SIMOCODE pro V basic unit
BU2(+)	2nd generation SIMOCODE pro V basic unit (for UM(+))
BU2_MBR(+)	2nd generation SIMOCODE pro V Modbus RTU basic unit (for UM(+))
IM	Current measuring module
UM	Current / voltage measuring module
UM(+)	2nd generation current / voltage measuring module
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
MM	Multifunction module
OP	Operator panel
OPD	Operator panel with display
AM	Analog module
EM	Ground-fault module
TM	Temperature module
Th	Thermistor
GF	Control function
Cycl.	Cyclic
Acycl.	Acyclic
F	Fault
M	Status information
W	Warning

Specifications

The following specifications apply in the tables:

Designation	Type	Range	Unit	Information
*Reserved *)*	*Byte[4] *)*			
Max. current I_max	Word	0 … 65535	1 % / I_s	BU0 BU1 BU2
*) Items in italics are not relevant (reserved) and must be filled with "0" when written to. Parameters that can be changed during operation. BU0 BU1 BU2: Entry relevant for basic units SIMOCODE pro S, SIMOCODE pro C, and SIMOCODE pro V.				

Settings are valid/can only be made when the corresponding system components are used.

"Float" data type

32-bit floating-point number

S: Sign (0 = positive; 1 = negative)

E: Exponent

M: Mantissa

31	30	29	28	27	26	25	24	23	22	21	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
S	E: Exponent + 127 (8 bits)								M: Mantissa (23 bits)																						

3.3.2.2 Data record 0/1 - S7 system diagnostics

Table 3- 26 Data record 0/1 S7 system diagnostics

Byte Bit	DR0	DS1	Designation	Type	No error	Error	Information
0.0	X	X	Module fault / OK	Bit	0	1	
0.1	X	X	Internal fault	Bit	0	0	
0.2	X	X	External fault	Bit	0	1	
0.3	X	X	Channel fault	Bit	0	1	
0.4	X	X	External auxiliary voltage missing	Bit	0	0	
0.5	X	X	Front panel plug missing	Bit	0	0	
0.6	X	X	Module not parameterized	Bit	0	0	
0.7	X	X	Wrong parameters on module	Bit	0	0	
1.0	X	X	Module type	Bit[4]	3	3	
1.4	X	X	Channel information available	Bit	1	1	
1.5	X	X	Application information available	Bit	0	0	
1.6	X	X	Substitute diagnosis alarm	Bit	0	0	
1.7	*X*	*X*	*Reserved = 0*	*Bit*	*0*	*0*	
2.0	X	X	Application module wrong / missing	Bit	0	0	
2.1	X	X	Communication fault	Bit	0	0	
2.2	X	X	Operating state (0=RUN, 1=STOP)	Bit	0	0	
2.3	X	X	Time monitoring activated	Bit	0	0	
2.4	X	X	Supply voltage within module failed	Bit	0	0	
2.5	X	X	Battery flat (BATTF)	Bit	0	0	
2.6	X	X	Total backup power failed	Bit	0	0	
2.7	X	X	Reserved = 0	Bit	0	0	
3.0	X	X	Rack failure (detected by IM / UM)	Bit	0	0	
3.1	X	X	Processor failure	Bit	0	0	
3.2	X	X	EEPROM error	Bit	0	0	
3.3	X	X	RAM error	Bit	0	0	
3.4	X	X	ADU/DAU error	Bit	0	0	
3.5	X	X	Blown fuse	Bit	0	0	
3.6	X	X	PRAL missing	Bit	0	0	
3.7	*X*	*X*	*Reserved = 0*	*Bit*	*0*	*0*	
4.0		X	Channel type	Byte	0x7D	0x7D	
5.0		X	Length of the channel-specific diagnostics	Byte	0x20	0x20	
6.0		X	Number of channels	Byte	0x01	0x01	
7.0		X	Channel fault vector (one bit per channel)	Byte	0x00	0x01	
8.0		*X*	*Reserved*	*Bit*	*0*	*0*	
8.1		X	Short circuit	Bit	0	0	
8.2		X	Undervoltage	Bit	0	0	

Byte Bit	DR0	DS1	Designation	Type	No error	Error	Information
8.3		X	Overvoltage	Bit	0	0	
8.4		X	Overload	Bit	0	0	
8.5		X	Overtemperature	Bit	0	0	
8.6		X	Open circuit	Bit	0	0	
8.7		X	Upper limit overshot	Bit	0	0	
9.0		X	Lower limit undershot	Bit	0	0	
9.1		X	Error	Bit	0	X	Fault F9
9.2		*X*	*Reserved*	*Bit*	*0*	*0*	
9.3		*X*	*Reserved*	*Bit*	*0*	*0*	
9.4		*X*	*Reserved*	*Bit*	*0*	*0*	
9.5		*X*	*Reserved*	*Bit*	*0*	*0*	
9.6		*X*	*Reserved*	*Bit*	*0*	*0*	
9.7		*X*	*Reserved*	*Bit*	*0*	*0*	
10.0		X	Parameterization error	Bit	0	X	Fault F16
10.1		X	Sensor or load voltage missing	Bit	0	0	
10.2		X	Fuse defective	Bit	0	0	
10.3		*X*	*Reserved*	*Bit*	*0*	*0*	
10.4		X	Earth fault	Bit	0	0	
10.5		X	Reference channel fault	Bit	0	0	
10.6		X	Process alarm missing	Bit	0	0	
10.7		X	Actuator warning	Bit	0	0	
11.0		X	Actuator trip	Bit	0	0	
11.1		X	Safety-related tripping	Bit	0	0	
11.2		X	External fault	Bit	0	0	
11.3		X	Non-specific error	Bit	0	0	
11.4		*X*	*Reserved*	*Bit*	*0*	*0*	
11.5		*X*	*Reserved*	*Bit*	*0*	*0*	
11.6		*X*	*Reserved*	*Bit*	*0*	*0*	
11.7		*X*	*Reserved*	*Bit*	*0*	*0*	
12.0		*X*	*Reserved*	*Byte[4]*	*0*	*0*	

3.3.2.3 Data record 63 - Analog value recording

Table 3- 27 Data record 63 - Analog value recording

Byte.Bit	Designation	Type	Range	Information
0.0	StartPos	Word	0	BU2(+)
2.0	Channel No.	Byte	1	BU2(+)
3.0	Analog value record currently running	Bit	0, 1	BU2(+)
3.1	Trigger event occurred	Bit	0, 1	BU2(+)
3.2	Reserved	Bit[6]	0	
4.0	Measured value (0)	Word	0 ... 65535	BU2(+)
6.0	Measured value (1)	Word	0 ... 65535	BU2(+)
...				
122.0	Measured value (59)	Word	0 ... 65535	BU2(+)
124.0	Reserved	Byte[76]	0	

The unit of the measured value is dependent on the assigned analog value. You will find all available analog values with their units in Chapter Socket assignment table - analog (Page 153).

3.3.2.4 Data record 67 - Process image output

Table 3- 28 Data record 67 - Process image output

Byte.Bit	Designation	Default (also see parameters)	Type	Information
0.0	Cyclic receive - Bit 0.0	Control station - PLC/ PCS [DP] ON<	Bit	BU0 BU1 BU2(+)
0.1	Cyclic receive - Bit 0.1	Control station - PLC/PCS [DP] OFF	Bit	
0.2	Cyclic receive - Bit 0.2	Control station - PLC/PCS [DP] ON>	Bit	
0.3	Cyclic receive - Bit 0.3	Test 1	Bit	
0.4	Cyclic receive - Bit 0.4	Motor protection - Emergency start	Bit	
0.5	Cyclic receive - Bit 0.5	Mode selector S1	Bit	
0.6	Cyclic receive - Bit 0.6	Reset 1	Bit	
0.7	Cyclic receive - Bit 0.7	Not assigned	Bit	
1.0	Cyclic receive - Bit 1.0	Not assigned	Bit	
1.1	Cyclic receive - Bit 1.1	Not assigned	Bit	
1.2	Cyclic receive - Bit 1.2	Not assigned	Bit	
1.3	Cyclic receive - Bit 1.3	Not assigned	Bit	
1.4	Cyclic receive - Bit 1.4	Not assigned	Bit	
1.5	Cyclic receive - Bit 1.5	Not assigned	Bit	
1.6	Cyclic receive - Bit 1.6	Not assigned	Bit	
1.7	Cyclic receive - Bit 1.7	Not assigned	Bit	
2.0 to 3.7	Cyclic receive - Analog value	Not assigned	Word	BU0 BU2(+)

3.3.2.5 Data record 69 - Process image input

Table 3- 29 Data record 69 - Process image input

Byte.Bit	Designation	Default (also see parameters)	Type		Information	
0.0	Cyclic send - Bit 0.0	Status - ON<	Bit		BU0 BU1 BU2(+)	
0.1	Cyclic send - Bit 0.1	Status - Off	Bit			
0.2	Cyclic send - Bit 0.2	Status - ON>	Bit			
0.3	Cyclic send - Bit 0.3	Event - Overload operation	Bit			
0.4	Cyclic send - Bit 0.4	Status - Interlocking time active	Bit			
0.5	Cyclic send - Bit 0.5	Status - Remote mode	Bit			
0.6	Cyclic send - Bit 0.6	Status - General fault	Bit			
0.7	Cyclic send - Bit 0.7	Status - general warning	Bit			
1.0	Cyclic send - Bit 1.0	Not assigned	Bit			
1.1	Cyclic send - Bit 1.1	Not assigned	Bit			
1.2	Cyclic send - Bit 1.2	Not assigned	Bit			
1.3	Cyclic send - Bit 1.3	Not assigned	Bit			
1.4	Cyclic send - Bit 1.4	Not assigned	Bit			
1.5	Cyclic send - Bit 1.5	Not assigned	Bit			
1.6	Cyclic send - Bit 1.6	Not assigned	Bit			
1.7	Cyclic send - Bit 1.7	Not assigned	Bit			
2.0	PLC/PCS analog Input 1	Max. current I_max	Word	Float	BU0, BU1, BU2	BU2+
4.0	PLC/PCS analog input 2	Not assigned	Word		BU0, BU2	
6.0	PLC/PCS analog input 3	Not assigned	Word	Float	BU0, BU2	
8.0	PLC/PCS analog input 4	Not assigned	Word		BU0, BU2	

3.3.2.6 Data record 72 - Error buffer

Table 3- 30 Data record 72 - Error buffer

Byte.Bit	Entry	Designation	Type	Information
0.0	1	Time stamp	D-word	BU0 BU1 BU2(+)
4.0		Type	Byte	
5.0		Error number	Byte	
6.0	2	Time stamp	D-word	
10.0		Type	Byte	
11.0		Error number	Byte	
...				
120.0	21	Time stamp	D-word	BU0 BU1 BU2(+)
124.0		Type	Byte	
125.0		Error number	Byte	

Time stamp

The operating hours of the device are used as a time stamp (resolution: 1 s).

Type/error number

Refer to the error numbers for detailed information. You will find the meaning in Chapter Data record 92 - Device diagnostics (Page 169) in column "Error number" of table "Data record 92 - Diagnostics."

3.3.2.7 Data record 73 - Event memory

Table 3- 31 Data record 73 - Event memory

Byte.Bit	Entry	Designation	Type	Information
0.0	1	Time stamp	D-word	BU2(+)
4.0		Type	Byte	BU2(+)
5.0		Information	Byte	BU2(+)
8.0	2	Time stamp	D-word	BU2(+)
12.0		Type	Byte	BU2(+)
13.0		Information	Byte	BU2(+)
14.0		Info	Byte[2]	BU2(+)

3.3.2.8 Data record 92 - Device diagnostics

Table 3- 32 Data record 92 - Device diagnostics

Byte.Bit	Designation		Information	DP diagnostics *)	Error No. **)
0.0		*Reserved*			
1.0	Status information - General	Status - General fault	BU0 BU1 BU2(+)		
1.1		Status - General warning	BU0 BU1 BU2(+)		
1.2		Status - Device	BU0 BU1 BU2(+)		
1.3		Status - Bus	BU0 BU1 BU2(+)		
1.4		Status - PLC/PCS	BU0 BU1 BU2(+)		
1.5		Status - Current flowing	IM UM		
1.6		*Reserved*			
2.0	Status information - Receive	Status - ON<<	Dependent on the control function		
2.1		Status - ON<			
2.2		Status - Off			
2.3		Status - ON>			
2.4		Status - ON>>			
2.5		Status - Start active	BU0 BU1 BU2(+)		
2.6		Status - Interlocking time active	All reversing starters and positioners		
2.7		Status - Change-over pause active	Star-delta starter, Dahlander starter, pole-changing starter		
3.0		Status - Runs in open direction	Dependent on the control function		
3.1		Status - Runs in close direction			
3.2		Status - FC			
3.3		Status - FO			
3.4		Status - TC			
3.5		Status - TO			
3.6		Status - Cold start (TPF)	BU0 BU1 BU2(+)	M	
3.7		Status - OPO	BU2		
4.0		Status - Remote mode	BU0 BU1 BU2(+)		
4.1	Status information - Protection	Status - Emergency start executed	IM UM	M	
4.2		Status - Cooling down period active	IM UM	M	
4.3		Status - Pause time active	IM UM		
4.4	Status information - Miscellaneous	Status - Device check active	BU0 BU1 BU2(+)		
4.5		Status - Phase sequence 1-2-3	UM		
4.6		Status - Phase sequence 3-2-1	UM		

Byte.Bit	Designation		Information	DP diagnostics *)	Error No. **)
4.7		Status - DM-F enabling circuit	DM-F		
5.0	Events - Protection	Event - Overload operation	IM UM		
5.1		Event - Unbalance	IM UM		
5.2		Event - Overload	IM UM		
5.3		Event - overload + phase failure	IM UM		
5.4		Event - Internal ground fault	IM UM		
5.5		Event - External ground fault	EM		
5.6		Event - Warning ext. ground fault	EM		
5.7		Event - Thermistor overload	Th		
6.0		Event - Thermistor short-circuit	Th		
6.1		Event - Thermistor open circuit	Th		
6.2		Event - TM warning T>	TM MM		
6.3		Event - TM trip T>	TM MM		
6.4		Event - TM sensor fault	TM MM		
6.5		Event - TM out of range	TM MM		
6.6		Event - EM+ open circuit	MM EM(+) 1)		
6.7		Event - EM+ short-circuit	MM EM(+) 1)		
7.0	Events - Level monitoring	Event - Warning I>	IM UM		
7.1		Event - Warning I<	IM UM		
7.2		Event - Warning P>	UM		
7.3		Event - Warning P<	UM		
7.4		Event - Warning cos phi<	UM		
7.5		Event - Warning U<	UM		
7.6		Event - Warning 0/4 - 20mA>	AM		
7.7		Event - Warning 0/4 - 20mA<	AM		
8.0		Event - Trip I>	IM UM		
8.1		Event - Trip I<	IM UM		
8.2		Event - Trip P>	UM		
8.3		Event - Trip P<	UM		
8.4		Event - Trip cos phi<	UM		
8.5		Event - Trip U<	UM		
8.6		Event - trip 0/4 - 20mA>	AM		
8.7		Event - trip 0/4 - 20mA<	AM		
9.0		Event - Stalled rotor	IM UM		
9.1	Events - Protection	Warning - Internal ground fault	UM+		
9.2		*Reserved*			
9.3	Events - Level monitoring	Event - No start permitted	BU0 BU1 BU2(+)		
9.4		Event - No. of starts >	BU0 BU1 BU2(+)		
9.5		Event - Just one start possible	BU0 BU1 BU2(+)		
9.6		Event - motor operating hours >	BU0 BU1 BU2(+)		
9.7		Event - Motor stop time >	BU0 BU1 BU2(+)		

Byte.Bit	Designation		Information	DP diagnostics *)	Error No. **)
10.0		Event - Limit 1	BU2(+)		
10.1		Event - Limit 2	BU2(+)		
10.2		Event - Limit 3	BU2(+)		
10.3		Event - Limit 4	BU2(+)		
10.4	Events - Miscellaneous	Event - ext. fault 1	BU0 BU1 BU2(+)		
10.5		Event - ext. fault 2	BU0 BU1 BU2(+)		
10.6		Event - ext. fault 3	BU0 BU1 BU2(+)		
10.7		Event - ext. fault 4	BU0 BU1 BU2(+)		
11.0		Event - ext. fault 5	BU2(+)		
11.1		Event - ext. fault 6	BU2(+)		
11.2	Events - FW update	Event - BU FW update active	BU2+		
11.3		Event - Module FW update active	BU2+		
11.4	Events - Miscellaneous	Event - Analog module open circuit	AM		
11.5		Event - DM-F safety-related tripping	DM-F		
11.6		Event - DM-F - Test requirement	DM-F		
11.7		*Reserved*			
12.0	Events - Time stamp function	Event - Timestamping function active + OK	BU2(+)		
12.1		*Reserved*			
12.2	Events - Miscellaneous	Event - DM-FL safety ok	DM-FL		
12.3		Event - DM-FP PROFIsafe active	DM-FP		
12.4	Events - System interfaces	Event - Configured operator panel missing	BU0 BU1 BU2(+)		
12.5		Event - Module not supported	BU0 BU1 BU2(+)		
12.6		Event - No module voltage	BU2		
13.0	Events - Memory module	Event - Memory module read in	BU0 BU1 BU2(+)		
13.1		Event - Memory module programmed	BU0 BU1 BU2(+)		
13.2		Event - Memory module erased	BU0 BU1 BU2(+)		
13.3		*Reserved*			
13.4		Event - Initialization module read in	BU0 BU2(+)		
13.5		Event - Initialization module programmed	BU0 BU2(+)		
13.6		Event - Initialization module cleared	BU0 BU2(+)		
13.7	Event - Addressing plug	Event - Addressing plug read in	BU0 BU1 BU2(+)		
14.0	Events - parameterization	Event - startup parameter block active	BU0 BU1 BU2(+)	M	
14.1		Event - Parameter changes not allowed in the current operating state	BU0 BU1 BU2(+)	M	
14.2		Event - Device does not support the required functions	BU0 BU1 BU2(+)	M	
14.3		Event - Wrong parameter	BU0 BU1 BU2(+)	M	
14.4		Event - Wrong password	BU0 BU1 BU2(+)	M	
14.5		Event - Password protection active	BU0 BU1 BU2(+)		

Byte.Bit	Designation		Information	DP diagnostics *)	Error No. **)
14.6		Event - Factory settings	BU0 BU1 BU2(+)		
14.7		Event - Parameterization active	BU0 BU1 BU2(+)		
15.0		Event - PRM error number (bytes) **	BU0 BU1 BU2(+)		
16.0		Event - DM-FL configuration mode	DM-FL		
16.1		Event - DM-FL actual and set configuration are different	DM-FL		
16.2		Event - DM-FL waiting for start-up test	DM-FL		
16.3		Event - DM FP PRM error	DM-FP		
16.4		*Reserved*			
17.0	Warnings - Protection	Warning - Overload operation	IM UM	W	
17.1		Warning - Unbalance	IM UM	W	
17.2		Warning - Overload	IM UM	W	
17.3		Warning - Overload + phase failure	IM UM	W	
17.4		Warning - Internal ground fault	IM UM	W	
17.5		Warning - external ground fault	EM MM	W	
17.6		*Reserved*			
17.7		Warning - Thermistor overload	Th	W	
18.0		Warning - Thermistor short circuit	Th	W	
18.1		Warning - Thermistor open circuit	Th	W	
18.2		Warning - TM warning T>	TM MM	W	
18.3		*Reserved*			
18.4		Warning - TM sensor fault	TM MM	W	
18.5		Warning - TM out of range	TM MM	W	
18.6		Warning - EM+ open circuit	MM EM+ 1)	W	
18.7		Warning - EM+ short-circuit	MM EM+ 1)	W	
19.0	Warnings - Level monitoring	Warning - Warning I>	IM UM	W	
19.1		Warning - Warning I<	IM UM	W	
19.2		Warning - Warning P>	UM	W	
19.3		Warning - Warning P<	UM	W	
19.4		Warning - Warning cos phi<	UM	W	
19.5		Warning - Warning U<	UM	W	
19.6		Warning - Warning 0/4 - 20mA>	AM	W	
19.7		Warning - Warning 0/4 - 20mA<	AM	W	
20.0		Warning - Stalled rotor	IM UM	W	
20.1		*Reserved*			
20.3		Warning - No start permitted	BU0 BU1 BU2(+)	W	
20.4		Warning - Number of starts >	BU0 BU1 BU2(+)	W	
20.5		Warning - Just one start possible	BU0 BU1 BU2(+)	W	
20.6		Warning - Motor operating hours>	BU0 BU1 BU2(+)	W	
20.7		Warning - Motor stop time >	BU0 BU1 BU2(+)	W	
21.0	Warnings - Miscellaneous	Warning - ext. fault 1	BU0 BU1 BU2(+)	W	

Byte.Bit	Designation		Information	DP diagnostics *)	Error No. **)
21.1		Warning - ext. fault 2	BU0 BU1 BU2(+)	W	
21.2		Warning - ext. fault 3	BU0 BU1 BU2(+)	W	
21.3		Warning - ext. fault 4	BU0 BU1 BU2(+)	W	
21.4		Warning - ext. fault 5	BU2(+)	W	
21.5		Warning - ext. fault 6	BU2(+)	W	
21.6		*Reserved*			
21.7		*Reserved*			
22.0		Warning - Analog module open circuit	AM	W	
22.1		Warning - DM-F safety-related tripping	DM-F	W	
22.2		Warning - DM-F test requirement	DM-F	W	
22.3		*Reserved*			
22.6		Warning - DM-F feedback circuit	DM-F	W	
22.7		Warning - DM-FL simultaneity	DM-FL	W	
23.0	Faults - General	Fault - HW fault basic unit	BU0 BU1 BU2(+)	F9	0
23.1		Fault - Module fault (e.g. module IM, UM, DM)	BU0 BU1 BU2(+)	F9	1
23.2		Fault - temporary components (e.g. memory module)	BU0 BU1 BU2(+)	F9	2
23.3		Fault - configuration error	BU0 BU1 BU2(+)	F16	3
23.4		Fault - Parameterization	BU0 BU1 BU2(+)	F16	4
23.5		Fault - Bus	BU0 BU1 BU2(+)		5
23.6		Fault - PLC/PCS	BU0 BU1 BU2(+)		6
23.7		*Reserved*			
24.0	Faults - Control	Fault - execution ON command	BU1 BU2(+)	F	8
24.1		Fault - execution STOP command	BU1 BU2(+)	F	9
24.2		Fault - feedback (FB) ON	BU1 BU2(+)	F	10
24.3		Fault - feedback (FB) OFF	BU1 BU2(+)	F	11
24.4		Fault - Stalled positioner	CF = positioner	F	12
24.5		Fault - Double 0	CF = positioner	F	13
24.6		Fault - Double 1	CF = positioner	F	14
24.7		Fault - End position	CF = positioner	F	15
25.0		Fault - Antivalence	CF = positioner	F	16
25.1		Fault - Cold start (TPF) fault	BU0 BU1 BU2(+)	F	17
25.2		Fault - power failure (UVO)	BU2(+)	F	18
25.3		Fault - Operational Protection Off (OPO)	BU2(+)	F	19
25.4		*Reserved*			
26.0		*Reserved*			
26.1	Faults - Protection	Fault - unbalance	IM UM	F	25
26.2		Fault - overload	IM UM	F	26
26.3		Fault - overload + phase failure	IM UM	F	27
26.4		Fault - int. ground fault	IM UM	F	28

Byte.Bit	Designation		Information	DP diagnostics *)	Error No. **)
26.5		Fault - ext. ground fault	EM MM	F	29
26.6		*Reserved*			
26.7		Fault - thermistor overload	Th	F	31
27.0		Fault - thermistor short circuit	Th	F	32
27.1		Fault - thermistor open circuit	Th	F	33
27.2		*Reserved*			
27.3		Fault - TM trip T>	TM MM	F	35
27.4		Fault - TM sensor fault	TM MM	F	36
27.5		Fault - TM out of range	TM MM	F	37
27.6		Fault - EM+ open circuit	MM EM(+) 1)	F	
27.7		Fault - EM+ short-circuit	MM EM(+) 1)	F	
28.0	Faults - level monitoring	Fault - trip I>	IM UM	F	40
28.1		Fault - trip I<	IM UM	F	41
28.2		Fault - trip P>	UM	F	42
28.3		Fault - trip P<	UM	F	43
28.4		Fault - trip cos phi<	UM	F	44
28.5		Fault - trip U<	UM	F	45
28.6		Fault - Trip 0/4 - 20mA>	AM	F	46
28.7		Fault - Trip 0/4 - 20mA<	AM	F	47
29.0		Fault - stalled rotor	IM UM	F	48
29.1		*Reserved*			
29.4		Fault - Number of starts >	BU0 BU1 BU2(+)	F	52
29.5		*Reserved*			
30.0	Faults - Miscellaneous	Fault - external fault 1	BU0 BU1 BU2(+)	F	56
30.1		Fault - external fault 2	BU0 BU1 BU2(+)	F	57
30.2		Fault - external fault 3	BU0 BU1 BU2(+)	F	58
30.3		Fault - external fault 4	BU0 BU1 BU2(+)	F	59
30.4		Fault - external fault 5	BU2(+)	F	60
30.5		Fault - external fault 6	BU2(+)	F	61
30.6		*Reserved*			
30.7		*Reserved*			
31.0		Fault - analog module open circuit	AM	F	64
31.1		Fault - test trip	BU0 BU1 BU2(+)	F	65
31.2		Fault - DM-F - safety-related tripping	DM-F	F	66
31.3		Fault - DM-F wiring	DM-F	F	67
31.4		Fault - DM-FL cross circuit	DM-FL	F	68
31.5		*Reserved*			

*) The "DP Diagnostics" column contains the bits that are additionally available in the diagnostics using PROFIBUS DP:

- F: Fault
- M: Status information
- W: Warning
- F9, F16: Fault types

See also Chapter Detailed messages of the slave diagnostics (Page 156).

**) Events - PRM error number (bytes):

If parameterization is not possible, the number of the parameter group (PRM group) that caused the error is communicated here. You will find the parameter group in the parameter data records 130 to 133.

Byte.Bit	Designation (PRM group)
0.0	Reserved
4.0	Device configuration (see above) (12) — Parameter group 12
⋮	⋮

Figure 3-3 Example for parameter group

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

3.3.2.9 Data record 94 - measured values

Table 3- 33 Data record 94 - Measured values

Byte.Bit	Designation	Type	Range	Unit	Information
0.0	*Reserved*	*Byte[4]*			
4.0	Thermal motor model	Byte	0 - 255	See [2])	IM UM(+)
5.0	Phase unbalance	Byte	0 - 100	1 %	IM UM(+)
6.0	cos phi	Byte	0 - 100	1 %	UM(+)
7.0	*Reserved*	*Byte[5]*			
12.0	Max. current I_max	Word	0 - 65535	1 % / I_s	IM UM(+)
14.0	Current I_L1	Word	0 - 65535	1 % / I_s	IM UM(+)
16.0	Current I_L2	Word	0 - 65535	1 % / I_s	IM UM(+)
18.0	Current I_L3	Word	0 - 65535	1 % / I_s	IM UM(+)
20.0	Last trip current	Word	0 - 65535	1 % / I_s	IM UM(+)
22.0	Time to trip	Word	0 - 65535	100 ms	IM UM(+)
24.0	Cooling down period	Word	0 - 65535	100 ms	IM UM(+)
26.0	Voltage U_L1	Word	0 - 65535	1 V	UM(+)
28.0	Voltage U_L2	Word	0 - 65535	1 V	UM(+)
30.0	Voltage U_L3	Word	0 - 65535	1 V	UM(+)
32.0	AM output	Word	0 - 32767	See [1])	AM
34.0	AM - Input 1	Word	0 - 32767		AM
36.0	AM - Input 2	Word	0 - 32767		AM
38.0	*Reserved*				
40.0	TM - Max. temperature	Word	0 - 65535	1 K see [3])	TM MM
42.0	TM - Temperature 1	Word	0 - 65535	1 K see [3])	TM MM
44.0	TM - Temperature 2	Word	0 - 65535	1 K see [3])	TM
46.0	TM - Temperature 3	Word	0 - 65535	1 K see [3])	TM
48.0	EM+ [4]) - ground-fault current	Word	0 - 65535	1 mA	MM EM(+)
50.0	EM+ [4]) - last tripping current	Word	0 - 65535	1 mA	MM EM(+)
52.0	Active power P	D-word	0 - 0xFFFFFFFF	1 W	UM(+)
56.0	Apparent power S	D-word	0 - 0xFFFFFFFF	1 VA	UM(+)
60.0	*Reserved*	*Byte[14]*			
132.0	Frequency	Word	0 - 65535	0.01 Hz	UM+
134.0	*Reserved*				
136.0	*Reserved*				
138.0	*Reserved*				
140.0	*Reserved*	*Byte[4]*			
144.0	Current I_max_A_F (float)	Float		1 A	UM+
148.0	Current I_avg_A_F	Float		1 A	UM+
152.0	Current I_L1_A_F	Float		1 A	UM+
156.0	Current I_L2_A_F	Float		1 A	UM+
160.0	Current I_L3_A_F	Float		1 A	UM+
164.0	Active power P_F	Float		1 W	UM+

Byte.Bit	Designation	Type	Range	Unit	Information
168.0	Apparent power S_F	Float		1 VA	UM+
172.0	Voltage U1_F	Float		1 V	UM+
176.0	Voltage U2_F	Float		1 V	UM+
180.0	Voltage U3_F	Float		1 V	UM+
184.0	Cos phi_F	Float			UM+
188.0	Frequency_F	Float		1 Hz	UM+
192.0	*Reserved*	*Byte[8]*			

1) S7 format:

0/4 mA = 0

20 mA = 27648

2) Representation of the "Thermal motor model":

Value always refers to symm. trip level,
representation in 2 % increments 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

3.3.2.10 Data record 95 - Service data/statistical data

Writing the service data/statistical data

Writing is only possible if password protection is not active.

Additional abbreviations:

- r / w = value can be written / changed
- r = value can only be read

Table 3- 34 Data record 95 - Diagnostics - Statistical data

Byte.Bit	Designation	Type	Range	Unit		Information
0.0	*Coordination*	*Byte[4]*				BU0 BU1 BU2(+)
4.0	Permissible starts - actual value	Byte	0 - 255		r 1)	BU0 BU1 BU2(+)
5.0	DM-F - Time until test required	Byte	0 - 255	1 week	r	BU2(+)
6.0	*Reserved*	*Byte[2]*				
8.0	Number of parameterizations	Word	0 - 65535		r	BU0 BU1 BU2(+)
10.0	Number of overload trips	Word	0 - 65535		r / w	BU0 BU1 BU2(+)
12.0	Number of internal overload trips	Word	0 - 65535		r	BU0 BU1 BU2(+)
14.0	Motor stop time	Word	0 - 65535	1 h	r / w	BU0 BU1 BU2(+)
16.0	Timer 1 - Actual value	Word	0 - 65535	100 ms	r	BU0 BU1 BU2(+)
18.0	Timer 2 - Actual value	Word	0 - 65535	100 ms	r	BU0 BU1 BU2(+)
20.0	Timer 3 - Actual value	Word	0 - 65535	100 ms	r	BU2(+)
22.0	Timer 4 - Actual value	Word	0 - 65535	100 ms	r	BU2(+)
24.0	Counter 1 - Actual value	Word	0 - 65535		r	BU0 BU1 BU2(+)
26.0	Counter 2 - Actual value	Word	0 - 65535		r	BU0 BU1 BU2(+)
28.0	Counter 3 - Actual value	Word	0 - 65535		r	BU2(+)
30.0	Counter 4 - Actual value	Word	0 - 65535		r	BU2(+)
32.0	Calculation module 1 - Output	Word	0 - 65535		r	BU2(+)
34.0	Calculation module 2 - Output		0 - 65535		r	BU2(+)
36.0	*Reserved*	*Byte[4]*	*0*			
40.0	Motor operating hours	D-word	0 - 0xFFFFFFFF	1 s	r / w	BU0 BU1 BU2(+)
44.0	Int. motor operating hours	D-word	0 - 0xFFFFFFFF	1 s	r	BU0 BU1 BU2(+)
48.0	Device operating hours	D-word	0 - 0xFFFFFFFF	1 s	r	BU0 BU1 BU2(+)
52.0	Number of starts	D-word	0 - 0xFFFFFFFF		r / w	BU0 BU1 BU2(+)
56.0	Internal number of starts CW	D-word	0 - 0xFFFFFFFF		r	BU0 BU1 BU2(+)
60.0	Internal number of starts CCW	D-word	0 - 0xFFFFFFFF		r	BU0 BU1 BU2(+)
64.0	Consumed energy	D-word	0 - 0xFFFFFFFF	1 kWh	r / w	UM(+)
68.0	Energy W_F (float)	Byte[8]		1 kWh	r	BU2+

1) Can only be written when the start monitoring function is active!

3.3.2.11 Data record 130 - Basic device parameters 1

Table 3- 35 Data record 130 - Basic device parameters 1

Byte.Bit	Designation (PRM group)	Type	Range	Unit	Default	Note	Information
0.0	Coordination (byte[4]	Byte					BU0 BU1 BU2(+)
4.0	Device class	Byte	5, 7, 9			5 = BU1 7 = BU0 9 = BU2(+)	BU0 BU1 BU2(+)
5.0	Thermistor	Bit	0, 1			1 = active; thermistor in the BU	BU0 BU1 BU2(+)
(+)5.1	*Reserved*	*Bit[5]*					
5.6	Multifunction module (MM).	Bit	0, 1				BU0
5.7	Initialization module (InM)	Bit	0, 1				BU0 BU2(+)
6.0	Operator panel (OP)	Bit	0, 1				BU0 BU1 BU2(+)
6.1	Analog module 1 (AM1)	Bit	0, 1				BU2(+)
6.2	Temperature module 1 (TM1)	Bit	0, 1				BU0 BU2(+)
6.3	3UF7500 ground-fault module for 3UL22 residual current transformer	Bit	0, 1				BU2(+)
6.4	Digital module 1 (DM1)	Bit[2]	0 - 3			0 = no digital module 1 = monostable 2 = bistable 3 = special type (see 3.4)	BU0 BU2(+)
6.6	Digital module 2 (DM2)	Bit[2]	0 - 2				BU2(+)
7.0	Operator panel with display (OPD)	Bit	0, 1				BU2(+)
7.1	3UF7510 ground-fault module for 3UL23 residual current transformer	Bit	0, 1				BU0 BU2(+)
7.4	DM1 - Special type	Bit[2]	0, 1			0 = DM-FL 1 = DM-FP	BU2(+)
7.6	*Reserved*	*Bit[2]*					
8.0	Current measuring (IM)	Bit[7]	0 - 5			IM / UM: 0 = no current measurement 1 = 0.3 A - 3 A 2 = 2.4 A - 25 A 3 = 10 A - 100 A 4 = 20 A - 200 A 5 = 63 A - 630 A UM+: 9 = 0.3 A - 4 A 10 = 3 A - 40 A 11 = 10 A - 115 A 12 = 20 - 200 A 13 = 63 - 630 A	BU0 BU1 BU2(+)

Byte.Bit	Designation (PRM group)	Type	Range	Unit	Default	Note	Information
8.7	Voltage measuring module (UM)	Bit	0, 1				BU2(+)
9.0	*Reserved*						
10.0	Control function (CF)		0x00 0x10 0x11 0x12 0x20 0x21 0x30 0x31 0x40 0x41 0x50 0x60 0x61 0x62 0x63 0x64 0x70 0x71			0x00 = Overload 0x10 = Direct starter 0x11 = Reversing starter 0x12 = 3VL molded case circuit breaker (MCCB) 0x20 = Star-delta starter 0x21 = Star-delta reversing starter 0x30 = Dahlander starter 0x31 = Dahlander reversing starter 0x40 = Pole-changing starter 0x41 = Pole-changing reversing starter 0x50 = Solenoid valve 0x60 = Positioner 1 0x61 = Positioner 2 0x62 = Positioner 3 0x63 = Positioner 4 0x64 = Positioner 5 0x70 = Soft starter 0x71 = Soft starter with reversing contactor	BU0 BU1 BU2(+) BU0 BU1 BU2(+) BU0 BU1 BU2(+) BU0 BU1 BU2(+) BU0 BU2(+) BU2(+) BU2(+) BU2(+) BU2(+) BU2(+) BU2(+) BU2(+) BU2(+) BU2(+) BU2(+) BU2(+) BU0 BU2(+) BU2(+)
11.0	*Reserved*	*Bit[8]*					
12.0	**Bit parameters (16)**						
12.0	No configuration fault due to OP	Bit	0, 1		0		BU0 BU1 BU2(+)
12.1	Startup parameter block active	Bit	0, 1		1		BU0 BU1 BU2(+)
12.2	Test / Reset keys disabled	Bit	0, 1		0		BU0 BU1 BU2(+)
12.3	Bus and PLC/PCS - Reset	Bit	0, 1		0	0 = Manual 1 = Auto	BU0 BU1 BU2(+)
12.1	Startup parameter block active	Bit	0, 1		1		BU0 BU1 BU2(+)
12.2	Test / Reset keys disabled	Bit	0, 1		0		BU0 BU1 BU2(+)

Byte.Bit	Designation (PRM group)	Type	Range	Unit	Default	Note	Information
12.3	Bus and PLC/PCS - Reset	Bit	0, 1		0	0 = Manual 1 = Auto	BU0 BU1 BU2(+)
12.3	Bus and PLC/PCS - Reset	Bit	0, 1		0	0 = Manual 1 = Auto	BU0 BU1 BU2(+)
12.2	Test / Reset keys disabled	Bit	0, 1		0		BU0 BU1 BU2(+)
12.3	Bus and PLC/PCS - Reset	Bit	0, 1		0	0 = Manual 1 = Auto	BU0 BU1 BU2(+)
12.4	*Reserved*	*Bit*			*0*		
12.5	*Reserved*	*Bit*			*0*		
12.6	*Reserved*	*Bit*			*0*		
12.7	*Reserved*	*Bit*			*0*		
13.0	Diagnostics for process events	Bit	0, 1		0		BU0 BU1 BU2(+)
13.1	Diagnostics for process warnings	Bit	0, 1		1		BU0 BU1 BU2(+)
13.2	Diagnostics for process faults	Bit	0, 1		1		BU0 BU1 BU2(+)
13.3	Diagnostics for device faults	Bit	0, 1		1		BU0 BU1, BU2(+)
13.4	*Reserved*	*Bit*			*0*		
13.5	*Reserved*	*Bit*			*0*		
13.6	Bus monitoring	Bit	0, 1		1		BU0 BU1 BU2(+)
13.7	PLC/PCS monitoring	Bit	0, 1		1		BU0 BU1 BU2(+)
14.0	Overload protection - Load type	Bit	0, 1		0	0 = 3-phase 1 = 1-phase	IM UM(+)
14.1	Overload protection - Reset	Bit	0, 1		0	0 = Manual 1 = Auto	IM UM(+)
14.2	*Reserved*	*Bit*			*0*		
14.3	Save change-over command	Bit	0, 1		0		BU0 BU1 BU2(+)
14.4	Non-maintained command mode	Bit	0, 1		0		BU0 BU1 BU2(+)
14.5	Cold start level (TPF)	Bit	0, 1		0	0 = NO contact 1 = NC contact	BU0 BU1 BU2(+)
14.6	Type of consumer load	Bit	0, 1		0	0 = Motor 1 = ohmic load	BU0 BU1 BU2(+)
14.7	*Reserved*	*Bit*			*0*		
15.0	External fault 1 - Type	Bit	0, 1		0	0 = NO contact 1 = NC contact	BU0 BU1 BU2(+)
15.1	External fault 2 - Type	Bit	0, 1		0		BU0 BU1 BU2(+)
15.2	External fault 3 - Type	Bit	0, 1		0		BU0 BU1 BU2(+)
15.3	External fault 4 - Type	Bit	0, 1		0		BU0 BU1 BU2(+)

Byte.Bit	Designation (PRM group)	Type	Range	Unit	Default	Note	Information
15.4	External fault 1 - active status	Bit	0, 1		0	0 = Always 1 = Only motor ON	BU0 BU1 BU2(+)
15.5	External fault 2 - Activity	Bit	0, 1		0		BU0 BU1 BU2(+)
15.6	External fault 3 - Activity	Bit	0, 1		0		BU0 BU1 BU2(+)
15.7	External fault 4 - Activity	Bit	0, 1		0		BU0 BU1 BU2(+)
16.0	**Bit[2] - Parameters (20)**						
16.0	Thermistor - Overload response	Bit[2]	1, 2, 3		3	0 = disabled 1 = signaling 2 = warn 3 = tripping	Th
16.2	Thermistor - Response to sensor fault	Bit[2]	0, 1, 2, 3		2		Th
16.4	Internal ground fault - Response	Bit[2]	0, 1, 2, 3		0		BU0 BU1 BU2(+)
16.6	Motor protection - Overload response	Bit[2]	0, 1, 2, 3		3		IM
17.0	Motor protection - Overload response	Bit[2]	0, 1, 2		2		IM
17.2	Unbalance protection - Response	Bit[2]	0, 1, 2, 3		2		IM
17.4	Trip response I>	Bit[2]	0, 1, 3		0		BU0 BU1 BU2(+)
17.6	Warning response I>	Bit[2]	0, 1, 2		0		BU0 BU1 BU2(+)
18.0	Trip response I<	Bit[2]	0, 1, 3		0		BU0 BU1 BU2(+)
18.2	Warning response I<	Bit[2]	0, 1, 2		0		BU0 BU1 BU2(+)
18.4	Stalled rotor - Response	Bit[2]	0, 1, 2, 3		0		BU0 BU1 BU2(+)
18.6	EM+ 1) - response to sensor fault	Bit[2]	0, 1, 2, 3		0		BU0 BU2(+)
19.0	Monitoring the number of starts - Response to overshoot	Bit[2]	0, 1, 2, 3		0		BU0 BU1 BU2(+)
19.2	Monitoring the number of starts - Response to prewarning	Bit[2]	0, 1, 2		0		BU0 BU1 BU2(+)
19.4	Motor operating hours monitoring - Response	Bit[2]	0, 1, 2		0		BU0 BU1 BU2(+)
19.6	Motor stop time monitoring - Response	Bit[2]	0, 1, 2		0		BU0 BU1 BU2(+)
20.0	External fault 1 - Response	Bit[2]	1, 2, 3		1		BU0 BU1 BU2(+)
20.2	External fault 2 - Response	Bit[2]	1, 2, 3		1		BU0 BU1 BU2(+)
20.4	External fault 3 - Response	Bit[2]	1, 2, 3		1		BU0 BU1 BU2(+)
20.6	External fault 4 - Response	Bit[2]	1, 2, 3		1		BU0 BU1 BU2(+)
21.0	*Reserved*	*Bit[2]*			*0*		
21.2	Basic unit - Debounce time inputs	Bit[2]	0 - 3	10 ms	1	Offset 6 ms	BU0 BU1 BU2(+)

Byte.Bit	Designation (PRM group)	Type	Range	Unit	Default	Note	Information
21.4	Timer 1 - Type	Bit[2]	0, 1, 2, 3		0	0 = With closing delay 1 = Closing delay with memory 2 = With opening delay 3 = With fleeting closing	BU0 BU1 BU2(+)
21.6	Timer 2 - Type	Bit[2]	0, 1, 2, 3		0		BU0 BU1 BU2(+)
22.0	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	BU0 BU1 BU2(+)
22.2	Signal conditioning 2 - Type	Bit[2]	0, 1, 2, 3		0		BU0 BU1 BU2(+)
22.4	Non-volatile element 1 - Type	Bit[2]	0, 1, 2, 3		0		BU0 BU1 BU2(+)
22.6	Non-volatile element 2 - Type	Bit[2]	0, 1, 2, 3		0		BU0 BU1 BU2(+)
23.0	EM+ [2] - monitoring	Bit[2]	0, 1, 2, 3		0	0 = on 1 = on+ 2 = run 3 = run+	BU0 BU2(+)
23.2	EM+ [2] - monitoring warning	Bit[2]	0, 1, 2, 3		0		BU0 BU2(+)
23.4	EM - response to an external ground fault	Bit[2]	1, 3		1	0 = disabled 1 = signaling 2 = warn 3 = tripping	BU0 BU1 BU2(+)
23.6	EM - response to warning of an external ground fault	Bit[2]	0, 1, 2,		0		BU0 BU1 BU2(+)
24.0	**Part - Bit[4] parameters**						
24.0	External fault 1 - Reset also by	Bit[4]	0 - 1111B		0101B	Bit[0] = Panel reset Bit[1] = Auto-reset Bit[2] = Remote reset Bit[4] = OFF command reset	BU0 BU1 BU2(+)
24.4	External fault 2 - Reset also by	Bit[4]	0 - 1111B		0101B		BU0 BU1 BU2(+)
25.0	External fault 3 - Reset also by	Bit[4]	0 - 1111B		0101B		BU0 BU1 BU2(+)
25.4	External fault 4 - Reset also by	Bit[4]	0 - 1111B		0101B		BU0 BU1 BU2(+)
26.0	Limit monitor - Hysteresis for limit monitor	Bit[4]	0 - 15	1 %	5		BU2(+)
26.4	EM+ [2] - hysteresis	*Bit[4]*	0 - 15	1 %	5		BU0 BU2(+)
27.0	*Reserved*	*Bit[4]*			*0*		*BU0 BU1 BU2(+)*
27.4	*Reserved*	*Bit[4]*			*0*		*BU2+*
28.0	Byte parameters (28)						
28.0	Internal ground fault - Delay	Byte	0 - 255	100 ms	5		IM / UM
29.0	Overload protection - Class	Byte	5, 7 [3], 10 ... 35, 40		10		BU0 BU1 BU2(+)
30.0	Motor protection - Delay with overload operation	Byte	0 - 255	100 ms	5		IM / UM(+)

Byte.Bit	Designation (PRM group)	Type	Range	Unit	Default	Note	Information
31.0	Motor protection - Unbalance protection level	Byte	0 - 100	1 %	40		IM / UM(+)
32.0	Unbalance protection - Delay with unbalance	Byte	0 - 255	100 ms	5		IM / UM(+)
33.0	Interlocking time	Byte	0 - 255	1 s	0		
34.0	FB time	Byte	0 - 255	100 ms	5	0 = disabled	
35.0	Trip level I>	Byte	0 - 255	4 % / I_s	0		IM / UM(+)
36.0	Warning level I>	Byte	0 - 255	4 % / Is	0		IM / UM(+)
37.0	Trip level I<	Byte	0 - 255	4 % / Is	0		IM / UM(+)
38.0	Warning level I<	Byte	0 - 255	4 % / Is	0		IM / UM(+)
39.0	Stalled rotor level	Byte	0 - 255	4 % / Is	0		IM / UM(+)
40.0	Trip delay I>	Byte	0 - 255	100 ms	5		IM / UM(+)
41.0	Warning delay I>	Byte	0 - 255	100 ms	5		IM / UM(+)
42.0	Trip delay I<	Byte	0 - 255	100 ms	5		IM / UM(+)
43.0	Warning delay I<	Byte	0 - 255	100 ms	5		IM / UM(+)
44.0	Blocking delay	Byte	0 - 255	100 ms	5		IM / UM(+)
45.0	Monitoring the number of starts - Permissible starts	Byte	1 - 255		1		BU0 BU1 BU2(+)
46.0	*Reserved*	*Byte*			*0*		
47.0	EM / MM [2)] - delay warning	Byte	0 - 255	100 ms	1		BU0 BU2(+)
48.0	Truth table 1 type 3I/1O	Byte	0 - 11111111B		0		BU0 BU1 BU2(+)
49.0	Truth table 2 type 3I/1O	Byte	0 - 11111111B		0		BU0 BU1 BU2(+)
50.0	Truth table 3 type 3I/1O	Byte	0 - 11111111B		0		BU0 BU1 BU2(+)
51.0	*Reserved*	*Byte*			*0*		
52.0	**Word parameters (32)**						
52.0	Motor protection - Cooling down period	Word	600 - 65535	100 ms	3000		IM / UM(+)
54.0	Motor protection - Pause time	Word	0 - 65535	100 ms	0	0 = disabled	IM / UM(+)
56.0	Execution time	Word	0 - 65535	100 ms	10	0 = disabled	BU0 BU1 BU2(+)
58.0	Monitoring the number of starts - Time range for starts	Word	0 - 65535	1 s	0		BU0 BU1 BU2(+)
60.0	Monitoring the number of starts - Interlocking time	Word	0 - 65535	1 s	0		BU0 BU1 BU2(+)

Byte.Bit	Designation (PRM group)	Type	Range	Unit	Default	Note	Information
62.0	Motor stop time level >	Word	0 - 65535	1 h	0		BU0 BU1 BU2(+)
64.0	Timer 1 - Limit	Word	0 - 65535	100 ms	0		BU0 BU1 BU2(+)
66.0	Timer 2 - Limit	Word	0 - 65535	100 ms	0		BU0 BU1 BU2(+)
68.0	Counter 1 - Limit	Word	0 - 65535		0		BU0 BU1 BU2(+)
70.0	Counter 2 - Limit	Word	0 - 65535		0		BU0 BU1 BU2(+)
72.0	EM+ [2] - trip level	Word	30 - 40000	1 mA	1000		BU0 BU2(+)
74.0	EM+ [2] - warning level	Word	30 - 40000	1 mA	500		BU0 BU2(+)
76.0	**D-word parameters (36)**						
76.0	Operator control enable	Bit[32]	0 ... 1..1B		0..0B		
80.0	Motor protection - set current I_s1	D-word	[1]	10 mA	30		IM / UM(+)
84.0	Motor operating hours level >	D-word	0 - 0xFFFFFFFF	1 s	0		BU0 BU1 BU2(+)
88.0	*Reserved*	*D-word*			*0*		

1) Value range dependent on current range of the IM / UM and the conversion factor; bit 31 = 1, i.e. conversion factor is active

2) 3UF7510-1AA00-0 ground-fault module

3) Class 7 only for BU2+

3.3.2.12 Data record 131 - Basic device parameters 2 (plug binary)

Table 3- 36 Data record 131 - Basic device parameters 2

Byte.Bit	Designation (PRM group)	Type	Range	Default	Note	Information
0.0	*Reserved*	*Byte[4]*				
4.0	**Byte parameters (40)**					
4.0	BU - Output 1	Byte	0 - 255	0		BU0 BU1 BU2(+)
5.0	BU - Output 2	Byte	0 - 255	0		BU0 BU1 BU2(+)
6.0	BU - Output 3	Byte	0 - 255	0		BU1 BU2(+)
7.0	*Reserved*	*Byte*		*0*		
8.0	OP - LED green 1	Byte	0 - 255	0		OP OPD
9.0	OP - LED green 2	Byte	0 - 255	0		OP OPD
10.0	OP - LED green 3	Byte	0 - 255	0		OP OPD
11.0	OP - LED green 4	Byte	0 - 255	0		OP OPD
12.0	OP - LED yellow 1	Byte	0 - 255	0		OP
13.0	OP - LED yellow 2	Byte	0 - 255	0		OP
14.0	OP - LED yellow 3	Byte	0 - 255	0		OP
15.0	*Reserved*	*Byte*		*0*		
16.0	Cyclic send - Bit 0.0	Byte	0 - 255	105	Default: Status - ON<	BU0 BU1 BU2(+)
17.0	Cyclic send - Bit 0.1	Byte	0 - 255	106	Default: Status - Off	BU0 BU1 BU2(+)
18.0	Cyclic send - Bit 0.2	Byte	0 - 255	107	Default: Status - ON>	BU0 BU1 BU2(+)
19.0	Cyclic send - Bit 0.3	Byte	0 - 255	128	Default: Event - Overload operation	BU0 BU1 BU2(+)
20.0	Cyclic send - Bit 0.4	Byte	0 - 255	110	Default: Status - Interlocking time active	BU0 BU1 BU2(+)
21.0	Cyclic send - Bit 0.5	Byte	0 - 255	120	Default: Status - Auto mode	BU0 BU1 BU2(+)
22.0	Cyclic send - Bit 0.6	Byte	0 - 255	96	Default: Status - General fault	BU0 BU1 BU2(+)
23.0	Cyclic send - Bit 0.7	Byte	0 - 255	97	Default: Status - group warning	BU0 BU1 BU2(+)
24.0	Cyclic send - Bit 1.0	Byte	0 - 255	0		BU0 BU1 BU2(+)
25.0	Cyclic send - Bit 1.1	Byte	0 - 255	0		BU0 BU1 BU2(+)
26.0	Cyclic send - Bit 1.2	Byte	0 - 255	0		BU0 BU1 BU2(+)
27.0	Cyclic send - Bit 1.3	Byte	0 - 255	0		BU0 BU1 BU2(+)
28.0	Cyclic send - Bit 1.4	Byte	0 - 255	0		BU0 BU1 BU2(+)
29.0	Cyclic send - Bit 1.5	Byte	0 - 255	0		BU0 BU1 BU2(+)
30.0	Cyclic send - Bit 1.6	Byte	0 - 255	0		BU0 BU1 BU2(+)
31.0	Cyclic send - Bit 1.7	Byte	0 - 255	0		BU0 BU1 BU2(+)
32.0	Acyclic send - Bit 0.0	Byte	0 - 255	0		BU0 BU1 BU2(+)

Byte.Bit	Designation (PRM group)	Type	Range	Default	Note	Information
33.0	Acyclic send - Bit 0.1	Byte	0 - 255	0		BU0 BU1 BU2(+)
34.0	Acyclic send - Bit 0.2	Byte	0 - 255	0		BU0 BU1 BU2(+)
35.0	Acyclic send - Bit 0.3	Byte	0 - 255	0		BU0 BU1 BU2(+)
36.0	Acyclic send - Bit 0.4	Byte	0 - 255	0		BU0 BU1 BU2(+)
37.0	Acyclic send - Bit 0.5	Byte	0 - 255	0		BU0 BU1 BU2(+)
38.0	Acyclic send - Bit 0.6	Byte	0 - 255	0		BU0 BU1 BU2(+)
39.0	Acyclic send - Bit 0.7	Byte	0 - 255	0		BU0 BU1 BU2(+)
40.0	Acyclic send - Bit 1.0	Byte	0 - 255	0		BU0 BU1 BU2(+)
41.0	Acyclic send - Bit 1.1	Byte	0 - 255	0		BU0 BU1 BU2(+)
42.0	Acyclic send - Bit 1.2	Byte	0 - 255	0		BU0 BU1 BU2(+)
43.0	Acyclic send - Bit 1.3	Byte	0 - 255	0		BU0 BU1 BU2(+)
44.0	Acyclic send - Bit 1.4	Byte	0 - 255	0		BU0 BU1 BU2(+)
45.0	Acyclic send - Bit 1.5	Byte	0 - 255	0		BU0 BU1 BU2(+)
46.0	Acyclic send - Bit 1.6	Byte	0 - 255	0		BU0 BU1 BU2(+)
47.0	Acyclic send - Bit 1.7	Byte	0 - 255	0		BU0 BU1 BU2(+)
48.0	Monitoring PLC/PCS input	Byte	0 - 255	0		BU0 BU1 BU2(+)
49.0	Motor protection - Emergency start	Byte	0 - 255	60	Default: Cyclic receive - Bit 0.4	IM UM
50.0	*Reserved*	*Byte*		*0*		
51.0	*Reserved*	*Byte*		*0*		
52.0	Mode selector S1	Byte	0 - 255	61	Default: Cyclic receive - Bit 0.5	BU0 BU1 BU2(+)
53.0	Mode selector S2	Byte	0 - 255	2	Default: Fixed level value "1"	BU0 BU1 BU2(+)
54.0	Control station - Local control [LC] ON<	Byte	0 - 255	0		Dependent on the control function
55.0	Control station - Local control [LC] OFF	Byte	0 - 255	0		
56.0	Control station - Local control [LC] ON>	Byte	0 - 255	0		
57.0	Control station - PLC/PCS [DP] ON<	Byte	0 - 255	56	Default: Cyclic receive - Bit 0.0	
58.0	Control station - PLC/PCS [DP] OFF	Byte	0 - 255	57	Default: Cyclic receive - Bit 0.1	
59.0	Control station - PLC/PCS [DP] ON>	Byte	0 - 255	58	Default: Cyclic receive - Bit 0.2	
60.0	Control station - PC[DPV1] ON<	Byte	0 - 255	0		
61.0	Control Station - PC[DPV1] OFF	Byte	0 - 255	0		
62.0	Control station - PC[DPV1] ON>	Byte	0 - 255	0		
63.0	Control station - Operator panel [OP] ON<	Byte	0 - 255	0		
64.0	Control station - Operator panel [OP] OFF	Byte	0 - 255	0		
65.0	Control station - Operator panel [OP] ON>	Byte	0 - 255	0		

Byte.Bit	Designation (PRM group)	Type	Range	Default	Note	Information
66.0	Control function - ON<	Byte	0 - 255	73	Default: Group control station ON<	
67.0	Control function - OFF	Byte	0 - 255	74	Default: Group control station OFF	
68.0	Control function - ON>	Byte	0 - 255	75	Default: Group control station ON>	
69.0	Control function - Feedback ON	Byte	0 - 255	101	Default: Status - current flowing	
70.0	External fault 1 - input	Byte	0 - 255	0		BU0 BU1 BU2(+)
71.0	External fault 2 - input	Byte	0 - 255	0		BU0 BU1 BU2(+)
72.0	External fault 3 - input	Byte	0 - 255	0		BU0 BU1 BU2(+)
73.0	External fault 4 - input	Byte	0 - 255	0		BU0 BU1 BU2(+)
74.0	External fault 1 - Reset	Byte	0 - 255	0		BU0 BU1 BU2(+)
75.0	External fault 2 - Reset	Byte	0 - 255	0		BU0 BU1 BU2(+)
76.0	External fault 3 - Reset	Byte	0 - 255	0		BU0 BU1 BU2(+)
77.0	External fault 4 - Reset	Byte	0 - 255	0		BU0 BU1 BU2(+)
78.0	Cold starting (TPF)	Byte	0 - 255	0		BU0 BU1 BU2(+)
79.0	Test 1 - Input	Byte	0 - 255	59	Default: Cyclic receive - Bit 0.3	BU0 BU1 BU2(+)
80.0	Test 2 - Input	Byte	0 - 255	0		BU0 BU1 BU2(+)
81.0	Reset 1 - Input	Byte	0 - 255	62	Default: Cyclic receive - Bit 0.6	BU0 BU1 BU2(+)
82.0	Reset 2 - Input	Byte	0 - 255	0		BU0 BU1 BU2(+)
83.0	Reset 3 - Input	Byte	0 - 255	0		BU0 BU1 BU2(+)
84.0	*Reserved*	*Byte*		*0*		
85.0	*Reserved*	*Byte*		*0*		
86.0	*Reserved*	*Byte*		*0*		
87.0	*Reserved*	*Byte*		*0*		
88.0	Truth table 1 3I/1O - input 1	Byte	0 - 255	0		BU0 BU1 BU2(+)
89.0	Truth table 1 3I/1O - input 2	Byte	0 - 255	0		BU0 BU1 BU2(+)
90.0	Truth table 1 3I/1O - input 3	Byte	0 - 255	0		BU0 BU1 BU2(+)
91.0	Truth table 2 3I/1O - input 1	Byte	0 - 255	0		BU0 BU1 BU2(+)
92.0	Truth table 2 3I/1O - input 2	Byte	0 - 255	0		BU0 BU1 BU2(+)
93.0	Truth table 2 3I/1O - input 3	Byte	0 - 255	0		BU0 BU1 BU2(+)
94.0	Truth table 3 3I/1O - input 1	Byte	0 - 255	0		BU0 BU1 BU2(+)
95.0	Truth table 3 3I/1O - input 2	Byte	0 - 255	0		BU0 BU1 BU2(+)
96.0	Truth table 3 3I/1O - input 3	Byte	0 - 255	0		BU0 BU1 BU2(+)
97.0	*Reserved*	*Byte*		*0*		
98.0	Timer 1 - input	Byte	0 - 255	0		BU0 BU1 BU2(+)
99.0	Timer 1 - reset	Byte	0 - 255	0		BU0 BU1 BU2(+)
100.0	Timer 2 - input	Byte	0 - 255	0		BU0 BU1 BU2(+)

Byte.Bit	Designation (PRM group)	Type	Range	Default	Note	Information
101.0	Timer 2 - reset	Byte	0 - 255	0		BU0 BU1 BU2(+)
102.0	Counter 1 - input +	Byte	0 - 255	0		BU0 BU1 BU2(+)
103.0	Counter 1 - input -	Byte	0 - 255	0		BU0 BU1 BU2(+)
104.0	Counter 1 - reset	Byte	0 - 255	0		BU0 BU1 BU2(+)
105.0	Counter 2 - input +	Byte	0 - 255	0		BU0 BU1 BU2(+)
106.0	Counter 2 - input -	Byte	0 - 255	0		BU0 BU1 BU2(+)
107.0	Counter 2 - reset	Byte	0 - 255	0		BU0 BU1 BU2(+)
108.0	Signal conditioning 1 - input	Byte	0 - 255	0		BU0 BU1 BU2(+)
109.0	Signal conditioning 1 - reset	Byte	0 - 255	0		BU0 BU1 BU2(+)
110.0	Signal conditioning 2 - input	Byte	0 - 255	0		BU0 BU1 BU2(+)
111.0	Signal conditioning 2 - reset	Byte	0 - 255	0		BU0 BU1 BU2(+)
112.0	Non-volatile element 1 - ınput	Byte	0 - 255	0		BU0 BU1 BU2(+)
113.0	Non-volatile element 1 - reset	Byte	0 - 255	0		BU0 BU1 BU2(+)
114.0	Non-volatile element 2 - input	Byte	0 - 255	0		BU0 BU1 BU2(+)
115.0	Non-volatile element 2 - reset	Byte	0 - 255	0		BU0 BU1 BU2(+)
116.0	Flashing 1 - Input	Byte	0 - 255	0		BU0 BU1 BU2(+)
117.0	Flashing 2 - Input	Byte	0 - 255	0		BU0 BU1 BU2(+)
118.0	Flashing 3 - Input	Byte	0 - 255	0		BU0 BU1 BU2(+)
119.0	Flicker 1 - Input	Byte	0 - 255	0		BU0 BU1 BU2(+)
120.0	Flicker 2 - Input	Byte	0 - 255	0		BU0 BU1 BU2(+)
121.0	Flicker 3 - Input	Byte	0 - 255	0		BU0 BU1 BU2(+)
122.0	**Analog parameters (44)**					
122.0	PLC/PCS analog input	Byte	0 - 255	16	Default: Max. current I_max	BU0 BU1 BU2(+)
123.0	*Reserved*	*Byte*		*0*		

3.3.2.13 Data record 132 - Extended device parameters 1

Table 3- 37 Data record 132 - Extended device parameters 1

Byte.Bit	Designation (PRM group)	Type	Range	Unit	Default	Note	Information
0.0	Coordination	Byte[4]					BU0 BU2(+)
4.0	Bit parameters (17)						
4.0	3UF50 compatibility mode	Bit	0, 1		0		BU2(+)
4.1	3UF50 operating mode	Bit	0, 1		0	0 = DPV0 1 = DPV1	BU2(+)
4.2	*Reserved*	*Bit*			*0*		
4.3	*Reserved*	*Bit*			*0*		
4.4	*Reserved*	*Bit*			*0*		
4.5	*Reserved*	*Bit*			*0*		
4.6	*Reserved*	*Bit*			*0*		
4.7	*Reserved*	*Bit*			*0*		
5.0	*Reserved*	*Bit*			*0*		
5.1	*Reserved*	*Bit*			*0*		
5.2	OPD - Warnings	Bit	0, 1		0	0 = Do not display 1 = Display	BU2(+)
5.3	OPD - Faults	Bit	0, 1		0		BU2(+)
5.4	Analog module - Measuring range input	Bit	0, 1		0	0 = 0 - 20mA 1 = 4 - 20mA	AM1
5.5	Analog module - Measuring range output	Bit	0, 1		0		AM1
5.6	*Reserved*	*Bit*			*0*		
5.7	*Reserved*	*Bit*			*0*		
6.0	Overshooting/undershooting limit 1	Bit	0, 1		0	0 = ">" (overshooting) 1 = "<" (undershooting)	BU2(+)
6.1	Overshooting/undershooting limit 2	Bit	0, 1		0		BU2(+)
6.2	Overshooting/undershooting limit 3	Bit	0, 1		0		BU2(+)
6.3	Overshooting/undershooting limit 4	Bit	0, 1		0		BU2(+)
6.4	Line-to-line voltage	Bit	0, 1		0	0 = No, 1 = Yes	BU2(+)
6.5	OPO level	Bit	0, 1		0	0 = NO contact 1 = NC contact	BU2(+)
6.6	Positioner response for OPO	Bit	0, 1		0	0 = CLOSED 1 = OPEN	BU2(+)
6.7	Star-delta - Transformer mounting	Bit	0, 1		0	0 = Delta 1 = In supply cable	BU0 BU2(+)
7.0	External fault 5 - Type	Bit	0, 1		0	0 = NO contact 1 = NC contact	BU2(+)
7.1	External fault 6 - Type	Bit	0, 1		0		BU2(+)
7.2	*Reserved*	*Bit*			*0*		
7.3	*Reserved*	*Bit*			*0*		

Byte.Bit	Designation (PRM group)	Type	Range	Unit	Default	Note	Information
7.4	Monitoring external fault 5	Bit	0, 1		0	0 = Always 1 = Only motor ON	BU2(+)
7.5	Monitoring external fault 6	Bit	0, 1		0		BU2(+)
7.6	*Reserved*	*Bit*			*0*		
7.7	*Reserved*	*Bit*			*0*		
8.0	Calculation module 2 - Operating mode	Bit	0, 1		0	0 = Word 1 = D-word	BU2(+)
8.1	*Reserved*	*Bit*			*0*		
8.2	DM-F - Safe tripping function	Bit	0, 1		0	0 = No 1 = Yes	DM-F
8.3	DM-F - reset safety-related tripping	Bit	0, 1		0	0 = Manual, 1 = Auto	DM-F
8.4	Time stamping active	Bit	0, 1		0		BU2(+)
8.5	*Reserved*	*Bit*			*0*		
8.6	*Reserved*	*Bit*			*0*		
8.7	*Reserved*	*Bit*			*0*		
9.0	DM-FL - Configuration 1	Bit	0, 1		0	Configurable parameters comparable with the module configuration	DM-FL
9.1	DM-FL - Configuration 2	Bit	0, 1		0		DM-FL
9.2	DM-FL - Configuration 3	Bit	0, 1		0		DM-FL
9.3	DM-FL - Configuration 4	Bit	0, 1		0		DM-FL
9.4	DM-FL - Configuration 5	Bit	0, 1		0		DM-FL
9.5	DM-FL - Configuration 6	Bit	0, 1		0		DM-FL
9.6	DM-FL - Configuration 7	Bit	0, 1		0		DM-FL
9.7	DM-FL - Configuration 8	Bit	0, 1		0		DM-FL
10.0	**Bit[2] - Parameters (21)**						
10.0	3UF50 basic type	Bit[2]	0, 1, 2		0		BU2(+)
10.2	*Reserved*	*Bit[2]*			*0*		
10.4	UVO timebase	Bit[2]	0, 1, 2		0	0 = 100 ms, 1 = 1 s, 2 = 10 s	BU2(+)
10.6	UVO operating mode	Bit[2]	0, 1		0	0 = Deactivated, 1 = Activated	BU2(+)
11.0	Trip monitoring U<	Bit[2]	0, 1, 2		1	0 = ON (always) 1 = on+ (always, not TPF) 2 = RUN (motor ON, not TPF)	UM(+)
11.2	Warning monitoring U<	Bit[2]	0, 1, 2		1		UM(+)
11.4	*Reserved*	*Bit[2]*			*0*		
11.6	*Reserved*	*Bit[2]*			*0*		

Byte.Bit	Designation (PRM group)	Type	Range	Unit	Default	Note	Information
12.0	Trip monitoring 0/4-20 mA>	Bit[2]	0, 1, 2, 3		0	0 = ON (always) 1 = ON + (always, not TPF) 2 = RUN (motor ON, not TPF) 3 = RUN+ (motor ON, not TPF, startup override)	AM1
12.2	Warning monitoring 0/4-20 mA>	Bit[2]	0, 1, 2, 3		0		AM1
12.4	Trip monitoring 0/4-20 mA<	Bit[2]	0, 1, 2, 3		0		AM1
12.6	Warning monitoring 0/4-20 mA<	Bit[2]	0, 1, 2, 3		0		AM1
13.0	Monitoring limit 1	Bit[2]	0, 1, 2, 3		0		BU2(+)
13.2	Monitoring limit 2	Bit[2]	0, 1, 2, 3		0		BU2(+)
13.4	Monitoring limit 3	Bit[2]	0, 1, 2, 3		0		BU2(+)
13.6	Monitoring limit 4	Bit[2]	0, 1, 2, 3		0		BU2(+)
14.0	*Reserved*	*Bit[2]*			*0*		
14.2	*Reserved*	*Bit[2]*			*0*		
14.4	*Reserved*	*Bit[2]*			*0*		
14.6	AM1 - active inputs	Bit[2]	0, 1, 2		0	0 = 1 input 1 = 2 inputs 2 = 3 inputs	AM1
15.0	DM - Debounce time inputs	Bit[2]	0, 1, 2, 3	10 ms	1	Offset 6ms	DM1 DM2 MM
15.2	AM1 - Response for open circuit	Bit[2]	1, 2, 3		2	0 = disabled 1 = signal 2 = warn 3 = tripping	AM1
15.4	EM - response to an external ground fault	Bit[2]	1, 3		1		EM EM(+) MM
15.6	EM - response to warning of an external ground fault	Bit[2]	0, 1, 2		0		EM EM(+) MM
16.0	*Reserved*	*Bit[2]*			*0*		
16.2	*Reserved*	*Bit[2]*			*0*		
16.4	DM-F - Test requirement response	Bit[2]	0, 1, 2		0	0 = disabled 1 = signal 2 = warn 3 = tripping	DM-F
16.6	DM-F - safety-related tripping response	Bit[2]	0, 1, 2, 3		0		DM-F
17.0	TM1 - Trip response T>	Bit[2]	1, 3		3		TM1 MM
17.2	TM1 - Warning response T>	Bit[2]	0, 1, 2		2		TM1 MM
17.4	TM1 - Response to a sensor fault / out of range	Bit[2]	0, 1, 2, 3		2		TM1 MM
17.6	TM1 - Active sensors	Bit[2]	0, 1, 2		2	0 = 1 sensors 1 = 2 sensors 2 = 3 sensors	TM1 MM
18.0	Trip response P>	Bit[2]	0, 1, 3		0	0 = disabled 1 = signal 2 = warn 3 = tripping	UM(+)
18.2	Warning response P>	Bit[2]	0, 1, 2		0		UM(+)
18.4	Trip response P<	Bit[2]	0, 1, 3		0		UM(+)
18.6	Warning response P<	Bit[2]	0, 1, 2		0		UM(+)
19.0	Trip response cos phi <	Bit[2]	0, 1, 3		0		UM(+)
19.2	Warning response cos phi <	Bit[2]	0, 1, 2		0		UM(+)
19.4	Trip response U<	Bit[2]	0, 1, 3		0		UM(+)
19.6	Warning response U<	Bit[2]	0, 1, 2		0		UM(+)
20.0	Trip response 0/4-20 mA>	Bit[2]	0, 1, 3		0		AM1
20.2	Warning response 0/4-20 mA>	Bit[2]	0, 1, 2		0		AM1
20.4	Trip response 0/4-20 mA<	Bit[2]	0, 1, 3		0		AM1
20.6	Warning response 0/4-20 mA<	Bit[2]	0, 1, 2		0		AM1

Byte.Bit	Designation (PRM group)	Type	Range	Unit	Default	Note	Information
21.0	*Reserved*	*Bit[2]*			*0*		
21.2	*Reserved*	*Bit[2]*			*0*		
21.4	*Reserved*	*Bit[2]*			*0*		
21.6	*Reserved*	*Bit[2]*			*0*		
22.0	External fault 5 - Response	Bit[2]	1, 2, 3		1	0 = disabled 1 = signal 2 = warn 3 = tripping	BU2(+)
22.2	External fault 6 - Response	Bit[2]	1, 2, 3		1		BU2(+)
22.4	*Reserved*	*Bit[2]*			*0*		
22.6	*Reserved*	*Bit[2]*			*0*		
23.0	Analog-value recording - Trigger edge	Bit[2]	0, 1		0	0 = positive 1 = Negative	BU2(+)
23.2	*Reserved*	*Bit[2]*			*0*		
23.4	*Reserved*	*Bit[2]*			*0*		
23.6	*Reserved*	*Bit[2]*			*0*		
24.0	*Reserved*	*Bit[2]*			*0*		
24.2	*Reserved*	*Bit[2]*			*0*		
24.4	*Reserved*	*Bit[2]*			*0*		
24.6	*Reserved*	*Bit[2]*			*0*		
25.0	Timer 3 - Type	Bit[2]	0, 1, 2, 3		0	0 = With closing delay 1 = Closing delay with memory 2 = With opening delay 3 = With fleeting closing	BU2(+)
25.2	Timer 4 - Type	Bit[2]	0, 1, 2, 3		0		BU2(+)
25.4	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	BU0 BU2(+)
25.6	Signal conditioning 4 - Type	Bit[2]	0, 1, 2, 3		0		BU0 BU2(+)
26.0	Non-volatile element 3 - Type	Bit[2]	0, 1, 2, 3		0		BU2(+)
26.2	Non-volatile element 4 - Type	Bit[2]	0, 1, 2, 3		0		BU2(+)
26.4	Calculation module 2 - Operator	Bit[2]	0, 1, 2, 3		0	0 = +, 1 = -, 2 = *, 3 = /	BU2(+)
26.6	*Reserved*	*Bit[2]*			*0*		
27.0	*Reserved*	*Bit[2]*			*0*		
27.2	*Reserved*	*Bit[2]*			*0*		
27.4	OPD - Operator panel display (bit 0 to 1)	Bit[2]	0 - 4		2	0 = Manual 1 = 3 s 2 = 10 s 3 = 1 min 4 = 5 min	BU2+
27.6	OPD - Operator panel display (bit 2 to 3)	Bit[2]	0 - 4				BU2+

Byte.Bit	Designation (PRM group)	Type	Range	Unit	Default	Note	Information
28.0	**Bit[4] - Parameters (25)**						
28.0	TM - sensor type	Bit[3] + Bit	000B to 100B		000B	000B = PT100 001B = PT1000 010B = KTY83 011B = KTY84 100B = NTC	TM1 MM
28.4	OPD - Language	Bit[4]	0 - 15		0		BU2+
29.0	External fault 5 - Reset also by	Bit[4]	0 - 1111B		0101B	Bit[0] = Panel reset Bit[1] = Auto-reset Bit[2] = Remote reset Bit[3] = OFF command reset	BU2(+)
29.4	External fault 6 - Reset also by	Bit[4]	0 - 1111B		0101B		BU2(+)
30.0	OPD - Contrast (bit 0 to 3)	Bit[4]	0 - 255	1 %	50		BU2+
30.4	OPD - Contrast (bit 4 to 7)	Bit[4]					BU2+
31.0	OPD - Profile (bit 0 to 3)	Bit[4]	0 - 33		0		BU2+
31.4	OPD - Profile (bit 4 to 7)	Bit[4]					BU2+
32.0	Truth table 7 type 2I/1O	Bit[4]	0 - 1111B		0		BU0 BU2(+)
32.4	Truth table 8 type 2I/1O	Bit[4]	0 - 1111B		0		BU0 BU2(+)
33.0	I_s1 conversion factor - Denominator	Bit[4]	0 - 15		0		BU2(+)
33.4	I_s2 conversion factor - Denominator	Bit[4]	0 - 15		0		BU2(+)
34.0	Hysteresis P - Cos phi - U	Bit[4]	0 - 15		5	1 %	UM(+)
34.4	Hysteresis 0/4-20 mA	Bit[4]	0 - 15		5	1 %	AM1
35.0	Hysteresis free limits	Bit[4]	0 - 15		5	1 %	BU2(+)
35.4	OPD - Lighting	Bit[4]	0 - 4		2	0 = Off 1 = 3 s 2 = 10 s 3 = 1 min 4 = 5 min	BU2+
36.0	**Byte parameters (29)**						
36.0	*Reserved*	*Byte*			*0*		
37.0	EM / MM - delay trip	Byte	0 - 255	100 ms	5		EM MM
38.0	Trip level cos phi<	Byte	0 - 100	1 %	0		UM(+)
39.0	Warning level cos phi<	Byte	0 - 100	1 %	0		UM(+)
40.0	Trip level U<	Byte	0 - 255	8 V	0		UM(+)
41.0	Warning level U<	Byte	0 - 255	8 V	0		UM(+)
42.0	Trip level 0/4-20 mA>	Byte	0 - 255	*128	0		AM1
43.0	Warning level 0/4-20 mA>	Byte	0 - 255	*128	0		AM1
44.0	Trip level 0/4-20 mA<	Byte	0 - 255	*128	0		AM1

Byte.Bit	Designation (PRM group)	Type	Range	Unit	Default	Note	Information
45.0	Warning level 0/4-20 mA<	Byte	0 - 255	*128	0		AM1
46.0	Trip delay P>	Byte	0 - 255	100 ms	5		UM(+)
47.0	Warning delay P>	Byte	0 - 255	100 ms	5		UM(+)
48.0	Trip delay P<	Byte	0 - 255	100 ms	5		UM(+)
49.0	Warning delay P<	Byte	0 - 255	100 ms	5		UM(+)
50.0	Trip delay cos phi<	Byte	0 - 255	100 ms	5		UM(+)
51.0	Warning delay cos phi<	Byte	0 - 255	100 ms	5		UM(+)
52.0	Trip delay U<	Byte	0 - 255	100 ms	5		UM(+)
53.0	Warning delay U<	Byte	0 - 255	100 ms	5		UM(+)
54.0	Trip delay 0/4-20 mA>	Byte	0 - 255	100 ms	5		AM1
55.0	Warning delay 0/4-20 mA>	Byte	0 - 255	100 ms	5		AM1
56.0	Trip delay 0/4-20 mA<	Byte	0 - 255	100 ms	5		AM1
57.0	Warning delay 0/4-20 mA<	Byte	0 - 255	100 ms	5		AM1
58.0	Delay limit 1	Byte	0 - 255	100 ms	5		BU2(+)
59.0	Delay limit 2	Byte	0 - 255	100 ms	5		BU2(+)
60.0	Delay limit 3	Byte	0 - 255	100 ms	5		BU2(+)
61.0	Delay limit 4	Byte	0 - 255	100 ms	5		BU2(+)
62.0	TM - Hysteresis	Byte	0 - 255	1 K	5		TM1 MM
63.0	Max. star time	Byte	0 - 255	1 s	20	Star-delta starter	BU0 BU2(+)
64.0	UVO time	Byte	0 - 255	100 ms	0		BU2(+)
65.0	Staggering time	Byte	0 - 255	1 s	0		BU2(+)
66.0	Analog value recording - Sampling rate	Byte	0 - 20	5%	0		BU2(+)
67.0	Calculation module 2 - Denominator 1	Byte	0 - 255		0		BU2(+)
68.0	Calculation module 2 - Numerator 2	Byte	0 - 255		0		BU2(+)
69.0	Calculation module 1 - Denominator	Byte	0 - 255		0		BU2(+)
70.0	Truth table 4 type 3I/1O	Byte	0 - 11111111B		0		BU0, BU2(+)
71.0	Truth table 5 type 3I/1O	Byte	0 - 11111111B		0		BU2(+)
72.0	Truth table 6 type 3I/1O	Byte	0 - 11111111B		0		BU2(+)
73.0	Calculation module 2 - Numerator 1	Byte	-128 - 127		0		BU2(+)
74.0	Calculation module 2 - Denominator 2	Byte	-128 - 127		0		BU2(+)
75.0	DM-F - Test requirement level	Byte	0 - 255	1 week	0		BU2(+)

Byte.Bit	Designation (PRM group)	Type	Range	Unit	Default	Note	Information
76.0	**Word parameters (33)**						
76.0	Analog module - Start value output	Word	0 - 65535		0	Value for 0/4mA	AM1
78.0	Analog Module - End value output	Word	0 - 65535		27648	Value for 20mA	AM1
80.0	TM - Trip level T>	Word	0 - 65535	1 K	0		TM1 MM
82.0	TM - Warning level T>	Word	0 - 65535	1 K	0		TM1 MM
84.0	Limit monitor 1 - Limit	Word	0 - 65535		0		BU2(+)
86.0	Limit monitor 2 - Limit	Word	0 - 65535		0		BU2(+)
88.0	Limit monitor 3 - Limit	Word	0 - 65535		0		BU2(+)
90.0	Limit monitor 4 - Limit	Word	0 - 65535		0		BU2(+)
92.0	Timer 3 - Limit	Word	0 - 65535	100 ms	0		BU2(+)
94.0	Timer 4 - Limit	Word	0 - 65535	100 ms	0		BU2(+)
96.0	Counter 3 - Limit	Word	0 - 65535		0		BU2(+)
98.0	Counter 4 - Limit	Word	0 - 65535		0		BU2(+)
100.0	Change-over pause	Word	0 - 65535	10 ms	0		
102.0	Analog value recording - Sampling rate	Word	1 - 50000	1 ms	100		BU2(+)
104.0	I_s1 conversion factor - Numerator	Word	0 - 65535		0		BU2(+)
106.0	I_s2 conversion factor - Numerator	Word	0 - 65535		0		BU2(+)
108.0	**D-word parameters (37)**						
108.0	Motor protection - Set current I_s2	D-word	1)	10 mA	0		BU2(+)
112.0	Trip level P>	D-word	0 - 0xFFFFFFFF	1 W	0		UM(+)
116.0	Warning level P>	D-word	0 - 0xFFFFFFFF	1 W	0		UM(+)
120.0	Trip level P<	D-word	0 - 0xFFFFFFFF	1 W	0		UM(+)
124.0	Warning level P<	D-word	0 - 0xFFFFFFFF	1 W	0		UM(+)
128.0	Truth Table 9 5I/2O type - Output 1	Bit[32]	0 ... 1..1B		0		BU2(+)
132.0	Truth Table 9 5I/2O type - Output 2	Bit[32]	0 ... 1..1B		0		BU2(+)
136.0	Calculation module 2, offset	D-word	- 0x800000000 x7FFFFFFF		0		BU2(+)
140.0	Calculation module 1, numerator / offset	D-word	2x - 32768..32767		0		BU2(+)

1) Value range dependent on current range of the IM / UM and the conversion factor

3.3.2.14 Data record 133 - Extended device parameters 2 (plug binary)

Table 3- 38 Data record 133 - Extended device parameters

Byte.Bit	Designation (PRM group)	Type	Range	Default	Note	Information
0.0	*Reserved*	*Byte[4]*				
4.0	Byte parameters (41)					
4.0	DM1 - Output 1	Byte	0 - 255	0		DM1 DM-F MM
5.0	DM1 - Output 2	Byte	0 - 255	0		DM1 DM-F MM
6.0	DM2 - Output 1	Byte	0 - 255	0		DM2
7.0	DM2 - Output 2	Byte	0 - 255	0		DM2
8.0	*Reserved*	*Byte*		*0*		
9.0	*Reserved*	*Byte*		*0*		
10.0	*Reserved*	*Byte*		*0*		
11.0	*Reserved*	*Byte*		*0*		
12.0	Time stamping - input 0	Byte	0 - 255	0		BU2(+)
13.0	Time stamping - input 1	Byte	0 - 255	0		BU2(+)
14.0	Time stamping - input 2	Byte	0 - 255	0		BU2(+)
15.0	Time stamping - input 3	Byte	0 - 255	0		BU2(+)
16.0	Time stamping - input 4	Byte	0 - 255	0		BU2(+)
17.0	Time stamping - input 5	Byte	0 - 255	0		BU2(+)
18.0	Time stamping - input 6	Byte	0 - 255	0		BU2(+)
19.0	Time stamping - input 7	Byte	0 - 255	0		BU2(+)
20.0	Analog-value recording - Trigger input	Byte	0 - 255	0		BU2(+)
21.0	*Reserved*	*Byte*		*0*		
22.0	Control station - Local control [LC] ON<<	Byte	0 - 255	0		Dependent on the control function
23.0	Control station - Local control [LC] ON>>	Byte	0 - 255	0		
24.0	Control station - PLC/PCS [DP] ON<<	Byte	0 - 255	0		
25.0	Control station - PLC/PCS [DP] ON>>	Byte	0 - 255	0		
26.0	Control station - PC[DPV1] ON<<	Byte	0 - 255	0		
27.0	Control station - PC[DPV1] ON>>	Byte	0 - 255	0		
28.0	Control station - Operator panels [OP] ON>>	Byte	0 - 255	0		
29.0	Control station - Operator panels [OP]<>/<<>>	Byte	0 - 255	0		
30.0	Control function - ON<<	Byte	0 - 255	0		
31.0	Control function - ON>>	Byte	0 - 255	0		
32.0	Auxiliary control input - FC	Byte	0 - 255	0		
33.0	Auxiliary control input - FO	Byte	0 - 255	0		
34.0	Auxiliary control input - TC	Byte	0 - 255	0		
35.0	Auxiliary control input - TO	Byte	0 - 255	0		
36.0	External fault 5 - input	Byte	0 - 255	0		BU2(+)
37.0	External fault 6 - input	Byte	0 - 255	0		BU2(+)
38.0	*Reserved*	*Byte*		*0*		
39.0	*Reserved*	*Byte*		*0*		
40.0	External fault 5 - Reset	Byte	0 - 255	0		BU2(+)

Byte.Bit	Designation (PRM group)	Type	Range	Default	Note	Information
41.0	External fault 6 - Reset	Byte	0 - 255	0		BU2(+)
42.0	*Reserved*	*Byte*		*0*		
43.0	*Reserved*	*Byte*		*0*		
44.0	UVO fault	Byte	0 - 255	0		BU2(+)
45.0	OPO error	Byte	0 - 255	0		BU2(+)
46.0	Truth table 4 3E/1A - input 1	Byte	0 - 255	0		BU0 BU2(+)
47.0	Truth table 4 3I/1O - input 2	Byte	0 - 255	0		BU0 BU2(+)
48.0	Truth table 4 3I/1O - input 3	Byte	0 - 255	0		BU0 BU2(+)
49.0	Truth table 5 3I/1O - input 1	Byte	0 - 255	0		BU2(+)
50.0	Truth table 5 3I/1O - input 2	Byte	0 - 255	0		BU2(+)
51.0	Truth table 5 3I/1O - input 3	Byte	0 - 255	0		BU2(+)
52.0	Truth table 6 3I/1O - input 1	Byte	0 - 255	0		BU2(+)
53.0	Truth table 6 3I/1O - input 2	Byte	0 - 255	0		BU2(+)
54.0	Truth table 6 3I/1O - input 3	Byte	0 - 255	0		BU2(+)
55.0	Truth table 7 2I/1O - input 1	Byte	0 - 255	0		BU0 BU2(+)
56.0	Truth table 7 2I/1O - input 2	Byte	0 - 255	0		BU0 BU2(+)
57.0	Truth table 8 2I/1O - input 1	Byte	0 - 255	0		BU0 BU2(+)
58.0	Truth table 8 2I/1O - input 2	Byte	0 - 255	0		BU0 BU2(+)
59.0	Truth table 9 5I/2O - input 1	Byte	0 - 255	0		BU2(+)
60.0	Truth table 9 5I/2O - input 2	Byte	0 - 255	0		BU2(+)
61.0	Truth table 9 5I/2O - input 3	Byte	0 - 255	0		BU2(+)
62.0	Truth table 9 5I/2O - input 4	Byte	0 - 255	0		BU2(+)
63.0	Truth table 9 5I/2O - input 5	Byte	0 - 255	0		BU2(+)
64.0	Timer 3 - input	Byte	0 - 255	0		BU2(+)
65.0	Timer 3 - reset	Byte	0 - 255	0		BU2(+)
66.0	Timer 4 - input	Byte	0 - 255	0		BU2(+)
67.0	Timer 4 - reset	Byte	0 - 255	0		BU2(+)
68.0	Counter 3 - input +	Byte	0 - 255	0		BU2(+)
69.0	Counter 3 - input -	Byte	0 - 255	0		BU2(+)
70.0	Counter 3 - reset	Byte	0 - 255	0		BU2(+)
71.0	Counter 4 - input +	Byte	0 - 255	0		BU2(+)
72.0	Counter 4 - input -	Byte	0 - 255	0		BU2(+)
73.0	Counter 4 - reset	Byte	0 - 255	0		BU2(+)
74.0	Signal conditioning 3 - input	Byte	0 - 255	0		BU0 BU2(+)
75.0	Signal conditioning 3 - reset	Byte	0 - 255	0		BU0 BU2(+)
76.0	Signal conditioning 4 - input	Byte	0 - 255	0		BU0 BU2(+)
77.0	Signal conditioning 4 - reset	Byte	0 - 255	0		BU0 BU2(+)
78.0	Non-volatile element 3 - input	Byte	0 - 255	0		BU2(+)
79.0	Non-volatile element 3 - reset	Byte	0 - 255	0		BU2(+)
80.0	Non-volatile element 4 - input	Byte	0 - 255	0		BU2(+)
81.0	Non-volatile element 4 - reset	Byte	0 - 255	0		BU2(+)
82.0	*Reserved*	*Byte*		*0*		

Byte.Bit	Designation (PRM group)	Type	Range	Default	Note	Information
83.0	*Reserved*	*Byte*		*0*		
84.0	*Reserved*	*Byte*		*0*		
85.0	*Reserved*	*Byte*		*0*		
86.0	*Reserved*	*Byte*		*0*		
87.0	*Reserved*	*Byte*		*0*		
88.0	**Analog parameters (45)**					
88.0	Analog module - output	Byte	0 - 255	0		AM1
89.0	Analog input limit 1	Byte	0 - 255	0		BU2(+)
90.0	Analog input limit 2	Byte	0 - 255	0		BU2(+)
91.0	Analog input limit 3	Byte	0 - 255	0		BU2(+)
92.0	Analog input limit 4	Byte	0 - 255	0		BU2(+)
93.0	Calculator 1 - input	Byte	0 - 255	0		BU2(+)
94.0	Analog value recording - analog input	Byte	0 - 255	0		BU2(+)
95.0	PLC/PCS analog input 2	Byte	0 - 255	0		BU0 BU2(+)
96.0	PLC/PCS analog input 3	Byte	0 - 255	0		BU0 BU2(+)
97.0	PLC/PCS analog input 4	Byte	0 - 255	0		BU0 BU2(+)
98.0	Calculator 2, input 1	Byte	0 - 255	0		BU2(+)
99.0	Calculator 2, input 2	Byte	0 - 255	0		BU2(+)

3.3.2.15 Data record 134 - Extended device parameters 2

Table 3- 39 Data record 134 - ExtendedPlus device parameters

Byte.Bit	Designation (PRM group)	Type	Range	Unit	Default	Note	Info
	Part - Bit[2] parameters						
17.0	Internal ground fault+ - Warning response	Bit[2]	0, 1, 2		0	0 = Disabled 1 = Signaling 2 = Warn	UM+
	Part - Bit[4] parameters						
22.4	Internal ground fault+ - Hysteresis	Bit[4]	0 ... 15	1 %	5		UM+
	Part - Byte parameters						
42.0	Internal ground fault+ - warning delay	Byte	0 ... 255	100 ms	1		UM+
	Part - Word parameters						
43.0	Internal ground fault+ - Trip level	Word	10 ... 120	% / I_e	0	Value range dependent on current range of the UM+	UM+
44.0	Internal ground fault+ - Warning level	Word	10 ... 120	% / I_e	0	Value range dependent on current range of the UM+	UM+
148	**Part - Float parameters**						
172.0	*Reserved*	*Float*					
176.0	*Reserved*	*Float*					

3.3.2.16 Data record 135 - Extended device parameters 2

This data record is available for the SIMOCODE pro V PROFIBUS basic unit from version V4.0 and the SIMOCODE pro V Modbus RTU basic unit from version V2.0.

The bytes of this data record that are not mentioned are reserved entries that are not used by the stated devices.

Table 3- 40 Data record 135 - ExtendedPlus device parameters 2

Byte.Bit	Designation (PRM group)	Type	Range	Unit	Default	Note	Info
	Part - FII byte parameters						
100.0	PLC / PCS analog FI input	FII byte	0 ... 255		0		BU2+
101.0	PLC / PCS analog FI input	FII byte	0 ... 255		0		BU2+
102.0	PLC / PCS analog FI input	FII byte	0 ... 255		0		BU2+
103.0	PLC / PCS analog FI input	FII byte	0 ... 255		0		BU2+
107 ... 113	*Reserved*						

3.3.2.17 Data record 139 - Marking

For external faults, limit monitors, and monitoring functions of the temperature and analog modules, user-specific texts can be configured for marking. The diagnostics

- **External fault 1 to 6** (status information, warnings, and faults)
- **Limit 1 to 4** (status information)
- **TM warning T> / tripping T>** (status information, warnings, and faults)
- **AM Warning / tripping 0/4-20mA<>** (status information, warnings, and faults)

can be parameterized to have various meanings, e.g. fill level >, bearing hot, etc. To simplify diagnostics, these texts can be saved in the device. These can be created, read out and displayed, for example, with **SIMOCODE ES**. The texts do not contain any functions.

You can access the following texts via data record 139:

Table 3- 41 Data record 139 - Marking

Byte.Bit	Designation	Type	Information
0.0	*Reserved*	*Byte[4]*	
4.0	*Reserved*	*Byte[6]*	
10.0	Marking - External fault 1	Byte[10]	BU0 BU1 BU2(+)
20.0	Marking - External fault 2	Byte[10]	BU0 BU1 BU2(+)
30.0	Marking - External fault 3	Byte[10]	BU0 BU1 BU2(+)
40.0	Marking - External fault 4	Byte[10]	BU0 BU1 BU2(+)
50.0	Marking - External fault 5	Byte[10]	BU2(+)
60.0	Marking - External fault 6	Byte[10]	BU2(+)
70.0	*Reserved*	*Byte[10]*	
80.0	*Reserved*	*Byte[10]*	
90.0	Marking limit 1	Byte[10]	BU2(+)
100.0	Marking limit 2	Byte[10]	BU2(+)
110.0	Marking limit 3	Byte[10]	BU2(+)
120.0	Marking limit 4	Byte[10]	BU2(+)
130.0	Marking - TM warning T>	Byte[10]	BU0 BU2(+)
140.0	Marking - TM trip T>	Byte[10]	BU0 BU2(+)
150.0	Marking warning 0/4-20mA>	Byte[10]	BU2(+)
160.0	Marking - Warning 0/4-20 mA<	Byte[10]	BU2(+)
170.0	Marking - Trip 0/4-20 mA>	Byte[10]	BU2(+)
180.0	Marking - Trip 0/4-20 mA<	Byte[10]	BU2(+)
190.0	*Reserved*	*Byte[10]*	

3.3.2.18 Data record 160 - Communication parameters

Note

Only the address is relevant for writing. The baud rate is detected automatically. The actual baud rate is read.

Table 3- 42 Data record 160 - Communication parameters

Byte.Bit	Designation	Type	Information
0.0	*Reserved*	*Byte[4]*	BU0 BU1 BU2(+)
4.0	Station address	Byte	
5.0	Baud rate	Byte	
6.0 to 9.0	*Reserved*	*Byte[6]*	
10.0	PROFIsafe address (read only)	Word	BU2(+)

3.3.2.19 Data record 165 - Identification

Table 3- 43 Data record 165 - Identification

Byte.Bit	Designation	Type	Information
0.0	*Reserved*	*Byte[4]*	BU0 BU1 BU2(+)
4.0	Plant identifier	Byte[32]	
36.0	Location designation	Byte[22]	
58.0	Date installed	Byte[16]	
74.0	*Reserved*	*Byte[38]*	
112.0	Description	Byte[54]	

3.3.2.20 Data record 202 - Acyclic receive

Description

The acyclic receive data can be used for any functions. The receive data is available as device-internal outputs (sockets).

Table 3- 44 Data record 202 - Acyclic receive

Byte.Bit	Designation	Type	Information
0.0	*Reserved*	*Byte[4]*	BU0 BU1 BU2(+)
4.0	Acyclic receive - Bit 0.0	Bit	
4.1	Acyclic receive - Bit 0.1	Bit	
4.2	Acyclic receive - Bit 0.2	Bit	
4.3	Acyclic receive - Bit 0.3	Bit	
4.4	Acyclic receive - Bit 0.4	Bit	
4.5	Acyclic receive - Bit 0.5	Bit	
4.6	Acyclic receive - Bit 0.6	Bit	
4.7	Acyclic receive - Bit 0.7	Bit	
5.0	Acyclic receive - Bit 1.0	Bit	
5.1	Acyclic receive - Bit 1.1	Bit	
5.2	Acyclic receive - Bit 1.2	Bit	
5.3	Acyclic receive - Bit 1.3	Bit	
5.4	Acyclic receive - Bit 1.4	Bit	
5.5	Acyclic receive - Bit 1.5	Bit	
5.6	Acyclic receive - Bit 1.6	Bit	
5.7	Acyclic receive - Bit 1.7	Bit	
6.0	Acyclic receive - Analog value	Word	

3.3.2.21 Data record 203 - Acyclic send

Description

Any data can be transmitted via the acyclic send data. The send data is available as device-internal inputs (plugs).

Table 3- 45 Data record 203 - Acyclic send

Byte.Bit	Designation	Type	Information
0.0	Acyclic send - Bit 0.0	Bit	BU0 BU1 BU2(+)
0.1	Acyclic send - Bit 0.1	Bit	
0.2	Acyclic send - Bit 0.2	Bit	
0.3	Acyclic send - Bit 0.3	Bit	
0.4	Acyclic send - Bit 0.4	Bit	
0.5	Acyclic send - Bit 0.5	Bit	
0.6	Acyclic send - Bit 0.6	Bit	
0.7	Acyclic send - Bit 0.7	Bit	
1.0	Acyclic send - Bit 1.0	Bit	
1.1	Acyclic send - Bit 1.1	Bit	
1.2	Acyclic send - Bit 1.2	Bit	
1.3	Acyclic send - Bit 1.3	Bit	
1.4	Acyclic send - Bit 1.4	Bit	
1.5	Acyclic send - Bit 1.5	Bit	
1.6	Acyclic send - Bit 1.6	Bit	
1.7	Acyclic send - Bit 1.7	Bit	

3.3.2.22 Data record 224 - Password protection

Description

- Password protection ON

  If the data record is received with this control flag, the password protection is activated and the password applied. If "Password protection on" applies and the password is not identical at the time of receipt, the event "Event - Wrong password" is set and no change will be made.

- Password protection OFF

  If the data record is received with this control flag, the password protection is deactivated. If the password is incorrect, the event "Event - Wrong password" is set and no change is made.

Table 3- 46 Data record 224 - Password protection

Byte.Bit	Designation	Type	Information
0.0	*Reserved*	*Byte[4]*	BU0 BU1 BU2(+)
4.0	Control flag: 0 = Password protection off, 1 = Password protection on	Bit	
4.1	*Reserved*	*Bit[31]*	
8.0	Password	Byte[8]	BU0 BU1 BU2(+)
16.0	*Reserved*	*Byte[8]*	

3.4 Tables, PROFINET data records

3.4.1 PROFINET tables

3.4.1.1 Active control stations, contactor controls, lamp controls and status information for the control functions

Table 3- 47 Active control stations of control functions

Designation/control function	Control station				
	ON <<	ON <	OFF	ON >	ON >>
Overload	-	-	-	-	-
Direct starter	-	-	OFF	ON	-
Reversing starter	-	LEFT	OFF	RIGHT	-
Circuit breaker	-	-	OFF	ON	-
Star-delta starter	-	-	OFF	ON	-
Star-delta reversing starter	-	LEFT	OFF	RIGHT	-
Dahlander starter	-	-	OFF	SLOW	FAST
Dahlander reversing starter	LEFT-FAST	LEFT-SLOW	OFF	RIGHT-SLOW	RIGHT-FAST
Pole-changing starter	-	-	OFF	SLOW	FAST
Pole-changing reversing starter	LEFT-FAST	LEFT-SLOW	OFF	RIGHT-SLOW	RIGHT-FAST
Solenoid valve	-	-	CLOSED	OPEN	-
Positioner 1	-	CLOSED	STOP	OPEN	-
Positioner 2	-	CLOSED	STOP	OPEN	-
Positioner 3	-	CLOSED	STOP	OPEN	-
Positioner 4	-	CLOSED	STOP	OPEN	-
Positioner 5	-	CLOSED	STOP	OPEN	-
Soft starter	-	-	OFF	ON	-
Soft starter with reversing contactor	-	LEFT	OFF	RIGHT	-

Table 3- 48 Contactor control with control functions

Designation/control function	Contactor control				
	QE1	QE2	QE3	QE4	QE5
Overload	-	-	Active	-	-
Direct starter	ON	-	-	-	-
Reversing starter	RIGHT	LEFT	-	-	-
Circuit breaker	ON pulse	-	OFF pulse	-	-
Star-delta starter	Star contactor	Delta contactor	Line contactor	-	-
Star-delta reversing starter	Star contactor	Delta contactor	RIGHT line contactor	LEFT line contactor	-
Dahlander starter	FAST	SLOW	Star contactor FAST	-	-
Dahlander reversing starter	RIGHT-FAST	RIGHT-SLOW	Star contactor FAST	LEFT-SLOW	LEFT-FAST
Pole-changing starter	FAST	SLOW	-	-	-
Pole-changing reversing starter	RIGHT-FAST	RIGHT-SLOW	-	LEFT-SLOW	LEFT-FAST
Solenoid valve	OPEN	-	-	-	-
Positioner 1	OPEN	CLOSED	-	-	-
Positioner 2	OPEN	CLOSED	-	-	-
Positioner 3	OPEN	CLOSED	-	-	-
Positioner 4	OPEN	CLOSED	-	-	-
Positioner 5	OPEN	CLOSED	-	-	-
Soft starter	ON line contactor	-	Reset	ON command	-
Soft starter with reversing contactor	RIGHT line contactor	LEFT line contactor	Reset	ON command	-

Table 3- 49 Lamp control with control functions

Designation/control function	Lamp control				
	QLE << (ON <<)	QLE < (ON <)	QLA (OFF)	QLE < (ON >)	QLE >> (ON >>)
Overload	-	-	-	-	-
Direct starter	-	-	OFF	ON	-
Reversing starter	-	LEFT	OFF	RIGHT	-
Circuit breaker	-	-	OFF	ON	-
Star-delta starter	-	-	OFF	ON	-
Star-delta reversing starter	-	LEFT	OFF	RIGHT	-
Dahlander starter	-	-	OFF	SLOW	FAST
Dahlander reversing starter	LEFT-FAST	LEFT-SLOW	OFF	RIGHT-SLOW	RIGHT-FAST
Pole-changing starter	-	-	OFF	SLOW	FAST
Pole-changing reversing starter	LEFT-FAST	LEFT-SLOW	OFF	RIGHT-SLOW	RIGHT-FAST
Solenoid valve	-	-	CLOSED	OPEN	-
Positioner 1	-	CLOSED	STOP	OPEN	-
Positioner 2	-	CLOSED	STOP	OPEN	-
Positioner 3	-	CLOSED	STOP	OPEN	-
Positioner 4	-	CLOSED	STOP	OPEN	-
Positioner 5	-	CLOSED	STOP	OPEN	-
Soft starter	-	-	OFF	ON	-
Soft starter with reversing contactor	-	LEFT	OFF	RIGHT	-

3.4.1.2 OPC UA variables

Node IDs

The name of the variable is composed of the namespace ID2 and the node ID as follows:

ns=http://siemens.com/automation/simocode/provpn;i=Node ID of the relevant variable.

Example:

You want to access the maximum motor current. You search for the node ID of the variable "Max. Current I_max" in the following table: Node ID=33

Table 3- 50 Node IDs (1)

Node ID	Data type	Description
Acyclic receive		
11	Boolean	Acyclic receive - Bit 0.0
12	Boolean	Acyclic receive - Bit 0.1
13	Boolean	Acyclic receive - Bit 0.2
14	Boolean	Acyclic receive - Bit 0.3
15	Boolean	Acyclic receive - Bit 0.4
16	Boolean	Acyclic receive - Bit 0.5
17	Boolean	Acyclic receive - Bit 0.6
18	Boolean	Acyclic receive - Bit 0.7
19	Boolean	Acyclic receive - Bit 1.0
20	Boolean	Acyclic receive - Bit 1.1
21	Boolean	Acyclic receive - Bit 1.2
22	Boolean	Acyclic receive - Bit 1.3
23	Boolean	Acyclic receive - Bit 1.4
24	Boolean	Acyclic receive - Bit 1.5
25	Boolean	Acyclic receive - Bit 1.6
26	Boolean	Acyclic receive - Bit 1.7
27	Unsigned word	Acyclic receive - analog value
Measured values		
30	Unsigned byte	Thermal memory
31	Unsigned byte	Phase unbalance
32	Unsigned byte	Cos phi
33	Unsigned word	Max. current I_max
34	Unsigned word	Current I_L1
35	Unsigned word	Current I_L2
36	Unsigned word	Current I_L3
37	Unsigned word	Last trip current
38	Unsigned word	Time to trip
39	Unsigned word	Cooling down period
40	Unsigned word	Phase voltage UL1-N

Node ID	Data type	Description
41	Unsigned word	Phase voltage UL2-N
42	Unsigned word	Phase voltage UL3-N
43	Unsigned word	AM1 output
44	Unsigned word	AM1 input 1
45	Unsigned word	AM1 input 2
46	Unsigned word	AM1 input 3
47	Unsigned word	TM1 max. temperature
48	Unsigned word	TM1 temperature 1
49	Unsigned word	TM1 temperature 2
50	Unsigned word	TM1 temperature 3
51	Unsigned Dword	Active power P
52	Unsigned Dword	Apparent power S
53	Unsigned word	AM2 output
54	Unsigned word	AM2 input 1
55	Unsigned word	AM2 input 2
56	Unsigned word	AM2 input 3
57	Unsigned word	Max. temperature
58	Unsigned word	TM2 temperature 1
59	Unsigned word	TM2 temperature 2
60	Unsigned word	TM2 temperature 3
61	Unsigned Word	EM Ground Fault Current
62	Unsigned Word	EM Last Trip Current
Statistics		
70	Unsigned byte	Permissible starts - actual value
71	Unsigned byte	Time until test required
72	Unsigned word	Number of parameterizations
73	Unsigned word	Number of overload trips
74	Unsigned word	Int. number of overload trips
75	Unsigned word	Motor stop time
76	Unsigned word	Timer 1
77	Unsigned word	Timer 2
78	Unsigned word	Timer 3
79	Unsigned word	Timer 4
80	Unsigned word	Counter 1
81	Unsigned word	Counter 2
82	Unsigned word	Counter 3
83	Unsigned word	Counter 4
84	Unsigned word	Calculation module 1 - output
85	Unsigned word	Calculation module 2 - output
86	Unsigned Dword	Motor operating hours
87	Unsigned Dword	Int. motor operating hours
88	Unsigned Dword	Device operating hours

Node ID	Data type	Description
89	Unsigned Dword	Number of starts
90	Unsigned Dword	Int. number of direct starts
91	Unsigned Dword	Int. number of reverse starts
92	Unsigned Dword	Consumed energy
93	Unsigned word	Timer 5
94	Unsigned word	Timer 6
95	Unsigned word	Counter 5
96	Unsigned word	Counter 6
97	Unsigned word	Calculation module 3 - output
98	Unsigned word	Calculation module 4 - output
99	Unsigned word	Analog multiplexer - output
Diagnostic status		
108	Boolean	Status - General fault
109	Boolean	Status - General warning
110	Boolean	Status - Device OK
111	Boolean	Status - Bus OK
112	Boolean	Status - PLC/DCS in run
113	Boolean	Status - Current flowing
114	Boolean	Status - PE command Start_Pause is pending
115	Boolean	Status - PE energy-saving mode active
116	Boolean	Status - On<<
117	Boolean	Status - On <
118	Boolean	Status - Off
119	Boolean	Status - On >
120	Boolean	Status - On >>
121	Boolean	Status - Start active
122	Boolean	Status - Interlocking time active
123	Boolean	Status - Change-over pause active
124	Boolean	Status - Positioner running in open direction
125	Boolean	Status - Positioner running in open direction
126	Boolean	Status - Feedback closed (FC)
127	Boolean	Status - Feedback open (FO)
128	Boolean	Status - Torque closed (TC)
129	Boolean	Status - Torque open (TO)
130	Boolean	Status - Test position (TPF)
131	Boolean	Status - Operational Protection OFF (OPO)
132	Boolean	Status - Remote mode
133	Boolean	Status - Emergency start executed
134	Boolean	Status - Cooling down period active
135	Boolean	Status - Pause time active
136	Boolean	Status - Device check active
137	Boolean	Status - Phase-sequence 1-2-3

Node ID	Data type	Description
138	Boolean	Status - Phase-sequence 3-2-1
139	Boolean	Status - Enabling circuit closed
Diagnostic events		
140	Boolean	Event - Prewarning overload (I>115%Is)
141	Boolean	Event - Unbalance
142	Boolean	Event - Overload
143	Boolean	Event - Overload + loss of phase
144	Boolean	Event - Internal ground fault
145	Boolean	Event - External Ground Fault
146	Boolean	Event - Warning external ground fault
147	Boolean	Event - Thermistor trip level
148	Boolean	Event - Thermistor short circuit
149	Boolean	Event - Thermistor open circuit
150	Boolean	Event - TM1 warning level T>
151	Boolean	Event - TM1 trip level T>
152	Boolean	Event - TM1 sensor fault
153	Boolean	Event - TM1 out of range
154	Boolean	Event - EM Open Circuit
155	Boolean	Event - EM Short Circuit
156	Boolean	Event - Warning level I>
157	Boolean	Event - Warning level I<
158	Boolean	Event - Warning level P>
159	Boolean	Event - Warning level P<
160	Boolean	Event - Warning level cos phi<
161	Boolean	Event - Warning level U<
162	Boolean	Event - AM1 warning level 0/4-20mA>
163	Boolean	Event - AM1 warning level 0/4-20mA<
164	Boolean	Event - Trip level I>
165	Boolean	Event - Trip level I<
166	Boolean	Event - Trip level P>
167	Boolean	Event - Trip level P<
168	Boolean	Event - Trip level cos phi<
169	Boolean	Event - Trip level U<
170	Boolean	Event - AM1 trip level 0/4-20mA>
171	Boolean	Event - AM1 trip level 0/4-20mA<
172	Boolean	Event - Stalled rotor
175	Boolean	Event - No start possible
176	Boolean	Event - No. of starts>
177	Boolean	Event - Just one start possible
178	Boolean	Event - Motor operating hours >
179	Boolean	Event - Motor stop time >
180	Boolean	Event - Limit monitor 1

Node ID	Data type	Description
181	Boolean	Event - Limit monitor 2
182	Boolean	Event - Limit monitor 3
183	Boolean	Event - Limit monitor 4
184	Boolean	Event - External fault 1
185	Boolean	Event - External fault 2
186	Boolean	Event - External fault 3
187	Boolean	Event - External fault 4
188	Boolean	Event - External fault 5
189	Boolean	Event - External fault 6
192	Boolean	Event - AM1 open circuit
193	Boolean	Event - DM-F safety-related tripping
194	Boolean	Event - Monitoring interval for mandatory testing - test required
195	Boolean	Event - Time set (NTP)
196	-	-
197	Boolean	Event - Time synchronized (NTP)
198	Boolean	Event - DM-F LOCAL o.k.
199	Boolean	Event - DM-F PROFIsafe active
200	Boolean	Event - Configured operation panel missing
201	Boolean	Event - Module not supported
202	Boolean	Event - No module voltage
204	Boolean	Event - Memory module read in
205	Boolean	Event - Memory module programmed
206	Boolean	Event - Memory module cleared
208	Boolean	Event - Initialization module read in
209	Boolean	Event - Initialization module programmed
210	Boolean	Event - Initialization module cleared
212	Boolean	Event - Parameter blocking during start-up active
213	Boolean	Event - Parameter changes not allowed in the current operating state
214	Boolean	Event - Device does not support the required functions
215	Boolean	Event - Wrong parameter
216	Boolean	Event - Wrong password
217	Boolean	Event - Password protection active
218	Boolean	Event - Factory settings
219	Boolean	Event - Parameter setting active
220	Unsigned byte	Event - Prm error number
228	Boolean	Event - DM-F LOCAL configuration mode
229	Boolean	Event - DM-F LOCAL - actual configuration and desired configuration different
230	Boolean	Event - DM-F LOCAL waiting for start-up test
231	Boolean	Event - DM-F incorrect PROFIsafe address or incorrect PROFIsafe parameter
232	Boolean	Event - Initialization Module write protected, parameter changes not allowed

Node ID	Data type	Description
233	Boolean	Event - Memory module write-protected
234	Boolean	Event - Initialization module write-protected
235	Boolean	Event - Initialization module identification data write-protected
Diagnostic warnings (1)		
236	Boolean	Warning - Prewarning overload (I>115%Is)
237	Boolean	Warning - Unbalance
238	Boolean	Warning - Overload
239	Boolean	Warning - Overload + loss of phase
240	Boolean	Warning - Internal ground fault
241	Boolean	Warning - External ground fault
243	Boolean	Warning - Thermistor trip level
244	Boolean	Warning - Thermistor short circuit
245	Boolean	Warning - Thermistor open circuit

Table 3- 51 Node IDs (2)

Node ID	Data type	Description
Diagnostic warnings (2)		
246	Boolean	Warning - TM1 warning level T>
248	Boolean	Warning - TM1 sensor fault
249	Boolean	Warning - TM1 out of range
250	Boolean	Warning - EM Open Circuit
251	Boolean	Warning - EM Short Circuit
252	Boolean	Warning - Warning level I>
253	Boolean	Warning - Warning level I<
254	Boolean	Warning - Warning level P>
255	Boolean	Warning - Warning level P<
256	Boolean	Warning - Warning level cos phi<
257	Boolean	Warning - Warning level U<
258	Boolean	Warning - AM1 warning level 0/4-20mA>
259	Boolean	Warning - AM1 warning level 0/4-20mA<
260	Boolean	Warning - Stalled rotor
263	Boolean	Warning - No start possible
264	Boolean	Warning - No. of starts>
265	Boolean	Warning - Just one start possible
266	Boolean	Warning - Motor operating hours >
267	Boolean	Warning - Motor stop time >
268	Boolean	Warning - External fault 1
269	Boolean	Warning - External fault 2
270	Boolean	Warning - External fault 3
271	Boolean	Warning - External fault 4
272	Boolean	Warning - External fault 5
273	Boolean	Warning - External fault 6
276	Boolean	Warning - AM1 open circuit
277	Boolean	Warning - Safety-related tripping
278	Boolean	Warning - Test required
282	Boolean	Warning - Feedback circuit
283	Boolean	Warning - Simultaneity
Diagnostic trips		
284	Boolean	Trip - Hardware fault basic unit
285	Boolean	Trip - Module fault
286	Boolean	Trip - Temporary components
287	Boolean	Trip - Configuration fault
288	Boolean	Trip - Parameterization
289	Boolean	Trip - Bus
290	Boolean	Trip - PLC/DCS
292	Boolean	Trip - Execution on-command
293	Boolean	Trip - Execution stop command

Node ID	Data type	Description
294	Boolean	Trip - Feedback on
295	Boolean	Trip - Feedback off
296	Boolean	Trip - Stalled positioner
297	Boolean	Trip - Double 0
298	Boolean	Trip - Double 1
299	Boolean	Trip - End position
300	Boolean	Trip - Antivalence
301	Boolean	Trip - Test position feedback (TPF)
302	Boolean	Trip - Power failure (UVO)
303	Boolean	Trip - Operational Protection OFF (OPO)
309	Boolean	Trip - Unbalance
310	Boolean	Trip - Overload
311	Boolean	Trip - Overload + loss of phase
312	Boolean	Trip - Internal ground fault
313	Boolean	Trip - External ground fault
315	Boolean	Trip - Thermistor trip level
316	Boolean	Trip - Thermistor short circuit
317	Boolean	Trip - Thermistor open circuit
319	Boolean	Trip - TM1 trip level T>
320	Boolean	Trip - TM1 sensor fault
321	Boolean	Trip - TM1 out of range
322	Boolean	Trip - EM Open Circuit
323	Boolean	Trip - EM Short Circuit
324	Boolean	Trip - Trip level I>
325	Boolean	Trip - Trip level I<
326	Boolean	Trip - Trip level P>
327	Boolean	Trip - Trip level P<
328	Boolean	Trip - Trip level cos phi<
329	Boolean	Trip - Trip level U<
330	Boolean	Trip - AM1 trip level 0/4-20mA>
331	Boolean	Trip - AM1 trip level 0/4-20mA<
332	Boolean	Trip - Stalled rotor
336	Boolean	Trip - No. of starts >
340	Boolean	Trip - External fault 1
341	Boolean	Trip - External fault 2
342	Boolean	Trip - External fault 3
343	Boolean	Trip - External fault 4
344	Boolean	Trip - External fault 5
345	Boolean	Trip - External fault 6
348	Boolean	Trip - AM1 open circuit
349	Boolean	Trip - Test shutdown
350	Boolean	Trip - Safety-related tripping

Node ID	Data type	Description
351	Boolean	Trip - Wiring
352	Boolean	Trip - Cross circuit
356	Boolean	Trip - TM2 trip level T>
357	Boolean	Trip - TM2 sensor fault
358	Boolean	Trip - TM2 out of range
364	Boolean	Trip - AM2 trip level 0/4-20mA>
365	Boolean	Trip - AM2 trip level 0/4-20mA<
372	Boolean	Trip - AM2 open circuit
Diagnostic warnings		
388	Boolean	Warning - TM2 warning level T>
390	Boolean	Warning - TM2 sensor fault
391	Boolean	Warning - TM2 out of range
396	Boolean	Warning - AM2 warning level 0/4-20mA>
397	Boolean	Warning - AM2 warning level 0/4-20mA<
404	Boolean	Warning - AM2 open circuit
Diagnostic events		
420	Boolean	Event - TM2 warning level T>
421	Boolean	Event - TM2 trip level T>
422	Boolean	Event - TM2 sensor fault
423	Boolean	Event - TM2 out of range
428	Boolean	Event - AM2 warning level 0/4-20mA>
429	Boolean	Event - AM2 warning level 0/4-20mA<
430	Boolean	Event - AM2 trip level 0/4-20mA>
431	Boolean	Event - AM2 trip level 0/4-20mA<
432	Boolean	Event - Limit monitor 5
433	Boolean	Event - Limit monitor 6
444	Boolean	Event - AM2 open circuit
Acyclic send		
450	Boolean	Acyclic send data 0.0
451	Boolean	Acyclic send data 0.1
452	Boolean	Acyclic send data 0.2
453	Boolean	Acyclic send data 0.3
454	Boolean	Acyclic send data 0.4
455	Boolean	Acyclic send data 0.5
456	Boolean	Acyclic send data 0.6
457	Boolean	Acyclic send data 0.7
458	Boolean	Acyclic send data 1.0
459	Boolean	Acyclic send data 1.1
460	Boolean	Acyclic send data 1.2
461	Boolean	Acyclic send data 1.3
462	Boolean	Acyclic send data 1.4
463	Boolean	Acyclic send data 1.5
464	Boolean	Acyclic send data 1.6
465	Boolean	Acyclic send data 1.7

3.4.1.3 Abbreviations and specifications

Abbreviations

The following abbreviations are used in the tables:

Table 3- 52 Abbreviations in the tables

Abbreviation	Meaning
BU	Basic unit
IM	Current measuring module
UM	1st generation current / voltage measuring module
UM+	2nd generation current / voltage measuring module
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
OP	Operator panel
OPD	Operator panel with display
AM	Analog module
EM	3UF7500 ground-fault module
EM+	3UF7510 ground-fault module
TM	Temperature module
Th	Thermistor
GF	General fault, control function
Cycl.	Cyclic
Acycl.	Acyclic
F	Fault
M	Event
W	Warning

Specifications

The following specifications apply in the tables:

Table 3- 53 Table specifications (example)

Designation	Type	Range	Unit	Information
*Reserved *)*	*Byte[4] *)*			
Max. current I_max	Word	0 … 65535	1 % / I_s	
*) Items in italics are not relevant (reserved) and must be filled with "0" when written to.				
Parameters that can be changed during operation.				

Event - PRM error number (bytes):

If parameterization is not possible, the number of the parameter group (PRM group) that caused the error is communicated here.

Byte.Bit	Designation (PRM group)	. . .
0.0	Reserved	
4.0	Device configuration (12)	Parameter group 12
	⋮	

Figure 3-4 Example for parameter group

3.4.1.4 Socket assignment table - digital

This table contains all assignment numbers (No.) of the sockets (digital). You only need these assignment numbers if you, for example, use a user program to fill data records and write them back.

Table 3- 54 Socket assignment table - digital

No.	Designation	Designation	Information
0	Static level	Not connected	
1		Fixed level value,0	
2		Fixed level value,1	
3		*Reserved*	
4	Events – Level monitoring	Event – Warning 0/4 - 20mA>	AM2
5	Events – Level monitoring	Event – Warning 0/4 - 20mA<	AM2
6		Event – Trip 0/4 - 20mA>	AM2
7		Event – Trip 0/4 - 20mA<	AM2
8	Basic unit (BU)	BU - Test / Reset button	
9		BU - Input 1	
10		BU - Input 2	
11		BU - Input 3	
12		BU - Input 4	
13		*Reserved*	
14		*Reserved*	
15		*Reserved*	
16	Digital module DM	DM1 - Input 1	DM1
17		DM1 - Input 2	DM1
18		DM1 - Input 3	DM1
19		DM1 - Input 4	DM1
20		DM2 - Input 1	DM2
21		DM2 - Input 2	DM2
22		DM2 - Input 3	DM2
23		DM2 - Input 4	DM2
24		DM-FL sensor channel 1 Y12	DM-FL
25		DM-FL sensor channel 1 Y22	DM-FL
26		*Reserved*	
27		*Reserved*	
28	Events - Protection	Event – TM2 sensor fault	TM2
29		Event – TM2 out of range	TM2
30		Event – TM2 warning T>	TM2
31		Event – TM2 trip T>	TM2
32	Operator panel OP / OPD	OP – Test / Reset button	OP, OPD
33		OP – Button 1	OP, OPD

No.	Designation	Designation	Information
34		OP – Button 2	OP, OPD
35		OP – Button 3	OP, OPD
36		OP – Button 4	OP, OPD
37		*Reserved*	
38	Events – Limit 5+6	Event – Limit 5	
39		Event – Limit 6	
40	PC / OPC UA [OCM]	Acyclic receive data - Bit 0.0	
41		Acyclic receive data - Bit 0.1	
42		Acyclic receive data - Bit 0.2	
43		Acyclic receive data - Bit 0.3	
44		Acyclic receive data - Bit 0.4	
45		Acyclic receive data - Bit 0.5	
46		Acyclic receive data - Bit 0.6	
47		Acyclic receive data - Bit 0.7	
48		Acyclic receive data - Bit 1.0	
49		Acyclic receive data - Bit 1.1	
50		Acyclic receive data - Bit 1.2	
51		Acyclic receive data - Bit 1.3	
52		Acyclic receive data - Bit 1.4	
53		Acyclic receive data - Bit 1.5	
54		Acyclic receive data - Bit 1.6	
55		Acyclic receive data - Bit 1.7	
56	PLC/PCS interface PLC [PN] (cyclic data)	Cyclic receive data - Bit 0.0	
57		Cyclic receive data - Bit 0.1	
58		Cyclic receive data - Bit 0.2	
59		Cyclic receive data - Bit 0.3	
60		Cyclic receive data - Bit 0.4	
61		Cyclic receive data - Bit 0.5	
62		Cyclic receive data - Bit 0.6	
63		Cyclic receive data - Bit 0.7	
64		Cyclic receive data - Bit 1.0	
65		Cyclic receive data - Bit 1.1	
66		Cyclic receive data - Bit 1.2	
67		Cyclic receive data - Bit 1.3	
68		Cyclic receive data - Bit 1.4	
69		Cyclic receive data - Bit 1.5	
70		Cyclic receive data - Bit 1.6	
71		Cyclic receive data - Bit 1.7	

No.	Designation	Designation	Information
72	Enabled control command	Enabled control command ON<<	Dependent on the control function
73		Enabled control command ON<	
74		Enabled control command - OFF	
75		Enabled control command ON>	
76		Enabled control command ON>>	
77		*Reserved*	
78		*Reserved*	
79		*Reserved*	
80	Contactor controls	Contactor controls 1 QE1	Dependent on the control function
81		Contactor controls 2 QE2	
82		Contactor controls 3 QE3	
83		Contactor controls 4 QE4	
84		Contactor controls 5 QE5	
85		*Reserved*	
86		*Reserved*	
87		*Reserved*	
88	Lamp controls	Display - QLE<<(ON<<)	Dependent on the control function
89		Display - QLE<(ON<)	
90		Indication - QLA (OFF)	
91		Display - QLE>(ON>)	
92		Display - QLE>>(ON>>)	
93		Display - QLS (fault)	
94		*Reserved*	
95		*Reserved*	
96	Status information - General	Status - General fault	
97		Status - General warning	
98		Status - Device	
99		Status - Bus	
100		Status - PLC/PCS	
101		Status - Current flowing	IM UM(+)
102		Status – PE command Start_Pause pending	
103		*Reserved*	
104	Status information - Receive	Status - ON<<	Dependent on the control function
105		Status - ON<	
106		Status - Off	
107		Status - ON>	
108		Status - ON>>	
109		Status - Start active	
110		Status - Interlocking time active	All reversing starters and positioners

No.	Designation	Designation	Information
111		Status - Change-over pause active	Star-delta starter, Dahlander starter, pole-changing starter
112		Status - Runs in open direction	Dependent on the control function
113		Status - Runs in close direction	
114		Status - FC	
115		Status - FO	
116		Status - TC	
117		Status - TO	
118		Status - Cold start (TPF)	
119		Status - OPO	
120		Status - Remote mode	
121	Status information - Protection	Status - Emergency start executed	IM UM(+)
122		Status - Cooling down period active	IM UM(+)
123		Status - Pause time active	IM UM(+)
124	Status information - Miscellaneous	Status - Device check active	
125		Status - Phase sequence 1-2-3	UM(+)
126		Status - Phase sequence 3-2-1	UM(+)
127		Status - DM-F enabling circuit	DM-F
128	Events - Protection	Event - Overload operation	IM UM(+)
129		Event - Unbalance	IM UM(+)
130		Event - Overload	IM UM(+)
131		Event - overload + phase failure	IM UM(+)
132		Event - Internal ground fault	IM UM(+)
133		Event - External ground fault	EM
134		Event - Warning ext. ground fault	EM
135		Event - Thermistor overload	Th
136		Event - Thermistor short-circuit	Th
137		Event - Thermistor open circuit	Th
138		Event - TM1 warning T>	TM1
139		Event - TM1 trip T>	TM1
140		Event - TM1 sensor fault	TM
141		Event - TM1 out of range	TM
142		Event - EM+ open circuit	EM+
143		Event - EM+ short-circuit	EM+
144	Events - Level monitoring	Event - Warning I>	IM UM(+)
145		Event - Warning I<	IM UM(+)
146		Event - Warning P>	UM(+)
147		Event - Warning P<	UM(+)
148		Event - Warning cos phi<	UM(+)
149		Event - Warning U<	UM(+)
150		Event - Warning 0/4 - 20mA>	AM1

No.	Designation	Designation	Information
151		Event - Warning 0/4 - 20mA<	AM1
152		Event - Trip I>	IM UM(+)
153		Event - Trip I<	IM UM(+)
154		Event - Trip P>	UM(+)
155		Event - Trip P<	UM(+)
156		Event - Trip cos phi<	UM(+)
157		Event - Trip U<	UM(+)
158		Event - Trip 0/4-20 mA>	AM1
159		Event - Trip 0/4-20 mA<	AM1
160		Event - Stalled rotor	IM UM(+)
161	Events - Protection	Event - Warning internal ground fault	
162		*Reserved*	
163		Event - No start permitted	
164	Events - Level monitoring	Event - No. of starts >	
165		Event - Just one start possible	
166		Event - Motor operating hours >	
167		Event - Motor stop time >	
168		Event - Limit 1	
169		Event - Limit 2	
170		Event - Limit 3	
171		Event - Limit 4	
172	Events - Miscellaneous	Event - External fault 1	
173		Event - External fault 2	
174		Event - External fault 3	
175		Event - External fault 4	
176		Event - External fault 5	
177		Event - External fault 6	
178		*Reserved*	
179		Event - AM2 open circuit	AM2
180		Event - AM1 open circuit	AM1, AM2
181		Event - DM-F safety-related tripping	DM-F
182		Event - DM-F - Test requirement	DM-F
183		*Reserved*	
184		*Reserved*	
185		*Reserved*	
186	Events - Miscellaneous	Event - DM-FL safety o.k	DM-FL
187		Event - DM-FP PROFIsafe active	DM-FP
188	Events - System interface	Event - Configured operator panel missing	
189		*Reserved*	
190	Warnings - Miscellaneous	Warning - DM-F feedback circuit	DM-F
191		Warning - DM-FL simultaneity	DM-FL

No.	Designation	Designation	Information
192	Faults - General	Fault - HW fault basic unit	
193		Fault - Module fault (e.g. IM, DM)	
194		Fault - temporary components (e.g. memory module)	
195		Fault - configuration error	
196		Fault - Parameterization	
197		Fault - Bus	
198		Fault - PLC/PCS	
199		*Reserved*	
200	Faults - Control	Fault - Execution Time ON	Not for overload relays
201		Fault - Execution Time OFF	
202		Fault - feedback (FB) ON	
203		Fault - feedback (FB) OFF	
204		Fault - Stalled positioner	Positioner
205		Fault - Double 0	Solenoid valve / positioner
206		Fault - Double 1	Solenoid valve / positioner
207		Fault - End position	Solenoid valve / positioner
208		Fault - Antivalence	Positioner
209		Fault - Cold start (TPF) fault	
210		Fault - power failure (UVO)	
211		Fault - Operational Protection Off (OPO)	
212		*Reserved*	
213		*Reserved*	
214	Freely programmable elements	Signal conditioning 5 output	
215		Signal conditioning 6 output	
216		Truth table 1 3I/1O output	
217		Truth table 2 3I/1O output	
218		Truth table 3 3I/1O output	
219		Truth table 4 3I/1O output	
220		Truth table 5 3I/1O output	
221		Truth table 6 3I/1O output	
222		Truth table 7 2I/1O output	
223		Truth table 8 2I/1O output	
224		Truth table 9 5I/2O output 1	
225		Truth table 9 5I/2O output 2	
226		Truth table 10 3I/1O output	
227		Truth table 11 3I/1O output	
228		Counter 5 output	
229		Counter 6 output	
230		Timer 5 output	
231		Timer 6 output	
232		Timer 1 output	

No.	Designation	Designation	Information
233		Timer 2 output	
234		Timer 3 output	
235		Timer 4 output	
236		Counter 1 output	
237		Counter 2 output	
238		Counter 3 output	
239		Counter 4 output	
240		Signal conditioning 1 output	
241		Signal conditioning 2 output	
242		Signal conditioning 3 output	
243		Signal conditioning 4 output	
244		Non-volatile element 1 output	
245		Non-volatile element 2 output	
246		Non-volatile element 3 output	
247		Non-volatile element 4 output	
248		Flashing 1 output	
249		Flashing 2 output	
250		Flashing 3 output	
251		Flicker 1 output	
252		Flicker 2 output	
253		Flicker 3 output	
254		PWM output	
255		*Reserved*	

3.4.1.5 Socket assignment table - analog

This table contains all assignment numbers (No.) of the sockets (analog). You only need these assignment numbers if you, for example, use a user program to fill data records and write them back. All inputs for analog data can only process values of type "Word" (2 bytes). In order to also be able to process values of type "Byte", the following applies: The byte value is processed as a low byte, the high byte is always 0.

Table 3- 55 Socket assignment table - analog

No.	Designation	Unit	Information
0	Not connected		
1	Fixed level		
2	*Reserved*		
3	*Reserved*		
4	Timer 1 - Actual value	100 ms	
5	Timer 2 - Actual value	100 ms	
6	Timer 3 - Actual value	100 ms	
7	Timer 4 - Actual value	100 ms	
8	Counter 1 - Actual value		
9	Counter 2 - Actual value		
10	Counter 3 - Actual value		
11	Counter 4 - Actual value		
12	Counter 5 - Actual value		
13	Counter 6 - Actual value		
14	Timer 5 - Actual value	100 ms	
15	Timer 6 - Actual value	100 ms	
16	Max. current I_max	1 % / Is	IM UM(+)
17	Current I_L1	1 % / Is	IM UM(+)
18	Current I_L2	1 % / Is	IM UM(+)
19	Current I_L3	1 % / Is	IM UM(+)
20	Phase unbalance	1 %	IM UM(+)
21	Ground-fault current	1 mA	UM+
22	Internal ground fault - last trip current	1 mA	UM+
23	Voltage U_min	1 V	UM(+)
24	Voltage U_L1	1 V see 2)	UM(+)
25	Voltage U_L2	1 V see 2)	UM(+)
26	Voltage U_L3	1 V see 2)	UM(+)
27	Cos phi	1 %	UM(+)
28	Frequency	0.01 Hz	UM+
29	*Reserved*		
30	Number of overload trips		IM UM(+)
31	Int. Number of overload trips		IM UM(+)
32	Thermal motor model	2 %	IM UM(+)
33	Time to trip	100 ms	IM UM(+)

No.	Designation	Unit	Information
34	Recovery time	100 ms	IM UM(+)
35	Last trip current	1 % / Is	IM UM(+)
36	TM1 - max. temperature	1 K	TM1
37	TM1 - temperature 1	1 K	TM1
38	TM1 - temperature 2	1 K	TM1
39	TM1 - temperature 3	1 K	TM1
40	Permissible starts - Actual value		
41	Motor stop time	1 h	
42	DM-F - Time until test required	1 week	DM-F
43	EM+ - last trip current	1 mA	EM+
44	AM1 - input 1	See 1)	AM1
45	AM1 - input 2	See 1)	AM1
46	AM1 - input 3	See 1)	
47	EM+ - ground fault current	1 mA	
48	Acyclic receive data - analog value		
49	Cyclic receive data - analog value 1		
50	Cyclic receive data - analog value 2		
51	Number of parameterizations		
52	Motor operating hours - H word	1 s	
53	Motor operating hours - L word	1 s	
54	Int. motor operating hours - H word	1 s	
55	Int. motor operating hours - L word	1 s	
56	Device operating hours - H word	1 s	
57	Device operating hours - L word	1 s	
58	Number of starts - H word		
59	Number of starts - L word		
60	Int. number of starts CW - H word		
61	Int. number of starts CW - L word		
62	Int. number of starts CCW - H word		
63	Int. number of starts CCW - L word		
64	Energy W - high word	1 kWh	UM(+)
65	Energy W - low word	1 kWh	UM(+)
66	*Reserved*		
..	*Reserved*		
69	*Reserved*		
70	Active power P - H word	1 W	
71	Active power P - L word	1 W	
72	Apparent power S - H word	1 VA	
73	Apparent power S - L word	1 VA	
74	*Reserved*		
..	*Reserved*		
85	*Reserved*		

No.	Designation	Unit	Information
86	Calculation module 1 - Output		
87	*Reserved*		
88	*Reserved*		
89	*Reserved*		
90	Calculation module 2 - Output		
91	Analog arithmetic 1 output		
92	Analog arithmetic 2 output		
93	Analog multiplexer output		
94	*Reserved*		
..	*Reserved*		
103	*Reserved*		
104	Max. current I_max_10mA	10 mA	UM(+) IM
105	Current I_L1_10mA	10 mA	UM(+) IM
106	Current I_L2_10mA	10 mA	UM(+) IM
107	Current I_L3_10mA	10 mA	UM(+) IM
108	Max. current I_max_100mA	100 mA	UM(+) IM
109	Current I_L1_100mA	100 mA	UM(+) IM
110	Current I_L2_100mA	100 mA	UM(+) IM
111	Current I_L3_100mA	100 mA	UM(+) IM
112	*Reserved*		
113	*Reserved*		
114	*Reserved*		
115	*Reserved*		
116	TM2 - max. temperature	1 K	TM2
117	TM2 - temperature 1	1 K	TM2
118	TM2 - temperature 2	1 K	TM2
119	TM2 - temperature 3	1 K	TM2
120	AM2 - input 1		AM2
121	AM2 - input 2		AM2
122	AM2 - input 3		AM2
123	*Reserved*		
..	*Reserved*		
255	*Reserved*		

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

2) If "line-to-line voltage = 1," "Voltage U_Lx" contain the line-to-line voltages

Table 3- 56 Socket assignment table - analog in float format

No.	Designation	Unit	Info
0	Not connected		
1	*Reserved*		
2	*Reserved*		
3	*Reserved*		
4	Current I_max_A_F	1 A	UM+
5	Current I_avg_A_F	1 A	UM+
6	Current I_L1_A_F	1 A	UM+
7	Current I_L2_A_F	1 A	UM+
8	Current I_L3_A_F	1 A	UM+
9	Active power P_F	1 W	UM+
10	Apparent power S_F	1 VA	UM+
11	Voltage UL1_F	1 V	UM+
12	Voltage UL2_F	1 V	UM+
13	Voltage UL3_F	1 V	UM+
14	Cos phi_F	1	UM+
15	Frequency_F	1 Hz	UM+
16	*Reserved*		
...	*Reserved*		
255	*Reserved*		

3.4.2 PROFINET data records

3.4.2.1 PROFINET data records - general

Data records - overview

Table 3- 57 Data records - overview

Data record No.	Length [byte]	Description	Read / write
63	200	Analog value recording (Page 235)	Read
67	10	Process image output (Page 235)	Read
69	30	Process image input (Page 236)	Read
72	126	Error buffer (Page 237)	Read
73	168	Event memory (Page 237)	Read
92	46	Device diagnostics (faults, warnings, status information) (Page 238)	Read
94	172	Measured values (Page 247)	Read
95	148	Service / statistical data (Page 249)	Read / write
130	92	Basic device parameters 1 (Page 251)	Read / write
131	124	Basic device parameters 2 (Page 258)	Read / write
132	144	Extended device parameters 1 (Page 262)	Read / write
133	100	Extended device parameters 2 (Page 270)	Read / write
134	180	Extended device parameters 1 (Page 273)	Read / write
135	114	Extended device parameters 2 (Page 277)	Read / write
139	200	Labeling (Page 280)	Read / write
140	200	Labeling 2 (Page 281)	Read / write
165	168	Marking (Page 282)	Read / write
224	24	Password protection (Page 282)	Write

Writing / reading data records

Access to data records via the slot and index

- Index: Data record number

Writing / reading data records with STEP7

You can access the data records from the user program.

- Writing data records: By calling SFB 53 "WR_REC"
- Reading data records: By calling SFB 52 "RD_REC"

Further information

You can find additional information about the SFBs

- in System Software for S7-300/400, System and Standard Functions reference manual (https://support.automation.siemens.com/WW/view/en/1214574)
- In the STEP7 online help

Byte arrangements

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

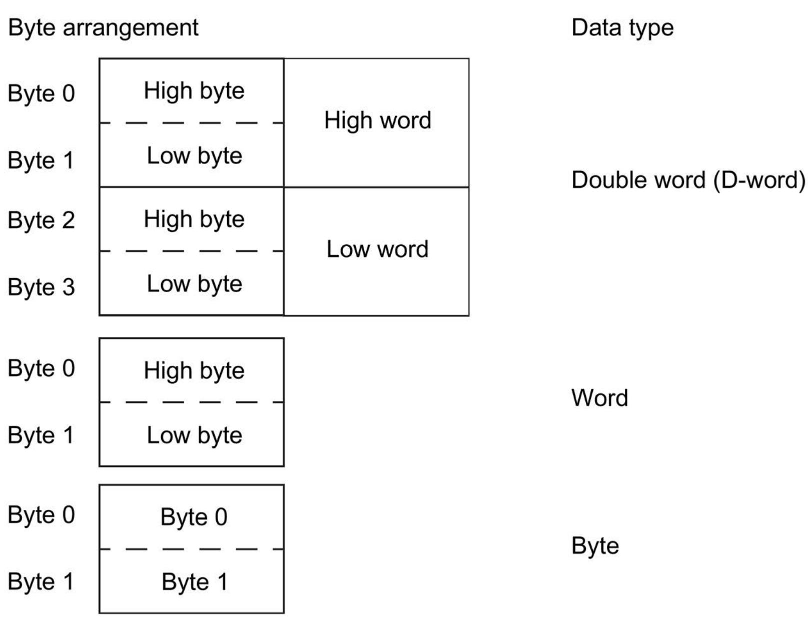


Figure 3-5 Byte arrangement in "big endian" format

Abbreviations

The following abbreviations are used in the tables:

Table 3- 58 Abbreviations in the tables

Abbreviation	Meaning
BU	Basic unit
IM	Current measuring module
UM	1st generation current / voltage measuring module
UM(+)	2nd generation current / voltage measuring module
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
OP	Operator panel
OPD	Operator panel with display
AM	Analog module
EM	Ground-fault module
TM	Temperature module
Th	Thermistor
GF	Control function
Cycl.	Cyclic
Acycl.	Acyclic
F	Fault
M	Event
W	Warning

Specifications

The following specifications apply in the tables:

Table 3- 59 Table specifications (example)

Designation	**Type**	**Range**	**Unit**	**Information**
*Reserved *)*	*Byte[4] *)*			
Max. current I_max	Word	0 … 65535	1 % / I_s	
*) Items in italics are not relevant (reserved) and must be filled with "0" when written to. Parameters that can be changed during operation.				

Settings are valid/can only be made when the corresponding system components are used.

The following specifications apply in the tables:

Settings are valid/can only be made when the corresponding system components are used.

"Float" data type

32-bit floating-point number

S: Sign (0 = positive; 1 = negative)

E: Exponent

M: Mantissa

31	30	29	28	27	26	25	24	23	22	21	20	19	18	17	16	15	114	13	12	11	10	9	8	7	6	5	4	3	2	1	0
S	E: Exponent + 127 (8 bits)								M: Mantissa (23 bits)																						

3.4.2.2 Data record 63 - Analog value recording

You can read out the data of the "Analog value recording" function stored in the device.

Table 3- 60 Data record 63 - Analog value recording

Byte.Bit	Designation	Type	Range	Information
0.0	StartPos	Word	0	
2.0	Channel No.	Byte	1	
3.0	Analog value record currently running	Bit	0, 1	
3.1	Trigger event occurred	Bit	0, 1	
3.2	*Reserved*	*Bit[6]*	*0*	
4.0	Measured value (0)	Word	0 - 65535	
6.0	Measured value (1)	Word	0 - 65535	
...				
122.0	Measured value (59)	Word	0 - 65535	
124.0	*Reserved*	*Byte[76]*	*0*	

The unit of the measured value is dependent on the assigned analog value. You will find all available analog values with their units in Chapter Socket assignment table - analog (Page 227).

3.4.2.3 Data record 67 - Process image output

Table 3- 61 Data record 67 - Process image output

Byte.Bit	Designation	Default (also see parameters)	Type	Information
0.0	Cyclic receive - Bit 0.0	Control station - PLC/PCS [PN] ON<	Bit	
0.1	Cyclic receive - Bit 0.1	Control station - PLC/PCS [PN] OFF	Bit	
0.2	Cyclic receive - Bit 0.2	Control station - PLC/PCS [PN] ON>	Bit	
0.3	Cyclic receive - Bit 0.3	Test 1	Bit	
0.4	Cyclic receive - Bit 0.4	Motor protection - Emergency start	Bit	
0.5	Cyclic receive - Bit 0.5	Mode selector S1	Bit	
0.6	Cyclic receive - Bit 0.6	Reset 1	Bit	
0.7	Cyclic receive - Bit 0.7	Not assigned	Bit	
1.0	Cyclic receive - Bit 1.0	Not assigned	Bit	
1.1	Cyclic receive - Bit 1.1	Not assigned	Bit	
1.2	Cyclic receive - Bit 1.2	Not assigned	Bit	
1.3	Cyclic receive - Bit 1.3	Not assigned	Bit	
1.4	Cyclic receive - Bit 1.4	Not assigned	Bit	
1.5	Cyclic receive - Bit 1.5	Not assigned	Bit	
1.6	Cyclic receive - Bit 1.6	Not assigned	Bit	
1.7	Cyclic receive - Bit 1.7	Not assigned	Bit	
2.0	Cyclic receive - analog value 1	Not assigned	Word	
4.0	Cyclic receive - analog value 2	Not assigned	Word	
6.0	*Reserved*		*Bytes[4]*	

3.4.2.4 Data record 69 - Process image input

Table 3- 62 Data record 69 - Process image input

Byte.Bit	Designation	Default (also see parameters)	Type	Information
0.0	Cyclic send - Bit 0.0	Status - ON<	Bit	
0.1	Cyclic send - Bit 0.1	Status - Off	Bit	
0.2	Cyclic send - Bit 0.2	Status - ON>	Bit	
0.3	Cyclic send - Bit 0.3	Event - Overload operation	Bit	
0.4	Cyclic send - Bit 0.4	Status - Interlocking time active	Bit	
0.5	Cyclic send - Bit 0.5	Status - Remote mode	Bit	
0.6	Cyclic send - Bit 0.6	Status - General fault	Bit	
0.7	Cyclic send - Bit 0.7	Status - General warning	Bit	
1.0	Cyclic send - Bit 1.0	Not assigned	Bit	
1.1	Cyclic send - Bit 1.1	Not assigned	Bit	
1.2	Cyclic send - Bit 1.2	Not assigned	Bit	
1.3	Cyclic send - Bit 1.3	Not assigned	Bit	
1.4	Cyclic send - Bit 1.4	Not assigned	Bit	
1.5	Cyclic send - Bit 1.5	Not assigned	Bit	
1.6	Cyclic send - Bit 1.6	Not assigned	Bit	
1.7	Cyclic send - Bit 1.7	Not assigned	Bit	
2.0	PLC/PCS analog Input 1	Max. current I_max	Word	
4.0	PLC/PCS analog input 2	Not assigned	Word	
6.0	PLC/PCS analog input 3	Not assigned	Word	
8.0	PLC/PCS analog input 4	Not assigned	Word	
10.0	PLC/PCS analog input 5	Not assigned	Word	
12.0	PLC/PCS analog input 6	Not assigned	Word	
14.0	PLC/PCS analog input 7	Not assigned	Word	
16.0	PLC/PCS analog input 8	Not assigned	Word	
18.0	PLC/PCS analog input 9	Unassigned	Word	
20.0	*Reserved*		*Bytes[10]*	

3.4.2.5 Data record 72 - Error buffer

Table 3- 63 Data record 72 - Error buffer

Byte.Bit	Entry	Designation	Type	Information
0.0	1	Time stamp	D-word	
4.0		Type	Byte	
5.0		Error number	Byte	
6.0	2	Time stamp	D-word	
10.0		Type	Byte	
11.0		Error number	Byte	
...				
120.0	21	Time stamp	D-word	
124.0		Type	Byte	
125.0		Error number	Byte	

Time stamp

The operating hours of the device are used as a time stamp (resolution: 1 s).

Type/error number

You will find the mean in Chapter Data record 92 - Device diagnostics (Page 238) in column "Error number" of table "Data record 92 - Device diagnostics."

If the type has the value 255, the entry displays "Power - On". In this case, the error number contains the number of power ON operations, reduced by 1 (0 = 1x power ON, ...).

3.4.2.6 Data record 73 - Event memory

Table 3- 64 Data record 73 - Event memory

Byte.Bit	Entry	Designation	Type	Information
0.0	1	Time stamp	D-word	
4.0		Entry - Type	Byte	
5.0		Entry - Info	Byte[3]	
8.0	2	Time stamp	D-word	
12.0		Entry - Type	Byte	
13.0		Entry - Info	Byte[3]	
16.0	3	Time stamp	D-word	
20.0		Entry - Type	Byte	
21.0		Entry - Info	Byte[3]	
...				
160.0	21	Time stamp	D-word	
164.0		Entry - Type	Byte	
165.0		Entry - Info	Byte[3]	

3.4.2.7 Data record 92 - Device diagnostics

Table 3- 65 Data record 92 - Diagnostics

Byte. Bit	Designation		Information	PNIO diagnostic status **)	PNIO error number (channel error type)	Error no.
0.0		*Reserved*				
1.0	Status information - General	Status - General fault				
1.1		Status - General warning				
1.2		Status - Device				
1.3		Status - Bus				
1.4		Status - PLC/PCS				
1.5		Status - Motor current flowing	IM UM(+)			
1.6		*Reserved*				
1.7		*Reserved*				
2.0	Status information - Receive	Status - ON<<	Dependent on the control function			
2.1		Status - ON<				
2.2		Status - Off				
2.3		Status - ON>				
2.4		Status - ON>>				
2.5		Status - Start active				
2.6		Status - Interlocking time active	All reversing starters and positioners			
2.7		Status - Change-over pause active	Star-delta starter, Dahlander starter, pole-changing starter			
3.0		Status - Runs in open direction	Dependent on the control function			
3.1		Status - Runs in close direction				
3.2		Status - FC				
3.3		Status - FO				
3.4		Status - TC				
3.5		Status - TO				
3.6		Status - Cold starting (TPF)		1	0x1009	
3.7		Status - OPO				
4.0		Status - Auto mode				
4.1	Status information - Protection	Status - Emergency start executed	IM UM(+)	1	0x1031	

Byte. Bit	Designation		Information	PNIO diagnostic status **)	PNIO error number (channel error type)	Error no.
4.2		Status - Cooling down period active	IM UM(+)	1	0x1032	
4.3		Status - Pause time active	IM UM(+)			
4.4	Status information - Miscellaneous	Status - Device check active				
4.5		Status - Phase sequence 1-2-3	UM(+)			
4.6		Status - Phase sequence 3-2-1	UM(+)			
4.7		Status - DM-F enabling circuit	DM-F			
5.0	Events - Protection	Event - Overload operation	IM UM(+)			
5.1		Event - Unbalance	IM UM(+)			
5.2		Event - Overload	IM UM(+)			
5.3		Event - Overload + loss of phase	IM UM(+)			
5.4		Event - Internal ground fault	IM UM(+)			
5.5		Event - External ground fault	EM			
5.6		Event - Warning ext. ground fault	EM			
5.7		Event - Thermistor overload	Th			
6.0		Event - Thermistor short-circuit	Th			
6.1		Event - Thermistor open circuit	Th			
6.2		Event - TM1 warning T>	TM1			
6.3		Event - TM1 trip T>	TM1			
6.4		Event - TM1 sensor fault	TM1			
6.5		Event - TM1 out of range	TM			
6.6		Event - EM+ open circuit	EM+ 1)			
6.7		Event - EM+ short-circuit	EM+ 1)			
7.0	Events - Level monitoring	Event - Warning I>	IM UM(+)			
7.1		Event - Warning I<	IM UM(+)			
7.2		Event - Warning P>	UM(+)			
7.3		Event - Warning P<	UM(+)			
7.4		Event - Warning cos phi<	UM(+)			
7.5		Event - Warning U<	UM(+)			
7.6		Event - Warning 0/4-20 mA>	AM1			
7.7		Event - Warning 0/4-20 mA<	AM1			
8.0		Event - Trip I>	IM UM(+)			
8.1		Event - Trip I<	IM UM(+)			
8.2		Event - Trip P>	UM(+)			
8.3		Event - Trip P<	UM(+)			
8.4		Event - Trip cos phi<	UM(+)			
8.5		Event - Trip U<	UM(+)			
8.6		Event - Trip 0/4-20 mA>	AM1			

Byte. Bit	Designation		Information	PNIO diagnostic status **)	PNIO error number (channel error type)	Error no.
8.7		Event - Trip 0/4-20 mA<	AM1			
9.0		Event - Stalled rotor	IM UM(+)			
9.1	Events - Protection	Warning - Internal ground fault	UM+			
9.2		*Reserved*				
9.3	Events - Level monitoring	Event - No start possible				
9.4		Event - No. of starts >				
9.5		Event - Just one start possible				
9.6		Event - Motor operating hours >				
9.7		Event - Motor stop time >				
10.0		Event - Limit 1				
10.1		Event - Limit 2				
10.2		Event - Limit 3				
10.3		Event - Limit 4				
10.4	Events - Miscellaneous	Event - ext. fault 1				
10.5		Event - ext. fault 2				
10.6		Event - ext. fault 3				
10.7		Event - ext. fault 4				
11.0		Event - ext. fault 5				
11.1		Event - ext. fault 6				
11.2	Events - FW update	Event - BU FW update active				
11.3		Event - Module FW update active				
11.4	Events - Miscellaneous	Event - AM1 open circuit	AM1			
11.5		Event - DM-F safety-related tripping	DM-F			
11.6		Event - DM-F - Test requirement	DM-F			
11.7		Event - NTP clock set				
12.0	Events - Timestamping function	Event - Timestamping function active + OK				
12.1	Events - Miscellaneous	Event - NTP clock synchronized				
12.2		Event - DM-FL safety ok	DM-FL			
12.3		Event - DM-FP PROFIsafe active	DM-FP			
12.4	Events - System interfaces	Event - Configured operator panel missing				
12.5		Event - Module not supported				
12.6		Event - No module voltage				
12.7		*Reserved*				

Byte. Bit	Designation		Information	PNIO diagnostic status **)	PNIO error number (channel error type)	Error no.
13.0	Events - Memory module / initialization module	Event - Memory module read in				
13.1		Event - Memory module programmed				
13.2		Event - Memory module cleared				
13.3		*Reserved*				
13.4		Event - Initialization module read in				
13.5		Event - Initialization module programmed				
13.6		Event - Initialization module cleared				
13.7	*Reserved*					
14.0	Events - parameterization	Event - Start-up parameter block active			***)	
14.1		Event - Parameter changes not allowed in the current operating state		1	0x0010	
14.2		Event - Device does not support the required functions		1	0x0010	
14.3		Event - Wrong parameter		1	0x0010	
14.4		Event - Wrong password		1	0x0010	
14.5		Event - Password protection active				
14.6		Event - Factory settings				
14.7		Event - Parameterization active				
15.0		Event - PRM error number (bytes)				
16.0		Event - DM-FL configuration mode				
16.1		Event - DM-FL configuration deviation				
16.2		Event - DM-FL waiting for start-up test				
16.3		Event - DM-FP F-Prm error *)		3	0x0010	
16.4		Event - Initialization module write-protected, parameter changes not allowed		1	0x0010	
16.5	Events - Memory module - initialization module (InM)	Event - Memory module write-protected				
16.6		Event - Initialization module write-protected				
16.7		Event - Initialization module identification data write-protected				

Byte. Bit	Designation		Information	PNIO diagnostic status **)	PNIO error number (channel error type)	Error no.
17.0	Warnings - Protection	Warning - Overload operation	IM UM(+)	2	0x1020	
17.1		Warning - Unbalance	IM UM(+)	2	0x1021	
17.2		Warning - Overload	IM UM(+)	2	0x1022	
17.3		Warning - Overload + phase failure	IM UM(+)	2	0x1023	
17.4		Warning - Internal ground fault	IM UM(+)	2	0x1027	
17.5		Warning - External ground fault	EM	2	0x1028	
17.6		*Reserved*				
17.7		Warning - Thermistor overload	Th	2	0x1024	
18.0		Warning - Thermistor short circuit	Th	2	0x1025	
18.1		Warning - Thermistor open circuit	Th	2	0x1026	
18.2		Warning - TM1 warning T >	TM1	2	0x102B	
18.3		*Reserved*				
18.4		Warning - TM1 sensor fault	TM1	2	0x102C	
18.5		Warning - TM1 out of range	TM1	2	0x102D	
18.6		Warning - EM+ open circuit	EM+ 1)	2	0x1029	
18.7		Warning - EM+ short-circuit	EM+ 1)	2	0x102A	
19.0	Warnings - Level monitoring	Warning - Warning I>	IM UM(+)	2	0x1040	
19.1		Warning - Warning I<	IM UM(+)	2	0x1041	
19.2		Warning - Warning P>	UM(+)	2	0x1042	
19.3		Warning - Warning P<	UM(+)	2	0x1043	
19.4		Warning - Warning cos phi<	UM(+)	2	0x1045	
19.5		Warning - Warning U<	UM(+)	2	0x1047	
19.6		Warning - Warning 0/4-20 mA>	AM1	2	0x1048	
19.7		Warning - Warning 0/4-20 mA<	AM1	2	0x1049	
20.0		Warning - Stalled rotor	IM UM(+)	2	0x104C	
20.1		*Reserved bit [2]*				
20.3		Warning - No start possible		2	0x1056	
20.4		Warning - Number of starts >		2	0x1057	
20.5		Warning - Just one start possible		2	0x1058	
20.6		Warning - Motor operating hours>		2	0x1059	
20.7		Warning - Motor stop time >		2	0x105A	
21.0	Warnings - Miscellaneous	Warning - ext. fault 1		2	0x1070	
21.1		Warning - ext. fault 2		2	0x1071	
21.2		Warning - ext. fault 3		2	0x1072	
21.3		Warning - ext. fault 4		2	0x1073	
21.4		Warning - ext. fault 5		2	0x1074	
21.5		Warning - ext. fault 6		2	0x1075	
21.6		*Reserved*				

Byte. Bit	Designation		Information	PNIO diagnostic status **)	PNIO error number (channel error type)	Error no.
21.7		*Reserved*				
22.0		Warning - AM1 open circuit	AM1	2	0x105B	
22.1		Warning - DM-F safety-related tripping	DM-F	2	0x0019	
22.2		Warning - DM-F test requirement	DM-F	2	0x105E	
22.3		*Reserved bit[3]*				
22.6		Warning - DM-F feedback circuit	DM-F	2	0x105F	
22.7		Warning - DM-FL simultaneity	DM-FL	2	0x1060	
23.0	Faults - General	Fault - HW fault basic unit		3	0x0009	0
23.1		Fault - Module fault (e.g. module IM, UM, DM)		3	0x0009	1
23.2		Fault - Temporary components (e.g. memory module)		3	0x0009	2
23.3		Fault - Configuration fault		3	0x0010	3
23.4		Fault - Parameterization		3	0x0010	4
23.5		Fault - Bus				5
23.6		Fault - PLC/PCS				6
23.7		*Reserved*				
24.0	Faults - Control	Fault - Execution ON command		3	0x1000	8
24.1		Fault - Execution STOP command		3	0x1001	9
24.2		Fault - FB ON		3	0x1002	10
24.3		Fault - FB OFF		3	0x1003	11
24.4		Fault - Stalled positioner	CF = positioner	3	0x1004	12
24.5		Fault - Double 0	CF = positioner	3	0x1005	13
24.6		Fault - Double 1	CF = positioner	3	0x1006	14
24.7		Fault - End position	CF = positioner	3	0x1007	15
25.0		Fault - Antivalence	CF = positioner	3	0x1008	16
25.1		Fault - Cold starting (TPF) fault		3	0x100A	17
25.2		Fault - UVO fault		3	0x100B	18
25.3		Fault - OPO fault		3	0x100C	19
25.4		*Reserved bit[4]*				
26.0		*Reserved*				
26.1	Fault - Protection	Fault - Unbalance	IM UM(+)	3	0x1021	25
26.2		Fault - Overload	IM UM(+)	3	0x1022	26
26.3		Fault - Overload + phase failure	IM UM(+)	3	0x1023	27
26.4		Fault - Int. ground fault	IM UM(+)	3	0x1027	28
26.5		Fault - Ext. ground fault	EM	3	0x1028	29

Byte. Bit	Designation		Information	PNIO diagnostic status **)	PNIO error number (channel error type)	Error no.
26.6		*Reserved*				
26.7		Fault - Thermistor overload	Th	3	0x1024	31
27.0		Fault - Thermistor short circuit	Th	3	0x1025	32
27.1		Fault - Thermistor open circuit	Th	3	0x1026	33
27.2		*Reserved*				
27.3		Fault - TM1 trip T>	TM1	3	0x102B	35
27.4		Fault - TM1 sensor fault	TM1	3	0x102C	36
27.5		Fault - TM1 out of range	TM1	3	0x102D	37
27.6		Fault - EM+ open circuit	EM+	3	0x1029	
27.7		Fault - EM+ short-circuit	EM+	3	0x102A	
28.0	Faults - Level monitoring	Fault - Trip I>	IM UM(+)	3	0x1040	40
28.1		Fault - Trip I<	IM UM(+)	3	0x1041	41
28.2		Fault - Trip P>	UM(+)	3	0x1042	42
28.3		Fault - Trip P<	UM(+)	3	0x1043	43
28.4		Fault - Trip cos phi<	UM(+)	3	0x1045	44
28.5		Fault - Trip U<	UM(+)	3	0x1047	45
28.6		Fault - Trip 0/4-20 mA>	AM1	3	0x1048	46
28.7		Fault - Trip 0/4-20 mA<	AM1	3	0x1049	47
29.0		Fault - Stalled rotor	IM UM(+)	3	0x104C	48
29.1		*Reserved bit[3]*				
29.4		Fault - Number of starts >		3	0x1057	52
29.5		*Reserved bit[3]*				
30.0	Faults - Miscellaneous	Fault - External fault 1		3	0x1070	56
30.1		Fault - External fault 2		3	0x1071	57
30.2		Fault - External fault 3		3	0x1072	58
30.3		Fault - External fault 4		3	0x1073	59
30.4		Fault - External fault 5		3	0x1074	60
30.5		Fault - External fault 6		3	0x1075	61
30.6		*Reserved*				
30.7		*Reserved*				
31.0		Fault - AM1 open circuit	AM1	3	0x105B	64
31.1		Fault - Test trip		3	0x1055	65
31.2		Fault - DM-F safety-related tripping	DM-F	3	0x0019	66
31.3		Fault - DM-F wiring	DM-FL	3	0x1061	67
31.4		Fault - DM-FL cross circuit	DM-FL	3	0x1062	68
31.5		*Reserved bit[3]*				
32.0	Faults - Protection extended	Fault - TM2 trip T >	TM2	3	0x102E	

Byte. Bit	Designation		Information	PNIO diagnostic status **)	PNIO error number (channel error type)	Error no.
32.1		Fault - TM2 sensor fault	TM2	3	0x102F	
32.2		Fault - TM2 out of range	TM2	3	0x1030	
32.3		*Reserved bit[5]*				
33.0	Faults - Level monitoring extended	Fault - Trip 0/4-20mA >	AM2	3	0x104A	
33.1		Fault - Trip 0/4-20mA <	AM2	3	0x104B	
33.2		*Reserved bit[6]*				
34.0	Faults - Miscellaneous extended	Fault - AM2 open circuit	AM2	3	0x105C	
34.1		*Reserved bit[7]*				
35.0		*Reserved bit[8]*				
36.0	Warnings - Protection extended	Warning - TM2 warning T >	TM2	2	0x102E	
36.1		*Reserved*				
36.2		Warning - TM2 sensor fault	TM2	2	0x102F	
36.3		Warning - TM2 out of range	TM2	2	0x1030	
36.4		*Reserved bit[4]*				
37.0	Warnings - Level monitoring extended	Warning - Warning 0/4-20mA >	AM2	2	0x104A	
37.1		Warning - Warning 0/4-20mA <	AM2	2	0x104B	
37.2		*Reserved bit[6]*				
38.0	Warnings - Miscellaneous extended	Warning - AM2 open circuit	AM2	2	0x105C	
38.1		*Reserved bit[7]*				
39.0		*Reserved bit[8]*				
40.0	Events - Protection extended	Event - TM2 warning T>	TM2			
40.1		Event - TM2 trip T>	TM2			
40.2		Event - TM2 sensor fault	TM2			
40.3		Event – TM2 out of range	TM2			
40.4		*Reserved bit[4]*				
41.0	Events - Level monitoring	Event - Warning 0/4-20mA >	AM2			
41.1		Event - Warning 0/4-20mA <	AM2			
41.2		Event - Trip 0/4-20mA > 2	AM2			
41.3		Event - Trip 0/4-20mA <	AM2			
41.4		Event - Limit 5	Limit monitor 5			

Byte. Bit	Designation		Information	PNIO diagnostic status **)	PNIO error number (channel error type)	Error no.
41.5		Event - Limit 6	Limit monitor 6			
41.6		*Reserved bit[2]*				
42.0		*Reserved bit[8]*				
43.0	Events - Miscellaneous extended	Event - AM2 open circuit	AM2			
43.1		*Reserved bit[7]*				
44.0		*Reserved Bit[16]*				
45.0		*Reserved bit[8]*				

*) The "GEN. FAULT" LED on the basic unit is not activated; instead, the "SF" LED lights up on the DM-FP (because PROFIsafe is not active)

**) PNIO diagnostic status for the raised alarm:

- 1 = Maintenance required
- 2 = Maintenance demanded
- 3 = Failure

***) No PNIO diagnostics

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

3.4.2.8 Data record 94 - measured values

Table 3- 66 Data record 94 - measured values

Byte.Bit	Designation	Type	Range	Unit	Information
0.0	*Reserved*	*Byte[4]*			
4.0	Thermal motor model	Byte	0 - 255	See 2)	IM UM(+)
5.0	Phase unbalance	Byte	0 - 100	1 %	IM UM(+)
6.0	cos phi	Byte	0 - 100	1 %	UM(+)
7.0	*Reserved*	*Byte[5]*			
12.0	Max. current I_max	Word	0 - 65535	1 % / I_s	IM UM(+)
14.0	Current I_L1	Word	0 - 65535	1 % / I_s	IM UM(+)
16.0	Current I_L2	Word	0 - 65535	1 % / I_s	IM UM(+)
18.0	Current I_L3	Word	0 - 65535	1 % / I_s	IM UM(+)
20.0	Last trip current	Word	0 - 65535	1 % / I_s	IM UM(+)
22.0	Time to trip	Word	0 - 65535	100 ms	IM UM(+)
24.0	Cooling down period	Word	0 - 65535	100 ms	IM UM(+)
26.0	Voltage U_L1	Word	0 - 65535	1 V	UM(+)
28.0	Voltage U_L2	Word	0 - 65535	1 V	UM(+)
30.0	Voltage U_L3	Word	0 - 65535	1 V	UM(+)
32.0	AM1 - output	Word	0 - 32767	See 1)	AM1
34.0	AM1 - input	Word	0 - 32767		AM1
36.0	AM1 - input 2	Word	0 - 32767		AM1
38.0	*Reserved*				
40.0	TM1 - max. temperature	Word	0 - 65535	1 K see 3)	TM1
42.0	TM1 - temperature 1	Word	0 - 65535		TM1
44.0	TM1 - temperature 2	Word	0 - 65535		TM1
46.0	TM1 - temperature 3	Word	0 - 65535		TM1
48.0	EM+ 4) - ground-fault current	Word	0 - 65535		EM(+)
50.0	EM+ 4 - last trip current	Word	0 - 65535		EM(+)
52.0	Active power P	D-word	0 - 0xFFFFFFFF	1 W	UM(+)
56.0	Apparent power S	D-word	0 - 0xFFFFFFFF	1 VA	UM(+)
60.0	*Reserved*	*Byte[14]*			
64.0	*Reserved*	*Byte[28]*			
92.0	*Reserved*	*Byte[24]*			
116.0	AM2 - output	Word	0 - 32767	See 1)	AM2
118.0	AM2 - input 1	Word	0 - 32767		AM2
120.0	AM2 - input 2	*Word*	0 - 32767		AM2
122.0	*Reserved*				
124.0	TM2 - max. temperature	Word	0 - 65535	1 K see 3)	TM2
126.0	TM2 - temperature 1	Word	0 - 65535		TM2
128.0	TM2 - temperature 2	Word	0 - 65535		TM2
130.0	TM2 - temperature 3	Word	0 - 65535		TM2
132.0	Frequency	Word	0 - 65535	0.01 Hz	UM+

Byte.Bit	Designation	Type	Range	Unit	Information
134.0	*Reserved*				
136.0	*Reserved*				
138.0	*Reserved*				
140.0	*Reserved*	*Byte[4]*			
144.0	Current I_max_A_F (float)	Float		1 A	UM+
148.0	Current I_avg_A_F	Float		1 A	UM+
152.0	Current I_L1_A_F	Float		1 A	UM+
156.0	Current I_L2_A_F	Float		1 A	UM+
160.0	Current I_L3_A_F	Float		1 A	UM+
164.0	Active power P_F	Float		1 W	UM+
168.0	Apparent power S_F	Float		1 VA	UM+
172.0	Voltage U1_F	Float		1 V	UM+
176.0	Voltage U2_F	Float		1 V	UM+
180.0	Voltage U3_F	Float		1 V	UM+
184.0	Cos phi_F	Float			UM+
188.0	Frequency_F	Float		1 Hz	UM+
192.0	*Reserved*	*Byte[8]*			

1) S7 format:

0/4 mA = 0

20 mA = 27648

2) Representation of the "Thermal motor model":

Value always refers to symm. 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

3.4.2.9 Data record 95 - Service data/statistical data

Writing the service data/statistical data

Writing is only possible if password protection is not active.

Additional abbreviations:

- r / w = value can be written / changed
- r = value can only be read

Table 3- 67 Data record 95 - service data/statistical data

Byte.Bit	Designation	Type	Range	Unit		Information
0.0	*Coordination*	*Byte[4]*				
4.0	Permissible starts - Actual value	Byte	0 - 255		r [1)]	
5.0	DM-F - Time until test required	Byte	0 - 255	1 week	r	
6.0	*Reserved*	*Byte[2]*				
8.0	Number of parameterizations	Word	0 - 65535		r	
10.0	Number of overload trips	Word	0 - 65535		r / w	
12.0	Number of internal overload trips	Word	0 - 65535		r	
14.0	Motor stop time	Word	0 - 65535	1 h	r / w	
16.0	Timer 1 - Actual value	Word	0 - 65535	100 ms	r	
18.0	Timer 2 - Actual value	Word	0 - 65535	100 ms	r	
20.0	Timer 3 - Actual value	Word	0 - 65535	100 ms	r	
22.0	Timer 4 - Actual value	Word	0 - 65535	100 ms	r	
24.0	Counter 1 - Actual value	Word	0 - 65535		r	
26.0	Counter 2 - Actual value	Word	0 - 65535		r	
28.0	Counter 3 - Actual value	Word	0 - 65535		r	
30.0	Counter 4 - Actual value	Word	0 - 65535		r	
32.0	Calculation module 1 - Output	Word	0 - 65535		r	
34.0	Calculation module 2 - Output	Word	0 - 65535		r	
36.0	*Reserved*	*Byte[4]*	*0*			
40.0	Motor operating hours	D-word	0 - 0xFFFFFFFF	1 s	r / w	
44.0	Int. motor operating hours	D-word	0 - 0xFFFFFFFF	1 s	r	
48.0	Device operating hours	D-word	0 - 0xFFFFFFFF	1 s	r	
52.0	Number of starts	D-word	0 - 0xFFFFFFFF		r / w	
56.0	Internal number of starts CW	D-word	0 - 0xFFFFFFFF		r	
60.0	Internal number of starts CCW	D-word	0 - 0xFFFFFFFF		r	
64.0	Consumed energy	D-word	0 - 0xFFFFFFFF	1 kWh	r / w	UM(+)
68.0	Energy W_F (float)	Byte[8]		1 kWh		UM+
76.0	*Reserved*	*D-word[6]*				
100.0	*Reserved*	*Byte[16]*				
116.0	Timer 5 - Actual value	Word	0 - 65535	100 ms	r	

Byte.Bit	Designation	Type	Range	Unit		Information
118.0	Timer 6 - Actual value	Word	0 - 65535	100 ms	r	
120.0	Counter 5 - Actual value	Word	0 - 65535		r	
122.0	Counter 6 - Actual value	*Word*	0 - 65535		r	
124.0	Analog arithmetic 1 output	Word	0 - 65535		r	
126.0	Analog arithmetic 2 output	Word	0 - 65535		r	
128.0	Analog multiplexer output	Word	0 - 65535		r	
130	*Reserved*	*Word[9]*				

1) Can only be written when the start monitoring function is active!

3.4.2.10 Data record 130 - Basic device parameters 1

Table 3- 68 Data record 130 - Basic device parameters 1

Byte. Bit	Designation (PRM group)	Type	Range	Unit	Default	Note	Information
0.0	Coordination (byte[4]	Byte					
4.0	Device class	Byte	5, 7, 9, 13			5 = BU1 7 = BU0 9 = BU2 13 = BU3	
5.0	Thermistor (Th)	Bit	0, 1			1 = active; thermistor in the BU	
5.1	*Reserved*	*Bit[5]*					
5.6	*Reserved*						
5.7	Initialization module (InM)	Bit	0, 1				
6.0	Operator panel (OP)	Bit	0, 1				
6.1	Analog module (AM1)	Bit	0, 1				
6.2	Temperature module (TM1)	Bit	0, 1				
6.3	Ground-fault module (EM)	Bit	0, 1				
6.4	Digital module 1 (DM1)	Bit[2]	0 - 3			0 = no digital module 1 = monostable 2 = bistable 3 = DM-F (see Byte.Bit 3.4)	
6.6	Digital module 2 (DM2)	Bit[2]	0 - 2				
7.0	Operator panel with display (OPD)	Bit	0, 1				
7.1	Ground-fault module for 3UL23 transformer (EM+)	Bit	0, 1				
7.2	Analog module 2 (AM2)	Bit	0, 1				
7.3	Temperature module 2 (TM2)	Bit	0, 1				
7.4	DM1 - Special type	Bit[2]	0, 1			0 = DM-FL 1 = DM-FP	
7.6	*Reserved*						
8.0	Current measuring (IM)	Bit[7]	0 .. 5			IM / UM: 0 = no current measurement 1 = 0.3 A - 3 A 2 = 2.4 A - 25 A 3 = 10 A - 100 A 4 = 20 A - 200 A 5 = 63 A - 630 A UM+: 9 = 0.3 A - 4 A 10 = 3 A - 40 A 11 = 10 A - 115 A 12 = 20 - 200 A 13 = 63 - 630 A	

Byte. Bit	Designation (PRM group)	Type	Range	Unit	Default	Note	Information
8.7	Voltage measuring module (UM)	Bit	0, 1				
9.0	*Reserved*						
10.0	Control function (CF)	Byte	0x00 0x10 0x11 0x12 0x20 0x21 0x30 0x31 0x40 0x41 0x50 0x60 0x61 0x62 0x63 0x64 0x70 0x71			0x00 = Overload 0x10 = Direct starter 0x11 = Reversing starter 0x12 = 3VL molded case circuit breaker (MCCB) 0x20 = Star-delta starter 0x21 = Star-delta reversing starter 0x30 = Dahlander starter 0x31 = Dahlander reversing starter 0x40 = Pole-changing starter 0x41 = Pole-changing reversing starter 0x50 = Solenoid valve 0x60 = Positioner 1 0x61 = Positioner 2 0x62 = Positioner 3 0x63 = Positioner 4 0x64 = Positioner 5 0x70 = Soft starter 0x71 = Soft starter with reversing contactor	
11.0	*Reserved*	*Bit[8]*					
12.0	**Bit parameters (16)**						
12.0	No configuration fault due to OP	Bit	0, 1		0		
12.1	Startup parameter block active	Bit	0, 1		1		
12.2	Test/Reset keys disabled	Bit	0, 1		0		
12.3	Bus and PLC/PCS - Reset	Bit	0, 1		0	0 = Manual 1 = Auto	
12.4	*Reserved*	*Bit*			*0*		
12.5	*Reserved*	*Bit*			*0*		
12.6	*Reserved*	*Bit*			*0*		
12.7	*Reserved*	*Bit*			*0*		
13.0	Diagnostics for process events	Bit	0, 1		0		
13.1	Diagnostics for process warnings	Bit	0, 1		1		

Byte. Bit	Designation (PRM group)	Type	Range	Unit	Default	Note	Information
13.2	Diagnostics for process faults	Bit	0, 1		1		
13.3	Diagnostics for device faults	Bit	0, 1		1		
13.4	*Reserved*	*Bit*			*0*		
13.5	*Reserved*	*Bit*			*0*		
13.6	Bus monitoring	Bit	0, 1		1		
13.7	PLC/PCS monitoring	Bit	0, 1		1		
14.0	Overload protection - Load type	Bit	0, 1		0	0 = 3-phase 1 = 1-phase	IM UM(+)
14.1	Overload protection - Reset	Bit	0, 1		0	0 = Manual 1 = Auto	IM UM(+)
14.2	*Reserved*	*Bit*			*0*		
14.3	Save change-over command	Bit	0, 1		0		
14.4	Non-maintained command mode	Bit	0, 1		0		
14.5	Cold start level (TPF)	Bit	0, 1		0	0 = NO contact 1 = NC contact	
14.6	Type of consumer load	Bit	0, 1		0	0 = Motor 1 = Resistive load	
14.7	*Reserved*	*Bit*			*0*		
15.0	External fault 1 - Type	Bit	0, 1		0	0 = NO contact 1 = NC contact	
15.1	External fault 2 - Type	Bit	0, 1		0		
15.2	External fault 3 - Type	Bit	0, 1		0		
15.3	External fault 4 - Type	Bit	0, 1		0		
15.4	External fault 1 - Activity	Bit	0, 1		0	0 = Always 1 = Only motor ON	
15.5	External fault 2 - Activity	Bit	0, 1		0		
15.6	External fault 3 - Activity	Bit	0, 1		0		
15.7	External fault 4 - Activity	Bit	0, 1		0		
16.0	**Bit[2] - Parameters (20)**						
16.0	Thermistor - Overload response	Bit[2]	1, 2, 3		3	0 = Disabled 1 = signaling 2 = warn 3 = tripping	Th
16.2	Thermistor - Response to sensor fault	Bit[2]	0, 1, 2, 3		2		Th
16.4	Internal ground fault - Response	Bit[2]	0, 1, 2, 3		0		
16.6	Motor protection - Overload response	Bit[2]	0, 1, 2, 3		3		IM
17.0	Motor protection - Overload response	Bit[2]	0, 1, 2		2		IM
17.2	Unbalance protection - Response	Bit[2]	0, 1, 2, 3		2		IM
17.4	Trip response I>	Bit[2]	0, 1, 3		0		
17.6	Warning response I>	Bit[2]	0, 1, 2		0		

Byte. Bit	Designation (PRM group)	Type	Range	Unit	Default	Note	Information
18.0	Trip response I<	Bit[2]	0, 1, 3		0		
18.2	Warning response I<	Bit[2]	0, 1, 2		0		
18.4	Stalled rotor - Response	Bit[2]	0, 1, 2, 3		0		
18.6	EM+ [1]- Response to sensor fault	Bit[2]	0, 1, 2, 3		0		
19.0	Monitoring the number of starts - Response to overshoot	Bit[2]	0, 1, 2, 3		0		
19.2	Monitoring the number of starts - Response to prewarning	Bit[2]	0, 1, 2		0		
19.4	Motor operating hours monitoring - Response	Bit[2]	0, 1, 2		0		
19.6	Motor stop time monitoring - Response	Bit[2]	0, 1, 2		0		
20.0	External fault 1 - Response	Bit[2]	1, 2, 3		1		
20.2	External fault 2 - Response	Bit[2]	1, 2, 3		1		
20.4	External fault 3 – Response	Bit[2]	1, 2, 3		1		
20.6	External fault 4 - Response	Bit[2]	1, 2, 3		1		
21.0	*Reserved*	*Bit[2]*			*0*		
21.2	Basic unit - Debounce time inputs	Bit[2]	0 - 3	10 ms	1	Offset 6 ms	
21.4	Timer 1 - Type	Bit[2]	0, 1, 2, 3		0	0 = With closing delay, 1 = Closing delay with memory 2 = With opening delay 3 = With fleeting closing	
21.6	Timer 2 - Type	Bit[2]	0, 1, 2, 3		0		
22.0	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	
22.2	Signal conditioning 2 - Type	Bit[2]	0, 1, 2, 3		0		
22.4	Non-volatile element 1 - Type	Bit[2]	0, 1, 2, 3		0		
22.6	Non-volatile element 2 - Type	Bit[2]	0, 1, 2, 3		0		
23.0	EM+ [2] - monitoring	Bit[2]	0, 1, 2, 3		0	0 = on 1 = on+ 2 = run 3 = run+	
23.2	EM+ [2] - monitoring warning	Bit[2]	0, 1, 2, 3		0		
23.4	EM - response to an external ground fault	Bit[2]	1, 3		1	0 = Disabled 1 = Signaling 2 = Warn 3 = Tripping	
23.6	EM - response to warning of an external ground fault	Bit[2]	0, 1, 2		0		

Byte. Bit	Designation (PRM group)	Type	Range	Unit	Default	Note	Information
24.0	**Bit[4] - Parameters (24)**						
24.0	External fault 1 - Reset also by	Bit[4]	0 - 1111B		0101B	Bit[0] = Panel reset Bit[1] = Auto-reset Bit[2] = Remote reset Bit[4] = OFF command reset	
24.4	External fault 2 - Reset also by	Bit[4]	0 - 1111B		0101B		
25.0	External fault 3 - Reset also by	Bit[4]	0 - 1111B		0101B		
25.4	External fault 4 - Reset also by	Bit[4]	0 - 1111B		0101B		
26.0	Limit monitor - Hysteresis for limit monitoring	Bit[4]	0 - 15	1 %	5		
26.4	EM+ 2) - hysteresis	Bit[4]	0 - 15	1 %	5		
27.0	Parameter target version - Part a	Bit[4]			0		
27.4	Parameter target version - Part b	Bit[4]			0		
28.0	**Byte parameters (28)**						
28.0	Internal ground fault - Delay	Byte	0 .. 255	100 ms	5		IM UM(+)
29.0	Overload protection - Class	Byte	5, 7, 10 .. 35, 40		10		
30.0	Motor protection - Delay with overload operation	Byte	0 - 255	100 ms	5		IM UM(+)
31.0	Motor protection - unbalance protection level	Byte	0 - 100	1 %	40		IM UM(+)
32.0	Motor protection - Unbalance protection - Delay in the event of unbalance	Byte	0 - 255	100 ms	5		IM UM(+)
33.0	Interlocking time	Byte	0 - 255	1 s	0		
34.0	FB time	Byte	0 - 255	100 ms	5	0 = disabled	
35.0	Trip level I>	Byte	0 - 255	4 % / I_s	0		IM UM(+)
36.0	Warning level I>	Byte	0 - 255	4 % / Is	0		IM UM(+)
37.0	Trip level I<	Byte	0 - 255	4 % / Is	0		IM UM(+)
38.0	Warning level I<	Byte	0 - 255	4 % / Is	0		IM UM(+)
39.0	Stalled rotor level	Byte	0 - 255	4 % / Is	0		IM UM(+)

Byte. Bit	Designation (PRM group)	Type	Range	Unit	Default	Note	Information
40.0	Trip delay I>	Byte	0 - 255	100 ms	5		IM UM(+)
41.0	Warning delay I>	Byte	0 - 255	100 ms	5		IM UM(+)
42.0	Trip delay I<	Byte	0 - 255	100 ms	5		IM UM(+)
43.0	Warning delay I<	Byte	0 - 255	100 ms	5		IM UM(+)
44.0	Blocking delay	Byte	0 - 255	100 ms	5		IM UM(+)
45.0	Monitoring the number of starts - Permissible starts	Byte	1 - 255		1		
46.0	*Reserved*	*Byte*			*0*		
47.0	EM+ [2] - delay	Byte	0 - 255	100 ms	0		
48.0	Truth table 1 type 3I/1O	Byte	0 - 11111111B		0		
49.0	Truth table 2 type 3I/1O	Byte	0 - 11111111B		0		
50.0	Truth table 3 type 3I/1O	Byte	0 - 11111111B		0		
51.0	*Reserved*	*Byte*			*0*		
52.0	**Word parameters (32)**						
52.0	Motor protection - Cooling down period	Word	600 - 65535	100 ms	3000		IM UM(+)
54.0	Motor protection - Pause time	Word	0 - 65535	100 ms	0	0 = disabled	IM UM(+)
56.0	Execution time	Word	0 - 65535	100 ms	10	0 = disabled	
58.0	Monitoring the number of starts - Time range for starts	Word	0 - 65535	1 s	0		
60.0	Monitoring the number of starts - Interlocking time	Word	0 - 65535	1 s	0		
62.0	Motor stop time level >	Word	0 - 65535	1 h	0		
64.0	Timer 1 - Limit	Word	0 - 65535	100 ms	0		
66.0	Timer 2 - Limit	Word	0 - 65535	100 ms	0		
68.0	Counter 1 - Limit	Word	0 - 65535		0		
70.0	Counter 2 - Limit	Word	0 - 65535		0		
72.0	EM+ [2] - trip level	Word	30 -40000	1 mA	1000		
74.0	EM+ [2] - warning level	Word	30 -40000	1 mA	500		

Byte. Bit	Designation (PRM group)	Type	Range	Unit	Default	Note	Information
76.0	**D-word parameters (36)**						
76.0	Operator control enables	Bit [32]	0 - 1-1B		0-0B		
80.0	Motor protection - Set current I_s1	D-word	1)	10 mA	30		IM UM(+) 
84.0	Motor operating hours level >	D-word	0 - 0xFFFFFFFF	1 s	0		
88.0	*Reserved*	*D-word*			*0*		

1) Value range dependent on current range of the IM / UM and the conversion factor Bit 31 = 1, i.e. conversion factor active.

2) 3UF7510-1AA00-0 ground-fault module

3.4.2.11 Data record 131 - Basic device parameters 2 (plug binary)

Table 3- 69 Data record 131 - Basic device parameters 2

Byte.Bit	Designation (PRM group)	Type	Range	Default	Note	Information
0.0	*Reserved*	*Byte[4]*				
4.0	**Byte parameters (40)**					
4.0	BU - Output 1	Byte	0 - 255	0		
5.0	BU - Output 2	Byte	0 - 255	0		
6.0	BU - Output 3	Byte	0 - 255	0		
7.0	*Reserved*	*Byte*		*0*		
8.0	OP - LED green 1	Byte	0 - 255	0		OP OPD
9.0	OP - LED green 2	Byte	0 - 255	0		OP OPD
10.0	OP - LED green 3	Byte	0 - 255	0		OP OPD
11.0	OP - LED green 4	Byte	0 - 255	0		OP OPD
12.0	OP - LED yellow 1	Byte	0 - 255	0		OP
13.0	OP - LED yellow 2	Byte	0 - 255	0		OP
14.0	OP - LED yellow 3	Byte	0 - 255	0		OP
15.0	*Reserved*	*Byte*		*0*		
16.0	Cyclic send - Bit 0.0	Byte	0 - 255	105	Default: Status - ON<	
17.0	Cyclic send - Bit 0.1	Byte	0 - 255	106	Default: Status - Off	
18.0	Cyclic send - Bit 0.2	Byte	0 - 255	107	Default: Status - ON>	
19.0	Cyclic send - Bit 0.3	Byte	0 - 255	128	Default: Event - Overload operation	
20.0	Cyclic send - Bit 0.4	Byte	0 - 255	110	Default: Status - Interlocking time active	
21.0	Cyclic send - Bit 0.5	Byte	0 - 255	120	Default: Status - Auto mode	
22.0	Cyclic send - Bit 0.6	Byte	0 - 255	96	Default: Status - General fault	
23.0	Cyclic send - Bit 0.7	Byte	0 - 255	97	Default: Status - General warning	
24.0	OPC UA Send - Bit 1.0	Byte	0 - 255	0		
25.0	OPC UA Send - Bit 1.1	Byte	0 - 255	0		
26.0	OPC UA Send - Bit 1.2	Byte	0 - 255	0		
27.0	OPC UA Send - Bit 1.3	Byte	0 .. 255	0		
28.0	OPC UA Send - Bit 1.4	Byte	0 - 255	0		
29.0	OPC UA Send - Bit 1.5	Byte	0 - 255	0		
30.0	OPC UA Send - Bit 1.6	Byte	0 - 255	0		
31.0	OPC UA Send - Bit 1.7	Byte	0 - 255	0		
32.0	OPC UA Send - Bit 0.0	Byte	0 - 255	0		
33.0	OPC UA Send - Bit 0.1	Byte	0 - 255	0		
34.0	OPC UA Send - Bit 0.2	Byte	0 - 255	0		
35.0	OPC UA Send - Bit 0.3	Byte	0 - 255	0		
36.0	OPC UA Send - Bit 0.4	Byte	0 - 255	0		
37.0	OPC UA Send - Bit 0.5	Byte	0 - 255	0		
38.0	OPC UA Send - Bit 0.6	Byte	0 - 255	0		

Byte.Bit	Designation (PRM group)	Type	Range	Default	Note	Information
39.0	OPC UA Send - Bit 0.7	Byte	0 - 255	0		
40.0	OPC UA Send - Bit 1.0	Byte	0 - 255	0		
41.0	OPC UA Send - Bit 1.1	Byte	0 - 255	0		
42.0	OPC UA Send - Bit 1.2	Byte	0 - 255	0		
43.0	OPC UA Send - Bit 1.3	Byte	0 - 255	0		
44.0	OPC UA Send - Bit 1.4	Byte	0 - 255	0		
45.0	OPC UA Send - Bit 1.5	Byte	0 - 255	0		
46.0	OPC UA Send - Bit 1.6	Byte	0 - 255	0		
47.0	OPC UA Send - Bit 1.7	Byte	0 - 255	0		
48.0	Monitoring PLC/PCS input	Byte	0 - 255	0		
49.0	Motor protection - Emergency start	Byte	0 - 255	60	Default: Cyclic receive - Bit 0.4	IM UM(+)
50.0	*Reserved*	*Byte*		*0*		
51.0	*Reserved*	*Byte*		*0*		
52.0	Mode selector S1	Byte	0 - 255	61	Default: Cyclic receive - Bit 0.5	
53.0	Mode selector S2	Byte	0 - 255	2	Default: Fixed level value "1"	
54.0	Control station - Local control [LC] ON<	Byte	0 - 255	0		Dependent on the control function
55.0	Control station - Local control [LC] OFF	Byte	0 - 255	0		
56.0	Control station - Local control [LC] ON>	Byte	0 - 255	0		
57.0	Control station - PLC/PCS [PN] ON<	Byte	0 - 255	56	Default: Cyclic receive - Bit 0.0	
58.0	Control station - PLC/PCS [PN] OFF	Byte	0 - 255	57	Default: Cyclic receive - Bit 0.1	
59.0	Control station - PLC/PCS [PN] ON>	Byte	0 - 255	58	Default: Cyclic receive - Bit 0.2	
60.0	Control station - PC/OPC-UA[OCM] ON<	Byte	0 - 255	0		
61.0	Control station - PC/OPC-UA[OCM] OFF	Byte	0 - 255	0		
62.0	Control station - PC/OPC-UA[OCM] ON>	Byte	0 - 255	0		
63.0	Control station - Operator panel [OP] ON<	Byte	0 - 255	0		
64.0	Control station - Operator panel [OP] OFF	Byte	0 - 255	0		
65.0	Control station - Operator panel [OP] ON>	Byte	0 - 255	0		
66.0	Control function - ON<	Byte	0 - 255	73	Default: Group control station ON<	
67.0	Control function - OFF	Byte	0 - 255	74	Default: Group control station OFF	
68.0	Control function - ON>	Byte	0 - 255	75	Default: Group control station ON>	

Byte.Bit	Designation (PRM group)	Type	Range	Default	Note	Information
69.0	Control function - Feedback ON	Byte	0 - 255	101	Default: Status - Motor current flowing	
70.0	External fault 1 - Input	Byte	0 - 255	0		
71.0	External fault 2 - Input	Byte	0 - 255	0		
72.0	External fault 3 - Input	Byte	0 - 255	0		
73.0	External fault 4 - Input	Byte	0 - 255	0		
74.0	External fault 1 - Reset	Byte	0 - 255	0		
75.0	External fault 2 - Reset	Byte	0 - 255	0		
76.0	External fault 3 - Reset	Byte	0 - 255	0		
77.0	External fault 4 - Reset	Byte	0 - 255	0		
78.0	Cold start (TPF)	Byte	0 - 255	0		
79.0	Test 1 - Input	Byte	0 - 255	59	Default: Cyclic receive - Bit 0.3	
80.0	Test 2 - Input	Byte	0 - 255	0		
81.0	Reset 1 - Input	Byte	0 - 255	62	Default: Cyclic receive - Bit 0.6	
82.0	Reset 2 - Input	Byte	0 - 255	0		
83.0	Reset 3 - Input	Byte	0 - 255	0		
84.0	*Reserved*	*Byte*		*0*		
85.0	*Reserved*	*Byte*		*0*		
86.0	*Reserved*	*Byte*		*0*		
87.0	*Reserved*	*Byte*		*0*		
88.0	Truth table 1 3I/1O - Input 1	Byte	0 - 255	0		
89.0	Truth table 1 3I/1O - Input 2	Byte	0 - 255	0		
90.0	Truth table 1 3I/1O - Input 3	Byte	0 - 255	0		
91.0	Truth table 2 3I/1O - Input 1	Byte	0 - 255	0		
92.0	Truth table 2 3I/1O - Input 2	Byte	0 - 255	0		
93.0	Truth table 2 3I/1O - Input 3	Byte	0 - 255	0		
94.0	Truth table 3 3I/1O - Input 1	Byte	0 - 255	0		
95.0	Truth table 3 3I/1O - Input 2	Byte	0 - 255	0		
96.0	Truth table 3 3I/1O - Input 3	Byte	0 - 255	0		
97.0	*Reserved*	*Byte*		*0*		
98.0	Timer 1 - Input	Byte	0 - 255	0		
99.0	Timer 1 - Reset	Byte	0 - 255	0		
100.0	Timer 2 - Input	Byte	0 - 255	0		
101.0	Timer 2 - Reset	Byte	0 - 255	0		
102.0	Counter 1 - Input +	Byte	0 - 255	0		
103.0	Counter 1 - Input -	Byte	0 - 255	0		
104.0	Counter 1 - Reset	Byte	0 - 255	0		
105.0	Counter 2 - Input +	Byte	0 - 255	0		
106.0	Counter 2 - Input -	Byte	0 - 255	0		
107.0	Counter 2 - Reset	Byte	0 - 255	0		
108.0	Signal conditioning 1 - Input	Byte	0 - 255	0		

Byte.Bit	Designation (PRM group)	Type	Range	Default	Note	Information
109.0	Signal conditioning 1 - Reset	Byte	0 - 255	0		
110.0	Signal conditioning 2 - Input	Byte	0 - 255	0		
111.0	Signal conditioning 2 - Reset	Byte	0 - 255	0		
112.0	Non-volatile element 1 - Input	Byte	0 - 255	0		
113.0	Non-volatile element 1 - Reset	Byte	0 - 255	0		
114.0	Non-volatile element 2 - Input	Byte	0 - 255	0		
115.0	Non-volatile element 2 - Reset	Byte	0 - 255	0		
116.0	Flashing 1 - Input	Byte	0 - 255	0		
117.0	Flashing 2 - Input	Byte	0 - 255	0		
118.0	Flashing 3 - Input	Byte	0 - 255	0		
119.0	Flicker 1 - Input	Byte	0 - 255	0		
120.0	Flicker 2 - Input	Byte	0 - 255	0		
121.0	Flicker 3 - Input	Byte	0 - 255	0		
122.0	**Analog parameters (44)**					
122.0	PLC/PCS analog input	Byte	0 - 255	16	Default: Max. current I_max	
123.0	*Reserved*	*Byte*		*0*		

3.4.2.12 Data record 132 - Extended device parameters 1

Table 3- 70 Data record 132 - Extended device parameters 1

Byte.Bit	Designation (PRM group)	Type	Range	Unit	Default	Note	Information
0.0	*Reserved*	*Byte[4]*					
4.0	Bit parameters (17)						
4.0	*Reserved*						
4.1	*Reserved*						
4.2	*Reserved*	*Bit*			*0*		
4.3	*Reserved*	*Bit*			*0*		
4.4	*Reserved*	*Bit*			*0*		
4.5	*Reserved*	*Bit*			*0*		
4.6	*Reserved*	*Bit*			*0*		
4.7	*Reserved*	*Bit*			*0*		
5.0	*Reserved*	*Bit*			*0*		
5.1	Voltage measuring - Type of load	Bit	0, 1		0	0 = 3-phase 1 = 1-phase	
5.2	OPD - Warnings	Bit	0, 1		0	0 = Do not display 1 = Display	
5.3	OPD - Faults	Bit	0, 1		1		
5.4	AM1 - Measuring range input	Bit	0, 1		0	0 = 0-20mA 1 = 4-20mA	AM1
5.5	AM1 - Measuring range output	Bit	0, 1		0		AM1
5.6	*Reserved*	*Bit*			*0*		
5.7	*Reserved*	*Bit*			*0*		
6.0	Overshooting/undershooting limit 1	Bit	0, 1		0	0 = ">" (overshooting) 1 = "<" (undershooting)	
6.1	Overshooting/undershooting limit 2	Bit	0, 1		0		
6.2	Overshooting/undershooting limit 3	Bit	0, 1		0		
6.3	Overshooting/undershooting limit 4	Bit	0, 1		0		
6.4	Line-to-line voltage	Bit	0, 1		0	0 = No 1 = Yes	
6.5	OPO level	Bit	0, 1		0	0 = NO contact 1 = NC contact	
6.6	Positioner response for OPO	Bit	0, 1		0	0 = CLOSED 1 = OPEN	
6.7	Star-delta - Transformer mounting	Bit	0, 1		0	0 = Delta 1 = In supply cable	
7.0	External fault 5 - Type	Bit	0, 1		0	0 = NO contact 1 = NC contact	
7.1	External fault 6 - Type	Bit	0, 1		0		
7.2	*Reserved*	*Bit*			*0*		
7.3	*Reserved*	*Bit*			*0*		
7.4	Monitoring external fault 5	Bit	0, 1		0	0 = Always 1 = Only motor ON	
7.5	Monitoring external fault 6	Bit	0, 1		0		

Byte.Bit	Designation (PRM group)	Type	Range	Unit	Default	Note	Information
7.6	*Reserved*	*Bit*			*0*		
7.7	*Reserved*	*Bit*			*0*		
8.0	Calculator 2, Operating mode	Bit	0, 1		0	0 = Word 1 = D-word	
8.1	*Reserved*	*Bit*			*0*		
8.2	DM-F - Safe tripping function	Bit	0, 1		0	0 = No 1 = Yes	DM-F
8.3	DM-F - Safety-related tripping reset	Bit	0, 1		0	0 = Manual 1 = Auto	DM-F
8.4	*Reserved*						
8.5	*Reserved*	*Bit*			*0*		
8.6	*Reserved*	*Bit*			*0*		
8.7	*Reserved*	*Bit*			*0*		
9.0	DM-FL - Configuration 1	Bit	0, 1		0	Configurable parameters comparable with the module configuration	DM-FL
9.1	DM-FL - Configuration 2	Bit	0, 1		0		DM-FL
9.2	DM-FL - Configuration 3	Bit	0, 1		0		DM-FL
9.3	DM-FL - Configuration 4	Bit	0, 1		0		DM-FL
9.4	DM-FL - Configuration 5	Bit	0, 1		0		DM-FL
9.5	DM-FL - Configuration 6	Bit	0, 1		0		DM-FL
9.6	DM-FL - Configuration 7	Bit	0, 1		0		DM-FL
9.7	DM-FL - Configuration 8	Bit	0, 1		0		DM-FL
10.0	**Bit[2] - Parameters (21)**						
10.0	*Reserved*	*Bit[2]*					
10.2	*Reserved*	*Bit[2]*			*0*		
10.4	UVO timebase	Bit[2]	0, 1, 2		0		
10.6	UVO operating mode	Bit[2]	0, 1, 2		0	0 = Deactivated 1 = Activated	
11.0	Trip monitoring U<	Bit[2]	0, 1, 2		1	0 = ON (always) 1 = ON+ (always, not TPF) 2 = RUN (motor ON, not TPF)	UM(+)
11.2	Warning monitoring U<	Bit[2]	0, 1, 2		1		UM(+)
11.4	*Reserved*	*Bit[2]*			*0*		
11.6	*Reserved*	*Bit[2]*			*0*		
12.0	Trip monitoring 0/4-20 mA>	Bit[2]	0, 1, 2, 3		0	0 = ON (always) 1 = ON + (always, not TPF) 2 = RUN (motor ON, not TPF) 3 = RUN+ (motor ON, not TPF, startup override)	AM1
12.2	Warning monitoring 0/4-20 mA>	Bit[2]	0, 1, 2, 3		0		AM1
12.4	Trip monitoring 0/4-20 mA<	Bit[2]	0, 1, 2, 3		0		AM1
12.6	Warning monitoring 0/4-20 mA<	Bit[2]	0, 1, 2, 3		0		AM1
13.0	Monitoring limit 1	Bit[2]	0, 1, 2, 3		0		
13.2	Monitoring limit 2	Bit[2]	0, 1, 2, 3		0		
13.4	Monitoring limit 3	Bit[2]	0, 1, 2, 3		0		
13.6	Monitoring limit 4	Bit[2]	0, 1, 2, 3		0		

Byte.Bit	Designation (PRM group)	Type	Range	Unit	Default	Note	Information
14.0	*Reserved*	*Bit[2]*			*0*		
14.2	*Reserved*	*Bit[2]*			*0*		
14.4	*Reserved*	*Bit[2]*			*0*		
14.6	AM1 - active inputs	Bit[2]	0, 1, 2		0	0 = 1 input 1 = 2 inputs 2 = 3 inputs	AM1
15.0	DM - Delays inputs	Bit[2]	0, 1, 2, 3	10 ms	1	Offset 6ms	DM1 DM2
15.2	AM1 - Response for open circuit	Bit[2]	1, 2, 3		2	0 = Disabled 1 = Signaling 2 = Warn 3 = Tripping	AM1
15.4	EM - Response to external ground fault	Bit[2]	1, 3		1		EM EM+
15.6	EM - response to warning of an external ground fault	Bit[2]	0, 1, 2		0		EM EM+
16.0	*Reserved*	*Bit[2]*			*0*		
16.2	*Reserved*	*Bit[2]*			*0*		
16.4	DM-F - Test requirement response	Bit[2]	0, 1, 2		0	0 = Disabled 1 = Signaling 2 = Warn 3 = Tripping	DM-F
16.6	DM-F - safety-related tripping response	Bit[2]	0, 1, 2, 3		0		DM-F
17.0	TM1 - Trip response T>	Bit[2]	1, 3		3		TM1
17.2	TM1 - Warning response T>	Bit[2]	0, 1, 2		2		TM1
17.4	TM1 - Response to a sensor fault / out of range	Bit[2]	0, 1, 2, 3		2		TM1
17.6	TM1 - Active sensors	Bit[2]	0, 1, 2		2	0 = 1 sensor 1 = 2 sensors 2 = 3 sensors	TM1
18.0	Trip response P>	Bit[2]	0, 1, 3		0	0 = Disabled 1 = Signaling 2 = Warn 3 = Tripping	UM(+)
18.2	Warning response P>	Bit[2]	0, 1, 2		0		UM(+)
18.4	Trip response P<	Bit[2]	0, 1, 3		0		UM(+)
18.6	Warning response P<	Bit[2]	0, 1, 2		0		UM(+)
19.0	Trip response cos phi <	Bit[2]	0, 1, 3		0		UM(+)
19.2	Warning response cos phi <	Bit[2]	0, 1, 2		0		UM(+)
19.4	Trip response U<	Bit[2]	0, 1, 3		0		UM(+)
19.6	Warning response U<	Bit[2]	0, 1, 2		0		UM(+)
20.0	Trip response 0/4-20 mA>	Bit[2]	0, 1, 3		0		AM1
20.2	Warning response 0/4-20 mA>	Bit[2]	0, 1, 2		0		AM1
20.4	Trip response 0/4-20 mA<	Bit[2]	0, 1, 3		0		AM1
20.6	Warning response 0/4-20 mA<	Bit[2]	0, 1, 2		0		AM1
21.0	*Reserved*	*Bit[2]*			*0*		
21.2	*Reserved*	*Bit[2]*			*0*		
21.4	*Reserved*	*Bit[2]*			*0*		
21.6	*Reserved*	*Bit[2]*			*0*		

Byte.Bit	Designation (PRM group)	Type	Range	Unit	Default	Note	Information
22.0	External fault 5 – Response	Bit[2]	1, 2, 3		1	0 = Disabled 1 = Signaling 2 = Warn 3 = Tripping	
22.2	External fault 6 – Response	Bit[2]	1, 2, 3		1		
22.4	*Reserved*	*Bit[2]*			*0*		
22.6	*Reserved*	*Bit[2]*			*0*		
23.0	Analog-value recording - Trigger edge	Bit[2]	0, 1		0	0 = positive 1 = negative	
23.2	*Reserved*	*Bit[2]*			*0*		
23.4	*Reserved*	*Bit[2]*			*0*		
23.6	*Reserved*	*Bit[2]*			*0*		
24.0	*Reserved*	*Bit[2]*			*0*		
24.2	*Reserved*	*Bit[2]*			*0*		
24.4	*Reserved*	*Bit[2]*			*0*		
24.6	*Reserved*	*Bit[2]*			*0*		
25.0	Timer 3 - Type	Bit[2]	0, 1, 2, 3		0	0 = With closing delay 1 = Closing delay with memory 2 = With opening delay 3 = With fleeting closing	
25.2	Timer 4 - Type	Bit[2]	0, 1, 2, 3		0		
25.4	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	
25.6	Signal conditioning 4 - Type	Bit[2]	0, 1, 2, 3		0		
26.0	Non-volatile element 3 - Type	Bit[2]	0, 1, 2, 3		0		
26.2	Non-volatile element 4 - Type	Bit[2]	0, 1, 2, 3		0		
26.4	Calculator 2, Operator	Bit[2]	0, 1, 2, 3		0	0 = + 1 = - 2 = * 3 = /	
26.6	*Reserved*	*Bit[2]*			*0*		
27.0	*Reserved*	*Bit[2]*			*0*		
27.2	*Reserved*	*Bit[2]*			*0*		
27.4	OPD - Operator panel display (bit 0 to 1)	Bit[2]	0 - 4		2	0 = Manual 1 = 3 s 2 = 10 s 3 = 1 min 4 = 5 min	
27.6	OPD - Operator panel display (bit 2 to 3)	Bit[2]	0 - 4		2		

Byte.Bit	Designation (PRM group)	Type	Range	Unit	Default	Note	Information
28.0	**Bit[4] - Parameters (25)**						
28.0	TM1 - sensor type	Bit[3] + Bit	000B to 100B		000B	000B = PT100 001B = PT100 010B = KTY83 011B = KTY84 100B = NTC	TM1
28.4	OPD language	Bit[4]	0 - 7		1	0 = English 1 = German 2 = French 3 = Polish 4 = Spanish 5 = Portuguese 6 = Italian 7 = Finnish	
29.0	External fault 5 - Reset also by	Bit[4]	0 - 1111B		0101B	Bit[0] = Panel reset Bit[1] = Auto-reset Bit[2] = Remote reset Bit[3] = OFF command reset	
29.4	External fault 6 - Reset also by	Bit[4]	0 - 1111B		0101B		
30.0	OPD - Contrast (bit 0 to 3)	Bit[4]	0 - 255	1 %	50		
30.4	OPD - Contrast (bit 4 to 7)	Bit[4]					
31.0	OPD - Profile (bit 0 to 3)	*Bit[4]*	0 - 26		*0*		
31.4	OPD - Profile (bit 4 to 7)	*Bit[4]*					
32.0	Truth table 7 type 2I/1O	Bit[4]	0 - 1111B		0		
32.4	Truth table 8 type 2I/1O	Bit[4]	0 - 1111B		0		
33.0	I_s1 conversion factor - Denominator	Bit[4]	0 - 15		0		
33.4	I_s2 conversion factor - Denominator	Bit[4]	0 - 15		0		
34.0	Hysteresis P - Cos phi - U	Bit[4]	0 - 15		5	1 %	UM(+)
34.4	Hysteresis 0/4-20 mA	Bit[4]	0 - 15		5	1 %	AM1 AM2
35.0	Hysteresis free limits	Bit[4]	0 - 15		5	1 %	
35.4	OPD - Lighting	Bit[4]	0 - 4		2	0 = Off 1 = 3 s 2 = 10 s 3 = 1 min 4 = 5 min	
36.0	**Byte parameters (29)**						
36.0	*Reserved*	*Byte*			*0*		
37.0	EM - Delay	Byte	0 - 255	100 ms	5		EM
38.0	Trip level cos phi<	Byte	0 - 100	1 %	0		UM(+)
39.0	Warning level cos phi<	Byte	0 - 100	1 %	0		UM(+)

Byte.Bit	Designation (PRM group)	Type	Range	Unit	Default	Note	Information
40.0	Trip level U<	Byte	0 - 255	8 V	0		UM(+)
41.0	Warning level U<	Byte	0 - 255	8 V	0		UM(+)
42.0	Trip level 0/4-20 mA>	Byte	0 - 255	*128	0		AM1
43.0	Warning level 0/4-20 mA>	Byte	0 - 255	*128	0		AM1
44.0	Trip level 0/4-20 mA<	Byte	0 - 255	*128	0		AM1
45.0	Warning level 0/4-20 mA<	Byte	0 - 255	*128	0		AM1
46.0	Trip delay P>	Byte	0 - 255	100 ms	5		UM(+)
47.0	Warning delay P>	Byte	0 - 255	100 ms	5		UM(+)
48.0	Trip delay P<	Byte	0 - 255	100 ms	5		UM(+)
49.0	Warning delay P<	Byte	0 - 255	100 ms	5		UM(+)
50.0	Trip delay cos phi<	Byte	0 - 255	100 ms	5		UM(+)
51.0	Warning delay cos phi<	Byte	0 - 255	100 ms	5		UM(+)
52.0	Trip delay U<	Byte	0 - 255	100 ms	5		UM(+)
53.0	Warning delay U<	Byte	0 - 255	100 ms	5		UM(+)
54.0	Trip delay 0/4-20 mA>	Byte	0 - 255	100 ms	5		AM1
55.0	Warning delay 0/4-20 mA>	Byte	0 - 255	100 ms	5		AM1
56.0	Trip delay 0/4-20 mA<	Byte	0 - 255	100 ms	5		AM1
57.0	Warning delay 0/4-20 mA<	Byte	0 - 255	100 ms	5		AM1
58.0	Delay limit 1	Byte	0 - 255	100 ms	5		
59.0	Delay limit 2	Byte	0 - 255	100 ms	5		
60.0	Delay limit 3	Byte	0 - 255	100 ms	5		
61.0	Delay limit 4	Byte	0 - 255	100 ms	5		
62.0	TM - Hysteresis	Byte	0 - 255	1 K	5		TM1 TM2
63.0	Max. star time	Byte	0 - 255	1 s	20	Star-delta starter	
64.0	UVO time	Byte	0 - 255	100 ms	0		
65.0	Staggering time	Byte	0 - 255	1 s	0		
66.0	Analog value recording - Sampling rate	Byte	0 - 20	5%	0		
67.0	Calculator 2, Denominator 1	Byte	0 - 255		0		
68.0	Calculator 2, Numerator 2	Byte	0 - 255		0		
69.0	Calculator 1, Denominator	Byte	0 - 255		0		
70.0	Truth table 4 type 3I/1O	Byte	0 - 11111111B		0		
71.0	Truth table 5 type 3I/1O	Byte	0 - 11111111B		0		

Byte.Bit	Designation (PRM group)	Type	Range	Unit	Default	Note	Information
72.0	Truth table 6 type 3I/1O	Byte	0 - 11111111B		0		
73.0	Calculator 2, Numerator 1	Byte	-128 - 127		0		
74.0	Calculator 2, Denominator 2	Byte	-128 - 127		0		
75.0	DM-F - Test requirement level	Byte	0 - 255	1 week	0		
76.0	**Word parameters (33)**						
76.0	Analog module - Start value output	Word	0 - 65535		0	Value for 0/4mA	AM1
78.0	Analog Module - End value output	Word	0 - 65535		27648	Value for 20mA	AM1
80.0	TM1 - Trip level T>	Word	0 - 65535	1 K	0		TM1
82.0	TM1 - Warning level T>	Word	0 - 65535	1 K	0		TM1
84.0	Limit monitor 1 - Limit	Word	0 - 65535		0		
86.0	Limit monitor 2 - Limit	Word	0 - 65535		0		
88.0	Limit monitor 3 - Limit	Word	0 - 65535		0		
90.0	Limit monitor 4 - Limit	Word	0 - 65535		0		
92.0	Timer 3 - Limit	Word	0 - 65535	100 ms	0		
94.0	Timer 4 - Limit	Word	0 - 65535	100 ms	0		
96.0	Counter 3 - Limit	Word	0 - 65535		0		
98.0	Counter 4 - Limit	Word	0 - 65535		0		
100.0	Change-over pause	Word	0 - 65535	10 ms	0		
102.0	Analog value recording - Sampling rate	Word	1 - 50000	1 ms	100		
104.0	I_s1 conversion factor - Numerator	Word	0 - 65535		0		
106.0	I_s2 conversion factor - Numerator	Word	0 - 65535		0		
108.0	**D-word parameters (37)**						
108.0	Motor protection - Set current I_s2	D-word	1)	10 mA	0		
112.0	Trip level P>	D-word	0 - 0xFFFFFFFF	1 W	0		UM(+)
116.0	Warning level P>	D-word	0 - 0xFFFFFFFF	1 W	0		UM(+)
120.0	Trip level P<	D-word	0 - 0xFFFFFFFF	1 W	0		UM(+)

Byte.Bit	Designation (PRM group)	Type	Range	Unit	Default	Note	Information
124.0	Warning level P<	D-word	0 - 0xFFFFFFFF	1 W	0		UM(+)
128.0	Truth Table 9 5I/2O type - Output 1	Bit[32]	0 - 1-1B		0		
132.0	Truth Table 9 5I/2O type - Output 2	Bit[32]	0 - 1-1B		0		
136.0	Calculator 2, Offset	D-word	-0x80000000 - 0x7FFFFFFF		0		
140.0	Calculator 1, Numerator/Offset	D-word	2x -32768 - 32767		0		

1) Value range dependent on current range of the IM/UM and the conversion factor; bit 31 = 1, i.e. conversion factor is active

3.4.2.13 Data record 133 - Extended device parameters 2 (plug binary)

Table 3- 71 Data record 133 - Extended device parameters

Byte.Bit	Designation (PRM group)	Type	Range	Default	Note	Information
0.0	*Reserved*	*Byte[4]*				
4.0	**Byte parameters (41)**					
4.0	DM1 - Output 1	Byte	0 - 255	0		DM1 DM-F
5.0	DM1 - Output 2	Byte	0 - 255	0		DM1 FM-F
6.0	DM2 - Output 1	Byte	0 - 255	0		DM2
7.0	DM2 - Output 2	Byte	0 - 255	0		DM2
8.0	*Reserved*	*Byte*		*0*		
9.0	*Reserved*	*Byte*		*0*		
10.0	*Reserved*	*Byte*		*0*		
11.0	*Reserved*	*Byte*		*0*		
12.0	*Reserved*					
13.0	*Reserved*					
14.0	*Reserved*					
15.0	*Reserved*					
16.0	*Reserved*					
17.0	*Reserved*					
18.0	*Reserved*					
19.0	*Reserved*					
20.0	Analog value recording - Trigger input	Byte	0 - 255	0		
21.0	*Reserved*	*Byte*		*0*		
22.0	Control station - Local control [LC] ON<<	Byte	0 - 255	0		Dependent on the control function
23.0	Control station - Local control [LC] ON>>	Byte	0 - 255	0		
24.0	Control station - PLC/PCS [PN] ON<<	Byte	0 - 255	0		
25.0	Control station - PLC/PCS [PN] ON>>	Byte	0 - 255	0		
26.0	Control station - PC/OPC UA[OCM] ON<<	Byte	0 - 255	0		
27.0	Control station - PC/OPC UA[OCM] ON<<	Byte	0 - 255	0		
28.0	Control station - Operator panels [OP] ON>>	Byte	0 - 255	0		
29.0	Control station - Operator panels [OP]<>/<<>>	Byte	0 - 255	0		
30.0	Control function - ON<<	Byte	0 - 255	0		
31.0	Control function - ON>>	Byte	0 - 255	0		
32.0	Auxiliary control input - FC	Byte	0 - 255	0		
33.0	Auxiliary control input - FO	Byte	0 - 255	0		
34.0	Auxiliary control input - TC	Byte	0 - 255	0		
35.0	Auxiliary control input - TO	Byte	0 - 255	0		
36.0	External fault 5 - Input	Byte	0 - 255	0		
37.0	External fault 6 - Input	Byte	0 - 255	0		
38.0	*Reserved*	*Byte*		*0*		
39.0	*Reserved*	*Byte*		*0*		

Byte.Bit	Designation (PRM group)	Type	Range	Default	Note	Information
40.0	External fault 5 - Reset	Byte	0 - 255	0		
41.0	External fault 6 - Reset	Byte	0 - 255	0		
42.0	*Reserved*	*Byte*		*0*		
43.0	*Reserved*	*Byte*		*0*		
44.0	UVO fault	Byte	0 - 255	0		
45.0	OPO error	Byte	0 - 255	0		
46.0	Truth table 4 3I/1O - Input 1	Byte	0 - 255	0		
47.0	Truth table 4 3I/1O - Input 2	Byte	0 - 255	0		
48.0	Truth table 4 3I/1O - Input 3	Byte	0 - 255	0		
49.0	Truth table 5 3I/1O - Input 1	Byte	0 - 255	0		
50.0	Truth table 5 3I/1O - Input 2	Byte	0 - 255	0		
51.0	Truth table 5 3I/1O - Input 3	Byte	0 - 255	0		
52.0	Truth table 6 3I/1O - Input 1	Byte	0 - 255	0		
53.0	Truth table 6 3I/1O - Input 2	Byte	0 - 255	0		
54.0	Truth table 6 3I/1O - Input 3	Byte	0 - 255	0		
55.0	Truth table 7 2I/1O - Input 1	Byte	0 - 255	0		
56.0	Truth table 7 2I/1O - Input 2	Byte	0 - 255	0		
57.0	Truth table 8 2I/1O - Input 1	Byte	0 - 255	0		
58.0	Truth table 8 2I/1O - Input 2	Byte	0 - 255	0		
59.0	Truth table 9 5I/2O - Input 1	Byte	0 - 255	0		
60.0	Truth table 9 5I/2O - Input 2	Byte	0 - 255	0		
61.0	Truth table 9 5I/2O - Input 3	Byte	0 - 255	0		
62.0	Truth table 9 5I/2O - Input 4	Byte	0 - 255	0		
63.0	Truth table 9 5I/2O - Input 5	Byte	0 - 255	0		
64.0	Timer 3 - Input	Byte	0 - 255	0		
65.0	Timer 3 - Reset	Byte	0 - 255	0		
66.0	Timer 4 - Input	Byte	0 - 255	0		
67.0	Timer 4 - Reset	Byte	0 - 255	0		
68.0	Counter 3 - Input +	Byte	0 - 255	0		
69.0	Counter 3 - Input -	Byte	0 - 255	0		
70.0	Counter 3 - Reset	Byte	0 - 255	0		
71.0	Counter 4 - Input +	Byte	0 - 255	0		
72.0	Counter 4 - Input -	Byte	0 - 255	0		
73.0	Counter 4 - Reset	Byte	0 - 255	0		
74.0	Signal conditioning 3 - Input	Byte	0 - 255	0		
75.0	Signal conditioning 3 - Reset	Byte	0 - 255	0		
76.0	Signal conditioning 4 - Input	Byte	0 - 255	0		
77.0	Signal conditioning 4 - Reset	Byte	0 - 255	0		
78.0	Non-volatile element 3 - Input	Byte	0 - 255	0		
79.0	Non-volatile element 3 - Reset	Byte	0 - 255	0		
80.0	Non-volatile element 4 - Input	Byte	0 - 255	0		
81.0	Non-volatile element 4 - Reset	Byte	0 - 255	0		

Byte.Bit	Designation (PRM group)	Type	Range	Default	Note	Information
82.0	*Reserved*	*Byte*		*0*		
83.0	*Reserved*	*Byte*		*0*		
84.0	*Reserved*	*Byte*		*0*		
85.0	*Reserved*	*Byte*		*0*		
86.0	*Reserved*	*Byte*		*0*		
87.0	*Reserved*	*Byte*		*0*		
88.0	**Analog parameters (45)**					
88.0	AM1 - Output	Byte	0 - 255	0		AM1
89.0	Analog input limit 1	Byte	0 - 255	0		
90.0	Analog input limit 2	Byte	0 - 255	0		
91.0	Analog input limit 3	Byte	0 - 255	0		
92.0	Analog input limit 4	Byte	0 - 255	0		
93.0	Calculator 1, Input	Byte	0 - 255	0		
94.0	Analog value recording - Analog input	Byte	0 - 255	0		
95.0	PLC/PCS analog input 2	Byte	0 - 255	0		
96.0	PLC/PCS analog input 3	Byte	0 - 255	0		
97.0	PLC/PCS analog input 4	Byte	0 - 255	0		
98.0	Calculator 2, Input 1	Byte	0 - 255	0		
99.0	Calculator 2, Input 2	Byte	0 - 255	0		

3.4.2.14 Data record 134 - Extended device parameters 1

Table 3- 72 Data record 134 - ExtendedPlus device parameters

Byte.Bit	Designation (PRM group)	Type	Range	Unit	Default	Note	Information
	Part - Bit[2] parameters						
17.0	Internal ground fault+ - Warning response	Bit[2]	0, 1, 2		0	0 = Disabled 1 = signaling 2 = warn	UM+
18.2	*Reserved*						
18.4	*Reserved*						
18.6	*Reserved*						
19.0	*Reserved*						
19.2	*Reserved*						
19.4	*Reserved*						
19.6	*Reserved*						
20.0	*Reserved*						
20.2	*Reserved*						
20.4	*Reserved*						
20.6	*Reserved*						
21.0	*Reserved*						
21.2	*Reserved*						
21.4	*Reserved*						
21.6	*Reserved*						
22.0	**Part - Bit[4] parameters**						
22.0	TM2 - sensor type	Bit[3+1]	000B to 100B		000B	Like TM1	TM2
22.4	Internal ground fault+ - Hysteresis	Bit[4]	0 ... 15	1 %	5		UM+
23.0	*Reserved*						
23.4	*Reserved*						
24.0	*Reserved*						
24.4	*Reserved*						
25.0	*Reserved*						
25.4	*Reserved*						
26.0	*Reserved*						
26.4	*Reserved*						
27.0	*Reserved*						
27.4	*Reserved*						
28.0	*Reserved*						
28.4	*Reserved*						
29.0	*Reserved*						
29.4	*Reserved*						

Byte.Bit	Designation (PRM group)	Type	Range	Unit	Default	Note	Information
30.0	**Part - Byte parameters**						
30.0	Trip level 0/4-20 mA >	Byte	0 - 255	*128	0		AM2
31.0	Warning level 0/4-20 mA >	Byte	0 - 255	*128	0		AM2
32.0	Trip level 0/4-20 mA <	Byte	0 - 255	*128	0		AM2
33.0	Warning level 0/4-20 mA <	Byte	0 - 255	*128	0		AM2
34.0	Trip delay 0/4-20 mA >	Byte	0 - 255	100 ms	5		AM2
35.0	Warning delay 0/4-20 mA >	Byte	0 - 255	100 ms	5		AM2
36.0	Trip delay 0/4-20 mA <	Byte	0 - 255	100 ms	5		AM2
37.0	Warning delay 0/4-20 mA <	Byte	0 - 255	100 ms	5		AM2
38.0	Delay limit 5	Byte	0 - 255	100 ms	5		
39.0	Delay limit 6	Byte	0 - 255	100 ms	5		
40.0	Truth table 10 type 3I/1O	Byte	0 - 11111111B			0	
41.0	Truth table 11 type 3I/1O	Byte	0 - 11111111B			0	
	Part - Byte parameters						
42.0	Internal ground fault+ - warning delay	Byte	0 ... 255	100 ms	1		UM+
43.0	Internal ground fault+ - Trip level	Word	0 ... 65535	1 mA	0	Value range dependent on current range of the UM+	UM+
44.0	Internal ground fault+ - Warning level	Word	0 ... 65535	1 mA	0	Value range dependent on current range of the UM+	UM+
45.0	*Reserved*						
46.0	*Reserved*						
47.0	*Reserved*						
48.0	*Reserved*						
49.0	*Reserved*						
50.0	*Reserved*						
51.0	*Reserved*						
52.0	*Reserved*						
53.0	*Reserved*						

Byte.Bit	Designation (PRM group)	Type	Range	Unit	Default	Note	Information
54.0	*Reserved*						
55.0	*Reserved*						
56.0	*Reserved*						
57.0	*Reserved*						
58.0	*Reserved*						
59.0	*Reserved*						
60.0	**Part - Word parameters**						
60.0	AM2 - Start value output	Word	0 - 65535		0	Value for 0/4 mA	AM2
62.0	AM2 - End value output	Word	0 - 65535		27648	Value for 20 mA	AM2
64.0	TM2 - Trip level T>	Word	0 - 65535	1K	0		TM2
66.0	TM2 - Warning level T>	Word	0 - 65535	1K	0		TM2
68.0	Limit level 5	Word	0 - 65535		0		
70.0	Limit level 6	Word	0 - 65535		0		
72.0	Timer 5 value	Word	0 - 65535	100 ms	0		
74.0	Timer 6 value	Word	0 - 65535	100 ms	0		
76.0	Counter 5 value	Word	0 - 65535		0		
78.0	Counter 6 value	Word	0 - 65535		0		
80.0	Calculator 3 const 1	Word	0 - 65535		0		
82.0	Calculator 3 const 2	Word	0 - 65535		0		
84.0	Calculator 3 const 3	Word	0 - 65535		0		
86.0	Calculator 3 const 4	Word	0 - 65535		0		
88.0	Calculator 4 const 1	Word	0 - 65535		0		
90.0	Calculator 4 const 2	Word	0 - 65535		0		
92.0	Calculator 4 const 3	Word	0 - 65535		0		
94.0	Calculator 4 const 4	Word	0 - 65535		0		
96.0	Analog multiplexer const 1	Word	0 - 65535		0		
98.0	Analog multiplexer const 2	Word	0 - 65535		0		
100.0	Analog multiplexer const 3	Word	0 - 65535		0		
102.0	Analog multiplexer const 4	Word	0 - 65535		0		
104.0	PWM input const	Word	0 - 65535		0		
106.0	PWM input Min	Word	0 - 65535		0		
108.0	PWM input Max	Word	0 - 65535		0		
110.0	PWM duration	Word	0 - 65535	100 ms	20		

Byte.Bit	Designation (PRM group)	Type	Range	Unit	Default	Note	Information
	Part - Word parameters						
112.0	*Reserved*	Word					
114.0	*Reserved*	Word					
116.0	*Reserved*	Word					
118.0	*Reserved*	Word					
120.0	*Reserved*	Word					
122.0	*Reserved*	Word					
124.0	*Reserved*	Word					
126.0	*Reserved*	Word					
128.0	*Reserved*	Word					
130.0	*Reserved*	Word					
132.0	*Reserved*	Word					
134.0	*Reserved*	Word					
136.0	*Reserved*	Word					
138.0	*Reserved*	Word					
140.0	Part - D-word parameters						
140.0	PE - min. pause time motor	D-word	0 - FFFFFFFF	1 ms	0		
144.0	*Reserved*	D-word					
148	Part - Float parameters						
148.0 .. 168.0	*Reserved*	*Float*					
172.0	*Reserved*	D-word					
176.0	*Reserved*	D-word					

3.4.2.15 Data record 135 - Extended device parameters 2

Table 3- 73 Data record 135 - ExtendedPlus device parameters 2

Byte.Bit	Designation (PRM group)	Type	Range	Unit	Default	Note	Information
0.0	Coordination	Byte[4]					
4.0	**Part - DI byte parameters**						
4.0	Truth table 10 3I/1O - Input 1	DI byte	0 - 255		0		
5.0	Truth table 10 3I/1O - Input 2	DI byte	0 - 255		0		
6.0	Truth table 10 3I/1O - Input 3	DI byte	0 - 255		0		
7.0	Truth table 11 3I/1O - Input 1	DI byte	0 - 255		0		
8.0	Truth table 11 3I/1O - Input 2	DI byte	0 - 255		0		
9.0	Truth table 11 3I/1O - Input 3	DI byte	0 - 255		0		
10.0	Timer 5 input	DI byte	0 - 255		0		
11.0	Timer 5 reset	DI byte	0 - 255		0		
12.0	Timer 6 input	DI byte	0 - 255		0		
13.0	Timer 6 reset	DI byte	0 - 255		0		
14.0	Counter 5 input +	DI byte	0 - 255		0		
15.0	Counter 5 input -	DI byte	0 - 255		0		
16.0	Counter 5 reset	DI byte	0 - 255		0		
17.0	Counter 6 input +	DI byte	0 - 255		0		
18.0	Counter 6 input -	DI byte	0 - 255		0		
19.0	Counter 6 reset	DI byte	0 - 255		0		
20.0	Signal conditioning 5 input	DI byte	0 - 255		0		
21.0	Signal conditioning 5 reset	DI byte	0 - 255		0		
22.0	Signal conditioning 6 input	DI byte	0 - 255		0		
23.0	Signal conditioning 6 reset	DI byte	0 - 255		0		
24.0	Analog multiplexer S1	DI byte	0 - 255		0		
25.0	Analog multiplexer S2	DI byte	0 - 255		0		
26.0	*Reserved*						
27.0	*Reserved*						
28.0	*Reserved*						
29.0	*Reserved*						
30.0	*Reserved*						
31.0	*Reserved*						
32.0	*Reserved*						
33.0	*Reserved*						
34.0	*Reserved*						
35.0	*Reserved*						
36.0	*Reserved*						
37.0	*Reserved*						
38.0	*Reserved*						
39.0	*Reserved*						

Byte.Bit	Designation (PRM group)	Type	Range	Unit	Default	Note	Information
40.0	*Reserved*						
41.0	*Reserved*						
42.0	*Reserved*						
43.0	*Reserved*						
44.0	*Reserved*						
45.0	*Reserved*						
46.0	*Reserved*						
47.0	*Reserved*						
48.0	*Reserved*						
49.0	*Reserved*						
50.0	*Reserved*						
51.0	*Reserved*						
52.0	*Reserved*						
53.0	*Reserved*						
54.0	*Reserved*						
55.0	*Reserved*						
56.0	*Reserved*						
57.0	*Reserved*						
58.0	*Reserved*						
59.0	*Reserved*						
60.0	*Reserved*						
61.0	*Reserved*						
62.0	*Reserved*						
63.0	*Reserved*						
64.0	**Part - AI byte parameters**						
64.0	AM2 - Output	AI byte	0 - 255		0		AM2
65.0	SPS/PLS_analog input 5	AI byte	0 - 255		0		
66.0	SPS/PLS_analog input 6	AI byte	0 - 255		0		
67.0	SPS/PLS_analog input 7	AI byte	0 - 255		0		
68.0	SPS/PLS_analog input 8	AI byte	0 - 255		0		
69.0	SPS/PLS_analog input 9	AI byte	0 - 255		0		
70.0	Analog input limit 5	AI byte	0 - 255		0		
71.0	Analog input limit 6	AI byte	0 - 255		0		
72.0	Analog arithmetic 1 input 1	AI byte	0 - 255		0		
73.0	Analog arithmetic 1 input 2	AI byte	0 - 255		0		
74.0	Analog arithmetic 1 input 3	AI byte	0 - 255		0		
75.0	Analog arithmetic 1 input 4	AI byte	0 - 255		0		
76.0	Analog arithmetic 2 input 1	AI byte	0 - 255		0		
77.0	Analog arithmetic 2 input 2	AI byte	0 - 255		0		
78.0	Analog arithmetic 2 input 3	AI byte	0 - 255		0		
79.0	Analog arithmetic 2 input 4	AI byte	0 - 255		0		

Byte.Bit	Designation (PRM group)	Type	Range	Unit	Default	Note	Information
80.0	Analog multiplexer input 1	AI byte	0 - 255		0		
81.0	Analog multiplexer input 2	AI byte	0 - 255		0		
82.0	Analog multiplexer input 3	AI byte	0 - 255		0		
83.0	Analog multiplexer input 4	AI byte	0 - 255		0		
84.0	PWM input	AI byte	0 - 255		0		
85.0	*Reserved*	AI byte					
86.0	*Reserved*	AI byte					
87.0	*Reserved*	AI byte					
88.0	*Reserved*	AI byte					
89.0	*Reserved*	AI byte					
90.0	*Reserved*	AI byte					
91.0	*Reserved*	AI byte					
92.0	*Reserved*	AI byte					
93.0	*Reserved*	AI byte					
94.0	*Reserved*	AI byte					
95.0	*Reserved*	AI byte					
96.0	*Reserved*	AI byte					
97.0	*Reserved*	AI byte					
98.0	*Reserved*	AI byte					
99.0	*Reserved*	AI byte					
	Part - FII byte parameters						
100.0	PLC / PCS analog FI input	FII byte	0 ... 255		0		
101.0	PLC / PCS analog FI input	FII byte	0 ... 255		0		
102.0	PLC / PCS analog FI input	FII byte	0 ... 255		0		
103.0	PLC / PCS analog FI input	FII byte	0 ... 255		0		
107 ... 113	*Reserved*						

3.4.2.16 Data record 139 - Marking

For external faults, limit monitors, and monitoring functions of the temperature and analog modules, user-specific texts can be configured for marking.

You can access the following texts via data record 139:

- External fault 1 to 6 (status information, warnings, and faults)
- Limit 1 to 4 (status information)
- TM1 warnings T> / trip T> (status information, warnings, and faults)
- AM1 warning/tripping 0/4 - 20 mA<> (status information, warnings and faults).

Can be parameterized to have various meanings, e.g. fill level >, bearing hot, etc. To simplify diagnostics, these texts can be saved in the device. These can be created, read out and displayed, for example, with **SIMOCODE ES**. The texts do not contain any functions.

Note

Changing the marking

Each change to the marking requires that the communication interface be restarted when the web server is active. A new start interrupts all Ethernet and PROFINET links and reestablishes them afterward.

Table 3- 74 Data record 139 - Marking

Byte.Bit	Designation	Type	Information
0.0	*Reserved*	*Byte[4]*	
4.0	*Reserved*	*Byte[6]*	
10.0	Marking - External fault 1	Byte[10]	
20.0	Marking - External fault 2	Byte[10]	
30.0	Marking - External fault 3	Byte[10]	
40.0	Marking - External fault 4	Byte[10]	
50.0	Marking - External fault 5	Byte[10]	
60.0	Marking - External fault 6	Byte[10]	
70.0	*Reserved*	*Byte[10]*	
80.0	*Reserved*	*Byte[10]*	
90.0	Marking limit 1	Byte[10]	
100.0	Marking limit 2	Byte[10]	
110.0	Marking limit 3	Byte[10]	
120.0	Marking limit 4	Byte[10]	
130.0	Marking - TM warning T>	Byte[10]	
140.0	Marking - TM trip T>	Byte[10]	
150.0	Marking - Warning 0/4-20 mA>	Byte[10]	
160.0	Marking - Warning 0/4-20 mA<	Byte[10]	
170.0	Marking - Trip 0/4-20 mA>	Byte[10]	
180.0	Marking - Trip 0/4-20 mA<	Byte[10]	
190.0	*Reserved*	*Byte[10]*	

3.4.2.17 Data record 140 - Marking 2

For limit monitors, and monitoring functions of the temperature and analog modules, user-specific texts can be configured for marking.

You can access the following texts via data record 140:

- Limit 5 and 6
- TM2 warnings T> / trip T>
- AM2 warning / trip 0/4-20mA<>.

Note

Changing the marking

Each change to the marking requires that the communication interface be restarted when the web server is active. A new start interrupts all Ethernet and PROFINET links and reestablishes them afterward.

Table 3- 75 Data record 140 - Marking 2

Byte.Bit	Designation	Type	Information
0.0	Coordination	Byte[4]	
4.0	*Reserved*		
10.0	Marking limit 5	Byte[10]	
20.0	Marking limit 6	Byte[10]	
30.0	Marking - TM2 warning T>	Byte[10]	
40.0	Marking - TM2 trip T>	Byte[10]	
50.0	Marking - Warning 0/4-20 mA>	Byte[10]	
60.0	Marking - Warning 0/4-20 mA<	Byte[10]	
70.0	Marking - Trip 0/4-20 mA>	Byte[10]	
80.0	Marking - Trip 0/4-20 mA>	Byte[10]	
90.0	*Reserved*	*Byte[110]*	

3.4.2.18 Data record 165 - Identification

You can access the following identifiers stored in the device:

- Plant identifier
- Location designation
- Installation date
- Comment.

Table 3- 76 Data record 165 - Identification

Byte.Bit	Designation	Type	Information
0.0	*Reserved*	*Byte[4]*	
4.0	Plant identifier	Byte[32]	
36.0	Location designation	Byte[22]	
58.0	Date	Byte[16]	
74.0	*Reserved*	*Byte[38]*	
112.0	Comment	Byte[54]	

3.4.2.19 Data record 224 - Password protection

Description

- Password protection ON

  If the data record is received with this control flag, the password protection is activated and the password applied. If "Password protection on" and the password are not identical at the time of receipt, the event "Event - Wrong password" is set and no change will be made.
- Password protection OFF

  If the data record is received with this control flag, the password protection is deactivated. If the password is incorrect, the event "Event - Wrong password" is set and no change is made.

Table 3- 77 Data record 224 - Password protection

Byte.Bit	Designation	Type	Information
0.0	*Reserved*	*Byte[4]*	
4.0	Control flag: 0 = Password protection off, 1 = Password protection on	Bit	
4.1	*Reserved*	*Bit[31]*	
8.0	Password	Byte[8]	
16.0	*Reserved*	*Byte[8]*	

3.5 Modbus data tables

3.5.1 General information

3.5.1.1 Memory image

Hexadecimal address	Chapter
0x0000	See Process image output - command data (Page 285)
0x0400	See Process image input - monitoring data (Page 286)
0x0800	See Measured values (Page 287)
0x0C00	See Display and statistical data (Page 289)
0x1C00	See Device diagnostics (Page 290)
0x2100	See Error memory (Page 297)
0x2200	See Event memory (Page 298)
0x2A80	See Trace data (Page 299)
0x4000	See I&M0 - device identification (Page 299)
0x4020	See I&M1 data (Page 300)
0x4040	See I&M2 - Installation date (Page 300)
0x4060	See I&M3 - Comment (Page 300)
0x4180	See Basic device parameter 1 (Page 301)
0x4380	See Extended device parameters 1 (Page 308)
0x4880	See Marking (Page 319)

3.5.1.2 Byte arrangement

Byte arrangement

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

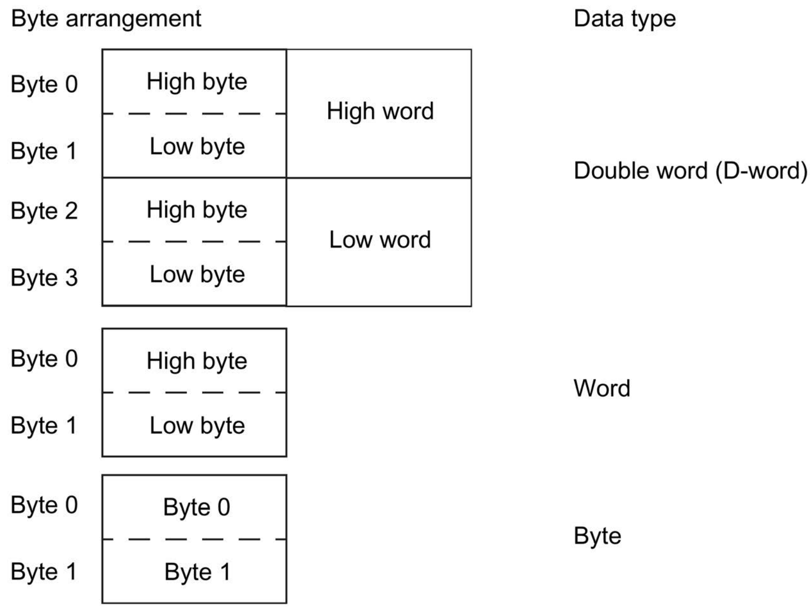


Figure 3-6 Byte arrangement in "big endian" format

3.5.1.3 Specifications

The following specifications apply in the tables:

Table 3- 78 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

3.5.2 Modbus RTU data tables

3.5.2.1 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.

The process image output and the process image input can also be accessed via function code 23 as a combined write/read access operation.

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 3- 79 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

3.5.2.2 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.

The process image output and the process image input can also be accessed via function code 23 as a combined write/read access operation.

Table 3- 80 Process image input - monitoring data

Register address	high/low	Coil address	Type	Designation	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

3.5.2.3 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: 31 registers.

Table 3- 81 Measured values

Input/holding register		Designation	Type	Range	Unit	Access [5]	Info
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	
0x0842		Frequency	Word	0 - 65535	0.01 Hz	r	from E03
0x0848		Current I_max_A_F	Float		1 A	r	from E03
0x084A		Current I_avg_A_F	Float		1 A	r	from E03
0x084C		Current I_L1_A_F	Float		1 A	r	from E03

Input/holding register		Designation	Type	Range	Unit	Access 5)	Info
Address offset	high/low						
0x084E		Current I_L2_A_F	Float		1 A	r	from E03
0x0850		Current I_L3_A_F	Float		1 A	r	from E03
0x0852		Active power P_F	Float		1 W	r	from E03
0x0854		Apparent power S	Float		1 VA	r	from E03
0x0856		Voltage UL1_F	Float		1 V	r	from E03
0x0858		Voltage UL2_F	Float		1 V	r	from E03
0x085A		Voltage UL3_F	Float		1 V	r	from E03
0x085C		Cos phi_F	Float			r	from E03
0x085E		Frequency_F	Float		1 Hz	r	from E03

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

3.5.2.4 Display and statistical data

Read access to the display and statistical data is possible from the register memory area with function codes 03 and 04.

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: 34 registers.

Table 3- 82 Display and statistical data

Input/holding register		Designation	Type	Range	Unit	Access [1)]	Info
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		Motor 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 .. 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	
0x0C22		Energy W_F	Float		1 kWh	r	from E03

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

3.5.2.5 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 3- 83 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
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

Input/holding register		Type	Discrete input / coil address	Identifier	Access 1)
Address	high/low				
	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*
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

Input/holding register		Type	Discrete input / coil address	Identifier	Access 1)
Address	high/low				
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
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

Input/holding register		Type	Discrete input / coil address	Identifier	Access 1)
Address	high/low				
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
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

Input/holding register Address	high/low	Type	Discrete input / coil address	Identifier	Access 1)
	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*
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

3.5.2.6 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 3- 84 Error buffer

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 found in the table "Alarm, fault, and system events, PROFIBUS error handling" in the SIMOCODE pro system manual.

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

3.5.2.7 Event memory

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

Max. data length per access: 84 registers.

Table 3- 85 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

3.5.2.8 Trace data

Read-only access to the trace data is possible via function codes 03 and 04.

Max. data length per access: 63 registers.

Table 3- 86 Trace data

Input/holding register			Identifier	Type	Range	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

3.5.2.9 I&M0 - device identification

Read-only access to the I&M0 device identification is possible via function codes 03 and 04.

Max. data length per access: 32 registers.

Table 3- 87 I&M (device identification)

Input register	Content	Size	Coding (H)	Access 1)
Address				
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 record length: 64 bytes

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

3.5.2.10 I&M1 data

Read access to the I&M1 data is possible via function codes 03 and 04. Write access is possible via function codes 06 and 16.

Max. data length per access: 32 registers.

Table 3- 88 I&M1D data

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

3.5.2.11 I&M2 - Installation date

Read access to the I&M2 data is possible via function codes 03 and 04. Write access is possible via function codes 06 and 16.

Max. data length per access: 13 registers.

Table 3- 89 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

3.5.2.12 I&M3 - Comment

Read access to the I&M3 data is possible via function codes 03 and 04. Write access is possible via function codes 06 and 16.

Max. data length per access: 32 registers.

Table 3- 90 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

3.5.2.13 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. data record length per access: 46 registers.

The "SIMOCODE ES (TIA Portal)" software is nonetheless required for full parameterization of the SIMOCODE pro V Modbus devices (see also Chapter "Commissioning with Modbus RTU" in the SIMOCODE pro – System Manual (https://support.industry.siemens.com/cs/ww/en/view/109743957)).

Table 3- 91 Basic device parameter 1

Input/holding register			Designation	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 monitor ing	Bit	0, 1		1			r

Input/holding register			Designation	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
			Part - Bit[2] parameter							
0x4188	high	0-1	Thermistor - Overload response	Bit[2]	1, 2, 3		3	0 = Disabled 1 = Signaling 2 = Warn 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

Input/holding register			Designation	Type	Range	Unit	Default	Comments	Info	Access1)
Address	high/low	Bit								
		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
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

Input/holding register			Designation	Type	Range	Unit	Default	Comments	Info	Access[1)]
Address	high/low	Bit								
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*
			Part - Bit[4] parameters							r
0x418C	high		Reset response external fault 1	Bit[4]	0 ... 1111B		0101B	Bit[0] = Panel reset Bit[1] = Auto reset Bit[2] = Remote reset Bit[1] = OFF command reset		r
			Reset response external fault 2	Bit[4]	0 ... 1111B		0101B			r
	low		Reset response external fault 3	Bit[4]	0 ... 1111B		0101B			r
			Reset response external fault 4	Bit[4]	0 ... 1111B		0101B			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

Input/holding register			Designation	Type	Range	Unit	Default	Comments	Info	Access[1)]
Address	high/low	Bit								
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
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

Input/holding register			Designation	Type	Range	Unit	Default	Comments	Info	Access[1)]
Address	high/low	Bit								
0x4195	high		Trip delay I<	Byte	0 ... 255	100 ms	5		IM U M(+)	r/w
	low		Warning delay I<	Byte	0 ... 255	100 ms	5		IM U M(+)	r/w
0x4196	high		Blocking delay	Byte	0 ... 255	100 ms	5		IM U M(+)	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 ... 1111 1111B		0			r
	low		Truth table 2 type 3I/1O	Byte	0 ... 1111 1111B		0			r
0x4199	high		Truth table 3 type 3I/1O	Byte	0 ... 1111 1111B		0			r
	low		*Reserved*	Byte			0			r
			Part - Word parameters							
0x419A			Motor protection - Cooling down period	Word	600 ... 65535	100 ms	3000		IM U M(+)	r/w
0x419B			Motor protection - Pause time	Word	0 ... 65535	100 ms	0	0 = Disabled	IM U M(+)	r/w
0x419C			Execution time	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

Input/holding register			Designation	Type	Range	Unit	Default	Comments	Info	Access[1)]
Address	high/low	Bit								
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 ... 0xFFFFFFFF	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

3.5.2.14 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.

The "SIMOCODE ES (TIA Portal)" software is nonetheless required for full parameterization of the SIMOCODE pro V Modbus devices (see also Chapter "Commissioning with Modbus RTU" in the SIMOCODE pro – System Manual (https://support.industry.siemens.com/cs/ww/en/view/109743957)).

Max. data length per access: 72 registers.

Table 3- 92 Extended device parameters 1

Input/holding register			**Designation**	**Type**	**Range**	**Unit**	**Default**	**Comments**	**Access** 1)	**Info**
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	from E03
		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*	
0x4383	high	0	Overshooting/undershooting limit 1	Bit	0, 1		0	0 = > (overshooting)	r	

Input/holding register			Designation	Type	Range	Unit	Default	Comments	Access 1)	Info
Address	high/low	Bit								
		1	Overshooting/undershooting limit 2	Bit	0, 1		0	1 = < (undershooting)	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	
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	r	
		1	DM-FL - Configuration 2	Bit	0, 1		0		r	

Input/holding register			Designation	Type	Range	Unit	Default	Comments	Access 1)	Info
Address	high/low	Bit								
		2	DM-FL - Configuration 3	Bit	0, 1		0	configuration	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	
			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) 1 = ON+ (always, not TPF) 2 = RUN (motor ON, not TPF)	r	
		2-3	Warning monitoring U <	Bit[2]	0, 1, 2		1		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	

Input/holding register			Designation	Type	Range	Unit	Default	Comments	Access [1)]	Info
Address	high/low	Bit								
	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	
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 = Warn 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	
0x4389	high	0-1	Trip response P>	Bit[2]	0, 1, 3		0	0 = Disabled 1 = Signaling 2 = Warn	r	
		2-3	Warning response P>	Bit[2]	0, 1, 2		0			
		4-5	Trip response P<	Bit[2]	0, 1, 3		0		r	

Input/holding register			Designation	Type	Range	Unit	Default	Comments	Access 1)	Info
Address	high/low	Bit								
		6-7	Warning response P<	Bit[2]	0, 1, 2		0	3 = Tripping	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*	
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	

Input/holding register			Designation	Type	Range	Unit	Default	Comments	Access 1)	Info
Address	high/low	Bit								
		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	from E03
		6-7	OPD - Operator panel display (bit 2 ... 3)	Bit[2]					r	
			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	from E03
	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	from E03
		4-7	OPD - Contrast (bit 4 ... 7)	Bit[4]					r	
	low	0-3	OPD - Profile (bit 0 ... 3)	Bit[4]	0 ... 33		0		r	

Input/holding register			Designation	Type	Range	Unit	Default	Comments	Access 1)	Info
Address	high/low	Bit								
		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	from E03
			Part - Byte parameters							
0x4392	high			*Byte*					*r*	
	low		EM - Delay	Byte	0 ... 255	100 ms	5		r/w	EM
0x4393	high		Trip level cos phi<	Byte	0 ... 100	1 %	0		r/w	UM
	low		Warning level cos phi<	Byte	0 ... 100	1 %	0		r/w	UM
0x4394	high		Trip level U<	Byte	0 ... 255	8 V	0		r/w	UM
	low		Warning level U<	Byte	0 ... 255	8 V	0		r/w	UM
0x4395	high		Trip level 0/4-20 mA>	Byte	0 ... 255	*128	0		r/w	AM1

Input/holding register			Designation	Type	Range	Unit	Default	Comments	Access [1)]	Info
Address	high/low	Bit								
	low		Warning level 0/4-20mA>	Byte	0 ... 255	*128	0		r/w	AM1
0x4396	high		Trip level 0/4-20 mA<	Byte	0 ... 255	*128	0		r/w	AM1
	low		Warning level 0/4-20mA>	Byte	0 ... 255	*128	0		r/w	AM1
0x4397	high		Trip delay P>	Byte	0 ... 255	100 ms	5		r/w	UM
	low		Warning delay P>	Byte	0 ... 255	100 ms	5		r/w	UM
0x4398	high		Trip delay P<	Byte	0 ... 255	100 ms	5		r/w	UM
	low		Warning delay P<	Byte	0 ... 255	100 ms	5		r/w	UM
0x4399	high		Trip delay cos phi<	Byte	0 ... 255	100 ms	5		r/w	UM
	low		Warning delay cos phi<	Byte	0 ... 255	100 ms	5		r/w	UM
0x439A	high		Trip delay U<	Byte	0 ... 255	100 ms	5		r/w	UM
	low		Warning delay U<	Byte	0 ... 255	100 ms	5		r/w	UM
0x439B	high		Trip delay 0/4-20 mA>	Byte	0 ... 255	100 ms	5		r/w	AM1
	low		Warning delay 0/4-20 mA>	Byte	0 ... 255	100 ms	5		r/w	AM1
0x439C	high		Trip delay 0/4-20 mA<	Byte	0 ... 255	100 ms	5		r/w	AM1

Input/holding register			Designation	Type	Range	Unit	Default	Comments	Access 1)	Info
Address	high/low	Bit								
	low		Warning delay 0/4-20 mA<	Byte	0 ... 255	100 ms	5		r/w	AM1
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	
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 ... 11111111B		0		r	
	low		Truth table 5 type 3I/1O	Byte	0 ... 11111111B		0		r	
0x43A4	high		Truth table 6 type 3I/1O	Byte	0 ... 11111111B		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	

Input/holding register			Designation	Type	Range	Unit	Default	Comments	Access [1)]	Info
Address	high/low	Bit								
			Part - Word parameters						r/w	
0x43A6			AM1 - Start value output	Word	0 ... 65535		0	Value for 0/4 mA	r/w	AM1
0x43A7			AM1 - End value output	Word	0 ... 65535		27648	Value for 20 mA	r/w	AM1
0x43A8			TM1 - Trip level T>	Word	0 ... 65535	1 K	0		r/w	TM1
0x43A9			TM1 - Warning level T>	Word	0 ... 65535	1 K	0		r/w	TM1
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	
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	

Input/holding register			Designation	Type	Range	Unit	Default	Comments	Access 1)	Info
Address	high/low	Bit								
			Part - D word parameter							
0x43B6			Motor protection - Set current Is2	D word		10 mA	0		r	
0x43B8			Trip level P>	D word	0 ... 0xFFF FFFFF	1 W	0		r/w	
0x43BA			Warning level P>	D word	0 ... 0xFFF FFFFF	1 W	0		r/w	
0x43BC			Trip level P<	D word	0 ... 0x FFFFF FFF	1 W	0		r/w	
0x43BE			Warning level P<	D word	0 ... 0xFFF FFFFF	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 ... 0x7FF FFFFF		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

3.5.2.15 Marking

Read access to the labeling is possible via function codes 03 and 04. Write access is possible via function codes 06 and 16.

Max. data length per access: 100 registers.

Table 3- 93 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 record length: 200 bytes

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

3.6 EtherNet/IP data tables

3.6.1 Supported objects

The following CIP (Common Industrial Protocol) objects and SIMOCODE objects are supported:

Table 3- 94 Device profile - supported objects

Object name	Object class	CIP objects	SIMOCODE objects	Object length
Identity object (Page 321)	0x0001	X		
Message Router object (Page 322)	0x0002	X		
Assembly object (Page 323)	0x0004	X		
Connection Manager object (Page 334)	0x0006	X		
Control Supervisor object	0x0029	X		
DLR object	0x0047	X		
QoS object	0x0048	X		
Device Diagnosis object (Page 334)	0x0096		X	46 bytes
Measurement object (Page 335)	0x0097		X	240 bytes
Statistical Data object (Page 337)	0x0098		X	228 bytes
Motor Parameter object (Page 339)	0x0099		X	116 bytes
TCP/IP Interface object (Page 341)	0x00F5	X		
Ethernet Link object (Page 342)	0x00F6	X		
Overload object	0x002C	X		

3.6.2 Identity object

The following information applies to the Identity object of the SIMOCODE pro V EtherNet/IP device:

- Class code: 0x0001
- Class attributes: 1, 2, 3
- Number of instances: 1

Table 3- 95 Attributes of instance 1 for the Identity object

Attribute ID	Access	Name	Data type	Value / comment
1	Get	Manufacturer	UINT	1251
2	Get	Device Type	UINT	0x03
3	Get	Product Code	UINT	2000
4	Get	Revision	STRUCT of	Device revision level
		Major Revision	USINT	
		Minor Revision	USINT	
5	Get	Device_Status	WORD	Defined in the "Device_Status" definition table below
6	Get	Serial number	UDINT	Device serial number
7	Get	Product Name	SHORT_STRING	SIMOCODE pro V EIP

Table 3- 96 Device_Status definitions for the Identity object

Bit (s)	Query	Definition
0	Ownership	0 = Not owned 1 = Device has an owner
	I/O communication is active	Always 0
2	Configured	0 = Device still in delivery state 1 = Configuration changed
3	Reserved	
4, 5, 6, 7	Extended device status	Not supported
8	Minor rectifiable fault/error	Not supported
9	Minor non-rectifiable fault/error	Not supported
10	Serious rectifiable fault/error	Serious problem with configuration such as module fault, configuring error, parameterization error, temporary components fault
11	Serious non-rectifiable fault/error	Serious device fault, e.g. basic unit hardware fault
12 - 15	Reserved	Always 0

Table 3- 97 **General services for the Identity object**

Service code	Available service		Service designation	Description
	Class	Instance		
0x01	No	Yes	Get_Attributes_All	Supplies contents of all attributes
0x0E	No	Yes	Get_Attribute_Single	Supplies contents of one attribute

Table 3- 98 Class attributes

Attribute ID	Access	Description	Data type
1	Get	Revision	UINT
2	Get	Max Instance	UINT
3	Get	Num of Instances	UINT

3.6.3 Message Router object

The Message Router object is defined by CIP. It does not possess any class or instance attributes, but simply transfers explicit messages to the relevant objects.

3.6.4 Assembly object

The following information applies to the Assembly object of the SIMOCODE pro V EtherNet/IP device:

- Class code: 0x04
- Class attributes: 1, 2, 3
- Number of instances: 13.

Instance 2: Output assembly basic overload from ODVA Profile

The tables below describe in each case the format of attribute 3 of the relevant assembly instance.

Byte	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
0	Reserved	Reserved	Reserved	Reserved	Reserved	Fault Reset	Reserved	Reserved

Instance 50: Input assembly basic overload from ODVA Profile

The table below describes the format of attribute 3:

Byte	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
0	Reserved	Reserved	Reserved	Reserved	Reserved	Reserved	Reserved	Faulted / Trip

Instance 51: Input assembly extended overload from ODVA Profile

The table below describes the format of attribute 3:

Byte	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
0	Reserved	Reserved	Reserved	Reserved	Reserved	Reserved	Warning	Faulted / Trip

Instance 100: Output assembly SIMOCODE basic type 1

The table below describes the format of attribute 3:

Byte	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
0	Cycl. receive byte 0 - bit 0.7	Cycl. receive byte 0 - bit 0.6	Cycl. receive byte 0 - bit 0.5	Cycl. receive byte 0 - bit 0.4	Cycl. receive byte 0 - bit 0.3	Cycl. receive byte 0 - bit 0.2	Cycl. receive byte 0 - bit 0.1	Cycl. receive byte 0 - bit 0.0
1	Cycl. receive byte 1 - bit 1.7	Cycl. receive byte 1 - bit 1.6	Cycl. receive byte 1 - bit 1.5	Cycl. receive byte 1 - bit 1.4	Cycl. receive byte 1 - bit 1.3	Cycl. receive byte 1 - bit 1.2	Cycl. receive byte 1 - bit 1.1	Cycl. receive byte 1 - bit 1.0
2 ... 3	Cycl. receive byte 2/3 - analog value 1							

The values passed to SIMOCODE pro via instance 100 can be processed further in the SIMOCODE ES (TIA Portal) software.

Corresponding function blocks in the SIMOCODE ES (TIA Portal) charts:

Default settings of cyclic receive and send data: See Assignment of cyclic receive and send data for predefined control functions (Page 130).

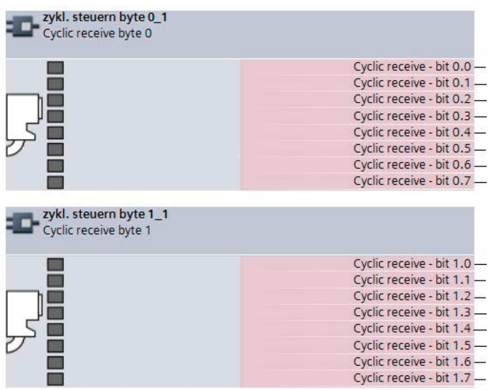
Instance 101: Output assembly SIMOCODE basic type 2

The table below describes the format of attribute 3:

Byte	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
0	Cycl. receive byte 0 - bit 0.7	Cycl. receive byte 0 - bit 0.6	Cycl. receive byte 0 - bit 0.5	Cycl. receive byte 0 - bit 0.4	Cycl. receive byte 0 - bit 0.3	Cycl. receive byte 0 - bit 0.2	Cycl. receive byte 0 - bit 0.1	Cycl. receive byte 0 - bit 0.0
1	Cycl. receive byte 1 - bit 1.7	Cycl. receive byte 1 - bit 1.6	Cycl. receive byte 1 - bit 1.5	Cycl. receive byte 1 - bit 1.4	Cycl. receive byte 1 - bit 1.3	Cycl. receive byte 1 - bit 1.2	Cycl. receive byte 1 - bit 1.1	Cycl. receive byte 1 - bit 1.0

The values passed to SIMOCODE pro via instance 101 can be processed further in the SIMOCODE ES (TIA Portal) software.

Corresponding function blocks in the SIMOCODE ES (TIA Portal) charts:



Default settings of cyclic receive and send data: See Assignment of cyclic receive and send data for predefined control functions (Page 130).

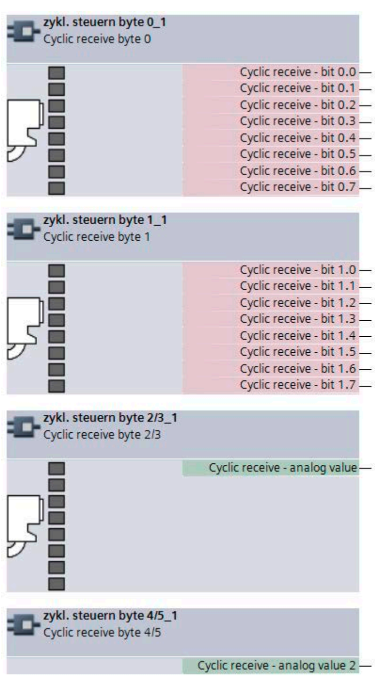
Instance 102: Output assembly SIMOCODE basic type 3

The table below describes the format of attribute 3:

Byte	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
0	Cycl. receive byte 0 - bit 0.7	Cycl. receive byte 0 - bit 0.6	Cycl. receive byte 0 - bit 0.5	Cycl. receive byte 0 - bit 0.4	Cycl. receive byte 0 - bit 0.3	Cycl. receive byte 0 - bit 0.2	Cycl. receive byte 0 - bit 0.1	Cycl. receive byte 0 - bit 0.0
1	Cycl. receive byte 1 - bit 1.7	Cycl. receive byte 1 - bit 1.6	Cycl. receive byte 1 - bit 1.5	Cycl. receive byte 1 - bit 1.4	Cycl. receive byte 1 - bit 1.3	Cycl. receive byte 1 - bit 1.2	Cycl. receive byte 1 - bit 1.1	Cycl. receive byte 1 - bit 1.0
2, 3	Cycl. receive byte 2/3 - analog value 1							
4, 5	Cycl. receive byte 4/5 - analog value 2							

The values passed to SIMOCODE pro via instance 102 can be processed further in the SIMOCODE ES (TIA Portal) software.

Corresponding function blocks in the SIMOCODE ES (TIA Portal) charts:



Default settings of cyclic receive and send data for predefined control functions: See Assignment of cyclic receive and send data for predefined control functions (Page 130).

Instance 120: Configuration assembly

Configuring of devices using a "Configuration assembly" is not supported by SIMOCODE. Devices are parameterized by means of the SIMOCODE ES (TIA Portal) parameterization software.

Integrating a SIMOCODE device as a "Generic Ethernet module" into the Rockwell Studio 5000 environment:

For this purpose, the "Configuration assembly" with the instance 120 and the length 0 must be specified as well:

Instance 150: Input assembly SIMOCODE basic type 1

The table below describes the format of attribute 3:

Byte	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
0	Cycl. send byte 0 - bit 0.7	Cycl. send byte 0 - bit 0.6	Cycl. send byte 0 - bit 0.5	Cycl. send byte 0 - bit 0.4	Cycl. send byte 0 - bit 0.3	Cycl. send byte 0 - bit 0.2	Cycl. send byte 0 - bit 0.1	Cycl. send byte 0 - bit 0.0
1	Cycl. send byte 1 - bit 1.7	Cycl. send byte 1 - bit 1.6	Cycl. send byte 1 - bit 1.5	Cycl. send byte 1 - bit 1.4	Cycl. send byte 1 - bit 1.3	Cycl. send byte 1 - bit 1.2	Cycl. send byte 1 - bit 1.1	Cycl. send byte 1 - bit 1.0
2 ... 3	Cycl. send byte 2/3 - analog value 1				Cycl. analog float input 1			
4 ... 5	Cycl. send byte 4/5 - analog value 2							
6 ... 7	Cycl. send byte 6/7 - analog value 3				Cycl. analog float input 2			
8 ... 9	Cycl. send byte 8/9 - analog value 4							

The bit and analog values signaled by SIMOCODE pro to the control system via instance 150 can be freely assigned in the SIMOCODE ES (TIA Portal) software.

Corresponding function blocks in the SIMOCODE ES (TIA Portal) charts:

Default settings of cyclic receive and send data: See Assignment of cyclic receive and send data for predefined control functions (Page 130).

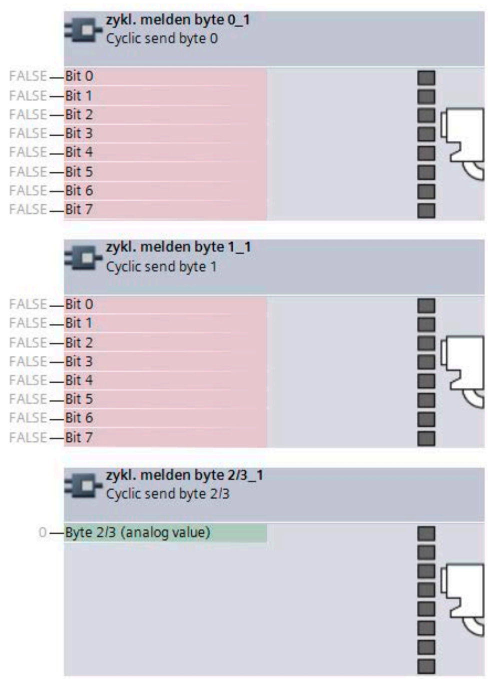
Instance 151: Input assembly SIMOCODE basic type 2

The table below describes the format of attribute 3:

Byte	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
0	Cycl. send byte 0 - bit 0.7	Cycl. send byte 0 - bit 0.6	Cycl. send byte 0 - bit 0.5	Cycl. send byte 0 - bit 0.4	Cycl. send byte 0 - bit 0.3	Cycl. send byte 0 - bit 0.2	Cycl. send byte 0 - bit 0.1	Cycl. send byte 0 - bit 0.0
1	Cycl. send byte 1 - bit 1.7	Cycl. send byte 1 - bit 1.6	Cycl. send byte 1 - bit 1.5	Cycl. send byte 1 - bit 1.4	Cycl. send byte 1 - bit 1.3	Cycl. send byte 1 - bit 1.2	Cycl. send byte 1 - bit 1.1	Cycl. send byte 1 - bit 1.0
2 ... 3	Cycl. send byte 2/3 - analog value 1							

The bit and analog values signaled by SIMOCODE pro to the control system via instance 151 can be freely assigned in the SIMOCODE ES (TIA Portal) software.

Corresponding function blocks in the SIMOCODE ES (TIA Portal) charts:



Default settings of cyclic receive and send data: See Assignment of cyclic receive and send data for predefined control functions (Page 130).

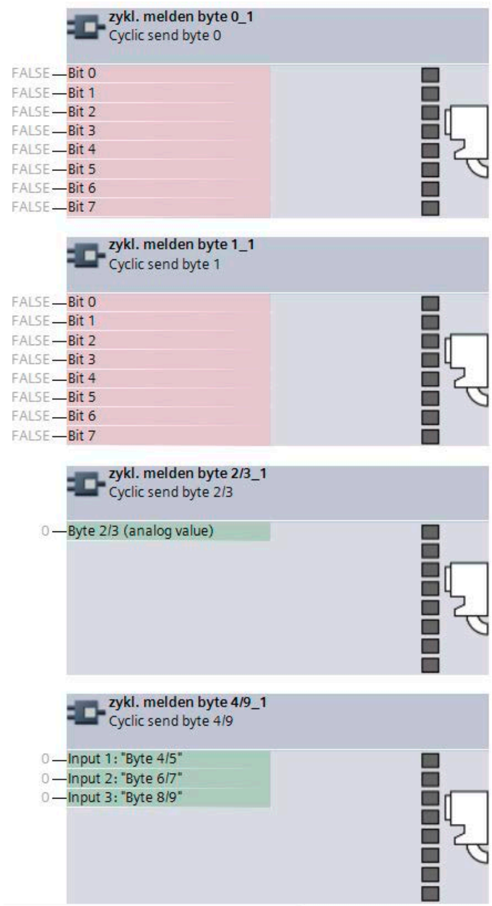
Instance 152: Input assembly SIMOCODE basic type 3

The table below describes the format of attribute 3:

Byte	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
0	Cycl. send byte 0 - bit 0.7	Cycl. send byte 0 - bit 0.6	Cycl. send byte 0 - bit 0.5	Cycl. send byte 0 - bit 0.4	Cycl. send byte 0 - bit 0.3	Cycl. send byte 0 - bit 0.2	Cycl. send byte 0 - bit 0.1	Cycl. send byte 0 - bit 0.0
1	Cycl. send byte 1 - bit 1.7	Cycl. send byte 1 - bit 1.6	Cycl. send byte 1 - bit 1.5	Cycl. send byte 1 - bit 1.4	Cycl. send byte 1 - bit 1.3	Cycl. send byte 1 - bit 1.2	Cycl. send byte 1 - bit 1.1	Cycl. send byte 1 - bit 1.0
2 ... 3	Cycl. send byte 2/3 - analog value 1				Cycl. analog float input 1			
4 ... 5	Cycl. send byte 4/5 - analog value 2							
6 ... 7	Cycl. send byte 6/7 - analog value 3				Cycl. analog float input 2			
8 ... 9	Cycl. send byte 8/9 - analog value 4							
10 ... 11	Cycl. send byte 8/9 - analog value 5				Cycl. analog float input 3			
12 ... 13	Cycl. send byte 8/9 - analog value 6							
14 ... 15	Cycl. send byte 8/9 - analog value 7				Cycl. analog float input 4			
16 ... 17	Cycl. send byte 8/9 - analog value 8							
18 ... 19	Cycl. send byte 8/9 - analog value 9							

The bit and analog values signaled by SIMOCODE pro to the control system via instance 152 can be freely assigned in the SIMOCODE ES (TIA Portal) software.

Corresponding function blocks in the SIMOCODE ES (TIA Portal) charts:



Default settings of cyclic receive and send data: See Assignment of cyclic receive and send data for predefined control functions (Page 130).

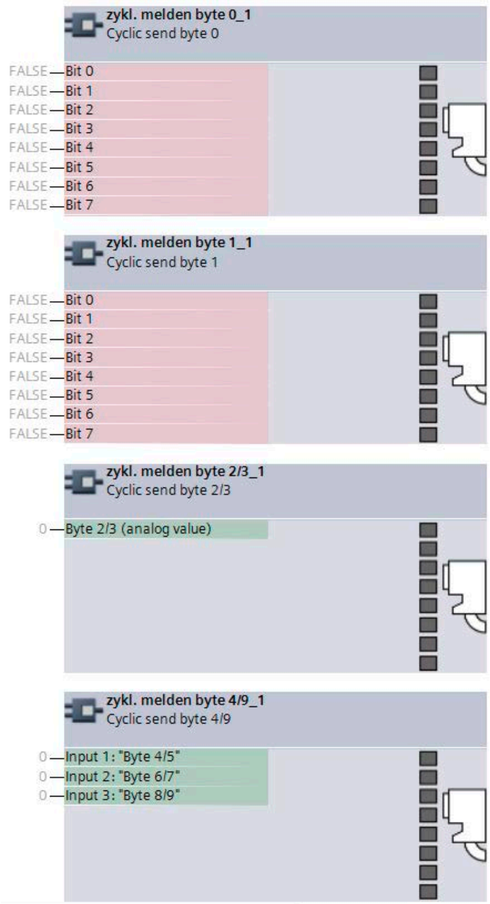
Instance 153: Input assembly SIMOCODE basic type 4

The table below describes the format of attribute 3:

Byte	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
0	Cycl. send byte 0 - bit 0.7	Cycl. send byte 0 - bit 0.6	Cycl. send byte 0 - bit 0.5	Cycl. send byte 0 - bit 0.4	Cycl. send byte 0 - bit 0.3	Cycl. send byte 0 - bit 0.2	Cycl. send byte 0 - bit 0.1	Cycl. send byte 0 - bit 0.0
1	Cycl. send byte 1 - bit 1.7	Cycl. send byte 1 - bit 1.6	Cycl. send byte 1 - bit 1.5	Cycl. send byte 1 - bit 1.4	Cycl. send byte 1 - bit 1.3	Cycl. send byte 1 - bit 1.2	Cycl. send byte 1 - bit 1.1	Cycl. send byte 1 - bit 1.0
2 ... 3	Cycl. send byte 2/3 - analog value 1				Cycl. analog float input 1			
4 ... 5	Cycl. send byte 4/5 - analog value 2							
6 ... 7	Cycl. send byte 6/7 - analog value 3				Cycl. analog float input 2			
8 ... 9	Cycl. send byte 8/9 - analog value 4							
10 ... 11	Cycl. send byte 8/9 - analog value 5				Cycl. analog float input 3			
12 ... 13	Cycl. send byte 8/9 - analog value 6							
14 ... 15	Cycl. send byte 8/9 - analog value 7				Cycl. analog float input 4			
16 ... 17	Cycl. send byte 8/9 - analog value 8							
18 ... 19	Cycl. send byte 8/9 - analog value 9							
20 ... 259	Data of the Measurement object: See Measurement object (Page 335).							
260 ... 487	Data of the Statistical Data object: See Statistical Data object (Page 337).							

The bit and analog values signaled by SIMOCODE pro to the control system via instance 153 can be freely assigned in the SIMOCODE ES (TIA Portal) software.

Corresponding function blocks in the SIMOCODE ES (TIA Portal) charts:



Default settings of cyclic receive and send data: See Assignment of cyclic receive and send data for predefined control functions (Page 130).

General services for the Assembly object

Service code	Available service		Service designation	Description
	Class	Instance		
0x0E	Yes	Yes	Get_Attribute_Single	Supplies contents of one attribute
0x10	No	Yes	Set_Attribute_Single	Changes an attribute value

Class attributes for the Assembly object

Attribute ID	Access	Description	Data type
1	Get	Revision	UINT
2	Get	Max Instance	UINT
3	Get	Num of Instances	UINT

3.6.5 Connection Manager object

The following information applies to the Connection Manager object of the SIMOCODE pro V EtherNet/IP device:

- Class code: 0x06
- Class attributes: 0
- Number of instances: 1

The instance attributes are defined according to Volume 1 of the CIP Specification.

All instance attributes that are defined as "required" in this specification are supported.

Table 3- 99 **General services for the Connection Manager object**

Service code	Available service		Service designation	Description
	Class	Instance		
0x0E	No	Yes	Get_Attribute_Single	Supplies contents of one attribute
0x10	No	Yes	Set_Attribute_Single	Changes an attribute value

3.6.6 Device Diagnosis object

The Device Diagnosis object supplies information about the current status of the device. This object contains details of all fault messages, warnings and events that relate to the relevant SIMOCODE device.

- Class code: 0x0096
- Class attributes: 0
- Number of instances: 1
- Object length: 46 bytes

Table 3- 100 **General services for the Device Diagnosis object**

Service code	Available service		Service designation	Description
	Class	Instance		
0x01	No	Yes	Get_Attributes_All	Supplies contents of all attributes
0x0E	No	Yes	Get_Attribute_Single	Supplies contents of one attribute

Table 3- 101 Attributes of instance 1 for the Diagnosis object

Attribute ID	Access	Designation	Data type
1	Get	Diagnostic bits	Byte[46]

Details of the meaning of individual diagnostic bits can be found in Chapter Data record 92 - Device diagnostics (Page 238).

Note

Functional Example of EtherNet/IP

A functional example of EtherNet/IP in the Industry Online Support provides this information as a preprogrammed, user-defined data type for the Rockwell Studio 5000 environment.

3.6.7 Measurement object

The Measurement object supplies the latest measurements of quantities such as current, voltage, output, cos phi, etc. of the SIMOCODE pro V EtherNet/IP device.

- Class code: 0x0097
- Class attributes: 0
- Number of instances: 1
- Object length: 240 bytes

Table 3- 102 **General services for the Measurement object**

Service code	Available service		Service designation	Description
	Class	Instance		
0x01	No	Yes	Get_Attributes_All	Supplies contents of all attributes
0x0E	No	Yes	Get_Attribute_Single	Supplies contents of one attribute

Table 3- 103 **Attributes of instance 1 for the Measurement object**

Attribute ID	Access	Designation	Data type	Range	Unit
1	Get	Thermal motor model	INT		See 2)
2	Get	Phase unbalance	SINT	0 .. 127	1 %
3	Get	Cos φ	SINT	0 .. 127	1 %
4..8	*Get*	*Reserved*	*INT[5]*		
9	Get	Max. current I_max	INT	0 .. 32767	1 % / I_s
10	Get	Current I_L1	INT	0 .. 32767	1 % / I_s
11	Get	Current I_L2	INT	0 .. 32767	1 % / I_s
12	Get	Current I_L3	INT	0 .. 32767	1 % / I_s
13	Get	Last trip current	INT	0 .. 32767	1 % / I_s
14	Get	Time to trip	DINT		100 ms 6)
15	Get	Recovery time	DINT		100 ms
16	Get	Voltage U_L1	INT	0 .. 32767	1 V
17	Get	Voltage U_L2	INT	0 .. 32767	1 V
18	Get	Voltage U_L3	INT	0 .. 32767	1 V
19	Get	AM1 - output	INT	0 .. 32767	See 1)
20	Get	AM1 - input	INT	0 .. 32767	
21	Get	AM1 - input 2	INT	0 .. 32767	
22	*Get*	*Reserved*	*INT*		
23	Get	TM1 - temperature	INT	0 .. 32767	1 K see 3)
24	Get	TM1 - temperature 1	INT	0 .. 32767	1 K see 3)
25	Get	TM1 - temperature 2	INT	0 .. 32767	1 K see 3)
26	Get	TM1 - temperature 3	INT	0 .. 32767	1 K see 3)
27	*Get*	*Reserved*	*INT*		

Attribute ID	Access	Designation	Data type	Range	Unit
28	Get	EM+ - ground fault current	DINT		1 mA
29	Get	EM+ - last trip current	DINT		1 mA
30	Get	Active power P	DINT	0..0x7FFFFFFF	1 W
31	Get	Apparent power S	DINT	0..0x7FFFFFFF	1 VA
32	*Get*	*Reserved*	*DINT*		
33..39	*Get*	*Reserved*	*DINT[7]*		
40..63	*Get*	*Reserved*	*INT[24]*		
64	Get	AM2 - output	INT	0 .. 32767	See 1)
65	Get	AM2 - input	INT	0 .. 32767	
66	Get	AM2 - input 2	INT	0 .. 32767	
67	*Get*	*Reserved*	*INT*		
68	Get	TM2 - temperature	INT	0 .. 32767	1 K see 3)
69	Get	TM2 - temperature 1	INT	0 .. 32767	1 K see 3)
70	Get	TM2 - temperature 2	INT	0 .. 32767	1 K see 3)
71	Get	TM2 - temperature 3	INT	0 .. 32767	1 K see 3)
72	Get	Frequency	INT	0 .. 32767	0.01 Hz
73	Get		INT		
74	*Get*	*Reserved*	*DINT*		
75	*Get*	*Reserved*	*DINT*		
76	*Get*	*Reserved*	*DINT*		
77	Get	Current I_max_A_F	REAL		1 A
78	Get	Current I_avg_A_F	REAL		1 A
79	Get	Current I_L1_A_F	REAL		1 A
80	Get	Current I_L2_A_F	REAL		1 A
81	Get	Current I_L3_A_F	REAL		1 A
82	Get	Active power P_F	REAL		1 W
83	Get	Apparent power S_F	REAL		1 VA
84	Get	Voltage UL1_F	REAL		1 V
85	Get	Voltage UL2_F	REAL		1 V
86	Get	Voltage UL3_F	REAL		1 V
87	Get	Cos phi_F	REAL		1
88	Get	Frequency_F	REAL		1 Hz
89..90	*Get*	*Reserved*	*REAL[2]*		

1) S7 format:

0/4 mA = 0

20 mA = 27648

2) Representation of the "Thermal motor model":

Value always refers to symm. Trip level, representation in 2 % increments in bits 6 ... 0 (range 0 to 254 %), bit 7 shows unbalance (fixed level 50 %).

3) Representation in Kelvin.

3.6.8 Statistical Data object

The Statistical Data object supplies the statistical data (such as operating hours, number of overload trips, number of starts, etc.) of the SIMOCODE pro V EtherNet/IP device.

- Class code: 0x0098
- Class attributes: 0
- Number of instances: 1
- Object length: 228 bytes

Table 3- 104 **General services for the Statistical Data object**

Service code	Available service		Service designation	Description
	Class	Instance		
0x01	No	Yes	Get_Attributes_All	Supplies contents of all attributes
0x0E	No	Yes	Get_Attribute_Single	Supplies contents of one attribute

Table 3- 105 **Attributes of instance 1 for the Statistical Data object**

Attribute ID	Access	Designation	Data type	Range	Unit
1	Get	Permissible starts - actual value	INT	0 - 255	
2	Get	DM-F - Time until test required	INT	0 - 255	1 week
3	Get	*Reserved*	*DINT*		
4	Get	Number of parameterizations	DINT	0 - 65535	
5	Get	Number of overload trips	DINT	0 - 65535	
6	Get	Int. number of overload trips	DINT	0 - 65535	
7	Get	Motor stop time	DINT	0 - 65535	1 h
8	Get	Timer 1 actual value	DINT	0 - 65535	100 ms
9	Get	Timer 2 actual value	DINT	0 - 65535	100 ms
10	Get	Timer 3 actual value	DINT	0 - 65535	100 ms
11	Get	Timer 4 actual value	DINT	0 - 65535	100 ms
12	Get	Counter 1 actual value	DINT	0 - 65535	
13	Get	Counter 2 actual value	DINT	0 - 65535	
14	Get	Counter 3 actual value	DINT	0 - 65535	
15	Get	Counter 4 actual value	DINT	0 - 65535	
16	Get	Calculation module 1 output	DINT	0 - 65535	
17	Get	Calculation module 2 output	DINT	0 - 65535	
18..19	Get	*Reserved*	*DINT[2]*		
20	Get	Motor operating hours	DINT	0..0x7FFFFFFF	1 s
21	Get	Int. Motor operating hours	DINT	0..0x7FFFFFFF	1 s
22	Get	Device operating hours	DINT	0..0x7FFFFFFF	1 s
23	Get	Number of starts	DINT	0..0x7FFFFFFF	
24	Get	Int. number of starts CW	DINT	0..0x7FFFFFFF	
25	Get	Int. number of starts CCW	DINT	0..0x7FFFFFFF	
26	Get	Energy W	DINT	0..0x7FFFFFFF	1 kWh
27	Get	Energy W_F	REAL		1 kWh
28	Get	*Reserved*	*DINT*		
29..34	Get	*Reserved*	*DINT[6]*		
35..50	Get	*Reserved*	*INT[16]*		
51	Get	Timer 5 actual value	DINT	0 - 65535	100 ms
52	Get	Timer 6 actual value	DINT	0 - 65535	100 ms
53	Get	Counter 5 actual value	DINT	0 - 65535	
54	Get	Counter 6 actual value	DINT	0 - 65535	
55	Get	Analog arithmetic 1 output	DINT	0 - 65535	
56	Get	Analog arithmetic 2 output	DINT	0 - 65535	
57	Get	Analog multiplexer output	DINT	0 - 65535	
58..66	Get	*Reserved*	*DINT[9]*		

3.6.9 Motor Parameter object

Selected device parameters of the SIMOCODE pro V EtherNet/IP device can be read or written via the Motor Parameter object. This allows the device parameters to be adjusted via the controller or a connected control system.

- Class code: 0x0099
- Class attributes: 0
- Number of instances: 1
- Object length: 116 bytes

Table 3- 106 **General services for the Motor Parameter object**

Service code	Available service		Service designation	Description
	Class	Instance		
0x0E	No	Yes	Get_Attribute_Single	Supplies contents of one attribute
0x10	No	Yes	Set_Attribute_Single	Changes an attribute value

Table 3- 107 **Attributes of instance 1 for the Motor Parameter object**

Attribute ID	Access	Designation	Data type	Range of values	Unit
1	Get/ Set	Motor protection - set current Is1	LINT	1)	10 mA
2	Get/ Set	Motor protection - set current Is2	LINT	1)	10 mA
3	Get/ Set	Motor protection - class	SINT	5, 7, 10, 15, 20, 25, 30, 35, 40	
4	*Get*	*Reserved*	*SINT*		
5	*Get*	*Reserved*	*INT*		
6	Get/ Set	Trip level I>	INT	0 .. 255	4% / I_s
7	Get/ Set	Warning level I>	INT	0 .. 255	4% / I_s
8	Get/ Set	Trip level I<	INT	0 .. 255	4% / I_s
9	Get/ Set	Warning level I<	INT	0 .. 255	4% / I_s
10	Get/ Set	Stalled rotor level	INT	0 .. 255	4% / I_s
11	Get/ Set	Trip level U<	INT	0 .. 255	8 V
12	Get/ Set	Warning level U<	INT	0 .. 255	8 V
13	Get/ Set	Trip level cos phi<	SINT	0 .. 100	1 %
14	Get/ Set	Warning level cos phi<	SINT	0 .. 100	1 %
15	Get/ Set	Trip level P>	DINT	0..0xFFFFFFFF	1 W
16	Get/ Set	Warning level P>	DINT	0..0xFFFFFFFF	1 W
17	Get/ Set	Trip level P<	DINT	0..0xFFFFFFFF	1 W
18	Get/ Set	Warning level P<	DINT	0..0xFFFFFFFF	1 W
19	Get/ Set	EM+ - trip level	DINT	30 .. 40000	1 mA
20	Get/ Set	EM+ - warning level	DINT	30 .. 40000	1 mA
21	Get/ Set	TM1 - trip level T>	DINT	0 .. 65535	1 K
22	Get/ Set	TM1 - warning level T>	DINT	0 .. 65535	1 K
23	Get/ Set	TM2 - trip level T>	DINT	0 .. 65535	1 K
24	Get/ Set	TM2 - warning level T>	DINT	0 .. 65535	1 K
25	Get/ Set	Trip level 0/4-20 mA> 1	INT	0 .. 255	*128
26	Get/ Set	Warning level 0/4-20 mA> 1	INT	0 .. 255	*128
27	Get/ Set	Trip level 0/4-20 mA< 1	INT	0 .. 255	*128
28	Get/ Set	Warning level 0/4-20 mA< 1	INT	0 .. 255	*128
29	Get/ Set	Trip level 0/4-20 mA> 2	INT	0 .. 255	*128
30	Get/ Set	Warning level 0/4-20 mA> 2	INT	0 .. 255	*128
31	Get/ Set	Trip level 0/4-20 mA< 2	INT	0 .. 255	*128
32	Get/ Set	Warning level 0/4-20 mA< 2	INT	0 .. 255	*128
33	Get/ Set	Limit level 1	DINT	0 .. 65535	
34	Get/ Set	Limit level 2	DINT	0 .. 65535	
35	Get/ Set	Limit level 3	DINT	0 .. 65535	
36	Get/ Set	Limit level 4	DINT	0 .. 65535	
37	Get/ Set	Limit level 5	DINT	0 .. 65535	
38	Get/ Set	Limit level 6	DINT	0 .. 65535	

1) Value range dependent on current range of the IM / UM and the conversion factor

3.6.10 TCP/IP Interface object

The TCP/IP Interface object provides the mechanism for configuring the TCP/IP network interface of the SIMOCODE pro V EtherNet/IP device.

The configured elements include, for example, the IP address, the network mask, the gateway address and the host name of the device.

- Class code: 0x00F5
- Class attributes: 1, 2, 3
- Number of instances: 1

The instance attributes are defined according to Volume 2 of the CIP Specification. All instance attributes that are defined as "required" in this specification are supported.

Table 3- 108 **General services for the TCP/IP Interface object**

Attribute ID	Available service		Service designation	Description
	Class	Service		
0x01	No	Yes	Get_Attributes_All	Supplies contents of all attributes
0x0E	No	Yes	Get_Attribute_Single	Supplies contents of one attribute
0x10	No	Yes	Set_Attribute_Single	Changes an attribute value

Table 3- 109 Class attributes

Attribute ID	Service	Data type	Name
1	Get	UINT	Revision
2	Get	UINT	Max Instance
3	Get	UINT	Num of Instances

3.6.11 Ethernet Link object

The Ethernet Link object stores link-specific counters and status information for an IEEE 802.3 communication interface.

- Class code: 0x00F6
- Class attributes: 0
- Number of instances: 3

The instance attributes are defined according to Volume 2 of the CIP Specification.

All instance attributes that are defined as "required" in this specification are supported.

Table 3- 110 **General services for the EtherNet Link object**

Attribute ID	Available service		Service designation	Description
	Class	Service		
0x01	No	Yes	Get_Attributes_All	Supplies contents of all attributes
0x0E	No	Yes	Get_Attributes_Single	Supplies contents of one attribute
0x10	No	Yes	Set_Attributes_Single	Changes an attribute value
0x4C	No	Yes	Get_and_Clear	Receive attribute and set to 0

List of abbreviations

A

A.1 List of abbreviations

See SIMOCODE pro – System Manual (https://support.industry.siemens.com/cs/ww/en/view/109743957).

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"

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