



**MRU4 – Modbus
HighPROTEC**

Data point list

Manual DOK-TD-MRU4MDE

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This Manual is valid for version (applies for Modbus RTU and Modbus TCP):

Version 2.2.e

Build: 21029

Modbus Parameters

For the Modbus Protocol several parameters have to be set which are relevant for the communication between the control system (SCADA) and the device. The parameters and their setting possibilities or value ranges are shown in the table below.



ATTENTION!

The Parameters are described within the appendix of the device manual (chapter Modbus).

Notes for the SCADA-System

When using Modbus RTU the following times have to be considered by the control system and are fixed within the device :
The dwell times (t_D) before start of a telegram must at least be set to 3.5 characters.

Examples:

3.5 characters 9600 Baud = 4 ms

3.5 characters 19200 Baud = 2 ms

3.6 3.5 characters 38400 Baud = 1 ms

Start of a new telegram is expected when the dwell time (t_D) is > 3.5 characters.

The fact that the probability of disruptions during transmission of a telegram increases with its length has to be taken into duly consideration and thus a query to the Slave should be possibly such that the response telegram is not much longer than 32 Byte.

Specific Modbus Function Codes

For reading out data from the device or to carry out commands, the services listed in the table, also called »Function Codes«, are supported.

Function-code	Designation	Description
3	Read Holding Registers	There are single or several data words read as from a specific data word address. Only status addresses and parameter addresses can be read.
4	Read Input Registers	There are single or several data words read as from a specific data word address. Only measuring values can be read.
5	Write single Output (Bit)	All other values are illegal and will not affect the output. Via this function code acknowledgments can be executed as well as counters reseted or blockings set.
8	Loopback Test	Test function for the communication system
16	Load Multiple Registers	There are single or several data words written as from a specific data word address.

Table 3.1: function codes

On the following pages the Modbus functions are described in detail:

Function-Code 3/4:

Query

Slave address	3/4	Register address HI	Register address LO	Register number HI	Register number LO	Check-sum HI	Check-sum LO
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Response

Slave address	3/4	Byte number	Register 0 HI	Register 0 LO	...	Check-sum HI	Check-sum LO
---------------	-----	-------------	---------------	---------------	-----	--------------	--------------

Register address (HI*256 + LO)

The data word address from where reading should start.

Register number (HI*256 + LO)

Number of data words to be read. Valid range: 1..125

Byte number

Number of subsequent Bytes containing data words.

Register

Data words read out of the device (Highbyte and Lowbyte).

Function Code 5:

Query

Slave address	5	Register address HI	Register address LO	Register data HI	Register data LO	Check-sum HI	Check-sum LO
---------------	---	---------------------	---------------------	------------------	------------------	--------------	--------------

Response

Slave address	5	Register address HI	Register address LO	Register data HI	Register data LO	Check-sum HI	Check-sum LO
---------------	---	---------------------	---------------------	------------------	------------------	--------------	--------------

Register address (HI*256 + LO)
Data word address to be written

Register data
Value of the data word to be written (Highbyte and Lowbyte).

Permitted value range :

FF00 hex request for a single bit to be on: This often means to reset a counter, execute acknowledgments or set blockings signals.
0000 hex request for a single bit to be off: This often means to deactivate blocking signals or to reset single bits.

Function Code 8:

Query

Slave address	8	Data Diag Code HI 0x00	Data Diag Code LO 0x00	Test data	Test data	Check-sum HI	Check-sum LO
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Response

Slave address	8	Data Diag Code HI	Data Diag Code LO	Test data	Test data	Check-sum HI	Check-sum LO
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Data Diag Code HI (high), Data Diag Code LO (Low)
Diagnostic Code (subfunction code of function code 8) for testing the communication system. The Diagnostic Code „Return Query Data“ (0x00, 0x00) is being supported.

Test Data

By using the Diagnostic Code 0x00 0x00, the transmitted data is sent back to the Master unchanged.

Function Code 16:

Query

Slave address	16	Register address HI	Register address LO	Register number HI	Register number LO	Byte number	Register 0 HI	Register 0 LO	...	Check-sum HI	Check-sum LO
---------------	----	---------------------	---------------------	--------------------	--------------------	-------------	---------------	---------------	-----	--------------	--------------

Response

Slave address	16	Register address HI	Register address LO	Register number HI	Register number LO	Check-sum HI	Check-sum LO
---------------	----	---------------------	---------------------	--------------------	--------------------	--------------	--------------

Register address (HI*256 + LO)

Data word address as from where writing should start.

Register number (HI*256 + LO)

Query: Number of data words to be written. Valid range: 1..123

Response: Number of data words written.

Byte number

Number of subsequent Bytes to contain data words.

Register

Data words read out of the device (Highbyte und Lowbyte).

Setting Date and Time

Date and time can be set by means of function code 16 and read with function code 3. If the device address 0 (broadcast address) is selected, the times of all devices connected to this bus are simultaneously reset. The devices do not respond to a broadcast command.

Supported MODBUS- Error Messages

Exception Response Telegrams are described within the general "Modbus Application Protocol Specification". An exception response table with examples is shown there. The table below contains just the actually used codes. In case the device has recognized an error it will react in the following way:

Exception Code	Designation	Description
1	Illegal Function	The message received includes a function code which is not supported by the Slave.
2	Illegal Data Address	Access was sought on a data word address not included in the data module.
3	Illegal Data Value	The received message contains an invalid data structure (e.g. wrong number of data bytes).
4	Slave Device Failure	An unrecoverable error occurred while the server (or slave) was attempting to perform the requested action.

The response given by the *device* in a failure case has the following format:

Slave Address	0x80 + Function Code	Exception Code	Check-sum HI	Check-sum LO
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In the second Byte of the response the Function Code is sent with the highest Bit set to 1. This is equivalent to an addition by 0x80. The third Byte holds the Exception Code of the error message.

Appendix - Data Point Lists

Signals

<i>Module</i>	<i>Subgroup Names Functions</i>	<i>Start Register Address</i>	<i>No. of Modbus Registers</i>	<i>Function Code</i>	<i>Format</i>	<i>Bit Mask / (Bit Position)</i>	<i>Unit</i>	<i>Description</i>
BO Slot X2		1003	1	3	Struct			
	BO 1	1003	1	3	Bit	0x1 (1)	-	Signal: Binary Output Relay
	BO 2	1003	1	3	Bit	0x2 (2)	-	Signal: Binary Output Relay
	BO 3	1003	1	3	Bit	0x4 (3)	-	Signal: Binary Output Relay
	BO 4	1003	1	3	Bit	0x8 (4)	-	Signal: Binary Output Relay
	BO 5	1003	1	3	Bit	0x10 (5)	-	Signal: Binary Output Relay
	DISARMED!	1003	1	3	Bit	0x40 (7)	-	Signal: CAUTION! RELAYS DISARMED in order to safely perform maintenance while eliminating the risk of taking an entire process off-line. (Note: The Self Supervision Contact cannot be disarmed). YOU MUST ENSURE that the relays are ARMED AGAIN after maintenance

Module	Subgroup Names Functions	Start Register Address	No. of Modbus Registers	Function Code	Format	Bit Mask / (Bit Position)	Unit	Description
	Outs forced	1003	1	3	Bit	0x80 (8)	-	Signal: The State of at least one Relay Output has been set by force. That means that the state of at least one Relay is forced and hence does not show the state of the assigned signals.
CBF		53	1	3	Struct			
	ExBlo1-l	53	1	3	Bit	0x1 (1)	-	Module input state: External blocking1
	ExBlo2-l	53	1	3	Bit	0x2 (2)	-	Module input state: External blocking2
	active	53	1	3	Bit	0x4 (3)	-	Signal: active
	ExBlo	53	1	3	Bit	0x8 (4)	-	Signal: External Blocking
	Trigger1	53	1	3	Bit	0x10 (5)	-	Module Input: Trigger that will start the CBF
	Trigger2	53	1	3	Bit	0x20 (6)	-	Module Input: Trigger that will start the CBF
	Trigger3	53	1	3	Bit	0x40 (7)	-	Module Input: Trigger that will start the CBF
	running	53	1	3	Bit	0x80 (8)	-	Signal: CBF-Module started
	Alarm (*)	53	1	3	Bit	0x100 (9)	-	Signal: Circuit Breaker Failure

Appendix - Data Point Lists

Module	Subgroup Names Functions	Start Register Address	No. of Modbus Registers	Function Code	Format	Bit Mask / (Bit Position)	Unit	Description
	Lockout (*)	53	1	3	Bit	0x200 (10)	-	Signal: Lockout
	Waiting for Trigger (*)	53	1	3	Bit	0x400 (11)	-	Waiting for Trigger
Ctrl		176	1	3	Struct			
	Local	176	1	3	Bit	0x1 (1)	-	Switching Authority: Local
	Remote	176	1	3	Bit	0x2 (2)	-	Switching Authority: Remote
	NonInterl	176	1	3	Bit	0x4 (3)	-	Non-Interlocking is active
	SG Disturb	176	1	3	Bit	0x8 (4)	-	Minimum one Switchgear is disturbed.
	SG Indeterm	176	1	3	Bit	0x10 (5)	-	Minimum one Switchgear is moving (Position cannot be determined).
DI Slot X1		1000	1	3	Struct			
	DI 1	1000	1	3	Bit	0x1 (1)	-	Signal: Digital Input
	DI 2	1000	1	3	Bit	0x2 (2)	-	Signal: Digital Input
	DI 3	1000	1	3	Bit	0x4 (3)	-	Signal: Digital Input

Module	Subgroup Names Functions	Start Register Address	No. of Modbus Registers	Function Code	Format	Bit Mask / (Bit Position)	Unit	Description
	DI 4	1000	1	3	Bit	0x8 (4)	-	Signal: Digital Input
	DI 5	1000	1	3	Bit	0x10 (5)	-	Signal: Digital Input
	DI 6	1000	1	3	Bit	0x20 (6)	-	Signal: Digital Input
	DI 7	1000	1	3	Bit	0x40 (7)	-	Signal: Digital Input
	DI 8	1000	1	3	Bit	0x80 (8)	-	Signal: Digital Input
Exp[1]		49	1	3	Struct			
	ExBlo1-I	49	1	3	Bit	0x1 (1)	-	Module input state: External blocking1
	ExBlo2-I	49	1	3	Bit	0x2 (2)	-	Module input state: External blocking2
	ExBlo TripCmd-I	49	1	3	Bit	0x4 (3)	-	Module input state: External Blocking of the Trip Command
	Alarm-I	49	1	3	Bit	0x8 (4)	-	Module input state: Alarm
	Trip-I	49	1	3	Bit	0x10 (5)	-	Module input state: Trip
	active	49	1	3	Bit	0x20 (6)	-	Signal: active

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Module	Subgroup Names Functions	Start Register Address	No. of Modbus Registers	Function Code	Format	Bit Mask / (Bit Position)	Unit	Description
	ExBlo	49	1	3	Bit	0x40 (7)	-	Signal: External Blocking
	Blo TripCmd	49	1	3	Bit	0x80 (8)	-	Signal: Trip Command blocked
	ExBlo TripCmd	49	1	3	Bit	0x100 (9)	-	Signal: External Blocking of the Trip Command
	Alarm	49	1	3	Bit	0x200 (10)	-	Signal: Alarm
	Trip (*)	49	1	3	Bit	0x400 (11)	-	Signal: Trip
	TripCmd (*)	49	1	3	Bit	0x800 (12)	-	Signal: Trip Command
Exp[2]		50	1	3	Struct			
	ExBlo1-I	50	1	3	Bit	0x1 (1)	-	Module input state: External blocking1
	ExBlo2-I	50	1	3	Bit	0x2 (2)	-	Module input state: External blocking2
	ExBlo TripCmd-I	50	1	3	Bit	0x4 (3)	-	Module input state: External Blocking of the Trip Command
	Alarm-I	50	1	3	Bit	0x8 (4)	-	Module input state: Alarm
	Trip-I	50	1	3	Bit	0x10 (5)	-	Module input state: Trip

Module	Subgroup Names Functions	Start Register Address	No. of Modbus Registers	Function Code	Format	Bit Mask / (Bit Position)	Unit	Description
	active	50	1	3	Bit	0x20 (6)	-	Signal: active
	ExBlo	50	1	3	Bit	0x40 (7)	-	Signal: External Blocking
	Blo TripCmd	50	1	3	Bit	0x80 (8)	-	Signal: Trip Command blocked
	ExBlo TripCmd	50	1	3	Bit	0x100 (9)	-	Signal: External Blocking of the Trip Command
	Alarm	50	1	3	Bit	0x200 (10)	-	Signal: Alarm
	Trip (*)	50	1	3	Bit	0x400 (11)	-	Signal: Trip
	TripCmd (*)	50	1	3	Bit	0x800 (12)	-	Signal: Trip Command
Exp[3]		51	1	3	Struct			
	ExBlo1-I	51	1	3	Bit	0x1 (1)	-	Module input state: External blocking1
	ExBlo2-I	51	1	3	Bit	0x2 (2)	-	Module input state: External blocking2
	ExBlo TripCmd-I	51	1	3	Bit	0x4 (3)	-	Module input state: External Blocking of the Trip Command
	Alarm-I	51	1	3	Bit	0x8 (4)	-	Module input state: Alarm

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Module	Subgroup Names Functions	Start Register Address	No. of Modbus Registers	Function Code	Format	Bit Mask / (Bit Position)	Unit	Description
	Trip-I	51	1	3	Bit	0x10 (5)	-	Module input state: Trip
	active	51	1	3	Bit	0x20 (6)	-	Signal: active
	ExBlo	51	1	3	Bit	0x40 (7)	-	Signal: External Blocking
	Blo TripCmd	51	1	3	Bit	0x80 (8)	-	Signal: Trip Command blocked
	ExBlo TripCmd	51	1	3	Bit	0x100 (9)	-	Signal: External Blocking of the Trip Command
	Alarm	51	1	3	Bit	0x200 (10)	-	Signal: Alarm
	Trip (*)	51	1	3	Bit	0x400 (11)	-	Signal: Trip
	TripCmd (*)	51	1	3	Bit	0x800 (12)	-	Signal: Trip Command
Exp[4]		52	1	3	Struct			
	ExBlo1-I	52	1	3	Bit	0x1 (1)	-	Module input state: External blocking1
	ExBlo2-I	52	1	3	Bit	0x2 (2)	-	Module input state: External blocking2
	ExBlo TripCmd-I	52	1	3	Bit	0x4 (3)	-	Module input state: External Blocking of the Trip Command

Module	Subgroup Names Functions	Start Register Address	No. of Modbus Registers	Function Code	Format	Bit Mask / (Bit Position)	Unit	Description
	Alarm-I	52	1	3	Bit	0x8 (4)	-	Module input state: Alarm
	Trip-I	52	1	3	Bit	0x10 (5)	-	Module input state: Trip
	active	52	1	3	Bit	0x20 (6)	-	Signal: active
	ExBlo	52	1	3	Bit	0x40 (7)	-	Signal: External Blocking
	Blo TripCmd	52	1	3	Bit	0x80 (8)	-	Signal: Trip Command blocked
	ExBlo TripCmd	52	1	3	Bit	0x100 (9)	-	Signal: External Blocking of the Trip Command
	Alarm	52	1	3	Bit	0x200 (10)	-	Signal: Alarm
	Trip (*)	52	1	3	Bit	0x400 (11)	-	Signal: Trip
	TripCmd (*)	52	1	3	Bit	0x800 (12)	-	Signal: Trip Command
IRIG-B		148	1	3	Struct			
	active	148	1	3	Bit	0x1 (1)	-	Signal: active
	inverted	148	1	3	Bit	0x2 (2)	-	Signal: IRIG-B inverted

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Module	Subgroup Names Functions	Start Register Address	No. of Modbus Registers	Function Code	Format	Bit Mask / (Bit Position)	Unit	Description
	Control Signal1	148	1	3	Bit	0x4 (3)	-	Signal: IRIG-B Control Signal
	Control Signal2	148	1	3	Bit	0x8 (4)	-	Signal: IRIG-B Control Signal
	Control Signal4	148	1	3	Bit	0x10 (5)	-	Signal: IRIG-B Control Signal
	Control Signal5	148	1	3	Bit	0x20 (6)	-	Signal: IRIG-B Control Signal
	Control Signal6	148	1	3	Bit	0x40 (7)	-	Signal: IRIG-B Control Signal
	Control Signal7	148	1	3	Bit	0x80 (8)	-	Signal: IRIG-B Control Signal
	Control Signal8	148	1	3	Bit	0x100 (9)	-	Signal: IRIG-B Control Signal
	Control Signal9	148	1	3	Bit	0x200 (10)	-	Signal: IRIG-B Control Signal
	Control Signal10	148	1	3	Bit	0x400 (11)	-	Signal: IRIG-B Control Signal
	Control Signal11	148	1	3	Bit	0x800 (12)	-	Signal: IRIG-B Control Signal
	Control Signal12	148	1	3	Bit	0x1000 (13)	-	Signal: IRIG-B Control Signal

Module	Subgroup Names Functions	Start Register Address	No. of Modbus Registers	Function Code	Format	Bit Mask / (Bit Position)	Unit	Description
	Control Signal13	148	1	3	Bit	0x2000 (14)	-	Signal: IRIG-B Control Signal
	Control Signal14	148	1	3	Bit	0x4000 (15)	-	Signal: IRIG-B Control Signal
	Control Signal15	148	1	3	Bit	0x8000 (16)	-	Signal: IRIG-B Control Signal
IRIG-B		149	1	3	Struct			
	Control Signal16	149	1	3	Bit	0x1 (1)	-	Signal: IRIG-B Control Signal
	Control Signal17	149	1	3	Bit	0x2 (2)	-	Signal: IRIG-B Control Signal
	Control Signal18	149	1	3	Bit	0x4 (3)	-	Signal: IRIG-B Control Signal
Intertripping		253	1	3	Struct			
	ExBlo1-I	253	1	3	Bit	0x1 (1)	-	Module input state: External blocking1
	ExBlo2-I	253	1	3	Bit	0x2 (2)	-	Module input state: External blocking2
	ExBlo TripCmd-I	253	1	3	Bit	0x4 (3)	-	Module input state: External Blocking of the Trip Command
	Alarm-I	253	1	3	Bit	0x8 (4)	-	Module input state: Alarm

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Module	Subgroup Names Functions	Start Register Address	No. of Modbus Registers	Function Code	Format	Bit Mask / (Bit Position)	Unit	Description
	Trip-I	253	1	3	Bit	0x10 (5)	-	Module input state: Trip
	active	253	1	3	Bit	0x20 (6)	-	Signal: active
	ExBlo	253	1	3	Bit	0x40 (7)	-	Signal: External Blocking
	Blo TripCmd	253	1	3	Bit	0x80 (8)	-	Signal: Trip Command blocked
	ExBlo TripCmd	253	1	3	Bit	0x100 (9)	-	Signal: External Blocking of the Trip Command
	Alarm	253	1	3	Bit	0x200 (10)	-	Signal: Alarm
	Trip (*)	253	1	3	Bit	0x400 (11)	-	Signal: Trip
	TripCmd (*)	253	1	3	Bit	0x800 (12)	-	Signal: Trip Command
LVRT		254	1	3	Struct			
	ExBlo1-I	254	1	3	Bit	0x1 (1)	-	Module input state: External blocking1
	ExBlo2-I	254	1	3	Bit	0x2 (2)	-	Module input state: External blocking2
	ExBlo TripCmd-I	254	1	3	Bit	0x4 (3)	-	Module input state: External Blocking of the Trip Command

Module	Subgroup Names Functions	Start Register Address	No. of Modbus Registers	Function Code	Format	Bit Mask / (Bit Position)	Unit	Description
	active	254	1	3	Bit	0x8 (4)	-	Signal: active
	ExBlo	254	1	3	Bit	0x10 (5)	-	Signal: External Blocking
	Blo TripCmd	254	1	3	Bit	0x20 (6)	-	Signal: Trip Command blocked
	ExBlo TripCmd	254	1	3	Bit	0x40 (7)	-	Signal: External Blocking of the Trip Command
LVRT		255	1	3	Struct			
	Alarm L1	255	1	3	Bit	0x1 (1)	-	Signal: Alarm L1
	Alarm L2	255	1	3	Bit	0x2 (2)	-	Signal: Alarm L2
	Alarm L3	255	1	3	Bit	0x4 (3)	-	Signal: Alarm L3
	Alarm	255	1	3	Bit	0x8 (4)	-	Signal: Alarm voltage stage
	Trip L1 (*)	255	1	3	Bit	0x10 (5)	-	Signal: General Trip Phase L1
	Trip L2 (*)	255	1	3	Bit	0x20 (6)	-	Signal: General Trip Phase L2
	Trip L3 (*)	255	1	3	Bit	0x40 (7)	-	Signal: General Trip Phase L3

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Module	Subgroup Names Functions	Start Register Address	No. of Modbus Registers	Function Code	Format	Bit Mask / (Bit Position)	Unit	Description
	Trip (*)	255	1	3	Bit	0x80 (8)	-	Signal: Trip
	TripCmd (*)	255	1	3	Bit	0x100 (9)	-	Signal: Trip Command
	t-LVRT is running (*)	255	1	3	Bit	0x200 (10)	-	Signal: t-LVRT is running
Logics		1100	1	3	Struct			
	LE1.Gate Out	1100	1	3	Bit	0x1 (1)	-	Signal: Output of the logic gate
	LE1.Timer Out	1100	1	3	Bit	0x2 (2)	-	Signal: Timer Output
	LE1.Out	1100	1	3	Bit	0x4 (3)	-	Signal: Latched Output (Q)
	LE1.Out inverted	1100	1	3	Bit	0x8 (4)	-	Signal: Negated Latched Output (Q NOT)
	LE1.Gate In1-I	1100	1	3	Bit	0x10 (5)	-	State of the module input: Assignment of the Input Signal
	LE1.Gate In2-I	1100	1	3	Bit	0x20 (6)	-	State of the module input: Assignment of the Input Signal
	LE1.Gate In3-I	1100	1	3	Bit	0x40 (7)	-	State of the module input: Assignment of the Input Signal
	LE1.Gate In4-I	1100	1	3	Bit	0x80 (8)	-	State of the module input: Assignment of the Input Signal

Module	Subgroup Names Functions	Start Register Address	No. of Modbus Registers	Function Code	Format	Bit Mask / (Bit Position)	Unit	Description
	LE1.Reset Latch-I	1100	1	3	Bit	0x100 (9)	-	State of the module input: Reset Signal for the Latching
Logics		1101	1	3	Struct			
	LE2.Gate Out	1101	1	3	Bit	0x1 (1)	-	Signal: Output of the logic gate
	LE2.Timer Out	1101	1	3	Bit	0x2 (2)	-	Signal: Timer Output
	LE2.Out	1101	1	3	Bit	0x4 (3)	-	Signal: Latched Output (Q)
	LE2.Out inverted	1101	1	3	Bit	0x8 (4)	-	Signal: Negated Latched Output (Q NOT)
	LE2.Gate In1-I	1101	1	3	Bit	0x10 (5)	-	State of the module input: Assignment of the Input Signal
	LE2.Gate In2-I	1101	1	3	Bit	0x20 (6)	-	State of the module input: Assignment of the Input Signal
	LE2.Gate In3-I	1101	1	3	Bit	0x40 (7)	-	State of the module input: Assignment of the Input Signal
	LE2.Gate In4-I	1101	1	3	Bit	0x80 (8)	-	State of the module input: Assignment of the Input Signal
	LE2.Reset Latch-I	1101	1	3	Bit	0x100 (9)	-	State of the module input: Reset Signal for the Latching
Logics		1102	1	3	Struct			

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Module	Subgroup Names Functions	Start Register Address	No. of Modbus Registers	Function Code	Format	Bit Mask / (Bit Position)	Unit	Description
	LE3.Gate Out	1102	1	3	Bit	0x1 (1)	-	Signal: Output of the logic gate
	LE3.Timer Out	1102	1	3	Bit	0x2 (2)	-	Signal: Timer Output
	LE3.Out	1102	1	3	Bit	0x4 (3)	-	Signal: Latched Output (Q)
	LE3.Out inverted	1102	1	3	Bit	0x8 (4)	-	Signal: Negated Latched Output (Q NOT)
	LE3.Gate In1-I	1102	1	3	Bit	0x10 (5)	-	State of the module input: Assignment of the Input Signal
	LE3.Gate In2-I	1102	1	3	Bit	0x20 (6)	-	State of the module input: Assignment of the Input Signal
	LE3.Gate In3-I	1102	1	3	Bit	0x40 (7)	-	State of the module input: Assignment of the Input Signal
	LE3.Gate In4-I	1102	1	3	Bit	0x80 (8)	-	State of the module input: Assignment of the Input Signal
	LE3.Reset Latch-I	1102	1	3	Bit	0x100 (9)	-	State of the module input: Reset Signal for the Latching
Logics		1103	1	3	Struct			
	LE4.Gate Out	1103	1	3	Bit	0x1 (1)	-	Signal: Output of the logic gate
	LE4.Timer Out	1103	1	3	Bit	0x2 (2)	-	Signal: Timer Output

Module	Subgroup Names Functions	Start Register Address	No. of Modbus Registers	Function Code	Format	Bit Mask / (Bit Position)	Unit	Description
	LE4.Out	1103	1	3	Bit	0x4 (3)	-	Signal: Latched Output (Q)
	LE4.Out inverted	1103	1	3	Bit	0x8 (4)	-	Signal: Negated Latched Output (Q NOT)
	LE4.Gate In1-I	1103	1	3	Bit	0x10 (5)	-	State of the module input: Assignment of the Input Signal
	LE4.Gate In2-I	1103	1	3	Bit	0x20 (6)	-	State of the module input: Assignment of the Input Signal
	LE4.Gate In3-I	1103	1	3	Bit	0x40 (7)	-	State of the module input: Assignment of the Input Signal
	LE4.Gate In4-I	1103	1	3	Bit	0x80 (8)	-	State of the module input: Assignment of the Input Signal
	LE4.Reset Latch-I	1103	1	3	Bit	0x100 (9)	-	State of the module input: Reset Signal for the Latching
Logics		1104	1	3	Struct			
	LE5.Gate Out	1104	1	3	Bit	0x1 (1)	-	Signal: Output of the logic gate
	LE5.Timer Out	1104	1	3	Bit	0x2 (2)	-	Signal: Timer Output
	LE5.Out	1104	1	3	Bit	0x4 (3)	-	Signal: Latched Output (Q)
	LE5.Out inverted	1104	1	3	Bit	0x8 (4)	-	Signal: Negated Latched Output (Q NOT)

Module	Subgroup Names Functions	Start Register Address	No. of Modbus Registers	Function Code	Format	Bit Mask / (Bit Position)	Unit	Description
	LE5.Gate In1-I	1104	1	3	Bit	0x10 (5)	-	State of the module input: Assignment of the Input Signal
	LE5.Gate In2-I	1104	1	3	Bit	0x20 (6)	-	State of the module input: Assignment of the Input Signal
	LE5.Gate In3-I	1104	1	3	Bit	0x40 (7)	-	State of the module input: Assignment of the Input Signal
	LE5.Gate In4-I	1104	1	3	Bit	0x80 (8)	-	State of the module input: Assignment of the Input Signal
	LE5.Reset Latch-I	1104	1	3	Bit	0x100 (9)	-	State of the module input: Reset Signal for the Latching
Logics		1105	1	3	Struct			
	LE6.Gate Out	1105	1	3	Bit	0x1 (1)	-	Signal: Output of the logic gate
	LE6.Timer Out	1105	1	3	Bit	0x2 (2)	-	Signal: Timer Output
	LE6.Out	1105	1	3	Bit	0x4 (3)	-	Signal: Latched Output (Q)
	LE6.Out inverted	1105	1	3	Bit	0x8 (4)	-	Signal: Negated Latched Output (Q NOT)
	LE6.Gate In1-I	1105	1	3	Bit	0x10 (5)	-	State of the module input: Assignment of the Input Signal
	LE6.Gate In2-I	1105	1	3	Bit	0x20 (6)	-	State of the module input: Assignment of the Input Signal

Module	Subgroup Names Functions	Start Register Address	No. of Modbus Registers	Function Code	Format	Bit Mask / (Bit Position)	Unit	Description
	LE6.Gate In3-I	1105	1	3	Bit	0x40 (7)	-	State of the module input: Assignment of the Input Signal
	LE6.Gate In4-I	1105	1	3	Bit	0x80 (8)	-	State of the module input: Assignment of the Input Signal
	LE6.Reset Latch-I	1105	1	3	Bit	0x100 (9)	-	State of the module input: Reset Signal for the Latching
Logics		1106	1	3	Struct			
	LE7.Gate Out	1106	1	3	Bit	0x1 (1)	-	Signal: Output of the logic gate
	LE7.Timer Out	1106	1	3	Bit	0x2 (2)	-	Signal: Timer Output
	LE7.Out	1106	1	3	Bit	0x4 (3)	-	Signal: Latched Output (Q)
	LE7.Out inverted	1106	1	3	Bit	0x8 (4)	-	Signal: Negated Latched Output (Q NOT)
	LE7.Gate In1-I	1106	1	3	Bit	0x10 (5)	-	State of the module input: Assignment of the Input Signal
	LE7.Gate In2-I	1106	1	3	Bit	0x20 (6)	-	State of the module input: Assignment of the Input Signal
	LE7.Gate In3-I	1106	1	3	Bit	0x40 (7)	-	State of the module input: Assignment of the Input Signal
	LE7.Gate In4-I	1106	1	3	Bit	0x80 (8)	-	State of the module input: Assignment of the Input Signal

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Module	Subgroup Names Functions	Start Register Address	No. of Modbus Registers	Function Code	Format	Bit Mask / (Bit Position)	Unit	Description
	LE7.Reset Latch-I	1106	1	3	Bit	0x100 (9)	-	State of the module input: Reset Signal for the Latching
Logics		1107	1	3	Struct			
	LE8.Gate Out	1107	1	3	Bit	0x1 (1)	-	Signal: Output of the logic gate
	LE8.Timer Out	1107	1	3	Bit	0x2 (2)	-	Signal: Timer Output
	LE8.Out	1107	1	3	Bit	0x4 (3)	-	Signal: Latched Output (Q)
	LE8.Out inverted	1107	1	3	Bit	0x8 (4)	-	Signal: Negated Latched Output (Q NOT)
	LE8.Gate In1-I	1107	1	3	Bit	0x10 (5)	-	State of the module input: Assignment of the Input Signal
	LE8.Gate In2-I	1107	1	3	Bit	0x20 (6)	-	State of the module input: Assignment of the Input Signal
	LE8.Gate In3-I	1107	1	3	Bit	0x40 (7)	-	State of the module input: Assignment of the Input Signal
	LE8.Gate In4-I	1107	1	3	Bit	0x80 (8)	-	State of the module input: Assignment of the Input Signal
	LE8.Reset Latch-I	1107	1	3	Bit	0x100 (9)	-	State of the module input: Reset Signal for the Latching
Logics		1108	1	3	Struct			

Module	Subgroup Names Functions	Start Register Address	No. of Modbus Registers	Function Code	Format	Bit Mask / (Bit Position)	Unit	Description
	LE9.Gate Out	1108	1	3	Bit	0x1 (1)	-	Signal: Output of the logic gate
	LE9.Timer Out	1108	1	3	Bit	0x2 (2)	-	Signal: Timer Output
	LE9.Out	1108	1	3	Bit	0x4 (3)	-	Signal: Latched Output (Q)
	LE9.Out inverted	1108	1	3	Bit	0x8 (4)	-	Signal: Negated Latched Output (Q NOT)
	LE9.Gate In1-I	1108	1	3	Bit	0x10 (5)	-	State of the module input: Assignment of the Input Signal
	LE9.Gate In2-I	1108	1	3	Bit	0x20 (6)	-	State of the module input: Assignment of the Input Signal
	LE9.Gate In3-I	1108	1	3	Bit	0x40 (7)	-	State of the module input: Assignment of the Input Signal
	LE9.Gate In4-I	1108	1	3	Bit	0x80 (8)	-	State of the module input: Assignment of the Input Signal
	LE9.Reset Latch-I	1108	1	3	Bit	0x100 (9)	-	State of the module input: Reset Signal for the Latching
Logics		1109	1	3	Struct			
	LE10.Gate Out	1109	1	3	Bit	0x1 (1)	-	Signal: Output of the logic gate
	LE10.Timer Out	1109	1	3	Bit	0x2 (2)	-	Signal: Timer Output

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Module	Subgroup Names Functions	Start Register Address	No. of Modbus Registers	Function Code	Format	Bit Mask / (Bit Position)	Unit	Description
	LE10.Out	1109	1	3	Bit	0x4 (3)	-	Signal: Latched Output (Q)
	LE10.Out inverted	1109	1	3	Bit	0x8 (4)	-	Signal: Negated Latched Output (Q NOT)
	LE10.Gate In1-l	1109	1	3	Bit	0x10 (5)	-	State of the module input: Assignment of the Input Signal
	LE10.Gate In2-l	1109	1	3	Bit	0x20 (6)	-	State of the module input: Assignment of the Input Signal
	LE10.Gate In3-l	1109	1	3	Bit	0x40 (7)	-	State of the module input: Assignment of the Input Signal
	LE10.Gate In4-l	1109	1	3	Bit	0x80 (8)	-	State of the module input: Assignment of the Input Signal
	LE10.Reset Latch-l	1109	1	3	Bit	0x100 (9)	-	State of the module input: Reset Signal for the Latching
Logics		1110	1	3	Struct			
	LE11.Gate Out	1110	1	3	Bit	0x1 (1)	-	Signal: Output of the logic gate
	LE11.Timer Out	1110	1	3	Bit	0x2 (2)	-	Signal: Timer Output
	LE11.Out	1110	1	3	Bit	0x4 (3)	-	Signal: Latched Output (Q)
	LE11.Out inverted	1110	1	3	Bit	0x8 (4)	-	Signal: Negated Latched Output (Q NOT)

Module	Subgroup Names Functions	Start Register Address	No. of Modbus Registers	Function Code	Format	Bit Mask / (Bit Position)	Unit	Description
	LE11.Gate In1-l	1110	1	3	Bit	0x10 (5)	-	State of the module input: Assignment of the Input Signal
	LE11.Gate In2-l	1110	1	3	Bit	0x20 (6)	-	State of the module input: Assignment of the Input Signal
	LE11.Gate In3-l	1110	1	3	Bit	0x40 (7)	-	State of the module input: Assignment of the Input Signal
	LE11.Gate In4-l	1110	1	3	Bit	0x80 (8)	-	State of the module input: Assignment of the Input Signal
	LE11.Reset Latch-l	1110	1	3	Bit	0x100 (9)	-	State of the module input: Reset Signal for the Latching
Logics		1111	1	3	Struct			
	LE12.Gate Out	1111	1	3	Bit	0x1 (1)	-	Signal: Output of the logic gate
	LE12.Timer Out	1111	1	3	Bit	0x2 (2)	-	Signal: Timer Output
	LE12.Out	1111	1	3	Bit	0x4 (3)	-	Signal: Latched Output (Q)
	LE12.Out inverted	1111	1	3	Bit	0x8 (4)	-	Signal: Negated Latched Output (Q NOT)
	LE12.Gate In1-l	1111	1	3	Bit	0x10 (5)	-	State of the module input: Assignment of the Input Signal
	LE12.Gate In2-l	1111	1	3	Bit	0x20 (6)	-	State of the module input: Assignment of the Input Signal

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Module	Subgroup Names Functions	Start Register Address	No. of Modbus Registers	Function Code	Format	Bit Mask / (Bit Position)	Unit	Description
	LE12.Gate In3-I	1111	1	3	Bit	0x40 (7)	-	State of the module input: Assignment of the Input Signal
	LE12.Gate In4-I	1111	1	3	Bit	0x80 (8)	-	State of the module input: Assignment of the Input Signal
	LE12.Reset Latch-I	1111	1	3	Bit	0x100 (9)	-	State of the module input: Reset Signal for the Latching
Logics		1112	1	3	Struct			
	LE13.Gate Out	1112	1	3	Bit	0x1 (1)	-	Signal: Output of the logic gate
	LE13.Timer Out	1112	1	3	Bit	0x2 (2)	-	Signal: Timer Output
	LE13.Out	1112	1	3	Bit	0x4 (3)	-	Signal: Latched Output (Q)
	LE13.Out inverted	1112	1	3	Bit	0x8 (4)	-	Signal: Negated Latched Output (Q NOT)
	LE13.Gate In1-I	1112	1	3	Bit	0x10 (5)	-	State of the module input: Assignment of the Input Signal
	LE13.Gate In2-I	1112	1	3	Bit	0x20 (6)	-	State of the module input: Assignment of the Input Signal
	LE13.Gate In3-I	1112	1	3	Bit	0x40 (7)	-	State of the module input: Assignment of the Input Signal
	LE13.Gate In4-I	1112	1	3	Bit	0x80 (8)	-	State of the module input: Assignment of the Input Signal

Module	Subgroup Names Functions	Start Register Address	No. of Modbus Registers	Function Code	Format	Bit Mask / (Bit Position)	Unit	Description
	LE13.Reset Latch-I	1112	1	3	Bit	0x100 (9)	-	State of the module input: Reset Signal for the Latching
Logics		1113	1	3	Struct			
	LE14.Gate Out	1113	1	3	Bit	0x1 (1)	-	Signal: Output of the logic gate
	LE14.Timer Out	1113	1	3	Bit	0x2 (2)	-	Signal: Timer Output
	LE14.Out	1113	1	3	Bit	0x4 (3)	-	Signal: Latched Output (Q)
	LE14.Out inverted	1113	1	3	Bit	0x8 (4)	-	Signal: Negated Latched Output (Q NOT)
	LE14.Gate In1-I	1113	1	3	Bit	0x10 (5)	-	State of the module input: Assignment of the Input Signal
	LE14.Gate In2-I	1113	1	3	Bit	0x20 (6)	-	State of the module input: Assignment of the Input Signal
	LE14.Gate In3-I	1113	1	3	Bit	0x40 (7)	-	State of the module input: Assignment of the Input Signal
	LE14.Gate In4-I	1113	1	3	Bit	0x80 (8)	-	State of the module input: Assignment of the Input Signal
	LE14.Reset Latch-I	1113	1	3	Bit	0x100 (9)	-	State of the module input: Reset Signal for the Latching
Logics		1114	1	3	Struct			

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Module	Subgroup Names Functions	Start Register Address	No. of Modbus Registers	Function Code	Format	Bit Mask / (Bit Position)	Unit	Description
	LE15.Gate Out	1114	1	3	Bit	0x1 (1)	-	Signal: Output of the logic gate
	LE15.Timer Out	1114	1	3	Bit	0x2 (2)	-	Signal: Timer Output
	LE15.Out	1114	1	3	Bit	0x4 (3)	-	Signal: Latched Output (Q)
	LE15.Out inverted	1114	1	3	Bit	0x8 (4)	-	Signal: Negated Latched Output (Q NOT)
	LE15.Gate In1-I	1114	1	3	Bit	0x10 (5)	-	State of the module input: Assignment of the Input Signal
	LE15.Gate In2-I	1114	1	3	Bit	0x20 (6)	-	State of the module input: Assignment of the Input Signal
	LE15.Gate In3-I	1114	1	3	Bit	0x40 (7)	-	State of the module input: Assignment of the Input Signal
	LE15.Gate In4-I	1114	1	3	Bit	0x80 (8)	-	State of the module input: Assignment of the Input Signal
	LE15.Reset Latch-I	1114	1	3	Bit	0x100 (9)	-	State of the module input: Reset Signal for the Latching
Logics		1115	1	3	Struct			
	LE16.Gate Out	1115	1	3	Bit	0x1 (1)	-	Signal: Output of the logic gate
	LE16.Timer Out	1115	1	3	Bit	0x2 (2)	-	Signal: Timer Output

Module	Subgroup Names Functions	Start Register Address	No. of Modbus Registers	Function Code	Format	Bit Mask / (Bit Position)	Unit	Description
	LE16.Out	1115	1	3	Bit	0x4 (3)	-	Signal: Latched Output (Q)
	LE16.Out inverted	1115	1	3	Bit	0x8 (4)	-	Signal: Negated Latched Output (Q NOT)
	LE16.Gate In1-l	1115	1	3	Bit	0x10 (5)	-	State of the module input: Assignment of the Input Signal
	LE16.Gate In2-l	1115	1	3	Bit	0x20 (6)	-	State of the module input: Assignment of the Input Signal
	LE16.Gate In3-l	1115	1	3	Bit	0x40 (7)	-	State of the module input: Assignment of the Input Signal
	LE16.Gate In4-l	1115	1	3	Bit	0x80 (8)	-	State of the module input: Assignment of the Input Signal
	LE16.Reset Latch-l	1115	1	3	Bit	0x100 (9)	-	State of the module input: Reset Signal for the Latching
Logics		1116	1	3	Struct			
	LE17.Gate Out	1116	1	3	Bit	0x1 (1)	-	Signal: Output of the logic gate
	LE17.Timer Out	1116	1	3	Bit	0x2 (2)	-	Signal: Timer Output
	LE17.Out	1116	1	3	Bit	0x4 (3)	-	Signal: Latched Output (Q)
	LE17.Out inverted	1116	1	3	Bit	0x8 (4)	-	Signal: Negated Latched Output (Q NOT)

Module	Subgroup Names Functions	Start Register Address	No. of Modbus Registers	Function Code	Format	Bit Mask / (Bit Position)	Unit	Description
	LE17.Gate In1-l	1116	1	3	Bit	0x10 (5)	-	State of the module input: Assignment of the Input Signal
	LE17.Gate In2-l	1116	1	3	Bit	0x20 (6)	-	State of the module input: Assignment of the Input Signal
	LE17.Gate In3-l	1116	1	3	Bit	0x40 (7)	-	State of the module input: Assignment of the Input Signal
	LE17.Gate In4-l	1116	1	3	Bit	0x80 (8)	-	State of the module input: Assignment of the Input Signal
	LE17.Reset Latch-l	1116	1	3	Bit	0x100 (9)	-	State of the module input: Reset Signal for the Latching
Logics		1117	1	3	Struct			
	LE18.Gate Out	1117	1	3	Bit	0x1 (1)	-	Signal: Output of the logic gate
	LE18.Timer Out	1117	1	3	Bit	0x2 (2)	-	Signal: Timer Output
	LE18.Out	1117	1	3	Bit	0x4 (3)	-	Signal: Latched Output (Q)
	LE18.Out inverted	1117	1	3	Bit	0x8 (4)	-	Signal: Negated Latched Output (Q NOT)
	LE18.Gate In1-l	1117	1	3	Bit	0x10 (5)	-	State of the module input: Assignment of the Input Signal
	LE18.Gate In2-l	1117	1	3	Bit	0x20 (6)	-	State of the module input: Assignment of the Input Signal

Module	Subgroup Names Functions	Start Register Address	No. of Modbus Registers	Function Code	Format	Bit Mask / (Bit Position)	Unit	Description
	LE18.Gate In3-I	1117	1	3	Bit	0x40 (7)	-	State of the module input: Assignment of the Input Signal
	LE18.Gate In4-I	1117	1	3	Bit	0x80 (8)	-	State of the module input: Assignment of the Input Signal
	LE18.Reset Latch-I	1117	1	3	Bit	0x100 (9)	-	State of the module input: Reset Signal for the Latching
Logics		1118	1	3	Struct			
	LE19.Gate Out	1118	1	3	Bit	0x1 (1)	-	Signal: Output of the logic gate
	LE19.Timer Out	1118	1	3	Bit	0x2 (2)	-	Signal: Timer Output
	LE19.Out	1118	1	3	Bit	0x4 (3)	-	Signal: Latched Output (Q)
	LE19.Out inverted	1118	1	3	Bit	0x8 (4)	-	Signal: Negated Latched Output (Q NOT)
	LE19.Gate In1-I	1118	1	3	Bit	0x10 (5)	-	State of the module input: Assignment of the Input Signal
	LE19.Gate In2-I	1118	1	3	Bit	0x20 (6)	-	State of the module input: Assignment of the Input Signal
	LE19.Gate In3-I	1118	1	3	Bit	0x40 (7)	-	State of the module input: Assignment of the Input Signal
	LE19.Gate In4-I	1118	1	3	Bit	0x80 (8)	-	State of the module input: Assignment of the Input Signal

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Module	Subgroup Names Functions	Start Register Address	No. of Modbus Registers	Function Code	Format	Bit Mask / (Bit Position)	Unit	Description
	LE19.Reset Latch-I	1118	1	3	Bit	0x100 (9)	-	State of the module input: Reset Signal for the Latching
Logics		1119	1	3	Struct			
	LE20.Gate Out	1119	1	3	Bit	0x1 (1)	-	Signal: Output of the logic gate
	LE20.Timer Out	1119	1	3	Bit	0x2 (2)	-	Signal: Timer Output
	LE20.Out	1119	1	3	Bit	0x4 (3)	-	Signal: Latched Output (Q)
	LE20.Out inverted	1119	1	3	Bit	0x8 (4)	-	Signal: Negated Latched Output (Q NOT)
	LE20.Gate In1-I	1119	1	3	Bit	0x10 (5)	-	State of the module input: Assignment of the Input Signal
	LE20.Gate In2-I	1119	1	3	Bit	0x20 (6)	-	State of the module input: Assignment of the Input Signal
	LE20.Gate In3-I	1119	1	3	Bit	0x40 (7)	-	State of the module input: Assignment of the Input Signal
	LE20.Gate In4-I	1119	1	3	Bit	0x80 (8)	-	State of the module input: Assignment of the Input Signal
	LE20.Reset Latch-I	1119	1	3	Bit	0x100 (9)	-	State of the module input: Reset Signal for the Latching
Modbus		1005	1	3	Struct			

Module	Subgroup Names Functions	Start Register Address	No. of Modbus Registers	Function Code	Format	Bit Mask / (Bit Position)	Unit	Description
	Scada Cmd 1	1005	1	3	Bit	0x1 (1)	-	Scada Command
	Scada Cmd 2	1005	1	3	Bit	0x2 (2)	-	Scada Command
	Scada Cmd 3	1005	1	3	Bit	0x4 (3)	-	Scada Command
	Scada Cmd 4	1005	1	3	Bit	0x8 (4)	-	Scada Command
	Scada Cmd 5	1005	1	3	Bit	0x10 (5)	-	Scada Command
	Scada Cmd 6	1005	1	3	Bit	0x20 (6)	-	Scada Command
	Scada Cmd 7	1005	1	3	Bit	0x40 (7)	-	Scada Command
	Scada Cmd 8	1005	1	3	Bit	0x80 (8)	-	Scada Command
	Scada Cmd 9	1005	1	3	Bit	0x100 (9)	-	Scada Command
	Scada Cmd 10	1005	1	3	Bit	0x200 (10)	-	Scada Command
	Scada Cmd 11	1005	1	3	Bit	0x400 (11)	-	Scada Command

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Module	Subgroup Names Functions	Start Register Address	No. of Modbus Registers	Function Code	Format	Bit Mask / (Bit Position)	Unit	Description
	Scada Cmd 12	1005	1	3	Bit	0x800 (12)	-	Scada Command
	Scada Cmd 13	1005	1	3	Bit	0x1000 (13)	-	Scada Command
	Scada Cmd 14	1005	1	3	Bit	0x2000 (14)	-	Scada Command
	Scada Cmd 15	1005	1	3	Bit	0x4000 (15)	-	Scada Command
	Scada Cmd 16	1005	1	3	Bit	0x8000 (16)	-	Scada Command
Modbus		1006	1	3	Struct			
	Transmission	1006	1	3	Bit	0x1 (1)	-	Signal: SCADA active
PSet-Switch		59	1	3	Struct			
	PS 1	59	1	3	Bit	0x1 (1)	-	Signal: Parameter Set 1
	PS 2	59	1	3	Bit	0x2 (2)	-	Signal: Parameter Set 2
	PS 3	59	1	3	Bit	0x4 (3)	-	Signal: Parameter Set 3
	PS 4	59	1	3	Bit	0x8 (4)	-	Signal: Parameter Set 4

Module	Subgroup Names Functions	Start Register Address	No. of Modbus Registers	Function Code	Format	Bit Mask / (Bit Position)	Unit	Description
	PSS manual	59	1	3	Bit	0x10 (5)	-	Signal: Manual Switch over of a Parameter Set
	PSS via Scada	59	1	3	Bit	0x20 (6)	-	Signal: Parameter Set Switch via Scada
	PSS via Inp fct	59	1	3	Bit	0x40 (7)	-	Signal: Parameter Set Switch via input function
	PS1-I	59	1	3	Bit	0x80 (8)	-	State of the module input respectively of the signal, that should activate this Parameter Setting Group.
	PS2-I	59	1	3	Bit	0x100 (9)	-	State of the module input respectively of the signal, that should activate this Parameter Setting Group.
	PS3-I	59	1	3	Bit	0x200 (10)	-	State of the module input respectively of the signal, that should activate this Parameter Setting Group.
	PS4-I	59	1	3	Bit	0x400 (11)	-	State of the module input respectively of the signal, that should activate this Parameter Setting Group.
	min 1 param changed (*)	59	1	3	Bit	0x800 (12)	-	Signal: At least one parameter has been changed
Prot		1	1	3	Struct			
	ExBlo1-I	1	1	3	Bit	0x1 (1)	-	Module input state: External blocking1
	ExBlo2-I	1	1	3	Bit	0x2 (2)	-	Module input state: External blocking2

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Module	Subgroup Names Functions	Start Register Address	No. of Modbus Registers	Function Code	Format	Bit Mask / (Bit Position)	Unit	Description
	active	1	1	3	Bit	0x4 (3)	-	Signal: active
	ExBlo	1	1	3	Bit	0x8 (4)	-	Signal: External Blocking
	Alarm L1	1	1	3	Bit	0x10 (5)	-	Signal: General-Alarm L1
	Alarm L2	1	1	3	Bit	0x20 (6)	-	Signal: General-Alarm L2
	Alarm L3	1	1	3	Bit	0x40 (7)	-	Signal: General-Alarm L3
	Alarm G	1	1	3	Bit	0x80 (8)	-	Signal: General-Alarm - Earth fault
	Alarm	1	1	3	Bit	0x100 (9)	-	Signal: General Alarm
	Trip L1 (*)	1	1	3	Bit	0x200 (10)	-	Signal: General Trip L1
	Trip L2 (*)	1	1	3	Bit	0x400 (11)	-	Signal: General Trip L2
	Trip L3 (*)	1	1	3	Bit	0x800 (12)	-	Signal: General Trip L3
	Trip G (*)	1	1	3	Bit	0x1000 (13)	-	Signal: General Trip Ground fault

Module	Subgroup Names Functions	Start Register Address	No. of Modbus Registers	Function Code	Format	Bit Mask / (Bit Position)	Unit	Description
	Trip (*)	1	1	3	Bit	0x2000 (14)	-	Signal: General Trip
Prot		2	1	3	Struct			
	Blo TripCmd	2	1	3	Bit	0x1 (1)	-	Signal: Trip Command blocked
	ExBlo TripCmd-I	2	1	3	Bit	0x2 (2)	-	Module input state: External Blocking of the Trip Command
	ExBlo TripCmd	2	1	3	Bit	0x4 (3)	-	Signal: External Blocking of the Trip Command
Prot		57	1	3	Struct			
	FaultNo	57	1	3	Bit	0xffff (1)	-	Disturbance No
Prot		58	1	3	Struct			
	No of grid faults	58	1	3	Bit	0xffff (1)	-	Number of grid faults: A grid fault, e.g. a short circuit, might cause several faults with trip and autoreclosing, each fault being identified by an increased fault number. In this case, the grid fault number remains the same.
SG[1]		177	1	3	Struct			
	Aux OFF-I	177	1	3	Bit	0x1 (1)	-	Module input state: Position indicator/check-back signal of the CB (52b)
	Aux ON-I	177	1	3	Bit	0x2 (2)	-	Module Input State: Position indicator/check-back signal of the CB (52a)

Appendix - Data Point Lists

Module	Subgroup Names Functions	Start Register Address	No. of Modbus Registers	Function Code	Format	Bit Mask / (Bit Position)	Unit	Description
	Ready-I	177	1	3	Bit	0x4 (3)	-	Module input state: CB ready
	Sys-in-Sync-I	177	1	3	Bit	0x8 (4)	-	State of the module input: This signals has to become true within the synchronization time. If not, switching is unsuccessful.
	Interl OFF1-I	177	1	3	Bit	0x10 (5)	-	State of the module input: Interlocking of the OFF command
	Interl OFF2-I	177	1	3	Bit	0x20 (6)	-	State of the module input: Interlocking of the OFF command
	Interl OFF3-I	177	1	3	Bit	0x40 (7)	-	State of the module input: Interlocking of the OFF command
	Interl ON1-I	177	1	3	Bit	0x80 (8)	-	State of the module input: Interlocking of the ON command
	Interl ON2-I	177	1	3	Bit	0x100 (9)	-	State of the module input: Interlocking of the ON command
	Interl ON3-I	177	1	3	Bit	0x200 (10)	-	State of the module input: Interlocking of the ON command
	SCmd OFF-I	177	1	3	Bit	0x800 (12)	-	State of the module input: Switching OFF Command, e.g. the state of the Logics or the state of the digital input
	SCmd ON-I	177	1	3	Bit	0x1000 (13)	-	State of the module input: Switching ON Command, e.g. the state of the Logics or the state of the digital input

Module	Subgroup Names Functions	Start Register Address	No. of Modbus Registers	Function Code	Format	Bit Mask / (Bit Position)	Unit	Description
	TripCmd (*)	177	1	3	Bit	0x2000 (14)	-	Signal: Trip Command
	OFF Cmd	177	1	3	Bit	0x4000 (15)	-	Signal: OFF Command issued to the switchgear. Depending on the setting the signal may include the OFF command of the Prot module.
	OFF Cmd manual	177	1	3	Bit	0x8000 (16)	-	Signal: OFF Cmd manual
SG[1]		178	1	3	Struct			
	ON Cmd	178	1	3	Bit	0x1 (1)	-	Signal: ON Command issued to the switchgear. Depending on the setting the signal may include the ON command of the Prot module.
	ON Cmd manual	178	1	3	Bit	0x2 (2)	-	Signal: ON Cmd manual
	Sync ON request	178	1	3	Bit	0x4 (3)	-	Signal: Synchronous ON request
	SGwear Slow SG	178	1	3	Bit	0x8 (4)	-	Signal: Alarm, the circuit breaker (load-break switch) becomes slower
	Res SGwear SI SG	178	1	3	Bit	0x10 (5)	-	Signal: Resetting the slow Switchgear Alarm
	CES Disturbed	178	1	3	Bit	0x40 (7)	-	Signal: Command Execution Supervision: Switching Command unsuccessful. Switchgear in disturbed position.

Appendix - Data Point Lists

Module	Subgroup Names Functions	Start Register Address	No. of Modbus Registers	Function Code	Format	Bit Mask / (Bit Position)	Unit	Description
	CES Fiel Interl	178	1	3	Bit	0x80 (8)	-	Signal: Command Execution Supervision: Switching Command not executed because of field interlocking.
	CES ON d OFF	178	1	3	Bit	0x400 (11)	-	Signal: Command Execution Supervision: On Command during a pending OFF Command.
	CES SwitchDir	178	1	3	Bit	0x800 (12)	-	Signal: Command Execution Supervision respectively Switching Direction Control: This signal becomes true, if a switch command is issued even though the switchgear is already in the requested position. Example: A switchgear that is already OFF should be switched OFF again (doubly). The same applies to CLOSE commands.
	CES SG not ready	178	1	3	Bit	0x1000 (13)	-	Signal: Command Execution Supervision: Switchgear not ready
	CES SyncTimeout	178	1	3	Bit	0x2000 (14)	-	Signal: Command Execution Supervision: Switching Command not executed. No Synchronization signal while t-sync was running.
	CES succesf	178	1	3	Bit	0x4000 (15)	-	Signal: Command Execution Supervision: Switching command executed successfully.
	Prot ON	178	1	3	Bit	0x8000 (16)	-	Signal: ON Command issued by the Prot module
SG[1]		179	1	3	Struct			

Module	Subgroup Names Functions	Start Register Address	No. of Modbus Registers	Function Code	Format	Bit Mask / (Bit Position)	Unit	Description
	Pos Disturb	179	1	3	Bit	0x1 (1)	-	Signal: Circuit Breaker Disturbed - Undefined Breaker Position. The Position Indicators contradict themselves. After expiring of a supervision timer this signal becomes true.
	t-Dwell	179	1	3	Bit	0x2 (2)	-	Signal: Dwell time
	Pos Indeterm	179	1	3	Bit	0x4 (3)	-	Signal: Circuit Breaker is in Indeterminate Position
	Pos OFF	179	1	3	Bit	0x8 (4)	-	Signal: Circuit Breaker is in OFF-Position
	Pos ON	179	1	3	Bit	0x10 (5)	-	Signal: Circuit Breaker is in ON-Position
	Ready	179	1	3	Bit	0x20 (6)	-	Signal: Circuit breaker is ready for operation.
	Pos not ON	179	1	3	Bit	0x40 (7)	-	Signal: Pos not ON
	SI SingleContactInd	179	1	3	Bit	0x80 (8)	-	Signal: The Position of the Switchgear is detected by one auxiliary contact (pole) only. Thus indeterminate and disturbed Positions cannot be detected.
	Position Ind manipul	179	1	3	Bit	0x100 (9)	-	Signal: Position Indicators faked

Appendix - Data Point Lists

Module	Subgroup Names Functions	Start Register Address	No. of Modbus Registers	Function Code	Format	Bit Mask / (Bit Position)	Unit	Description
	OFF incl TripCmd	179	1	3	Bit	0x200 (10)	-	Signal: The OFF Command includes the OFF Command issued by the Protection module.
	ON incl Prot ON	179	1	3	Bit	0x400 (11)	-	Signal: The ON Command includes the ON Command issued by the Protection module.
	CES Fail TripCmd	179	1	3	Bit	0x800 (12)	-	Signal: Command Execution Supervision: Command execution failed because trip command is pending.
	Interl OFF	179	1	3	Bit	0x1000 (13)	-	Signal: One or more IL_Off inputs are active.
	Interl ON	179	1	3	Bit	0x2000 (14)	-	Signal: One or more IL_On inputs are active.
SG[1]		195	1	3	Struct			
	Operations Alarm	195	1	3	Bit	0x100 (9)	-	Signal: Service Alarm, too many Operations
SG[1]		256	1	3	Struct			
	Removed-l	256	1	3	Bit	0x1 (1)	-	State of the module input: The withdrawable circuit breaker is Removed
	CES SG removed	256	1	3	Bit	0x2 (2)	-	Signal: Command Execution Supervision: Switching Command unsuccessful, Switchgear removed.
	Removed	256	1	3	Bit	0x4 (3)	-	Signal: The withdrawable circuit breaker is Removed
Sgen		1012	1	3	Struct			

Module	Subgroup Names Functions	Start Register Address	No. of Modbus Registers	Function Code	Format	Bit Mask / (Bit Position)	Unit	Description
	ExBlo	1012	1	3	Bit	0x1 (1)	-	Module input state: External blocking
	Ex ForcePost-I	1012	1	3	Bit	0x2 (2)	-	State of the module input:Force Post state. Abort simulation.
	Running	1012	1	3	Bit	0x10 (5)	-	Signal; Measuring value simulation is running
	State	1012	1	3	Bit	0xe0 (6)	-	Signal: Wave generation states: 0=Off, 1=PreFault, 2=Fault, 3=PostFault, 4=InitReset
	Ex Start Simulation-I	1012	1	3	Bit	0x100 (9)	-	State of the module input:External Start of Fault Simulation (Using the test parameters)
Sync		175	1	3	Struct			
	active	175	1	3	Bit	0x1 (1)	-	Signal: active
	ExBlo1-I	175	1	3	Bit	0x2 (2)	-	Module input state: External blocking1
	ExBlo2-I	175	1	3	Bit	0x4 (3)	-	Module input state: External blocking2
	ExBlo	175	1	3	Bit	0x8 (4)	-	Signal: External Blocking
	Bypass-I	175	1	3	Bit	0x10 (5)	-	State of the module input: Bypass

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Module	Subgroup Names Functions	Start Register Address	No. of Modbus Registers	Function Code	Format	Bit Mask / (Bit Position)	Unit	Description
	CBCloseInitiate-I	175	1	3	Bit	0x20 (6)	-	State of the module input: Breaker Close Initiate with synchronism check from any control sources (e.g. HMI / SCADA). If the state of the assigned signal becomes true, a Breaker Close will be initiated (Trigger Source).
	AngleDiffTooHigh	175	1	3	Bit	0x40 (7)	-	Signal: Phase Angle difference between bus and line voltages too high.
	Sys-in-Sync	175	1	3	Bit	0x80 (8)	-	Signal: Bus and line voltages are in synchronism according to the system synchronism criteria.
	LiveBus	175	1	3	Bit	0x100 (9)	-	Signal: Live-Bus flag: 1=Live-Bus, 0=Voltage is below the LiveBus threshold
	LiveLine	175	1	3	Bit	0x200 (10)	-	Signal: Live Line flag: 1=Live-Line, 0=Voltage is below the LiveLine threshold
	SlipTooHigh	175	1	3	Bit	0x400 (11)	-	Signal: Frequency difference (slip frequency) between bus and line voltages too high.
	SyncOverridden	175	1	3	Bit	0x800 (12)	-	Signal:Synchronism Check is overridden because one of the Synchronism overriding conditions (DB/DL or ExtBypass) is met.
	Ready to Close	175	1	3	Bit	0x1000 (13)	-	Signal: Ready to Close

Module	Subgroup Names Functions	Start Register Address	No. of Modbus Registers	Function Code	Format	Bit Mask / (Bit Position)	Unit	Description
	SynchronFailed	175	1	3	Bit	0x2000 (14)	-	Signal: This signal indicates a failed synchronization. It is set for 5s when the circuit breaker is still open after the Synchron-Run-timer has timed out.
	SynchronRunTiming	175	1	3	Bit	0x4000 (15)	-	Signal: SynchronRunTiming
	VDiffTooHigh	175	1	3	Bit	0x8000 (16)	-	Signal: Voltage difference between bus and line too high.
Sys		154	1	3	Struct			
	Lock Settings-I	154	1	3	Bit	0x40 (7)	-	State of the module input: No parameters can be changed as long as this input is true. The parameter settings are locked.
	SNTP active	154	1	3	Bit	0x80 (8)	-	Signal: If there is no valid SNTP signal for 120 sec, SNTP is regarded as inactive.
	Setting Lock Bypass	154	1	3	Bit	0x100 (9)	-	Signal: Short-period unlock of the Setting Lock
SysA		173	1	3	Struct			
	ExBlo-I	173	1	3	Bit	0x1 (1)	-	Module input state: External blocking
	ExBlo	173	1	3	Bit	0x2 (2)	-	Signal: External Blocking
	active	173	1	3	Bit	0x8 (4)	-	Signal: active

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Module	Subgroup Names Functions	Start Register Address	No. of Modbus Registers	Function Code	Format	Bit Mask / (Bit Position)	Unit	Description
	Alarm V THD	173	1	3	Bit	0x200 (10)	-	Signal: Alarm Total Harmonic Distortion Voltage
SysA		174	1	3	Struct			
	Trip V THD (*)	174	1	3	Bit	0x4 (3)	-	Signal: Trip Total Harmonic Distortion Voltage
TCS		150	1	3	Struct			
	ExBlo1-I	150	1	3	Bit	0x1 (1)	-	Module input state: External blocking1
	ExBlo2-I	150	1	3	Bit	0x2 (2)	-	Module input state: External blocking2
	active	150	1	3	Bit	0x4 (3)	-	Signal: active
	ExBlo	150	1	3	Bit	0x8 (4)	-	Signal: External Blocking
	Alarm	150	1	3	Bit	0x10 (5)	-	Signal: Alarm Trip Circuit Supervision
	Not Possible	150	1	3	Bit	0x20 (6)	-	Not possible because no state indicator assigned to the breaker.
	CB Pos Detect-I	150	1	3	Bit	0xc0 (7)	-	Module input state: Criterion by which the Circuit Breaker Switch Position is to be detected.
	Aux ON-I	150	1	3	Bit	0x100 (9)	-	Module Input State: Position indicator/check-back signal of the CB (52a)

Module	Subgroup Names Functions	Start Register Address	No. of Modbus Registers	Function Code	Format	Bit Mask / (Bit Position)	Unit	Description
	Aux OFF-I	150	1	3	Bit	0x200 (10)	-	Module input state: Position indicator/check-back signal of the CB (52b)
V012[1]		100	1	3	Struct			
	ExBlo1-I	100	1	3	Bit	0x1 (1)	-	Module input state: External blocking1
	ExBlo2-I	100	1	3	Bit	0x2 (2)	-	Module input state: External blocking2
	ExBlo TripCmd-I	100	1	3	Bit	0x4 (3)	-	Module input state: External Blocking of the Trip Command
	active	100	1	3	Bit	0x8 (4)	-	Signal: active
	ExBlo	100	1	3	Bit	0x10 (5)	-	Signal: External Blocking
	Blo TripCmd	100	1	3	Bit	0x20 (6)	-	Signal: Trip Command blocked
	ExBlo TripCmd	100	1	3	Bit	0x40 (7)	-	Signal: External Blocking of the Trip Command
	Alarm	100	1	3	Bit	0x80 (8)	-	Signal: Alarm voltage asymmetry
	Trip (*)	100	1	3	Bit	0x100 (9)	-	Signal: Trip
	TripCmd (*)	100	1	3	Bit	0x200 (10)	-	Signal: Trip Command

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Module	Subgroup Names Functions	Start Register Address	No. of Modbus Registers	Function Code	Format	Bit Mask / (Bit Position)	Unit	Description
V012[2]		101	1	3	Struct			
	ExBlo1-I	101	1	3	Bit	0x1 (1)	-	Module input state: External blocking1
	ExBlo2-I	101	1	3	Bit	0x2 (2)	-	Module input state: External blocking2
	ExBlo TripCmd-I	101	1	3	Bit	0x4 (3)	-	Module input state: External Blocking of the Trip Command
	active	101	1	3	Bit	0x8 (4)	-	Signal: active
	ExBlo	101	1	3	Bit	0x10 (5)	-	Signal: External Blocking
	Blo TripCmd	101	1	3	Bit	0x20 (6)	-	Signal: Trip Command blocked
	ExBlo TripCmd	101	1	3	Bit	0x40 (7)	-	Signal: External Blocking of the Trip Command
	Alarm	101	1	3	Bit	0x80 (8)	-	Signal: Alarm voltage asymmetry
	Trip (*)	101	1	3	Bit	0x100 (9)	-	Signal: Trip
	TripCmd (*)	101	1	3	Bit	0x200 (10)	-	Signal: Trip Command
V012[3]		102	1	3	Struct			

Module	Subgroup Names Functions	Start Register Address	No. of Modbus Registers	Function Code	Format	Bit Mask / (Bit Position)	Unit	Description
	ExBlo1-l	102	1	3	Bit	0x1 (1)	-	Module input state: External blocking1
	ExBlo2-l	102	1	3	Bit	0x2 (2)	-	Module input state: External blocking2
	ExBlo TripCmd-l	102	1	3	Bit	0x4 (3)	-	Module input state: External Blocking of the Trip Command
	active	102	1	3	Bit	0x8 (4)	-	Signal: active
	ExBlo	102	1	3	Bit	0x10 (5)	-	Signal: External Blocking
	Blo TripCmd	102	1	3	Bit	0x20 (6)	-	Signal: Trip Command blocked
	ExBlo TripCmd	102	1	3	Bit	0x40 (7)	-	Signal: External Blocking of the Trip Command
	Alarm	102	1	3	Bit	0x80 (8)	-	Signal: Alarm voltage asymmetry
	Trip (*)	102	1	3	Bit	0x100 (9)	-	Signal: Trip
	TripCmd (*)	102	1	3	Bit	0x200 (10)	-	Signal: Trip Command
V012[4]		103	1	3	Struct			
	ExBlo1-l	103	1	3	Bit	0x1 (1)	-	Module input state: External blocking1

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Module	Subgroup Names Functions	Start Register Address	No. of Modbus Registers	Function Code	Format	Bit Mask / (Bit Position)	Unit	Description
	ExBlo2-I	103	1	3	Bit	0x2 (2)	-	Module input state: External blocking2
	ExBlo TripCmd-I	103	1	3	Bit	0x4 (3)	-	Module input state: External Blocking of the Trip Command
	active	103	1	3	Bit	0x8 (4)	-	Signal: active
	ExBlo	103	1	3	Bit	0x10 (5)	-	Signal: External Blocking
	Blo TripCmd	103	1	3	Bit	0x20 (6)	-	Signal: Trip Command blocked
	ExBlo TripCmd	103	1	3	Bit	0x40 (7)	-	Signal: External Blocking of the Trip Command
	Alarm	103	1	3	Bit	0x80 (8)	-	Signal: Alarm voltage asymmetry
	Trip (*)	103	1	3	Bit	0x100 (9)	-	Signal: Trip
	TripCmd (*)	103	1	3	Bit	0x200 (10)	-	Signal: Trip Command
V012[5]		104	1	3	Struct			
	ExBlo1-I	104	1	3	Bit	0x1 (1)	-	Module input state: External blocking1
	ExBlo2-I	104	1	3	Bit	0x2 (2)	-	Module input state: External blocking2

Module	Subgroup Names Functions	Start Register Address	No. of Modbus Registers	Function Code	Format	Bit Mask / (Bit Position)	Unit	Description
	ExBlo TripCmd-I	104	1	3	Bit	0x4 (3)	-	Module input state: External Blocking of the Trip Command
	active	104	1	3	Bit	0x8 (4)	-	Signal: active
	ExBlo	104	1	3	Bit	0x10 (5)	-	Signal: External Blocking
	Blo TripCmd	104	1	3	Bit	0x20 (6)	-	Signal: Trip Command blocked
	ExBlo TripCmd	104	1	3	Bit	0x40 (7)	-	Signal: External Blocking of the Trip Command
	Alarm	104	1	3	Bit	0x80 (8)	-	Signal: Alarm voltage asymmetry
	Trip (*)	104	1	3	Bit	0x100 (9)	-	Signal: Trip
	TripCmd (*)	104	1	3	Bit	0x200 (10)	-	Signal: Trip Command
V012[6]		105	1	3	Struct			
	ExBlo1-I	105	1	3	Bit	0x1 (1)	-	Module input state: External blocking1
	ExBlo2-I	105	1	3	Bit	0x2 (2)	-	Module input state: External blocking2
	ExBlo TripCmd-I	105	1	3	Bit	0x4 (3)	-	Module input state: External Blocking of the Trip Command

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Module	Subgroup Names Functions	Start Register Address	No. of Modbus Registers	Function Code	Format	Bit Mask / (Bit Position)	Unit	Description
	active	105	1	3	Bit	0x8 (4)	-	Signal: active
	ExBlo	105	1	3	Bit	0x10 (5)	-	Signal: External Blocking
	Blo TripCmd	105	1	3	Bit	0x20 (6)	-	Signal: Trip Command blocked
	ExBlo TripCmd	105	1	3	Bit	0x40 (7)	-	Signal: External Blocking of the Trip Command
	Alarm	105	1	3	Bit	0x80 (8)	-	Signal: Alarm voltage asymmetry
	Trip (*)	105	1	3	Bit	0x100 (9)	-	Signal: Trip
	TripCmd (*)	105	1	3	Bit	0x200 (10)	-	Signal: Trip Command
VG[1]		32	1	3	Struct			
	ExBlo1-I	32	1	3	Bit	0x1 (1)	-	Module input state: External blocking1
	ExBlo2-I	32	1	3	Bit	0x2 (2)	-	Module input state: External blocking2
	ExBlo TripCmd-I	32	1	3	Bit	0x4 (3)	-	Module input state: External Blocking of the Trip Command
	active	32	1	3	Bit	0x8 (4)	-	Signal: active

Module	Subgroup Names Functions	Start Register Address	No. of Modbus Registers	Function Code	Format	Bit Mask / (Bit Position)	Unit	Description
	ExBlo	32	1	3	Bit	0x10 (5)	-	Signal: External Blocking
	Blo TripCmd	32	1	3	Bit	0x20 (6)	-	Signal: Trip Command blocked
	ExBlo TripCmd	32	1	3	Bit	0x40 (7)	-	Signal: External Blocking of the Trip Command
	Alarm	32	1	3	Bit	0x80 (8)	-	Signal: Alarm Residual Voltage Supervision-stage
	Trip (*)	32	1	3	Bit	0x100 (9)	-	Signal: Trip
	TripCmd (*)	32	1	3	Bit	0x200 (10)	-	Signal: Trip Command
VG[2]		33	1	3	Struct			
	ExBlo1-I	33	1	3	Bit	0x1 (1)	-	Module input state: External blocking1
	ExBlo2-I	33	1	3	Bit	0x2 (2)	-	Module input state: External blocking2
	ExBlo TripCmd-I	33	1	3	Bit	0x4 (3)	-	Module input state: External Blocking of the Trip Command
	active	33	1	3	Bit	0x8 (4)	-	Signal: active
	ExBlo	33	1	3	Bit	0x10 (5)	-	Signal: External Blocking

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Module	Subgroup Names Functions	Start Register Address	No. of Modbus Registers	Function Code	Format	Bit Mask / (Bit Position)	Unit	Description
	Blo TripCmd	33	1	3	Bit	0x20 (6)	-	Signal: Trip Command blocked
	ExBlo TripCmd	33	1	3	Bit	0x40 (7)	-	Signal: External Blocking of the Trip Command
	Alarm	33	1	3	Bit	0x80 (8)	-	Signal: Alarm Residual Voltage Supervision-stage
	Trip (*)	33	1	3	Bit	0x100 (9)	-	Signal: Trip
	TripCmd (*)	33	1	3	Bit	0x200 (10)	-	Signal: Trip Command
VTS		56	1	3	Struct			
	Ex Fuse Fail VT-I	56	1	3	Bit	0x1 (1)	-	Module input state: External fuse failure voltage transformers
	Ex Fuse Fail EVT-I	56	1	3	Bit	0x2 (2)	-	Module input state: External fuse failure earth voltage transformer
	ExBlo1-I	56	1	3	Bit	0x4 (3)	-	Module input state: External blocking1
	ExBlo2-I	56	1	3	Bit	0x8 (4)	-	Module input state: External blocking2
	active	56	1	3	Bit	0x10 (5)	-	Signal: active
	ExBlo	56	1	3	Bit	0x20 (6)	-	Signal: External Blocking

Module	Subgroup Names Functions	Start Register Address	No. of Modbus Registers	Function Code	Format	Bit Mask / (Bit Position)	Unit	Description
	Alarm ΔV	56	1	3	Bit	0x40 (7)	-	Signal: Alarm ΔV Voltage Transformer Measuring Circuit Supervision
	Alarm	56	1	3	Bit	0x80 (8)	-	Signal: Alarm Voltage Transformer Measuring Circuit Supervision
	Ex FF VT	56	1	3	Bit	0x100 (9)	-	Signal: Ex FF VT
	Ex FF EVT	56	1	3	Bit	0x200 (10)	-	Signal: Alarm Fuse Failure Earth Voltage Transformers
V[1]		24	1	3	Struct			
	ExBlo1-I	24	1	3	Bit	0x1 (1)	-	Module input state: External blocking1
	ExBlo2-I	24	1	3	Bit	0x2 (2)	-	Module input state: External blocking2
	ExBlo TripCmd-I	24	1	3	Bit	0x4 (3)	-	Module input state: External Blocking of the Trip Command
	active	24	1	3	Bit	0x8 (4)	-	Signal: active
	ExBlo	24	1	3	Bit	0x10 (5)	-	Signal: External Blocking
	Blo TripCmd	24	1	3	Bit	0x20 (6)	-	Signal: Trip Command blocked
	ExBlo TripCmd	24	1	3	Bit	0x40 (7)	-	Signal: External Blocking of the Trip Command

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Module	Subgroup Names Functions	Start Register Address	No. of Modbus Registers	Function Code	Format	Bit Mask / (Bit Position)	Unit	Description
V[1]		25	1	3	Struct			
	Alarm L1	25	1	3	Bit	0x1 (1)	-	Signal: Alarm L1
	Alarm L2	25	1	3	Bit	0x2 (2)	-	Signal: Alarm L2
	Alarm L3	25	1	3	Bit	0x4 (3)	-	Signal: Alarm L3
	Alarm	25	1	3	Bit	0x8 (4)	-	Signal: Alarm voltage stage
	Trip L1 (*)	25	1	3	Bit	0x10 (5)	-	Signal: General Trip Phase L1
	Trip L2 (*)	25	1	3	Bit	0x20 (6)	-	Signal: General Trip Phase L2
	Trip L3 (*)	25	1	3	Bit	0x40 (7)	-	Signal: General Trip Phase L3
	Trip (*)	25	1	3	Bit	0x80 (8)	-	Signal: Trip
	TripCmd (*)	25	1	3	Bit	0x100 (9)	-	Signal: Trip Command
V[2]		26	1	3	Struct			
	ExBlo1-I	26	1	3	Bit	0x1 (1)	-	Module input state: External blocking1

Module	Subgroup Names Functions	Start Register Address	No. of Modbus Registers	Function Code	Format	Bit Mask / (Bit Position)	Unit	Description
	ExBlo2-I	26	1	3	Bit	0x2 (2)	-	Module input state: External blocking2
	ExBlo TripCmd-I	26	1	3	Bit	0x4 (3)	-	Module input state: External Blocking of the Trip Command
	active	26	1	3	Bit	0x8 (4)	-	Signal: active
	ExBlo	26	1	3	Bit	0x10 (5)	-	Signal: External Blocking
	Blo TripCmd	26	1	3	Bit	0x20 (6)	-	Signal: Trip Command blocked
	ExBlo TripCmd	26	1	3	Bit	0x40 (7)	-	Signal: External Blocking of the Trip Command
V[2]		27	1	3	Struct			
	Alarm L1	27	1	3	Bit	0x1 (1)	-	Signal: Alarm L1
	Alarm L2	27	1	3	Bit	0x2 (2)	-	Signal: Alarm L2
	Alarm L3	27	1	3	Bit	0x4 (3)	-	Signal: Alarm L3
	Alarm	27	1	3	Bit	0x8 (4)	-	Signal: Alarm voltage stage
	Trip L1 (*)	27	1	3	Bit	0x10 (5)	-	Signal: General Trip Phase L1

Appendix - Data Point Lists

Module	Subgroup Names Functions	Start Register Address	No. of Modbus Registers	Function Code	Format	Bit Mask / (Bit Position)	Unit	Description
	Trip L2 (*)	27	1	3	Bit	0x20 (6)	-	Signal: General Trip Phase L2
	Trip L3 (*)	27	1	3	Bit	0x40 (7)	-	Signal: General Trip Phase L3
	Trip (*)	27	1	3	Bit	0x80 (8)	-	Signal: Trip
	TripCmd (*)	27	1	3	Bit	0x100 (9)	-	Signal: Trip Command
V[3]		28	1	3	Struct			
	ExBlo1-I	28	1	3	Bit	0x1 (1)	-	Module input state: External blocking1
	ExBlo2-I	28	1	3	Bit	0x2 (2)	-	Module input state: External blocking2
	ExBlo TripCmd-I	28	1	3	Bit	0x4 (3)	-	Module input state: External Blocking of the Trip Command
	active	28	1	3	Bit	0x8 (4)	-	Signal: active
	ExBlo	28	1	3	Bit	0x10 (5)	-	Signal: External Blocking
	Blo TripCmd	28	1	3	Bit	0x20 (6)	-	Signal: Trip Command blocked
	ExBlo TripCmd	28	1	3	Bit	0x40 (7)	-	Signal: External Blocking of the Trip Command

Appendix - Data Point Lists

Module	Subgroup Names Functions	Start Register Address	No. of Modbus Registers	Function Code	Format	Bit Mask / (Bit Position)	Unit	Description
V[3]		29	1	3	Struct			
	Alarm L1	29	1	3	Bit	0x1 (1)	-	Signal: Alarm L1
	Alarm L2	29	1	3	Bit	0x2 (2)	-	Signal: Alarm L2
	Alarm L3	29	1	3	Bit	0x4 (3)	-	Signal: Alarm L3
	Alarm	29	1	3	Bit	0x8 (4)	-	Signal: Alarm voltage stage
	Trip L1 (*)	29	1	3	Bit	0x10 (5)	-	Signal: General Trip Phase L1
	Trip L2 (*)	29	1	3	Bit	0x20 (6)	-	Signal: General Trip Phase L2
	Trip L3 (*)	29	1	3	Bit	0x40 (7)	-	Signal: General Trip Phase L3
	Trip (*)	29	1	3	Bit	0x80 (8)	-	Signal: Trip
	TripCmd (*)	29	1	3	Bit	0x100 (9)	-	Signal: Trip Command
V[4]		30	1	3	Struct			
	ExBlo1-I	30	1	3	Bit	0x1 (1)	-	Module input state: External blocking1

Appendix - Data Point Lists

Module	Subgroup Names Functions	Start Register Address	No. of Modbus Registers	Function Code	Format	Bit Mask / (Bit Position)	Unit	Description
	ExBlo2-I	30	1	3	Bit	0x2 (2)	-	Module input state: External blocking2
	ExBlo TripCmd-I	30	1	3	Bit	0x4 (3)	-	Module input state: External Blocking of the Trip Command
	active	30	1	3	Bit	0x8 (4)	-	Signal: active
	ExBlo	30	1	3	Bit	0x10 (5)	-	Signal: External Blocking
	Blo TripCmd	30	1	3	Bit	0x20 (6)	-	Signal: Trip Command blocked
	ExBlo TripCmd	30	1	3	Bit	0x40 (7)	-	Signal: External Blocking of the Trip Command
V[4]		31	1	3	Struct			
	Alarm L1	31	1	3	Bit	0x1 (1)	-	Signal: Alarm L1
	Alarm L2	31	1	3	Bit	0x2 (2)	-	Signal: Alarm L2
	Alarm L3	31	1	3	Bit	0x4 (3)	-	Signal: Alarm L3
	Alarm	31	1	3	Bit	0x8 (4)	-	Signal: Alarm voltage stage
	Trip L1 (*)	31	1	3	Bit	0x10 (5)	-	Signal: General Trip Phase L1

Module	Subgroup Names Functions	Start Register Address	No. of Modbus Registers	Function Code	Format	Bit Mask / (Bit Position)	Unit	Description
	Trip L2 (*)	31	1	3	Bit	0x20 (6)	-	Signal: General Trip Phase L2
	Trip L3 (*)	31	1	3	Bit	0x40 (7)	-	Signal: General Trip Phase L3
	Trip (*)	31	1	3	Bit	0x80 (8)	-	Signal: Trip
	TripCmd (*)	31	1	3	Bit	0x100 (9)	-	Signal: Trip Command
V[5]		92	1	3	Struct			
	ExBlo1-I	92	1	3	Bit	0x1 (1)	-	Module input state: External blocking1
	ExBlo2-I	92	1	3	Bit	0x2 (2)	-	Module input state: External blocking2
	ExBlo TripCmd-I	92	1	3	Bit	0x4 (3)	-	Module input state: External Blocking of the Trip Command
	active	92	1	3	Bit	0x8 (4)	-	Signal: active
	ExBlo	92	1	3	Bit	0x10 (5)	-	Signal: External Blocking
	Blo TripCmd	92	1	3	Bit	0x20 (6)	-	Signal: Trip Command blocked
	ExBlo TripCmd	92	1	3	Bit	0x40 (7)	-	Signal: External Blocking of the Trip Command

Appendix - Data Point Lists

Module	Subgroup Names Functions	Start Register Address	No. of Modbus Registers	Function Code	Format	Bit Mask / (Bit Position)	Unit	Description
	Alarm	92	1	3	Bit	0x80 (8)	-	Signal: Alarm voltage stage
	Alarm L1	92	1	3	Bit	0x100 (9)	-	Signal: Alarm L1
	Alarm L2	92	1	3	Bit	0x200 (10)	-	Signal: Alarm L2
	Alarm L3	92	1	3	Bit	0x400 (11)	-	Signal: Alarm L3
	Trip (*)	92	1	3	Bit	0x800 (12)	-	Signal: Trip
	Trip L1 (*)	92	1	3	Bit	0x1000 (13)	-	Signal: General Trip Phase L1
	Trip L2 (*)	92	1	3	Bit	0x2000 (14)	-	Signal: General Trip Phase L2
	Trip L3 (*)	92	1	3	Bit	0x4000 (15)	-	Signal: General Trip Phase L3
	TripCmd (*)	92	1	3	Bit	0x8000 (16)	-	Signal: Trip Command
V[6]		93	1	3	Struct			
	ExBlo1-I	93	1	3	Bit	0x1 (1)	-	Module input state: External blocking1
	ExBlo2-I	93	1	3	Bit	0x2 (2)	-	Module input state: External blocking2

Module	Subgroup Names Functions	Start Register Address	No. of Modbus Registers	Function Code	Format	Bit Mask / (Bit Position)	Unit	Description
	ExBlo TripCmd-I	93	1	3	Bit	0x4 (3)	-	Module input state: External Blocking of the Trip Command
	active	93	1	3	Bit	0x8 (4)	-	Signal: active
	ExBlo	93	1	3	Bit	0x10 (5)	-	Signal: External Blocking
	Blo TripCmd	93	1	3	Bit	0x20 (6)	-	Signal: Trip Command blocked
	ExBlo TripCmd	93	1	3	Bit	0x40 (7)	-	Signal: External Blocking of the Trip Command
	Alarm	93	1	3	Bit	0x80 (8)	-	Signal: Alarm voltage stage
	Alarm L1	93	1	3	Bit	0x100 (9)	-	Signal: Alarm L1
	Alarm L2	93	1	3	Bit	0x200 (10)	-	Signal: Alarm L2
	Alarm L3	93	1	3	Bit	0x400 (11)	-	Signal: Alarm L3
	Trip (*)	93	1	3	Bit	0x800 (12)	-	Signal: Trip
	Trip L1 (*)	93	1	3	Bit	0x1000 (13)	-	Signal: General Trip Phase L1

Appendix - Data Point Lists

Module	Subgroup Names Functions	Start Register Address	No. of Modbus Registers	Function Code	Format	Bit Mask / (Bit Position)	Unit	Description
	Trip L2 (*)	93	1	3	Bit	0x2000 (14)	-	Signal: General Trip Phase L2
	Trip L3 (*)	93	1	3	Bit	0x4000 (15)	-	Signal: General Trip Phase L3
	TripCmd (*)	93	1	3	Bit	0x8000 (16)	-	Signal: Trip Command
delta phi		249	1	3	Struct			
	ExBlo1-I	249	1	3	Bit	0x1 (1)	-	Module input state: External blocking1
	ExBlo2-I	249	1	3	Bit	0x2 (2)	-	Module input state: External blocking2
	ExBlo TripCmd-I	249	1	3	Bit	0x4 (3)	-	Module input state: External Blocking of the Trip Command
	active	249	1	3	Bit	0x8 (4)	-	Signal: active
	ExBlo	249	1	3	Bit	0x10 (5)	-	Signal: External Blocking
	Blo TripCmd	249	1	3	Bit	0x20 (6)	-	Signal: Trip Command blocked
	ExBlo TripCmd	249	1	3	Bit	0x40 (7)	-	Signal: External Blocking of the Trip Command
	Alarm	249	1	3	Bit	0x80 (8)	-	Signal: Alarm Frequency Protection (collective signal)

Module	Subgroup Names Functions	Start Register Address	No. of Modbus Registers	Function Code	Format	Bit Mask / (Bit Position)	Unit	Description
	Trip (*)	249	1	3	Bit	0x100 (9)	-	Signal: Trip Frequency Protection (collective signal)
	TripCmd (*)	249	1	3	Bit	0x200 (10)	-	Signal: Trip Command
	Blo by V<	249	1	3	Bit	0x400 (11)	-	Signal: Module is blocked by undervoltage.
df/dt		250	1	3	Struct			
	ExBlo1-l	250	1	3	Bit	0x1 (1)	-	Module input state: External blocking1
	ExBlo2-l	250	1	3	Bit	0x2 (2)	-	Module input state: External blocking2
	ExBlo TripCmd-l	250	1	3	Bit	0x4 (3)	-	Module input state: External Blocking of the Trip Command
	active	250	1	3	Bit	0x8 (4)	-	Signal: active
	ExBlo	250	1	3	Bit	0x10 (5)	-	Signal: External Blocking
	Blo TripCmd	250	1	3	Bit	0x20 (6)	-	Signal: Trip Command blocked
	ExBlo TripCmd	250	1	3	Bit	0x40 (7)	-	Signal: External Blocking of the Trip Command
	Alarm	250	1	3	Bit	0x80 (8)	-	Signal: Alarm Frequency Protection (collective signal)

Appendix - Data Point Lists

Module	Subgroup Names Functions	Start Register Address	No. of Modbus Registers	Function Code	Format	Bit Mask / (Bit Position)	Unit	Description
	Trip (*)	250	1	3	Bit	0x100 (9)	-	Signal: Trip Frequency Protection (collective signal)
	TripCmd (*)	250	1	3	Bit	0x200 (10)	-	Signal: Trip Command
	Blo by V<	250	1	3	Bit	0x400 (11)	-	Signal: Module is blocked by undervoltage.
f[1]		34	1	3	Struct			
	ExBlo1-l	34	1	3	Bit	0x1 (1)	-	Module input state: External blocking1
	ExBlo2-l	34	1	3	Bit	0x2 (2)	-	Module input state: External blocking2
	ExBlo TripCmd-l	34	1	3	Bit	0x4 (3)	-	Module input state: External Blocking of the Trip Command
	active	34	1	3	Bit	0x8 (4)	-	Signal: active
	ExBlo	34	1	3	Bit	0x10 (5)	-	Signal: External Blocking
	Blo by V<	34	1	3	Bit	0x20 (6)	-	Signal: Module is blocked by undervoltage.
	Blo TripCmd	34	1	3	Bit	0x40 (7)	-	Signal: Trip Command blocked
	ExBlo TripCmd	34	1	3	Bit	0x80 (8)	-	Signal: External Blocking of the Trip Command

Module	Subgroup Names Functions	Start Register Address	No. of Modbus Registers	Function Code	Format	Bit Mask / (Bit Position)	Unit	Description
f[1]		35	1	3	Struct			
	Alarm f	35	1	3	Bit	0x1 (1)	-	Signal: Alarm Frequency Protection
	Alarm df/dt DF/DT	35	1	3	Bit	0x2 (2)	-	Alarm instantaneous or average value of the rate-of-frequency-change
	Trip f (*)	35	1	3	Bit	0x4 (3)	-	Signal: Frequency has exceeded the limit.
	Trip df/dt DF/DT (*)	35	1	3	Bit	0x8 (4)	-	Signal: Trip df/dt or DF/DT
	Alarm	35	1	3	Bit	0x10 (5)	-	Signal: Alarm Frequency Protection (collective signal)
	Alarm delta phi	35	1	3	Bit	0x20 (6)	-	Signal: Alarm Vector Surge
	Trip (*)	35	1	3	Bit	0x40 (7)	-	Signal: Trip Frequency Protection (collective signal)
	Trip delta phi (*)	35	1	3	Bit	0x80 (8)	-	Signal: Trip Vector Surge
	TripCmd (*)	35	1	3	Bit	0x100 (9)	-	Signal: Trip Command
f[2]		36	1	3	Struct			
	ExBlo1-l	36	1	3	Bit	0x1 (1)	-	Module input state: External blocking1

Appendix - Data Point Lists

Module	Subgroup Names Functions	Start Register Address	No. of Modbus Registers	Function Code	Format	Bit Mask / (Bit Position)	Unit	Description
	ExBlo2-I	36	1	3	Bit	0x2 (2)	-	Module input state: External blocking2
	ExBlo TripCmd-I	36	1	3	Bit	0x4 (3)	-	Module input state: External Blocking of the Trip Command
	active	36	1	3	Bit	0x8 (4)	-	Signal: active
	ExBlo	36	1	3	Bit	0x10 (5)	-	Signal: External Blocking
	Blo by V<	36	1	3	Bit	0x20 (6)	-	Signal: Module is blocked by undervoltage.
	Blo TripCmd	36	1	3	Bit	0x40 (7)	-	Signal: Trip Command blocked
	ExBlo TripCmd	36	1	3	Bit	0x80 (8)	-	Signal: External Blocking of the Trip Command
f[2]		37	1	3	Struct			
	Alarm f	37	1	3	Bit	0x1 (1)	-	Signal: Alarm Frequency Protection
	Alarm df/dt DF/DT	37	1	3	Bit	0x2 (2)	-	Alarm instantaneous or average value of the rate-of-frequency-change
	Trip f (*)	37	1	3	Bit	0x4 (3)	-	Signal: Frequency has exceeded the limit.
	Trip df/dt DF/DT (*)	37	1	3	Bit	0x8 (4)	-	Signal: Trip df/dt or DF/DT

Module	Subgroup Names Functions	Start Register Address	No. of Modbus Registers	Function Code	Format	Bit Mask / (Bit Position)	Unit	Description
	Alarm	37	1	3	Bit	0x10 (5)	-	Signal: Alarm Frequency Protection (collective signal)
	Alarm delta phi	37	1	3	Bit	0x20 (6)	-	Signal: Alarm Vector Surge
	Trip (*)	37	1	3	Bit	0x40 (7)	-	Signal: Trip Frequency Protection (collective signal)
	Trip delta phi (*)	37	1	3	Bit	0x80 (8)	-	Signal: Trip Vector Surge
	TripCmd (*)	37	1	3	Bit	0x100 (9)	-	Signal: Trip Command
f[3]		38	1	3	Struct			
	ExBlo1-I	38	1	3	Bit	0x1 (1)	-	Module input state: External blocking1
	ExBlo2-I	38	1	3	Bit	0x2 (2)	-	Module input state: External blocking2
	ExBlo TripCmd-I	38	1	3	Bit	0x4 (3)	-	Module input state: External Blocking of the Trip Command
	active	38	1	3	Bit	0x8 (4)	-	Signal: active
	ExBlo	38	1	3	Bit	0x10 (5)	-	Signal: External Blocking
	Blo by V<	38	1	3	Bit	0x20 (6)	-	Signal: Module is blocked by undervoltage.

Appendix - Data Point Lists

Module	Subgroup Names Functions	Start Register Address	No. of Modbus Registers	Function Code	Format	Bit Mask / (Bit Position)	Unit	Description
	Blo TripCmd	38	1	3	Bit	0x40 (7)	-	Signal: Trip Command blocked
	ExBlo TripCmd	38	1	3	Bit	0x80 (8)	-	Signal: External Blocking of the Trip Command
f[3]		39	1	3	Struct			
	Alarm f	39	1	3	Bit	0x1 (1)	-	Signal: Alarm Frequency Protection
	Alarm df/dt DF/DT	39	1	3	Bit	0x2 (2)	-	Alarm instantaneous or average value of the rate-of-frequency-change
	Trip f (*)	39	1	3	Bit	0x4 (3)	-	Signal: Frequency has exceeded the limit.
	Trip df/dt DF/DT (*)	39	1	3	Bit	0x8 (4)	-	Signal: Trip df/dt or DF/DT
	Alarm	39	1	3	Bit	0x10 (5)	-	Signal: Alarm Frequency Protection (collective signal)
	Alarm delta phi	39	1	3	Bit	0x20 (6)	-	Signal: Alarm Vector Surge
	Trip (*)	39	1	3	Bit	0x40 (7)	-	Signal: Trip Frequency Protection (collective signal)
	Trip delta phi (*)	39	1	3	Bit	0x80 (8)	-	Signal: Trip Vector Surge
	TripCmd (*)	39	1	3	Bit	0x100 (9)	-	Signal: Trip Command

Module	Subgroup Names Functions	Start Register Address	No. of Modbus Registers	Function Code	Format	Bit Mask / (Bit Position)	Unit	Description
f[4]		40	1	3	Struct			
	ExBlo1-l	40	1	3	Bit	0x1 (1)	-	Module input state: External blocking1
	ExBlo2-l	40	1	3	Bit	0x2 (2)	-	Module input state: External blocking2
	ExBlo TripCmd-l	40	1	3	Bit	0x4 (3)	-	Module input state: External Blocking of the Trip Command
	active	40	1	3	Bit	0x8 (4)	-	Signal: active
	ExBlo	40	1	3	Bit	0x10 (5)	-	Signal: External Blocking
	Blo by V<	40	1	3	Bit	0x20 (6)	-	Signal: Module is blocked by undervoltage.
	Blo TripCmd	40	1	3	Bit	0x40 (7)	-	Signal: Trip Command blocked
	ExBlo TripCmd	40	1	3	Bit	0x80 (8)	-	Signal: External Blocking of the Trip Command
f[4]		41	1	3	Struct			
	Alarm f	41	1	3	Bit	0x1 (1)	-	Signal: Alarm Frequency Protection
	Alarm df/dt DF/DT	41	1	3	Bit	0x2 (2)	-	Alarm instantaneous or average value of the rate-of-frequency-change

Appendix - Data Point Lists

Module	Subgroup Names Functions	Start Register Address	No. of Modbus Registers	Function Code	Format	Bit Mask / (Bit Position)	Unit	Description
	Trip f (*)	41	1	3	Bit	0x4 (3)	-	Signal: Frequency has exceeded the limit.
	Trip df/dt DF/DT (*)	41	1	3	Bit	0x8 (4)	-	Signal: Trip df/dt or DF/DT
	Alarm	41	1	3	Bit	0x10 (5)	-	Signal: Alarm Frequency Protection (collective signal)
	Alarm delta phi	41	1	3	Bit	0x20 (6)	-	Signal: Alarm Vector Surge
	Trip (*)	41	1	3	Bit	0x40 (7)	-	Signal: Trip Frequency Protection (collective signal)
	Trip delta phi (*)	41	1	3	Bit	0x80 (8)	-	Signal: Trip Vector Surge
	TripCmd (*)	41	1	3	Bit	0x100 (9)	-	Signal: Trip Command
f[5]		42	1	3	Struct			
	ExBlo1-I	42	1	3	Bit	0x1 (1)	-	Module input state: External blocking1
	ExBlo2-I	42	1	3	Bit	0x2 (2)	-	Module input state: External blocking2
	ExBlo TripCmd-I	42	1	3	Bit	0x4 (3)	-	Module input state: External Blocking of the Trip Command
	active	42	1	3	Bit	0x8 (4)	-	Signal: active

Module	Subgroup Names Functions	Start Register Address	No. of Modbus Registers	Function Code	Format	Bit Mask / (Bit Position)	Unit	Description
	ExBlo	42	1	3	Bit	0x10 (5)	-	Signal: External Blocking
	Blo by V<	42	1	3	Bit	0x20 (6)	-	Signal: Module is blocked by undervoltage.
	Blo TripCmd	42	1	3	Bit	0x40 (7)	-	Signal: Trip Command blocked
	ExBlo TripCmd	42	1	3	Bit	0x80 (8)	-	Signal: External Blocking of the Trip Command
f[5]		43	1	3	Struct			
	Alarm f	43	1	3	Bit	0x1 (1)	-	Signal: Alarm Frequency Protection
	Alarm df/dt DF/DT	43	1	3	Bit	0x2 (2)	-	Alarm instantaneous or average value of the rate-of-frequency-change
	Trip f (*)	43	1	3	Bit	0x4 (3)	-	Signal: Frequency has exceeded the limit.
	Trip df/dt DF/DT (*)	43	1	3	Bit	0x8 (4)	-	Signal: Trip df/dt or DF/DT
	Alarm	43	1	3	Bit	0x10 (5)	-	Signal: Alarm Frequency Protection (collective signal)
	Alarm delta phi	43	1	3	Bit	0x20 (6)	-	Signal: Alarm Vector Surge
	Trip (*)	43	1	3	Bit	0x40 (7)	-	Signal: Trip Frequency Protection (collective signal)

Appendix - Data Point Lists

Module	Subgroup Names Functions	Start Register Address	No. of Modbus Registers	Function Code	Format	Bit Mask / (Bit Position)	Unit	Description
	Trip delta phi (*)	43	1	3	Bit	0x80 (8)	-	Signal: Trip Vector Surge
	TripCmd (*)	43	1	3	Bit	0x100 (9)	-	Signal: Trip Command
f[6]		44	1	3	Struct			
	ExBlo1-I	44	1	3	Bit	0x1 (1)	-	Module input state: External blocking1
	ExBlo2-I	44	1	3	Bit	0x2 (2)	-	Module input state: External blocking2
	ExBlo TripCmd-I	44	1	3	Bit	0x4 (3)	-	Module input state: External Blocking of the Trip Command
	active	44	1	3	Bit	0x8 (4)	-	Signal: active
	ExBlo	44	1	3	Bit	0x10 (5)	-	Signal: External Blocking
	Blo by V<	44	1	3	Bit	0x20 (6)	-	Signal: Module is blocked by undervoltage.
	Blo TripCmd	44	1	3	Bit	0x40 (7)	-	Signal: Trip Command blocked
	ExBlo TripCmd	44	1	3	Bit	0x80 (8)	-	Signal: External Blocking of the Trip Command
f[6]		45	1	3	Struct			

Appendix - Data Point Lists

Module	Subgroup Names Functions	Start Register Address	No. of Modbus Registers	Function Code	Format	Bit Mask / (Bit Position)	Unit	Description
	Alarm f	45	1	3	Bit	0x1 (1)	-	Signal: Alarm Frequency Protection
	Alarm df/dt DF/DT	45	1	3	Bit	0x2 (2)	-	Alarm instantaneous or average value of the rate-of-frequency-change
	Trip f (*)	45	1	3	Bit	0x4 (3)	-	Signal: Frequency has exceeded the limit.
	Trip df/dt DF/DT (*)	45	1	3	Bit	0x8 (4)	-	Signal: Trip df/dt or DF/DT
	Alarm	45	1	3	Bit	0x10 (5)	-	Signal: Alarm Frequency Protection (collective signal)
	Alarm delta phi	45	1	3	Bit	0x20 (6)	-	Signal: Alarm Vector Surge
	Trip (*)	45	1	3	Bit	0x40 (7)	-	Signal: Trip Frequency Protection (collective signal)
	Trip delta phi (*)	45	1	3	Bit	0x80 (8)	-	Signal: Trip Vector Surge
	TripCmd (*)	45	1	3	Bit	0x100 (9)	-	Signal: Trip Command

Legend * = These Signals have to be acknowledged by the Scada System.

Measuring values

Module	Subgroup Names Functions	Start Register Address	No. of Modbus Registers	Function Code	Format	Bit Mask / (Bit Position)	Unit	Description
Date and Time		20000	6	4	Struct			
	y	20000	6	4	Short	Word 0 (1)	-	year
	m	20000	6	4	Short	Word 1 (17)	-	month
	d	20000	6	4	Short	Word 2 (33)	-	days
	h	20000	6	4	Short	Word 3 (49)	-	hours
	min	20000	6	4	Short	Word 4 (65)	-	minute
	ms	20000	6	4	Short	Word 5 (81)	-	milliseconds
IRIG-B	Edges	20298	2	4	Float IEE754		-	Edges
IRIG-B	NoOfFrameErrors	20300	2	4	Float IEE754		-	Total Number of Frame Errors. Physically corrupted Frame.
IRIG-B	NoOfFramesOK	20302	2	4	Float IEE754		-	Total Number valid Frames.
LVRT	Cr Tot Numb of Vdips	24092	2	4	Float IEE754		-	Counter Total number of voltage dips.

Appendix - Data Point Lists

Module	Subgroup Names Functions	Start Register Address	No. of Modbus Registers	Function Code	Format	Bit Mask / (Bit Position)	Unit	Description
LVRT	NumOf Vdips in t-LVRT	24094	2	4	Float IEE754		-	Number of Voltage dips during t-LVRT
LVRT	Cr Tot Numb of Vdips to Trip	24096	2	4	Float IEE754		-	Counter Total number of voltage dips that caused a Trip.
SG[1]	TripCmd Cr	20810	2	4	Float IEE754		-	Counter: Total number of trips of the switchgear (circuit breaker, load break switch...). Resettable with Total or All.
Sync	f Bus	20520	2	4	Float IEE754		Hz	Bus frequency
Sync	V Bus	20522	2	4	Float IEE754		V	Bus Voltage
Sync	Angle Bus	20524	2	4	Float IEE754		°	Bus Angle (Reference)
Sync	Angle Diff	20526	2	4	Float IEE754		°	Angle difference between bus and line voltages.
Sync	Volt Diff	20528	2	4	Float IEE754		V	Voltage difference between bus and line.
Sync	f Line	20530	2	4	Float IEE754		Hz	Line frequency
Sync	V Line	20532	2	4	Float IEE754		V	Line Voltage
Sync	Angle Line	20534	2	4	Float IEE754		°	Line Angle

Appendix - Data Point Lists

Module	Subgroup Names Functions	Start Register Address	No. of Modbus Registers	Function Code	Format	Bit Mask / (Bit Position)	Unit	Description
Sync	Slip Freq	20536	2	4	Float IEE754		Hz	Slip frequency
Values	Build	20008	2	4	Float IEE754		-	Build
Values	Operating hours Cr	20010	2	4	Float IEE754		h	Operating hours counter of the protective device
Voltage	f	20128	2	4	Float IEE754		Hz	Measured value: Frequency
Voltage	VL12	20130	2	4	Float IEE754		V	Measured value: Phase-to-phase voltage (fundamental)
Voltage	VL23	20132	2	4	Float IEE754		V	Measured value: Phase-to-phase voltage (fundamental)
Voltage	VL31	20134	2	4	Float IEE754		V	Measured value: Phase-to-phase voltage (fundamental)
Voltage	VL1	20136	2	4	Float IEE754		V	Measured value: Phase-to-neutral voltage (fundamental)
Voltage	VL2	20138	2	4	Float IEE754		V	Measured value: Phase-to-neutral voltage (fundamental)
Voltage	VL3	20140	2	4	Float IEE754		V	Measured value: Phase-to-neutral voltage (fundamental)
Voltage	VX meas	20142	2	4	Float IEE754		V	Measured value (measured): VX measured (fundamental)

Appendix - Data Point Lists

Module	Subgroup Names Functions	Start Register Address	No. of Modbus Registers	Function Code	Format	Bit Mask / (Bit Position)	Unit	Description
Voltage	V0	20146	2	4	Float IEE754		V	Measured value (calculated): Symmetrical components Zero voltage(fundamental)
Voltage	V1	20148	2	4	Float IEE754		V	Measured value (calculated): Symmetrical components positive phase sequence voltage(fundamental)
Voltage	V2	20150	2	4	Float IEE754		V	Measured value (calculated): Symmetrical components negative phase sequence voltage(fundamental)
Voltage	VG calc	20162	2	4	Float IEE754		V	Measured value (calculated): VG (fundamental)
Voltage	phi VG calc	20386	2	4	Float IEE754		°	Measured value (calculated): Angle of Phasor VG calc
Voltage	phi VX meas	20388	2	4	Float IEE754		°	Measured value: Angle of Phasor VX meas
Voltage	phi VL12	20390	2	4	Float IEE754		°	Measured value (calculated): Angle of Phasor VL12
Voltage	phi VL1	20392	2	4	Float IEE754		°	Measured value (calculated): Angle of Phasor VL1
Voltage	phi VL23	20394	2	4	Float IEE754		°	Measured value (calculated): Angle of Phasor VL23
Voltage	phi VL2	20396	2	4	Float IEE754		°	Measured value (calculated): Angle of Phasor VL2
Voltage	phi VL31	20398	2	4	Float IEE754		°	Measured value (calculated): Angle of Phasor VL31

Appendix - Data Point Lists

Module	Subgroup Names Functions	Start Register Address	No. of Modbus Registers	Function Code	Format	Bit Mask / (Bit Position)	Unit	Description
Voltage	phi VL3	20400	2	4	Float IEE754		°	Measured value (calculated): Angle of Phasor VL3
Voltage	phi V0	20402	2	4	Float IEE754		°	Measured value (calculated): Angle Zero Sequence System
Voltage	phi V1	20404	2	4	Float IEE754		°	Measured value (calculated): Angle of Positive Sequence System
Voltage	phi V2	20406	2	4	Float IEE754		°	Measured Value (calculated): Angle of Negative Sequence System
Voltage	VL1 THD	20408	2	4	Float IEE754		V	Measured value (calculated): VL1 Total Harmonic Distortion
Voltage	VL12 THD	20410	2	4	Float IEE754		V	Measured value (calculated): V12 Total Harmonic Distortion
Voltage	VL2 THD	20412	2	4	Float IEE754		V	Measured value (calculated): VL2 Total Harmonic Distortion
Voltage	VL23 THD	20414	2	4	Float IEE754		V	Measured value (calculated): V23 Total Harmonic Distortion
Voltage	VL3 THD	20416	2	4	Float IEE754		V	Measured value (calculated): VL3 Total Harmonic Distortion
Voltage	VL31 THD	20418	2	4	Float IEE754		V	Measured value (calculated): V31 Total Harmonic Distortion
Voltage	%VL1 THD	20420	2	4	Float IEE754		%	Measured value (calculated): VL1 Total Harmonic Distortion / Ground wave

Appendix - Data Point Lists

Module	Subgroup Names Functions	Start Register Address	No. of Modbus Registers	Function Code	Format	Bit Mask / (Bit Position)	Unit	Description
Voltage	%VL12 THD	20422	2	4	Float IEE754		%	Measured value (calculated): V12 Total Harmonic Distortion / Ground wave
Voltage	%VL2 THD	20424	2	4	Float IEE754		%	Measured value (calculated): VL2 Total Harmonic Distortion / Ground wave
Voltage	%VL23 THD	20426	2	4	Float IEE754		%	Measured value (calculated): V23 Total Harmonic Distortion / Ground wave
Voltage	%VL3 THD	20428	2	4	Float IEE754		%	Measured value (calculated): VL3 Total Harmonic Distortion / Ground wave
Voltage	%VL31 THD	20430	2	4	Float IEE754		%	Measured value (calculated): V31 Total Harmonic Distortion / Ground wave
Voltage	VG calc RMS	20432	2	4	Float IEE754		V	Measured value (calculated): VG (RMS)
Voltage	VX meas RMS	20434	2	4	Float IEE754		V	Measured value (measured): VX measured (RMS)
Voltage	VL1 RMS	20436	2	4	Float IEE754		V	Measured value: Phase-to-neutral voltage (RMS)
Voltage	VL12 RMS	20438	2	4	Float IEE754		V	Measured value: Phase-to-phase voltage (RMS)
Voltage	VL2 RMS	20440	2	4	Float IEE754		V	Measured value: Phase-to-neutral voltage (RMS)
Voltage	VL23 RMS	20442	2	4	Float IEE754		V	Measured value: Phase-to-phase voltage (RMS)

Appendix - Data Point Lists

Module	Subgroup Names Functions	Start Register Address	No. of Modbus Registers	Function Code	Format	Bit Mask / (Bit Position)	Unit	Description
Voltage	VL3 RMS	20444	2	4	Float IEE754		V	Measured value: Phase-to-neutral voltage (RMS)
Voltage	VL31 RMS	20446	2	4	Float IEE754		V	Measured value: Phase-to-phase voltage (RMS)
Voltage	%(V2/V1)	20450	2	4	Float IEE754		%	Measured value (calculated): V2/V1, phase sequence will be taken into account automatically.
Voltage	f max	21002	2	4	Float IEE754		Hz	Max. frequency value
Voltage	f min	21004	2	4	Float IEE754		Hz	Min. frequency value
Voltage	V1 max	21044	2	4	Float IEE754		V	Maximum value: Symmetrical components positive phase sequence voltage(fundamental)
Voltage	V1 min	21046	2	4	Float IEE754		V	Minimum value: Symmetrical components positive phase sequence voltage(fundamental)
Voltage	V2 max	21050	2	4	Float IEE754		V	Maximum value: Symmetrical components negative phase sequence voltage(fundamental)
Voltage	V2 min	21052	2	4	Float IEE754		V	Minimum value: Symmetrical components negative phase sequence voltage(fundamental)
Voltage	VG calc max RMS	21498	2	4	Float IEE754		V	Measured value (calculated):VX maximum value (RMS)
Voltage	VG calc min RMS	21500	2	4	Float IEE754		V	Measured value (calculated):VX minimum value (RMS)

Appendix - Data Point Lists

Module	Subgroup Names Functions	Start Register Address	No. of Modbus Registers	Function Code	Format	Bit Mask / (Bit Position)	Unit	Description
Voltage	VX meas max RMS	21504	2	4	Float IEE754		V	Measured value: VX maximum value (RMS)
Voltage	VX meas min RMS	21506	2	4	Float IEE754		V	Measured value: VX minimum value (RMS)
Voltage	VL12 avg RMS	21508	2	4	Float IEE754		V	VL12 average value (RMS)
Voltage	VL12 max RMS	21510	2	4	Float IEE754		V	VL12 maximum value (RMS)
Voltage	VL12 min RMS	21512	2	4	Float IEE754		V	VL12 minimum value (RMS)
Voltage	VL1 avg RMS	21514	2	4	Float IEE754		V	VL1 average value (RMS)
Voltage	VL1 max RMS	21516	2	4	Float IEE754		V	VL1 maximum value (RMS)
Voltage	VL1 min RMS	21518	2	4	Float IEE754		V	VL1 minimum value (RMS)
Voltage	VL23 avg RMS	21520	2	4	Float IEE754		V	VL23 average value (RMS)
Voltage	VL23 max RMS	21522	2	4	Float IEE754		V	VL23 maximum value (RMS)
Voltage	VL23 min RMS	21524	2	4	Float IEE754		V	VL23 minimum value (RMS)

Appendix - Data Point Lists

Module	Subgroup Names Functions	Start Register Address	No. of Modbus Registers	Function Code	Format	Bit Mask / (Bit Position)	Unit	Description
Voltage	VL2 avg RMS	21526	2	4	Float IEE754		V	VL2 average value (RMS)
Voltage	VL2 max RMS	21528	2	4	Float IEE754		V	VL2 maximum value (RMS)
Voltage	VL2 min RMS	21530	2	4	Float IEE754		V	VL2 minimum value (RMS)
Voltage	VL31 avg RMS	21532	2	4	Float IEE754		V	VL31 average value (RMS)
Voltage	VL31 max RMS	21534	2	4	Float IEE754		V	VL31 maximum value (RMS)
Voltage	VL31 min RMS	21536	2	4	Float IEE754		V	VL31 minimum value (RMS)
Voltage	VL3 avg RMS	21538	2	4	Float IEE754		V	VL3 average value (RMS)
Voltage	VL3 max RMS	21540	2	4	Float IEE754		V	VL3 maximum value (RMS)
Voltage	VL3 min RMS	21542	2	4	Float IEE754		V	VL3 minimum value (RMS)
Voltage	%(V2/V1) max	21552	2	4	Float IEE754		%	Measured value (calculated):V2/V1 maximum value, phase sequence will be taken into account automatically
Voltage	%(V2/V1) min	21554	2	4	Float IEE754		%	Measured value (calculated):V2/V1 minimum value , phase sequence will be taken into account automatically

Commands

Module	Subgroup Names Functions	Start Register Address	No. of Modbus Registers	Function Code	Format	Bit Mask / (Bit Position)	Unit	Description
Acknowledge	LEDs	22000	1	5	0xFF00		-	LEDs
Acknowledge	Binary Outputs	22001	1	5	0xFF00		-	Binary Outputs
Acknowledge	Scada	22002	1	5	0xFF00		-	Scada
Acknowledge	Device	22003	1	5	0xFF00		-	Device
Acknowledge	Ack TripCmd	22005	1	5	0xFF00		-	Signal: Acknowledge Trip Command
Reset	Modbus diagnosis counter	22006	1	5	0xFF00		-	Modbus diagnosis counter
Scada Cmd	Assbl Scada Cmd 1	22020	1	5	0xFF00=On 0x0000=Off		-	Assignable Scada Command
Scada Cmd	Assbl Scada Cmd 2	22021	1	5	0xFF00=On 0x0000=Off		-	Assignable Scada Command

Appendix - Data Point Lists

Module	Subgroup Names Functions	Start Register Address	No. of Modbus Registers	Function Code	Format	Bit Mask / (Bit Position)	Unit	Description
Scada Cmd	Assbl Scada Cmd 3	22022	1	5	0xFF00=On 0x0000=Off		-	Assignable Scada Command
Scada Cmd	Assbl Scada Cmd 4	22023	1	5	0xFF00=On 0x0000=Off		-	Assignable Scada Command
Scada Cmd	Assbl Scada Cmd 5	22024	1	5	0xFF00=On 0x0000=Off		-	Assignable Scada Command
Scada Cmd	Assbl Scada Cmd 6	22025	1	5	0xFF00=On 0x0000=Off		-	Assignable Scada Command
Scada Cmd	Assbl Scada Cmd 7	22026	1	5	0xFF00=On 0x0000=Off		-	Assignable Scada Command
Scada Cmd	Assbl Scada Cmd 8	22027	1	5	0xFF00=On 0x0000=Off		-	Assignable Scada Command
Scada Cmd	Assbl Scada Cmd 9	22028	1	5	0xFF00=On 0x0000=Off		-	Assignable Scada Command

Appendix - Data Point Lists

Module	Subgroup Names Functions	Start Register Address	No. of Modbus Registers	Function Code	Format	Bit Mask / (Bit Position)	Unit	Description
Scada Cmd	Assbl Scada Cmd 10	22029	1	5	0xFF00=On 0x0000=Off		-	Assignable Scada Command
Scada Cmd	Assbl Scada Cmd 11	22030	1	5	0xFF00=On 0x0000=Off		-	Assignable Scada Command
Scada Cmd	Assbl Scada Cmd 12	22031	1	5	0xFF00=On 0x0000=Off		-	Assignable Scada Command
Scada Cmd	Assbl Scada Cmd 13	22032	1	5	0xFF00=On 0x0000=Off		-	Assignable Scada Command
Scada Cmd	Assbl Scada Cmd 14	22033	1	5	0xFF00=On 0x0000=Off		-	Assignable Scada Command
Scada Cmd	Assbl Scada Cmd 15	22034	1	5	0xFF00=On 0x0000=Off		-	Assignable Scada Command
Scada Cmd	Assbl Scada Cmd 16	22035	1	5	0xFF00=On 0x0000=Off		-	Assignable Scada Command

Appendix - Data Point Lists

Module	Subgroup Names Functions	Start Register Address	No. of Modbus Registers	Function Code	Format	Bit Mask / (Bit Position)	Unit	Description
PSet-Switch	Scada PS1	22050	1	5	0xFF00		-	Scada Setting Group1
PSet-Switch	Scada PS2	22051	1	5	0xFF00		-	Scada Setting Group2
PSet-Switch	Scada PS3	22052	1	5	0xFF00		-	Scada Setting Group3
PSet-Switch	Scada PS4	22053	1	5	0xFF00		-	Scada Setting Group4
AFRMS Mode	AFRMS SCADA	22054	1	5	0xFF00=On 0x0000=Off		-	Signal: Arcflash Reduction Maintenance SCADA Mode
SG	SG ControlCmd1	22100	1	5	0xFF00=On 0x0000=Off		-	Control Command Switchgear

Settings

<i>Module</i>	<i>Subgroup Names Functions</i>	<i>Start Register Address</i>	<i>No. of Modbus Registers</i>	<i>Function Code</i>	<i>Format</i>	<i>Bit Mask / (Bit Position)</i>	<i>Unit</i>	<i>Description</i>
Date and Time		32500	6	3 16	Struct			
	y	32500	6	3 16	Short	Word 0 (1)	-	year
	m	32500	6	3 16	Short	Word 1 (17)	-	month
	d	32500	6	3 16	Short	Word 2 (33)	-	days
	h	32500	6	3 16	Short	Word 3 (49)	-	hours
	min	32500	6	3 16	Short	Word 4 (65)	-	minute
	ms	32500	6	3 16	Short	Word 5 (81)	-	milliseconds

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Woodward Kempen GmbH

Krefelder Weg 47 xD – 47906 Kempen (Germany)
Postfach 10 07 55 (P.O.Box) xD – 47884 Kempen (Germany)
Phone: +49 (0) 21 52 145 1

Internet

www.woodward.com

Sales

Phone: +49 (0) 21 52 145 216 or 342
Fax: +49 (0) 21 52 145 354
e-mail: salesEMEA_PGD@woodward.com

Service

Phone: +49 (0) 21 52 145 614
Fax: +49 (0) 21 52 145 455
e-mail: supportEMEA_PGD@woodward.com