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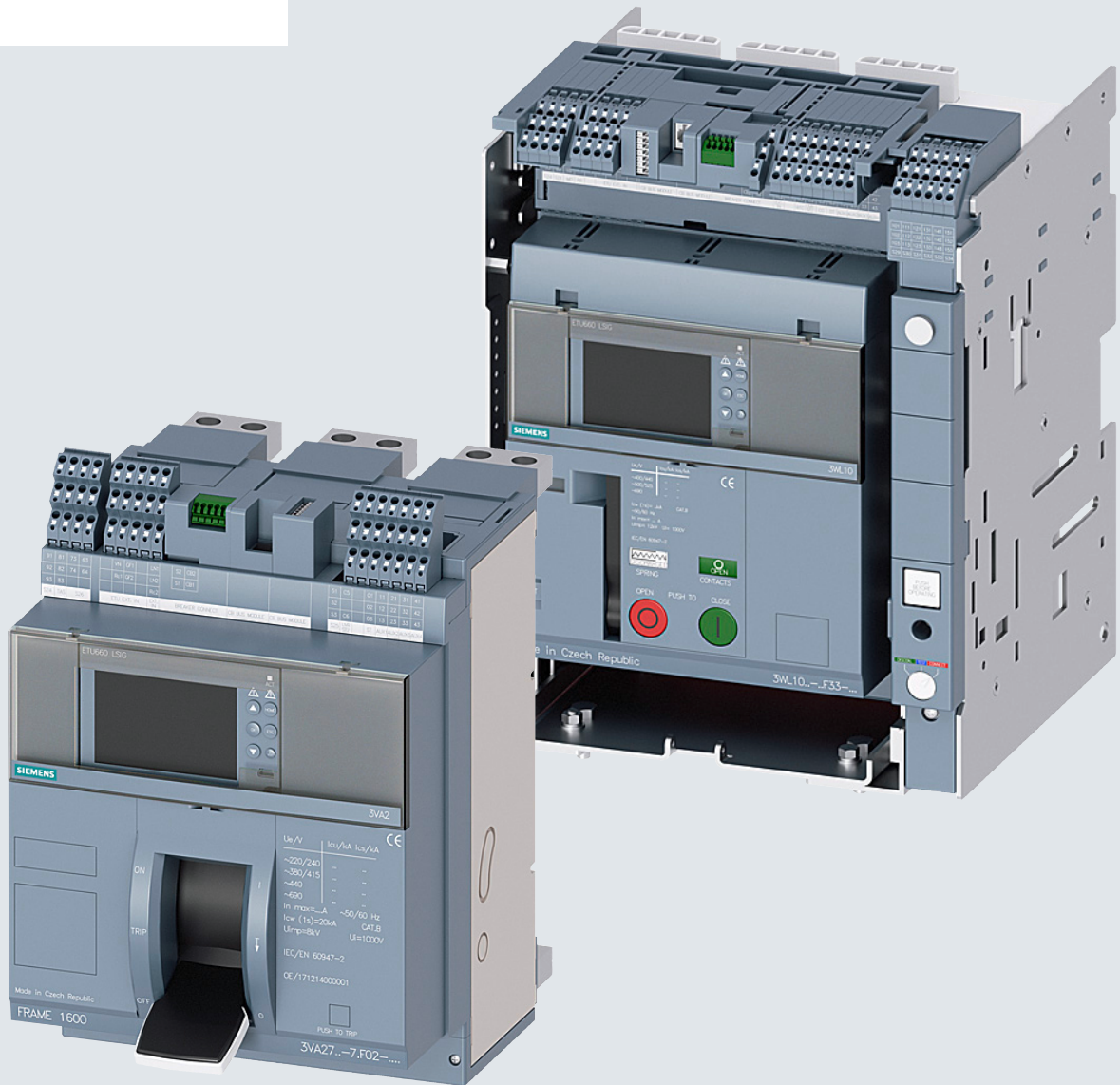
SENTRON

Air Circuit Breaker and Molded Case Circuit Breaker

3WL10 and 3VA27 with communication-capability

Edition   05/2019

siemens.de/SENTRON

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**Protection devices
Communication 3WL10 Air Circuit
Breakers & 3VA27 Molded Case
Circuit Breakers**

System Manual

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

Introduction

<div style="text-align: right; font-size: 3em;">1</div>

1.1 About this documentation

Target readers of this documentation

The information contained in this manual is provided for the benefit of:

- Users
- Control panel manufacturers
- Switchboard manufacturers
- Maintenance personnel

1.2 Product-specific information

Siemens Technical Support

You can find further support on the Internet at:
Technical Support (http://www.siemens.com/lowvoltage/technical-support)

1.3 Safety instructions

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:

Industrial security (https://new.siemens.com/global/en/company/topic-areas/future-of-manufacturing/industrial-security.html)

Disclaimer of liability

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:

Product updates (https://new.siemens.com/global/en/company/topic-areas/future-of-manufacturing/industrial-security.html)

1.4 Reference documents

You can find further details in the following documents:

Title	Article number
3WL10 Air Circuit Breakers & 3VA27 Molded Case Circuit Breakers Equipment manual (https://support.industry.siemens.com/cs/ww/en/view/109753821)	3ZW1012-0WL10-0AB1
3WL10 Air Circuit Breakers / Non-Automatic Air Circuit Breakers Catalog (https://support.industry.siemens.com/cs/ww/en/view/109749565)	E86060-K8280-A101-A7
LV10 Catalog (https://support.industry.siemens.com/cs/document/109482234)	E86060-K8280-A101-A7
Circuit breaker (CB) 3WL10, fixed-mounted Operating Instructions (https://support.industry.siemens.com/cs/ww/de/view/109748199)	3ZW1012-0VA27-0AA0
Circuit breaker (CB) 3WL10, withdrawable Operating Instructions (https://support.industry.siemens.com/cs/ww/com/view/109748198)	3ZW1012-0VA27-1AA0
Circuit breaker (CB) 3VA27, fixed-mounted Operating Instructions (https://support.industry.siemens.com/cs/ww/en/view/109748313)	3ZW1012-0VA27-0AA0
Circuit breaker (CB) 3VA27, withdrawable Operating Instructions (https://support.industry.siemens.com/cs/ww/en/view/109748314)	3ZW1012-0VA27-1AA0
Circuit Breaker CB Bus module - COM / IOM Operating Instructions (https://support.industry.siemens.com/cs/document/109754881)	3ZW1012-0VW00-3CA0
Actuator module COM ACT remote control f. aux. solenoids (ST/CC) Operating Instructions (https://support.industry.siemens.com/cs/document/109754868)	3ZW1012-0VW00-7CA0
Breaker Connect module, external power supply Operating Instructions (https://support.industry.siemens.com/cs/document/109754879)	3ZW1012-0VW00-2CA0
External digital I/O module IOM300 Operating Instructions (https://support.industry.siemens.com/cs/document/109756445)	3ZW1012-0VW00-0DA0
Position signaling switch PSS - COM for guide frame Operating Instructions (https://support.industry.siemens.com/cs/document/109754872)	3ZW1012-0VW00-8AA0
Ready to close signaling switch COM RTC Operating Instructions (https://support.industry.siemens.com/cs/document/109754921)	3ZW1012-0VW00-2BA0
Metering function MF basic / advanced for ETU6xx Operating Instructions (https://support.industry.siemens.com/cs/document/109756489)	3ZW1012-0VW00-1DA0
Display DSP800 Operating Instructions (https://support.industry.siemens.com/cs/document/102393764)	3ZW1012-0VA00-8DA0
Hartmut Kiank, Wolfgang Fruth: Planning Guide for Power Distribution Plants, Publicis Publishing	ISBN: A19100-L531-B115
Schalten, Schützen, Verteilen in Niederspannungsnetzen (Switching, Protection and Distribution in Low-Voltage Networks), substantially extended and revised edition 1997	ISBN 3-89578-041-3
Siemens: Residual Current Protective Devices, Low-Voltage Circuit Protection Technology Primer Siemens AG © 04 / 2009	E10003-E38-9T-B3011

1.5 Advanced training courses

Find out about training courses on offer on the following link.

Training for Industry (https://www.siemens.com/sitrain-lowvoltage)

This is where you can choose from

- Web-based training courses (online, informative, free)
- Classroom training courses (course attendance, comprehensive, subject to fee).

You also have the possibility of compiling your own training portfolio via **Learning paths**.

1.6 3WL10 / 3VA27 circuit breakers

1.6.1 System overview

In order to meet the requirements of modern power distribution, the 3WL10 / 3VA27 communication-capable air circuit breaker is modular in design and allows for the flexible addition of functions as required.

The system is based on a reliable, microprocessor-controlled electronic trip unit, precise measured value acquisition with an integrated voltage tap, in addition to support for the most common bus systems for industry and infrastructure.

Overview
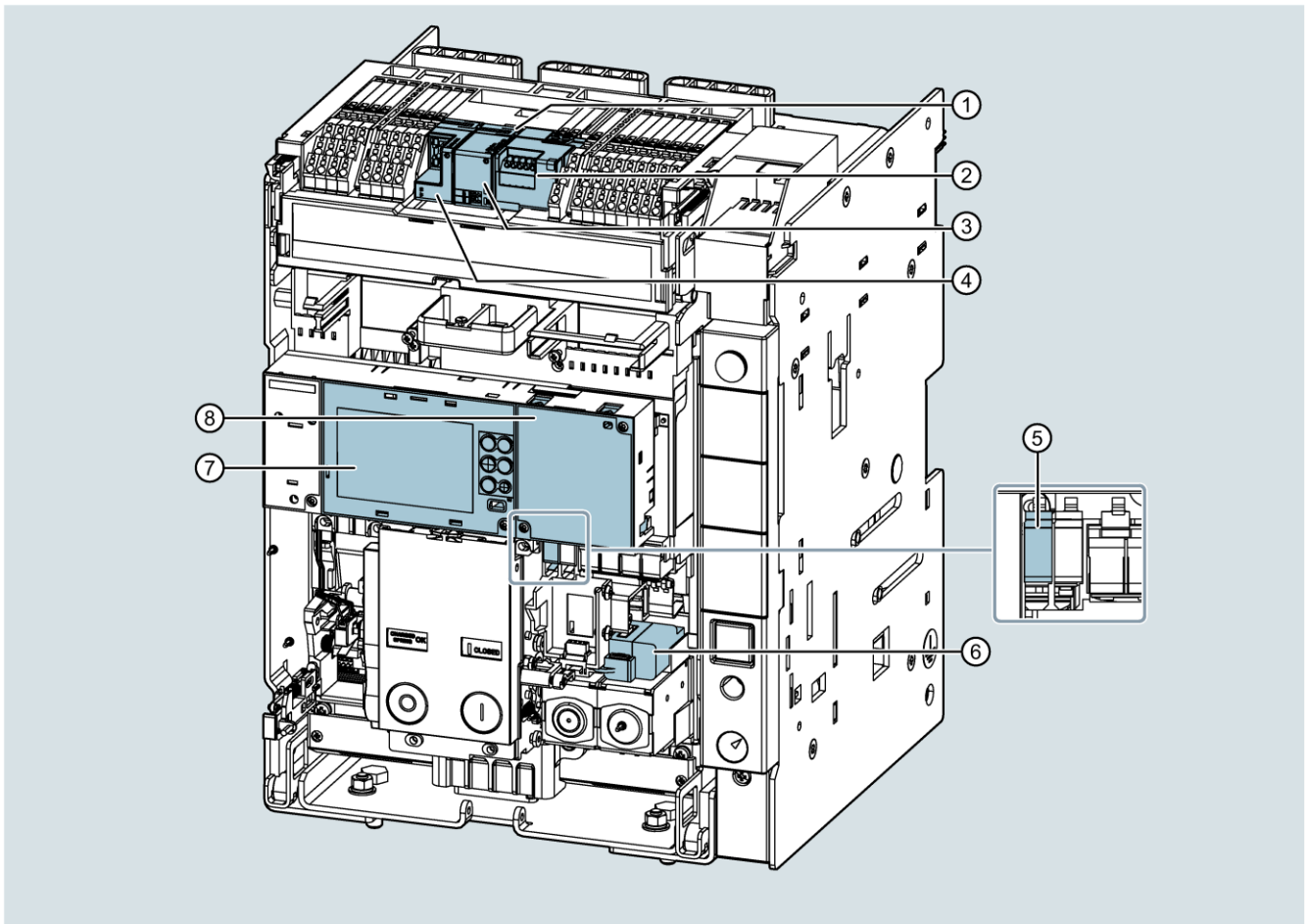
①   Position signaling switch of the circuit breaker in the guide frame (COM PSS), not shown in the figure.

②   Breaker Connect module, external power supply

③   Module slots for communication modules or digital I/O modules

④   IOM040 digital I/O module

⑤   Ready-to-close signaling switch for communication (COM RTC) - only available for the version with a spring energy store

⑥   Actuation module for remote operation (COM ACT) - only available for the version with a spring energy store

⑦   Electronic trip unit (ETU)

⑧   Metering function

Modules and their tasks

- **COM - PSS**
  For signaling the position of the withdrawable breaker in the guide frame

- **Breaker Connect module**
  For the power supply to the electronics

- **COM4x**
  Communication modules for various protocols

- **IOM040**
  Digital I/O module with two input and two output contacts

- **COM RTC**
  To signal the readiness to close of the circuit breaker

- **COM ACT**
  To switch the circuit breaker on/off via communication.

The following are installed as standard in circuit breakers with a communication function (ordered via Z option):

COM4x (ordered via Z option) included

- PSS - COM module (on withdrawable circuit breakers)

- Breaker Connect module 24 V DC or optionally 110/240 V AC

- COM-RTC module

- COM-ACT module

The following are installed as standard in circuit breakers with a metering function:

- Basic or Advanced metering function

- Internal voltage tap above or below the main contacts (depending on the option ordered)

1.6.2 Software applications

Energy management with powermanager

Siemens offers the powermanager software application, which is designed for power and plant monitoring applications. When used in conjunction with SENTRON protection devices such as 3VA, 3WL, 3VL, and PAC as well as equipment supplied by third parties, powermanager is a power monitoring system that reduces energy costs and increases the availability of electrical supply and distribution systems.

powermanager acquires the measured variables that are needed to optimize power consumption and so reduce costs. These variables not only include energy and power values, but also electrical parameters such as current, voltage, or power factor. Not only is this system able to display values, but also to monitor and archive them for later analysis. In addition, the load monitoring function is capable of monitoring a specified setpoint and making recommendations as to which loads should be connected and disconnected.

Identifying cost-cutting potential

The power monitoring software has been tested by the TÜV Rheinland for its suitability to support an energy management system in accordance with ISO 50001.

Functionality and user-friendliness

The salient features and functions of the power monitoring software are as follows:

- Good scalability

- Enhanced report templates

- Reaction plans

- Mass parameterization

- Virtual measuring points for computing customer-specific parameters

- Load monitoring function for monitoring specified power limits for freely definable time periods

- Switching recommendations in the event of limit violations

- Remote control of circuit breakers

You can find more information on energy management with powermanager in the Internet (https://new.siemens.com/global/en/products/energy/low-voltage/components/sentron-measuring-devices-and-power-monitoring.html).

Commissioning and service

powerconfig is a commissioning and service software application for communication-capable measuring devices and circuit breakers from the SENTRON product family. Its main functions are as follows:

- powerconfig facilitates parameterization of the devices, resulting in considerable time savings, particularly when several devices have to be set up.

- With powerconfig, the SENTRON circuit breakers and the 7KM and ATC measuring devices can be parameterized, documented, operated, and analyzed using various communication interfaces.

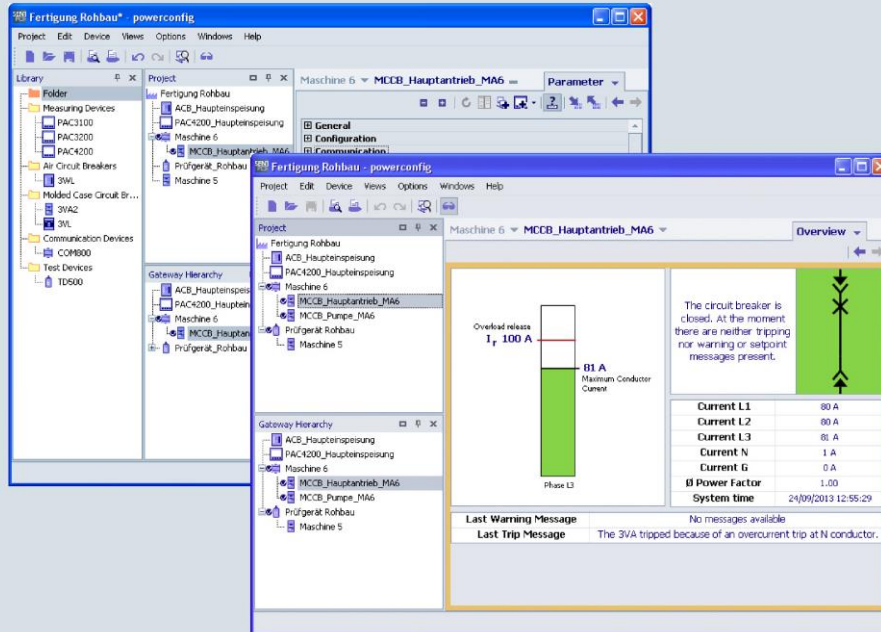- powerconfig can be used to archive settings electronically and as printouts.

Figure 1-1   powerconfig

Further information on powerconfig can be found on the Internet
(https://mall.industry.siemens.com/mall/en/WW/Catalog/Products/10230050).

1.7 Individually configured circuit breakers

The 3WL10/3VA27 circuit breaker is manufactured according to individual system requirements. To adapt a 3WL10/3VA27 circuit breaker to individual requirements, a 3WL10/3VA27 circuit breaker can be configured in the Internet.

Note

You can assemble your own 3WL10/3VA27 circuit breaker simply and quickly in the online configurator and then generate an article number.

Online configurator for 3WL10 (https://mall.industry.siemens.com/spice/pcmplus/app/)

Online configurator for 3VA27 (https://mall.industry.siemens.com/spice/pcmplus/app/)

In the Online Configurator, impermissible combinations are automatically excluded in the article number. If you compile the article number yourself based on the following lists, you must check the exclusion criteria yourself.

You will find more information in Catalog LV10 (see Chapter Reference documents (Page 7)).

Complete circuit breaker

If you want to order a circuit breaker with communication and metering functions, order a circuit breaker with the Z option. All the components are preinstalled.

- F11: COM043 module (Modbus TCP)
- F12: COM042 module (Modbus RTU)

Example: 3WL10__-_____-____-Z F11+F12

Spare parts

- 3VW9011-0AT10 COM-ACT module
- 3VW9011-0AT07 Breaker Connect module
- 3VW9011-0AT30 I/O module IOM0403
- 3VW9011-0AT20 I/O module IOM300
- 3VW9011-0AT12 PSS - COM module
- 3VW9011-0AT11 COM-RTC module
- 3VA9987-0TD10 DSP800

Description

2

2.1 Communication modules

2.1.1 COM043 (Modbus TCP)

Overview

The COM043 module offers fast and simple integration in monitoring, maintenance, and energy management systems as well as in industrial automation systems by way of the Modbus TCP module.

Communication permits the continuous transfer of data, such as status and measured values, from the 3WL10 / 3VA27 circuit breaker. Switching and reset commands can be executed by means of simple operations.
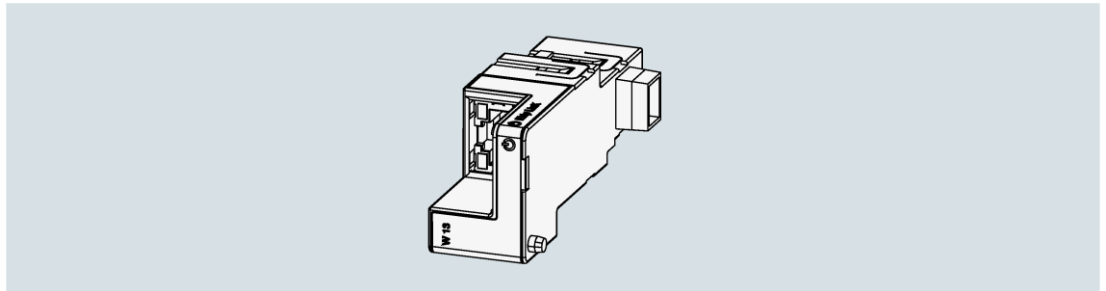
Figure 2-1   COM043 (Modbus TCP)

In addition to the static IP address, the module also supports:

- DHCP

- AutoIP
  In the 169.254.x.x range, where the 2 LSBs (.x.x, least significant bytes) of the IP address are calculated on the basis of the device MAC address and are therefore identical between consecutive operations.

Default settings

Feature	Value
IP address Modbus TCP	0.0.0.0
Network mask	0.0.0.0
Gateway address	0.0.0.0
Port	502

Technical specifications

Feature	Value
Designation	COM043
Article number in conjunction with 3WL10 / 3VA27	Z option F11
Article number (as spare part)	3VW9011-0AT16
Protocol	Modbus TCP
Transmission medium	Ethernet, IEEE 802.3
Transmission rate	10/100 Mbps
Port	502
Connection technology	An RJ45 socket
Simultaneous TCP clients	Maximum 3
Storage temperature	−40 °C … +70 °C
Operating temperature	−25 °C … +70 °C

See also

Breaker Connect module (Page 19)

2.1.2 COM042 (Modbus RTU)

Overview

The COM042 module offers fast and simple integration in monitoring, maintenance, and energy management systems as well as in industrial automation systems by way of the Modbus RTU module.

Communication permits the continuous transfer of data, such as status and measured values, from the 3WL10 / 3VA27 circuit breaker. Switching and reset commands can be executed by means of simple binary operations.
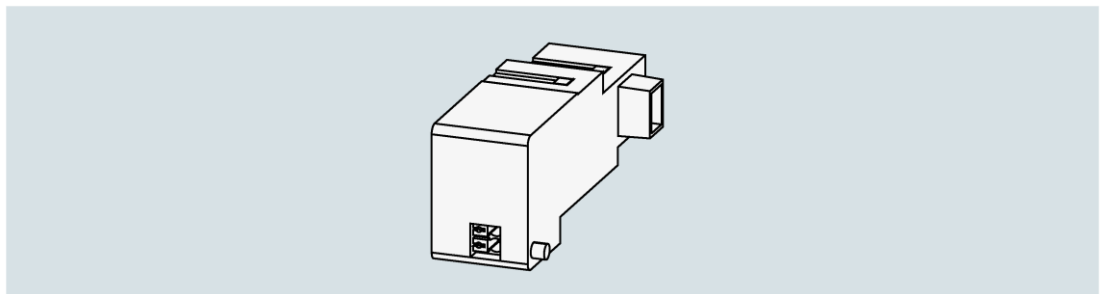

Figure 2-2   COM042 (Modbus RTU)

Default settings

Feature	Value
Transmission rate	19200 bps
Address	247
Format	8E1

Technical specifications

Feature	Value
Designation	COM042
Article number in conjunction with 3WL10 / 3VA27	Z option F12
Article number (as spare part)	3VW9011-0AT17
Protocol	Modbus RTU
Transmission medium	RS485
Transmission rate	9,600, 19,200, and 38,400 bps
Address	1 … 247
Format	8N2, 8E1, 8O1, 8N1
Connection technology	Clamping
Modbus terminating resistor	120 Ω integrated in COM042, can be switched on or off
Storage temperature	−40 °C … +70 °C
Operating temperature	−25 °C … +70 °C

See also

Breaker Connect module (Page 19)

2.1.3   Actuation module for remote operation (COM ACT)

The COM-ACT module is required to switch the 3WL10 / 3VA27 circuit breaker on or off via the communication modules.

The COM-ACT module is installed in the accessory area on the right on the front panel of the circuit breaker and activates the auxiliary solenoids (CC closing coil / ST shunt trip).

The COM ACT module can be used to switch the circuit breaker on or off via the communication connection and, at the same time, to operate it manually using the magnets.

The COM ACT module is installed as standard when the circuit breaker is ordered for communication.

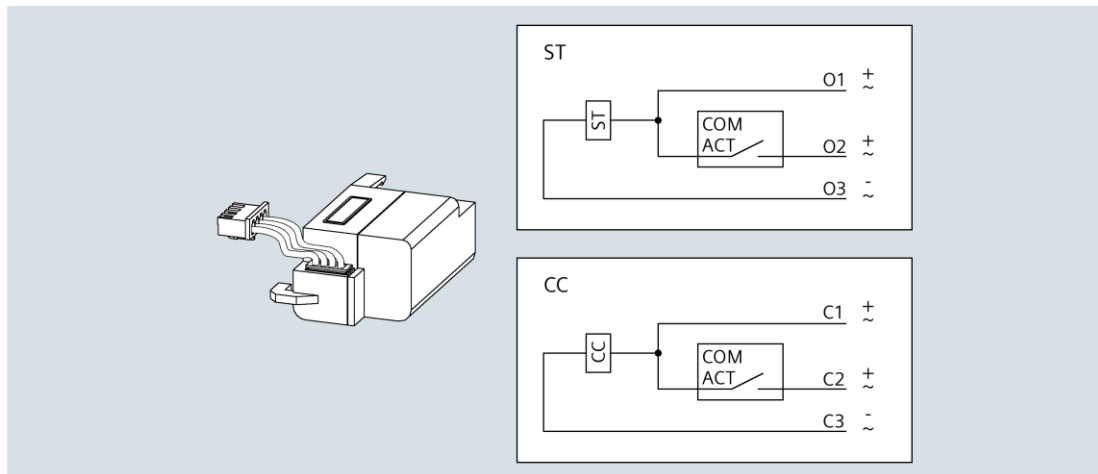Figure 2-3   Actuator module COM ACT

Technical specifications

Feature	Value
Designation	COM ACT
Article number (as spare part)	3VW9011-0AT10
Storage temperature	−40 °C … +70 °C
Operating temperature	−25 °C … +70 °C

2.1.4 Breaker Connect module

Two versions are available depending on the primary voltage used:

- Breaker Connect module 110 to 240 V AC/DC (option; can be ordered via Z option)

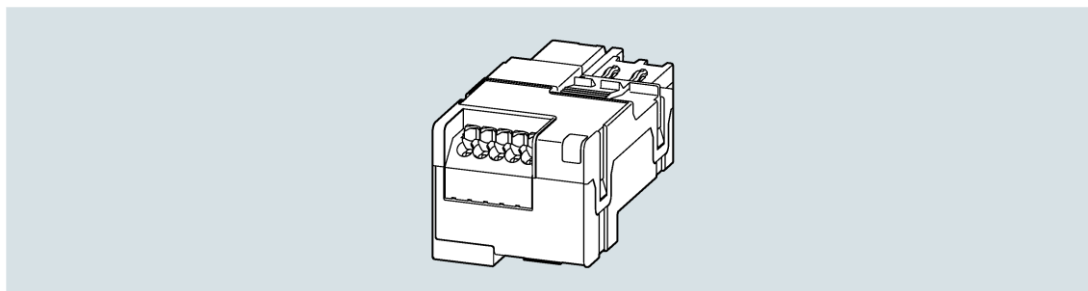- Breaker Connect module 24 to 48 V AC/DC (standard)

Figure 2-4   Breaker Connect module

Via the Breaker Connect module, the electronic trip units (3-series and 6-series ETUs) and the communication modules can be supplied with power externally at the auxiliary terminal block (auxiliary power supply).

The Breaker Connect module is installed as standard when the circuit breaker is ordered for communication.

Technical specifications

Feature	Value
Designation	Breaker Connect module
3WL10 / 3VA27 and communication functions	24 … 48 V AC/DC, included in delivery as standard
Article number (as spare part)	3VW9011-0AT07
Operating voltage	24 ... 48 V AC/DC
Voltage range	21.5 ... 53 V AC/DC
Power consumption	Max. 10 VA/W

As an alternative to the standard, the following module can be ordered with Z option F26:

Feature	Value
Article number in conjunction with 3WL10 / 3VA27 and communication function	Z option F26
Article number (as spare part)	3VW9011-0AT06
Operating voltage	110 ... 240 V AC/DC
Voltage range	105 ... 265 V AC/DC
Frequency range	45 … 66 Hz
Power consumption	Max. 10 VA/W
Storage temperature	−40 °C … +70 °C
Operating temperature	−25 °C … +70 °C

2.1.5 IOM040 digital I/O module

The IOM040 digital I/O module provides two input and two output contacts for electrical control and signaling of states, alarms, and tripping of the circuit breaker.

Default settings of the inputs and outputs can be selected via the ETU display. The settings can be freely configured via the TD410/TD420 test and commissioning tools and the powerconfig software.

The IOM040 digital I/O module does not come with default factory settings.

Figure 2-5   IOM040 digital I/O module

The IOM040 digital I/O module can simply be plugged into the slot provided in the auxiliary conductor contact system. Two different communication modules can be used at the same time. If a IOM040 module is used, only one COM module can be used. A Breaker Connect module is always required for the internal power supply of a COM module.

Technical specifications

Feature	Value
Designation	IOM040
Article number in conjunction with 3WL10 / 3VA27	Z option K56
Article number (as spare part)	3VW9011-0AT30
Voltage	≤ 150 V DC or 250 V AC
Max. switching current per contact	At ≤ 30 V DC equal to 2 A At 50 V DC equal to 0.8 A At 150 V DC equal to 0.2 A At 250 V AC equal to 4 A
Inputs and outputs	2 inputs 2 outputs
Contact/coil isolation	1000 Vrms (1 min @50 Hz)
Storage temperature	−40 °C … +70 °C
Operating temperature	−25 °C … +70 °C

2.1.6 IOM300 external digital I/O module

The IOM300 external digital I/O module provides 11 input and 10 output contacts for electrical control and signaling of states, alarms, and tripping of the circuit breaker.

The IOM300 external digital I/O module is suitable for external mounting on a standard rail. The IOM300 external digital I/O module is suitable for the ETUs of both the 6-series and the 3-series because it is connected directly to the CB1 and CB2 terminals of the auxiliary conductor terminal system.

The settings can be freely configured via the TD410/TD420 test and commissioning tools and the powerconfig software.

The IOM040 external digital I/O module does not come with default factory settings.
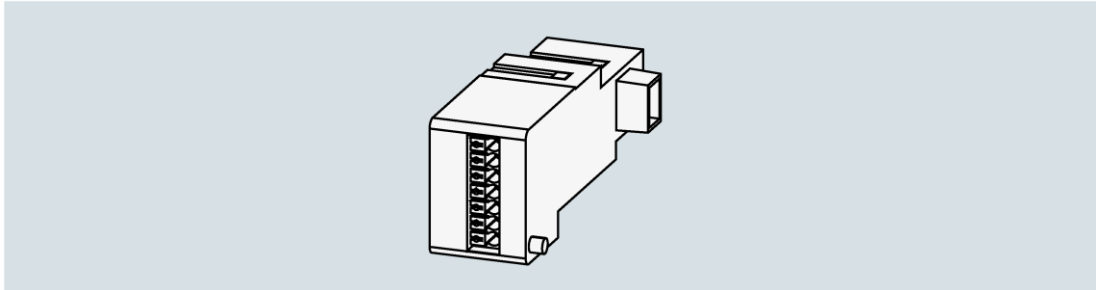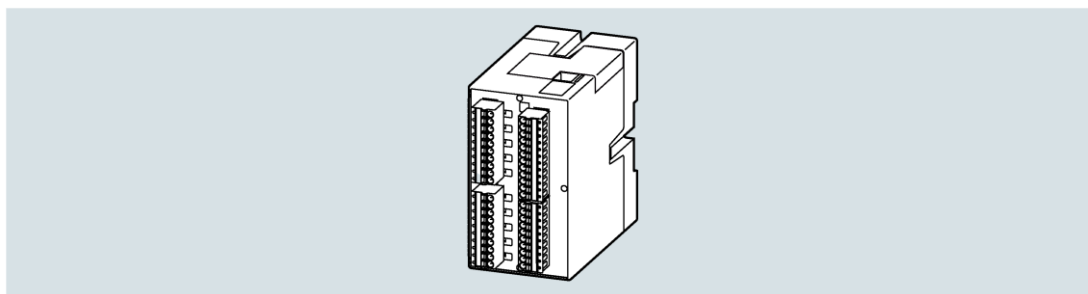

Figure 2-6   IOM300 digital I/O module

Technical specifications

Feature	Value
Designation	IOM300
Article number (as spare part)	3VW9011-0AT20
Voltage	≤ 150 V DC or 250 V AC
Max. switching current per contact	At ≤ 30 V DC equal to 2 A At 50 V DC equal to 0.8 A At 150 V DC equal to 0.2 A At 250 V AC equal to 4 A
Inputs and outputs	11 inputs 10 outputs
Contact/coil isolation	1000 Vrms (1 min @50 Hz)
Auxiliary supply voltage	24 … 48 V AC/DC, 110 … 240 V AC/DC
Voltage interval	21.5 … 53 V AC/DC, 105 … 265 V AC/DC
Rated current	10 VA/W
Making current	1 A for 10 ms
Storage temperature	−40 °C … +70 °C
Operating temperature	−25 °C … +70 °C

2.1.7 Position signaling switch communication (PSS - COM)

Via the communication link, the position signaling switch PSS - COM provides the signal indicating whether the circuit breaker in the guide frame is inserted or removed.

Unlike the position signaling switch PSS, whose signals are available at the auxiliary conductor terminal strip, the position signaling switch PSS - COM only signals two different states:

- "INSERTED" breaker position (circuit breaker in the CONNECT position)
- "ISOLATED" breaker position (circuit breaker in the TEST or DISCONNECT position)

The PSS - COM position signaling switch is installed as standard if the withdrawable circuit breaker is ordered for communication.

Technical specifications

Feature	Value
Designation	PSS - COM
Article number (as spare part)	3VW9011-0AT12
Storage temperature	−40 °C … +70 °C
Operating temperature	−25 °C … +70 °C

2.1.8 Ready-to-close signaling switch for communication (COM RTC)

The COM RTC module ascertains the ready-to-close state and transmits this information to the communication system. The function is the same as that of the RTC ready-to-close signaling switch.

The COM RTC module and the RTC ready-to-close signaling switch function can be operated simultaneously.

The COM RTC module is installed as standard when the circuit breaker is ordered for communication.

Technical specifications

Feature	Value
Designation	COM RTC
Article number (as spare part)	3VW9011-0AT11
Storage temperature	−40 °C … +70 °C
Operating temperature	-25 °C … +70 °C

2.2 Metering function MF Basic and MF Advanced

Overview

The ETUs of the 6-series can be expanded with the metering functions MF Basic or MF Advanced:

- MF Basic provides many measured values in accordance with IEC-61557-12.

- MF Advanced provides many enhanced protection functions in addition. For more information about the protection functions, see the 3WL10 / 3VA27 equipment manual. The metering function MF Advanced can also supply the ETU with energy via the internal voltage tap, thus making the ETU independent of the instantaneous current flow.
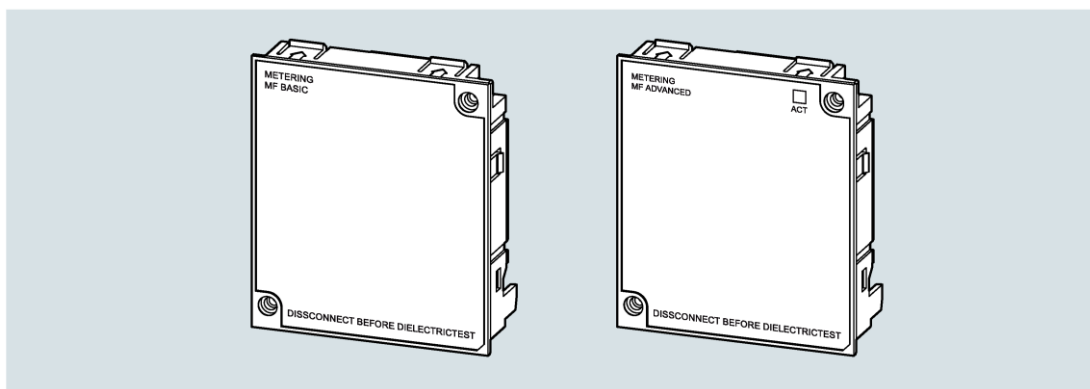

Figure 2-7   Metering function MF Basic and MF Advanced

Metering functions of the ETUs of the 6-series

Instantaneous values			
		Measured values	**Precision** **Reference standard: IEC 61557-12**
Currents (rms value)	A	L_r, L_{sd}, L_i, neutral	1 %
Ground-fault current	A	I_g	2 %
Phase-to-phase voltage (rms value)	V	U12, U23, U31	0.5 %
Phase-to-neutral voltage (rms value)	V	U1, U2, U3	0.5 %
Phase sequence		–	–
Frequency	Hz	f	0.2 %
Active power	kW	P1, P2, P3, P_{tot}	2 %
Reactive power	kVAR	Q1, Q2, Q3, Q_{tot}	2 %
Apparent power	kVA	S1, S2, S3, S_{tot}	2 %
Power factor		Total	2 %
Peak factor		L1, L2, L3, Ne	–
Counter (recorded since installation or last reset)			
		Measured values	**Precision** **Reference standard: IEC 61557-12**
Active energy	kWh	E_p total E_p drawn E_p	2 %
Reactive energy	kvarh	E_q total E_q drawn E_q	2 %
Apparent energy	kVAh	E_s total	2 %

Min/Max values of the individual Measured values for each interval with a time stamp				
		Measured values	**Time window**	**Interval**
Current: smallest and largest	A	I_{min}, I_{max}	Fixed Can be synchronized by remote access.	Duration: 5 … 120 min Number of intervals: 24
Phase-to-phase voltage: smallest and largest	V	U_{min}, U_{max}		
Active power: mean and largest	kW	P_{mean}, P_{max}		
Reactive power: mean and largest	kVAR	Q_{mean}, Q_{max}		
Apparent power: mean and largest	kVA	S_{mean}, S_{max}		

Data logger Recording of measured values with a high sampling rate		
		Measured values
Currents	A	L1, L2, L3, N, I_g
Voltages	V	U12, U23, U31
Sampling rate	Hz	1200-2400-4800-9600
Max. recording duration	s	16
Recording stop delay	s	0 to 10
Number of registers	No.	2 independent

Instantaneous values		
Information on tripping and switch-off data		
		Protection functions
Type of protection function tripped		e.g. L, S, I, G, U$_V$, Q$_V$
Fault values per phase	A / V / Hz w / VAR	e.g. I$_r$, I$_{sd}$, I$_i$, neutral for protection S
Time stamp		Date, time, and consecutive number
Maintenance displays		
		Maintenance information
Information on the last 30 trips		Type of protection function, fault values, and time stamp
Information on the last 200 events		Type of event, time stamp
Number of mechanical switching operations [1]	No.	Can be assigned to alarm
Total number of trips	No.	–
Total switching time	h	–
Contact wear	%	Pre-alarm > 80 % Alarm = 100%
Date of maintenance performed		Last
Display about necessary maintenance		–
ID of circuit breaker		Type of circuit breaker, assigned name, serial number
Self-diagnostics		
		Measured values
Continuity tests of internal connections		Alarm due to disconnection: current sensor, sensors, shunt release (ST)	Note: Tripping of the circuit breaker can be set in the case of an alarm
No switching off of circuit breaker (ANSI 50BF)		Alarm due to non-tripping of protection functions	
Temperature (OT)		Pre-alarm and alarm due to overheating	

[1] If auxiliary power supply is connected.

Technical specifications

Feature	Value
Designation	Metering function Basic
Article number in conjunction with 3WL10 / 3VA27	See ETU650/ETU660
Article number (as spare part)	3VW9011-0AT01
Storage temperature	−40 °C … +70 °C
Operating temperature	−25 °C … +70 °C

2.3 DSP800 display

The DSP800 display is used for the visualization of circuit breakers directly at the control cabinet door.

The DSP800 display can be used to display switching states, measured variables and the parameter settings of the connected 3VA molded case circuit breakers and of the 3WL10 air circuit breaker in the control cabinet door.

Information is visualized using predefined menus and does not require software development.

You can connect/display up to eight circuit breakers simultaneously. Maximum three of these circuit breakers can be 3WL10 / 3VA27 circuit breakers.
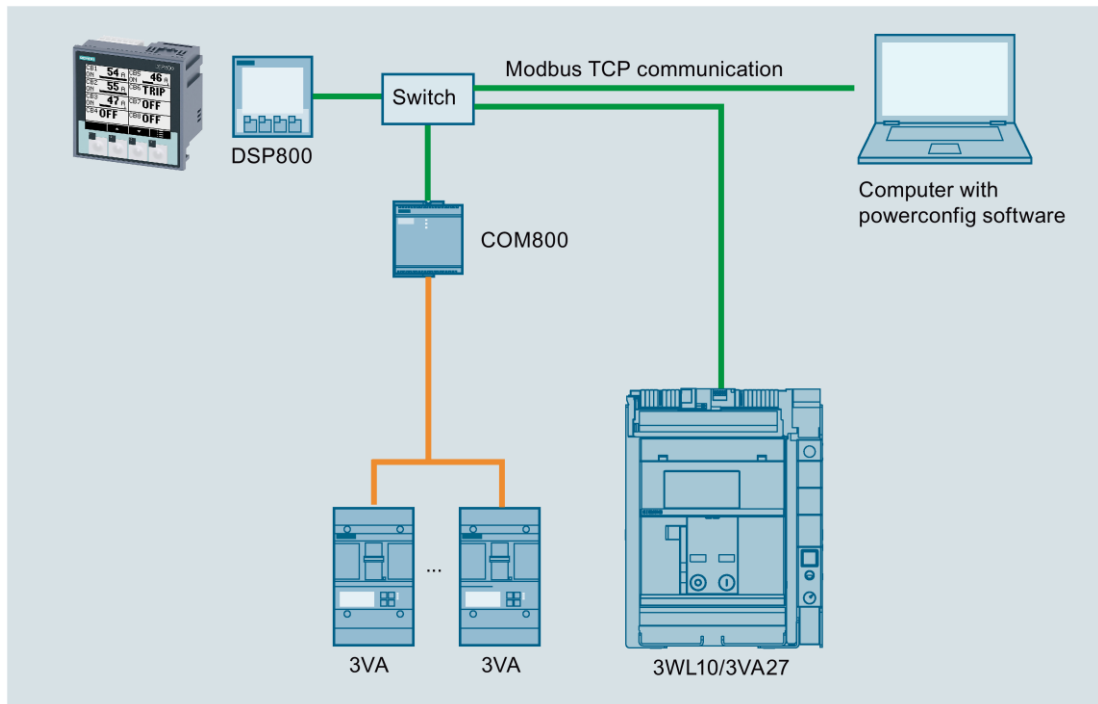
Figure 2-8   DSP800 display integrated in the system

Technical specifications

Feature	Value
Designation	DSP800
Article number (as spare part)	3VA9987-0TD10
Protocol	Modbus TCP
Transmission medium	Ethernet, IEEE 802.3
Transmission rate	100 Mbps
Connection technology	One RJ-45 socket
Total circuit breakers	Max. 8
3VA molded case circuit breakers	Max. 8
3WL10 / 3VA27 circuit breakers	Max. 3
Power supply	24 V DC
Door cutout	92 x 92 mm
Power consumption	2.2 W

Commissioning 3

3.1 Overview

Overview

The Breaker Connect module is a prerequisite for communication operation. The Breaker Connect module is installed as standard when the circuit breaker is ordered for communication.
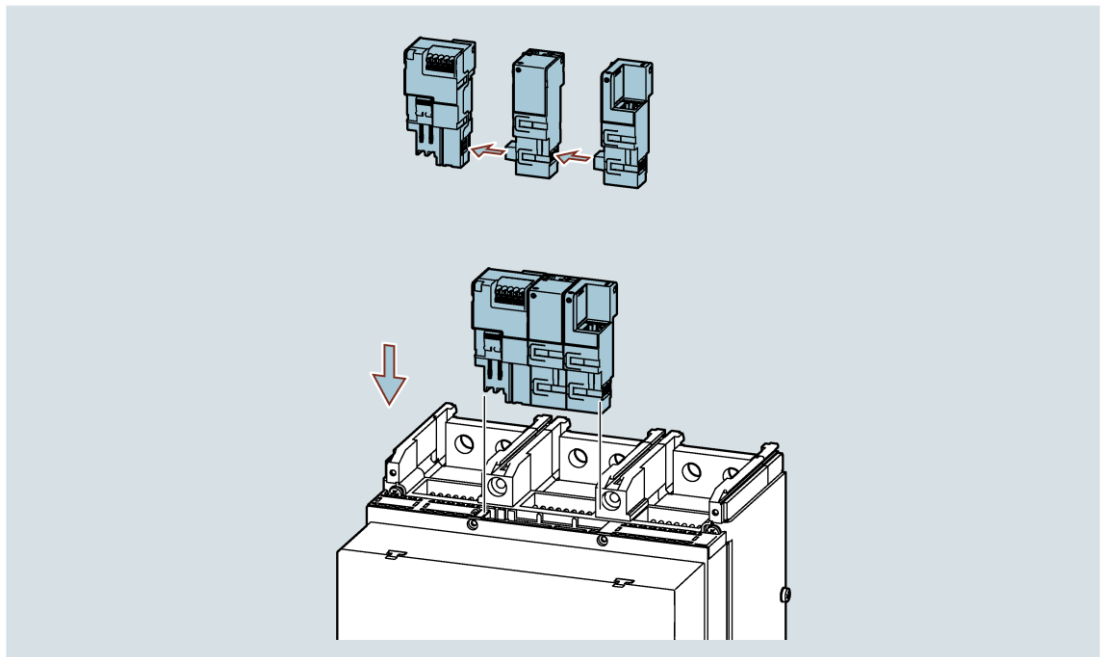
Figure 3-1   3WL10 / 3VA27 fixed breaker, "plug-and-play" installation – Breaker Connect module plus two modules

The COM042 module and COM043 module can simply be plugged into the slot provided in the auxiliary conductor contact system. Two different communication modules can be used at the same time. A Breaker Connect module is always required for the power supply. For further information about the Breaker Connect module please see Chapter Breaker Connect module (Page 19).

The IOM040 digital I/O module is optional and can be installed on the auxiliary conductor terminal system of the circuit breaker at any time along with the COM module.

The IOM300 external digital I/O module is optional and can be installed externally on a standard rail at any time.

The metering function is inserted in the side recesses next to the ETU.

See also

> System overview (Page 8)

3.2 Commissioning communication modules

The COM modules must be enabled either on the ETU display or in the powerconfig software.

⇒ with ETU display (`Display → Settings → Modules → Local bus → ON`)

Setup via local laptop / Ethernet

⇒ Windows OS: `Control Panel → Network and Sharing Center → Change adapter settings`

To be able to connect to the COM module, you may have to change the network address of your PC/notebook when you commission the COM module for the first time.

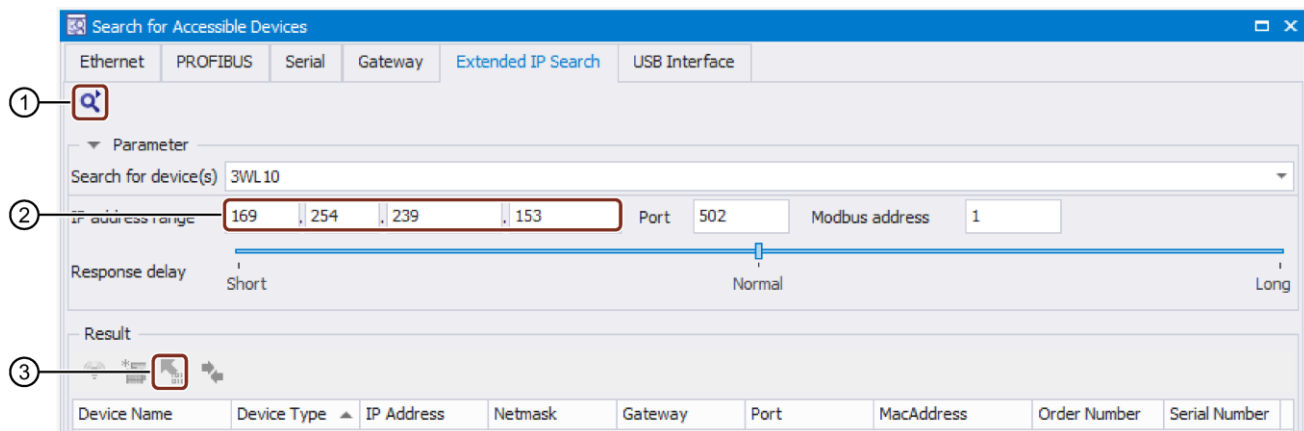- Address area: 169.254.x.x (Auto-IP)
- Subnet: 255.255.0.0

Consult your network administrator for more information.

Searching for and creating circuit breaker 3WL10/3VA27 with powerconfig

1. In powerconfig, click "Search".

2. Change to "Extended IP search".

3. In ②, enter the IP address of 3WL10/3VA27.

4. Click "Search" ①.

   The found devices are listed.

5. Mark an entry from the result list.

6. Click "Load device in powerconfig" ③.

Troubleshooting

In the operator panel on the electronic current limiter, call up the `Settings` menu command.

- Check the entries: `Settings → Modules → Remote`

- With a ping command (Windows search bar, call cmd.exe, enter ping and IP addressed), test whether communication with the device is available.

See also

Information/Download powerconfig
(https://mall.industry.siemens.com/mall/en/WW/Catalog/Products/10230050)

Getting Started powerconfig
(https://support.industry.siemens.com/cs/ww/en/view/109480256)

Download powerconfig (http://support.automation.siemens.com/WW/view/en/63452759)

Configuration

<div style="text-align: right; font-size: 3em;">4</div>

4.1 Overview

Installation

Information about installation of the necessary components is to be found in the relevant operating instructions. You will find more information on this in chapter Reference documents (Page 7).

Reading and writing parameters

It is always possible to read parameters with the powerconfig software (front interface or fieldbus interface), irrespective of whether the switch is set to "Local bus ON" (local) or "Local bus OFF" (remote).

For writing parameters and switching, the switch must be set to "Local" or "Remote".

Changing the setting

⇒ with the ETU display of the circuit breaker (`Display → Settings → Modules → Local bus → ON/OFF`)

If the circuit breaker is set to "Local bus ON" (local):

- Writing and switching parameters can only be performed via the front interface via TD410 / TD420.

- Parameters cannot be written or switched via the fieldbus interface (Modbus TCP or Modbus RTU). An error message is displayed in powerconfig.

If the circuit breaker is set to "Local bus OFF" (remote):

- Writing and switching parameters can only be performed via the fieldbus interface.

- Parameters cannot be written via the front interface of the circuit breaker and the TD410 / TD420. An error message is displayed in powerconfig.

See also

Commissioning communication modules (Page 30)

Industry online support (https://support.industry.siemens.com/)

4.2 Configuring the communication function

The online configurator provides a simple way of configuring a 3WL10 / 3VA27 circuit breaker with communication function. The online configurator allows you to configure a circuit breaker step by step and supports you with interactive technical information. It also provides you with a range of technical documents, such as data sheets, 3D drawings, Eplan macros, etc.

You will find more information on this in the Internet:

Online configurator for 3WL10 (https://mall.industry.siemens.com/spice/pcmplus/app/)

Online configurator for 3VA27 (https://mall.industry.siemens.com/spice/pcmplus/app/)

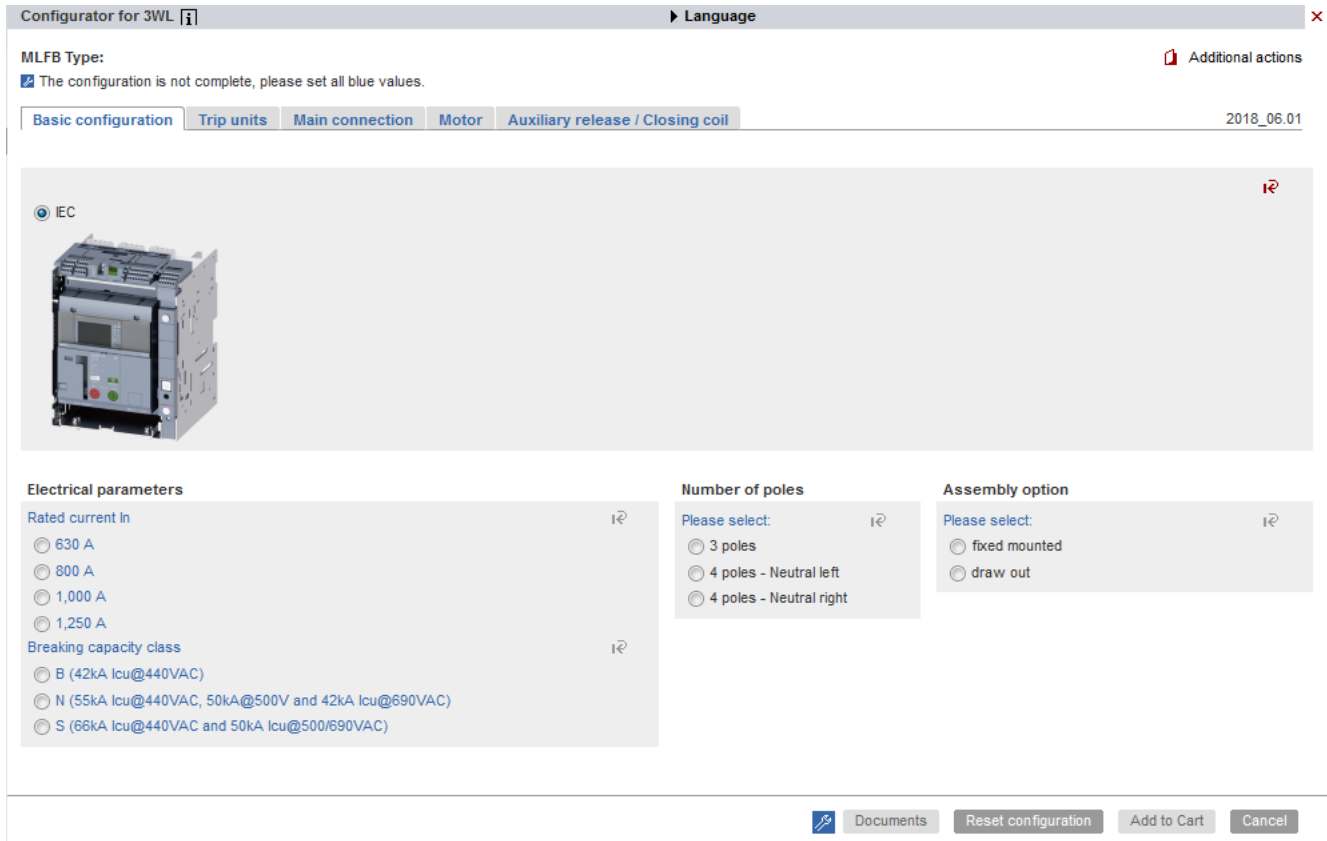Figure 4-1   Online configurator – Example view

Data structure

<div style="text-align: right; font-size: 3em;">5</div>

Units of information such as status information or measured variables are made available in suitable data formats by products in the SENTRON range.

5.1 Modbus data formats and byte ordering

Identifying data points

Abbreviation	Description
U8	8-bit unsigned
U16	16-bit unsigned
U32	32-bit unsigned
U32SWAPPED	32-bit unsigned with reversed register order
S32SWAPPED	32-bit signed with reversed register order
FP32	32-bit floating point
FP64	64-bit floating point
TS	Time stamp
ST	System time

Individual units of information are identified by register addresses. A register is 16 bits in size. If a unit of information is larger than 16 bits, the unit of information will require the corresponding number of registers.

The individual data types are stored as described in the table below:

Register		U8	U16	U32	FP32
Register address	High byte	0x00	High data byte	High data byte	1st data byte (sign bit)
	Low byte	Data byte	Low data byte	2nd data byte	2nd data byte
Register address +1	High byte	–	–	3rd data byte	3rd data byte
	Low byte	–	–	Low data byte	Last data byte
Number of registers		1	1	2	2

Example of bit counting using a 32-bit data format:

Bit	31	–	24	23	–	16	15	–	8	7	–	0
Byte	High byte			Low byte			High byte			Low byte		
Register	Register address						Register address +1					

You will find more information about storing Float32 (FP32) and Float64 (FP64) in Chapter Floating-point number according to IEEE 754 (Page 36).

5.2 Floating-point number according to IEEE 754

Float32 (FP32) and Float64 (FP64) are stored in accordance with the following tables:

Representation of the 32-bit floating-point number (single precision) in accordance with IEEE 754

0 … 7	8 … 15	16 … 22	23	24	25 … 29	30	31
M	M	M	E	E	E	E	V
Mantissa			Exponent				
Modbus register address +1		Modbus register address +0					
Low byte	High byte	Low byte		High byte			

Representation of the 64-bit floating-point number (double precision) in accordance with IEEE 754

0 … 7	8 … 15	16 … 23	24 … 31	32 … 39	40 … 47	48 … 51	52	53	54	55	56 … 62	63
M	M	M	M	M	M	M	E	E	E	E	E	V
Mantissa						Exponent						
Modbus register address +3		Modbus register address +2		Modbus register address +1		Modbus register address +0						
Low byte	High byte	Low byte	High byte	Low byte	High byte	Low byte					High byte	

Representation of the system time or the time stamp

0 … 7	8 … 15	16 … 23	24 … 31	32 … 39	40 … 47	48 … 51	52	53	54	55	56 … 62	63
M	M	M	M	M	M	M	E	E	E	E	E	V
4th byte Fraction of the second	3rd byte Fraction of the second	2nd byte Fraction of the second	Highest byte Fraction of the second	4th byte Seconds	3rd byte Seconds	2nd byte Seconds					Highest byte Seconds	
Modbus register address +3		Modbus register address +2		Modbus register address +1		Modbus register address +0						
Low byte	High byte	Low byte	High byte	Low byte	High byte	Low byte					High byte	

You will find the Modbus map in Chapter Register addresses (Page 37).

5.3 Register addresses

Register address	Number of registers	Name	Unit	Min.	Max.	Factor	Access	Description
0x0002	2	Current L1	A	0	429496729.5	1	R	FP32
0x0004	2	Current L2	A	0	429496729.5	1	R	FP32
0x0006	2	Current L3	A	0	429496729.5	1	R	FP32
0x0008	2	Neutral conductor current	A	0	429496729.5	1	R	FP32
0x000A	2	Calculated ground-fault current	A	0	429496729.5	1	R	FP32
0x0016	1	Phase with the highest current	–	0	4	1	R	0: N/A 1: L1 2: L2 3: L3 4: N
0x0018	2	Maximum phase current	A	0	429496729.5	1	R	FP32
0x001A	2	Voltage L1-N	V	0	6553.5	1	R	FP32
0x001C	2	Voltage L2-N	V	0	6553.5	1	R	FP32
0x001E	2	Voltage L3-N	V	0	6553.5	1	R	FP32
0x0020	2	Voltage L1-L2	V	0	6553.5	1	R	FP32
0x0022	2	Voltage L2-L3	V	0	6553.5	1	R	FP32
0x0024	2	Voltage L3-L1	V	0	6553.5	1	R	FP32
0x002E	2	Frequency	Hz	30.00	80.00	1	R	FP32
0x0030	2	Active power L1	W	−214748364.8	214748364.7	1	R	FP32
0x0032	2	Active power L2	W	−214748364.8	214748364.7	1	R	FP32
0x0034	2	Active power L3	W	−214748364.8	214748364.7	1	R	FP32
0x0036	2	Total active power	W	−214748364.8	214748364.7	1	R	FP32
0x0038	2	Apparent power L1	VA	−214748364.8	214748364.7	1	R	FP32
0x003A	2	Apparent power L2	VA	−214748364.8	214748364.7	1	R	FP32

Register address	Number of registers	Name	Unit	Min.	Max.	Factor	Access	Description
0x003C	2	Apparent power L3	VA	−214748364.8	214748364.7	1	R	FP32
0x003E	2	Total apparent power	VA	−214748364.8	214748364.7	1	R	FP32
0x0040	2	Reactive power L1	VAr	−214748364.8	214748364.7	1	R	FP32
0x0042	2	Reactive power L2	VAr	−214748364.8	214748364.7	1	R	FP32
0x0044	2	Reactive power L3	VAr	−214748364.8	214748364.7	1	R	FP32
0x0046	2	Total reactive power	VAr	−214748364.8	214748364.7	1	R	FP32
0x0056	2	Power factor	–	−1	1.000	1	R	FP32
0x007A	4	Imported active energy	kWh	−214748364.8	214748364.7	1	R	FP64
0x007E	4	Exported active energy	kWh	−214748364.8	214748364.7	1	R	FP64
0x0082	4	Imported reactive energy	kVARh	−214748364.8	214748364.7	1	R	FP64
0x0086	4	Exported reactive energy	kVARh	−214748364.8	214748364.7	1	R	FP64
0x008A	4	Total reactive energy	kVAh	−214748364.8	214748364.7	1	R	FP64
0x00E6	1	Contact wear	%	0	65000	1/650	R	U16
0x00E8	1	Number of ETU trips	–	0	65535	1	R	U16
0x00F8	2	Number of mechanical switching operations	–	0	65535	1	R	U32

Register address	Number of registers	Name	Unit	Min.	Max.	Factor	Access	Description
0x0FA0	2	Commands	–	0	27	1	R/W	First register: Command (value 0 … 27) Second register: Parameter (must be zero, expect command 27) 0: Dummy command 1: Reset trip 2: Rest signals 3: RESET STATISTICAL COM 4: Program start 5: Program abort 6: Program end 7: Open circuit breaker 8: Close circuit breakers 9: Reset circuit breaker 10: Flashing 11: Save result 12: Reset measured value history 13: Reset display wizard 15: Reset energy counter 25: DAS mode on 26: DAS mode off 27: Reset absolute min./max. values: 0 = reset currents (I), 1 = reset voltages (U)
0x0FA3	2	System time Seconds	s	0	4294967295	1	R/W	U32SWAPPED
0x0FA5	1	System time Milliseconds	ms	0	65535	1	R/W	U16
0x0FB6	1	Number of manual operations	–	0	65535	1	R	U16
0x0FB9	1	Number of test trips	–	0	65535	1	R	U16

Register address	Number of regis-ters	Name	Unit	Min.	Max.	Fac-tor	Ac-ces s	Description
0x0FC8	1	Status Global 1	–	0	0	–	R	Bit 0: Circuit breaker closed
								Bit 1: Circuit breaker position connected
								Bit 2: Circuit breakers discon-nected / ETU active
								Bit 3: Circuit breaker tripped
								Bit 4: Circuit breaker ready to close
								Bit 5: Circuit breaker in unde-fined condition
								Bit 6: Circuit breaker open
								Bit 7: Error on tripping
								Bit 8: Local/remote control
								Bit 9: Warning active
								Bit 10: Alarm active
								Bit 11: Protective function active
								Bit 12: Circuit breaker tripped
								Bit 13: Position in guide frame undefined
								Bit 14: Reserved
								Bit 15: ETU communication
0x0FCA	1	Status Glitch 1	–	0	0	–	R	Bit 0: Parameter changed
								Bit 1: Trip reset
								Bit 2: Reset
								Bit 4: Open command
								Bit 5: Close command
								Bit 10: Update measurement history
								Bit 11: Reset signaling
								Bit 12: Energy reset
								Bit 13: Switch over parameter set
								Bit 14: New event

Register address	Number of regis-ters	Name	Unit	Min.	Max.	Fac-tor	Ac-ces s	Description
0x0FCC	1	Status flags 1	–	0	0	–	R	Bit 0: Parameter assignment via Bit 2: Test running Bit 3: Test device (TD) is con-nected Bit 4: LED mode active Bit 5: Parameter set in use Bit 6: ETU supply via auxiliary voltage Bit 7: ETU supply via test de-vice (TD) Bit 8: ETU supply via metering function (MF advanced) Bit 9: ETU firmware Bit 10: Parameterization
0x0FCE	1	Status Accessories 1	–	0	0	–	R	Bit 0: I/O module IOM040 Bit 1: I/O module IOM040-2 Bit 4: COM Modbus RS 485 Bit 5: COM PROFIBUS Bit 6: COM043 (Modbus TCP) Bit 12: COM PROFINET Bit 13: Reserved
0x0FCF	1	Status Accessories 2	–	0	0	–	R	Bit 0: Ext I/O module - IOM300 Bit 9: Reserved
0x0FD0	1	Status timing 1	–	0	0	–	R	Bit 0: Overload (LT) active Bit 1: Short-time-delayed short-circuit protection (ST) active Bit 2: Ground-fault protection (GF) active Bit 4: Current unbalance protec-tion (I-NBA) active Bit 5: Normal directional protec-tion active Bit 6: Reverse directional pro-tection active Bit 9: Undervoltage protection (Uu) active Bit 10: Overvoltage protection (Uo) active Bit 12: Ground fault feedback (Gret) active Bit 13: Directional short-circuit protection active Bit 15: Reverse power active

Register address	Number of registers	Name	Unit	Min.	Max.	Factor	Access	Description
0x0FD1	1	Status timing 2	–	0	0	–	R	Bit 0: Underfrequency (fu) active Bit 1: Overfrequency (fo) active Bit 2: Voltage unbalance protection active
0x0FD2	1	Status tripping operations 1	–	0	0	–	R	Bit 0: Overload protection (LT) Bit 1: Short-time delayed short-circuit current (ST) Bit 2: Instantaneous short-circuit protection (INST) Bit 3: Ground-fault protection (GF) Bit 4: INST tripped Bit 6: Current unbalance (I-NBA) Bit 11: Simulation Bit 12: Undervoltage tripped Bit 13: Overvoltage protection (Uo) Bit 15: Ground fault feedback (Gret)
0x0FD3	1	Status tripping operations 2	–	0	0	–	R	Bit 0: Directional short-time delayed short-circuit protection (DST) Bit 1: Overtemperature Bit 3: Reverse power active tripped Bit 4: Underfrequency tripped Bit 5: Overfrequency tripped Bit 6: Test tripped Bit 7: Hardware fault tripped Bit 9: Making current release (MCR) Bit 10: Fault current (Rc) Bit 11: Test tripping – fault current (Rc) Bit 12: Voltage unbalance (U-NBA) Bit 13: DST – forwards (FW) Bit 14: DST – backward (BW) Bit 15: Trip failed
0x0FD4	1	Status tripping operations 3	–	0	0	–	R	Bit 11: Tripped by DAS mode

Register address	Number of regis-ters	Name	Unit	Min.	Max.	Fac-tor	Ac-ces s	Description
0x0FD5	1	Status warnings, alarms 1	–	0	0	–	R	Bit 0: Overload (LT) pre-alarm
								Bit 1: Ground fault (GF) pre-alarm
								Bit 2: In_pal (1) warning
								Bit 3: Ground fault feedback (Gret) pre-alarm
								Bit 6: Internal CB bus error
								Bit 7: Overtemperature (T) pre-alarm
								Bit 8: Display from (over-temperature)
								Bit 9: Magnetically-operated switch unlatched
								Bit 10: Directional short-time delayed short-circuit protection alarm 1 (DST)
								Bit 11: Directional short-time delayed short-circuit protection alarm 2 (DST)
								Bit 12: Undervoltage protection (Uu) alarm
								Bit 13: Overvoltage protection (Uo) alarm
								Bit 14: Ground fault alarm
								Bit 15: Gret alarm (ground fault protection star point)

Register address	Number of registers	Name	Unit	Min.	Max.	Factor	Access	Description
0x0FD6	1	Status warnings, alarms 2	–	0	0	–	R	Bit 0: Overtemperature (T) alarm
								Bit 1: Only overtemperature (T) alarm
								Bit 2: Only current unbalance (I-NBA) alarm
								Bit 4: Only reverse power (RP) alarm
								Bit 5: Only underfrequency (fu) alarm
								Bit 6: Only overfrequency (fo) alarm
								Bit 7: Contact wear pre-alarm
								Bit 8: Contact wear alarm
								Bit 10: L1 current transformer disconnected
								Bit 11: L2 current transformer disconnected
								Bit 12: L3 current transformer disconnected
								Bit 13: Neutral current transformer disconnected
								Bit 14: Current transformer for ground fault disconnected
								Bit 15: Rated current module fault
0x0FD7	1	Status warnings, alarms 3	–	0	0	–	R	Bit 0: Internal error
								Bit 1: cos phi fault
								Bit 2: Phase cycle error
								Bit 3: Invalid date warning
								Bit 4: Directional short-time delayed short-circuit protection (DST) alarm
								Bit 5: Status error
								Bit 6: Frequency range warning
								Bit 7: Rated current module installation warning
								Bit 14: In_pal (2) warning

Register address	Number of regis- ters	Name	Unit	Min.	Max.	Fac- tor	Ac- ces s	Description
0x0FD8	1	Status warnings, alarms 4	–	0	0	–	R	Bit 3: Battery charge low Bit 8: Metering function (MF) installation warning Bit 13: Metering function (MF) error Bit 14: Only DST – forward (FW) alarm Bit 15: Only DST – backward (BW) alarm
0x0FD9	1	Status warnings, alarms 5	–	0	0	–	R	Bit 0: Time and date not syn-chronized Bit 1: CB bus modules installa-tion error Bit 2: Error in configuration Bit 3: Maintenance warning Bit 5: CB undefined Bit 6: SNTP synchronization warning Bit 7: Reserved Bit 8: Module memory alarm Bit 10: ETU module connection warning Bit 11: Arc suppression (DAS) active Bit 12: ETU monitoring alarm 1 Bit 13: ETU monitoring alarm 2
0x0FDC	1	Status Ext I/O module IOM300 Input A	–	0	0	–	R	Bit 0: Input 101 Bit 1: Input 102 Bit 2: Input 103 Bit 3: Input 104 Bit 4: Input 105 Bit 5: Input 106 Bit 6: Input 107 Bit 7: Input 108 Bit 8: Input 109 Bit 9: Input 110 Bit 10: Input 111
0x0FDE	1	Status I/O module IOM040 input	–	0	0	–	R	Bit 0: Input 11 Bit 1: Input 12

Register address	Number of regis-ters	Name	Unit	Min.	Max.	Fac-tor	Ac-ces s	Description
0x0FDF	1	Status Ext I/O module IOM300 output A	–	0	0	–	R	Bit 0: Output 101 Bit 1: Output 102 Bit 2: Output 103 Bit 3: Output 104 Bit 4: Output 105 Bit 5: Output 106 Bit 6: Output 107 Bit 7: Output 108 Bit 8: Output 109 Bit 9: Output 110
0x0FE1	1	Status I/O module IOM040 output	–	0	0	1	R	Bit 0: Output 11 Bit 1: Output 12
0x100E	1	Measured ground-fault current	A	0	65535	0.01	R	U16
0x103D	1	Maximum voltage	V	0	65535	0.1	R	U16
0x103E	1	Maximum voltage in phase	–	0	3	1	R	0: N/A 1: U12 2: U23 3: U31
0x104A	2	Minimum cur-rent	A	0	4294967295	0.1	R	U32SWAPPED
0x104C	1	Minimum current in phase	–	0	4	1	R	0: N/A 1: L1 2: L2 3: L3 4: N
0x104D	2	Time stamp of minimum current in sec-onds	s	0	4294967295	1	R	U32SWAPPED
0x104F	1	Time stamp of minimum current in milliseconds	ms	0	65535	1	R	U16
0x1050	2	Maximum current value Low	A	0	4294967295	0.1	R	U32SWAPPED

Register address	Number of regis- ters	Name	Unit	Min.	Max.	Fac- tor	Ac- ces s	Description
0x1052	1	Maximum current value Phase	–	0	4	1	R	0: N/A 1: L1 2: L2 3: L3 4: N
0x1053	2	Time stamp of maximum current in seconds	s	0	4294967295	1	R	U32SWAPPED
0x1055	1	Time stamp of maximum current in milliseconds	ms	0	65535	1	R	U16
0x1056	1	Minimum voltage value	V	0	65535	0.1	R	U16
0x1057	1	Minimum voltage value Phase	–	0	3	1	R	0: N/A 1: U12 2: U23 3: U31
0x1058	2	Time stamp of minimum voltage in seconds	s	0	4294967295	1	R	U32SWAPPED
0x105A	1	Time stamp of minimum voltage in milliseconds	ms	0	65535	1	R	U16
0x105B	1	Maximum voltage value	V	0	65535	0.1	R	U16
0x105C	1	Maximum voltage Phase	–	0	3	1	R	0: N/A 1: U12 2: U23 3: U31
0x105D	2	Time stamp of maximum voltage in seconds	s	0	4294967295	1	R	U32SWAPPED
0x105F	1	Time stamp of maximum voltage in milliseconds	ms	0	65535	1	R	U16
0x10D0	2	Total active energy	kWh	−2147483648	2147483647	1	R	S32SWAPPED
0x10D8	2	Total apparent energy	kVAh	−2147483648	2147483647	1	R	S32SWAPPED

Register address	Number of registers	Name	Unit	Min.	Max.	Factor	Access	Description
0x10DA	2	Energy storage time	s	0	4294967295	1	R	U32SWAPPED
0x1197	1	Displays	–	–	–	–	R	Bit 0: Type of installation Bit 1: Reversed pole arrangement
0x1198	1	Rated current In (A)	A	100	6300	1	R	U16
0x119A	8	Serial number of the circuit breaker	–	–	–	–	R	U8[16]
0x11A2	8	Article number	–	–	–	–	R	U8[16]
0x11AA	1	Number of poles	–	1	3	1	R	U16
0x11B5	1	Rating N-conductor	–	0	3	1	R	0: 50 % 1: 100 % 2: 150 % 3: 200 %
0x11B6	1	Line frequency	–	0	1	1	R	0: 50Hz 1: 60Hz
0x11B7	1	Tripping characteristic	–	0	2	1	R	0: LI 1: LSI 2: LSIG
0x11D0	1	Metering module	–	0	2	1	R	0: N/A 1: Metering function (MF Basic) 2: Metering function (MF Advanced)
0x1214	5	Plant identifier	–	–	–	–	R/W	U8[10]
0x1219	5	Location identifier	–	–	–	–	R/W	U8[10]
0x1224	1	External current transformer	–	0	2	1	R/W	0: Not installed 1: Star-point current transformer (Gret_CT) 2: Summation current transformer (Rc)

Register address	Number of registers	Name	Unit	Min.	Max.	Factor	Acces s	Description
0x1226	1	Rated voltage Un (V)	–	0	19	1	R/W	0: 0 V
								1: 115 V
								2: 120 V
								3: 190 V
								4: 208 V
								5: 220 V
								6: 230 V
								7: 240 V
								8: 277 V
								9: 347 V
								10: 380 V
								11: 400 V
								12: 415 V
								13: 440 V
								14: 480 V
								15: 500 V
								16: 550 V
								17: 600 V
								18: 660 V
								19: 690 V
0x1591	1	Function selection I/O module IM040 1. Output	–	0	15	1	R/W	0: –
								1: Overload protection (LT) pre-alarm
								2: Overload protection (LT) active
								3: ST overload protection (LT) active
								4: Overload protection (LT) tripped
								5: Short-time-delayed short-circuit protection (ST) tripped
								6: Instantaneous (INST) tripped
								7: Ground-fault (GF) tripped
								8: Every trip operation
								9: Every alarm
								10: Ir_pal (1)
								11: Ir_pal(2)
								12: Circuit breaker open
								13: Circuit breaker closed
								14: CB bus not active
								15: –

Register address	Number of regis-ters	Name	Unit	Min.	Max.	Fac-tor	Acces s	Description
0x1593	1	Function selection I/O module IM040 2. Output	–	0	15	1	R/W	0: – 1: Overload protection (LT) pre-alarm 2: Overload protection (LT) active 3: ST overload protection (LT) active 4: Overload protection (LT) trip 5: Short-time-delayed short-circuit protection (ST) tripped 6: Instantaneous short-circuit protection (INST) tripped 7: Ground-fault (GF) tripped 8: Every trip operation 9: Every alarm 10: Ir_pal (1) 11: Ir_pal (2) 12: Circuit breaker open 13: Circuit breaker closed 14: CB bus not active 15: –
0x258B	1	Module status	–	–	–	–	R	Bit 0: CRC error Bit 1: CRC calculated
0x25A7	1	Module status	–	–	–	–	R	Bit 0: CRC Bit 1: CRC calculated Bit 2: Ethernet connection sta-tus error Bit 3: SNTP server error Bit 4: SNTP server not syn-chronized

List of abbreviations

A

Overview

Table A- 1   Meaning of abbreviations used in this document

Abbreviation	Meaning
AC	AC voltage
ACT	Actuator module
CC	Closing coil
DC	Direct voltage
DIN	Deutsches Institut für Normierung e. V. (German Institute for Standardization)
EN	European Standard
ETU	Electronic trip unit
G	Ground fault (ground-fault protection GF)
GF	Ground fault (ground-fault protection)
I	Instantaneous (instantaneous short-circuit protection INST)
I/O	Input/Output
IEC	International Electrotechnical Commission
INST	Instantaneous (short-circuit protection)
IP	International Protection
L	Long time delay (overload protection LT), overload release
LT [tripping characteristic]	Partial overload range of the characteristic curve of a switching device
MF	Metering function
N	Neutral conductor, neutral protection
PSS	Position signaling switch
Rc	Residual current
Rc CT	Summation current transformer
RP	Reverse Power
RTC	Ready to close signaling switch
S	Short-time-delayed short-circuit protection (ST)
ST	Short-time delayed short-circuit protection
ST/CC	Auxiliary solenoid
TCP	Transmission Control Protocol
TD	Test Device
Uu	Undervoltage protection
Uo	Overvoltage protection

Abbreviation	Meaning
VDE	Verein Deutscher Ingenieure (Association of German Electrical Engineers)
VDI	Verein Deutscher Ingenieure (Association of German Engineers)

Table A- 2   Meaning of symbols and abbreviations

Symbol/ abbreviation	Meaning
I_I	Inrush current
I'_{KG}	Initial balanced short-circuit current
I^2t	Let-through energy
I_{cm}	Making capacity; rated short-circuit making capacity
I_{cn}	Rated breaking capacity; rated short-circuit breaking capacity
I_{cs}	Maximum short-circuit breaking capacity (partial selectivity); rated service short-circuit breaking capacity
I_{cu}	Maximum short-circuit breaking capacity (full selectivity); rated ultimate short-circuit breaking capacity
I_{cw}	Rated short-time withstand current; rated short-time current
I_d	Prospective current; residual current; response residual current
I_D	Let-through current
I_g	Ground-fault protection; ground-fault release; ground-fault current setting value
I_i	Instantaneous tripping current; instantaneous short-circuit protection; instantaneous magnetic protection; rated tripping current of instantaneous trip
I_k	Short circuit current
I_{KD}	Uninterrupted short-circuit current
$I_{K\ MAX}$	Maximum short-circuit current
$I_{Kmaxline}$	Uninterrupted system short-circuit current
I_n	Rated current
I_P	Rated peak withstand current, rated peak withstand current
I_r	Thermal protection; setting current; response value; current setting value of adjustable overload protection (pickup value overload protection)
I_s	Limit current with selectivity; maximum short-circuit current for selectivity limit
I_{sc}	Prospective current
I_{sd}	Short-time delayed tripping current; response current of the S release; short-time delayed short-circuit release; short-time delayed short-circuit protection; delay time of the S release
I_{th}	Conventional free-air thermal current
I_U	Rated uninterrupted current
R_A	Contact resistance of exposed conductive part ground
t_1	Time of inrush current
t_2	Ramp up time
t_A	Safety clearance
t_g	Delay time associated with the adjustable response current; trip time associated with ground-fault current setting value

Symbol/ abbreviation	Meaning
T_p	Trip time; delay time; time-lag class
t_r	Trip time associated with current setting value of adjustable overload protection
t_{sd}	Trip time associated with short-time delayed tripping current; delay time of S protection
U	Voltage across main contacts of the molded case circuit breaker
U_e	Maximum voltage; rated operational voltage
U_{Nn}	Nominal system voltage
U_s	Rated control supply voltage

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Further Information

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