

Industrial Controls

Soft starters and solid-state switching devices SIRIUS 3RW5 Modbus communication module

Equipment Manual

Siemens Industry Online Support	1
Safety information	2
Description	3
Mounting and dismantling	4
Connecting	5
Configuring	6
Messages and diagnostics	7
Maintenance and service	8
Technical data	9
Dimension drawings	10
Circuit diagrams	11
Appendix	A

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.

NOTICE

indicates that property damage can result if proper precautions are not taken.

If more than one degree of danger is present, the warning notice representing the highest degree of danger will be used. A notice warning of injury to persons with a safety alert symbol may also include a warning relating to property damage.

Qualified Personnel

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.

Proper use of Siemens products

Note the following:

WARNING

Siemens products may only be used for the applications described in the catalog and in the relevant technical documentation. If products and components from other manufacturers are used, these must be recommended or approved by Siemens. Proper transport, storage, installation, assembly, commissioning, operation and maintenance are required to ensure that the products operate safely and without any problems. The permissible ambient conditions must be complied with. The information in the relevant documentation must be observed.

Trademarks

All names identified by ® are registered trademarks of Siemens AG. The remaining trademarks in this publication may be trademarks whose use by third parties for their own purposes could violate the rights of the owner.

Disclaimer of Liability

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.

Table of contents

1	Siemens Industry Online Support	7
1.1	Support Request	9
1.2	Additional documentation	10
2	Safety information	13
2.1	Security information	13
2.2	ESD Guidelines.....	14
2.3	Data security in automation	16
2.4	Recycling and disposal	18
3	Description.....	19
3.1	History	21
3.2	Hardware configuration.....	22
3.3	Functions of the 3RW5 Modbus communication module	24
3.3.1	Modbus TCP	24
3.3.2	Modbus RTU	25
3.3.3	Assignment of data to Modbus addresses.....	26
3.4	Connection monitoring	27
3.5	Telegram structure	28
3.5.1	Telegram structure Modbus TCP	28
3.5.2	Modbus RTU telegram format	29
3.6	Access options for the 3RW5 soft starter	30
3.7	Operating modes and master control function.....	32
3.7.1	Operating modes	32
3.7.2	Sets the operating mode.....	35
3.7.3	Control via digital input.....	39
3.8	Bus connection cable and bus connector	41
3.8.1	Bus connection cable and bus connector for Modbus TCP	41
3.8.2	Bus connection cable for Modbus RTU	41
3.9	Accessories.....	42
3.9.1	SIRIUS Soft Starter ES (TIA Portal)	42
3.9.2	Use on the 3RW50 soft starter	44
4	Mounting and dismantling	45
4.1	Installing the 3RW5 communication module in the 3RW5 soft starter	45
4.1.1	Break out the cover of the slot	46
4.1.2	Mount the 3RW5 communication module in the slot of the 3RW5 Soft Starter.....	48
4.2	Removing the 3RW5 communication module from the 3RW5 soft starter	49
4.3	Installing the 3RW5 communication module on a level surface	51
4.4	Removing the 3RW5 communication module from a level surface	53

5	Connecting	55
5.1	COM connecting cable.....	55
5.1.1	Connecting the COM connecting cable to the 3RW50 soft starter.....	55
5.1.2	Connecting the COM connecting cable to the 3RW5 communication module.....	57
5.1.3	Removing the COM connecting cable on the 3RW5 communication module.....	59
5.1.4	Remove the COM connecting cable on the 3RW50 soft starter.....	60
5.2	Fieldbus.....	61
5.2.1	3RW5 Modbus TCP communication module.....	61
5.2.1.1	Connecting the bus connector	61
5.2.1.2	Removing the bus connector	63
5.2.2	3RW5 Modbus RTU communication module.....	64
5.2.2.1	Connecting the bus connection cable.....	64
5.2.2.2	Removing the bus connection cable.....	67
6	Configuring	69
6.1	Configuring the 3RW5 Soft Starter in the Modbus TCP system.....	69
6.2	Configuring the 3RW5 soft starter in the Modbus RTU system.....	71
6.3	Configuring the 3RW5 Soft Starter	73
6.3.1	Configuring the 3RW5 soft starter in the Modbus TCP system	73
6.3.1.1	Configuring 3RW5 soft starters without assistance from a 3RW5 HMI High Feature	73
6.3.1.2	Configuring 3RW5 soft starters with the aid of a 3RW5 HMI High Feature.....	75
6.3.1.3	IP parameters.....	77
6.3.2	Configuring the 3RW5 soft starter in the Modbus RTU system.....	78
6.3.2.1	Configuring 3RW5 soft starters without help from a 3RW5 HMI	78
6.3.2.2	Configuring 3RW5 soft starters with the aid of a 3RW5 HMI.....	80
6.3.2.3	Station address	82
6.3.2.4	Setting station address via 3RW5 HMI Standard	83
6.3.2.5	Port configuration and baud rate.....	84
6.3.2.6	Silent interval time.....	86
6.3.3	Access monitoring time	87
6.4	Operation on failure of the bus connection to the controller	88
6.4.1	3RW50 and 3RW52 Soft Starters	88
6.4.2	3RW55 and 3RW55 Failsafe Soft Starters	89
7	Messages and diagnostics	93
7.1	LED display	94
7.1.1	Device LEDs on the 3RW5 Modbus communication modules	94
7.1.2	Status and error displays	95
7.1.2.1	Status and error displays on the 3RW5 Modbus TCP communication module.....	95
7.1.2.2	Status and error displays on the 3RW5 Modbus RTU communication module	97
7.2	Function Codes	98
7.2.1	Function Codes 01 (Read Coils) and 02 (Read Discrete Inputs)	100
7.2.2	Function Codes 03 (Read Holding Registers) and 04 (Read Input Registers).....	101
7.2.3	Function Code 05 (Write Single Coil).....	103
7.2.4	Function Code 06 (Write Single Register)	105
7.2.5	Function Code 15 (Write Multiple Coils)	106
7.2.6	Function Code 16 (Write Multiple Registers)	108
7.2.7	Function Code 23 (Read/Write Multiple Registers)	110

7.3	Exception Codes	112
7.3.1	Error Responses	112
7.3.2	Supported Exception Codes	113
7.4	Errors and remedial measures on the 3RW5 communication module	114
7.5	Messages about the mode	115
8	Maintenance and service	117
8.1	Firmware update	117
8.1.1	Performing firmware update with micro SD card (3RW5 HMI High Feature)	119
8.2	Replacing the 3RW5 communication module	120
8.3	Restoring factory settings	122
9	Technical data	125
9.1	Technical data in Siemens Industry Online Support	125
10	Dimension drawings	127
10.1	Cx data	127
10.2	Drilling patterns for 3RW5 communication module on the 3RW50 soft starter	128
11	Circuit diagrams	131
11.1	Cx data	131
A	Appendix	133
A.1	Data formats	133
A.1.1	Current values as percentages	133
A.1.2	Statistic data	134
A.1.3	Maximum pointer	135
A.2	Data tables	136
A.2.1	Byte arrangement	136
A.2.2	Specifications	137
A.2.3	Memory image	138
A.2.4	Node flash test	140
A.2.5	I&M0 - device identification (3RW5 communication module)	141
A.2.6	I&M0 - device identification (3RW5 soft starter)	142
A.2.7	I&M1 - equipment identifier (3RW5 soft starter)	143
A.2.8	I&M2 - installation (3RW5 soft starter)	144
A.2.9	I&M3 - description (3RW5 soft starter)	145
A.2.10	I&M0 - device identification (3RW5 HMI High Feature)	146
A.2.11	Energy management	147
A.2.12	Process image input (PII)	148
A.2.13	Process image output (PIQ)	150
A.2.14	Soft starter diagnostics	152
A.2.15	Measured values	158
A.2.16	Statistic data	160
A.2.17	Maximum pointer	162
A.2.18	Parameters	164
A.2.19	Modbus TCP communication parameters	176
A.2.20	Modbus RTU communication parameters	177
A.2.21	HMI diagnostics	179
A.2.22	HMI parameters	180

Glossary 181

Index 183

Siemens Industry Online Support

Information and service

At Siemens Industry Online Support you can obtain up-to-date information from our global support database:

- Product support
- Application examples
- Forum
- mySupport

Link: Siemens Industry Online Support (<https://support.industry.siemens.com/cs/ww/en/>)

Product support

You can find information and comprehensive know-how covering all aspects of your product here:

- **FAQs**

Answers to frequently asked questions

- **Manuals/operating instructions**

Read online or download, available as PDF or individually configurable.

- **Certificates**

Clearly sorted according to approving authority, type and country.

- **Characteristics**

For support in planning and configuring your system.

- **Product announcements**

The latest information and news concerning our products.

- **Downloads**

Here you will find updates, service packs, HSPs and much more for your product.

- **Application examples**

Function blocks, background and system descriptions, performance statements, demonstration systems, and application examples, clearly explained and represented.

- **Technical data**

Technical product data for support in planning and implementing your project

Link: Product support (<https://support.industry.siemens.com/cs/ww/en/ps>)

mySupport

The following functions are available in your personal work area "mySupport":

- **Support Request**
Search for request number, product or subject
- **My filters**
With filters, you limit the content of the online support to different focal points.
- **My favorites**
With favorites you bookmark articles and products that you need frequently.
- **My notifications**
Your personal mailbox for exchanging information and managing your contacts. You can compile your own individual newsletter in the "Notifications" section.
- **My products**
With product lists you can virtually map your control cabinet, your system or your entire automation project.
- **My documentation**
Configure your individual documentation from different manuals.
- **CAX data**
Easy access to CAX data, e.g. 3D models, 2D dimension drawings, EPLAN macros, device circuit diagrams
- **My IBase registrations**
Register your Siemens products, systems and software.

Siemens Industry Online Support app

The Siemens Industry Online Support app provides you access to all the device-specific information available on the Siemens Industry Online Support portal for a particular article number, such as operating instructions, manuals, data sheets, FAQs etc.

Die Siemens Industry Online Support app is available for Android and iOS:



Android



iOS

1.1 Support Request

Use the Support Request online form to send your question directly to Technical Support:

Support Request:	Internet (https://support.industry.siemens.com/My/ww/en/requests)
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1.2 Additional documentation

Manuals / online help

At this point, you will find further manuals and online help that may be of interest to you for your automation system. They are available to download from the Internet free of charge. You can create your own individual system documentation in mySupport.

- 3RW5 topic page (<https://support.industry.siemens.com/cs/ww/en/view/109747404>)
- Equipment Manual for the 3RW50 soft starter (<https://support.industry.siemens.com/cs/ww/en/view/109753750>)
- Equipment Manual for the 3RW52 soft starter (<https://support.industry.siemens.com/cs/ww/en/view/109753751>)
- Equipment Manual for the 3RW55 and 3RW55 Failsafe soft starters (<https://support.industry.siemens.com/cs/ww/en/view/109753752>)
- Equipment Manuals for the 3RW5 soft starter (<https://support.industry.siemens.com/cs/ww/en/ps/16212/man>)
- Equipment Manual for the 3RW5 Modbus communication modules (<https://support.industry.siemens.com/cs/ww/en/view/109753755>)
- Equipment Manual for the 3RW5 PROFINET communication modules (<https://support.industry.siemens.com/cs/ww/en/view/109753754>)
- Manual for the 3RW5 PROFIBUS communication module (<https://support.industry.siemens.com/cs/ww/en/view/109753753>)
- Equipment Manual for the 3RW5 EtherNet/IP communication module (<https://support.industry.siemens.com/cs/ww/en/view/109758201>)
- "System Software for S7-300/400, System and Standard Functions" reference manual (<https://support.industry.siemens.com/cs/ww/en/view/1214574>)
- Online help for SIRIUS Soft Starter ES (TIA Portal)
- Online help for STEP 7
- The EMC Directive 2014/30/EU in practice (<http://www.siemens.com/emc-guideline>)
- Industrial Control Panels and Electronic Equipment of Industrial Machinery for North America (<http://www.siemens.com/UL508A>)
- Control Panels compliant with IEC Standards and European Directives (<http://www.siemens.com/iec60204>)

Interesting links

- Manuals in Siemens Industry Online Support
(<https://support.industry.siemens.com/cs/ww/en/ps/man>)
- FAQs on 3RW5 Soft Starters
(<https://support.industry.siemens.com/cs/ww/en/ps/16212/faq>)
- Downloads for 3RW5 Soft Starters
(<https://support.industry.siemens.com/cs/ww/en/ps/16212/dl>)
- Catalog IC 10 (<https://support.industry.siemens.com/cs/ww/en/view/109747945>)
- Product support for STEP 7 (TIA Portal)
(<https://support.industry.siemens.com/cs/ww/en/ps/14672>)
- FAQ "How do you program and assign parameters to the Modbus/TCP communication between S7-1500 CPU and S7-1200 CPU?"
(<https://support.industry.siemens.com/cs/ww/en/view/102020340>)
- FAQ "How are the memory areas in the SIMATIC S7-1200/S7-1500 and in the Modbus device addressed during Modbus/TCP data exchange?"
(<https://support.industry.siemens.com/cs/ww/en/view/100633819>)
- FAQ "Which hardware and software components do you need to establish communication between SIMATIC S7 stations and third-party devices using the MODBUS RTU protocol?"
(<https://support.industry.siemens.com/cs/ww/en/view/58386780>)
- Premium Efficiency - Efficiency class IE3
(<http://w3.siemens.com/mcms/topics/en/application-consulting/ie3ready/Pages/Default.aspx>)

Safety information

2.1 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 constitute one element of such a concept.

Customers are responsible for preventing unauthorized access to their plants, systems, machines and networks. Such systems, machines and components should only be connected to an enterprise network or the internet if and to the extent such a connection is necessary and only when appropriate security measures (e.g. firewalls and/or network segmentation) are in place.

For additional information on industrial security measures that may be implemented, please visit

<https://www.siemens.com/industrialsecurity>

Siemens' products and solutions undergo continuous development to make them more secure. Siemens strongly recommends that product updates are applied as soon as they are available and that the latest product versions are used. Use of product versions that are no longer supported, and failure to apply the 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>

2.2 ESD Guidelines

ESD

All electronic devices are equipped with large-scale integrated ICs or components. Due to their design, these electronic elements are highly sensitive to overvoltage, and thus to any electrostatic discharge.

The acronym ESD has become the established designation for such electrostatic sensitive components/devices. This is also the international abbreviation for such devices.

ESD devices are identified by the following symbol:

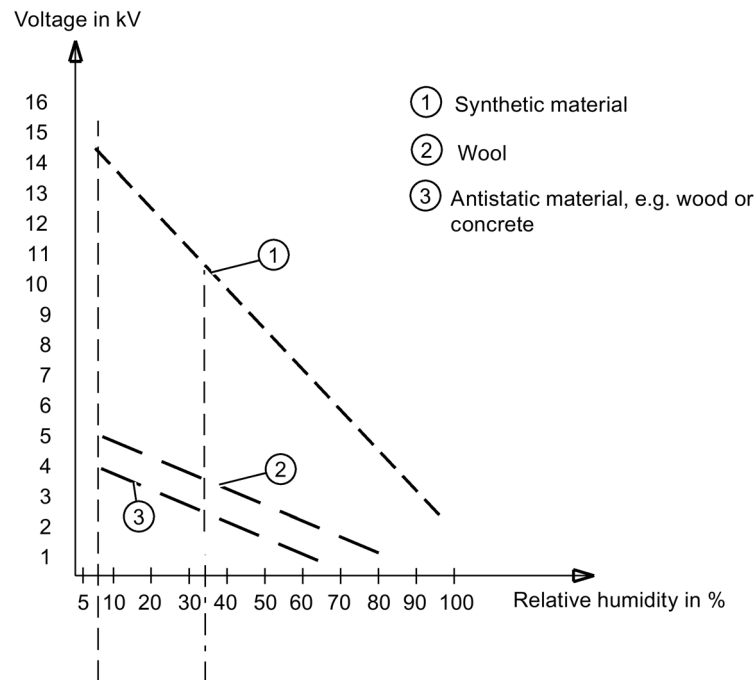


NOTICE
Electrostatic discharge ESD devices can be destroyed by voltages well below the threshold of human perception. These static voltages develop when you touch a component or electrical connection of a device without having drained the static charges present on your body. The damage caused to a device by overvoltage is usually not immediately evident and is only noticed after an extended period of operation.

Electrostatic charging

Anyone who is not connected to the electrical potential of their surroundings can be electrostatically charged.

The diagram below shows the maximum electrostatic voltage which may build up on a person coming into contact with the materials specified in the diagram. These values correspond to IEC 801-2 specifications.



Basic protective measures against electrostatic discharge

- Make sure the grounding is good:

When handling electrostatic sensitive devices, ensure that your body, the workplace and packaging are grounded. In this way, you can avoid becoming electrostatically charged.

- Avoid direct contact:

As a general rule, only touch electrostatic sensitive devices when this is unavoidable (e.g. during maintenance work). Handle the devices without touching any chip pins or PCB traces. In this way, the discharged energy cannot reach or damage sensitive devices.

Discharge your body before taking any necessary measurements on a device. Do so by touching grounded metallic parts. Use only grounded measuring instruments.

2.3 Data security in automation

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.

VDI guidelines on information security in industrial automation

The VDI/VDE Association of German Engineers "Measurement and Automation" has published a guideline for implementation of a security architecture in the industrial environment in the VDI guideline "VDI/VDE 2182 Sheet 1, IT Security for Industrial Automation - General Model". You will find the guideline under "VDI Standards" on the VDI home page (<https://www.vdi.de/richtlinien>).

2.4 Recycling and disposal

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

Description

You can equip SIRIUS soft starters of the 3RW5 series with an optional 3RW5 communication module and therefore also with network functionality. Using the 3RW5 communication module, you integrate the 3RW5 soft starters into the associated network environment with their complete functionality.

The 3RW5 soft starters can be equipped with a slot for fitting the 3RW5 communication modules. If the 3RW5 soft starter does not feature a slot, install the 3RW5 communication module next to the 3RW5 soft starter on a level surface, e.g. a mounting plate.

Preconditions for using the 3RW5 communication modules on the 3RW5 soft starter

Note

3RW5 Modbus TCP communication module

The 3RW5 Modbus TCP communication module is supported by the following 3RW5 soft starters:

- 3RW50 soft starter¹⁾
- 3RW52 soft starter
- 3RW55 soft starter
- 3RW55 Failsafe soft starter¹⁾

The 3RW5 Modbus TCP communication module is supported by the 3RW5 HMI High Feature.

A history of the firmware versions with new features can be found in the downloads on the 3RW5 topic page (<https://support.industry.siemens.com/cs/ww/en/view/109747404>).

¹⁾ 3RW5 Modbus TCP communication module from firmware version V1.1.

Note

3RW5 Modbus RTU communication module

The 3RW5 Modbus RTU communication module is supported by the following 3RW5 soft starters:

- 3RW50 soft starter
- 3RW52 soft starter from firmware version V2.0
- 3RW55 soft starter from firmware version V2.0
- 3RW55 soft starter Failsafe

From firmware version V2.0, the 3RW5 Modbus RTU communication module is supported by the 3RW5 HMI High Feature.

A history of the firmware versions with new features can be found in the downloads on the 3RW5 topic page (<https://support.industry.siemens.com/cs/ww/en/view/109747404>).

When operating in an automation system:

- Programmable logic controller (PLC), e.g. SIMATIC S7-1500, or a PC as the Modbus TCP client or Modbus RTU master
- For use with a PLC: PC or programming device with the configuration software of the controller installed, e.g. STEP 7
- Parameterization software (optional), e.g. SIRIUS Soft Starter ES (TIA Portal) (Page 42) (only possible via local interface on the 3RW5 HMI High Feature)

Note

Full functional scope

In order to be able to use 3RW5 soft starters without any difficulties and with their full range of functions, ensure that you have the latest firmware and software updates:

- 3RW5 soft starter, 3RW5 communication module, 3RW5 HMI High Feature
- SIRIUS Soft Starter ES (TIA Portal)

You will find current downloads and a history of the versions with new features on the 3RW5 topic page (<https://support.industry.siemens.com/cs/ww/en/view/109747404>).

Basic knowledge of the following areas:

- General electrical engineering
- Drive technology
- Automation technology
- Handling the automation system and the software used

Target group

The manual is intended for everyone involved in the following tasks:

- Planning and configuring systems
- Installation
- Commissioning
- Service and maintenance

3.1 History

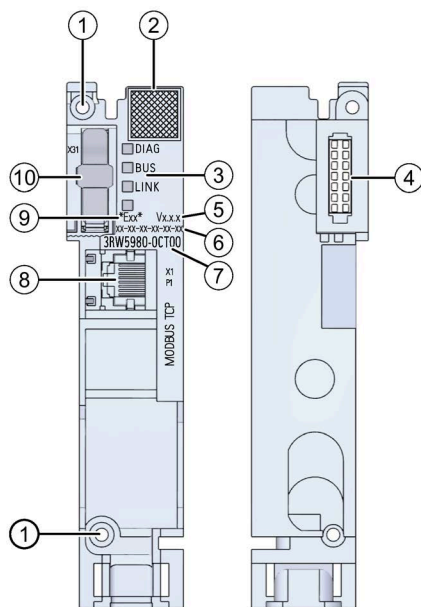
Release number	New features
03/2018	• Initial release
02/2019	• Revision of the manual • Supplementary functions for the 3RW5 Modbus TCP communication module • 3RW5 Modbus RTU communication module
03/2020	• Revision of the manual • Supplementing the contents for the 3RW50 and 3RW55 Failsafe soft starters

3.2 Hardware configuration

Article number

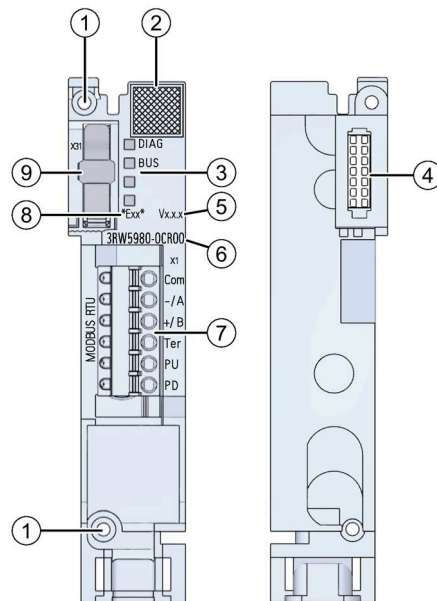
3RW5 Modbus communication module	Article number
Modbus TCP	3RW5980-OCT00
Modbus RTU	3RW5980-OCR00

3RW5 Modbus TCP communication module



- ① Fastening holes
- ② Data Matrix Code
- ③ LED display
- ④ Plug-in connection to the 3RW5 soft starter
- ⑤ Firmware version of the 3RW5 communication module as delivered
- ⑥ MAC address
- ⑦ Article number
- ⑧ Fieldbus connection (RJ45 socket)
- ⑨ Product version
- ⑩ Plug-in connection to the 3RW5 soft starter with cover cap

3RW5 Modbus RTU communication module



- ① Fastening holes
- ② Data Matrix Code
- ③ LED display
- ④ Plug-in connection to the 3RW5 soft starter
- ⑤ Firmware version of the 3RW5 communication module as delivered
- ⑥ Article number
- ⑦ Fieldbus connection (6-pin terminal connection)
- ⑧ Product version
- ⑨ Plug-in connection to the 3RW5 soft starter with cover cap

3.3 Functions of the 3RW5 Modbus communication module

3.3.1 Modbus TCP

Modbus TCP is a bus system according to the standard IEC 61784-2 CPF 15/1 with the transmission protocol Modbus. Modbus TCP is based on a client/server architecture.

As the client, the controller has the initiative in data transmission and transmits requests to the server. The requests contain the Function Code and additional data. A server cannot transmit information to the client autonomously. The 3RW5 soft starter works as the server and can only respond to the requests of the client. The 3RW5 soft starter supplies the relevant feedback messages to the bits and registers retrieved by the client or takes over the bits and registers written by the client into the internal memory. No requests can be transferred from server to server.

The server processes the requests of the client and answers within a certain time with one of the following acknowledgments:

- Requested data
- Error code (Exception Code)

You can find more information about the telegram structure in chapter Telegram structure Modbus TCP (Page 28).

3.3.2 Modbus RTU

Modbus RTU (Remote Terminal Unit) is a bus system with the Modbus transmission protocol. Modbus RTU is based on a master/slave architecture and transmits data serially.

As the master, the controller has the initiative in data transmission and transmits requests to the slaves. The requests contain the Function Code and additional data. A slave cannot transfer any information autonomously to the master. The 3RW5 soft starter works as the slave and can only respond to the requests of the master. The 3RW5 soft starter supplies the relevant feedback messages to the bits and registers retrieved by the master or takes over the bits and registers written by the master into the internal memory. Requests cannot be transferred between slaves.

The slave processes the requests of the master and answers within a certain time with one of the following acknowledgments:

- Requested data
- Error code (Exception Code)

You can find more information about the telegram structure in chapter Modbus RTU telegram format (Page 29).

Broadcast

The slave address "0" is reserved for broadcasting. In a broadcast telegram, the master transmits a request with a write function to all slaves that are subordinate to the master. The 3RW5 soft starter processes the master's request as a slave, but does not respond to the broadcast telegram.

Port configuration and communication speed

The 3RW5 Modbus RTU communication module supports different port configurations and baud rates up to 115.2 kbit/s.

You will find the supported port configuration and baud rates in chapter Modbus RTU communication parameters (Page 177). You will find the setting options in chapter Port configuration and baud rate (Page 84).

3.3.3 Assignment of data to Modbus addresses

All data of the 3RW5 soft starter are available in datasets or in the process image.

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
Readable and writable bits	Coils
Read-only data sets and words (16-bit)	Input Registers
Read/write data sets and words	Holding Registers

1 Coil / Discrete Input corresponds to 1 bit.

1 Register corresponds to 1 word (2 bytes).

You can find more information about access to the memory areas in chapter Function Codes (Page 98).

3.4 Connection monitoring

Connection monitoring function - "TCP keep-alive monitoring"

To avoid blocking the communication connection permanently if the communication partner fails, Modbus TCP provides the "TCP keep-alive monitoring" function for monitoring the connection.

The following parameters can be permanently set for this purpose:

- Keep-alive time: 300 s
- Keep-alive maximum attempts: 1
- Keep-alive interval: 75 s

If no TCP data transmission is detected within 375 seconds, the "TCP keep-alive monitoring" function signals connection broken and ends the communication connection automatically. On a broken connection, the 3RW5 soft starter responds in accordance with the behavior described in chapter Operation on failure of the bus connection to the controller (Page 88) (Parameter "Response to CPU/Master Stop").

Connection monitoring function - Access monitoring of the control source

An independent connection monitoring function monitors access by the authorized Modbus TCP client or the Modbus RTU master within the access monitoring time. In the case of Modbus TCP, only the Modbus TCP client, which is the first to set up a communication connection to the server, is authorized for this access.

An access (write or read) of the Modbus TCP client to the server or of the Modbus RTU master to the slave (e.g. process image outputs (PIQ), parameters) must be repeated regularly. If the write or read process is not repeated for the duration of the access monitoring time, the 3RW5 soft starter interprets this condition as a broken connection to the Modbus TCP client or Modbus RTU master. The 3RW5 soft starter responds in accordance with the behavior described in chapter Operation on failure of the bus connection to the controller (Page 88) (Parameter "Response to CPU/Master Stop").

Note

3RW5 Modbus TCP communication module with a firmware version lower than V1.1

With a 3RW5 Modbus TCP communication module with a firmware version lower than V1.1, a write access by the Modbus TCP client to the server must be repeated regularly. Only read access throughout the access monitoring time prevents a broken connection with the Modbus TCP client.

You will find the setting options for the "access monitoring time" in chapter Access monitoring time (Page 87). The factory setting is 5 seconds.

3.5 Telegram structure

3.5.1 Telegram structure Modbus TCP

The data traffic between the client and the server and the corresponding answer from the server to the client starts with the Address Field, followed by the Function Code. Following this, the data (Data) are transferred. The structure of the Data depends on the Function Code used. In the response telegram of the server to the client, the same Address Field and the same Function Code are entered. The Data are filled according to the requested data.

Address Field	Function Code	Data
7 bytes	1 byte	n bytes

- Address Field = MBAP Header (Modbus Application Protocol): This address is used to address a defined server on the bus.
 - Transaction identifier (2 bytes)
 - Protocol identifier (2 bytes)
 - Length (2 bytes)
 - Unit identifier (1 byte)
- Function Code: Defines the server function requested with the telegram.
- Data = Telegram 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.

You can find more information on Function Codes in chapter Function Codes (Page 98).

Error responses

For a negative acknowledgment, the response telegram is equivalent to an Error response.

You can find more information on Error responses in chapter Exception Codes (Page 112).

3.5.2 Modbus RTU telegram format

The data traffic between the master and slave and the corresponding answer from the slave to the master starts with the Address Field, followed by the Function Code. Following this, the data (Data) are transferred. The structure of the Data depends on the Function Code used. The CRC-CHECK is transmitted at the end of the telegram. In the response telegram of the slave to the master, the same Address Field and the same Function Code are entered. The Data are filled according to the requested data.

Address Field	Function Code	Data	CRC CHECK
1 byte	1 byte	n bytes	2 bytes

- Address Field = Slave address (parameter "Station address"): This address (1 to 247) is used to address a defined slave on the bus. The broadcast address "0" is used to address all slaves that are subordinate to the master.
- Function Code: Defines the server function requested with the telegram.
- Data = Telegram 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 = Telegram checksum: The end of the telegram is identified by the CRC-16 checksum of 2 bytes in length.

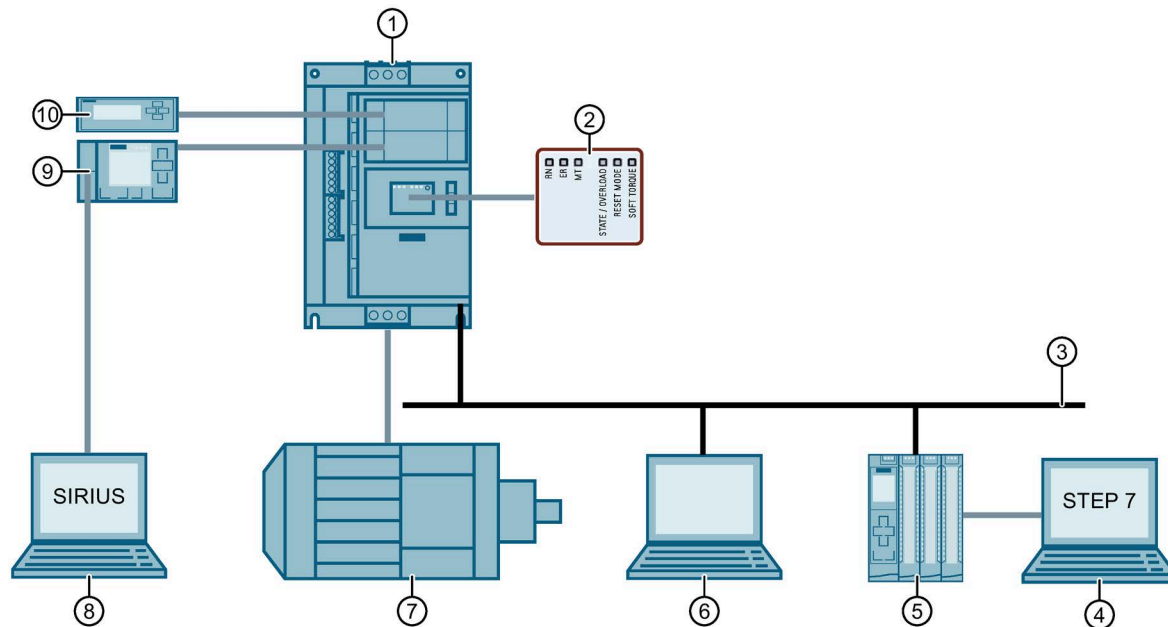
You can find more information on Function Codes in chapter Function Codes (Page 98).

Error responses

For a negative acknowledgment, the response telegram is equivalent to an Error response.

You can find more information on Error responses in chapter Exception Codes (Page 112).

3.6 Access options for the 3RW5 soft starter



- ① SIRIUS 3RW5 soft starter (illustration similar)
- ② LED display on 3RW5 soft starter
- ③ Modbus TCP or Modbus RTU
(via 3RW5 Modbus TCP communication module or 3RW5 Modbus RTU communication module)
- ④ PC or programming device with configuration software of the controller, e.g. STEP 7
- ⑤ Programmable logic controller, e.g. SIMATIC S7-1500
- ⑥ PC with Modbus TCP client or Modbus RTU master
- ⑦ Motor
- ⑧ PC with SIRIUS Soft Starter ES (TIA Portal) via local interface on 3RW5 HMI High Feature
- ⑨ 3RW5 HMI High Feature (accessories depend on 3RW5 soft starter)
- ⑩ 3RW5 HMI Standard (accessories depend on 3RW5 soft starter)

Options for data transfer

-	Monitoring	Diagnostics	Control	Parameterization
3RW5 HMI High Feature	✓	✓	✓	(✓) ²⁾
3RW5 HMI Standard	✓	✓	✓	- ³⁾
SIRIUS Soft Starter ES (TIA Portal) ¹⁾	✓	✓	✓	(✓) ²⁾
Fieldbus via 3RW5 communication module	✓ (via user program)	✓	✓	(✓) ²⁾
3RW5 soft starter	LEDs	LEDs	Via input IN or digital inputs	(✓) ²⁾

1) Via local interface on the 3RW5 HMI High Feature

2) Depends on the 3RW5 soft starter

3) Station address for Modbus RTU can be set

Possible number of applications per access path

The following number of applications are simultaneously possible via the 3RW5 Modbus communication module for each access path:

Access path	3RW5 Modbus communication module	
	TCP	RTU
Modbus TCP client	3 ¹⁾	-
Modbus RTU master	-	1

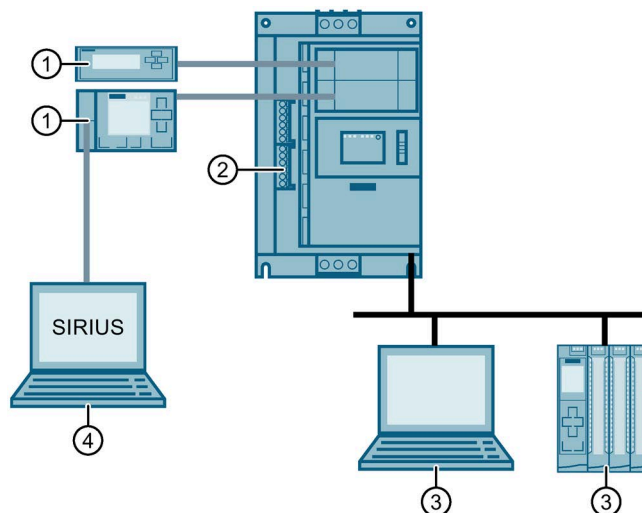
1) Only the Modbus TCP client, which is the first to set up a communication connection to the server, is authorized for write access.

3.7 Operating modes and master control function

3.7.1 Operating modes

Control source and master control

The operating modes assign access rights to the various control sources (access sources). The control source that possesses the rights for controlling and writing access has control. As only one control source can ever have control at one time, different priorities are assigned to the modes. Read access is also possible without control.



- ① Control source: 3RW5 HMI, operating mode: Manual operation local - HMI controlled
- ② Control source: Input IN or digital inputs, operating mode: Manual operation local - input controlled or Automatic - input controlled
- ③ Control source: Modbus client or Modbus master (e.g. PLC), operating mode: Automatic
- ④ Control source: SIRIUS Soft Starter ES (TIA Portal), operating mode: Manual operation local - PC controlled

"Automatic" mode

The control source is connected to the 3RW5 soft starter via the 3RW5 communication module. In "Automatic" mode, control is with a higher-level control:

- Modbus TCP: Modbus Client (e.g. PLC)
- Modbus RTU: Modbus Master (e.g. PLC)

Note**"Automatic - input controlled" mode**

The "Automatic - input controlled" mode is available for 3RW55 soft starter as of firmware version V2.1 if the digital inputs have master control by activating the "Manual operation local - input controlled" bit in the process image output (PIQ). The PLC can regain master control at any time.

Operating mode "manual - local"

In the operating mode "manual - local" the master control function rests with a control source directly on the 3RW5 soft starter:

- Input IN (3RW50 and 3RW52 Soft Starters) or digital inputs (3RW55 and 3RW55 Failsafe soft starters)
- 3RW5 HMI
- SIRIUS Soft Starter ES (TIA Portal) via local interface on the 3RW5 HMI High Feature

Priorities of the operating modes

Operating mode		Control source	Priority
Automatic	-	Modbus client or Modbus master (e.g. PLC)	Lowest
	Input controlled ¹⁾	Digital inputs ²⁾	↓
Manual operation local	-	Connection abort ³⁾ (depending on the 3RW5 soft starter and parameterization)	↓
	Input controlled	Input IN or digital inputs ⁴⁾	↓
	3RW5 HMI controlled	3RW5 HMI	↓
	PC controlled	SIRIUS Soft Starter ES (TIA Portal)	Highest

¹⁾ Supported by 3RW55 soft starter from firmware version V2.1

²⁾ Not possible for 3RW50, 3RW52, 3RW55 soft starters with firmware version earlier than V2.1 and 3RW55 Failsafe. For the 3RW55 soft starter as of firmware version V2.1 if the digital inputs have master control by activating the "Manual operation local - input controlled" bit in the process image output (PIQ). The PLC can regain master control at any time.

³⁾ Explanation in text below.

⁴⁾ Possible for 3RW50, 3RW52, 3RW55 and 3RW55 Failsafe soft starters. For 3RW55 soft starters as of firmware version V2.1, only if the input action "Operating mode manual - local" has been parameterized and activated.

Connection abort

On failure of the bus connection or a CPU stop, the 3RW5 soft starter behaves as follows, irrespective of the operating mode:

- 3RW50 soft starter: The 3RW50 soft starter behaves in accordance with the parameter "Control via digital input" (Page 39).
- 3RW52 soft starter with firmware version earlier than V2.0.1: The 3RW52 soft starter remains in "Automatic" mode or switches to "Automatic" mode.

Note**Response of 3RW52 soft starter in the event of bus connection failure or CPU stop (3RW52 soft starter with firmware version earlier than V2.0.1)**

To enable you to continue controlling the 3RW52 soft starter after failure of the bus connection or CPU stop, you will need a 3RW5 HMI (accessory), which enables you to switch to "Manual operation local" mode.

Without 3RW5 HMI, you cannot control the 3RW52 soft starter until the bus connection has been restored.

Alternatively, you can remove the 3RW5 communication module (Page 49). Then restore the 3RW52 soft starter on the device to the factory setting, in order to switch to the "Manual operation local - Input controlled" mode.

- 3RW52 soft starter from firmware version V2.0.1: The 3RW52 soft starter behaves in accordance with the parameter "Control via digital input" (Page 39).
- 3RW55 and 3RW55 Failsafe soft starters: The 3RW55 soft starter behaves in accordance with the parameter "Response to CPU/master stop" (Page 88).

If other connections to the control source are aborted, the master control automatically switches back to the lowest priority of the current mode.

- "Automatic" mode: The 3RW5 soft starter responds as it does upon failure of the bus connection or CPU stop.
- Operating mode "Manual - local": Master control switches either to "Manual - local - Connection abort" or to "Manual operation local - input controlled". For certain 3RW5 soft starters and parameter assignments, "Manual - local - Connection abort" is not possible. In the following cases, control switches to "Manual operation local - input controlled":
 - 3RW50 soft starter
 - 3RW52 soft starter
 - 3RW55 and 3RW55 Failsafe soft starters: Input action "Operating mode manual - local" is parameterized and activated.

Example of a 3RW55 soft starter: The 3RW5 HMI High Feature has master control. Input 2 is assigned the input action "Operating mode manual - local" and the input action is activated. On a connection abort terminating the connection to the 3RW5 HMI High Feature, control switches to "Manual - local - input controlled".

Additional information

Further information on the 3RW5 soft starters and restoring the factory settings of the device can be found in the Equipment Manual of the respective 3RW5 soft starter.

3.7.2 Sets the operating mode

Basic behavior when the operating mode is changed

A higher-priority mode can fetch control from a lower-priority mode at any time; the reverse is not possible. The master control function can only be returned to the operating mode with the lowest priority. Control sources with higher priority must take the master control function from the operating mode with the lowest priority.

Requirements

An operating mode with lower priority can only take the master control function back while the motor is switched off.

"Automatic" mode

Note that the 3RW5 soft starters switch to "Automatic" mode after the 3RW5 communication module has been installed in the 3RW52 soft starter with a firmware version earlier than V2.0.1, 3RW55 or 3RW55 Failsafe. The 3RW5 soft starters switch to the "Automatic" mode after installation of the 3RW5 communication module in the 3RW52 soft starter as of firmware version V2.0.1 and after the 3RW5 communication module is connected to the 3RW50 soft starter only for the settings "Manual activation" or "No change on bus error" of the parameter "Control via digital input" (Page 39).

Fetching control

"Automatic" mode fetches control from the operating mode "manual - local" as follows:

- For 3RW55 and 3RW55 Failsafe soft starters if the input action "Operating mode manual - local" is parameterized: By deactivating the input action "Operating mode manual - local".
- 3RW50, 3RW52 soft starters and for 3RW55 and 3RW55 Failsafe soft starters if the input action "Operating mode manual - local" is not parameterized: Disabling the "Manual operation local - input controlled" bit in the data table "Process image output (PIQ)" (Page 150) causes "Automatic" mode to fetch control from the input IN or from the digital inputs.
- "LOCAL / REMOTE" action on the 3RW5 HMI
- Command in SIRIUS Soft Starter ES (TIA Portal)
(local interface on the 3RW5 HMI High Feature)

Brief overview: Window "Task Card" > Tab "Online Tools" > "SIRIUS Control Panel > Master Control > Release Control"

Withdrawal of master control by other control sources

In "Automatic" mode, control can be withdrawn by any control source.

"Manual operation local - input controlled" and "Automatic - input controlled" mode

Fetching control

The input IN or the digital inputs fetch control from the "Automatic" mode as follows:

- 3RW50, 3RW52 soft starters and for 3RW55 and 3RW55 Failsafe soft starters if the input action "Operating mode manual - local" is not parameterized: by enabling the "Manual operation local - input controlled" bit in the data table "Process image outputs (PIQ)" (Page 150).
- For 3RW55 and 3RW55 Failsafe soft starters if the input action "Operating mode manual - local" is parameterized: by enabling the input action "Operating mode manual - local".

If the master control function is on the 3RW5 HMI or, in the case of the local interface, on the 3RW5 HMI High Feature (higher priority), you must actively give up the master control function beforehand. The input IN or the digital inputs can then fetch control.

Giving back control

"Automatic" mode fetches control as follows:

- 3RW50, 3RW52 soft starters and for 3RW55 and 3RW55 Failsafe soft starters if the input action "Operating mode manual - local" is not parameterized: by disabling the "Manual operation local - input controlled" bit in the data table "Process image outputs (PIQ)" (Page 150).
- For 3RW55 and 3RW55 Failsafe soft starters if the input action "Operating mode manual - local" is parameterized: By deactivating the input action "Operating mode manual - local".

Withdrawal of master control by other control sources

Control is withdrawn from the input IN or digital inputs as follows:

- "LOCAL / REMOTE" action on the 3RW5 HMI
- Command in SIRIUS Soft Starter ES (TIA Portal)
(local interface on the 3RW5 HMI High Feature)

Brief overview: Window "Task Card" > Tab "Online Tools" > "SIRIUS Control Panel > Master Control > Get Control"

Operating mode "Manual operation local - HMI controlled"

Fetching control

The 3RW5 HMI actively assumes the master control function via the action "LOCAL / REMOTE" from the lower priority control source.

If the master control function at the local interface on the 3RW5 HMI High Feature (higher priority), you must actively give up the master control function beforehand in SIRIUS Soft Starter ES (TIA Portal). You can then get control with the action "LOCAL / REMOTE".

Giving back control

The 3RW5 HMI actively gives up the master control function via the action "LOCAL / REMOTE" to the "Automatic" mode or alternatively to the input IN or the digital inputs. In the following cases, the master control function is given back to input IN or the digital inputs:

- No 3RW5 communication module installed in the 3RW5 soft starter or connected to the 3RW50 soft starter.
- 3RW50 and 3RW52 soft starters: The parameter "Control via digital input" (Page 39) is set to "Permanent activation".

Withdrawal of master control by other control sources

In the event of a corresponding command in SIRIUS Soft Starter ES (TIA Portal) at the local interface on the 3RW5 HMI High Feature, the master control function is taken from the 3RW5 HMI.

Brief overview: Window "Task Card" > Tab "Online Tools" > "SIRIUS Control Panel > Master Control > Get Control"

Operating mode "Manual operation local - PC controlled"

Fetching control

In response to a command to this effect, SIRIUS Soft Starter ES (TIA Portal) actively fetches control from any control source.

Brief overview: Window "Task Card" > Tab "Online Tools" > "SIRIUS Control Panel > Master Control > Get Control"

Giving back control

If there is a corresponding command, SIRIUS Soft Starter ES (TIA Portal) actively gives up the master control function to the "Automatic" mode or alternatively to the Input IN or the digital inputs.

Brief overview: Window "Task Card" > Tab "Online Tools" > "SIRIUS Control Panel > Master Control > Release Control"

In the following cases, the master control function is given back to input IN or the digital inputs:

- No 3RW5 communication module installed in the 3RW5 soft starter or connected to the 3RW50 soft starter.
- 3RW50 and 3RW52 soft starters: The parameter "Control via digital input" (Page 39) is set to "Permanent activation".

Withdrawal of master control by other control sources

The master control function cannot be withdrawn from SIRIUS Soft Starter ES (TIA Portal) by any control source.

Additional information

Further information on the 3RW5 soft starters can be found in the Equipment Manual of the respective 3RW5 soft starter.

Further information on the operation of SIRIUS Soft Starter ES (TIA Portal) can be found in the online help of SIRIUS Soft Starter ES (TIA Portal).

Messages about the mode

You will find more information on messages in chapter Messages about the mode (Page 115).

3.7.3 Control via digital input

Requirements

- 3RW50 Soft Starter from firmware version V1.0 or 3RW52 Soft Starter from firmware version V2.0.1

Operating principle

The parameter "Control via digital input" is helpful, for example, for applications in which the bus connection serves mainly for observation and monitoring purposes.

The parameter defines how the master control function behaves on failure of the bus connection or a CPU stop. A failure of the bus connection or a CPU stop can also occur in the operating mode "manual - local", for example when observing or monitoring via the bus connection. You can use the parameter to disable a switchover to "Automatic" mode.

Setting options

- 3RW5 HMI High Feature (firmware version V3.0 or higher)

Menu: "Parameters > Soft Starter > Additional parameters > Control via digital input"

You will find more information on operating the 3RW5 HMI High Feature in the Equipment Manual of the 3RW5 Soft Starter.

- Parameterization mode via key combination on the 3RW5 Soft Starter

Further information on the parameterization mode can be found in the Equipment Manual of the respective 3RW5 soft starter.

Parameter

Parameter	Description
Control via digital input	• Manual activation On failure of the bus connection or a CPU stop the 3RW5 Soft Starter remains in the "Automatic" mode or the 3RW5 Soft Starter switches to the "Automatic" mode. • Permanent activation Switching "Automatic" mode is not possible. If the 3RW5 Soft Starter is in "Automatic" mode, the 3RW5 Soft Starter switches to "Manual operation local - input controlled" mode. Control by means of a higher-level control (e.g. PLC) is not possible. • Activate on bus error (factory setting) On failure of the bus connection or a CPU stop, the 3RW5 Soft Starter switches from the "Automatic" mode to the "Manual operation local - input controlled" mode or the 3RW5 Soft Starter remains in the operating mode "manual - local" mode. • No change on bus error On failure of the bus connection or a CPU stop the master control function does not switch, but the 3RW5 Soft Starter remains in the current mode.

Additional information

For more information, see Chapter Operating modes (Page 32).

Further information on the 3RW5 Soft Starters can be found in the Equipment Manual of the respective 3RW5 Soft Starter.

3.8 Bus connection cable and bus connector

3.8.1 Bus connection cable and bus connector for Modbus TCP

For connection, use only angled industrial bus connectors with a RJ45 socket for Industrial Ethernet.

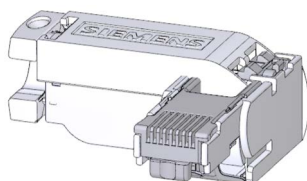


Illustration similar

NOTICE

Damage to the cable, bus connector and 3RW5 communication module

If you use unsuitable bus connectors, the following can happen:

- The hinged cover of the 3RW5 soft starter does not close.
- The connecting cable is impermissibly bent.
- The bus connector or the 3RW5 communication module is damaged.

Use bus connectors with a right-angled cable outlet and dimensions that match the recommended bus connector.

Recommended bus connector

Article number	Description
6GK1901-1BB20-2AA0	Industrial Ethernet FastConnect RJ45 Plug 90 2x 2, RJ45 plug connector (10/100 Mbit/s) with rugged metal housing and FC connecting method, for IE FC cable 2x 2; 90° cable outlet

3.8.2 Bus connection cable for Modbus RTU

Use only twisted pair bus connection cables (RS 485) for connection.

Strip back the insulation of the the pair of cores for signal transmission and the core of the Com cable. You will find further information and requirements for stripping insulation in the Technical Data (<https://support.industry.siemens.com/cs/ww/en/ps/16212/td>) and on the 3RW5 communication module.

3.9 Accessories

3.9.1 SIRIUS Soft Starter ES (TIA Portal)

SIRIUS Soft Starter ES (TIA Portal) as of V15 Update 2 is the central software for configuring, commissioning, operation, and diagnostics of 3RW5 Soft Starters.

You connect your PC or your programming device to the 3RW5 soft starter via the local interface on the optional 3RW5 HMI High Feature.

By displaying all operating data, service data and diagnostic data, SIRIUS Soft Starter ES (TIA Portal) provides reliable information, which helps you to avoid faults, or quickly locate and eliminate faults if they occur.

Download

SIRIUS Soft Starter ES (TIA Portal) can be downloaded on the 3RW5 topic page (<https://support.industry.siemens.com/cs/ww/en/view/109747404>) or via the following link (<https://support.industry.siemens.com/cs/ww/en/ps/24231/dl>).

You will find further information on the SIRIUS Soft Starter ES (TIA Portal) software program and necessary versions and updates in Catalog IC 10 (<https://support.industry.siemens.com/cs/ww/en/view/109747945>) and on the 3RW5 topic page.

Available versions for V15 and V15.1

Supported functions (V15.1)	SIRIUS Soft Starter ES (TIA Portal)		
	Basic	Standard	Premium
Access via local interface on the 3RW5 HMI High Feature	x	x	x
Parameterization	x	x	x
Operator control	x	x	x
Diagnostics	x	x	x
Expert list	-	x	x
Parameter comparison	-	x	x
Service data (maximum pointer, statistic data)	-	x	x
Trace	-	x	x
Access via PROFIBUS or PROFINET	-	-	x
Teleservice via MPI	-	-	x
Routing	-	-	x
Bulk engineering (group function)	-	-	x

Versions available as of V16

Supported functions	SIRIUS Soft Starter ES (TIA Portal)	
	Basic	Professional ¹⁾
Access via local interface on the 3RW5 HMI High Feature	x	x
Parameterization	x	x
Operator control	x	x
Diagnostics	x	x
Expert list	-	x
Parameter comparison	-	x
Service data (maximum pointer, statistic data)	-	x
Trace	-	x
Access via PROFIBUS or PROFINET	-	x
Teleservice via MPI	-	x
Routing	-	x
Bulk engineering (group function)	-	x

¹⁾ The "Professional" variant corresponds to the "Premium" version of V15.1

3.9.2 Use on the 3RW50 soft starter

The following accessories are needed for using the 3RW5 communication module on the 3RW50 soft starter:

- Push-in lugs for wall mounting (3ZY1311-0AA00)
- COM connecting cable (3RW5900-0CC00)

Mounting and dismantling

4.1 Installing the 3RW5 communication module in the 3RW5 soft starter

Requirements

- 3RW5 soft starter with integrated slot (3RW52, 3RW55, 3RW55 Failsafe)

NOTICE
Damage to property due to electrical voltage Switch off the power to the 3RW5 soft starter before starting work (main and control supply voltage).

Procedure

1. Break out the cover of the slot (Page 46).
2. Mount the 3RW5 communication module (Page 48).

Result

You have mounted the 3RW5 communication module in the 3RW5 soft starter, which you can connect to the fieldbus via the 3RW5 Modbus TCP communication module (Page 61) or 3RW5 Modbus RTU communication module (Page 64).

4.1.1 Break out the cover of the slot

Requirements

- 3RW5 soft starter with integrated slot (3RW52, 3RW55, 3RW55 Failsafe)
- Sharp, robust knife or diagonal cutter

Procedure



CAUTION

Sharp edges

Risk of injury from sharp edges or burrs.

Make sure that there are no sharp-edged burrs on the connecting webs and the preset breaking points after knocking out. Deburr spots with sharp edges properly to prevent injuries.

NOTICE

Damage to property

Hold the cover tight so that it does not fall into the interior.

Ensure that no further foreign matter can get into the slot.

4.1 Installing the 3RW5 communication module in the 3RW5 soft starter

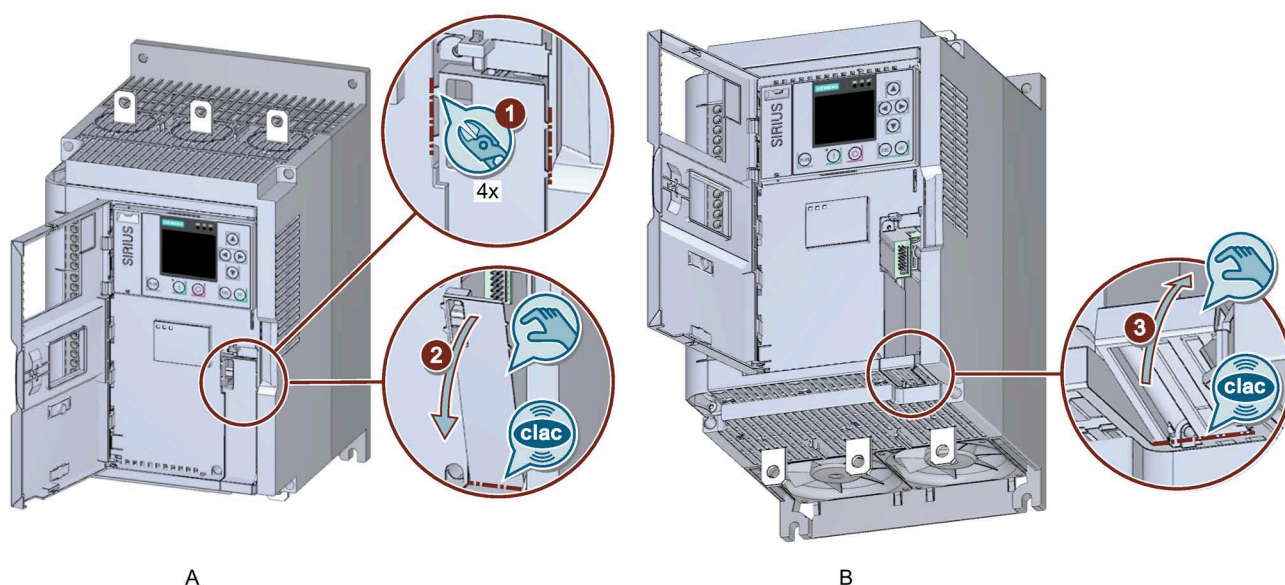


Illustration similar

A View at an angle from above.

B View at an angle from below.

1. Cut through the connecting webs of the cover. Use a sharp and robust knife or a diagonal cutter.
2. Lift the cover with a finger on the top side of the device and break the cover at the preset breaking point toward the outside.
3. Press the second part of the cover toward the interior of the device and break the cover inward at the preset breaking point.

Result

You can mount the 3RW5 communication module in the slot of the 3RW5 soft starter (Page 48).

4.1.2 Mount the 3RW5 communication module in the slot of the 3RW5 Soft Starter

Requirements

- 3RW5 soft starter with integrated slot (3RW52, 3RW55, 3RW55 Failsafe)
- Broken out slot cover (Page 46)
- Screwdriver PH1

Note

A magnetic screwdriver simplifies assembly.

Procedure

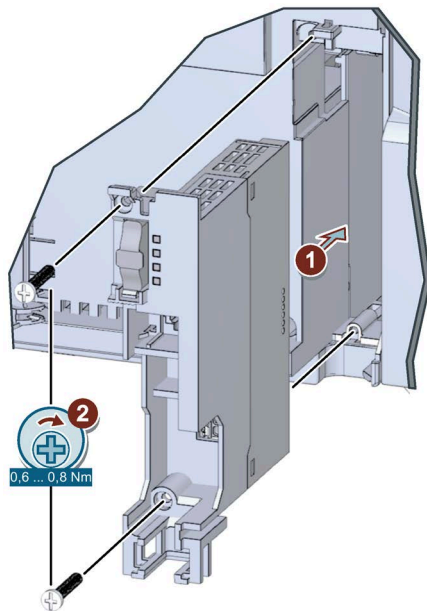


Illustration similar

1. Push the 3RW5 communication module into the slot.
2. Secure the 3RW5 communication module with the fastening screws supplied at the lower and upper mounting holes.

Result

You have mounted the 3RW5 communication module in the 3RW5 soft starter, which you can connect to the fieldbus via the 3RW5 Modbus TCP communication module (Page 61) or 3RW5 Modbus RTU communication module (Page 64).

4.2 Removing the 3RW5 communication module from the 3RW5 soft starter

Requirements

- 3RW52, 3RW55 or 3RW55 Failsafe soft starters
- Removed bus connector (Page 63) or removed bus connection cable (Page 67)
- Screwdriver PH1
- Slotted screwdriver with blade width 5.5 to 8 mm

NOTICE
Damage to property due to electrical voltage
Switch off the power to the 3RW5 soft starter before starting work (main and control supply voltage).

Note

A magnetic screwdriver simplifies disassembly.

Procedure

NOTICE

Damage to property

Ensure that no foreign matter can get into the slot.

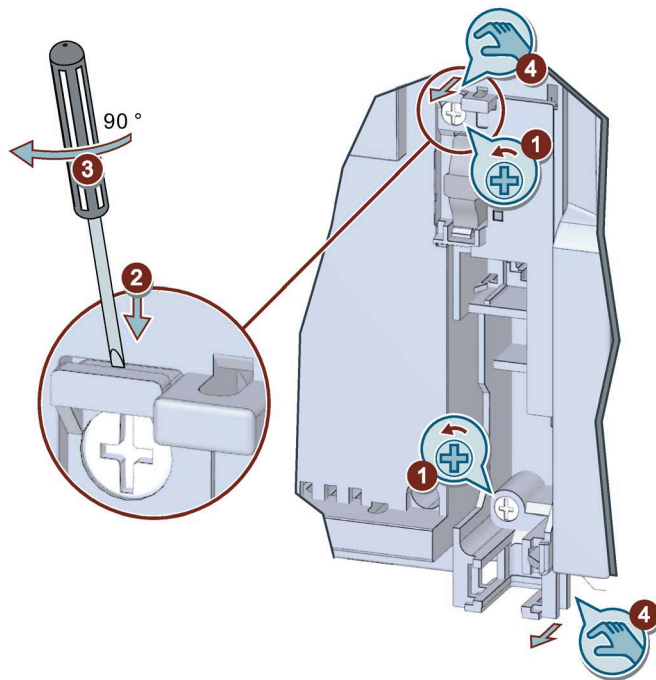


Illustration similar

1. Remove the fastening screws from 3RW5 communication module.
2. There is a small gap above the upper mounting hole on the 3RW5 communication module between the 3RW5 communication module and the 3RW5 soft starter. Insert the slotted screwdriver into this gap from above.
3. Turn the slotted screwdriver 90°. The turning movement lifts the 3RW5 communication module slightly out of the slot of the 3RW5 soft starter.
4. Pull the 3RW5 communication module out of the slot of the 3RW5 soft starter with your fingers.

Result

You have removed the 3RW5 communication module and can now mount another 3RW5 communication module.

4.3 Installing the 3RW5 communication module on a level surface

Requirements

- 3RW50 soft starter
- Level surface, e.g. sufficiently strong mounting plate
- Observe the mounting positions, minimum clearances and ambient conditions stated on the data sheet.
- 2 properly executed drill holes with thread or plugs on the level surface.

The 3RW5 communication module must be mounted to the left of the 3RW50 soft starter. Observe the position of the 3RW5 communication module in the drilling pattern (Page 128). The COM connecting cable has a limited length.

- 2 head screws M4 x 12 DIN ISO 7045 to fit the drill-holes
- Screwdriver (depending on the drive of the screws)
- 2 push-in lugs (accessories) for wall mounting (Page 44)

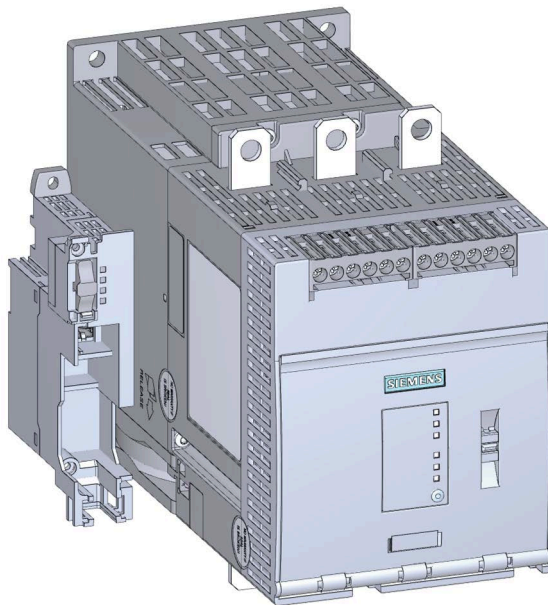


Illustration similar

Procedure

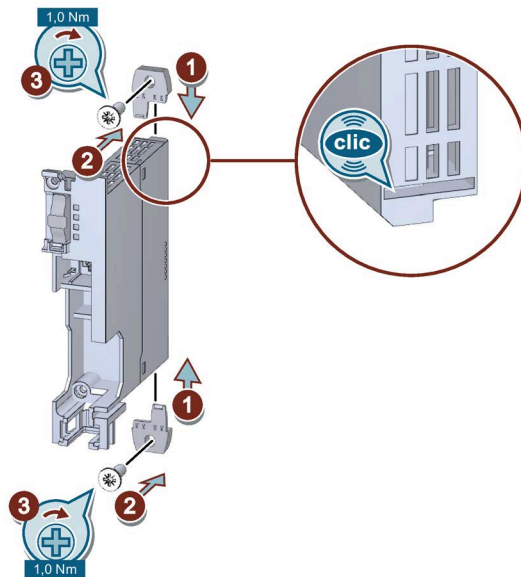


Illustration similar

1. Insert the push-in lugs into each side of the enclosure until you hear them engage.
2. Position the 3RW5 communication module on the level surface over the drill-holes and insert the head screws.
3. Attach the 3RW5 communication module on the bottom and top side of the level surface using the head screws.

Result

You have mounted the 3RW5 communication module on a level surface. You can connect the COM connecting cable to the 3RW50 soft starter (Page 55) and on the 3RW5 communication module (Page 57) and connect the 3RW50 soft starter to the fieldbus via the 3RW5 Modbus TCP communication module (Page 61) or 3RW5 Modbus RTU communication module (Page 64).

4.4 Removing the 3RW5 communication module from a level surface

Requirements

- 3RW50 soft starter
- Removed bus connector (Page 63) or removed bus connection cable (Page 67)
- Removed COM connecting cable (Page 59)
- Screwdriver (depending on the drive of the screws)

Procedure

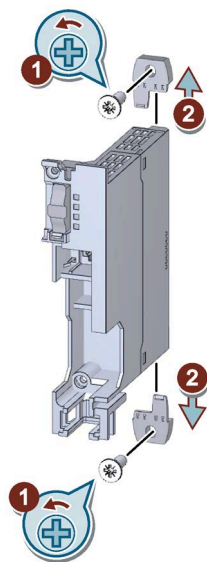


Illustration similar

1. Loosen the head screws on the 3RW5 communication module.
2. Pull out the push-in lugs from the 3RW5 communication module.

Result

You have removed the 3RW5 communication module and can now mount another 3RW5 communication module.

Connecting

5.1 COM connecting cable

5.1.1 Connecting the COM connecting cable to the 3RW50 soft starter

Requirements

- 3RW50 soft starter
- Removed hinged cover

Further information on removing the hinged cover can be found in the Equipment Manual of the 3RW50 soft starter.

- COM connecting cable (accessory)

Procedure

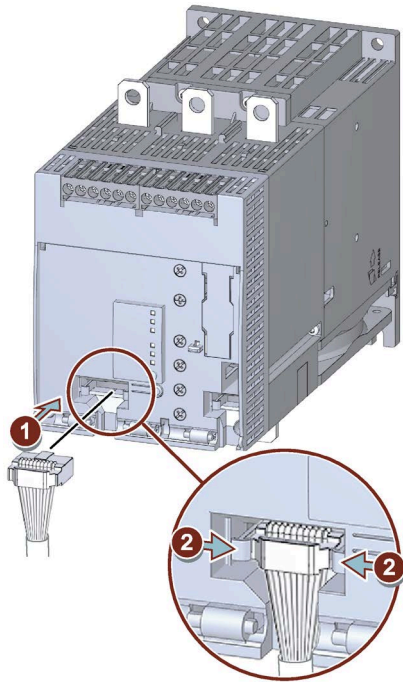


Illustration similar

1. Plug the bus connector of the COM connecting cable (without pin connectors) into the corresponding socket on the 3RW50 soft starter. Observe the coding of the bus connector and of the socket.

Further information on the connections on the 3RW50 soft starter can be found in the Equipment Manual for the 3RW50 soft starter.

2. Lock the bus connector in the socket.
3. Install the hinged cover.

Further information on installing the hinged cover can be found in the Equipment Manual of the 3RW50 soft starter.

Result

You have connected the COM connecting cable to the 3RW50 soft starter. You can connect the other side of the COM connecting cable to the 3RW5 communication module (Page 57).

5.1.2 Connecting the COM connecting cable to the 3RW5 communication module

Requirements

- 3RW5 communication module mounted on a level surface (Page 51)
- Removed cover cap
Loosen and remove the securing mechanism of the cover cap and keep the cover cap in a safe place.
- 3RW50 soft starter with connected COM connecting cable (accessory) (Page 55)

NOTICE

Damage to property due to electrical voltage

Switch off the power to the 3RW5 soft starter before starting work (main and control supply voltage).

Procedure

NOTICE

Material damage due to incorrect plug-in connection

Use the front plug-in connection of the 3RW5 communication module. The rear plug-in connection is not suitable for connecting to the COM connecting cable.

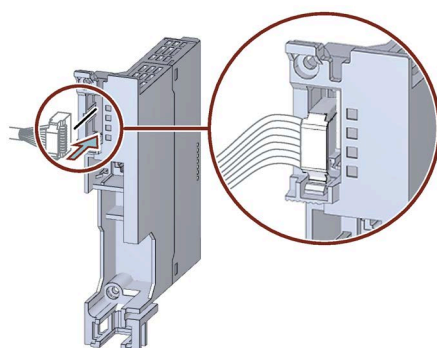


Illustration similar

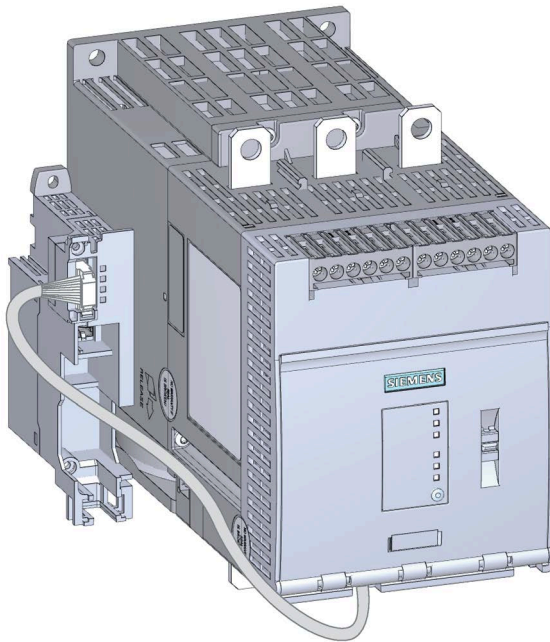


Illustration similar

Plug the bus connector of the COM connecting cable with the pin connectors into the front plug-in connection of the 3RW5 communication module until the securing mechanism on the bus connector of the COM connecting cable latches into place.

Route the COM connecting cable in front under the 3RW50 soft starter and then on the side next to the 3RW50 soft starter. Maintain sufficient distance from the main power connections and ensure that your routing is EMC-compliant.

Result

The 3RW5 communication module is now properly mounted and connected to the 3RW50 soft starter. You can connect the 3RW50 soft starter to the fieldbus via the 3RW5 Modbus TCP communication module (Page 61) or 3RW5 Modbus RTU communication module (Page 64).

5.1.3 Removing the COM connecting cable on the 3RW5 communication module

Requirements

- 3RW5 communication module mounted on a level surface (Page 51)
- Removed bus connector (fieldbus) (Page 63) or removed bus connection cable (Page 67)
- Cover cap

NOTICE

Damage to property due to electrical voltage

Switch off the power to the 3RW5 soft starter before starting work (main and control supply voltage).

Procedure

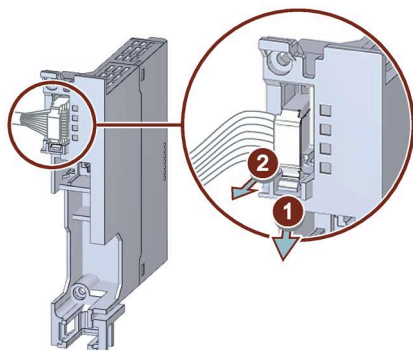


Illustration similar

1. Loosen the securing mechanism on the bus connector of the COM connecting cable.
2. Pull the bus connector of the COM connecting cable out of the plug-in connection of the 3RW5 communication module.

Result

You have disconnected the 3RW5 communication module from the 3RW50 soft starter. Place the cover cap onto the front plug-in connection of the 3RW5 communication module.

5.1.4 Remove the COM connecting cable on the 3RW50 soft starter

Requirements

- 3RW50 soft starter
- Removed hinged cover

Further information on removing the hinged cover can be found in the Equipment Manual of the 3RW50 soft starter.

- COM connecting cable removed from the 3RW5 communication module (Page 59)

Procedure

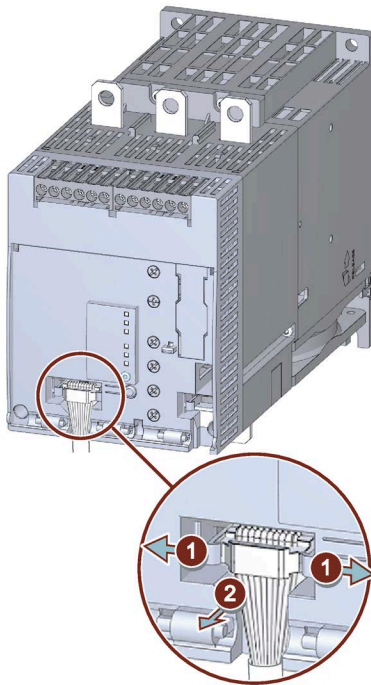


Illustration similar

1. Loosen the securing mechanism on the bus connector of the COM connecting cable.
2. Pull the bus connector of the COM connecting cable out of the socket on the 3RW50 soft starter.
3. Install the hinged cover.

Further information on installing the hinged cover can be found in the Equipment Manual of the 3RW50 soft starter.

Result

You have disconnected the COM connecting cable from the 3RW50 soft starter.

5.2 Fieldbus

5.2.1 3RW5 Modbus TCP communication module

5.2.1.1 Connecting the bus connector

Requirements

- Mounted 3RW5 communication module
- Bus connector (Page 41)
- Cable tie

Note

Malfunctions caused by EMC interference

The purpose of shielding cables is to attenuate (dampen) magnetic, electrical or electromagnetic interference fields. Connect the cable shield of the fieldbus cable to system ground with low impedance to that interference currents on the cable shield can be conducted to ground.

Generally follow the instructions in the EMC Guide (<http://www.siemens.com/emc-guideline>) and implement the measures stated in it for shielding the cables and for connecting the shield.

Procedure

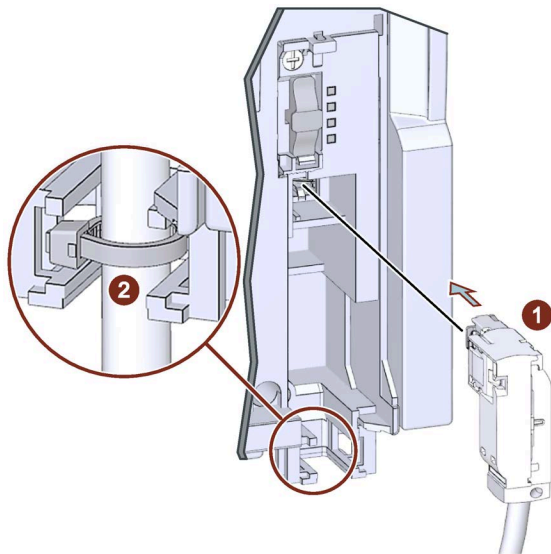


Illustration similar

1. Plug the bus connector of the cable into the socket of the 3RW5 communication module.
2. Secure the cable with a cable tie.

Result

The 3RW5 communication module is now properly mounted and connected. You can integrate the 3RW5 soft starter into the associated network environment.

5.2.1.2 Removing the bus connector

Requirements

- Diagonal cutter
- Slotted screwdriver with blade width < 2.5 mm

Procedure

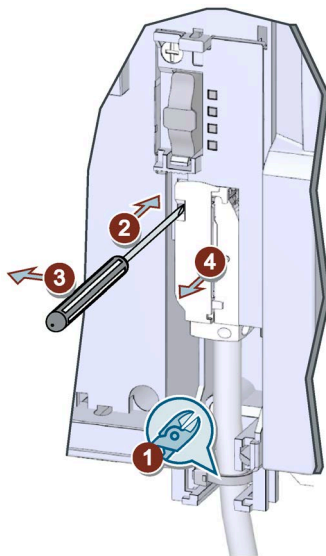


Illustration similar

1. Carefully cut through the cable ties with a diagonal cutter and remove the cable tie. Take care that you do not damage the cable.
2. Insert the slotted screwdriver into the opening on the bus connector (depending on which bus connector is used).
3. Hold back the locking bolt of the bus connector with the slotted screwdriver. Press the slotted screwdriver slightly to the left to do this.
4. Pull the bus connector of the cable out of the socket of the 3RW5 communication module.

Result

You have disconnected the 3RW5 communication module from the bus connection.

5.2.2 3RW5 Modbus RTU communication module

5.2.2.1 Connecting the bus connection cable

Requirements

- Mounted 3RW5 communication module
- Correctly stripped bus connection cable for Modbus RTU (Page 41)
- Cable tie
- Jumper (optional)

Note

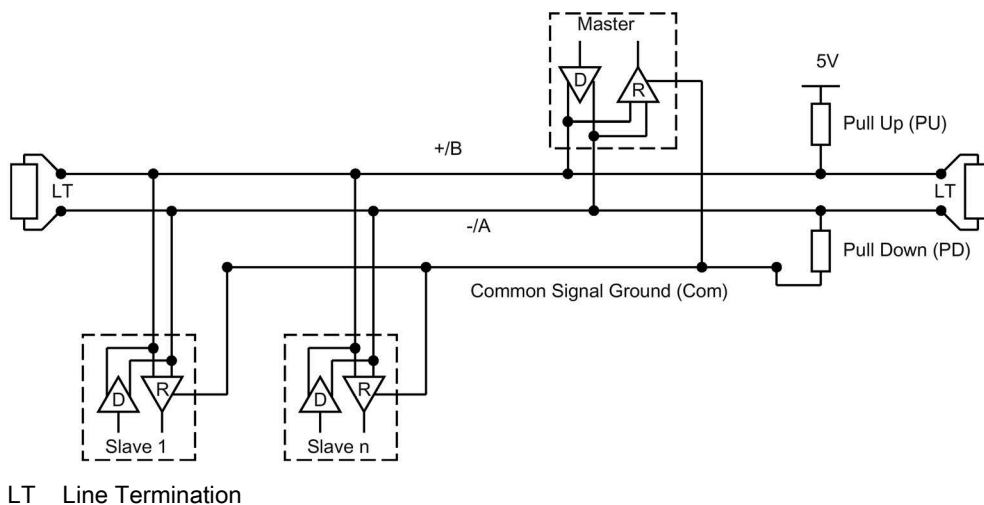
Malfunctions caused by EMC interference

The purpose of shielding cables is to attenuate (dampen) magnetic, electrical or electromagnetic interference fields. Connect the cable shield of the fieldbus cable to system ground with low impedance so that interference currents on the cable shield can be conducted to ground.

Generally follow the instructions in the EMC Guide (<http://www.siemens.com/emc-guideline>) and implement the measures stated in it for shielding the cables and for connecting the shield.

General structure and design

Half duplex (RS 485), twisted-pair operation with multiple nodes:



3RW5 Modbus RTU communication module	Other possible designations on devices in the Modbus RTU segment
Com	GND, SC
-/A	D0, D-, TX-/RX-, RxD/TxD-N
+/B	D1, D+, TX+/RX+, RxD/RxD-P

Procedure

NOTICE

Damage to property due to incorrect connection of the bus connection cable

Destruction of the 3RW5 communication module is possible due to incorrect connection of the bus connection cable.

Do not connect the cable shield to the Com connection. On all devices in the Modbus RTU segment, connect the core of the Com cable.

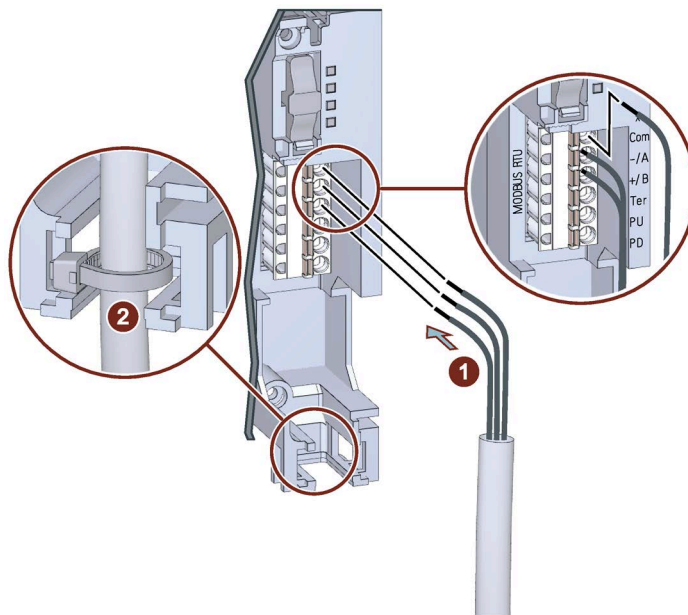


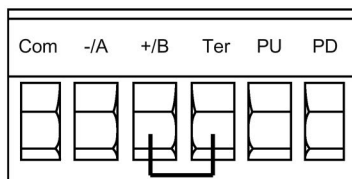
Illustration similar

1. Connect the pair of cores for signal transmission and the core of the Com cable. To do this, press the cores into the corresponding spring-type terminals.
2. Secure the cable with a cable tie. If you are using 2 cables, secure both cables together in an appropriate manner with a cable tie.

Terminating resistor for line termination (LT)

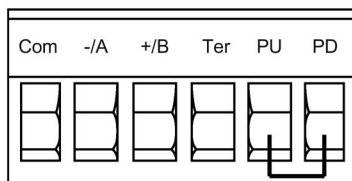
On the first and last device in the Modbus RTU segment, place a terminating resistor between the positive and negative signal.

The 3RW5 communication module contains a built-in 120- Ω terminating resistor. You can place this terminating resistor using a jumper as shown in the diagram below. If other terminating resistors are required, use an external bus terminating resistor.



Line polarization

If devices in the Modbus RTU segment require line polarization, you can activate line polarization in the 3RW5 communication module with a jumper between PU and PD. The 3RW5 communication module contains a built-in 560- Ω resistor pair that is placed by activation of the line polarization.



Result

The 3RW5 communication module is now properly mounted and connected. You can integrate the 3RW5 soft starter into the associated network environment.

5.2.2.2 Removing the bus connection cable

Requirements

- Diagonal cutter
- Slotted screwdriver with blade width < 2.5 mm

Procedure

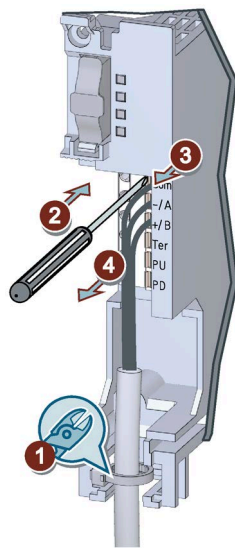


Illustration similar

1. Carefully cut through the cable ties with a diagonal cutter and remove the cable tie. Take care that you do not damage the cable.
2. Use the flat-head screwdriver to operate the pressure element on an inserted core and keep the pressure element pressed.
3. Pull the core on the operated pressure element out.
4. Repeat the procedure for the inserted cores.

Result

You have disconnected the 3RW5 communication module from the bus connection.

Configuring

6.1 Configuring the 3RW5 Soft Starter in the Modbus TCP system.

Requirements

- Mounted 3RW5 Modbus TCP communication module
3RW50 soft starters must also be connected to the 3RW5 communication module.
The 3RW5 soft starter automatically detects the presence of the 3RW5 communication module when it is switched on.
- Modbus TCP system
 - Client
(PC, programming device or programmable logic controller, e.g. SIMATIC S7-1500)
 - Server (3RW5 Modbus TCP communication module)
- Configuration software of the controller, e.g. STEP 7
- Parameterization software, e.g.
 - SIRIUS Soft Starter ES (TIA Portal) (Page 42) via local interface on the 3RW5 HMI High Feature
 - Modbus TCP client
- Depending on the control, additional communication components may be necessary for Modbus TCP. Additional information can be found on the Internet (<https://support.industry.siemens.com/cs/ww/en/view/102020340>).
- Fundamental knowledge in working with Modbus TCP, e.g. for IP parameters (Page 77)

Note

Full functional scope

In order to be able to use 3RW5 soft starters without any difficulties and with their full range of functions, ensure that you have the latest firmware and software updates:

- 3RW5 soft starter, 3RW5 communication module, 3RW5 HMI High Feature
- SIRIUS Soft Starter ES (TIA Portal)

You will find current downloads and a history of the versions with new features on the 3RW5 topic page (<https://support.industry.siemens.com/cs/ww/en/view/109747404>).

Procedure

1. Configure the 3RW5 soft starter in the Modbus TCP system.

The following procedures are possible, for example:

- Configuring 3RW5 soft starters without assistance from a 3RW5 HMI High Feature (Page 73)
- Configuring 3RW5 soft starters with the aid of a 3RW5 HMI High Feature (Page 75)

Refer to the information on Modbus TCP in chapter Configuring the 3RW5 Soft Starter (Page 73).

2. Parameterize the 3RW5 soft starter. In particular, note the information in chapter Operation on failure of the bus connection to the controller (Page 88). You will find more information on parameterization in the Equipment Manual of the 3RW5 soft starter.

Depending on the selection and equipment of the 3RW5 soft starter, you can parameterize the 3RW5 soft starter in different ways via the 3RW5 communication module:

- Modbus client on PC with Modbus TCP connection
- Configuration software of the controller on PC or programming device with a Modbus TCP connection.

Note

With Modbus TCP, you can set only values for parameter set 1 (PS 1) and parameters (e.g. input action) that are independent of the parameter set. For PS 2 and PS 3, the default values are used.

Note

During parameterization of the 3RW5 soft starter, it is possible to select impossible combinations of interdependent values. In the "Soft starter diagnostics" data table (Page 152) the diagnosis "Invalid parameter value" is then signaled. You will find the dependencies of the parameters in the Equipment Manual of the 3RW5 soft starter.

Result

The 3RW5 soft starter is integrated into the Modbus TCP system as a server and parameterized. You can program the controller and commission the 3RW5 soft starter in the Modbus TCP system.

6.2 Configuring the 3RW5 soft starter in the Modbus RTU system

Requirements

- Mounted 3RW5 Modbus RTU communication module
3RW50 soft starters must also be connected to the 3RW5 communication module.
The 3RW5 soft starter automatically detects the presence of the 3RW5 communication module when it is switched on.
- Modbus RTU system
 - Master
(PC, programming device or programmable logic controller, e.g. SIMATIC S7-1500)
 - Slave (3RW5 Modbus RTU communication module)
- Configuration software of the controller, e.g. STEP 7
- Parameterization software, e.g.
 - SIRIUS Soft Starter ES (TIA Portal) (Page 42) via local interface on the 3RW5 HMI High Feature
 - Modbus RTU master
- Depending on the control system, further hardware and software components may be required for Modbus RTU. Additional information can be found on the Internet (<https://support.industry.siemens.com/cs/ww/en/view/58386780>).
- Fundamental knowledge in working with Modbus RTU, e.g. for the station address (Page 82)

Note

Full functional scope

In order to be able to use 3RW5 soft starters without any difficulties and with their full range of functions, ensure that you have the latest firmware and software updates:

- 3RW5 soft starter, 3RW5 communication module, 3RW5 HMI High Feature
- SIRIUS Soft Starter ES (TIA Portal)

You will find current downloads and a history of the versions with new features on the 3RW5 topic page (<https://support.industry.siemens.com/cs/ww/en/view/109747404>).

Procedure

1. Configure the 3RW5 soft starter in the Modbus RTU system.

The following procedures are possible, for example:

- Configuring 3RW5 soft starters without help from a 3RW5 HMI (Page 78)
- Configuring 3RW5 soft starters with the aid of a 3RW5 HMI (Page 80)

Refer to the information on Modbus RTU in chapter Configuring the 3RW5 Soft Starter (Page 73).

2. Parameterize the 3RW5 soft starter. In particular, note the information in chapter Operation on failure of the bus connection to the controller (Page 88). You will find more information on parameterization in the Equipment Manual of the 3RW5 soft starter.

Depending on the selection and equipment of the 3RW5 soft starter, you can parameterize the 3RW5 soft starter in different ways via the 3RW5 communication module:

- Modbus master on PC with Modbus RTU connection
- Configuration software of the controller on PC or programming device with a Modbus RTU connection.

Note

With Modbus RTU, you can set only values for parameter set 1 (PS 1) and parameters (e.g. input action) that are independent of the parameter set. For PS 2 and PS 3, the default values are used.

Note

During parameterization of the 3RW5 soft starter, it is possible to select impossible combinations of interdependent values. In the "Soft starter diagnostics" data table (Page 152) the diagnosis "Invalid parameter value" is then signaled. You will find the dependencies of the parameters in the Equipment Manual of the 3RW5 soft starter.

Result

The 3RW5 soft starter is integrated into the Modbus RTU system as a slave and parameterized. You can program the controller and commission the 3RW5 soft starter in the Modbus RTU system.

6.3 Configuring the 3RW5 Soft Starter

Note

Setting via the local interface and on the 3RW5 HMI High Feature

Setting of the IP parameters via the station address via the local interface and on the 3RW5 HMI High Feature is always possible, even if no corresponding Modbus connection is available.

Modbus TCP

A requirement for communication via Modbus TCP is that the IP parameters (Page 77) are set in the 3RW5 communication module.

Possible procedures for configuration can be found in chapters Configuring 3RW5 soft starters without assistance from a 3RW5 HMI High Feature (Page 73) and Configuring 3RW5 soft starters with the aid of a 3RW5 HMI High Feature (Page 75).

Modbus RTU

A requirement for communication via Modbus RTU is that the station address (Page 82) is set in the 3RW5 communication module.

Possible procedures for configuration can be found in chapters Configuring 3RW5 soft starters without help from a 3RW5 HMI (Page 78) and Configuring 3RW5 soft starters with the aid of a 3RW5 HMI (Page 80).

6.3.1 Configuring the 3RW5 soft starter in the Modbus TCP system

6.3.1.1 Configuring 3RW5 soft starters without assistance from a 3RW5 HMI High Feature

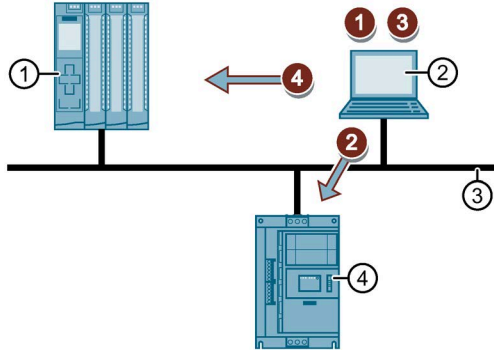
This section describes a possible configuration of the 3RW5 soft starter which you can only carry out via the Modbus TCP client or the configuration software of the controller. You do not need a 3RW5 HMI High Feature for this configuring option.

Requirements

- Connection of the 3RW5 soft starter via Modbus TCP
- Switched on control supply voltage on the 3RW5 soft starter
- Any IP parameters currently stored in the 3RW5 Modbus TCP communication module must be known.

The factory settings (default) of the IP parameters are listed in chapter Modbus TCP communication parameters (Page 176).

Procedure



① Programmable logic controller / Modbus TCP client, e.g. SIMATIC S7-1500

② PC or programming device with configuration software of controller

③ Modbus TCP

④ SIRIUS 3RW5 soft starter / server

① ... ④ : Steps to be taken in the procedure

1. Start the Modbus TCP client in your automation system and address the server (3RW5 soft starter) using the IP parameter that is currently stored in the 3RW5 Modbus TCP communication module. For first commissioning and after restoration of the factory settings, these IP parameters have the factory settings (Page 176).

When using a SIMATIC S7-1500, for example, integrate the FB "MB_CLIENT" into the user program.

2. By means of the "Communication parameters" (Page 176) data table set the required IP parameters in the 3RW5 soft starter.

Note the information in chapter IP parameters (Page 77).

Note

Writing down IP parameters

Write down the set IP parameters that you have just set. To change the configuration, the IP parameters currently stored in the 3RW5 Modbus TCP communication module must be known. You need a 3RW5 HMI High Feature to restore the factory settings.

3. Enter the modified IP parameters of the server in the Modbus TCP client.

Note the information in chapter IP parameters (Page 77).

4. Load the configuration into the Modbus TCP client (if necessary).

Result

The 3RW5 soft starter is configured in the Modbus TCP system and can communicate with other Modbus TCP devices via the 3RW5 Modbus TCP communication module.

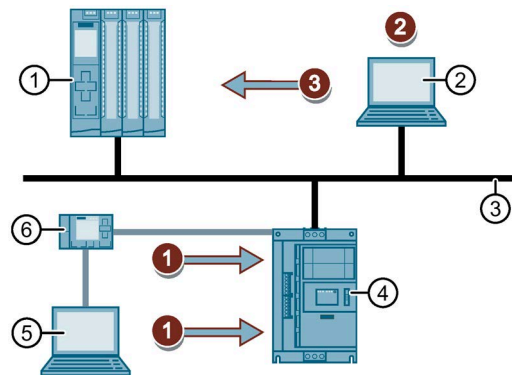
6.3.1.2 Configuring 3RW5 soft starters with the aid of a 3RW5 HMI High Feature

This chapter describes options for configuring the 3RW5 soft starter that you require for a 3RW5 HMI High Feature.

Requirements

- Input device (3RW5 HMI High Feature, PC)
- Switched on control supply voltage on the 3RW5 soft starter

Procedure



- ① Programmable logic controller / Modbus TCP client, e.g. SIMATIC S7-1500
- ② PC or programming device with configuration software of controller and Modbus TCP client (optional)
- ③ Modbus TCP
- ④ SIRIUS 3RW5 soft starter / server
- ⑤ PC with SIRIUS Soft Starter ES (TIA Portal)
- ⑥ 3RW5 HMI High Feature (accessories depend on 3RW5 soft starter)
- ① ... ③ : Steps to be taken in the procedure

1. Set the IP parameters in the 3RW5 communication module.

The following procedures are possible:

- Via SIRIUS Soft Starter ES (TIA Portal) over the local interface on the 3RW5 HMI High Feature

Brief overview: Window "Project Navigation" with current project under created Soft Starter > "Device configuration" > Window "Work area" > Communication module "Modbus TCP" > Inspector window "Modbus TCP" > Tab "Properties" > Tab "General" > "Interface"

Further information on the operation of SIRIUS Soft Starter ES (TIA Portal) can be found in the online help of SIRIUS Soft Starter ES (TIA Portal).

- Via the 3RW5 HMI High Feature

Menu: "Parameter > Communication module > Modbus TCP > IP address"

Menu: "Parameter > Communication module > Modbus TCP > Subnet mask"

Menu: "Parameter > Communication module > Modbus TCP > Router address"

You will find more information on operating the 3RW5 HMI High Feature in the Equipment Manual of the 3RW5 soft starter.

Note the information in chapter IP parameters (Page 77).

2. Start the Modbus TCP client in your automation system and address the server (3RW5 soft starter) using the previously set IP parameters.

When using a SIMATIC S7-1500, for example, integrate the FB "MB_CLIENT" into the user program.

Note the information in chapter IP parameters (Page 77).

3. Load the configuration into the client (if necessary).

Result

The 3RW5 soft starter is configured in the Modbus TCP system and can communicate with other Modbus TCP devices via the 3RW5 Modbus TCP communication module.

6.3.1.3 IP parameters

All Modbus TCP devices are capable of using the TCP/IP protocol. Before the 3RW5 soft starter can be addressed as a server by a client, the 3RW5 communication module must have IP parameters. The IP parameters of the 3RW5 communication module must match the IP parameters in the Modbus application, so that the Modbus TCP client can communicate.

IP parameters

- IP address
- Subnet mask
- Router address

The factory settings (default) of the IP parameters are listed in chapter Modbus TCP communication parameters (Page 176).

Static IP parameters

The IP parameters set on the 3RW5 soft starter are stored retentively in the 3RW5 communication module. The IP parameters of the 3RW5 communication module must match the IP parameters in the Modbus application.

Note

Restarting the communication interface

Any change in the IP parameters via SIRIUS Soft Starter ES (TIA Portal) requires a restart of the communication interface.

Restarting interrupts the Modbus TCP connections. Reestablish the Modbus TCP connections.

MAC address

Via the MAC address, the 3RW5 communication module can be accessed via LAN. You can read the MAC address on the front of the 3RW5 communication module or display it on the 3RW5 HMI High Feature.

Menu: "Parameter > Communication module > Modbus TCP > MAC address"

6.3.2 Configuring the 3RW5 soft starter in the Modbus RTU system

6.3.2.1 Configuring 3RW5 soft starters without help from a 3RW5 HMI

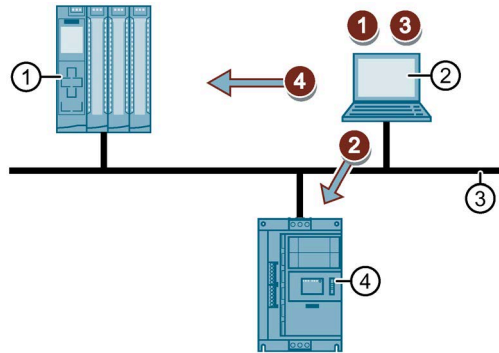
This section describes a possible configuration of the 3RW5 soft starter which you can only carry out via the Modbus RTU client or the configuration software of the controller. You do not need a 3RW5 HMI for this option.

Requirements

- Connection of the 3RW5 soft starter via Modbus RTU
- Switched on control supply voltage on the 3RW5 soft starter
- The station address currently stored in the 3RW5 Modbus RTU must be known.

You will find the factory setting (default) of the station address in chapter Station address (Page 82).

Procedure



- ① Programmable logic controller / Modbus RTU master, e.g. SIMATIC S7-1500
- ② PC or programming device with configuration software of controller
- ③ Modbus RTU
- ④ SIRIUS 3RW5 soft starter / slave
- ① ... ④ : Steps to be taken in the procedure

1. Start the Modbus RTU master in your automation system and address the slave (3RW5 soft starter) using the station address currently stored in the 3RW5 Modbus RTU communication module. For first commissioning and after restoration of the factory settings, this station address has the factory setting (Page 82).
2. By means of the "Modbus RTU communication parameters" (Page 177) data table, set the required station address in the 3RW5 soft starter.

Note the information in chapter Station address (Page 82).

Note

Writing down the station address

Write down the set station address that you have just set. To change the configuration, the station address currently stored in the 3RW5 Modbus RTU communication module must be known. You need a 3RW5 HMI High Feature to restore the factory settings.

3. Enter the modified station address of the slave in the Modbus RTU master.
Note the information in chapter Station address (Page 82).
4. Load the configuration into the Modbus RTU master (if necessary).

Result

The 3RW5 soft starter is configured in the Modbus RTU system and can communicate with other Modbus RTU devices via the 3RW5 Modbus RTU communication module.

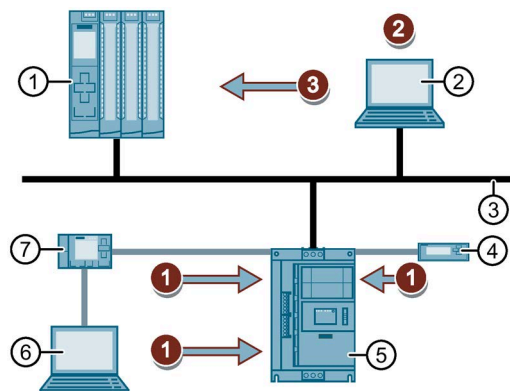
6.3.2.2 Configuring 3RW5 soft starters with the aid of a 3RW5 HMI

This section describes options for configuring the 3RW5 soft starter that requires a 3RW5 HMI.

Requirements

- Input device (3RW5 HMI High Feature, PC)
From firmware version V2.0, the 3RW5 Modbus RTU communication module is supported by the 3RW5 HMI High Feature.
- Switched on control supply voltage on the 3RW5 soft starter

Procedure



- ① Programmable logic controller / Modbus RTU master, e.g. SIMATIC S7-1500
- ② PC or programming device with configuration software of controller and Modbus RTU master (optional)
- ③ Modbus RTU
- ④ 3RW5 HMI Standard (accessories depend on 3RW5 soft starter)
- ⑤ SIRIUS 3RW5 soft starter / slave
- ⑥ PC with SIRIUS Soft Starter ES (TIA Portal)
- ⑦ 3RW5 HMI High Feature (accessories depend on 3RW5 soft starter)
- ① ... ③ : Steps to be taken in the procedure

1. Set the required station address in the 3RW5 soft starter.

The following procedures are possible:

- Via SIRIUS Soft Starter ES (TIA Portal) over the local interface on the 3RW5 HMI High Feature

Brief overview: Window "Project Navigation" with current project under created Soft Starter > "Parameters" > Window "Work area" > "Communication module > Interface"

Further information on the operation of SIRIUS Soft Starter ES (TIA Portal) can be found in the online help of SIRIUS Soft Starter ES (TIA Portal).

- Via the 3RW5 HMI High Feature

Menu: "Parameter > Communication module > Modbus RTU > station address"

You will find more information on operating the 3RW5 HMI High Feature in the Equipment Manual of the 3RW5 soft starter.

- Via the standard 3RW5 HMI (Page 83)

Note the information in chapter Station address (Page 82).

2. Start the Modbus RTU master in your automation system and address the slave (3RW5 soft starter) using the previously set station address.

Note the information in chapter Station address (Page 82).

3. Load the configuration into the Modbus RTU master (if necessary).

Result

The 3RW5 soft starter is configured in the Modbus RTU system and can communicate with other Modbus RTU devices via the 3RW5 Modbus RTU communication module.

6.3.2.3 Station address

Before the 3RW5 soft starter can be addressed as a slave by a Modbus RTU master, the 3RW5 communication module must have a station address. The station address of the 3RW5 communication module must match the station address in the Modbus application so that the Modbus RTU master can communicate.

Selection of the station address

Observe the following points when selecting the station address:

- 3RW5 soft starters are preset to station address 126 as the factory default. Set another station address during configuration.
- The station address can be set in a range from 1 to 247.

Assigning or setting station address

If you assign the station address to the 3RW5 soft starter online or set it directly on the 3RW5 soft starter, the station address is stored in the 3RW5 communication module. The 3RW5 soft starter is accessible via the assigned or set station address after a restart of the 3RW5 communication module and can be addressed by a Modbus RTU master.

6.3.2.4 Setting station address via 3RW5 HMI Standard

Requirements

- 3RW50 or 3RW52 soft starter with 3RW5 HMI Standard
- Unlocked locking switch on the 3RW5 HMI Standard
- Control priority is with the 3RW5 HMI Standard
- Information in chapter Station address (Page 82).

Procedure

1. Select the menu item "MODBS".

The currently set station address is displayed. You will find more information on operating the 3RW5 HMI Standard in the Equipment Manual of the 3RW5 soft starter.
2. Hold down a navigation button until the ">" symbol appears before the currently set station address.

The ">" symbol denotes the processing status of the station address.
3. Press a navigation button.

The first position of the station address runs through the potential digits (0 ... 2).
4. Press a navigation button when the desired digit appears.

This sets the first digit of the station address. The second position of the station address runs through the potential digits (0 ... 9, depending on the first digit).
5. Press a navigation button when the desired digit appears.

This sets the second digit of the station address. The third position of the station address runs through the potential digits (0 ... 9, depending on the second digit).
6. Press a navigation button when the desired digit appears.

You have set the station address and are in the "MODBS" menu item. The ">" symbol to denote the processing state is grayed out.

Result

The set station address is saved in the 3RW5 communication module and the 3RW5 communication module restarts automatically. The 3RW5 soft starter is accessible via the set station address after the restart of the 3RW5 communication module and can be addressed by a Modbus RTU master.

6.3.2.5 Port configuration and baud rate

Setting options

- SIRIUS Soft Starter ES (TIA Portal) via local interface on the 3RW5 HMI High Feature
Brief overview: Window "Project Navigation" with current project under created Soft Starter > "Parameters" > Window "Work area" > "Communication module > Interface"
Further information on the operation of SIRIUS Soft Starter ES (TIA Portal) can be found in the online help of SIRIUS Soft Starter ES (TIA Portal).
- 3RW5 HMI High Feature
Menu: "Parameter > Communication module > Modbus RTU > Port configuration"
Menu: "Parameter > Communication module > Modbus RTU > Baud rate"
You will find more information on operating the 3RW5 HMI High Feature in the Equipment Manual of the 3RW5 soft starter.
- User program via the "Modbus RTU communication parameters" data table (Page 177)

Parameters

Parameter	Description
Port configuration	• Automatic • 1 start, 8 data, 1 stop bit, even parity (factory setting) • 1 start, 8 data, 1 stop bit, odd parity • 1 start, 8 data, 2 stop bit, no parity • 1 start, 8 data, 1 stop bit, no parity
Baud rate	• Automatic • 115.2 kbit/s • 76.8 kbit/s • 57.6 kbit/s • 38.4 kbit/s • 19.2 kbit/s (factory setting) • 9.6 kbit/s • 4.8 kbit/s • 2.4 kbit/s • 1.2 kbit/s

Automatic setting of Port configuration or Baud rate

When "Automatic" is selected, the Port configuration or the Baud rate of the Modbus RTU connection is set automatically. For this automatic setting, the Modbus RTU master must communicate with the 3RW5 communication module.

Note

Communication of the Modbus RTU master for automatic setting of port configuration and baud rate

The automatic setting of port configuration and baud rate requires continuous cyclic communication from the Modbus RTU master so that the 3RW5 communication module can recognize the correct port configuration and baud rate. This operation can take from several milliseconds to approx. 10 seconds. The request telegrams can refer to read or write access. While the port configuration and baud rate have not yet been set automatically, the 3RW5 communication module ignores the request telegram.

Tip: Cyclically send a request telegram to write register address range 0x7000 - 0x7099 (undefined address range) with changing data. As soon as you obtain an Exception Code as the response telegram, the port configuration and the baud rate have been set automatically.

Note

Automatic setting of port configuration and baud rate

The automatically set values are not stored in the 3RW5 communication module and are cleared after a restart. If necessary, you can read out automatically set values on the 3RW5 HMI High Feature or with SIRIUS Soft Starter ES (TIA Portal) via the local interface and then set them manually.

Read-out of the detected parameters after automatic setting

Parameters

- Detected port configuration
- Detected baud rate

Read-out options

- SIRIUS Soft Starter ES (TIA Portal) via local interface on the 3RW5 HMI High Feature

Brief overview: Window "Project Navigation" with current project under created Soft Starter > "Parameters" > Window "Work area" > "Communication module > Interface"

Further information on the operation of SIRIUS Soft Starter ES (TIA Portal) can be found in the online help of SIRIUS Soft Starter ES (TIA Portal).

- 3RW5 HMI High Feature

Menu: "Parameter > Communication module > Detected port configuration"

Menu: "Parameter > Communication module > Detected baud rate"

- User program via the "Modbus RTU communication parameters" data table (Page 177)

6.3.2.6 Silent interval time

Setting options

- 3RW5 HMI High Feature

Menu: "Parameter > Communication module > Modbus RTU > Silent interval time"

You will find more information on operating the 3RW5 HMI High Feature in the Equipment Manual of the 3RW5 soft starter.

- User program via the "Modbus RTU communication parameters" data table (Page 177)

Parameters

Parameter	Description
Silent interval time	The silent interval time is the interval between 2 Modbus telegrams. For the setting "Automatic" (factory setting), the minimum silent interval time of the baud rate used is automatically set. For example, 2 ms for the baud rate 19.2 kbit/s. You will find the setting range of the silent interval time in chapter Modbus RTU communication parameters (Page 177).

6.3.3 Access monitoring time

You will find a description of the associated connection monitoring function in chapter Connection monitoring (Page 27).

Setting options

- 3RW5 HMI High Feature

Menu: "Parameter > Communication module > Modbus TCP / Modbus RTU > Access monitoring time"

You will find more information on operating the 3RW5 HMI High Feature in the Equipment Manual of the 3RW5 soft starter.

- SIRIUS Soft Starter ES (TIA Portal) via local interface on the 3RW5 HMI High Feature
 - Short overview of Modbus TCP: Window "Project Navigation" with current project under created Soft Starter > "Parameters" > Window "Work area" > "Communication module > Access monitoring time"
 - Short overview Modbus RTU: Window "Project Navigation" with current project under created Soft Starter > "Parameters" > Window "Work area" > "Communication module > Module parameters > Access monitoring time"

Further information on the operation of SIRIUS Soft Starter ES (TIA Portal) can be found in the online help of SIRIUS Soft Starter ES (TIA Portal).

- User program via the "Modbus TCP communication parameters (Page 176)" or "Modbus RTU communication parameters (Page 177)" data table

Parameters

Parameter	Description
Access monitoring time	You will find a description of the parameter in connection with the associated connection monitoring function in chapter Connection monitoring (Page 27). • 5 seconds (factory setting) • 10 seconds

6.4 Operation on failure of the bus connection to the controller

An interruption in the connection between the 3RW5 soft starter and the controller must not result in an undefined plant status.

Depending on the 3RW5 soft starter, you can set parameters that define the behavior of the 3RW5 soft starter on interruption of the connection with the controller in "Automatic" mode.

- 3RW50 and 3RW52 Soft Starters (Page 88)
- 3RW55 and 3RW55 Failsafe Soft Starters (Page 89)

6.4.1 3RW50 and 3RW52 Soft Starters

The 3RW50 and 3RW52 soft starters do not support the parameters for "Operation with CPU / Master". On failure of the bus connection or CPU stop, all bits of the process image output (PIQ) are set to 0. In reference to the operating mode, the 3RW50 and 3RW52 soft starters respond as follows:

- 3RW50 soft starter: The 3RW50 soft starter behaves in accordance with the parameter "Control via digital input" (Page 39).
- 3RW52 soft starter with firmware version earlier than V2.0.1: The 3RW52 soft starter remains in the "Automatic" mode or switches to the "Automatic" mode.

Note

Response of 3RW52 soft starter in the event of bus connection failure or CPU stop (3RW52 soft starter with firmware version earlier than V2.0.1)

To enable you to continue controlling the 3RW52 soft starter in the "Automatic" mode on failure of the bus connection, you require a 3RW5 HMI (accessory) which enables you to switch to the "Manual operation local" mode (Page 32).

Without 3RW5 HMI you cannot control the 3RW52 soft starter until the bus connection has been restored.

Alternatively, you can remove the 3RW5 communication module (Page 49). Then restore the 3RW52 soft starter on the device to the factory setting, in order to switch to the "Manual operation local - Input controlled" mode.

- 3RW52 soft starter from firmware version V2.0.1: The 3RW52 soft starter behaves in accordance with the parameter "Control via digital input" (Page 39).

Additional information

You will find more information on restoring the factory setting on the device in the Equipment Manual of the 3RW52 soft starter.

6.4.2 3RW55 and 3RW55 Failsafe Soft Starters

Setting options

- SIRIUS Soft Starter ES (TIA Portal) via local interface on the 3RW5 HMI High Feature
Brief overview: Window "Project Navigation" with current project under created Soft Starter > "Parameters" > Window "Work area" > "Soft Starter > Additional parameters > Operation with CPU / Master"
Further information on the operation of SIRIUS Soft Starter ES (TIA Portal) can be found in the online help of SIRIUS Soft Starter ES (TIA Portal).
- 3RW5 HMI High Feature
Menu: "Parameter > Soft Starter > Additional parameters > Operation with CPU / Master"
You will find more information on operating the 3RW5 HMI High Feature in the Equipment Manual of the 3RW5 soft starter.
- User program via the "Parameters" data table (Page 164)

Parameters

Parameters	Description
Response to CPU/Master Stop	This parameter defines how the 3RW55 and 3RW55 Failsafe Soft Starters behave on failure of the bus connection or CPU stop: - Switch substitute value (factory setting) The process image output of the 3RW5 soft starter is automatically changed to the values defined in the following parameter "Substitute value". - Keep last value The 3RW5 soft starter does not change the process image output. The current control commands are retained.
Substitute value ¹⁾	On failure of the bus connection or CPU stop, the 3RW55 and 3RW55 Failsafe Soft Starters can be controlled by a substitute process image output. - Motor CW - Motor CCW - Reset - Emergency start - Creep speed - Output 1 - Output 2 - Parameter set bit 0²⁾ - Parameter set bit 1²⁾ - Disable Quick-stop - Output 3 - Activate pump cleaning (only adjustable via user program) - Manual operation local - input controlled (only adjustable via user program) - Use alternative stopping mode - Motor standstill
Parameters of CPU / master disabled	This parameter defines how the 3RW55 and 3RW55 Failsafe Soft Starters process the parameter values received from the controller. - Deactivate (factory setting) The parameters set on the 3RW55 or 3RW55 Failsafe Soft Starter are overwritten on bus startup by the values stored in the configuration software of the controller. - Activate The Soft Starter acknowledges to the controller the correct receipt of all the parameter values sent to it by the controller via cyclic and acyclic communication channels. The 3RW55 or 3RW55 Failsafe Soft Starter then rejects these values. This prevents the parameters stored in the 3RW55 and 3RW55 Failsafe Soft Starters from being overwritten.

¹⁾ In the 3RW5 HMI High Feature, the parameter is only visible if "Switch substitute value" is selected in the parameter "Response to CPU / Master Stop".

²⁾ Explanation in the following table. When making the settings via the 3RW5 HMI High Feature, observe the Equipment Manual of the 3RW5 soft starter. You can select the parameter set directly in the SIRIUS Soft Starter ES (TIA Portal).

Additional information

The following table describes the assignment of the substitute values "Parameter set bit 0" and "Parameter set bit 1":

Parameter set	Parameter set bit 0	Parameter set bit 1
Process image error	1	1
Parameter set 1 (PS1)	0	0
Parameter set 2 (PS2)	1	0
Parameter set 3 (PS3)	0	1

Messages and diagnostics

The 3RW5 communication module provides you with the following diagnostics options:

- LED display (Page 94)
- 3RW5 HMI High Feature

Menu: "Diagnostics > Communication module"

You will find more information on operating the 3RW5 HMI High Feature in the Equipment Manual of the 3RW5 soft starter.

- SIRIUS Soft Starter ES (TIA Portal) via local interface on the 3RW5 HMI High Feature

Brief overview: Window "Project Navigation" with current project under created Soft Starter > "Commissioning" > Window "Work area" > "Soft Starter / HMI > Diagnosis"

Further information on the operation of SIRIUS Soft Starter ES (TIA Portal) can be found in the online help of SIRIUS Soft Starter ES (TIA Portal).

- Programmable logic controller (e.g. SIMATIC S7-1500) or a PC (as the Modbus TCP client or Modbus RTU master)

Note the information in chapters Telegram structure (Page 28), Function Codes (Page 98), and Exception Codes (Page 112).

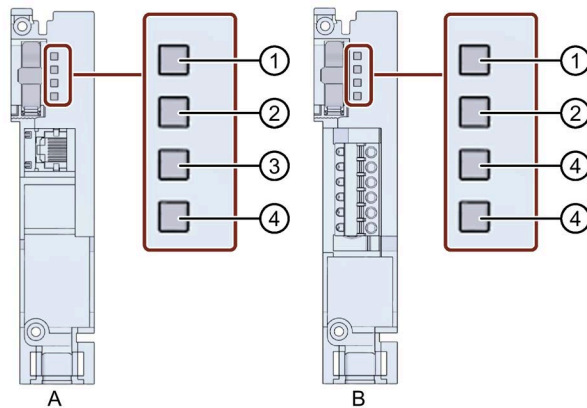
You will find faults and remedial measures for the 3RW5 communication module in chapter Errors and remedial measures on the 3RW5 communication module (Page 114).

7.1 LED display

7.1.1 Device LEDs on the 3RW5 Modbus communication modules

The diagnostics of the 3RW5 communication module is displayed by LEDs on the 3RW5 communication module under the hinged cover of the 3RW5 soft starter. The LEDs briefly light up simultaneously at the start-up of the 3RW5 communication module (LED test).

LED display on the 3RW5 Modbus communication modules



- A 3RW5 Modbus TCP communication module
- B 3RW5 Modbus RTU communication module
- ① DIAG (red / green)
- ② BUS (red / green)
- ③ LINK (green)
- ④ No function

7.1.2 Status and error displays

7.1.2.1 Status and error displays on the 3RW5 Modbus TCP communication module

"DIAG" LED

State	Meaning
 Lights up green	There is at least one TCP connection between the 3RW5 communication module and a communication partner (e.g. Modbus TCP client).
 Flashes green	- The 3RW5 soft starter is not configured. - The 3RW5 communication module is starting. - The 3RW5 communication module is being parameterized. - Factory settings are being restored. - Device not performing data exchange.
 Lights up red	Hardware or firmware defective.
 Flashes red	- Group error (only if the 3RW5 communication module is malfunctioning) - Switchover from old to new firmware after firmware update (flashes briefly)
 Flashes green / red	The "node flash test" was activated.
 Off	No supply voltage available.

7.1 LED display

"BUS" LED

State	Meaning
 Lights up green	Device is performing data exchange (3RW5 Soft Starter in Automatic mode).
 Lights up red	- Bus error, e.g.: - Timeout for access monitoring of the control source. - Modbus TCP cable not connected. - Switchover from old to new firmware after firmware update (temporarily lights up)
 Flashes red	- Configuring error - Timeout for TCP keep-alive monitoring. - Device not performing data exchange - No Modbus TCP client connected
 Off	- If the Modbus TCP client is connected, no data exchange has occurred after the 3RW5 communication module has started up. - No supply voltage available.

"LINK" LED

State	Meaning
 Lights up green	There is at least one Ethernet connection between the 3RW5 communication module and a communication partner (e.g. Ethernet switch).
 Flashes green	The "node flash test" was activated.
 Off	- There is no Ethernet connection between the 3RW5 communication module and a communication partner (e.g. Ethernet switch). - No supply voltage available.

7.1.2.2 Status and error displays on the 3RW5 Modbus RTU communication module

"DIAG" LED

State	Meaning
 Lights up green	Device exchanging data with the Modbus RTU master.
 Flashes green	- The 3RW5 soft starter is not configured. - The 3RW5 communication module is starting. - The 3RW5 communication module is being parameterized. - Factory settings are being restored. - Device not performing data exchange.
 Lights up red	Hardware or firmware defective.
 Flashes red	- Group error (only if the 3RW5 communication module is malfunctioning) - Switchover from old to new firmware after firmware update (flashes briefly)
 Flashes green / red	The "node flash test" was activated.
 Off	No supply voltage available.

"BUS" LED

State	Meaning
 Lights up green	Device is performing data exchange (3RW5 Soft Starter in Automatic mode).
 Lights up red	- Bus error, e.g.: - Timeout for access monitoring of the control source. - Determining the baud rate or port configuration with the setting "Automatic". - Switchover from old to new firmware after firmware update (temporarily lights up)
 Flashes red	Configuring error
 Off	- After the 3RW5 communication module has started up, no data access has occurred yet. - No supply voltage available.

7.2 Function Codes

The Function Code defines the meaning of the telegram and defines the telegram structure.

Overview of the Function Codes

Function Code (decimal/hexadecimal)	Designation according to Modbus specification
01 / 0x01 (Page 100)	Read Coils
02 / 0x02 (Page 100)	Read Discrete Inputs
03 / 0x03 (Page 101)	Read Holding Registers
04 / 0x04 (Page 101)	Read Input Registers
05 / 0x05 (Page 103)	Write Single Coil
06 / 0x06 (Page 105)	Write Single Register
15 / 0x0F (Page 106)	Write Multiple Coils
16 / 0x10 (Page 108)	Write Multiple Registers
23 / 0x17 (Page 110)	Read/Write Multiple Registers

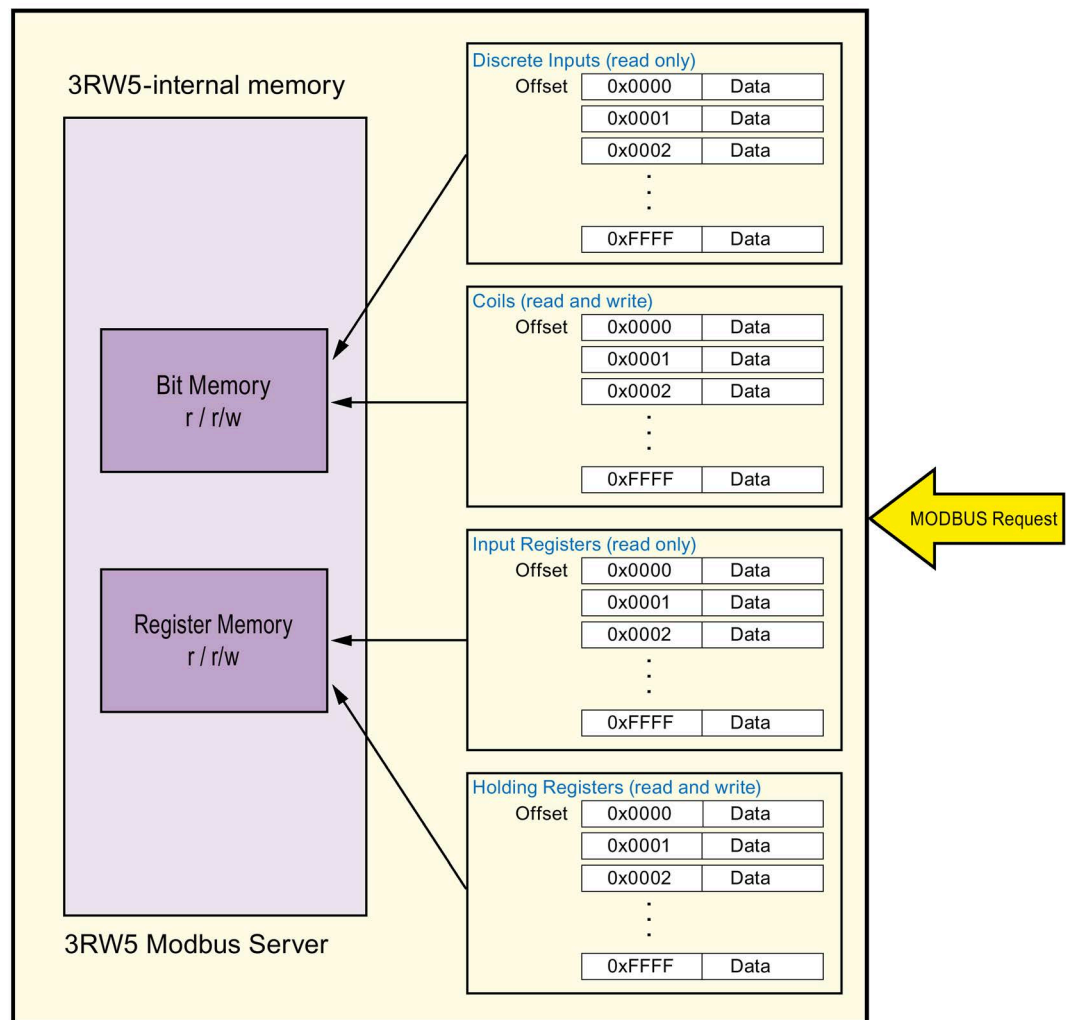
Access to memory areas

Two memory areas are used in the 3RW5 Soft Starter:

- A memory area for addressing the bit information
- A memory area for addressing 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.

Whether information is read-only (r) or read/writeable (r/w) is stated in the data tables in chapter Data tables (Page 136).

**Note****Addressing the memory areas in the TIA Portal**

Note the special aspects about addressing the memory areas in the TIA Portal. Additional information can be found on the Internet

(<https://support.industry.siemens.com/cs/ww/en/view/100633819>).

7.2.1 Function Codes 01 (Read Coils) and 02 (Read Discrete Inputs)

These functions enable the reading of individual bits from the 3RW5 bit memory area by the Modbus TCP client system or the Modbus RTU master system.

Function 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 2 000 bits can be read per telegram.

If a number that is not equal to a multiple of 8 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 telegram

Modbus TCP:

Address Field	Function Code	Start address	Number of bits
7 bytes	1 byte	2 bytes	2 bytes
-	0x01	0x84EF	0x0001

Modbus RTU:

Slave address	Function Code	Start address	Number of bits	CRC
1 byte	1 byte	2 bytes	2 bytes	2 bytes
-	0x01	0x84EF	0x0001	-

Response telegram

Modbus TCP:

Address Field	Function Code	Number of bytes <i>n</i>	Bit status
7 bytes	1 byte	1 byte	<i>n</i> bytes
-	0x01	0x01	0x01

Modbus RTU:

Slave address	Function Code	Number of bytes <i>n</i>	Bit status	CRC
1 byte	1 byte	1 byte	<i>n</i> bytes	2 bytes
-	0x01	0x01	0x01	-

Example

Reading in bypass operation mode "internal bypass" (Operation / bypass active):

- Address Field or slave address: The address of the 3RW5 soft starter is not entered in the example (-).
- The CRC CHECK is not entered in the example (-).
- The bit address of "Operation / bypass active" is 0x84EF.
- As feedback, the status "Operation / bypass active" is returned with a logical one (0x01). The remaining following bits of the transmitted byte are filled with zeros.

You will find the data table for the soft starter diagnostics in chapter Soft starter diagnostics (Page 152).

7.2.2 Function Codes 03 (Read Holding Registers) and 04 (Read Input Registers)

These functions enable the Modbus TCP client system or the Modbus RTU master system to read registers from the 3RW5 register memory area.

Function 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 telegram can be read.

Request telegram

Modbus TCP:

Address Field	Function Code	Start address	Number of registers
7 bytes	1 byte	2 bytes	2 bytes
-	0x03	0x880F	0x0006

Modbus RTU:

Slave address	Function Code	Start address	Number of registers	CRC
1 byte	1 byte	2 bytes	2 bytes	2 bytes
-	0x03	0x880F	0x0006	-

Response telegram

Modbus TCP:

Address Field	Function Code	Number of bytes	Register value
7 bytes	1 byte	1 byte	n registers
-	0x03	0x0C	0x0000 0x2710 0x0000 0x2710 0x0000 0x2710

Modbus RTU:

Slave address	Function Code	Number of bytes	Register value	CRC
1 byte	1 byte	1 byte	n registers	2 bytes
-	0x03	0x0C	0x0000 0x2710 0x0000 0x2710 0x0000 0x2710	-

Example

Reading in the rms phase currents:

- Address Field or slave address: The address of the 3RW5 soft starter is not entered in the example (-).
- The CRC CHECK is not entered in the example (-).
- The phase currents start at register address 0x880F and include 6 registers.
- As feedback, the measured values of the current rms phase currents (I L1, I L2, I L3) are returned with 100 A (0x0000 0x2710) each.

You can find the data table for the measured values in chapter Measured values (Page 158).

7.2.3 Function Code 05 (Write Single Coil)

This function enables the writing of an individual bit from the 3RW5 bit memory area by the Modbus TCP client system or the Modbus RTU master system.

A valid address from the bit memory area is expected as the start address. The selected address must be designated as writable in the data tables in chapter Data tables (Page 136).

0x0000 for a logical zero and 0xFF00 for a logical one are accepted as data. Any other value is impermissible and given a negative acknowledgment.

Request telegram

Modbus TCP:

Address Field	Function Code	Start address	Data
7 bytes	1 byte	2 bytes	2 bytes
-	0x05	0x8200	0xFF00

Modbus RTU:

Slave address	Function Code	Start address	Data	CRC
1 byte	1 byte	2 bytes	2 bytes	2 bytes
-	0x05	0x8200	0xFF00	-

Response telegram

Modbus TCP:

Address Field	Function Code	Start address	Data
7 bytes	1 byte	2 bytes	2 bytes
-	0x05	0x8200	0xFF00

Modbus RTU:

Slave address	Function Code	Start address	Data	CRC
1 byte	1 byte	2 bytes	2 bytes	2 bytes
-	0x05	0x8200	0xFF00	-

Example

Setting the bit address of the "Motor CW" command to a logical one:

- Address Field or slave address: The address of the 3RW5 soft starter is not entered in the example (-).
- The CRC CHECK is not entered in the example (-).
- The bit address of "Motor CW" is 0x8200.

You will find the data table for the process image output in chapter Process image output (PIQ) (Page 150).

7.2.4 Function Code 06 (Write Single Register)

This function enables the Modbus TCP client system or the Modbus RTU master system to write an individual register from the 3RW5 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 in the data tables in chapter Data tables (Page 136).

Request telegram

Modbus TCP:

Address Field	Function Code	Start address	Data
7 bytes	1 byte	2 bytes	2 bytes
-	0x06	0x9409	0x0005

Modbus RTU:

Slave address	Function Code	Start address	Data	CRC
1 byte	1 byte	2 bytes	2 bytes	2 bytes
-	0x06	0x9409	0x0005	-

Response telegram

Modbus TCP:

Address Field	Function Code	Start address	Data
7 bytes	1 byte	2 bytes	2 bytes
-	0x06	0x9409	0x0005

Modbus RTU:

Slave address	Function Code	Start address	Data	CRC
1 byte	1 byte	2 bytes	2 bytes	2 bytes
-	0x06	0x9409	0x0005	-

Example

Setting the starting mode "Voltage ramp + Current limiting":

- Address Field or slave address: The address of the 3RW5 soft starter is not entered in the example (-).
- The CRC CHECK is not entered in the example (-).
- The register address of the starting mode is 0x9409.
- For the starting mode "Voltage ramp + Current limiting" the value 5 is transmitted to the 3RW5 soft starter (0x0005).

You can find the data table for the parameters in Parameters (Page 164).

7.2.5 Function Code 15 (Write Multiple Coils)

This function enables the writing of multiple bits from the 3RW5 bit memory area by the Modbus TCP client system or the Modbus RTU master system.

A valid address from the bit memory area is expected as the start address. The selected address must be designated as writable in the data tables in chapter Data tables (Page 136).

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

Request telegram

Modbus TCP:

Address Field	Function Code	Start address	Number of bits	Number of bytes	Data
7 bytes	1 byte	2 bytes	2 bytes	1 byte	n bytes
-	0x0F	0x8200	0x0007	0x01	0x41

Modbus RTU:

Slave address	Function Code	Start address	Number of bits	Number of bytes	Data	CRC
1 byte	1 byte	2 bytes	2 bytes	1 byte	n bytes	2 bytes
-	0x0F	0x8200	0x0007	0x01	0x41	-

Response telegram

Modbus TCP:

Address Field	Function Code	Start address	Number of bits
7 bytes	1 byte	2 bytes	2 bytes
-	0x0F	0x8200	0x0007

Modbus RTU:

Slave address	Function Code	Start address	Number of bits	CRC
1 byte	1 byte	2 bytes	2 bytes	2 bytes
-	0x0F	0x8200	0x0007	-

Example

Setting the bit addresses of the "Motor CW" and "Creep speed" commands to a logical one:

- Address Field or slave address: The address of the 3RW5 soft starter is not entered in the example (-).
- The CRC CHECK is not entered in the example (-).
- The bit addresses of the commands are:
 - "Motor CW": 0x8200
 - "Creep speed": 0x8206
- The remaining bits of the byte are controlled with a logical zero (0x41).

You will find the data table for the process image output in chapter Process image output (PIQ) (Page 150).

7.2.6 Function Code 16 (Write Multiple Registers)

This function enables the Modbus TCP client system or the Modbus RTU master system to write multiple registers from the 3RW5 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 in the data tables in chapter Data tables (Page 136).

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

Request telegram

Modbus TCP:

Address Field	Function Code	Start address	Number of registers	Number of bytes	Data
7 bytes	1 byte	2 bytes	2 bytes	1 byte	n x 2 bytes
-	0x10	0x9403	0x0002	0x04	0x0000 0x2710

Modbus RTU:

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	0x9403	0x0002	0x04	0x0000 0x2710	-

Response telegram

Modbus TCP:

Address Field	Function Code	Start address	Number of registers
7 bytes	1 byte	2 bytes	2 bytes
-	0x10	0x9403	0x0002

Modbus RTU:

Slave address	Function Code	Start address	Number of registers	CRC
1 byte	1 byte	2 bytes	2 bytes	2 bytes
-	0x10	0x9403	0x0002	-

Example

Setting the rated operational current I_e to 100 A:

- Address Field or slave address: The address of the 3RW5 soft starter is not entered in the example (-).
- The CRC CHECK is not entered in the example (-).
- The register address of the rated operational current I_e is 0x9403.
- The rated operational current I_e occupies 2 registers.
- The value 100 A is transmitted to the 3RW5 soft starter (0x0000 0x2710).

You can find the data table for the parameters in Parameters (Page 164).

7.2.7 Function Code 23 (Read/Write Multiple Registers)

This function enables the Modbus TCP client system or the Modbus RTU master system to write and read several registers from the 3RW5 register memory area using a single function call.

The write operation is the first executed operation here. This function is typically used for outputting cyclic data in the 3RW5 soft starter and for reading back inputs or device statuses.

A valid address from the bit memory area is expected as the start address. The selected address must be designated as writable in the data tables in chapter Data tables (Page 136).

Request telegram

Modbus TCP:

Address Field	Function Code	Start address read operation	Number of registers (read access)
7 bytes	1 byte	2 bytes	2 bytes
-	0x17	0x8000	0x0008

Start address write operation	Number of registers N (write access)	Number of bytes (write access)	Data (write access)
2 bytes	2 bytes	1 byte	N x 2 bytes
0x8200	0x0001	0x01	0x0041

Modbus RTU:

Slave address	Function Code	Start address read operation	Number of registers (read access)
1 byte	1 byte	2 bytes	2 bytes
-	0x17	0x8000	0x0008

Start address write operation	Number of registers N (write access)	Number of bytes (write access)	Data (write access)	CRC
2 bytes	2 bytes	1 byte	N x 2 bytes	2 bytes
0x8200	0x0001	0x01	0x0041	-

Response telegram

Modbus TCP:

Address Field	Function Code	Number of bytes N	Data
7 bytes	1 byte	1 byte	N x 2 bytes
-	0x17	0x0010	-

Modbus RTU:

Slave address	Function Code	Number of bytes N	Data	CRC
1 byte	1 byte	1 byte	N x 2 bytes	2 bytes
-	0x17	0x0010	-	-

Example

Setting the bit addresses of the "Motor CW" and "Creep speed" commands to a logical one and reading the process image input:

- Address Field or slave address: The address of the 3RW5 soft starter is not entered in the example (-).
- The CRC CHECK is not entered in the example (-).
- The commands start in register address 0x8200. The bit addresses of the commands are:
 - "Motor CW": 0x8200
 - "Creep speed": 0x8206
- The remaining bits of the byte are controlled with a logical zero (0x41).
- The process image input starts at register address 0x8000 and occupies 8 registers.
- As feedback, the process image input is returned. In the example, the returned data are not entered (-). Note that the requested commands are not returned as a new status in the exact same cycle because implementation of the commands takes a while. The new status is not returned in the process image input until several communication cycles later.

You will find the data tables for the process image output and process image input in chapters Process image output (PIQ) (Page 150) and Process image input (PII) (Page 148).

7.3 Exception Codes

7.3.1 Error Responses

Operating principle

If the Modbus TCP server or the Modbus RTU slave detects an error in the request telegram of the Modbus TCP Client or the Modbus RTU master, e.g. register address not permitted, the Modbus TCP server or the Modbus RTU slave will permit the most significant bit in the Function Code of the response telegram: Requested Function Code + 0x80. This step is followed by transmission of a byte with the Exception Code that describes the cause of the error.

Typical Exception Code telegram

The Exception Code telegram of the Modbus TCP server or Modbus RTU slave has the following structure, for example:

- Address Field or slave address: The address of the 3RW5 soft starter is not entered in the example (-).
- Requested Function Code: 5 (= 0x05)
- Exception Code: 2 (= 0x02)
- The CRC CHECK is not entered in the example (-).

Response telegram from the Modbus TCP server:

Address Field	Function Code	Exception Code
7 bytes	1 byte	1 byte
-	0x85	0x02

Response telegram from the Modbus RTU slave:

Slave address	Function Code	Exception Code	CRC
1 byte	1 byte	1 byte	2 bytes
-	0x85	0x02	-

7.3.2 Supported Exception Codes

Exception Code	Meaning in accordance with Modbus specification	Cause	Brief description	Example
1 (= 0x01)	Illegal function	Impermissible Function Code	The requested Function Code is not supported. Pay particular attention to chapter Function Codes (Page 98).	The Function Code 43 was requested. The 3RW5 Modbus communication modules do not support the Function Code 43.
2 (= 0x02)	Illegal data address	Impermissible bit and register address in the Modbus TCP server or Modbus RTU slave	Address does not exist. For functions that work with an addressing range, all addresses affected by the request are checked.	Request for reading the register with address 0x7000. The register address 0x7000 is not defined for 3RW5 Modbus communication modules.
3 (= 0x03)	Illegal data value	Impermissible data value in the Modbus TCP server or Modbus RTU slave	The number of addresses is not correct. The number of parameters for the requested function was too high (or 0)	Request for writing the register with address 0xA102 with the value 7 000. The parameter "Access monitoring time" can only have the value 5 000 or 10 000.
4 (= 0x04)	Failure in associated device	Internal error in the Modbus TCP server or Modbus RTU slave	There is an unspecified error in the Modbus TCP server or Modbus RTU slave that prevented execution of the request.	Error in the 3RW5 soft starter so that the 3RW5 soft starter cannot answer the request.
6 (= 0x06)	Busy, rejected message	Modbus TCP server or Modbus RTU 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.

Note

TIA Portal

Note that the TIA portal does not support all Exception Codes. Unsupported Exception Codes are detected and evaluated as Exception Code 0x03. You will find further information in the online help for the TIA Portal.

7.4 Errors and remedial measures on the 3RW5 communication module

The following table describes possible errors and remedies for the 3RW5 communication module. Errors and remedies for the 3RW5 soft starter can be found in the Equipment Manual of the 3RW5 soft starter.

Error No. ¹⁾	Error	Cause	Remedy
303	Bus error	-	• Check the bus connection. • Check the bus parameters. • The error is acknowledged automatically once it has been rectified.

¹⁾ Visible on the display of the 3RW5 HMI Standard.

7.5 Messages about the mode

The following message bits in the "Soft starter diagnostics" data table (Page 152) clearly indicate which control source currently has control priority:

- Automatic mode (①)
- Automatic operation - input controlled (②)¹⁾
- Operating mode manual - local (③)
- Manual operation local - input controlled (④)
- Manual operation local - HMI controlled (⑤)
- Manual operation local - PC controlled (⑥)
- Connection abort in manual mode (⑦)

Automatic		Manual					Control priority is with:
		Manual operation local					
①	② ¹⁾	③	④	⑤	⑥	⑦	
0	0	0	0	0	0	0	Message is not permitted.
1	0	0	0	0	0	0	Modbus TCP client or Modbus RTU master controlled via fieldbus (e.g. PLC).
0	1	1	1	0	0	0	Control digital inputs. ²⁾
0	0	1	0	0	0	1	No control source.
0	0	1	1	0	0	0	Input IN or control digital inputs. ³⁾
0	0	1	0	1	0	0	HMI controlling.
0	0	1	0	0	1	0	PC controlled via local interface.

¹⁾ Supported by 3RW55 soft starter from firmware version V2.1

²⁾ For 3RW50, 3RW52, 3RW55 soft starters with firmware version earlier than V2.1 and 3RW55 Failsafe, it is not possible to combine the message bits. For the 3RW55 soft starter as of firmware version V2.1 if the digital inputs have master control by activating the "Manual operation local - input controlled" bit in the process image output (PIQ). The PLC can regain master control at any time.

³⁾ Combining the message bits is possible for 3RW50, 3RW52, 3RW55 and 3RW55 Failsafe Soft Starters. For 3RW55 soft starters as of firmware version V2.1, only if the input action "Operating mode manual - local" has been parameterized and activated.

For more information on setting the operating mode, see chapter Operating modes and master control function (Page 32).

Maintenance and service

8.1 Firmware update

During operation, it may be necessary to update the firmware, e.g. to extend the available functions. You update the firmware of the 3RW5 communication module with the help of firmware files. The retentive data is retained after the firmware has been updated.

Firmware updates and a history of the versions with the innovations are provided to you on the Internet.

Note**Firmware update**

You need a 3RW5 HMI High Feature to update the firmware. The firmware cannot be updated via the fieldbus.

Requirements

- Valid firmware update

You will find the latest firmware files on the 3RW5 topic page (<https://support.industry.siemens.com/cs/ww/en/view/109747404>).

- 3RW5 HMI High Feature

Procedure

1. Make sure that the motor is switched off and you do not start the motor during the firmware update.

A control command for starting the motor is not supported during the firmware update.

To ensure the quickest and most fault-free firmware update, it is recommended that you disconnect the main voltage of the 3RW5 soft starter and set the CPU / PLC to STOP state.

2. Perform the update of the device firmware.

The following procedures are possible:

- With a micro SD card via the 3RW5 HMI High Feature (Page 119)
- Via SIRIUS Soft Starter ES (TIA Portal) over the local interface on the 3RW5 HMI High Feature

Brief overview: Window "Project Navigation" with current project under created Soft Starter > "Online & Diagnostics" > Window "Work area" > "Modbus TCP / Modbus RTU > Functions > Firmware update"

Further information on the operation of SIRIUS Soft Starter ES (TIA Portal) can be found in the online help of SIRIUS Soft Starter ES (TIA Portal).

Result

You have performed a firmware update for the 3RW5 communication module. The 3RW5 communication module restarts automatically.

8.1.1 Performing firmware update with micro SD card (3RW5 HMI High Feature)

Requirements

- Micro SD card with valid firmware file (*.upd)
You will find more information and requirements for supporting the micro SD card in the Equipment Manual of the 3RW5 soft starter.
- The valid firmware file is located in the root directory (topmost level).
- 3RW5 HMI High Feature
Menu "Micro SD card > FW update".

Procedure

Note

Access to micro SD card.

Please note that the micro SD card is inserted in the 3RW5 HMI High Feature during updating of the firmware.

Premature removal of the micro SD card from the 3RW5 HMI High Feature is not permissible and will terminate updating of the firmware. Data could also be lost.

1. Select the folder of the 3RW5 communication module.
2. Select the firmware file of the 3RW5 communication module and confirm with the OK button.

You can see the firmware update is being performed from the progress bar on the display.

Following successful updating of the firmware, the 3RW5 communication module restarts automatically.
3. Check the new firmware version in the "Overview" menu.

Result

You have performed a firmware update for the 3RW5 communication module using the Micro SD card.

More information

You will find more information on operating the 3RW5 HMI High Feature in the Equipment Manual of the 3RW5 soft starter.

8.2 Replacing the 3RW5 communication module

Communication parameters are stored in the 3RW5 communication module and not automatically transferred into the replacement device.

Observe the following chapters on the communication parameters:

- Configuring the 3RW5 Soft Starter (Page 73)
- Modbus TCP communication parameters (Page 176)
- Modbus RTU communication parameters (Page 177)

Note

Back up the communication parameters on micro SD card

Depending on the 3RW5 soft starter, you can back up the communication parameters to a micro SD card via the 3RW5 HMI High Feature.

You will find more information about backing up the configuration data to a micro SD card and operating the 3RW5 HMI High Feature in the Equipment Manual of the 3RW5 soft starter.

Requirements

NOTICE
Damage to property due to electrical voltage Switch off the power to the 3RW5 soft starter before starting work (main and control supply voltage).

Procedure

1. Remove the bus connector (Page 63) or the bus connection cable (Page 67).
2. Remove the 3RW5 communication module.
 - 3RW50 soft starter: Remove the COM connecting cable from the 3RW5 communication module (Page 59) and remove the 3RW5 communication module on the level surface (Page 53).
 - 3RW52, 3RW55 and 3RW55 Failsafe soft starters: Remove the 3RW5 communication module in the 3RW5 soft starter (Page 49).
3. Mount the 3RW5 communication module.
 - 3RW50 soft starter: Mount the 3RW5 communication module on the level surface (Page 51) and connect the COM connecting cable to the 3RW5 communication module (Page 57).
 - 3RW52, 3RW55 and 3RW55 Failsafe soft starters: Mount the 3RW5 communication module in the 3RW5 soft starter (Page 48).
4. Connect the bus connector (Page 61) or the bus connection cable (Page 64) of the bus connection to the 3RW5 communication module.

Result

You have replaced the 3RW5 communication module and can commission the 3RW5 soft starter in the bus connection.

Set the communication parameters anew. If you backed up the communication parameters to a micro SD card before replacement, you can transfer them from the micro SD card to the replacement device.

8.3 Restoring factory settings

Effects of the factory setting

The following devices can be reset to the factory setting:

- 3RW5 soft starter
 - The parameters of the 3RW5 soft starter are reset to the factory setting (depending on the 3RW5 soft starter).
 - User accounts are deleted (depending on the 3RW5 soft starter).
 - Parameters relevant to protection against explosion are deleted (depends on the 3RW5 soft starter).
- 3RW5 communication module
 - The parameters of the 3RW5 communication module are reset.
- 3RW5 HMI High Feature
 - The parameters of the 3RW5 HMI High Feature and the PIN for access protection are reset to the factory setting.
- All devices
 - The 3RW5 soft starter, the 3RW5 communication module, and the 3RW5 HMI High Feature are reset to the factory settings, as described above.

Requirements

The control priority lies with the source of the command to restore the factory setting.

Procedure

1. Make sure that the motor is switched off and that you do not start the motor while restoring the factory settings.

To ensure the quickest and most fault-free restoration of the factory setting, it is recommended that you disconnect the main voltage at the 3RW5 soft starter.

2. Restore the factory settings.

Note

Restoring the factory settings

It is not possible to restore the factory settings via the fieldbus. Note the other possibilities for restoring the factory settings.

Other possibilities for restoring the factory settings

Additional information on restoring the factory setting via the 3RW5 soft starter, via the 3RW5 HMI High Feature or via the SIRIUS Soft Starter ES (TIA Portal) on the local interface on the 3RW5 HMI High Feature can be found in the 3RW5 Soft Starter Equipment Manual.

Result

The factory setting of the selected device or all devices is restored.

Technical data

9.1 Technical data in Siemens Industry Online Support

Technical data sheet

You can also find the technical data of the product at Siemens Industry Online Support (<https://support.industry.siemens.com/cs/ww/en/ps/16212/td>).

1. Enter the full article number of the desired device in the "Product" field, and confirm with the Enter key.
2. Click the "Technical data" link.

The screenshot shows the Siemens Industry Online Support search interface. At the top, there is a 'Product tree' dropdown set to 'All' and a search bar labeled 'Enter keyword...'. Below this, the 'Product' field contains the article number '3RW2015-4BA10' and is highlighted with a red box. To its right, the 'Entry type' dropdown is set to 'Technical data (1)' and is also highlighted with a red box. Further right, there is a 'Date' field with 'From' and 'To' sub-fields. Below the search fields, there is a '> Search product' button. The search results section shows a product image placeholder and the text '3RW2015-4BA10 CIRCUIT BREAKER, SCREW TYPE, 20 A CIRCUIT BREAKER SIZE S2, FOR MOTOR PROTECTION, CLASS 10, A-RELEASE 14... 20A, N-RELEASE 20DA, SCREW TERMINAL, STANDARD BREAKING CAPACITY'. At the bottom of the results, there are three links: '> Product details', '> Technical data' (highlighted with a red box), and '> CAx data'.

Overview tables technical data

You will find overview tables with technical data in the "Product information" tab in our online ordering system (<https://mall.industry.siemens.com/mall/en/WW/Catalog/Products/10024029?tree=CatalogTree>).

Dimension drawings

10.1 CAX data

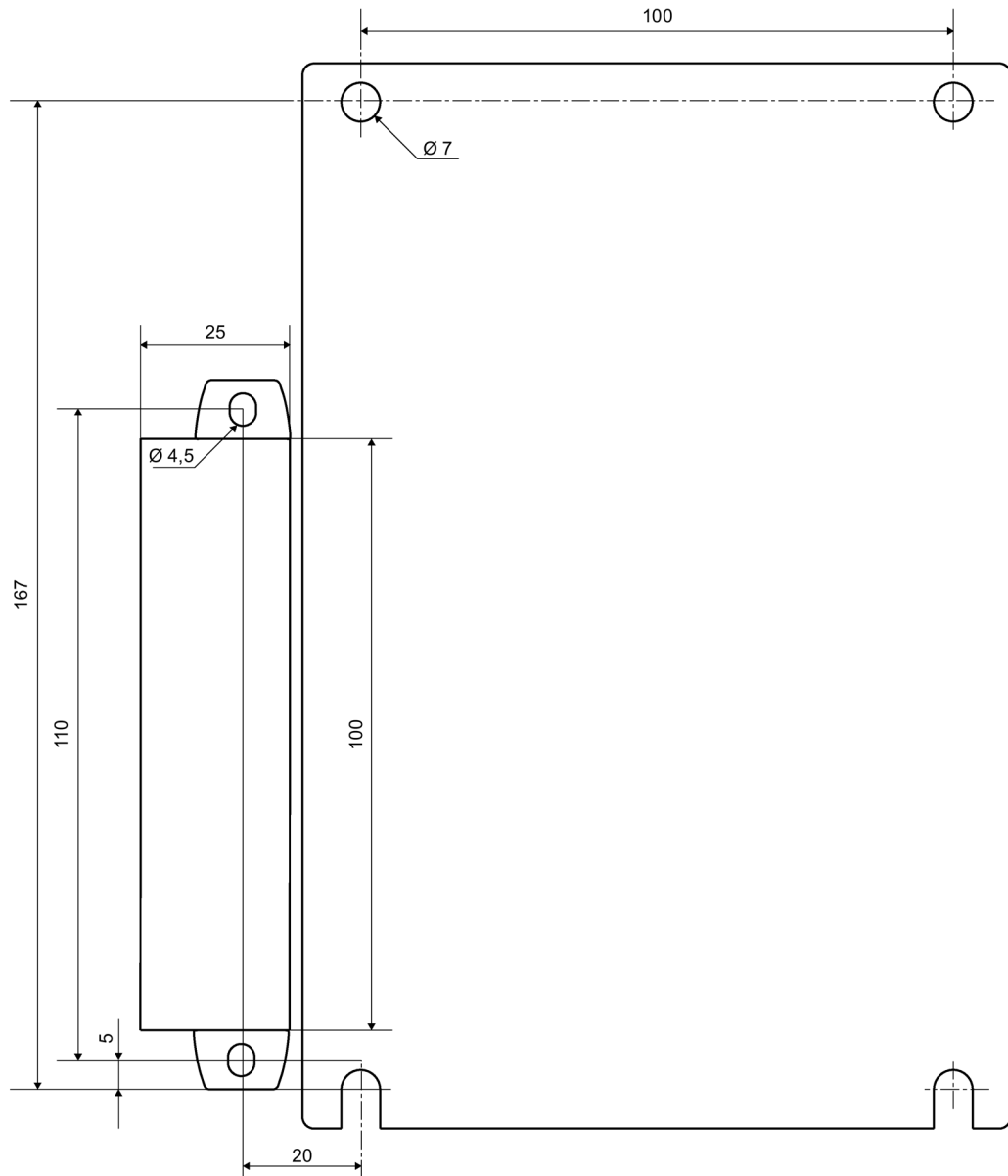
You can find the CAX data in the Siemens Industry Online Support (<https://support.industry.siemens.com/cs/ww/en/ps/16212/td>).

1. Enter the full article number of the desired device in the "Product" field, and confirm with the Enter key.
2. Click the "CAX data link."

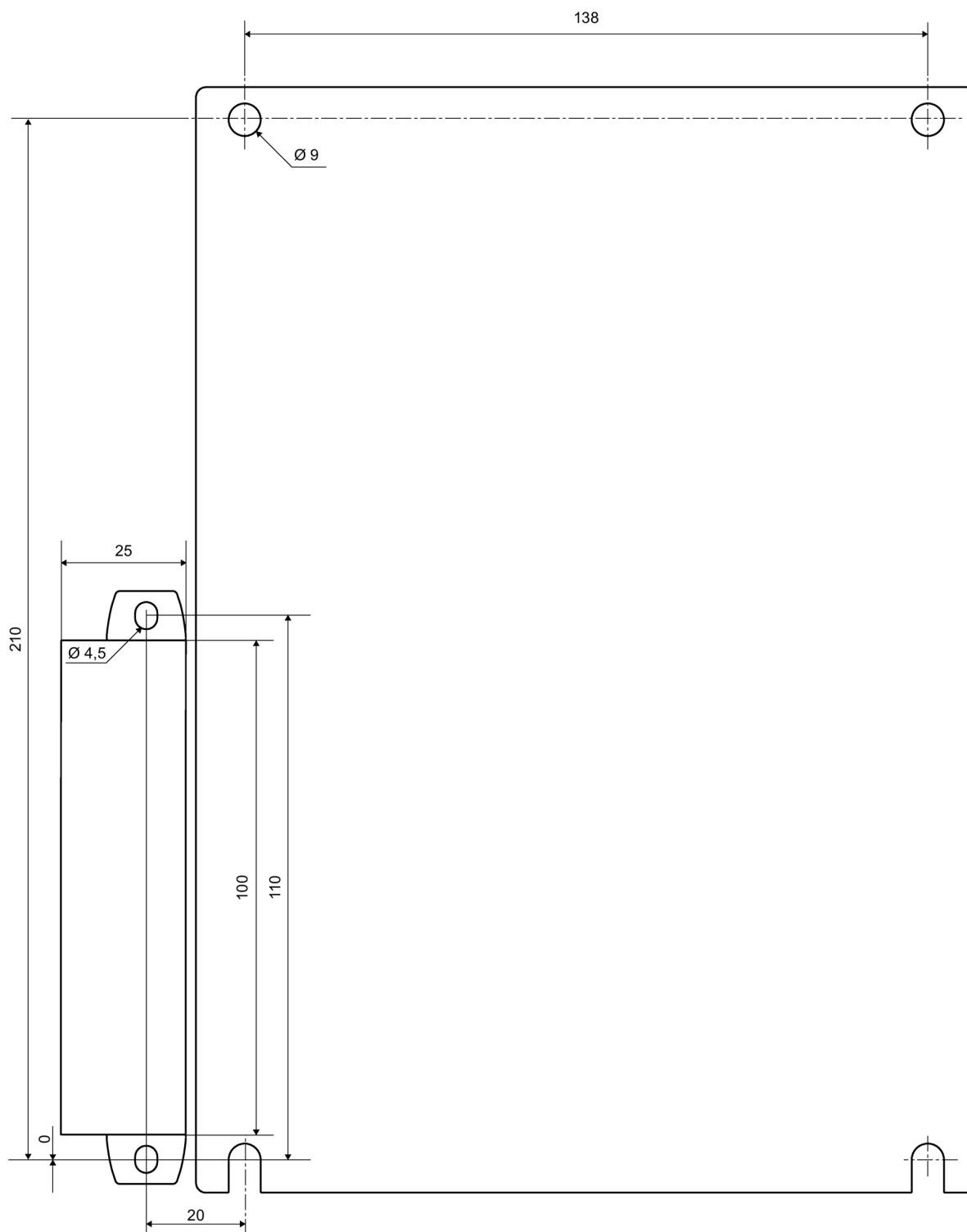
The screenshot shows the Siemens Industry Online Support search interface. At the top, there is a "Product tree" dropdown set to "All" and a search bar labeled "Enter keyword...". Below this, the search results are displayed. The "Product" field contains the article number "3RW2015-4BA10". The "Entry type" dropdown is set to "Technical data (1)". The "Date" field has "From" and "To" input boxes. Below the search filters, there is a "Search product" button. The search results show a product entry for "3RW2015-4BA10" with a description: "CIRCUIT BREAKER, SCREW TYPE, 20 A, CIRCUIT BREAKER SIZE S2, FOR MOTOR PROTECTION, CLASS 10, A-RELEASE 14...20A, N-RELEASE 20DA, SCREW TERMINAL, STANDARD BREAKING CAPACITY". Below the product description, there are navigation links: "> Product details", "> Technical data", and "> CAX data". The "CAX data" link is highlighted with a red box.

10.2 Drilling patterns for 3RW5 communication module on the 3RW50 soft starter

3RW5 communication module on the 3RW50 soft starter size S6



3RW5 communication module on the 3RW50 soft starter size S12



Circuit diagrams

11.1 CAX data

You can find the CAX data in the Siemens Industry Online Support (<https://support.industry.siemens.com/cs/ww/en/ps/16212/td>).

1. Enter the full article number of the desired device in the "Product" field, and confirm with the Enter key.
2. Click the "CAX data link."

The screenshot shows the Siemens Industry Online Support search interface. At the top, there is a "Product tree" dropdown set to "All" and a search bar labeled "Enter keyword...". Below this, the search results are displayed. The "Product" field contains the article number "3RW2031-4BA10". The "Entry type" dropdown is set to "Technical data (1)". The "Date" field has "From" and "To" input boxes. Below the search filters, there is a search button labeled "> Search product". The search results section shows a product image placeholder and the product description: "3RW2031-4BA10 CIRCUIT BREAKER, SCREW TYPE, 20 A CIRCUIT BREAKER SIZE S2, FOR MOTOR PROTECTION, CLASS 10, A-RELEASE 14...20A, N-RELEASE 20DA, SCREW TERMINAL, STANDARD BREAKING CAPACITY". At the bottom of the results, there are navigation links: "> Product details", "> Technical data", and "> CAX data", with the "CAX data" link highlighted by a red box.

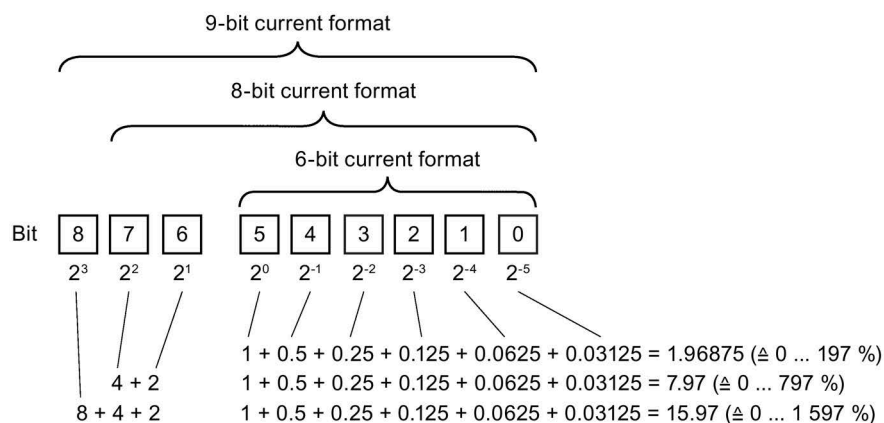
Appendix

A.1 Data formats

A.1.1 Current values as percentages

Current values are coded as percentages in different current formats:

- 6-bit current format
- 8-bit current format
- 9-bit current format



Examples of current values

The following values are examples of current values expressed as percentages:

- Phase currents I L1, I L2, I L3 (8-bit current format)
- Last tripping current (9-bit current format)

You will find a complete overview of all measured values in chapter Measured values (Page 158).

A.1.2 **Statistic data**

Statistic data group together the operating states from the past that are relevant to the load.

Examples of statistic data

The following values are examples of statistic data:

- Operating hours
 - Motor operating hours
 - Operating hours of the device (3RW5 Soft Starter)
- Number of motor overload trips
- Number of starts motor CW
- Number of starts motor CCW

You will find a complete overview of the statistic data in chapter Statistic data (Page 160).

A.1.3 Maximum pointer

Maximum pointers are stored extreme values of measured values from the past and are used for preventive diagnostics. Maximum pointers are stored in the device and can be deleted at any time.

Examples of maximum pointers

The following values are examples of maximum pointers:

- Number of motor overload trips
- Minimum and maximum phase current I L1, I L2, I L3
- Minimum and maximum line-to-line voltages
- Minimum and maximum line frequency

You will find a complete overview of the maximum pointers in chapter Maximum pointer (Page 162).

A.2 Data tables

A.2.1 Byte arrangement

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

Byte arrangement		Data type
Byte 0	High byte	High word
Byte 1	Low byte	
Byte 2	High byte	Low word
Byte 3	Low byte	
Byte 0	High byte	Word
Byte 1	Low byte	
Byte 0	Byte 0	Byte
Byte 1	Byte 1	

1 register corresponds to 1 word (2 bytes).

A.2.2 Specifications

The following specifications apply in the data tables:

- The addresses are represented as hexadecimal values (hex) and, under that, in square brackets "[...]" or in a separate column as decimal values (dec).
- The access to undefined addresses is illegal and generates an error message.
- Non-relevant (reserved) entries are not listed in the data tables.

On read access to data tables, logical zeros are returned for reserved address ranges.
On write access to the data tables, write commands for reserved address ranges are ignored.

Refer to the information on address ranges in chapter Memory image (Page 138).

- In data tables for parameters, codes are shown in square brackets "[...]". "[D^x]" describes the default encoding.

Object number (Obj. No.)

The object number (Obj. No.) is used for unique identification of all parameters available in the 3RW5 soft starter. In the case of a parameterization error, the object number of the faulty parameter is displayed in data table "Soft starter diagnostics" (Page 152) or in the data table "HMI diagnostics" (Page 179) under "Faulty parameter number".

A.2.3 Memory image

Address range		Chapter	Length	3RW	
hex	dec			50 / 52 ¹⁾	55 / 55-F ²⁾
Commands					
0x0000	0	Node flash test (Page 140)	1 register	x	x
Identification data					
0x00C1 - 0x00E0	193 - 224	I&M0 - device identification (3RW5 communication module) (Page 141)	32 registers	x ³⁾ , 4)	x ³⁾ , 4)
0x0181 - 0x01A0	385 - 416	I&M0 - device identification (3RW5 soft starter) (Page 142)	32 registers	x	x
0x01A1 - 0x1C0	417 - 448	I&M1 - equipment identifier (3RW5 soft Starter) (Page 143)	32 registers	x	x
0x01C1 - 0x01E0	449 - 480	I&M2 - installation (3RW5 soft starter) (Page 144)	32 registers	x	x
0x01E1 - 0x0200	481 - 512	I&M3 - description (3RW5 soft starter) (Page 145)	32 registers	x	x
0x0241 - 0x0260	577 - 608	I&M0 - device identification (3RW5 HMI High Feature) (Page 146)	32 registers	x ⁵⁾	x ⁵⁾
Energy management (Page 147)					
0x09C1 - 0x09C2	2497 - 2498	Phase current I L1 (rms)	2 registers	x	x
0x09C3 - 0x09C4	2499 - 2500	Phase current I L2 (rms)	2 registers	x	x
0x09C5 - 0x09C6	2501 - 2502	Phase current I L3 (rms)	2 registers	x	x
0x09C7 - 0x09C8	2503 - 2504	Phase current average (rms)	2 registers	x	x
0x0A47 - 0x0A48	2631 - 2632	Active power	2 registers	-	x
0x0A61 - 0x0A62	2657 - 2658	Active energy import (total)	2 registers	-	x
3RW5 soft starter					
0x8000 - 0x8007	32768 - 32775	Process image input (PII) (Page 148)	8 registers	x	x
0x8200 - 0x8201	33280 - 33281	Process image output (PIQ) (Page 150)	2 registers	x	x
0x8400 - 0x8429	33792 - 33833	Soft starter diagnostics (Page 152)	42 registers	x	x
0x8800 - 0x882C	34816 - 34860	Measured values (Page 158)	45 registers	x	x
0x8C00 - 0x8C5E	35840 - 35934	Statistic data (Page 160)	95 registers	x ⁶⁾	x
0x9000 - 0x9039	36864 - 36921	Maximum pointer (Page 162)	58 registers	x ⁶⁾	x
0x9400 - 0x945E	37888 - 37982	Parameters (Page 164)	95 registers	-	x
Communication (for 3RW5 Modbus TCP communication module only)					
0xA100 - 0xA116	41216 - 41238	Communication parameters Modbus TCP (Page 176)	23 registers	x ³⁾	x ³⁾
Communication (for 3RW5 Modbus RTU communication module only)					
0xA200 - 0xA209	41472 - 41481	Modbus RTU communication parameters (Page 177)	10 registers	x ⁴⁾	x ⁴⁾

Address range		Chapter	Length	3RW	
hex	dec			50 / 52 ¹⁾	55 / 55-F ²⁾
3RW5 HMI High Feature					
0xB000 - 0xB008	45056 - 45064	HMI diagnostics (Page 179)	9 registers	x ⁵⁾	x ⁵⁾
0xB100 - 0xB106	45312 - 45318	HMI parameters (Page 180)	7 registers	x ⁵⁾	x ⁵⁾

1) Supported by SIRIUS 3RW50 and 3RW52 soft starters

2) Supported by SIRIUS 3RW55 and 3RW55 Failsafe soft starters

3) Supported by Modbus TCP communication module SIRIUS 3RW5

4) Supported by Modbus RTU communication module SIRIUS 3RW5

5) Supported by 3RW5 HMI High Feature

6) 3RW50 Soft Starter from firmware version V1.0 or 3RW52 soft starter from firmware version V2.0

A.2.4 Node flash test

For the station flash test (Node flash test) only write access (w) is possible via Function Codes 05 and 06.

Register address	Bit address	Content	Access
0x0000 [0]	0x0000 [0]	Node flash test start	w
	0x0001 [1]	Node flash test end	w
	0x0002 ... 0x000F [2 ... 15]	Reserved	-

A.2.5 I&M0 - device identification (3RW5 communication module)

Only read access (r) to the device identification (I&M0) is possible via Function Codes 03 and 04.

Register			Content	Meaning	Access
Address		Quantity			
hex	dec				
0x00C1	193	5	RESERVED	-	r
0x00C6	198	1	MANUFACTURER_ID	42 = Manufacturer ID SIEMENS	r
0x00C7	199	10	ORDER_ID	Article number	r
0x00D1	209	8	SERIAL_NUMBER	Serial number	r
0x00D9	217	1	HARDWARE_REVISION	Product version	r
0x00DA	218	2	SOFTWARE_REVISION	Firmware version	r
0x00DC	220	1	REV_COUNTER	Provides information about the parameterized changes on the device.	r
0x00DD	221	1	PROFILE_ID	Gives information about the profile supported by the device and the line of products belonging to the device.	r
0x00DE	222	1	PROFILE_SPECIFIC_TYPE	Used to supplement the object "PROFILE_ID" and contains further information on the profile.	r
0x00DF	223	1	IM_VERSION	Provides information about the version of the identification data (0x0101 = Version 1.1).	r
0x00E0	224	1	IM_SUPPORTED	Provides information about the available identification data (Index 2 to 4).	r

A.2.6 I&M0 - device identification (3RW5 soft starter)

Only read access (r) to the device identification (I&M0) is possible via Function Codes 03 and 04.

Register			Content	Meaning	Access
Address		Quantity			
hex	dec				
0x0181	385	5	RESERVED	-	r
0x0186	390	1	MANUFACTURER_ID	42 = Manufacturer ID SIEMENS	r
0x0187	391	10	ORDER_ID	Article number	r
0x0191	401	8	SERIAL_NUMBER	Serial number	r
0x0199	409	1	HARDWARE_REVISION	Product version	r
0x019A	410	2	SOFTWARE_REVISION	Firmware version	r
0x019C	412	1	REV_COUNTER	Provides information about the parameterized changes on the device.	r
0x019D	413	1	PROFILE_ID	Gives information about the profile supported by the device and the line of products belonging to the device.	r
0x019E	414	1	PROFILE_SPECIFIC_TYPE	Used to supplement the object "PROFILE_ID" and contains further information on the profile.	r
0x019F	415	1	IM_VERSION	Provides information about the version of the identification data (0x0101 = Version 1.1).	r
0x01A0	416	1	IM_SUPPORTED	Provides information about the available identification data (Index 2 to 4).	r

A.2.7 I&M1 - equipment identifier (3RW5 soft starter)

Read access (r) to the equipment identifiers (I&M1) is possible via Function Codes 03 and 04. Write access (w) is possible via Function Codes 06 and 16 .

Note

Validity of the write access

The 3RW5 soft starter checks the validity of the write access. The ASCII characters 0x20 - 0x7E are accepted. If the 3RW5 soft starter does not accept the data of the request telegram, the 3RW5 communication module responds with an Exception Code 0x03.

Register			Content	Meaning	Access
Address		Quantity			
hex	dec				
0x01A1	417	5	RESERVED	-	r
0x01A6	422	16	TAG_FUNCTION	Plant identifier Fill unused positions with blanks (0x20).	r/w
0x01B6	438	11	TAG_LOCATION	Location designation Fill unused positions with blanks (0x20).	r/w

A.2.8 I&M2 - installation (3RW5 soft starter)

Read access (r) to the installation (I&M2) is possible via Function Codes 03 and 04. Write access (w) is possible via Function Codes 06 and 16 .

Note

Validity of the write access

The 3RW5 soft starter checks the validity of the write access. The accepted display formats are "YYYY-MM-DD" (year-month-day) and "YYYY-MM-DD HH:MM" (year-month-day hour:minute). If the 3RW5 soft starter does not accept the data of the request telegram, the 3RW5 communication module responds with an Exception Code 0x03.

- YYYY (year): 0001 - 9999
 - MM (month): 01 - 12
 - DD (day): 01 - 31 (depending on month)
 - HH (hour): 00 - 23
 - MM (minute): 00 - 59
-

Register		Quantity	Content	Meaning	Access
Address					
hex	dec				
0x01C1	449	5	RESERVED	-	r
0x01C6	454	8	INSTALLATION_DATE	Installation date Fill unused positions with blanks (0x20).	r/w
0x01CE	462	19	RESERVED	-	r

A.2.9 I&M3 - description (3RW5 soft starter)

For access to the description (I&M3) read access (r) is possible via Function Codes 03 and 04. Write access (w) is possible via Function Codes 06 and 16 .

Note

Validity of the write access

The 3RW5 soft starter checks the validity of the write access. The ASCII characters 0x20 - 0x7E are accepted. If the 3RW5 soft starter does not accept the data of the request telegram, the 3RW5 communication module responds with an Exception Code 0x03.

Register			Content	Meaning	Access
Address		Quantity			
hex	dec				
0x01E1	481	5	RESERVED	-	r
0x01E6	486	27	DESCRIPTOR	Individual additional information and explanations. Fill unused positions with blanks (0x20). If the DESCRIPTOR is described, the content is shown on the 3RW5 HMI High Feature in the upper left corner of the display. If the text is too long for the display, it will be truncated at the end.	r/w

A.2.10 I&M0 - device identification (3RW5 HMI High Feature)

Only read access (r) to the device identification (I&M0) is possible via Function Codes 03 and 04.

Register			Content	Meaning	Access
Address		Quantity			
hex	dec				
0x0241	577	5	RESERVED	-	r
0x0246	582	1	MANUFACTURER_ID	42 = Manufacturer ID SIEMENS	r
0x0247	583	10	ORDER_ID	Article number	r
0x0251	593	8	SERIAL_NUMBER	Serial number	r
0x0259	601	1	HARDWARE_REVISION	Product version	r
0x025A	602	2	SOFTWARE_REVISION	Firmware version	r
0x025C	604	1	REV_COUNTER	Provides information about the parameterized changes on the device.	r
0x025D	605	1	PROFILE_ID	Gives information about the profile supported by the device and the line of products belonging to the device.	r
0x025E	606	1	PROFILE_SPECIFIC_TYPE	Used to supplement the object "PROFILE_ID" and contains further information on the profile.	r
0x025F	607	1	IM_VERSION	Provides information about the version of the identification data (0x0101 = Version 1.1).	r
0x0260	608	1	IM_SUPPORTED	Provides information about the available identification data (Index 2 to 4).	r

A.2.11 Energy management

Only read access (r) to the energy management is possible via Function Codes 03 and 04.

Register		Quantity	Data format	Content	Unit	3RW	
Address						50 / 52 ¹⁾	55 / 55-F ²⁾
hex	dec						
0x09C1	2497	2	Float32	Phase current I L1 (rms)	A	r	r
0x09C3	2499	2	Float32	Phase current I L2 (rms)	A	r	r
0x09C5	2501	2	Float32	Phase current I L3 (rms)	A	r	r
0x09C7	2503	2	Float32	Phase current average (rms)	A	r	r
0x0A47	2631	2	Float32	Active power	W	-	r
0x0A61	2657	2	Float32	Active energy import (total)	Wh	-	r

1) Supported by SIRIUS 3RW50 and 3RW52 soft starters

2) Supported by SIRIUS 3RW55 and 3RW55 Failsafe soft starters

A.2.12 Process image input (PII)

For access to the process image input (PII) only read access (r) is possible via Function Codes 01, 02, 03, 04 and 23.

Register	Byte	Bit address		Data format	Process image	3RW	
Address	high / low	hex	dec			50 / 52 ¹⁾	55 / 55-F ²⁾
0x8000 [32768]	high	0x8000	32768	Bool	Ready (automatic)	r	r
		0x8001	32769	Bool	Motor On	r	r
		0x8002	32770	Bool	Group error	r	r
		0x8003	32771	Bool	Group warning	r	r
		0x8004	32772	Bool	Input 1	r	r
		0x8005	32773	Bool	Input 2	-	r
		0x8006	32774	Bool	Input 3	-	r
		0x8007	32775	Bool	Input 4	-	r
	low	0x8008	32776	Bool	Motor current lact-bit0	r	r
		0x8009	32777	Bool	Motor current lact-bit1	r	r
		0x800A	32778	Bool	Motor current lact-bit2	r	r
		0x800B	32779	Bool	Motor current lact-bit3	r	r
		0x800C	32780	Bool	Motor current lact-bit4	r	r
		0x800D	32781	Bool	Motor current lact-bit5	r	r
		0x800E	32782	Bool	Operating mode manual - local	r	r
		0x800F	32783	Bool	Ramp operation	r	r
0x8001 [32769]	high	0x8010	32784	Bool	Motor CW	r	r
		0x8011	32785	Bool	Motor CCW	-	r
		0x8014	32788	Bool	Starting mode active	r	r
		0x8015	32789	Bool	Operation / bypass active	r	r
		0x8016	32790	Bool	Stopping mode active	r	r
		0x8017	32791	Bool	Test mode active	r ³⁾	r
	low	0x8018	32792	Bool	Thermal motor model overload	r	r
		0x8019	32793	Bool	Temperature sensor overload	r	r
		0x801A	32794	Bool	Switching element overload	r	r
		0x801B	32795	Bool	Cooling time active	r	r
		0x801C	32796	Bool	Device error	r	r
		0x801D	32797	Bool	Automatic parameterization active	-	r
		0x801E	32798	Bool	New EX parameter values detected	-	r ⁴⁾

Register	Byte	Bit address		Data format	Process image	3RW	
Address	high / low	hex	dec			50 / 52 ¹⁾	55 / 55-F ²⁾
0x8002 [32770]	high	0x8020	32800	Float32	Measured value 1 ⁵⁾ (factory setting: Phase current I L1 (rms))	r	r
0x8004 [32772]	high	0x8040	32832	Float32	Measured value 2 ⁵⁾ (factory setting: Phase current I L2 (rms))	r	r
0x8006 [32774]	high	0x8060	32864	Float32	Measured value 3 ⁵⁾ (factory setting: Phase current I L3 (rms))	r	r

1) Supported by SIRIUS 3RW50 and 3RW52 soft starters

2) Supported by SIRIUS 3RW55 and 3RW55 Failsafe soft starters

3) 3RW50 soft starter from firmware version V1.0 or 3RW52 soft starter from firmware version V2.0

4) 3RW55 soft starter from firmware version V2.0 or 3RW55 Failsafe soft starter from firmware version V1.0

5) You can parameterize the measured values for the 3RW55 and 3RW55 Failsafe soft starters. You will find more information in the Equipment Manual of the 3RW5 soft starter and in the "Parameters" data table. An overview of the measured values can be found in the following table.

Data format	Measured value	Unit	3RW			
			50 ¹⁾	52 ²⁾	55 ³⁾	55-F ⁴⁾
Float32	Phase current IL1 (rms)	A	x	x	x	x
Float32	Phase current IL2 (rms)	A	x	x	x	x
Float32	Phase current IL3 (rms)	A	x	x	x	x
Float32	Phase current average (rms)	A	-	-	x	x
Float32	Active energy import (total)	Wh	-	-	x	x
Float32	Active power	W	-	-	x	x
Float32	Power factor L1...3	-	-	-	x	x

1) Supported by SIRIUS 3RW50 soft starter

2) Supported by SIRIUS 3RW52 soft starter

3) Supported by SIRIUS 3RW55 soft starter

4) Supported by SIRIUS 3RW55 Failsafe soft starter

A.2.13 Process image output (PIQ)

Read (r) and write (w) access to the process image output (PIQ) is possible.

- Read access via Function Codes 01, 02, 03, and 04
- Write access via function codes 05, 06, 15, and 16
- Read and write access combined via function code 23

Register	Byte	Bit address		Data format	Process image	3RW		
Address	high / low	hex	dec			50 / 52 ¹⁾	55 ²⁾	55-F ³⁾
0x8200 [33280]	high	0x8200	33280	Bool	Motor CW	r/w	r/w	r/w
		0x8201	33281	Bool	Motor CCW	-	r/w	r/w
		0x8203	33283	Bool	Reset ⁴⁾	r/w	r/w	r/w
		0x8204	33284	Bool	Emergency start	-	r/w ⁵⁾	r/w ⁵⁾
		0x8205	33285	Bool	Self-test (user-test)	r/w	r/w	r/w
		0x8206	33286	Bool	Creep speed	-	r/w	-
	low	0x8208	33288	Bool	Output 1 ^{6), 7)}	-	r/w	r/w
		0x8209	33289	Bool	Output 2 ^{6), 7)}	-	r/w	r/w
		0x820A	33290	Bool	Parameter set bit 0 ⁸⁾	-	r/w	r/w
		0x820B	33291	Bool	Parameter set bit 1 ⁸⁾	-	r/w	r/w
		0x820F	33295	Bool	Disable Quick-stop	-	r/w	r/w
0x8201 [33281]	high	0x8210	33296	Bool	Output 3 ⁶⁾	-	r/w	-
		0x8213	33299	Bool	Activate pump cleaning	-	r/w	r/w
	low	0x8218	33304	Bool	Manual operation local - input controlled	r/w	r/w	r/w
		0x8219	33305	Bool	Use alternative stopping mode	-	r/w	r/w
		0x821A	33306	Bool	Motor standstill	-	r/w	-

¹⁾ Supported by SIRIUS 3RW50 and 3RW52 soft starters

²⁾ Supported by SIRIUS 3RW55 soft starter

³⁾ Supported by SIRIUS 3RW55 Failsafe soft starter

⁴⁾ In order to perform the reset reliably, the control command "Reset" must be present for at least 20 ms.

⁵⁾ Control data are relevant for EX applications

⁶⁾ You can assign the control data "Output 1", "Output 2" and "Output 3" to the digital outputs 1, 2 and 4 of the 3RW55 soft starter in any order via the digital output actions. You will find more information in the Equipment Manual of the 3RW5 soft starter.

⁷⁾ You can assign the control data "Output 1" and "Output 2" to the digital outputs 1 and 2 of the 3RW55 Failsafe soft starter in any order via the digital output actions. You will find more information in the Equipment Manual of the 3RW5 soft starter.

⁸⁾ Explanation in the following table

Additional information

The following table describes the assignment of the process images "Parameter set bit 0" and "Parameter set bit 1":

Parameter set	Parameter set bit 0	Parameter set bit 1
Process image error	1	1
Parameter set 1 (PS1)	0	0
Parameter set 2 (PS2)	1	0
Parameter set 3 (PS3)	0	1

A.2.14 Soft starter diagnostics

For access to the soft starter diagnostics only read access (r) is possible via Function Codes 01, 02, 03 and 04.

Note

Message type of the soft starter diagnostics

In the "Soft starter diagnostics" data table, diagnostic messages may be present twice. In this case, the message type (error (ER), warning (MT) or other message type (-)) determines which bit is activated.

Register	Byte	Bit address		Data format	Soft starter diagnostics	3RW				Type ⁵⁾
		hex	dec			50 ¹⁾	52 ²⁾	55 ³⁾	55-F ⁴⁾	
0x8400 [33792]	high	0x8400	33792	Bool	Ready (automatic)	r	r	r	r	-
		0x8401	33793	Bool	Motor CW	r	r	r	r	-
		0x8402	33794	Bool	Motor CCW	-	-	r	r	-
		0x8403	33795	Bool	Switching element overload	r	r	r	r	ER
		0x8404	33796	Bool	Switching element defective	r	r	r	r	ER
		0x8405	33797	Bool	Emergency start active	-	-	r	r	-
		0x8406	33798	Bool	Group error	r	r	r	r	-
		0x8407	33799	Bool	Group warning	r	r	r	r	-
	low	0x8409	33801	Bool	No main power	r	r	r	r	ER
		0x840B	33803	Bool	Starting mode active	r	r	r	r	-
		0x840C	33804	Bool	Stopping mode active	r	r	r	r	-
		0x840E	33806	Bool	Electrical braking active	-	-	r	-	-
		0x840F	33807	Bool	Creep speed active	-	-	r	-	-
0x8401 [33793]	high	0x8410	33808	Bool	Temperature sensor overload	r	r	r	r	ER
		0x8411	33809	Bool	Temperature sensor wire break	r	r	r	r	ER
		0x8412	33810	Bool	Temperature sensor short-circuit	r	r	r	r	ER
		0x8413	33811	Bool	Thermal motor model overload	r	r	r	r	ER
		0x8414	33812	Bool	Motor overload protection - shutoff	r	r	r	r	ER
		0x8415	33813	Bool	Idle time active	-	-	r	r	-
		0x8416	33814	Bool	Cooling time active	r	r	r	r	-
		0x8417	33815	Bool	Safety-related shutoff	-	-	-	r	ER
	low	0x841B	33819	Bool	Current limiting active	r	r	r	r	-
		0x841E	33822	Bool	Generator operation	-	-	r	r	MT
		0x841F	33823	Bool	Input control	r	r	r	r	-

Register Address	Byte high / low	Bit address		Data format	Soft starter diagnostics	3RW				Type ⁵⁾
		hex	dec			50 ¹⁾	52 ²⁾	55 ³⁾	55-F ⁴⁾	
0x8402 [33794]	high	0x8420	33824	Bool	Asymmetry limit error exceeded	-	-	r	r	ER
		0x8421	33825	Bool	Asymmetry shutoff	-	-	r	r	ER
		0x8422	33826	Bool	Current limit error exceeded	-	-	r	r	ER
		0x8423	33827	Bool	Current limit error undershot	-	-	r	r	ER
		0x8424	33828	Bool	Current limit error shutoff	-	-	r	r	ER
	low	0x8428	33832	Bool	Input 1	r	r	r	r	-
		0x8429	33833	Bool	Input 2	-	-	r	r	-
		0x842A	33834	Bool	Input 3	-	-	r	r	-
		0x842B	33835	Bool	Input 4	-	-	r	r	-
0x8403 [33795]	high	0x8430	33840	Bool	Ground fault limit error exceeded	-	-	r	r	ER
		0x8432	33842	Bool	Quick-stop active	-	-	r	r	-
		0x8436	33846	Bool	Maximum pointer reset	r	r ⁶⁾	r	r	-
		0x8437	33847	Bool	Electronics supply voltage too low	r	r	r	r	ER
	low	0x8438	33848	Bool	Bus error	r	r	r	r	ER
		0x8439	33849	Bool	CPU/Master STOP	r	r	r	r	-
		0x843A	33850	Bool	Automatic mode	r	r	r	r	-
		0x843B	33851	Bool	Operating mode manual - bus	r	r	r	r	-
		0x843C	33852	Bool	Operating mode manual - local	r	r	r	r	-
		0x843E	33854	Bool	Connection abort in manual mode	r	r	r	r	MT
		0x843F	33855	Bool	Error process image	-	-	r	r	ER
0x8404 [33796]	high	0x8440	33856	Bool	Parameter assignment active	-	-	r	r	-
		0x8441	33857	Bool	Invalid parameter value	-	-	r	r	ER
		0x8442	33858	Bool	Parameters cannot be changed in ON state	-	-	r	r	-
		0x8443	33859	Bool	Parameters disable CPU/master active	-	-	r	r	-
		0x8444	33860	Bool	No external start parameters received	-	-	r	r	ER
	low	0x8448	33864	Bool	Self-test active	-	-	r	r	-
		0x844A	33866	Bool	Self-test error	r	r	r	r	ER
0x8405 [33797]	high	0x844B	33867	Bool	Factory settings restored	r	r	r	r	-
		0x8450	33872	Unsigned16	Faulty parameter number ⁷⁾	-	-	r	r	-

Register	Byte	Bit address		Data format	Soft starter diagnostics	3RW				Type ⁵⁾
Address	high / low	hex	dec			50 ¹⁾	52 ²⁾	55 ³⁾	55-F ⁴⁾	
0x8406 [33798]	high	0x8463	33891	Bool	Preset unequal actual configuration	r	r	r	r	ER
		0x8465	33893	Bool	Temperature sensor overload	-	-	r	r	MT
		0x8466	33894	Bool	Temperature sensor wire break	-	-	r	r	MT
		0x8467	33895	Bool	Temperature sensor short-circuit	-	-	r	r	MT
	low	0x8468	33896	Bool	Parameter set 1 active	-	-	r	r	-
		0x8469	33897	Bool	Parameter set 2 active	-	-	r	r	-
		0x846A	33898	Bool	Parameter set 3 active	-	-	r	r	-
		0x846C	33900	Bool	Parameter set change not possible	-	-	r	r	-
		0x846E	33902	Bool	Preset unequal actual configuration	-	-	r	r	MT
		0x846F	33903	Bool	Motor connection wrong	-	-	r	r	ER
0x8407 [33799]	high	0x8472	33906	Bool	Motor heating active	-	-	r	-	-
		0x8473	33907	Bool	DC braking active	-	-	r	-	-
		0x8474	33908	Bool	Dynamic DC braking active	-	-	r	-	-
		0x8475	33909	Bool	Type of motor connection standard	r	r	r	r	-
		0x8476	33910	Bool	Type of motor connection inside delta	-	r	r	r	-
		0x8477	33911	Bool	Type of motor connection unknown	r	r	r	r	-
	low	0x8478	33912	Bool	Missing load	r	r	r	r	ER
		0x847A	33914	Bool	Loss of phase L1	r	r	r	r	ER
		0x847B	33915	Bool	Loss of phase L2	r	r	r	r	ER
		0x847C	33916	Bool	Loss of phase L3	r	r	r	r	ER
		0x847D	33917	Bool	Main power rotation right	r	r	r	r	-
		0x847E	33918	Bool	Main power rotation left	r	r	r	r	-
0x8408 [33800]	low	0x8488	33928	Bool	Output 1 active	r	r	r	r	-
		0x8489	33929	Bool	Output 2 active	r	r	r	r	-
		0x848A	33930	Bool	Output 3 active	r	r	r	r	-
		0x848B	33931	Bool	Output 4 active	-	-	r	r	-
		0x848C	33932	Bool	Output 1 - Time active	-	-	r	r	-
		0x848D	33933	Bool	Output 2 - Time active	-	-	r	r	-
		0x848F	33935	Bool	Output 4 - Time active	-	-	r	-	-
0x8409 [33801]	low	0x8499	33945	Bool	Ready to start for motor ON	r	r	r	r	-
		0x849B	33947	Bool	Bypass defective	r	r	r	r	ER
		0x849C	33948	Bool	Bypass protective shutoff	r	r	r	r	ER
		0x849D	33949	Bool	Switching element L1 failed	r	r	r	r	ER
		0x849E	33950	Bool	Switching element L2 failed	-	r	r	r	ER
		0x849F	33951	Bool	Switching element L3 failed	r	r	r	r	ER

Register	Byte	Bit address		Data format	Soft starter diagnostics	3RW				Type ⁵⁾
		hex	dec			50 ¹⁾	52 ²⁾	55 ³⁾	55-F ⁴⁾	
0x840A [33802]	high	0x84A0	33952	Bool	Thermal motor model deactivated	r	r	r	r	-
		0x84A3	33955	Bool	Phase control failure	r	r	r	r	ER
	low	0x84A8	33960	Bool	Switching element cooling time active	r	r	r	r	-
		0x84A9	33961	Bool	Switching element too hot for Start	r	r	r	r	MT
		0x84AA	33962	Bool	Current measuring range exceeded	r	r	r	r	ER
0x840B [33803]	high	0x84B0	33968	Bool	Automatic mode	r	r	r	r	-
		0x84B1	33969	Bool	Operating mode manual - bus	r	r	r	r	-
		0x84B2	33970	Bool	Manual operation bus - PC controlled	r	r	r	r	-
		0x84B3	33971	Bool	Operating mode manual - local	r	r	r	r	-
		0x84B4	33972	Bool	Manual operation local - input controlled	r	r	r	r	-
		0x84B5	33973	Bool	Manual operation local - HMI controlled	r	r	r	r	-
		0x84B6	33974	Bool	Manual operation local - PC controlled	r	r	r	r	-
	low	0x84BB	33979	Bool	Automatic operation - input controlled	-	-	r ⁹⁾	r	-
0x840C [33804]	low	0x84C8	33992	Bool	Device error	r	r	r	r	ER
0x840E [33806]	high	0x84E0	34016	Bool	FW update rejected	r	r	r	r	-
		0x84E1	34017	Bool	FW update active	r	r	r	r	-
		0x84E2	34018	Bool	FW update successful	r	r	r	r	-
		0x84E3	34019	Bool	FW update faulty	r	r	r	r	ER
	low	0x84EF	34031	Bool	Operation / bypass active	r	r	r	r	-
0x8415 [33813]	high	0x8556	34134	Bool	Normal operation active	r	r ⁶⁾	r	r	-
	low	0x855B	34139	Bool	Test mode active	r	r ⁶⁾	r	r	-
0x8418 [33816]	low	0x8588	34184	Bool	Start condition not fulfilled	-	-	-	r	-
		0x8589	34185	Bool	Start condition fulfilled	-	-	-	r	-
		0x858A	34186	Bool	Reset ON command required	-	-	-	r	-
0x8419 [33817]	high	0x8590	34192	Bool	Ex application active	-	-	r ⁸⁾	r	-
		0x8592	34194	Bool	New EX parameter values detected	-	-	r ⁸⁾	r	MT
		0x8595	34197	Bool	Ex release denied - wrong CRC	-	-	r ⁸⁾	r	-

Register Address	Byte high / low	Bit address		Data format	Soft starter diagnostics	3RW				Type ⁵⁾
		hex	dec			50 ¹⁾	52 ²⁾	55 ³⁾	55-F ⁴⁾	
0x841A [33818]	high	0x85A2	34210	Bool	Remaining time for tripping warning limit undershot	-	-	r	r	MT
		0x85A3	34211	Bool	Motor heating warning limit exceeded	r	r	r	r	MT
		0x85A4	34212	Bool	Current limit - maintenance demanded exceeded	-	-	r	r	MT
		0x85A5	34213	Bool	Current limit - maintenance demanded undershot	-	-	r	r	MT
		0x85A6	34214	Bool	Asymmetry limit warning exceeded	-	-	r	r	MT
		0x85A7	34215	Bool	Ground fault limit warning exceeded	-	-	r	r	MT
0x841B [33819]	low	0x85B8	34232	Bool	Pump cleaning active	-	-	r	r	-
0x841C [33820]	high	0x85C5	34245	Bool	Analog output underflow	-	-	r	r	-
	low	0x85CD	34253	Bool	Analog output overflow	-	-	r	r	-
0x841E [33822]	high	0x85E0	34272	Bool	Missing initialization after maintenance	r	r	r	r	-
	low	0x85E8	34280	Bool	Switching frequency time running	-	-	r	r	-
		0x85E9	34281	Bool	Switching frequency time not kept	-	-	r	r	ER
		0x85EB	34283	Bool	Switching frequency time not kept	-	-	r	r	MT
		0x85EF	34287	Bool	Switching frequency lock active	-	-	r	r	-
0x841F [33823]	high	0x85F2	34290	Bool	Emergency start enabled	-	-	r	r	-
		0x85F4	34292	Bool	Emergency run enabled	-	-	r ⁹⁾	-	-
		0x85F5	34293	Bool	Emergency run active	-	-	r ⁹⁾	-	-
	low	0x85F8	34296	Bool	2-phase control with defective thyristor active	-	-	r ⁹⁾	-	MT
		0x85F9	34297	Bool	Alternative stopping mode active	-	-	r	r	-
0x8420 [33824]	high	0x8600	34304	Bool	Reversing DC braking active	-	-	r ⁸⁾	-	-
	low	0x8608	34312	Bool	Main power rotation faulty	-	-	r	r	ER
		0x860B	34315	Bool	Main power rotation faulty	-	-	r	r	MT
0x8421 [33825]	low	0x861D	34333	Bool	Check fan	r	r	r	r	MT

Register	Byte	Bit address		Data format	Soft starter diagnostics	3RW				Type ⁵⁾
		hex	dec			50 ¹⁾	52 ²⁾	55 ³⁾	55-F ⁴⁾	
0x8424 [33828]	low	0x864A	34378	Bool	Active power limit - maintenance demanded exceeded	-	-	r	r	MT
		0x864B	34379	Bool	Active power limit - maintenance demanded undershot	-	-	r	r	MT
		0x864C	34380	Bool	Active power limit error exceeded	-	-	r	r	ER
		0x864D	34381	Bool	Active power limit error undershot	-	-	r	r	ER
		0x864E	34382	Bool	Active power limit error shutoff	-	-	r	r	ER
0x8426 [33830]	low	0x8668	34408	Bool	Main power for test not allowed	-	-	r	-	ER
		0x8669	34409	Bool	Line voltage for test required	r	r ⁶⁾	r	r	ER
		0x866C	34412	Bool	Simulation active	-	-	r ⁸⁾	-	-
		0x866D	34413	Bool	Test with small load active	r	r ⁶⁾	r	r	-
0x8428 [33832]	high	0x8680	34432	Bool	Operating temperature too high	r	r	r	r	ER
	low	0x8688	34440	Bool	Automatic parameterization active	-	-	r	r	-
0x8429 [33833]	high	0x8692	34450	Bool	Starting time limit - maintenance demanded exceeded	-	-	r	r	MT
		0x8693	34451	Bool	Starting time limit - maintenance demanded undershot	-	-	r	r	MT
	low	0x8698	34456	Bool	Logbook application - error deleted	r	r	r	r	-
		0x869A	34458	Bool	Logbook application - warnings deleted	-	-	r	r	-
		0x869C	34460	Bool	Logbook application - events deleted	-	-	r	r	-
		0x869D	34461	Bool	Logbook service - errors deleted	-	-	r	r	-
		0x869F	34463	Bool	Logbook service - events deleted	-	-	r	r	-

- 1) Supported by SIRIUS 3RW50 soft starter
- 2) Supported by SIRIUS 3RW52 soft starter
- 3) Supported by SIRIUS 3RW55 soft starter
- 4) Supported by SIRIUS 3RW55 Failsafe soft starter
- 5) Message type: Error (ER), warning (MT) or other message type (-)
- 6) 3RW52 soft starter from firmware version V2.0
- 7) Object number of the incorrect parameter from the "Parameters" data table
- 8) 3RW55 soft starter from firmware version V2.0
- 9) 3RW55 soft starter from firmware version V2.1

A.2.15 Measured values

Only read access (r) to the measured values is possible via Function Codes 03 and 04.

Register	Byte	Data format	Measured value	Range of values	In steps of	3RW	
Address	high / low					50 / 52 ¹⁾	55 / 55-F ²⁾
0x8801 [34817]	high	Unsigned8	Phase current I L1 (%)	0 ... 796.9 %	3.125 %	r	r
	low	Unsigned8	Phase current I L2 (%)	0 ... 796.9 %	3.125 %	r	r
0x8802 [34818]	high	Unsigned8	Phase current I L3 (%)	0 ... 796.9 %	3.125 %	r	r
0x8803 [34819]	high	Unsigned16	Remaining motor cooling time	0 ... 1 800 s	0.1 s	r	r
0x8804 [34820]	low	Unsigned8	Asymmetry	0 ... 100 %	1 %	-	r
0x8805 [34821]	high	Unsigned16	Motor temperature rise	0 ... 1 000 %	1 %	r	r
0x8809 [34825]	high	Unsigned8	Output frequency	0 ... 100 Hz	0.5 Hz	-	r
0x880B [34827]	high	Unsigned8	Line frequency	0 ... 100 Hz	0.5 Hz	-	r
0x880C [34828]	high	Unsigned16	Line voltage U L1-L2 (rms)	0 ... 1 500 V	0.1 V	-	r
0x880D [34829]	high	Unsigned16	Line voltage U L2-L3 (rms)	0 ... 1 500 V	0.1 V	-	r
0x880E [34830]	high	Unsigned16	Line voltage U L3-L1 (rms)	0 ... 1 500 V	0.1 V	-	r
0x880F [34831]	high	Signed32	Phase current I L1 (rms)	-20 000 ... 20 000 A	0.01 A	r	r
0x8811 [34833]	high	Signed32	Phase current I L2 (rms)	-20 000 ... 20 000 A	0.01 A	r	r
0x8813 [34835]	high	Signed32	Phase current I L3 (rms)	-20 000 ... 20 000 A	0.01 A	r	r
0x8816 [34838]	low	Unsigned8	Switching element heating	0 ... 250 %	1 %	r	r
0x8817 [34839]	high	Unsigned16	Remaining switching element cooling time	0 ... 1 800 s	0.1 s	r	r
0x8818 [34840]	high	Unsigned16	Remaining time for motor overload protection	0 ... 6 500 s	0.1 s	-	r
0x8819 [34841]	high	Signed32	Active power	-2 147.483 ... 2 147.483 kW	0.0001 kW	-	r
0x881C [34844]	high	Unsigned8	Power factor L1...3	0 ... 1	0.01	-	r
0x8820 [34848]	high	Unsigned16	Remaining switching frequency monit. time	0 ... 65 535 s	1 s	-	r
0x8821 [34849]	high	Unsigned8	Phase current average (%)	0 ... 796.9 %	3.125 %	r	r

Register	Byte	Data format	Measured value	Range of values	In steps of	3RW	
Address	high / low					50 / 52 ¹⁾	55 / 55-F ²⁾
0x8823 [34851]	high	Signed32	Phase current average (rms)	-20 000 ... 20 000 A	0.01 A	r	r
0x8825 [34853]	high	Signed32	Phase current max (rms)	-20 000 ... 20 000 A	0.01 A	-	r

¹⁾ Supported by SIRIUS 3RW50 and 3RW52 soft starters

²⁾ Supported by SIRIUS 3RW55 and 3RW55 Failsafe soft starters

A.2.16 Statistic data

Only read access (r) to the statistical data is possible via Function Codes 03 and 04.

Register Address	Byte	Data format	Statistic data	Range of values	In steps of	3RW	
	high / low					50 / 52 ¹⁾	55 / 55-F ²⁾
0x8C01 [35841]	high	Unsigned8	Phase current max (%)	0 ... 796.9 %	3.125 %	r	r
0x8C02 [35842]	high	Unsigned16	Last tripping current IA (%)	0 ... 1 000 %	3.125 %	r	r
0x8C03 [35843]	high	Unsigned32	Operating hours - device	0 ... 4 294 967 295 s	1 s	r	r
0x8C05 [35845]	high	Unsigned32	Number of starts motor CW	0 ... 4 294 967 295	1	r	r
0x8C07 [35847]	high	Unsigned32	Number of starts motor CCW	0 ... 4 294 967 295	1	-	r
0x8C09 [35849]	high	Unsigned16	Number of motor overload trips	0 ... 65 535	1	r	r
0x8C0B [35851]	high	Signed32	Phase current max (rms)	-20 000 ... 20 000 A	0.01 A	r	r
0x8C0D [35853]	high	Signed32	Last tripping current IA (rms)	-20 000 ... 20 000 A	0.01 A	r	r
0x8C0F [35855]	high	Unsigned32	Operating hours - motor	0 ... 4 294 967 295 s	1 s	r	r
0x8C11 [35857]	high	Unsigned32	Operating hours - motor current = 18 ... 49.9% x I _{emax}	0 ... 4 294 967 295 s	1 s	r	r
0x8C13 [35859]	high	Unsigned32	Operating hours - motor current = 50 ... 89.9% x I _{emax}	0 ... 4 294 967 295 s	1 s	r	r
0x8C15 [35861]	high	Unsigned32	Operating hours - motor current = 90...119.9 (% x I _{emax})	0 ... 4 294 967 295 s	1 s	r	r
0x8C17 [35863]	high	Unsigned32	Operating hours - motor current = 120...1000 (% x I _{emax})	0 ... 4 294 967 295 s	1 s	r	r
0x8C1A [35866]	high	Unsigned16	Number of switching element overload trips	0 ... 65 535	1	r	r
0x8C1B [35867]	high	Unsigned16	Number of bypass overload trips	0 ... 65 535	1	r	r
0x8C1F [35871]	high	Unsigned32	Number of braking stops	0 ... 4 294 967 295	1	-	r
0x8C21 [35873]	high	Unsigned32	Number of starts output1	0 ... 4 294 967 295	1	-	r
0x8C23 [35875]	high	Unsigned32	Number of starts output2	0 ... 4 294 967 295	1	-	r
0x8C25 [35877]	high	Unsigned32	Number of starts output3	0 ... 4 294 967 295	1	-	r
0x8C27 [35879]	high	Unsigned32	Number of starts output4	0 ... 4 294 967 295	1	-	r
0x8C3B [35899]	high	Float32	Active energy import (total)	0 ... 4 294 967 295 Wh	1 Wh	-	r

Register	Byte	Data format	Statistic data	Range of values	In steps of	3RW	
Address	high / low					50 / 52 ¹⁾	55 / 55-F ²⁾
0x8C3F [35903]	high	Float32	Active energy export (total)	0 ... 4 294 967 295 Wh	1 Wh	-	r
0x8C43 [35907]	high	Unsigned16	Last real starting time	0 ... 1 000 s	0.1 s	-	r

¹⁾ Supported by SIRIUS 3RW50 soft starter from firmware version V1.0 and 3RW52 from firmware version V2.0

²⁾ Supported by SIRIUS 3RW55 and 3RW55 Failsafe soft starters

A.2.17 Maximum pointer

Only read access (r) to the maximum pointers is possible via Function Codes 03 and 04.

Register Address	Byte high / low	Data format	Maximum pointer	Range of values	In steps of	3RW	
						50 / 52 ¹⁾	55 / 55-F ²⁾
0x9001 [36865]	high	Unsigned8	Phase current I L1 min (%)	0 ... 796.9 %	3.125 %	r	r
	low	Unsigned8	Phase current I L2 min (%)	0 ... 796.9 %	3.125 %	r	r
0x9002 [36866]	high	Unsigned8	Phase current I L3 min (%)	0 ... 796.9 %	3.125 %	r	r
0x9003 [36867]	high	Unsigned8	Phase current I L1 max (%)	0 ... 796.9 %	3.125 %	r	r
	low	Unsigned8	Phase current I L2 max (%)	0 ... 796.9 %	3.125 %	r	r
0x9004 [36868]	high	Unsigned8	Phase current I L3 max (%)	0 ... 796.9 %	3.125 %	r	r
0x9005 [36869]	high	Unsigned16	Maximum trigger current	0 ... 1000 %	3.125 %	r	r
0x9006 [36870]	high	Unsigned16	Number of motor overload trips	0 ... 65 535	1	r	r
0x9007 [36871]	high	Signed32	Maximum trigger current	-20 000 ... 20 000 A	0.01 A	r	r
0x9009 [36873]	high	Signed32	Phase current I L1 min (rms)	-20 000 ... 20 000 A	0.01 A	r	r
0x900B [36875]	high	Signed32	Phase current I L2 min (rms)	-20 000 ... 20 000 A	0.01 A	r	r
0x900D [36877]	high	Signed32	Phase current I L3 min (rms)	-20 000 ... 20 000 A	0.01 A	r	r
0x900F [36879]	high	Signed32	Phase current I L1 max (rms)	-20 000 ... 20 000 A	0.01 A	r	r
0x9011 [36881]	high	Signed32	Phase current I L2 max (rms)	-20 000 ... 20 000 A	0.01 A	r	r
0x9013 [36883]	high	Signed32	Phase current I L3 max (rms)	-20 000 ... 20 000 A	0.01 A	r	r
0x9015 [36885]	high	Unsigned16	Line voltage U L1-L2 min	0 ... 1 500 V	0.1 V	-	r
0x9016 [36886]	high	Unsigned16	Line voltage U L2-L3 min	0 ... 1 500 V	0.1 V	-	r
0x9017 [36887]	high	Unsigned16	Line voltage U L3-L1 min	0 ... 1 500 V	0.1 V	-	r
0x9018 [36888]	high	Unsigned16	Line voltage U L1-L2 max	0 ... 1 500 V	0.1 V	-	r
0x9019 [36889]	high	Unsigned16	Line-to-line voltage U L2-L3 max	0 ... 1 500 V	0.1 V	-	r
0x901A [36890]	high	Unsigned16	Line voltage U L3-L1 max	0 ... 1 500 V	0.1 V	-	r
0x901D [36893]	low	Unsigned8	Maximum switching element heating	0 ... 250 %	1 %	r	r

Register	Byte	Data format	Maximum pointer	Range of values	In steps of	3RW	
Address	high / low					50 / 52 ¹⁾	55 / 55-F ²⁾
0x901E [36894]	high	Unsigned8	Minimum line frequency	0 ... 100 Hz	0.5 Hz	-	r
	low	Unsigned8	Maximum line frequency	0 ... 100 Hz	0.5 Hz	-	r
0x901F [36895]	high	Unsigned32	Operating hours - motor current = 18...49.9% x I _e	0 ... 4 294 967 295 s	1 s	r	r
0x9021 [36897]	high	Unsigned32	Operating hours - motor current = 50...89.9% x I _e	0 ... 4 294 967 295 s	1 s	r	r
0x9023 [36899]	high	Unsigned32	Operating hours - motor current = 90...119.9% x I _e	0 ... 4 294 967 295 s	1 s	r	r
0x9025 [36901]	high	Unsigned32	Operating hours - motor current = 120...1000% x I _e	0 ... 4 294 967 295 s	1 s	r	r
0x9027 [36903]	high	Unsigned32	Operating hours - device	0 ... 4 294 967 295 s	1 s	r	r
0x902B [36907]	high	Signed32	Starting current I max (rms)	-20 000 ... 20 000 A	0.01 A	r	r
0x902D [36909]	high	Signed32	Starting current I L1 max (rms)	-20 000 ... 20 000 A	0.01 A	r	r
0x902F [36911]	high	Signed32	Starting current I L2 max (rms)	-20 000 ... 20 000 A	0.01 A	r	r
0x9031 [36913]	high	Signed32	Starting current I L3 max (rms)	-20 000 ... 20 000 A	0.01 A	r	r
0x9033 [36915]	high	Unsigned16	Number of starts with ext. bypass	0 ... 65 535	1	r	r ^{3), 4)}

1) Supported by SIRIUS 3RW50 soft starter from firmware version V1.0 and 3RW52 from firmware version V2.0

2) Supported by SIRIUS 3RW55 and 3RW55 Failsafe soft starters

3) 3RW55 soft starter from firmware version V2.0

4) Not supported by SIRIUS 3RW55 Failsafe soft starter

A.2.18 Parameters

Read access (r) to the parameters is possible via Function Codes 03 and 04. Write access (w) is possible for individual parameters via Function Codes 06 and 16. The data table "Parameters" is not supported by the 3RW50 and 3RW52 soft starters.

Register	Byte	Data format	Parameter	Range of values	In steps	3RW55 /
Address	high / low	[Obj. No.]		[encoding]	of	55-F ¹⁾ [D ²⁾]
0x9401 [37889]	high	Bit4 [2313]	Automatic parameterization	[0 ... 2] [0] Off [1] ON - with preset starting time [2] ON - with preset starting time and current limit	-	r/w [0]
0x9402 [37890]	high	Unsigned16 [2315]	Preset starting time	0 ... 360 s [0 ... 3 600]	0.1 s	r/w [100]
0x9403 [37891]	high	Unsigned32 [130]	Rated operational current I _e	-	0.01 A	r/w ³⁾
SIRIUS 3RW55 Soft Starter, high performance, ___ A, 3-phase controlled, motor overload protection, torque control (rated operating current of the 3RW55 Soft Starter in the table) or SIRIUS 3RW55 Soft Starter, failsafe, high performance, ___ A, 3-phase controlled, motor overload protection, torque control (rated operating current of the 3RW55 soft starter Failsafe in the table)						
Motor connection type: Automatic detection						
13 A			2.5 ... 22.5 A [250 ... 2 250]	0.01 A	[440]	
18 A			3.5 ... 31.1 A [350 ... 3 110]	0.01 A	[610]	
25 A			5 ... 43.3 A [500 ... 4 330]	0.01 A	[870]	
32 A			6.5 ... 55.4 A [650 ... 5 540]	0.01 A	[1 130]	
38 A			7.5 ... 65.8 A [750 ... 6 580]	0.01 A	[1 300]	
25 A / 560 V ⁴⁾			5 ... 43.3 A [500 ... 4 330]	0.01 A	[870]	
25 A / 690 V ⁵⁾			5 ... 43.3 A [500 ... 4 330]	0.01 A	[870]	
47 A			10 ... 81.4 A [1 000 ... 8 140]	0.01 A	[1 740]	
63 A			13 ... 109 A [1 300 ... 10 900]	0.01 A	[2 260]	
77 A			16 ... 133 A [1 600 ... 13 300]	0.01 A	[2 780]	
93 A			19 ... 161 A [1 900 ... 16 100]	0.01 A	[3 300]	
113 A			23 ... 195 A [2 300 ... 19 500]	0.01 A	[3 990]	

Register	Byte	Data format [Obj. No.]	Parameter	Range of values [encoding]	In steps of	3RW55 / 55-F ¹⁾ [D ²⁾]
Address	high / low					
			143 A	29 ... 247 A [2 900 ... 24 700]	0.01 A	[5 030]
			171 A	34 ... 296 A [3 400 ... 29 600]	0.01 A	[5 890]
			210 A	42 ... 363 A [4 200 ... 36 300]	0.01 A	[7 280]
			250 A	50 ... 433 A [5 000 ... 43 300]	0.01 A	[8 670]
			315 A	63 ... 545 A [6 300 ... 54 500]	0.01 A	[10 920]
			370 A	74 ... 640 A [7 400 ... 64 000]	0.01 A	[12 820]
			470 A	94 ... 814 A [9 400 ... 81 400]	0.01 A	[16 290]
			570 A	114 ... 987 A [11 400 ... 98 700]	0.01 A	[19 750]
			630 A ⁵⁾	126 ... 1 091 A [12 600 ... 109 100]	0.01 A	[21 830]
			720 A ⁵⁾	144 ... 1 247 A [14 400 ... 124 700]	0.01 A	[24 950]
			840 A ⁵⁾	168 ... 1 454 A [16 800 ... 145 400]	0.01 A	[29 100]
			1 100 A ⁵⁾	220 ... 1 905 A [22 000 ... 190 500]	0.01 A	[38 110]
			1 280 A ⁵⁾	256 ... 2 217 A [25 600 ... 221 700]	0.01 A	[44 350]
			Motor connection type: Standard			
			13 A	2.5 ... 13 A [250 ... 1 300]	0.01 A	[440]
			18 A	3.5 ... 18 A [350 ... 1 800]	0.01 A	[610]
			25 A	5 ... 25 A [500 ... 2 500]	0.01 A	[870]
			32 A	6.5 ... 32 A [650 ... 3 200]	0.01 A	[1 130]
			38 A	7.5 ... 38 A [750 ... 3 800]	0.01 A	[1 300]
			25 A / 560 V ⁴⁾	5 ... 25 A [500 ... 2 500]	0.01 A	[870]
			25 A / 690 V ⁵⁾	5 ... 25 A [500 ... 2 500]	0.01 A	[870]
			47 A	10 ... 47 A [1 000 ... 4 700]	0.01 A	[1 740]
			63 A	13 ... 63 A [1 300 ... 6 300]	0.01 A	[2 260]

Register	Byte	Data format [Obj. No.]	Parameter	Range of values [encoding]	In steps of	3RW55 / 55-F ¹⁾ [D ²⁾]
Address	high / low					
			77 A	16 ... 77 A [1 600 ... 7 700]	0.01 A	[2 780]
			93 A	19 ... 93 A [1 900 ... 9 300]	0.01 A	[3 300]
			113 A	23 ... 113 A [2 300 ... 11 300]	0.01 A	[3 990]
			143 A	29 ... 143 A [2 900 ... 14 300]	0.01 A	[5 030]
			171 A	34 ... 171 A [3 400 ... 17 100]	0.01 A	[5 890]
			210 A	42 ... 210 A [4 200 ... 21 000]	0.01 A	[7 280]
			250 A	50 ... 250 A [5 000 ... 25 000]	0.01 A	[8 670]
			315 A	63 ... 315 A [6 300 ... 31 500]	0.01 A	[10 920]
			370 A	74 ... 370 A [7 400 ... 37 000]	0.01 A	[12 820]
			470 A	94 ... 470 A [9 400 ... 47 000]	0.01 A	[16 290]
			570 A	114 ... 570 A [11 400 ... 57 000]	0.01 A	[19 750]
			630 A ⁵⁾	126 ... 630 A [12 600 ... 63 000]	0.01 A	[21 830]
			720 A ⁵⁾	144 ... 720 A [14 400 ... 72 000]	0.01 A	[24 950]
			840 A ⁵⁾	168 ... 840 A [16 800 ... 84 000]	0.01 A	[29 100]
			1 100 A ⁵⁾	220 ... 1 100 A [22 000 ... 110 000]	0.01 A	[38 110]
			1 280 A ⁵⁾	256 ... 1 280 A [25 600 ... 128 000]	0.01 A	[44 350]
			Motor connection type: Inside delta			
			13 A	4.4 ... 22.5 A [440 ... 2 250]	0.01 A	[770]
			18 A	6.1 ... 31.1 A [610 ... 3 110]	0.01 A	[1 060]
			25 A	8.7 ... 43.3 A [870 ... 4 330]	0.01 A	[1 510]
			32 A	11.3 ... 55.4 A [1 130 ... 5 540]	0.01 A	[1 960]
			38 A	13 ... 65.8 A [1 300 ... 6 580]	0.01 A	[2 260]
			25 A / 560 V ⁴⁾	8.7 ... 43.3 A [870 ... 4 330]	0.01 A	[1 510]

Register	Byte	Data format [Obj. No.]	Parameter	Range of values [encoding]	In steps of	3RW55 / 55-F ¹⁾ [D ²⁾]
Address	high / low					
			25 A / 690 V ⁵⁾	8.7 ... 43.3 A [870 ... 4 330]	0.01 A	[1 510]
			47 A	17.4 ... 81.4 A [1 740 ... 8 140]	0.01 A	[3 020]
			63 A	22.6 ... 109 A [2 260 ... 10 900]	0.01 A	[3 920]
			77 A	27.8 ... 133 A [2 780 ... 13 300]	0.01 A	[4 820]
			93 A	33 ... 161 A [3 300 ... 16 100]	0.01 A	[5 720]
			113 A	39.9 ... 195 A [3 990 ... 19 500]	0.01 A	[6 920]
			143 A	50.3 ... 247 A [5 030 ... 24 700]	0.01 A	[8 720]
			171 A	58.9 ... 296 A [5 890 ... 29 600]	0.01 A	[10 210]
			210 A	72.8 ... 363 A [7 280 ... 36 300]	0.01 A	[12 610]
			250 A	86.7 ... 433 A [8 670 ... 43 300]	0.01 A	[15 020]
			315 A	110 ... 545 A [11 000 ... 54 500]	0.01 A	[19 060]
			370 A	129 ... 640 A [12 900 ... 64 000]	0.01 A	[22 350]
			470 A	163 ... 814 A [16 300 ... 81 400]	0.01 A	[28 240]
			570 A	198 ... 987 A [19 800 ... 98 700]	0.01 A	[34 300]
			630 A ⁵⁾	219 ... 1 091 A [21 900 ... 109 100]	0.01 A	[37 940]
			720 A ⁵⁾	250 ... 1 247 A [25 000 ... 124 700]	0.01 A	[43 310]
			840 A ⁵⁾	291 ... 1 454 A [29 100 ... 145 400]	0.01 A	[50 410]
			1 100 A ⁵⁾	382 ... 1 905 A [38 200 ... 190 500]	0.01 A	[66 170]
			1 280 A ⁵⁾	444 ... 2 217 A [44 400 ... 221 700]	0.01 A	[76 910]
0x9405 [37893]	high	Unsigned8 [2212]	Service factor	1 ... 1.15 [100 ... 115]	0.01	r/w ³⁾ [100]
0x9406 [37894]	high	Unsigned16 [113]	Rated torque	0 ... 10 000 Nm [0 ... 10 000]	1 Nm	r/w [0]
0x9407 [37895]	high	Unsigned16 [104]	Rated operating speed	500 ... 3600 rpm [500 ... 3 600]	1 rpm	r/w [1500]

Register Address	Byte high / low	Data format [Obj. No.]	Parameter	Range of values [encoding]	In steps of	3RW55 / 55-F ¹⁾ [D ²⁾]
0x9408 [37896]	high	Bit4 [228]	Motor connection type	[0 ... 2] [0] Automatic detection [1] Standard [2] Inside-delta	-	r/w ³⁾ [0]
0x9409 [37897]	high	Bit4 [167]	Starting mode	[0 ... 6] [0] Direct [1] Voltage ramp [2] Torque control [3] Motor heating ⁵⁾ [5] Voltage ramp + Current limiting [6] Torque control + Current limiting	-	r/w ³⁾ [5]
0x940A [37898]	high	Unsigned8 [40]	Starting voltage	20 ... 100 % [4 ... 20]	5 %	r/w [6]
0x940B [37899]	high	Unsigned16 [235]	Current limiting value	125 ... 800 % [125 ... 800]	1 %	r/w [400]
0x940C [37900]	high	Unsigned8 [172]	Starting torque	10 ... 100 % [2 ... 20]	5 %	r/w [2]
0x940D [37901]	high	Unsigned8 [118]	Limiting torque	20 ... 200 % [4 ... 40]	5 %	r/w [30]
0x940E [37902]	high	Unsigned16 [170]	Ramp up time	0 ... 360 s [0 ... 3 600]	0.1 s	r/w [100]
0x940F [37903]	high	Unsigned16 [169]	Maximum starting time	0 ... 1 000 s [0 ... 10 000]	0.1 s	r/w [0]
0x9410 [37904]	high	Unsigned8 [116]	Breakaway time	0 ... 2 s [0 ... 200]	0.01 s	r/w [0]
0x9411 [37905]	high	Unsigned8 [117]	Breakaway voltage	40 ... 100 % [8 ... 20]	5 %	r/w [8]
0x9412 [37906]	high	Unsigned8 [119]	Motor heating power	1 ... 100 % [1 ... 100]	1 %	r/w ⁵⁾ [20]
0x9413 [37907]	high	Bit4 [168]	Stopping mode	[0 ... 6] [0] Coasting down [1] Voltage ramp [2] Torque control [3] Pump stopping mode [4] DC braking ⁵⁾ [5] Dynamic DC braking ⁵⁾ [6] Reversing DC braking ^{5), 6)}	-	r/w ³⁾ [0]
0x9414 [37908]	high	Unsigned16 [171]	Stopping time	0 ... 360 s [0 ... 3 600]	0.1 s	r/w [100]
0x9415 [37909]	high	Unsigned8 [173]	Stopping torque	10 ... 100 % [2 ... 20]	5 %	r/w [2]
0x9416 [37910]	high	Unsigned8 [178]	Dynamic braking torque	20 ... 100 % [4 ... 20]	5 %	r/w ⁵⁾ [10]
0x9417 [37911]	high	Unsigned8 [47]	DC braking torque	20 ... 100 % [4 ... 20]	5 %	r/w ⁵⁾ [10]

Register Address	Byte high / low	Data format [Obj. No.]	Parameter	Range of values [encoding]	In steps of	3RW55 / 55-F ¹⁾ [D ²⁾]
0x9418 [37912]	high	Bit4 [2326]	Alternative stopping mode	[0 ... 6] [0] Coasting down [1] Voltage ramp [2] Torque control [3] Pump stopping mode [4] DC braking ⁵⁾ [5] Dynamic DC braking ⁵⁾ [6] Reversing DC braking ^{5), 6)}	-	r/w ³⁾ [0]
0x9419 [37913]	high	Unsigned16 [2327]	Alternative stopping time	0 ... 360 s [0 ... 3 600]	0.1 s	r/w [100]
0x941A [37914]	high	Unsigned8 [2329]	Alternative stopping torque	10 ... 100 % [2 ... 20]	5 %	r/w [2]
0x941B [37915]	high	Unsigned8 [2332]	Alternative dynamic braking torque	20 ... 100 % [4 ... 20]	5 %	r/w ⁵⁾ [10]
0x941C [37916]	high	Unsigned8 [2331]	Alternative DC braking torque	20 ... 100 % [4 ... 20]	5 %	r/w ⁵⁾ [10]
0x941D [37917]	high	Bit4 [6]	Trip class	[0 ... 15] [0] CLASS 10E [1] CLASS 20E [2] CLASS 30E [3] CLASS 10A [15] CLASS OFF	-	r/w ³⁾ [0]
0x941E [37918]	high	Unsigned16 [2211]	Remaining time for tripping warning limit	0 ... 500 s [0 ... 500]	1 s	r/w [0]
0x941F [37919]	high	Unsigned8 [2210]	Motor heating warning limit	0 ... 99 % [0 ... 99]	1 %	r/w [0]
0x9420 [37920]	high	Bit2 [5]	Response to overload thermal motor model	[0 ... 1] [0] Turn off without restart [1] Turn off with restart	-	r/w ³⁾ [0]
0x9421 [37921]	high	Unsigned8 [7]	Recovery time	60 ... 1 800 s [2 ... 60]	30 s	r/w ³⁾ [10]
0x9422 [37922]	high	Bit4 [9]	Temperature sensor	[0 ... 2] [0] Deactivated [1] Thermoclick [2] PTC type A	-	r/w ³⁾ [0]
0x9423 [37923]	high	Bit2 [10]	Response to overload temperature sensor	[0 ... 2] [0] Turn off without restart [1] Turn off with restart [2] Warn	-	r/w ³⁾ [0]
0x9424 [37924]	high	Unsigned8 [43]	Creep speed factor right	3 ... 21 [3 ... 21]	1	r/w ⁵⁾ [7]
0x9425 [37925]	high	Unsigned8 [44]	Creep speed torque right	20 ... 100 % [4 ... 20]	5 %	r/w ⁵⁾ [10]

Register Address	Byte high / low	Data format [Obj. No.]	Parameter	Range of values [encoding]	In steps of	3RW55 / 55-F ¹⁾ [D ²⁾]
0x9426 [37926]	high	Unsigned8 [198]	Creep speed factor left	3 ... 21 [3 ... 21]	1	r/w ⁵⁾ [7]
0x9427 [37927]	high	Unsigned8 [199]	Creep speed torque left	20 ... 100 % [4 ... 20]	5 %	r/w ⁵⁾ [10]
0x9428 [37928]	high	Unsigned16 [2337]	Current upper limit error	50 ... 400 % [50 ... 400] [0] Deactivated	5 %	r/w [0]
0x9429 [37929]	high	Unsigned16 [2338]	Current upper limit - maintenance demanded	50 ... 400 % [50 ... 400] [0] Deactivated	5 %	r/w [0]
0x942A [37930]	high	Unsigned8 [2340]	Current lower limit error	20 ... 100 % [20 ... 100] [0] Deactivated	5 %	r/w [0]
0x942B [37931]	high	Unsigned8 [2341]	Current lower limit - maintenance demanded	20 ... 100 % [20 ... 100] [0] Deactivated	5 %	r/w [0]
0x942C [37932]	high	Unsigned32 [2250]	Active power reference value	0 ... 2 000 000 W [0 ... 2 000 000]	1 W	r/w [0]
0x942E [37934]	high	Unsigned16 [2251]	Active power upper limit error	0 ... 400 % [0 ... 400]	1 %	r/w [0]
0x942F [37935]	high	Unsigned16 [2252]	Active power upper limit - maintenance demanded	0 ... 400 % [0 ... 400]	1 %	r/w [0]
0x9430 [37936]	high	Unsigned8 [2254]	Active power lower limit error	0 ... 100 % [0 ... 100]	1 %	r/w [0]
0x9431 [37937]	high	Unsigned8 [2255]	Active power lower limit - maintenance demanded	0 ... 100 % [0 ... 100]	1 %	r/w [0]
0x9432 [37938]	high	Unsigned16 [2317]	Starting time upper limit - maintenance demanded	0 ... 400 % [0 ... 400]	1 %	r/w [0]
0x9433 [37939]	high	Unsigned8 [2320]	Starting time lower limit - maintenance demanded	0 ... 100 % [0 ... 100]	1 %	r/w [0]
0x9434 [37940]	high	Bit4 [2218]	Asymmetry limit warning	10 ... 60 % [2 ... 12] [0] Deactivated	5 %	r/w [0]
0x9435 [37941]	high	Bit4 [21]	Asymmetry limit error	10 ... 60 % [2 ... 12] [0] Deactivated	5 %	r/w [6]
0x9436 [37942]	high	Unsigned8 [2220]	Ground fault limit warning	10 ... 95 % [2 ... 19] [0] Deactivated	5 %	r/w [0]

Register	Byte	Data format	Parameter	Range of values	In steps	3RW55 /
Address	high / low	[Obj. No.]		[encoding]	of	55-F ¹⁾ [D ²⁾]
0x9437 [37943]	high	Unsigned8 [2294]	Ground fault limit error	10 ... 95 % [2 ... 19] [0] Deactivated	5 %	r/w [4]
0x9438 [37944]	high	Bit4 [2242]	Emergency start	[0 ... 1] [0] Disable [1] Manually enable/disable	-	r/w ³⁾ [1]
0x9439 [37945]	high	Bit4 [2243]	Emergency run	[0 ... 2] [0] Disable [1] Manually enable/disable [2] Enable	-	r/w ³⁾ , 5), 7) [0]
0x943A [37946]	high	Unsigned8 [194]	Input 1-Action	[0 ... 45] [0] No action [6] Operating mode manual - local [7] Emergency start [10] Creep speed ⁵⁾ [11] Quick-stop [12] Reset [16] Motor CW with PS1 [17] Motor CCW with PS1 [18] Motor CW with PS2 [19] Motor CCW with PS2 [20] Motor CW with PS3 [21] Motor CCW with PS3 [43] Motor standstill ⁵⁾ [44] Use alternative stopping mode [45] Activate pump cleaning	-	r/w ³⁾ [16]
0x943B [37947]	high	Unsigned8 [195]	Input 2-Action	(see Input 1-Action)	-	r/w ³⁾ [0]
0x943C [37948]	high	Unsigned8 [196]	Input 3-Action	(see Input 1-Action)	-	r/w ³⁾ [0]
0x943D [37949]	high	Unsigned8 [197]	Input 4-Action	(see Input 1-Action)	-	r/w ³⁾ [12]

Register Address	Byte high / low	Data format [Obj. No.]	Parameter	Range of values [encoding]	In steps of	3RW55 / 55-F ¹⁾ [D ²⁾]
0x943E [37950]	high	Unsigned8 [163]	Output 1-Action	[0 ... 201] [0] No action [1] Control source PIQ-DQ-1.0 output 1 [2] Control source PIQ-DQ-1.1 output 2 [6] Control source input 1 [7] Control source input 2 [8] Control source input 3 [9] Control source input 4 [10] Start-up [11] Operation / bypass [12] Run-down [13] On time motor (RUN) [14] Control command MOTOR ON [16] DC braking contactor ⁵⁾ [18] Device on [19] Operation / Run-down [29] External bypass ^{5), 6)} [31] Group warning [32] Group error [33] Bus error [34] Device error [38] Ready to start for motor ON [41] Generator operation [42] Pump cleaning active [43] Alternative stopping mode active [44] CM - maintenance demanded [45] CM - error [180] Control source PIQ-DQ-2.0 output 3 [200] Reversing contactor right [201] Reversing contactor left	-	r/w [13]
0x943F [37951]	high	Unsigned16 [159]	Output 1 - ON delay time	0 ... 6 500 s [0 ... 65 000]	0.1 s	r/w [0]
0x9440 [37952]	high	Unsigned16 [2333]	Output 1 - OFF delay time	0 ... 6 500 s [0 ... 65 000]	0.1 s	r/w [0]
0x9441 [37953]	high	Unsigned8 [164]	Output 2-Action	(see Output 1-Action)	-	r/w [0]
0x9442 [37954]	high	Unsigned16 [160]	Output 2 - ON delay time	0 ... 6 500 s [0 ... 65 000]	0.1 s	r/w [0]
0x9443 [37955]	high	Unsigned16 [2334]	Output 2 - OFF delay time	0 ... 6 500 s [0 ... 65 000]	0.1 s	r/w [0]
0x9444 [37956]	high	Unsigned8 [166]	Output 4-Action	(see Output 1-Action)	-	r/w ⁵⁾ [0]
0x9445 [37957]	high	Unsigned16 [162]	Output 4 - ON delay time	0 ... 6 500 s [0 ... 65 000]	0.1 s	r/w [0]
0x9446 [37958]	high	Unsigned16 [2336]	Output 4 - OFF delay time	0 ... 6 500 s [0 ... 65 000]	0.1 s	r/w [0]

Register	Byte	Data format	Parameter	Range of values	In steps	3RW55 /
Address	high / low	[Obj. No.]		[encoding]	of	55-F ¹⁾ [D ²⁾]
0x9447 [37959]	high	Unsigned8 [2222]	Analog output - signal type	[0 ... 3] [0] Deactivated [2] 4-20mA [3] 0-10V	-	r/w [0]
0x9448 [37960]	high	Unsigned16 [2223]	Analog output - measured value	[0 ... 632] [0] Deactivated [502] Motor temperature rise [504] Phase current I L1 (%) [505] Phase current I L2 (%) [506] Phase current I L3 (%) [510] Line voltage U L1-L2 (rms) [511] Line voltage U L2-L3 (rms) [512] Line voltage U L3-L1 (rms) [513] Phase current I L1 (rms) [514] Phase current I L2 (rms) [515] Phase current I L3 (rms) [518] Switching element heating [521] Active power [523] Power factor L1...3 [528] Phase current average (%) [530] Phase current average (rms) [632] Active energy import total	-	r/w [0]
0x9449 [37961]	high	Unsigned32 [2224]	Analog output - range start value	0 ... 4 294 967 294 [0 ... 4 294 967 294]	1	r/w [0]
0x944B [37963]	high	Unsigned32 [2225]	Analog output - range end value	0 ... 4 294 967 295 [0 ... 4 294 967 295]	1	r/w [27 648]
0x944D [37965]	high	Bit4 [2209]	Ex application	[0 ... 3] [0] No [1] Yes, with complete motor protection [2] Yes, with motor model protection [3] Yes, with thermistor motor protection	-	r/w ^{3), 6)} [0]
0x944E [37966]	high	Bool [34]	Response to CPU/Master Stop	[0 ... 1] [0] Switch substitute value [1] Keep last value	-	r/w [0]
0x944F [37967]	high	Bit32 [35]	Substitute value	-	-	r/w [0]
	high (bit 0)	Bool	Substitute value: Motor CW	[0 ... 1]	-	r/w [0]
	high (bit 1)	Bool	Substitute value: Motor CCW	[0 ... 1]	-	r/w [0]
	high (bit 3)	Bool	Substitute value: Reset	[0 ... 1]	-	r/w [0]
	high (bit 4)	Bool	Substitute value: Emergency start	[0 ... 1]	-	r/w [0]
	high (bit 6)	Bool	Substitute value: Creep speed	[0 ... 1]	-	r/w ⁵⁾ [0]

Register Address	Byte high / low	Data format [Obj. No.]	Parameter	Range of values [encoding]	In steps of	3RW55 / 55-F ¹⁾ [D ²⁾]
	low (bit 0)	Bool	Substitute value: Output 1	[0 ... 1]	-	r/w [0]
	low (bit 1)	Bool	Substitute value: Output 2	[0 ... 1]	-	r/w [0]
	low (bit 2)	Bool	Substitute value: Parameter set bit 0	[0 ... 1]	-	r/w [0]
	low (bit 3)	Bool	Substitute value: Parameter set bit 1	[0 ... 1]	-	r/w [0]
	low (bit 7)	Bool	Substitute value: Disable Quick-stop	[0 ... 1]	-	r/w [0]
0x9450 [37968]	high (bit 0)	Bool	Substitute value: Output 3	[0 ... 1]	-	r/w ⁵⁾ [0]
	high (bit 3)	Bool	Substitute value: Activate pump cleaning	[0 ... 1]	-	r/w [0]
	low (bit 0)	Bool	Substitute value: Manual operation local - input controlled	[0 ... 1]	-	r/w [0]
	low (bit 1)	Bool	Substitute value: Use alternative stopping mode	[0 ... 1]	-	r/w [0]
	low (bit 2)	Bool	Substitute value: Motor standstill	[0 ... 1]	-	r/w [0]
0x9451 [37969]	high	Bit4 [2310]	Parameters of CPU/master disabled	[1 ... 2]	-	r/w [1]
				[1] Disable [2] Enable		
0x9452 [37970]	high	Bit2 [140]	Response to overload switching element	[0 ... 1]	-	r/w [0]
				[0] Turn off without restart [1] Turn off with restart		
0x9453 [37971]	high	Bit4 [232]	Response to faulty main power	[1 ... 2]	-	r/w [1]
				[1] Group error only at ON command [2] Warn		
0x9454 [37972]	high	Bit4 [129]	Response to preset unequal actual configuration of HMI	[0 ... 4]	-	r/w [0]
				[0] Turn off [1] Warn [4] Ignore		
0x9455 [37973]	high	Bit4 [2344]	Pump cleaning - mode	[0 ... 1]	-	r/w [0]
				[0] Deactivated [1] Manual		
	low	Bit4 [2345]	Pump cleaning - start/stop parameters	[1 ... 5]	-	r/w [5]
				[1] Parameter set 1 [2] Parameter set 2 [3] Parameter set 3 [5] Operating parameters		

Register	Byte	Data format	Parameter	Range of values	In steps	3RW55 /
Address	high / low	[Obj. No.]		[encoding]	of	55-F ¹⁾ [D ²⁾]
0x9456 [37974]	high	Unsigned8 [2346]	Pump cleaning - time	0 ... 30 s [0 ... 30]	1 s	r/w [20]
	low	Unsigned8 [2347]	Pump cleaning - cycles	0 ... 10 [0 ... 10]	1	r/w [3]
0x9457 [37975]	high	Unsigned16 [2352]	Current limiting value - maximum	125 ... 800 % [125 ... 800]	1 %	r/w [400]
0x945C [37980]	high	Unsigned16 [2002]	Measured value 1	[20 000 ... 20 006] [20 000] Phase current I L1 (rms) [20 001] Phase current I L2 (rms) [20 002] Phase current I L3 (rms) [20 003] Phase current average (rms) [20 004] Active energy import total [20 005] Active power [20 006] Power factor L1...3	-	r/w [20 000]
0x945D [37981]	high	Unsigned16 [2003]	Measured value 2	(see Measured value 1)	-	r/w [20 001]
0x945E [37982]	high	Unsigned16 [2004]	Measured value 3	(see Measured value 1)	-	r/w [20 002]

- 1) Supported by SIRIUS 3RW55 and 3RW55 Failsafe soft starters
- 2) Default encoding
- 3) Parameter is relevant for EX applications
- 4) Not supported by SIRIUS 3RW55 soft starter
- 5) Not supported by SIRIUS 3RW55 Failsafe soft starter
- 6) 3RW55 soft starter from firmware version V2.0 or 3RW55 Failsafe soft starter from firmware version V1.0
- 7) 3RW55 soft starter from firmware version V2.1

Dependencies

During parameterization, it is possible to select impossible combinations of interdependent values. In the "Soft starter diagnostics" data table (Page 152) the diagnosis "Invalid parameter value" is then signaled. You will find the dependencies of the parameters in the Equipment Manual of the 3RW5 soft starter.

A.2.19 Modbus TCP communication parameters

Read access (r) to the communication parameters is possible via Function Codes 03 and 04. Write access (w) is possible for individual communication parameters via Function Codes 06 and 16.

Note

IP parameters

The IP parameters (IP address, Subnet mask and Router address) influence each other. Change the IP parameters together in one write command.

Register	Byte	Data format	Parameter	Range of values [encoding]	Default	Access
Address	high / low					
0xA102 [41218]	high	Unsigned32	Access monitoring time	[5 000 ... 10 000] [5 000] 5 s [10 000] 10 s	5 000	r/w
-	-	Unsigned32	IP address (Byte3.Byte2.Byte1.Byte0)	-	-	-
0xA10E [41230]	high		Byte 3	[0 ... 255]	192	r/w
	low		Byte 2	[0 ... 255]	168	r/w
0xA10F [41231]	high		Byte 1	[0 ... 255]	42	r/w
	low		Byte 0	[0 ... 255]	99	r/w
-	-	Unsigned32	Subnet mask (Byte3.Byte2.Byte1.Byte0)	-	-	-
0xA110 [41232]	high		Byte 3	[0 ... 255]	255	r/w
	low		Byte 2	[0 ... 255]	255	r/w
0xA111 [41233]	high		Byte 1	[0 ... 255]	255	r/w
	low		Byte 0	[0 ... 255]	15	r/w
-	-	Unsigned32	Router address (Byte3.Byte2.Byte1.Byte0)	-	-	-
0xA112 [41234]	high		Byte 3	[0 ... 255]	0	r/w
	low		Byte 2	[0 ... 255]	0	r/w
0xA113 [41235]	high		Byte 1	[0 ... 255]	0	r/w
	low		Byte 0	[0 ... 255]	0	r/w
0xA114 [41236]	high	OctetString6	MAC address	-	-	r

A.2.20 Modbus RTU communication parameters

Read access (r) to the communication parameters is possible via Function Codes 03 and 04. Write access (w) is possible for individual communication parameters via Function Codes 06 and 16.

Register	Byte	Data format	Parameter	Range of values [encoding]	Default	Access
Address	high / low					
0xA202 [41474]	high	Unsigned32	Access monitoring time	[5 000 ... 10 000]	5 000	r/w
				[5 000] 5 s [10 000] 10 s		
0xA204 [41476]	high	Unsigned16	Silent interval time	Increment: 0.1 ms	0 ¹⁾	r/w
			Baud rate: 1.2 kbit/s	32 ... 6 553.5 ms [320 ... 65 535]		
			Baud rate: 2.4 kbit/s	16 ... 6 553.5 ms [160 ... 65 535]		
			Baud rate: 4.8 kbit/s	8 ... 6 553.5 ms [80 ... 65 535]		
			Baud rate: 9.6 kbit/s	4 ... 6 553.5 ms [40 ... 65 535]		
			Baud rate: 19.2 kbit/s	2 ... 6 553.5 ms [20 ... 65 535]		
			Baud rate: 38.4 kbit/s	1 ... 6 553.5 ms [10 ... 65 535]		
			Baud rate: 57.6 kbit/s	0.7 ... 6 553.5 ms [7 ... 65 535]		
			Baud rate: 76.8 kbit/s	0.5 ... 6 553.5 ms [5 ... 65 535]		
			Baud rate: 115.2 kbit/s	0.3 ... 6 553.5 ms [3 ... 65 535]		
			Automatic	[0] ¹⁾		
0xA206 [41478]	high	Unsigned8	Baud rate	[0 ... 12] [0] Automatic [1] 115.2 kbit/s [4] 76.8 kbit/s [6] 57.6 kbit/s [7] 38.4 kbit/s [8] 19.2 kbit/s [9] 9.6 kbit/s [10] 4.8 kbit/s [11] 2.4 kbit/s [12] 1.2 kbit/s	8	r/w
	low	Unsigned8	Port configuration	[0 ... 4] [0] Automatic [1] 1 start, 8 data, 1 stop bit, even parity [2] 1 start, 8 data, 1 stop bit, odd parity [3] 1 start, 8 data, 2 stop bit, no parity [4] 1 start, 8 data, 1 stop bit, no parity	1	r/w

Register	Byte	Data format	Parameter	Range of values [encoding]	Default	Access
Address	high / low					
0xA207 [41479]	high	Unsigned8	Station address	1 ... 247 [1 ... 247]	126	r/w
0xA208 [41480]	high	Unsigned8	Detected baud rate	[0 ... 12] [0] Automatic [1] 115.2 kbit/s [4] 76.8 kbit/s [6] 57.6 kbit/s [7] 38.4 kbit/s [8] 19.2 kbit/s [9] 9.6 kbit/s [10] 4.8 kbit/s [11] 2.4 kbit/s [12] 1.2 kbit/s	-	r
	low	Unsigned8	Detected port configuration	[0 ... 4] [0] Automatic [1] 1 start, 8 data, 1 stop bit, even parity [2] 1 start, 8 data, 1 stop bit, odd parity [3] 1 start, 8 data, 2 stop bit, no parity [4] 1 start, 8 data, 1 stop bit, no parity	-	r

1) For the value "0" ("Automatic"), the minimum silent interval time of the baud rate used is automatically set.

A.2.21 HMI diagnostics

For access to the HMI diagnostics only read access (r) is possible via Function Codes 01, 02, 03 and 04.

Register	Byte	Bit address		Data format	HMI diagnostics	3RW5 HMI HF ¹⁾
Address	high / low	hex	dec			
0xB000 [45056]	high	0xB000	45056	Bool	Error HMI	r
		0xB001	45057	Bool	Run	r
	low	0xB008	45064	Bool	Factory settings restored	r
0xB001 [45057]	high	0xB010	45072	Bool	FW update rejected	r
		0xB011	45073	Bool	FW update active	r
		0xB012	45074	Bool	FW update successful	r
		0xB013	45075	Bool	FW update not successful	r
		0xB014	45076	Bool	FWUpdateInvalidSignature	r
	low	0xB018	45080	Bool	Self-test active	r
		0xB01A	45082	Bool	Error during self-test	r
0xB002 [45058]	high	0xB020	45088	Bool	Device assigned	r
		0xB024	45092	Bool	HMI not configured	r
0xB004 [45060]	high	0xB040	45120	Bool	Micro SD card active	r
		0xB041	45121	Bool	Micro SD card access error	r
		0xB042	45122	Bool	Micro SD card plugged	r
		0xB043	45123	Bool	Micro SD card write protected	r
	low	0xB048	45128	Bool	Local interface active	r
0xB005 [45061]	high	0xB050	45136	Bool	Invalid parameter value	r
0xB006 [45062]	high	0xB063	45155	Bool	User account set up	r
	low	0xB068	45160	Bool	No device answer	r
0xB007 [45063]	high	0xB070	45168	Bool	Write Error	r
	low	0xB078	45176	Bool	Loading language rejected ²⁾	r
		0xB079	45177	Bool	Loading language active ²⁾	r
		0xB07A	45178	Bool	Loading language successful ²⁾	r
		0xB07B	45179	Bool	Loading language unsuccessful ²⁾	r
		0xB07C	45180	Bool	Invalid signature 'Load additional language' ²⁾	r
0xB008 [45064]	high	0xB080	45184	Unsigned 16	Faulty parameter number ³⁾	r

1) Supported by 3RW5 HMI High Feature

2) 3RW5 HMI High Feature firmware version V3.0 or higher

3) 3RW5 HMI High Feature firmware version V2.0 or higher

A.2.22 HMI parameters

Read access (r) to the HMI parameters is possible via Function Codes 03 and 04. Write access (w) is possible for individual HMI parameters via Function Codes 06 and 16.

Register	Byte	Data format	Parameter	Range of values	In steps	3RW5
Address	high / low	[Obj. No.]		[encoding]	of	HMI HF ¹⁾ [D ²⁾]
0xB100 [45312]	high	Unsigned8 [78]	Language	[0 ... 254] [0] English [1] German [2] French [3] Spanish [4] Italian [5] Chinese [6] Portuguese [254] Additional language ³⁾	-	r/w [0]
0xB101 [45313]	high	Unsigned16 [83]	Timer lighting dark	1 ... 60 min [1 ... 60] [0] Deactivated	1 min	r/w [5]
0xB102 [45314]	high	Bool [94]	Display time	[0 ... 1] [0] Disable [1] Enable	-	r/w [0]
0xB103 [45315]	high	Bool [87]	Do control after log off	[0 ... 1] [0] Stop motor and give back control [1] Continue with motor control	-	r/w [0]

¹⁾ Supported by 3RW5 HMI High Feature

²⁾ Default encoding

³⁾ 3RW5 HMI High Feature firmware version V3.0 or higher

Glossary

Configuration

Configuration is the systematic arrangement, setting, and networking of the individual 3RW5 soft starters within the device or network view.

Configuring

This section refers to the configuration and parameterization of 3RW5 soft starters.

Diagnostics

Data that is transferred from the 3RW5 soft starter and indicates the current operating status.

Fieldbus

Industrial communication system that connects a large number of field devices such as probes (sensors), final controlling elements, and drives (actuators) to a control device.

I&M data

Identification and maintenance data.

Information stored in a module that helps you to check the plant configuration, to locate hardware modifications in a plant, or to remedy faults in a plant. I&M data enable modules to be uniquely identified online.

IP address

To enable a Modbus TCP device to be addressed as a node on Industrial Ethernet, this Modbus TCP device 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 as follows:

- Address of the (sub)net
- Address of the station (host or network node)

MAC address

The MAC address is a worldwide unique device identification and is assigned to each Modbus TCP device during production. The Modbus TCP device can be accessed via the MAC address via LAN.

The MAC address is 6 bytes long and has the following structure:

- 3 bytes for the manufacturer ID
- 3 bytes with a 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.

Messages

Data that is transferred from the 3RW5 soft starter and indicates the current operating status.

Parameterization

Parameterization is the definition of parameters using the parameterization software.

PII/PIQ

Process image input/process image output

Reading data

Data are transferred from the 3RW5 soft starter.

Receive data

Data that are transferred to the 3RW5 soft starter.

SIRIUS Soft Starter ES (TIA Portal)

SIRIUS Soft Starter ES (TIA Portal) is the central software for commissioning, operating, and diagnostics of the SIRIUS 3RW5 soft starter series.

STEP 7

The basic STEP 7 software is the standard tool for the SIMATIC S7, SIMATIC C7, and SIMATIC WinAC automation systems.

Writing data

Data are transferred to the 3RW5 soft starter.

Index

3

- 3RW5, 19
- 3RW5 HMI High Feature
 - Access monitoring time, 87
 - Baud rate, 84
 - Detected baud rate, 85
 - Detected port configuration, 85
 - Diagnostics, 93
 - Firmware update, 119
 - IP parameters, 76
 - Operation with CPU / Master, 89
 - Port configuration, 84
 - Silent interval time, 86
 - Station address, 81
- 3RW5 HMI Standard
 - Station address, 83
- 3RW5 Modbus RTU communication module, 23
- 3RW5 Modbus TCP communication module, 22
- 3RW5 soft starter, 19

A

- Access monitoring, 27
- Access monitoring time, 87
- Access path, 31
- Access to memory areas, 98
- Application
 - Quantity, 31
- Article number, 22
- Assignment of the data, 26

B

- Baud rate, 25, 84
- Broadcast, 25
- Bus connection cable
 - Connection, 64
 - Pull out, 67
- Bus connector, 41
 - Connecting, 61
 - Pull out, 63
- Byte arrangements, 136

C

- Catalog, 11
- COM connecting cable, 44
 - Connecting, 57
 - Connection, 55
 - Pull out, 59, 60
- Communication module, 19
- Communication parameters, 120
- Communication speed, 25
- Configuring, 69, 71
- Connecting cable, 41
- Connection cable, 41
- Connection monitoring, 27
- Control via digital input, 39
- Cover of the slot, 46
- Current values, 133

D

- Data, 28, 29
- Data Matrix Code, 22
- Data security, 16
- Data table
 - Byte arrangements, 136
 - Energy management, 147
 - HMI diagnostics, 179
 - HMI parameters, 180
 - I&M0 - device identification (3RW5 communication module), 141
 - I&M0 - device identification (3RW5 HMI High Feature), 146
 - I&M0 - device identification (3RW5 soft starter), 142
 - I&M1 - equipment identifier (3RW5 soft starter), 143
 - I&M2 - installation (3RW5 soft starter), 144
 - I&M3 - description (3RW5 soft starter), 145
 - Maximum pointer, 162
 - Measured values, 158
 - Modbus RTU communication parameters, 177
 - Modbus TCP communication parameters, 176
 - Node flash test, 140
 - Parameter, 164
 - Process image input (PII), 148
 - Process image output (PIQ), 150
 - Soft starter diagnostics, 152

- Specifications, 137
- Statistic data, 160
- Data transfer, 31
- Detected baud rate, 85
- Detected port configuration, 85
- Diagnostics
 - 3RW5 HMI High Feature, 93
 - Diagnostics options, 93
- Diagnostics options, 93
- Drilling pattern, 128

E

- Error, 114
- Error responses, 28, 29
- Error Responses, 112
- ESD guidelines, 14
- Exception Codes, 113

F

- Factory setting, 122
- FAQs, 11
- Firmware update, 117
- Function Code, 28, 29, 98

G

- Guidelines
 - ESD guidelines, 14
- Guidelines on information security in industrial automation, 17

H

- Hardware configuration, 22

I

- Industrial Ethernet, 41
- Interaction interfaces, 30
- IP address, 77
- IP parameters, 77

K

- Knowledge, 20

L

- LED display, 94

M

- MAC address, 77
- Manuals, 10
- Maximum pointer, 135
- Memory image, 138
- Micro SD card, 119, 120
- Modbus RTU, 25
- Modbus TCP, 24
- Mounting, 45, 48
 - On a level surface, 51

N

- Network environment, 19
- Node flash test, 140, 140
- Number of applications, 31

O

- Object number, 137
- Online help, 10
- Operating mode, 32, 115
- Operation on failure of the bus connection to the controller, 88
- Operation with CPU / Master, 88

P

- PLC, 20
- Port configuration, 25, 84
- Process image input (PII), 148
- Process image output (PIQ), 150
- Push-in lugs, 44

R

- Recommended bus connector, 41
- References, 10
- Remedial measures, 114
- Removal, 49
 - On a level surface, 53
- Replacing, 120
- Router address, 77

S

- Setting the mode, 35
- Silent interval time, 86
- SIRIUS 3RW5 soft starter, 19
- SIRIUS Soft Starter ES (TIA Portal), 42
- Slot, 19
- Station address, 82, 83
- Statistic data, 134
- Subnet mask, 77

T

- Target group, 20
- Telegram structure
 - Modbus RTU, 29
 - Modbus TCP, 28
- Transmission rate, 25

V

- VDI guideline, 17

