Modbus – Data Point List

HighPROTEC | PROTECTION TECHNOLOGY MADE SIMPLE

MRI4 |

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English

Original reference manual

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Table of Contents

1 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 tables below.

NOTICE!

The Parameters are described within the Reference Manual of the device (separate document).

1.1 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 be set at least to 3.5 characters.

Examples:

- 3.5 characters 9600 Baud = 4 ms
- 3.5 characters 19200 Baud = 2 ms
- 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 Bytes.

2 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.

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

2.1 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

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).

2.2 Float Values IEEE 754

	Sign	Exponent	Mantissa
Value:	+1	2^{13}	1.34199857711792
Encoded as:	0	140	2868892
Binary:	☐	☑☐☐☐☑☑☐☐	☐☑☐☑☐☑☑☑☑☐☐☐☑☑☐☑☐☐☑☑☑☐☐
Decimal Representation:		10993.652	
Binary Representation:		01000110001010111100011010011100	
Hexadecimal Representation:		0x462bc69c	

For displaying a float value, it is important to save received bytes in a correct order. A float value in Modbus will be transmitted in “Big Endian” format (Motorola Format), that means the most significant byte is transmitted first.

For saving received bytes in Modbus master it must be considered which architecture is used. Is Modbus Master is a “Little Endian” architecture, the received frame needs to be swapped to corresponding memory addresses. If it is not saved in correct order it is possible that the displayed value is useless.

☼ **Example:**

The following value is transmitted:

Modbus transmit value			
0x46	0x2b	0xc6	0x9c

Then the representation in the receiving device's internal memory has to be as follows:

Memory Addresses	Big Endian		Little Endian	
Address	Hex	10993.65	Hex	10993.65
1000	0x46		0x9c	
1001	0x2b		0xc6	
1002	0xc6		0x2b	
1003	0x9c		0x46	

2.3 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 (High-byte and Low-byte).

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.

2.4 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

Response

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

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.

2.5 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 (High-byte and Low-byte).

2.6 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.

NOTICE!

The devices do not respond to a broadcast command.

2.7 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 case of a failure has the following format:

Slave Address	0x80 + Function Code	Exception Code	Check-sum HI	Check-sum LO

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.

3 Appendix – Data Point Lists

3.1 Signals

Legend: (*) = These signals have to be acknowledged by the Scada System.

Module (ANSI / IEEE)	Name Function	Start Register Address	No. of Modbus Registers	Function code	Format	Bit Mask (Bit position)	Unit	Description
AR – 79		**46**	**1**	**3**	**Struct**			
	active	46	1	3	Bit	0x1 (1)	-	Signal: active
	ExBlo	46	1	3	Bit	0x2 (2)	-	Signal: External Blocking
	running	46	1	3	Bit	0x8 (4)	-	Signal: Auto Reclosing running
	t-dead	46	1	3	Bit	0x10 (5)	-	Signal: Dead time between trip and reclosure attempt
	successful (*)	46	1	3	Bit	0x100 (9)	-	Signal: Auto Reclosing successful
	failed (*)	46	1	3	Bit	0x200 (10)	-	Signal: Auto Reclosing failure
	t-AR Supervision	46	1	3	Bit	0x1000 (13)	-	Signal: AR Supervision
AR – 79		**47**	**1**	**3**	**Struct**			

Module (ANSI / IEEE)	Name Function	Start Register Address	No. of Modbus Registers	Function code	Format	Bit Mask (Bit position)	Unit	Description
	ExBlo1-I	47	1	3	Bit	0x1 (1)	-	Module input state: External blocking1
	ExBlo2-I	47	1	3	Bit	0x2 (2)	-	Module input state: External blocking2
	CB ON Cmd	47	1	3	Bit	0x10 (5)	-	Signal: CB switch ON Command
	Pre Shot (*)	47	1	3	Bit	0x20 (6)	-	Pre Shot Control
	Shot 1 (*)	47	1	3	Bit	0x40 (7)	-	Shot Control
	Shot 2 (*)	47	1	3	Bit	0x80 (8)	-	Shot Control
	Shot 3 (*)	47	1	3	Bit	0x100 (9)	-	Shot Control
	Shot 4 (*)	47	1	3	Bit	0x200 (10)	-	Shot Control
	Shot 5 (*)	47	1	3	Bit	0x400 (11)	-	Shot Control
	Shot 6 (*)	47	1	3	Bit	0x800 (12)	-	Shot Control
AR – 79		**156**	**1**	**3**	**Struct**			

Module (ANSI / IEEE)	Name Function	Start Register Address	No. of Modbus Registers	Function code	Format	Bit Mask (Bit position)	Unit	Description
	Ex Lock-I	156	1	3	Bit	0x1 (1)	-	Module input state: External AR lockout.
	Ex Shot Inc-I	156	1	3	Bit	0x2 (2)	-	Module input state: The AR Shot counter will be incremented by this external Signal. This can be used for Zone Coordination (of upstream Auto Reclosure devices). Note: This parameter enables the functionality only. The assignment has to be set within the global parameters.
	Blo	156	1	3	Bit	0x4 (3)	-	Signal: Auto Reclosure is blocked
	t-Blo after CB man ON	156	1	3	Bit	0x8 (4)	-	Signal: AR blocked after circuit breaker was switched on manually. This timer will be started if the circuit breaker was switched on manually. While this timer is running, AR cannot be started.
	Lock	156	1	3	Bit	0x10 (5)	-	Signal: Auto Reclosure is locked out
	t-Reset Lockout	156	1	3	Bit	0x20 (6)	-	Signal: Delay Timer for resetting the AR lockout. The reset of the AR lockout state will be delayed for this time, after the reset signal (e.g digital input or Scada) has been detected .
	Ready	156	1	3	Bit	0x40 (7)	-	Signal: Ready to shoot
	t-Run2Ready	156	1	3	Bit	0x80 (8)	-	Signal: Examination Time: If the Circuit Breaker remains after a reclosure attempt for the duration of this timer in the Closed position, the AR has been successful and the AR module returns into the ready state.
	Standby	156	1	3	Bit	0x100	-	Signal: Standby

Module (ANSI / IEEE)	Name Function	Start Register Address	No. of Modbus Registers	Function code	Format	Bit Mask (Bit position)	Unit	Description
						(9)		
	Service Alarm 1	156	1	3	Bit	0x200 (10)	-	Signal: AR - Service Alarm 1, too many switching operations
	Service Alarm 2	156	1	3	Bit	0x400 (11)	-	Signal: AR - Service Alarm 2 - too many switching operations
	Max Shots / h exceeded	156	1	3	Bit	0x800 (12)	-	Signal: The maximum allowed number of shots per hour has been exceeded.
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

Module (ANSI / IEEE)	Name Function	Start Register Address	No. of Modbus Registers	Function code	Format	Bit Mask (Bit position)	Unit	Description
								ENSURE that the relays are ARMED AGAIN after maintenance
	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 – 50BF, 62BF		**53**	**1**	**3**	**Struct**			
	ExBlo1-I	53	1	3	Bit	0x1 (1)	-	Module input state: External blocking1
	ExBlo2-I	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-I	53	1	3	Bit	0x10 (5)	-	Module Input: Trigger that will start the CBF
	Trigger2-I	53	1	3	Bit	0x20 (6)	-	Module Input: Trigger that will start the CBF
	Trigger3-I	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

Module (ANSI / IEEE)	Name Function	Start Register Address	No. of Modbus Registers	Function code	Format	Bit Mask (Bit position)	Unit	Description
	Alarm (*)	53	1	3	Bit	0x100 (9)	-	Signal: Circuit Breaker Failure
	Lockout (*)	53	1	3	Bit	0x200 (10)	-	Signal: Lockout
	Waiting for Trigger (*)	53	1	3	Bit	0x400 (11)	-	Waiting for Trigger
CLPU		**66**	**1**	**3**	**Struct**			
	ExBlo1-I	66	1	3	Bit	0x1 (1)	-	Module input state: External blocking
	ExBlo2-I	66	1	3	Bit	0x2 (2)	-	Module input state: External blocking
	Ex rev Interl-I	66	1	3	Bit	0x4 (3)	-	Module input state: External reverse interlocking
	active	66	1	3	Bit	0x8 (4)	-	Signal: active
	ExBlo	66	1	3	Bit	0x10 (5)	-	Signal: External Blocking
	Ex rev Interl	66	1	3	Bit	0x20 (6)	-	Signal: External reverse Interlocking
	enabled	66	1	3	Bit	0x200 (10)	-	Signal: Cold Load enabled

Module (ANSI / IEEE)	Name Function	Start Register Address	No. of Modbus Registers	Function code	Format	Bit Mask (Bit position)	Unit	Description
	detected (*)	66	1	3	Bit	0x400 (11)	-	Signal: Cold Load detected
	I<	66	1	3	Bit	0x800 (12)	-	Signal: No Load Current.
	AR Blo	66	1	3	Bit	0x1000 (13)	-	Signal: Blocked by AR
	Load Inrush	66	1	3	Bit	0x2000 (14)	-	Signal: Load Inrush
	Settle Time	66	1	3	Bit	0x4000 (15)	-	Signal: Settle Time
CTS – 60L		**137**	**1**	**3**	**Struct**			
	ExBlo1-I	137	1	3	Bit	0x1 (1)	-	Module input state: External blocking1
	ExBlo2-I	137	1	3	Bit	0x2 (2)	-	Module input state: External blocking2
	active	137	1	3	Bit	0x4 (3)	-	Signal: active
	ExBlo	137	1	3	Bit	0x8 (4)	-	Signal: External Blocking
	Alarm	137	1	3	Bit	0x10 (5)	-	Signal: Alarm Current Transformer Measuring Circuit Supervision

Module (ANSI / IEEE)	Name Function	Start Register Address	No. of Modbus Registers	Function code	Format	Bit Mask (Bit position)	Unit	Description
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)	-	(At least one) Switchgear is disturbed.
	SG Indeterm	176	1	3	Bit	0x10 (5)	-	(At least 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
	DI 4	1000	1	3	Bit	0x8 (4)	-	Signal: Digital Input
	DI 5	1000	1	3	Bit	0x10	-	Signal: Digital Input

Module (ANSI / IEEE)	Name Function	Start Register Address	No. of Modbus Registers	Function code	Format	Bit Mask (Bit position)	Unit	Description
						(5)		
	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
	ExBlo	49	1	3	Bit	0x40	-	Signal: External Blocking

Module (ANSI / IEEE)	Name Function	Start Register Address	No. of Modbus Registers	Function code	Format	Bit Mask (Bit position)	Unit	Description
						(7)		
	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	-	Module input state: Trip

Module (ANSI / IEEE)	Name Function	Start Register Address	No. of Modbus Registers	Function code	Format	Bit Mask (Bit position)	Unit	Description
						(5)		
	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

Module (ANSI / IEEE)	Name Function	Start Register Address	No. of Modbus Registers	Function code	Format	Bit Mask (Bit position)	Unit	Description
	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
	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**			

Module (ANSI / IEEE)	Name Function	Start Register Address	No. of Modbus Registers	Function code	Format	Bit Mask (Bit position)	Unit	Description
	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
	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	-	Signal: Trip

Module (ANSI / IEEE)	Name Function	Start Register Address	No. of Modbus Registers	Function code	Format	Bit Mask (Bit position)	Unit	Description
						(11)		
	TripCmd (*)	52	1	3	Bit	0x800 (12)	-	Signal: Trip Command
Fast Status Register		**5000**	**1**	**3**	**Struct**			
	Device Type	5000	1	3	Bit	0xffff (1)	-	Device Type: Device type code for relationship between device name and its Modbus code. Woodward: MRI4 - 1000 MRU4 - 1001 MRA4 - 1002 MCA4 - 1003 MRDT4 - 1005 MCDTV4 - 1006 MCDGV4 - 1007 MRM4 - 1009 MRMV4 - 1010 MCDLV4 - 1011
Fast Status Register		**5001**	**1**	**3**	**Struct**			
	Comm Version	5001	1	3	Bit	0xffff (1)	-	Modbus Communication version. This version number changes if something becomes incompatible between different Modbus releases.

Module (ANSI / IEEE)	Name Function	Start Register Address	No. of Modbus Registers	Function code	Format	Bit Mask (Bit position)	Unit	Description
Fast Status Register		**5002**	**1**	**3**	**Struct**			
	Config Bin Inp1-I	5002	1	3	Bit	0x1 (1)	-	State of the module input: Config Bin Inp
	Config Bin Inp2-I	5002	1	3	Bit	0x2 (2)	-	State of the module input: Config Bin Inp
	Config Bin Inp3-I	5002	1	3	Bit	0x4 (3)	-	State of the module input: Config Bin Inp
	Config Bin Inp4-I	5002	1	3	Bit	0x8 (4)	-	State of the module input: Config Bin Inp
	Config Bin Inp5-I	5002	1	3	Bit	0x10 (5)	-	State of the module input: Config Bin Inp
	Config Bin Inp6-I	5002	1	3	Bit	0x20 (6)	-	State of the module input: Config Bin Inp
	Config Bin Inp7-I	5002	1	3	Bit	0x40 (7)	-	State of the module input: Config Bin Inp
	Config Bin Inp8-I	5002	1	3	Bit	0x80 (8)	-	State of the module input: Config Bin Inp
	Config Bin Inp9-I	5002	1	3	Bit	0x100 (9)	-	State of the module input: Config Bin Inp
	Config Bin Inp10-I	5002	1	3	Bit	0x200	-	State of the module input: Config Bin Inp

Module (ANSI / IEEE)	Name Function	Start Register Address	No. of Modbus Registers	Function code	Format	Bit Mask (Bit position)	Unit	Description
						(10)		
	Config Bin Inp11-I	5002	1	3	Bit	0x400 (11)	-	State of the module input: Config Bin Inp
	Config Bin Inp12-I	5002	1	3	Bit	0x800 (12)	-	State of the module input: Config Bin Inp
	Config Bin Inp13-I	5002	1	3	Bit	0x1000 (13)	-	State of the module input: Config Bin Inp
	Config Bin Inp14-I	5002	1	3	Bit	0x2000 (14)	-	State of the module input: Config Bin Inp
	Config Bin Inp15-I	5002	1	3	Bit	0x4000 (15)	-	State of the module input: Config Bin Inp
	Config Bin Inp16-I	5002	1	3	Bit	0x8000 (16)	-	State of the module input: Config Bin Inp
Fast Status Register		**5003**	**1**	**3**	**Struct**			
	Config Bin Inp17-I	5003	1	3	Bit	0x1 (1)	-	State of the module input: Config Bin Inp
	Config Bin Inp18-I	5003	1	3	Bit	0x2 (2)	-	State of the module input: Config Bin Inp
	Config Bin Inp19-I	5003	1	3	Bit	0x4 (3)	-	State of the module input: Config Bin Inp

Module (ANSI / IEEE)	Name Function	Start Register Address	No. of Modbus Registers	Function code	Format	Bit Mask (Bit position)	Unit	Description
	Config Bin Inp20-I	5003	1	3	Bit	0x8 (4)	-	State of the module input: Config Bin Inp
	Config Bin Inp21-I	5003	1	3	Bit	0x10 (5)	-	State of the module input: Config Bin Inp
	Config Bin Inp22-I	5003	1	3	Bit	0x20 (6)	-	State of the module input: Config Bin Inp
	Config Bin Inp23-I	5003	1	3	Bit	0x40 (7)	-	State of the module input: Config Bin Inp
	Config Bin Inp24-I	5003	1	3	Bit	0x80 (8)	-	State of the module input: Config Bin Inp
	Config Bin Inp25-I	5003	1	3	Bit	0x100 (9)	-	State of the module input: Config Bin Inp
	Config Bin Inp26-I	5003	1	3	Bit	0x200 (10)	-	State of the module input: Config Bin Inp
	Config Bin Inp27-I	5003	1	3	Bit	0x400 (11)	-	State of the module input: Config Bin Inp
	Config Bin Inp28-I	5003	1	3	Bit	0x800 (12)	-	State of the module input: Config Bin Inp
	Config Bin Inp29-I	5003	1	3	Bit	0x1000 (13)	-	State of the module input: Config Bin Inp
	Config Bin Inp30-I	5003	1	3	Bit	0x2000	-	State of the module input: Config Bin Inp

Module (ANSI / IEEE)	Name Function	Start Register Address	No. of Modbus Registers	Function code	Format	Bit Mask (Bit position)	Unit	Description
						(14)		
	Config Bin Inp31-I	5003	1	3	Bit	0x4000 (15)	-	State of the module input: Config Bin Inp
	Config Bin Inp32-I	5003	1	3	Bit	0x8000 (16)	-	State of the module input: Config Bin Inp
Fast Status Register		**5004**	**1**	**3**	**Struct**			
	Trip Cause (*)	5004	1	3	Bit	0xffff (1)	-	Initial reason of trip. It is presented as an integer value and corresponds to the “Trip” entry in the fault record, which refers to the name of the protective module that tripped first. Look up the definition of these integer values (i. e. the mapping trip code number-->module name) in the “Cause of Trip” table within the SCADA documentation.
I2>[1] – 46		**82**	**1**	**3**	**Struct**			
	ExBlo1-I	82	1	3	Bit	0x1 (1)	-	Module input state: External blocking1
	ExBlo2-I	82	1	3	Bit	0x2 (2)	-	Module input state: External blocking2
	ExBlo TripCmd-I	82	1	3	Bit	0x4 (3)	-	Module input state: External Blocking of the Trip Command
	active	82	1	3	Bit	0x8 (4)	-	Signal: active
	ExBlo	82	1	3	Bit	0x10	-	Signal: External Blocking

Module (ANSI / IEEE)	Name Function	Start Register Address	No. of Modbus Registers	Function code	Format	Bit Mask (Bit position)	Unit	Description
						(5)		
	Blo TripCmd	82	1	3	Bit	0x20 (6)	-	Signal: Trip Command blocked
	ExBlo TripCmd	82	1	3	Bit	0x40 (7)	-	Signal: External Blocking of the Trip Command
	Alarm	82	1	3	Bit	0x80 (8)	-	Signal: Alarm Negative Sequence
	Trip (*)	82	1	3	Bit	0x100 (9)	-	Signal: Trip
	TripCmd (*)	82	1	3	Bit	0x200 (10)	-	Signal: Trip Command
I2>[2] – 46		**83**	**1**	**3**	**Struct**			
	ExBlo1-I	83	1	3	Bit	0x1 (1)	-	Module input state: External blocking1
	ExBlo2-I	83	1	3	Bit	0x2 (2)	-	Module input state: External blocking2
	ExBlo TripCmd-I	83	1	3	Bit	0x4 (3)	-	Module input state: External Blocking of the Trip Command
	active	83	1	3	Bit	0x8 (4)	-	Signal: active
	ExBlo	83	1	3	Bit	0x10	-	Signal: External Blocking

Module (ANSI / IEEE)	Name Function	Start Register Address	No. of Modbus Registers	Function code	Format	Bit Mask (Bit position)	Unit	Description
						(5)		
	Blo TripCmd	83	1	3	Bit	0x20 (6)	-	Signal: Trip Command blocked
	ExBlo TripCmd	83	1	3	Bit	0x40 (7)	-	Signal: External Blocking of the Trip Command
	Alarm	83	1	3	Bit	0x80 (8)	-	Signal: Alarm Negative Sequence
	Trip (*)	83	1	3	Bit	0x100 (9)	-	Signal: Trip
	TripCmd (*)	83	1	3	Bit	0x200 (10)	-	Signal: Trip Command
IG[1] – 50N, 51N		**15**	**1**	**3**	**Struct**			
	ExBlo1-I	15	1	3	Bit	0x1 (1)	-	Module input state: External blocking1
	ExBlo2-I	15	1	3	Bit	0x2 (2)	-	Module input state: External blocking2
	ExBlo TripCmd-I	15	1	3	Bit	0x4 (3)	-	Module input state: External Blocking of the Trip Command
	Ex rev Interl-I	15	1	3	Bit	0x8 (4)	-	Module input state: External reverse interlocking
	active	15	1	3	Bit	0x10	-	Signal: active

Module (ANSI / IEEE)	Name Function	Start Register Address	No. of Modbus Registers	Function code	Format	Bit Mask (Bit position)	Unit	Description
						(5)		
	ExBlo	15	1	3	Bit	0x20 (6)	-	Signal: External Blocking
	Ex rev Interl	15	1	3	Bit	0x40 (7)	-	Signal: External reverse Interlocking
	Blo TripCmd	15	1	3	Bit	0x80 (8)	-	Signal: Trip Command blocked
	ExBlo TripCmd	15	1	3	Bit	0x100 (9)	-	Signal: External Blocking of the Trip Command
	IGH2 Blo	15	1	3	Bit	0x200 (10)	-	Signal: blocked by an inrush
	Alarm	15	1	3	Bit	0x400 (11)	-	Signal: The alarm threshold has been exceeded.
	Trip (*)	15	1	3	Bit	0x800 (12)	-	Signal: Trip
	TripCmd (*)	15	1	3	Bit	0x1000 (13)	-	Signal: Trip Command
IG[2] – 50N, 51N		**16**	**1**	**3**	**Struct**			
	ExBlo1-I	16	1	3	Bit	0x1 (1)	-	Module input state: External blocking1
	ExBlo2-I	16	1	3	Bit	0x2	-	Module input state: External blocking2

Module (ANSI / IEEE)	Name Function	Start Register Address	No. of Modbus Registers	Function code	Format	Bit Mask (Bit position)	Unit	Description
						(2)		
	ExBlo TripCmd-I	16	1	3	Bit	0x4 (3)	-	Module input state: External Blocking of the Trip Command
	Ex rev Interl-I	16	1	3	Bit	0x8 (4)	-	Module input state: External reverse interlocking
	active	16	1	3	Bit	0x10 (5)	-	Signal: active
	ExBlo	16	1	3	Bit	0x20 (6)	-	Signal: External Blocking
	Ex rev Interl	16	1	3	Bit	0x40 (7)	-	Signal: External reverse Interlocking
	Blo TripCmd	16	1	3	Bit	0x80 (8)	-	Signal: Trip Command blocked
	ExBlo TripCmd	16	1	3	Bit	0x100 (9)	-	Signal: External Blocking of the Trip Command
	IGH2 Blo	16	1	3	Bit	0x200 (10)	-	Signal: blocked by an inrush
	Alarm	16	1	3	Bit	0x400 (11)	-	Signal: The alarm threshold has been exceeded.
	Trip (*)	16	1	3	Bit	0x800 (12)	-	Signal: Trip

Module (ANSI / IEEE)	Name Function	Start Register Address	No. of Modbus Registers	Function code	Format	Bit Mask (Bit position)	Unit	Description
	TripCmd (*)	16	1	3	Bit	0x1000 (13)	-	Signal: Trip Command
IG[3] – 50N, 51N		**17**	**1**	**3**	**Struct**			
	ExBlo1-I	17	1	3	Bit	0x1 (1)	-	Module input state: External blocking1
	ExBlo2-I	17	1	3	Bit	0x2 (2)	-	Module input state: External blocking2
	ExBlo TripCmd-I	17	1	3	Bit	0x4 (3)	-	Module input state: External Blocking of the Trip Command
	Ex rev Interl-I	17	1	3	Bit	0x8 (4)	-	Module input state: External reverse interlocking
	active	17	1	3	Bit	0x10 (5)	-	Signal: active
	ExBlo	17	1	3	Bit	0x20 (6)	-	Signal: External Blocking
	Ex rev Interl	17	1	3	Bit	0x40 (7)	-	Signal: External reverse Interlocking
	Blo TripCmd	17	1	3	Bit	0x80 (8)	-	Signal: Trip Command blocked
	ExBlo TripCmd	17	1	3	Bit	0x100 (9)	-	Signal: External Blocking of the Trip Command

Module (ANSI / IEEE)	Name Function	Start Register Address	No. of Modbus Registers	Function code	Format	Bit Mask (Bit position)	Unit	Description
	IGH2 Blo	17	1	3	Bit	0x200 (10)	-	Signal: blocked by an inrush
	Alarm	17	1	3	Bit	0x400 (11)	-	Signal: The alarm threshold has been exceeded.
	Trip (*)	17	1	3	Bit	0x800 (12)	-	Signal: Trip
	TripCmd (*)	17	1	3	Bit	0x1000 (13)	-	Signal: Trip Command
IG[4] – 50N, 51N		**18**	**1**	**3**	**Struct**			
	ExBlo1-I	18	1	3	Bit	0x1 (1)	-	Module input state: External blocking1
	ExBlo2-I	18	1	3	Bit	0x2 (2)	-	Module input state: External blocking2
	ExBlo TripCmd-I	18	1	3	Bit	0x4 (3)	-	Module input state: External Blocking of the Trip Command
	Ex rev Interl-I	18	1	3	Bit	0x8 (4)	-	Module input state: External reverse interlocking
	active	18	1	3	Bit	0x10 (5)	-	Signal: active
	ExBlo	18	1	3	Bit	0x20 (6)	-	Signal: External Blocking

Module (ANSI / IEEE)	Name Function	Start Register Address	No. of Modbus Registers	Function code	Format	Bit Mask (Bit position)	Unit	Description
	Ex rev Interl	18	1	3	Bit	0x40 (7)	-	Signal: External reverse Interlocking
	Blo TripCmd	18	1	3	Bit	0x80 (8)	-	Signal: Trip Command blocked
	ExBlo TripCmd	18	1	3	Bit	0x100 (9)	-	Signal: External Blocking of the Trip Command
	IGH2 Blo	18	1	3	Bit	0x200 (10)	-	Signal: blocked by an inrush
	Alarm	18	1	3	Bit	0x400 (11)	-	Signal: The alarm threshold has been exceeded.
	Trip (*)	18	1	3	Bit	0x800 (12)	-	Signal: Trip
	TripCmd (*)	18	1	3	Bit	0x1000 (13)	-	Signal: Trip Command
IH2		**22**	**1**	**3**	**Struct**			
	ExBlo1-I	22	1	3	Bit	0x1 (1)	-	Module input state: External blocking1
	ExBlo2-I	22	1	3	Bit	0x2 (2)	-	Module input state: External blocking2
	active	22	1	3	Bit	0x4 (3)	-	Signal: active

Module (ANSI / IEEE)	Name Function	Start Register Address	No. of Modbus Registers	Function code	Format	Bit Mask (Bit position)	Unit	Description
	ExBlo	22	1	3	Bit	0x8 (4)	-	Signal: External Blocking
	Blo L1	22	1	3	Bit	0x10 (5)	-	Signal: Blocked L1
	Blo L2	22	1	3	Bit	0x20 (6)	-	Signal: Blocked L2
	Blo L3	22	1	3	Bit	0x40 (7)	-	Signal: Blocked L3
	Blo IG meas	22	1	3	Bit	0x80 (8)	-	Signal: Blocking of the ground (earth) protection module (measured ground current)
	3-ph Blo	22	1	3	Bit	0x100 (9)	-	Signal: Inrush was detected in at least one phase - trip command blocked.
	Blo IG calc	22	1	3	Bit	0x200 (10)	-	Signal: Blocking of the ground (earth) protection module (calculated ground current)
IRIG-B		**148**	**1**	**3**	**Struct**			
	IRIG-B active	148	1	3	Bit	0x1 (1)	-	Signal: If there is no valid IRIG-B signal for 60 sec, IRIG-B is regarded as inactive.
	High-Low Invert	148	1	3	Bit	0x2 (2)	-	Signal: The High and Low signals of the IRIG-B are inverted. This does NOT mean that the wiring is faulty. If the wiring is faulty no IRIG-B signal will be detected.
I[1] – 50, 51		**3**	**1**	**3**	**Struct**			
	ExBlo1-I	3	1	3	Bit	0x1	-	Module input state: External blocking1

Module (ANSI / IEEE)	Name Function	Start Register Address	No. of Modbus Registers	Function code	Format	Bit Mask (Bit position)	Unit	Description
						(1)		
	ExBlo2-I	3	1	3	Bit	0x2 (2)	-	Module input state: External blocking2
	ExBlo TripCmd-I	3	1	3	Bit	0x4 (3)	-	Module input state: External Blocking of the Trip Command
	Ex rev Interl-I	3	1	3	Bit	0x8 (4)	-	Module input state: External reverse interlocking
	active	3	1	3	Bit	0x10 (5)	-	Signal: active
	ExBlo	3	1	3	Bit	0x20 (6)	-	Signal: External Blocking
	Ex rev Interl	3	1	3	Bit	0x40 (7)	-	Signal: External reverse Interlocking
	Blo TripCmd	3	1	3	Bit	0x80 (8)	-	Signal: Trip Command blocked
	ExBlo TripCmd	3	1	3	Bit	0x100 (9)	-	Signal: External Blocking of the Trip Command
	IH2 Blo	3	1	3	Bit	0x200 (10)	-	Signal: Blocking the trip command by an inrush
I[1] – 50, 51		**4**	**1**	**3**	**Struct**			
	Alarm L1	4	1	3	Bit	0x1	-	Signal: Alarm L1

Module (ANSI / IEEE)	Name Function	Start Register Address	No. of Modbus Registers	Function code	Format	Bit Mask (Bit position)	Unit	Description
						(1)		
	Alarm L2	4	1	3	Bit	0x2 (2)	-	Signal: Alarm L2
	Alarm L3	4	1	3	Bit	0x4 (3)	-	Signal: Alarm L3
	Alarm	4	1	3	Bit	0x8 (4)	-	Signal: Alarm
	Trip L1 (*)	4	1	3	Bit	0x10 (5)	-	Signal: General Trip Phase L1
	Trip L2 (*)	4	1	3	Bit	0x20 (6)	-	Signal: General Trip Phase L2
	Trip L3 (*)	4	1	3	Bit	0x40 (7)	-	Signal: General Trip Phase L3
	Trip (*)	4	1	3	Bit	0x80 (8)	-	Signal: Trip
	TripCmd (*)	4	1	3	Bit	0x100 (9)	-	Signal: Trip Command
I[2] – 50, 51		**5**	**1**	**3**	**Struct**			
	ExBlo1-I	5	1	3	Bit	0x1 (1)	-	Module input state: External blocking1
	ExBlo2-I	5	1	3	Bit	0x2	-	Module input state: External blocking2

Module (ANSI / IEEE)	Name Function	Start Register Address	No. of Modbus Registers	Function code	Format	Bit Mask (Bit position)	Unit	Description
						(2)		
	ExBlo TripCmd-I	5	1	3	Bit	0x4 (3)	-	Module input state: External Blocking of the Trip Command
	Ex rev Interl-I	5	1	3	Bit	0x8 (4)	-	Module input state: External reverse interlocking
	active	5	1	3	Bit	0x10 (5)	-	Signal: active
	ExBlo	5	1	3	Bit	0x20 (6)	-	Signal: External Blocking
	Ex rev Interl	5	1	3	Bit	0x40 (7)	-	Signal: External reverse Interlocking
	Blo TripCmd	5	1	3	Bit	0x80 (8)	-	Signal: Trip Command blocked
	ExBlo TripCmd	5	1	3	Bit	0x100 (9)	-	Signal: External Blocking of the Trip Command
	IH2 Blo	5	1	3	Bit	0x200 (10)	-	Signal: Blocking the trip command by an inrush
I[2] – 50, 51		**6**	**1**	**3**	**Struct**			
	Alarm L1	6	1	3	Bit	0x1 (1)	-	Signal: Alarm L1
	Alarm L2	6	1	3	Bit	0x2	-	Signal: Alarm L2

Module (ANSI / IEEE)	Name Function	Start Register Address	No. of Modbus Registers	Function code	Format	Bit Mask (Bit position)	Unit	Description
						(2)		
	Alarm L3	6	1	3	Bit	0x4 (3)	-	Signal: Alarm L3
	Alarm	6	1	3	Bit	0x8 (4)	-	Signal: Alarm
	Trip L1 (*)	6	1	3	Bit	0x10 (5)	-	Signal: General Trip Phase L1
	Trip L2 (*)	6	1	3	Bit	0x20 (6)	-	Signal: General Trip Phase L2
	Trip L3 (*)	6	1	3	Bit	0x40 (7)	-	Signal: General Trip Phase L3
	Trip (*)	6	1	3	Bit	0x80 (8)	-	Signal: Trip
	TripCmd (*)	6	1	3	Bit	0x100 (9)	-	Signal: Trip Command
I[3] – 50, 51		**7**	**1**	**3**	**Struct**			
	ExBlo1-I	7	1	3	Bit	0x1 (1)	-	Module input state: External blocking1
	ExBlo2-I	7	1	3	Bit	0x2 (2)	-	Module input state: External blocking2

Module (ANSI / IEEE)	Name Function	Start Register Address	No. of Modbus Registers	Function code	Format	Bit Mask (Bit position)	Unit	Description
	ExBlo TripCmd-I	7	1	3	Bit	0x4 (3)	-	Module input state: External Blocking of the Trip Command
	Ex rev Interl-I	7	1	3	Bit	0x8 (4)	-	Module input state: External reverse interlocking
	active	7	1	3	Bit	0x10 (5)	-	Signal: active
	ExBlo	7	1	3	Bit	0x20 (6)	-	Signal: External Blocking
	Ex rev Interl	7	1	3	Bit	0x40 (7)	-	Signal: External reverse Interlocking
	Blo TripCmd	7	1	3	Bit	0x80 (8)	-	Signal: Trip Command blocked
	ExBlo TripCmd	7	1	3	Bit	0x100 (9)	-	Signal: External Blocking of the Trip Command
	IH2 Blo	7	1	3	Bit	0x200 (10)	-	Signal: Blocking the trip command by an inrush
I[3] – 50, 51		**8**	**1**	**3**	**Struct**			
	Alarm L1	8	1	3	Bit	0x1 (1)	-	Signal: Alarm L1
	Alarm L2	8	1	3	Bit	0x2 (2)	-	Signal: Alarm L2

Module (ANSI / IEEE)	Name Function	Start Register Address	No. of Modbus Registers	Function code	Format	Bit Mask (Bit position)	Unit	Description
	Alarm L3	8	1	3	Bit	0x4 (3)	-	Signal: Alarm L3
	Alarm	8	1	3	Bit	0x8 (4)	-	Signal: Alarm
	Trip L1 (*)	8	1	3	Bit	0x10 (5)	-	Signal: General Trip Phase L1
	Trip L2 (*)	8	1	3	Bit	0x20 (6)	-	Signal: General Trip Phase L2
	Trip L3 (*)	8	1	3	Bit	0x40 (7)	-	Signal: General Trip Phase L3
	Trip (*)	8	1	3	Bit	0x80 (8)	-	Signal: Trip
	TripCmd (*)	8	1	3	Bit	0x100 (9)	-	Signal: Trip Command
I[4] – 50, 51		**9**	**1**	**3**	**Struct**			
	ExBlo1-I	9	1	3	Bit	0x1 (1)	-	Module input state: External blocking1
	ExBlo2-I	9	1	3	Bit	0x2 (2)	-	Module input state: External blocking2
	ExBlo TripCmd-I	9	1	3	Bit	0x4 (3)	-	Module input state: External Blocking of the Trip Command

Module (ANSI / IEEE)	Name Function	Start Register Address	No. of Modbus Registers	Function code	Format	Bit Mask (Bit position)	Unit	Description
	Ex rev Interl-I	9	1	3	Bit	0x8 (4)	-	Module input state: External reverse interlocking
	active	9	1	3	Bit	0x10 (5)	-	Signal: active
	ExBlo	9	1	3	Bit	0x20 (6)	-	Signal: External Blocking
	Ex rev Interl	9	1	3	Bit	0x40 (7)	-	Signal: External reverse Interlocking
	Blo TripCmd	9	1	3	Bit	0x80 (8)	-	Signal: Trip Command blocked
	ExBlo TripCmd	9	1	3	Bit	0x100 (9)	-	Signal: External Blocking of the Trip Command
	IH2 Blo	9	1	3	Bit	0x200 (10)	-	Signal: Blocking the trip command by an inrush
I[4] – 50, 51		**10**	**1**	**3**	**Struct**			
	Alarm L1	10	1	3	Bit	0x1 (1)	-	Signal: Alarm L1
	Alarm L2	10	1	3	Bit	0x2 (2)	-	Signal: Alarm L2
	Alarm L3	10	1	3	Bit	0x4 (3)	-	Signal: Alarm L3

Module (ANSI / IEEE)	Name Function	Start Register Address	No. of Modbus Registers	Function code	Format	Bit Mask (Bit position)	Unit	Description
	Alarm	10	1	3	Bit	0x8 (4)	-	Signal: Alarm
	Trip L1 (*)	10	1	3	Bit	0x10 (5)	-	Signal: General Trip Phase L1
	Trip L2 (*)	10	1	3	Bit	0x20 (6)	-	Signal: General Trip Phase L2
	Trip L3 (*)	10	1	3	Bit	0x40 (7)	-	Signal: General Trip Phase L3
	Trip (*)	10	1	3	Bit	0x80 (8)	-	Signal: Trip
	TripCmd (*)	10	1	3	Bit	0x100 (9)	-	Signal: Trip Command
I[5] – 50, 51		**11**	**1**	**3**	**Struct**			
	ExBlo1-I	11	1	3	Bit	0x1 (1)	-	Module input state: External blocking1
	ExBlo2-I	11	1	3	Bit	0x2 (2)	-	Module input state: External blocking2
	ExBlo TripCmd-I	11	1	3	Bit	0x4 (3)	-	Module input state: External Blocking of the Trip Command
	Ex rev Interl-I	11	1	3	Bit	0x8 (4)	-	Module input state: External reverse interlocking

Module (ANSI / IEEE)	Name Function	Start Register Address	No. of Modbus Registers	Function code	Format	Bit Mask (Bit position)	Unit	Description
	active	11	1	3	Bit	0x10 (5)	-	Signal: active
	ExBlo	11	1	3	Bit	0x20 (6)	-	Signal: External Blocking
	Ex rev Interl	11	1	3	Bit	0x40 (7)	-	Signal: External reverse Interlocking
	Blo TripCmd	11	1	3	Bit	0x80 (8)	-	Signal: Trip Command blocked
	ExBlo TripCmd	11	1	3	Bit	0x100 (9)	-	Signal: External Blocking of the Trip Command
	IH2 Blo	11	1	3	Bit	0x200 (10)	-	Signal: Blocking the trip command by an inrush
I[5] – 50, 51		**12**	**1**	**3**	**Struct**			
	Alarm L1	12	1	3	Bit	0x1 (1)	-	Signal: Alarm L1
	Alarm L2	12	1	3	Bit	0x2 (2)	-	Signal: Alarm L2
	Alarm L3	12	1	3	Bit	0x4 (3)	-	Signal: Alarm L3
	Alarm	12	1	3	Bit	0x8 (4)	-	Signal: Alarm

Module (ANSI / IEEE)	Name Function	Start Register Address	No. of Modbus Registers	Function code	Format	Bit Mask (Bit position)	Unit	Description
	Trip L1 (*)	12	1	3	Bit	0x10 (5)	-	Signal: General Trip Phase L1
	Trip L2 (*)	12	1	3	Bit	0x20 (6)	-	Signal: General Trip Phase L2
	Trip L3 (*)	12	1	3	Bit	0x40 (7)	-	Signal: General Trip Phase L3
	Trip (*)	12	1	3	Bit	0x80 (8)	-	Signal: Trip
	TripCmd (*)	12	1	3	Bit	0x100 (9)	-	Signal: Trip Command
I[6] – 50, 51		**13**	**1**	**3**	**Struct**			
	ExBlo1-I	13	1	3	Bit	0x1 (1)	-	Module input state: External blocking1
	ExBlo2-I	13	1	3	Bit	0x2 (2)	-	Module input state: External blocking2
	ExBlo TripCmd-I	13	1	3	Bit	0x4 (3)	-	Module input state: External Blocking of the Trip Command
	Ex rev Interl-I	13	1	3	Bit	0x8 (4)	-	Module input state: External reverse interlocking
	active	13	1	3	Bit	0x10 (5)	-	Signal: active

Module (ANSI / IEEE)	Name Function	Start Register Address	No. of Modbus Registers	Function code	Format	Bit Mask (Bit position)	Unit	Description
	ExBlo	13	1	3	Bit	0x20 (6)	-	Signal: External Blocking
	Ex rev Interl	13	1	3	Bit	0x40 (7)	-	Signal: External reverse Interlocking
	Blo TripCmd	13	1	3	Bit	0x80 (8)	-	Signal: Trip Command blocked
	ExBlo TripCmd	13	1	3	Bit	0x100 (9)	-	Signal: External Blocking of the Trip Command
	IH2 Blo	13	1	3	Bit	0x200 (10)	-	Signal: Blocking the trip command by an inrush
I[6] – 50, 51		**14**	**1**	**3**	**Struct**			
	Alarm L1	14	1	3	Bit	0x1 (1)	-	Signal: Alarm L1
	Alarm L2	14	1	3	Bit	0x2 (2)	-	Signal: Alarm L2
	Alarm L3	14	1	3	Bit	0x4 (3)	-	Signal: Alarm L3
	Alarm	14	1	3	Bit	0x8 (4)	-	Signal: Alarm
	Trip L1 (*)	14	1	3	Bit	0x10 (5)	-	Signal: General Trip Phase L1

Module (ANSI / IEEE)	Name Function	Start Register Address	No. of Modbus Registers	Function code	Format	Bit Mask (Bit position)	Unit	Description
	Trip L2 (*)	14	1	3	Bit	0x20 (6)	-	Signal: General Trip Phase L2
	Trip L3 (*)	14	1	3	Bit	0x40 (7)	-	Signal: General Trip Phase L3
	Trip (*)	14	1	3	Bit	0x80 (8)	-	Signal: Trip
	TripCmd (*)	14	1	3	Bit	0x100 (9)	-	Signal: Trip Command
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

Module (ANSI / IEEE)	Name Function	Start Register Address	No. of Modbus Registers	Function code	Format	Bit Mask (Bit position)	Unit	Description
	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
	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

Module (ANSI / IEEE)	Name Function	Start Register Address	No. of Modbus Registers	Function code	Format	Bit Mask (Bit position)	Unit	Description
	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**			
	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

Module (ANSI / IEEE)	Name Function	Start Register Address	No. of Modbus Registers	Function code	Format	Bit Mask (Bit position)	Unit	Description
	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
	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

Module (ANSI / IEEE)	Name Function	Start Register Address	No. of Modbus Registers	Function code	Format	Bit Mask (Bit position)	Unit	Description
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)
	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	-	Signal: Output of the logic gate

Module (ANSI / IEEE)	Name Function	Start Register Address	No. of Modbus Registers	Function code	Format	Bit Mask (Bit position)	Unit	Description
						(1)		
	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
	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	-	Signal: Timer Output

Module (ANSI / IEEE)	Name Function	Start Register Address	No. of Modbus Registers	Function code	Format	Bit Mask (Bit position)	Unit	Description
						(2)		
	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
	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	-	Signal: Latched Output (Q)

Module (ANSI / IEEE)	Name Function	Start Register Address	No. of Modbus Registers	Function code	Format	Bit Mask (Bit position)	Unit	Description
						(3)		
	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**			
	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	-	Signal: Negated Latched Output (Q NOT)

Module (ANSI / IEEE)	Name Function	Start Register Address	No. of Modbus Registers	Function code	Format	Bit Mask (Bit position)	Unit	Description
						(4)		
	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
	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)

Module (ANSI / IEEE)	Name Function	Start Register Address	No. of Modbus Registers	Function code	Format	Bit Mask (Bit position)	Unit	Description
	LE10.Gate In1-I	1109	1	3	Bit	0x10 (5)	-	State of the module input: Assignment of the Input Signal
	LE10.Gate In2-I	1109	1	3	Bit	0x20 (6)	-	State of the module input: Assignment of the Input Signal
	LE10.Gate In3-I	1109	1	3	Bit	0x40 (7)	-	State of the module input: Assignment of the Input Signal
	LE10.Gate In4-I	1109	1	3	Bit	0x80 (8)	-	State of the module input: Assignment of the Input Signal
	LE10.Reset Latch-I	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)
	LE11.Gate In1-I	1110	1	3	Bit	0x10 (5)	-	State of the module input: Assignment of the Input Signal

Module (ANSI / IEEE)	Name Function	Start Register Address	No. of Modbus Registers	Function code	Format	Bit Mask (Bit position)	Unit	Description
	LE11.Gate In2-I	1110	1	3	Bit	0x20 (6)	-	State of the module input: Assignment of the Input Signal
	LE11.Gate In3-I	1110	1	3	Bit	0x40 (7)	-	State of the module input: Assignment of the Input Signal
	LE11.Gate In4-I	1110	1	3	Bit	0x80 (8)	-	State of the module input: Assignment of the Input Signal
	LE11.Reset Latch-I	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-I	1111	1	3	Bit	0x10 (5)	-	State of the module input: Assignment of the Input Signal
	LE12.Gate In2-I	1111	1	3	Bit	0x20 (6)	-	State of the module input: Assignment of the Input Signal

Module (ANSI / IEEE)	Name Function	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

Module (ANSI / IEEE)	Name Function	Start Register Address	No. of Modbus Registers	Function code	Format	Bit Mask (Bit position)	Unit	Description
	LE13.Gate In4-I	1112	1	3	Bit	0x80 (8)	-	State of the module input: Assignment of the Input Signal
	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

Module (ANSI / IEEE)	Name Function	Start Register Address	No. of Modbus Registers	Function code	Format	Bit Mask (Bit position)	Unit	Description
	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**			
	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

Module (ANSI / IEEE)	Name Function	Start Register Address	No. of Modbus Registers	Function code	Format	Bit Mask (Bit position)	Unit	Description
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
	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-I	1115	1	3	Bit	0x10 (5)	-	State of the module input: Assignment of the Input Signal
	LE16.Gate In2-I	1115	1	3	Bit	0x20 (6)	-	State of the module input: Assignment of the Input Signal
	LE16.Gate In3-I	1115	1	3	Bit	0x40 (7)	-	State of the module input: Assignment of the Input Signal
	LE16.Gate In4-I	1115	1	3	Bit	0x80 (8)	-	State of the module input: Assignment of the Input Signal
	LE16.Reset Latch-I	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	-	Signal: Output of the logic gate

Module (ANSI / IEEE)	Name Function	Start Register Address	No. of Modbus Registers	Function code	Format	Bit Mask (Bit position)	Unit	Description
						(1)		
	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)
	LE17.Gate In1-I	1116	1	3	Bit	0x10 (5)	-	State of the module input: Assignment of the Input Signal
	LE17.Gate In2-I	1116	1	3	Bit	0x20 (6)	-	State of the module input: Assignment of the Input Signal
	LE17.Gate In3-I	1116	1	3	Bit	0x40 (7)	-	State of the module input: Assignment of the Input Signal
	LE17.Gate In4-I	1116	1	3	Bit	0x80 (8)	-	State of the module input: Assignment of the Input Signal
	LE17.Reset Latch-I	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	-	Signal: Timer Output

Module (ANSI / IEEE)	Name Function	Start Register Address	No. of Modbus Registers	Function code	Format	Bit Mask (Bit position)	Unit	Description
						(2)		
	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-I	1117	1	3	Bit	0x10 (5)	-	State of the module input: Assignment of the Input Signal
	LE18.Gate In2-I	1117	1	3	Bit	0x20 (6)	-	State of the module input: Assignment of the Input Signal
	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	-	Signal: Latched Output (Q)

Module (ANSI / IEEE)	Name Function	Start Register Address	No. of Modbus Registers	Function code	Format	Bit Mask (Bit position)	Unit	Description
						(3)		
	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
	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	-	Signal: Negated Latched Output (Q NOT)

Module (ANSI / IEEE)	Name Function	Start Register Address	No. of Modbus Registers	Function code	Format	Bit Mask (Bit position)	Unit	Description
						(4)		
	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**			
	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	-	Scada Command

Module (ANSI / IEEE)	Name Function	Start Register Address	No. of Modbus Registers	Function code	Format	Bit Mask (Bit position)	Unit	Description
						(5)		
	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
	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

Module (ANSI / IEEE)	Name Function	Start Register Address	No. of Modbus Registers	Function code	Format	Bit Mask (Bit position)	Unit	Description
	Scada Cmd 16	1005	1	3	Bit	0x8000 (16)	-	Scada Command
PSet-Switch		**59**	**1**	**3**	**Struct**			
	PS 1	59	1	3	Bit	0x1 (1)	-	Signal: The currently active Parameter Set is PS 1
	PS 2	59	1	3	Bit	0x2 (2)	-	Signal: The currently active Parameter Set is PS 2
	PS 3	59	1	3	Bit	0x4 (3)	-	Signal: The currently active Parameter Set is PS 3
	PS 4	59	1	3	Bit	0x8 (4)	-	Signal: The currently active Parameter Set is PS 4
	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. Write into this output byte the integer of the parameter set that should become active (e.g. 4 => Switch onto parameter set 4).
	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.

Module (ANSI / IEEE)	Name Function	Start Register Address	No. of Modbus Registers	Function code	Format	Bit Mask (Bit position)	Unit	Description
	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
	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

Module (ANSI / IEEE)	Name Function	Start Register Address	No. of Modbus Registers	Function code	Format	Bit Mask (Bit position)	Unit	Description
	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
	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

Module (ANSI / IEEE)	Name Function	Start Register Address	No. of Modbus Registers	Function code	Format	Bit Mask (Bit position)	Unit	Description
	ExBlo TripCmd	2	1	3	Bit	0x4 (3)	-	Signal: External Blocking of the Trip Command
Prot		**57**	**1**	**3**	**Struct**			
	Fault No.	57	1	3	Bit	0xffff (1)	-	Fault number
Prot		**58**	**1**	**3**	**Struct**			
	No. of Grid Faults	58	1	3	Bit	0xffff (1)	-	Number of grid faults: This is a counter for all faults (i.e. General Alarms »Prot . Alarm«), but except faults during a running cycle of the Automatic Reclosure module (signal »AR . running«). (Remark: The »Fault No.« counts every new fault independent of AR cycles. This means that for protective devices without AR module these two counters are equivalent.)
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)
	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	-	State of the module input: Interlocking of the OFF command

Module (ANSI / IEEE)	Name Function	Start Register Address	No. of Modbus Registers	Function code	Format	Bit Mask (Bit position)	Unit	Description
						(5)		
	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
	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	-	Signal: OFF Cmd manual

Module (ANSI / IEEE)	Name Function	Start Register Address	No. of Modbus Registers	Function code	Format	Bit Mask (Bit position)	Unit	Description
						(16)		
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 Sl 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.
	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

Module (ANSI / IEEE)	Name Function	Start Register Address	No. of Modbus Registers	Function code	Format	Bit Mask (Bit position)	Unit	Description
								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**			
	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	-	Signal: Circuit Breaker is in ON-Position

Module (ANSI / IEEE)	Name Function	Start Register Address	No. of Modbus Registers	Function code	Format	Bit Mask (Bit position)	Unit	Description
						(5)		
	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
	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**			

Module (ANSI / IEEE)	Name Function	Start Register Address	No. of Modbus Registers	Function code	Format	Bit Mask (Bit position)	Unit	Description
	Isum Intr trip	195	1	3	Bit	0x10 (5)	-	Signal: Maximum permissible Summation of the interrupting (tripping) currents exceeded in at least one phase.
	Isum Intr trip: IL1	195	1	3	Bit	0x20 (6)	-	Signal: Maximum permissible Summation of the interrupting (tripping) currents exceeded: IL1
	Isum Intr trip: IL2	195	1	3	Bit	0x40 (7)	-	Signal: Maximum permissible Summation of the interrupting (tripping) currents exceeded: IL2
	Isum Intr trip: IL3	195	1	3	Bit	0x80 (8)	-	Signal: Maximum permissible Summation of the interrupting (tripping) currents exceeded: IL3
	Operations Alarm	195	1	3	Bit	0x100 (9)	-	Signal: Too many Operations. (The operations counter »TripCmd Cr« has exceeded the limit set at »Operations Alarm«.)
	WearLevel Alarm	195	1	3	Bit	0x200 (10)	-	Signal: Threshold for the Alarm
	WearLevel Lockout	195	1	3	Bit	0x400 (11)	-	Signal: Threshold for the Lockout Level
	Isum Intr ph Alm	195	1	3	Bit	0x800 (12)	-	Signal: Alarm, the per hour Sum (Limit) of interrupting currents has been exceeded.
SG[1]		**256**	**1**	**3**	**Struct**			
	Removed-I	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	-	Signal: Command Execution Supervision: Switching Command unsuccessful, Switchgear removed.

Module (ANSI / IEEE)	Name Function	Start Register Address	No. of Modbus Registers	Function code	Format	Bit Mask (Bit position)	Unit	Description
						(2)		
	Removed	256	1	3	Bit	0x4 (3)	-	Signal: The withdrawable circuit breaker is Removed
SOTF		**65**	**1**	**3**	**Struct**			
	ExBlo1-I	65	1	3	Bit	0x1 (1)	-	Module input state: External blocking
	ExBlo2-I	65	1	3	Bit	0x2 (2)	-	Module input state: External blocking
	Ext SOTF-I	65	1	3	Bit	0x4 (3)	-	Module input state: External Switch Onto Fault Alarm
	Ex rev Interl-I	65	1	3	Bit	0x8 (4)	-	Module input state: External reverse interlocking
	active	65	1	3	Bit	0x10 (5)	-	Signal: active
	ExBlo	65	1	3	Bit	0x20 (6)	-	Signal: External Blocking
	Ex rev Interl	65	1	3	Bit	0x40 (7)	-	Signal: External reverse Interlocking
	AR Blo	65	1	3	Bit	0x400 (11)	-	Signal: Blocked by AR

Module (ANSI / IEEE)	Name Function	Start Register Address	No. of Modbus Registers	Function code	Format	Bit Mask (Bit position)	Unit	Description
	enabled	65	1	3	Bit	0x800 (12)	-	Signal: Switch Onto Fault enabled. This Signal can be used to modify Overcurrent Protection Settings.
	I<	65	1	3	Bit	0x2000 (14)	-	Signal: No Load Current.
SSV		**273**	**1**	**3**	**Struct**			
	System Error	273	1	3	Bit	0x1 (1)	-	Signal: Device Failure
	New error (*)	273	1	3	Bit	0x8 (4)	-	Signal: A new error message has been issued.
	New warning (*)	273	1	3	Bit	0x10 (5)	-	Signal: A new warning message has been issued.
	active	273	1	3	Bit	0x20 (6)	-	Signal: active
Sgen		**1012**	**1**	**3**	**Struct**			
	ExBlo1-I	1012	1	3	Bit	0x1 (1)	-	Module input state: External blocking1
	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

Module (ANSI / IEEE)	Name Function	Start Register Address	No. of Modbus Registers	Function code	Format	Bit Mask (Bit position)	Unit	Description
	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)
	ExBlo2-I	1012	1	3	Bit	0x200 (10)	-	Module input state: External blocking2
	Manual Start	1012	1	3	Bit	0x400 (11)	-	Fault Simulation has been started manually.
	Manual Stop	1012	1	3	Bit	0x800 (12)	-	Fault Simulation has been stopped manually.
	Started	1012	1	3	Bit	0x1000 (13)	-	Fault Simulation has been started
	Stopped	1012	1	3	Bit	0x2000 (14)	-	Fault Simulation has been stopped
Sys		**154**	**1**	**3**	**Struct**			
	Setting Lock-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

Module (ANSI / IEEE)	Name Function	Start Register Address	No. of Modbus Registers	Function code	Format	Bit Mask (Bit position)	Unit	Description
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
	Alm Current avg (Demd)	173	1	3	Bit	0x4 (3)	-	Signal: Alarm: Averaged demand current exceeded
	active	173	1	3	Bit	0x8 (4)	-	Signal: active
	Alarm I THD	173	1	3	Bit	0x10 (5)	-	Signal: Alarm Total Harmonic Distortion Current
	Trip Current avg (Demd) (*)	173	1	3	Bit	0x1000 (13)	-	Signal: Trip: Averaged demand current exceeded
	Trip I THD (*)	173	1	3	Bit	0x2000 (14)	-	Signal: Trip Total Harmonic Distortion Current
TCS – 74TC		**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	-	Signal: active

Module (ANSI / IEEE)	Name Function	Start Register Address	No. of Modbus Registers	Function code	Format	Bit Mask (Bit position)	Unit	Description
						(3)		
	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.
	Aux ON-I	150	1	3	Bit	0x100 (9)	-	Module Input State: Position indicator/ check-back signal of the CB (52a)
	Aux OFF-I	150	1	3	Bit	0x200 (10)	-	Module input state: Position indicator/ check-back signal of the CB (52b)
ThR – 49		**19**	**1**	**3**	**Struct**			
	ExBlo1-I	19	1	3	Bit	0x1 (1)	-	Module input state: External blocking1
	ExBlo2-I	19	1	3	Bit	0x2 (2)	-	Module input state: External blocking2
	ExBlo TripCmd-I	19	1	3	Bit	0x4 (3)	-	Module input state: External Blocking of the Trip Command
	active	19	1	3	Bit	0x8 (4)	-	Signal: active
	ExBlo	19	1	3	Bit	0x10	-	Signal: External Blocking

Module (ANSI / IEEE)	Name Function	Start Register Address	No. of Modbus Registers	Function code	Format	Bit Mask (Bit position)	Unit	Description
						(5)		
	Blo TripCmd	19	1	3	Bit	0x20 (6)	-	Signal: Trip Command blocked
	ExBlo TripCmd	19	1	3	Bit	0x40 (7)	-	Signal: External Blocking of the Trip Command
	Alarm	19	1	3	Bit	0x80 (8)	-	Signal: Alarm Thermal Overload
	Trip (*)	19	1	3	Bit	0x100 (9)	-	Signal: Trip
	TripCmd (*)	19	1	3	Bit	0x200 (10)	-	Signal: Trip Command
TimeSync		**54**	**1**	**3**	**Struct**			
	synchronized	54	1	3	Bit	0x1 (1)	-	Clock is synchronized.

3.2 Measuring Values

Module (ANSI / IEEE)	Name Function	Start Register Address	No. of Modbus Registers	Function code	Format	Bit Mask (Bit position)	Unit	Description
AR – 79	Total number Cr	20164	2	4	Float IEE754		-	Total number of all executed Automatic Reclosures Attempts
AR – 79	Cr failed	20166	2	4	Float IEE754		-	Total number of unsuccessfully executed automatic reclosure attempts
AR – 79	Cr successfl	20168	2	4	Float IEE754		-	Total number of successfully executed Automatic Reclosures
AR – 79	Cr Service Alarm1	20170	2	4	Float IEE754		-	Remaining numbers of ARs until Service Alarm 1
AR – 79	Cr Service Alarm2	20172	2	4	Float IEE754		-	Remaining numbers of ARs until Service Alarm 2
AR – 79	AR Shot No.	20188	2	4	Float IEE754		-	Counter - Auto Reclosure Attempts
AR – 79	Max Shots / h Cr	20374	2	4	Float IEE754		-	Counter for the maximum allowed shots per hour.
CT	IL1	20100	2	4	Float IEE754		A	Measured value: Phase current (fundamental)
CT	IL2	20102	2	4	Float IEE754		A	Measured value: Phase current (fundamental)
CT	IL3	20104	2	4	Float IEE754		A	Measured value: Phase current (fundamental)
CT	IG meas	20106	2	4	Float IEE754		A	Measured value (measured): IG (fundamental)
CT	I0	20114	2	4	Float IEE754		A	Measured value (calculated): Zero current (fundamental)
CT	I1	20116	2	4	Float IEE754		A	Measured value (calculated): Positive phase sequence current (fundamental)
CT	I2	20118	2	4	Float IEE754		A	Measured value (calculated): Unbalanced load current (fundamental)

Module (ANSI / IEEE)	Name Function	Start Register Address	No. of Modbus Registers	Function code	Format	Bit Mask (Bit position)	Unit	Description
CT	IL1 H2	20120	2	4	Float IEE754		%	Measured value: 2nd harmonic/1st harmonic of IL1
CT	IL2 H2	20122	2	4	Float IEE754		%	Measured value: 2nd harmonic/1st harmonic of IL2
CT	IL3 H2	20124	2	4	Float IEE754		%	Measured value: 2nd harmonic/1st harmonic of IL3
CT	IG H2 meas	20126	2	4	Float IEE754		%	Measured value: 2nd harmonic/1st harmonic of IG (measured)
CT	IG calc	20160	2	4	Float IEE754		A	Measured value (calculated): IG (fundamental)
CT	phi IG calc	20200	2	4	Float IEE754		°	Measured value (calculated): Angle of Phasor IG calc Reference phasor is required to calculate the angle. This is the first measured voltage (or current) channel with sufficiently high amplitude.
CT	phi IG meas	20202	2	4	Float IEE754		°	Measured value (calculated): Angle of Phasor IG meas Reference phasor is required to calculate the angle. This is the first measured voltage (or current) channel with sufficiently high amplitude.
CT	phi IL1	20204	2	4	Float IEE754		°	Measured value (calculated): Angle of Phasor IL1 Reference phasor is required to calculate the angle. This is the first measured voltage (or current) channel with sufficiently high amplitude.
CT	phi IL2	20206	2	4	Float IEE754		°	Measured value (calculated): Angle of Phasor IL2 Reference phasor is required to calculate the angle. This is the first measured

Module (ANSI / IEEE)	Name Function	Start Register Address	No. of Modbus Registers	Function code	Format	Bit Mask (Bit position)	Unit	Description
								voltage (or current) channel with sufficiently high amplitude.
CT	phi IL3	20208	2	4	Float IEE754		°	Measured value (calculated): Angle of Phasor IL3 Reference phasor is required to calculate the angle. This is the first measured voltage (or current) channel with sufficiently high amplitude.
CT	IL1 THD	20210	2	4	Float IEE754		A	Measured value (calculated): IL1 Total Harmonic Current
CT	IL2 THD	20212	2	4	Float IEE754		A	Measured value (calculated): IL2 Total Harmonic Current
CT	IL3 THD	20214	2	4	Float IEE754		A	Measured value (calculated): IL3 Total Harmonic Current
CT	%IL1 THD	20216	2	4	Float IEE754		%	Measured value (calculated): IL1 Total Harmonic Distortion
CT	%IL2 THD	20218	2	4	Float IEE754		%	Measured value (calculated): IL2 Total Harmonic Distortion
CT	%IL3 THD	20220	2	4	Float IEE754		%	Measured value (calculated): IL3 Total Harmonic Distortion
CT	IL1 RMS	20316	2	4	Float IEE754		A	Measured value: Phase current (RMS)
CT	IL2 RMS	20318	2	4	Float IEE754		A	Measured value: Phase current (RMS)
CT	IL3 RMS	20320	2	4	Float IEE754		A	Measured value: Phase current (RMS)
CT	IG meas RMS	20322	2	4	Float IEE754		A	Measured value (measured): IG (RMS)
CT	IG calc RMS	20324	2	4	Float IEE754		A	Measured value (calculated): IG (RMS)
CT	%(I2/I1)	20376	2	4	Float IEE754		%	Measured value (calculated): I2/I1, phase sequence will be taken into account automatically.
CT	phi I0	20378	2	4	Float IEE754		°	Measured value (calculated): Angle Zero Sequence System

Module (ANSI / IEEE)	Name Function	Start Register Address	No. of Modbus Registers	Function code	Format	Bit Mask (Bit position)	Unit	Description
								Reference phasor is required to calculate the angle. This is the first measured voltage (or current) channel with sufficiently high amplitude.
CT	phi I1	20380	2	4	Float IEE754		°	Measured value (calculated): Angle of Positive Sequence System Reference phasor is required to calculate the angle. This is the first measured voltage (or current) channel with sufficiently high amplitude.
CT	phi I2	20382	2	4	Float IEE754		°	Measured Value (calculated): Angle of Negative Sequence System Reference phasor is required to calculate the angle. This is the first measured voltage (or current) channel with sufficiently high amplitude.
CT	IG H2 calc	20500	2	4	Float IEE754		%	Measured value (calculated): 2nd harmonic/1st harmonic of IG (calculated)
CT	I1 max	21074	2	4	Float IEE754		A	Maximum value positive phase sequence current (fundamental)
CT	I1 min	21076	2	4	Float IEE754		A	Minimum value positive phase sequence current (fundamental)
CT	I2 max	21080	2	4	Float IEE754		A	Maximum value negative sequence current (fundamental)
CT	I2 min	21082	2	4	Float IEE754		A	Minimum value unbalanced load current (fundamental)
CT	IL1 avg RMS	21130	2	4	Float IEE754		A	IL1 average value (RMS)
CT	IL2 avg RMS	21132	2	4	Float IEE754		A	IL2 average value (RMS)
CT	IL3 avg RMS	21134	2	4	Float IEE754		A	IL3 average value (RMS)
CT	IL1 max RMS	21136	2	4	Float IEE754		A	IL1 maximum value (RMS)
CT	IL2 max RMS	21138	2	4	Float IEE754		A	IL2 maximum value (RMS)

Module (ANSI / IEEE)	Name Function	Start Register Address	No. of Modbus Registers	Function code	Format	Bit Mask (Bit position)	Unit	Description
CT	IL3 max RMS	21140	2	4	Float IEE754		A	IL3 maximum value (RMS)
CT	IL1 min RMS	21142	2	4	Float IEE754		A	IL1 minimum value (RMS)
CT	IL2 min RMS	21144	2	4	Float IEE754		A	IL2 minimum value (RMS)
CT	IL3 min RMS	21146	2	4	Float IEE754		A	IL3 minimum value (RMS)
CT	IG H2 meas max	21222	2	4	Float IEE754		%	Measured value: Maximum ratio of 2nd harmonic over fundamental of IG (measured)
CT	IG H2 meas min	21224	2	4	Float IEE754		%	Measured value: Minimum ratio of 2nd harmonic over fundamental of IG (measured)
CT	IL1 H2 max	21228	2	4	Float IEE754		%	Maximum ratio of 2nd harmonic over fundamental of IL1
CT	IL1 H2 min	21230	2	4	Float IEE754		%	Minimum ratio of 2nd harmonic over fundamental of IL1
CT	IL2 H2 max	21234	2	4	Float IEE754		%	Maximum ratio of 2nd harmonic over fundamental of IL2
CT	IL2 H2 min	21236	2	4	Float IEE754		%	Minimum ratio of 2nd harmonic over fundamental of IL2
CT	IL3 H2 max	21240	2	4	Float IEE754		%	Maximum ratio of 2nd harmonic over fundamental of IL3
CT	IL3 H2 min	21242	2	4	Float IEE754		%	Minimum ratio of 2nd harmonic/1st harmonic minimum value of IL3
CT	IG calc max RMS	21456	2	4	Float IEE754		A	Measured value (calculated):IG maximum value (RMS)
CT	IG calc min RMS	21458	2	4	Float IEE754		A	Measured value (calculated):IG minimum value (RMS)
CT	IG meas max RMS	21462	2	4	Float IEE754		A	Measured value: IG maximum value (RMS)
CT	IG meas min RMS	21464	2	4	Float IEE754		A	Measured value: IG minimum value (RMS)

Module (ANSI / IEEE)	Name Function	Start Register Address	No. of Modbus Registers	Function code	Format	Bit Mask (Bit position)	Unit	Description
CT	%(I2/I1) max	21468	2	4	Float IEE754		%	Measured value (calculated): I2/I1 maximum value, phase sequence will be taken into account automatically
CT	%(I2/I1) min	21470	2	4	Float IEE754		%	Measured value (calculated): I2/I1 minimum value, phase sequence will be taken into account automatically
CT	IG H2 calc max	21774	2	4	Float IEE754		%	Measured value (calculated): Maximum ratio of 2nd harmonic over fundamental of IG (calculated)
CT	IG H2 calc min	21776	2	4	Float IEE754		%	IG H2 calc min
CT	IL1 Peak (Demand)	21784	2	4	Float IEE754		A	IL1 Peak value, RMS value
CT	IL2 Peak (Demand)	21786	2	4	Float IEE754		A	IL2 Peak value, RMS value
CT	IL3 Peak (Demand)	21788	2	4	Float IEE754		A	IL3 Peak value, RMS value
CT - fault value	IL1	50100	2	4	Float IEE754		A	Measured value: Phase current (fundamental) , as stored in the Fault Recorder
CT - fault value	IL2	50102	2	4	Float IEE754		A	Measured value: Phase current (fundamental) , as stored in the Fault Recorder
CT - fault value	IL3	50104	2	4	Float IEE754		A	Measured value: Phase current (fundamental) , as stored in the Fault Recorder
CT - fault value	IG meas	50106	2	4	Float IEE754		A	Measured value (measured): IG (fundamental) , as stored in the Fault Recorder
CT - fault value	I0	50114	2	4	Float IEE754		A	Measured value (calculated): Zero current (fundamental) , as stored in the Fault Recorder
CT - fault value	I1	50116	2	4	Float IEE754		A	Measured value (calculated): Positive phase sequence current (fundamental) , as stored in the Fault Recorder

Module (ANSI / IEEE)	Name Function	Start Register Address	No. of Modbus Registers	Function code	Format	Bit Mask (Bit position)	Unit	Description
CT - fault value	I2	50118	2	4	Float IEE754		A	Measured value (calculated): Unbalanced load current (fundamental) , as stored in the Fault Recorder
CT - fault value	IL1 H2	50120	2	4	Float IEE754		%	Measured value: 2nd harmonic/1st harmonic of IL1 , as stored in the Fault Recorder
CT - fault value	IL2 H2	50122	2	4	Float IEE754		%	Measured value: 2nd harmonic/1st harmonic of IL2 , as stored in the Fault Recorder
CT - fault value	IL3 H2	50124	2	4	Float IEE754		%	Measured value: 2nd harmonic/1st harmonic of IL3 , as stored in the Fault Recorder
CT - fault value	IG H2 meas	50126	2	4	Float IEE754		%	Measured value: 2nd harmonic/1st harmonic of IG (measured) , as stored in the Fault Recorder
CT - fault value	IG calc	50160	2	4	Float IEE754		A	Measured value (calculated): IG (fundamental) , as stored in the Fault Recorder
CT - fault value	phi IG calc	50200	2	4	Float IEE754		°	Measured value (calculated): Angle of Phasor IG calc Reference phasor is required to calculate the angle. This is the first measured voltage (or current) channel with sufficiently high amplitude. , as stored in the Fault Recorder
CT - fault value	phi IG meas	50202	2	4	Float IEE754		°	Measured value (calculated): Angle of Phasor IG meas Reference phasor is required to calculate the angle. This is the first measured voltage (or current) channel with sufficiently high amplitude. , as stored in the Fault Recorder
CT - fault value	phi IL1	50204	2	4	Float IEE754		°	Measured value (calculated): Angle of Phasor IL1

Module (ANSI / IEEE)	Name Function	Start Register Address	No. of Modbus Registers	Function code	Format	Bit Mask (Bit position)	Unit	Description
								Reference phasor is required to calculate the angle. This is the first measured voltage (or current) channel with sufficiently high amplitude. , as stored in the Fault Recorder
CT - fault value	phi IL2	50206	2	4	Float IEE754		°	Measured value (calculated): Angle of Phasor IL2 Reference phasor is required to calculate the angle. This is the first measured voltage (or current) channel with sufficiently high amplitude. , as stored in the Fault Recorder
CT - fault value	phi IL3	50208	2	4	Float IEE754		°	Measured value (calculated): Angle of Phasor IL3 Reference phasor is required to calculate the angle. This is the first measured voltage (or current) channel with sufficiently high amplitude. , as stored in the Fault Recorder
CT - fault value	IL1 RMS	50316	2	4	Float IEE754		A	Measured value: Phase current (RMS) , as stored in the Fault Recorder
CT - fault value	IL2 RMS	50318	2	4	Float IEE754		A	Measured value: Phase current (RMS) , as stored in the Fault Recorder
CT - fault value	IL3 RMS	50320	2	4	Float IEE754		A	Measured value: Phase current (RMS) , as stored in the Fault Recorder
CT - fault value	IG meas RMS	50322	2	4	Float IEE754		A	Measured value (measured): IG (RMS) , as stored in the Fault Recorder
CT - fault value	IG calc RMS	50324	2	4	Float IEE754		A	Measured value (calculated): IG (RMS) , as stored in the Fault Recorder
CT - fault value	%(I2/I1)	50376	2	4	Float IEE754		%	Measured value (calculated): I2/I1, phase sequence will be taken into account automatically. , as stored in the Fault Recorder

Module (ANSI / IEEE)	Name Function	Start Register Address	No. of Modbus Registers	Function code	Format	Bit Mask (Bit position)	Unit	Description
CT - fault value	IG H2 calc	50500	2	4	Float IEE754		%	Measured value (calculated): 2nd harmonic/1st harmonic of IG (calculated) , as stored in the Fault Recorder
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: Total number of rising and falling edges. This signal indicates if a signal is available at the IRIG-B input.
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.
Modbus	Mapped Meas 1	23000	2	4	Float IEE754		-	Mapped Measured Values. They can be used to provide measured values to the Modbus Master.

Module (ANSI / IEEE)	Name Function	Start Register Address	No. of Modbus Registers	Function code	Format	Bit Mask (Bit position)	Unit	Description
Modbus	Mapped Meas 2	23002	2	4	Float IEE754		-	Mapped Measured Values. They can be used to provide measured values to the Modbus Master.
Modbus	Mapped Meas 3	23004	2	4	Float IEE754		-	Mapped Measured Values. They can be used to provide measured values to the Modbus Master.
Modbus	Mapped Meas 4	23006	2	4	Float IEE754		-	Mapped Measured Values. They can be used to provide measured values to the Modbus Master.
Modbus	Mapped Meas 5	23008	2	4	Float IEE754		-	Mapped Measured Values. They can be used to provide measured values to the Modbus Master.
Modbus	Mapped Meas 6	23010	2	4	Float IEE754		-	Mapped Measured Values. They can be used to provide measured values to the Modbus Master.
Modbus	Mapped Meas 7	23012	2	4	Float IEE754		-	Mapped Measured Values. They can be used to provide measured values to the Modbus Master.
Modbus	Mapped Meas 8	23014	2	4	Float IEE754		-	Mapped Measured Values. They can be used to provide measured values to the Modbus Master.
Modbus	Mapped Meas 9	23016	2	4	Float IEE754		-	Mapped Measured Values. They can be used to provide measured values to the Modbus Master.
Modbus	Mapped Meas 10	23018	2	4	Float IEE754		-	Mapped Measured Values. They can be used to provide measured values to the Modbus Master.
Modbus	Mapped Meas 11	23020	2	4	Float IEE754		-	Mapped Measured Values. They can be used to provide measured values to the Modbus Master.
Modbus	Mapped Meas 12	23022	2	4	Float IEE754		-	Mapped Measured Values. They can be used to provide measured values to the Modbus Master.

Module (ANSI / IEEE)	Name Function	Start Register Address	No. of Modbus Registers	Function code	Format	Bit Mask (Bit position)	Unit	Description
Modbus	Mapped Meas 13	23024	2	4	Float IEE754		-	Mapped Measured Values. They can be used to provide measured values to the Modbus Master.
Modbus	Mapped Meas 14	23026	2	4	Float IEE754		-	Mapped Measured Values. They can be used to provide measured values to the Modbus Master.
Modbus	Mapped Meas 15	23028	2	4	Float IEE754		-	Mapped Measured Values. They can be used to provide measured values to the Modbus Master.
Modbus	Mapped Meas 16	23030	2	4	Float IEE754		-	Mapped Measured Values. They can be used to provide measured values to the Modbus Master.
SG[1]	Sum trip IL1	20800	2	4	Float IEE754		A	Summation of the tripping currents phase
SG[1]	Sum trip IL2	20802	2	4	Float IEE754		A	Summation of the tripping currents phase
SG[1]	Sum trip IL3	20804	2	4	Float IEE754		A	Summation of the tripping currents phase
SG[1]	Isum Intr per hour	20806	2	4	Float IEE754		kA	Sum per hour of interrupting currents.
SG[1]	CB OPEN capacity	20808	2	4	Float IEE754		%	Used capacity of the circuit breaker. (100% means that the circuit breaker has to be maintained.)
SG[1]	TripCmd Cr	20810	2	4	Float IEE754		-	Counter: Total number of trips of the switchgear.
ThR – 49	Thermal Cap Used	20110	2	4	Float IEE754		%	Measured value: Thermal Capacity Used
ThR – 49	Time To Trip	20112	2	4	Float IEE754		s	Measured value (calculated/measured): Remaining time until the thermal overload module will trip
ThR – 49	Thermal Cap max	21086	2	4	Float IEE754		%	Thermal Capacity maximum value
ThR - fault value – 49	Thermal Cap Used	50110	2	4	Float IEE754		%	Measured value: Thermal Capacity Used , as stored in the Fault Recorder
ThR - fault value – 49	Time To Trip	50112	2	4	Float IEE754		s	Measured value (calculated/measured): Remaining time until the thermal overload module will trip , as stored in the Fault Recorder

Module (ANSI / IEEE)	Name Function	Start Register Address	No. of Modbus Registers	Function code	Format	Bit Mask (Bit position)	Unit	Description
Values	Build	20008	2	4	Float IEE754		-	Build Number
Values	Operating hours Cr	20010	2	4	Float IEE754		h	Operating hours counter of the protective device

3.3 Commands

Module (ANSI / IEEE)	Name Function	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
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
Scada Cmd	Assbl Scada Cmd 10	22029	1	5	0xFF00=On, 0x0000=Off		-	Assignable Scada Command

Module (ANSI / IEEE)	Name Function	Start Register Address	No. of Modbus Registers	Function code	Format	Bit Mask (Bit position)	Unit	Description
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
Fault rec	Res all rec	22040	1	5	0xFF00		-	Reset all records
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

3.4 Settings

Module (ANSI / IEEE)	Name Function	Start Register Address	No. of Modbus Registers	Function code	Format	Bit Mask (Bit position)	Unit	Description
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
Fault rec		**50000**	**9**	**3 16**	**Struct**			
	RecordNo	50000	9	3 16	Short	Word 0 (1)	-	Record Number
	Trip Cause	50000	9	3 16	Short	Word 1 (17)	-	Code for the trip cause. In case of several simultaneous trip causes the primary cause is selected. If there is another trip later then the new trip cause overwrites the previous one. The codes for the trip cause are documented in the SCADA documentation.

Module (ANSI / IEEE)	Name Function	Start Register Address	No. of Modbus Registers	Function code	Format	Bit Mask (Bit position)	Unit	Description
	Pickup Cause	50000	9	3 16	Short	Word 2 (33)	-	Code for last PickUp cause corresponds to fault record: See scada doc for correlation between pickup reason and code
	Fault No.	50000	9	3 16	Short	Word 3 (49)	-	Fault number
	No. of Grid Faults	50000	9	3 16	Short	Word 4 (65)	-	Number of grid faults: This is a counter for all faults (i.e. General Alarms »Prot . Alarm«), but except faults during a running cycle of the Automatic Reclosure module (signal »AR . running«). (Remark: The »Fault No.« counts every new fault independent of AR cycles. This means that for protective devices without AR module these two counters are equivalent.)
	Time stamp:	50000	9	3 16	long long	Word 5- Word 9 (81)	-	Timestamp in milliseconds since 1970

3.5 Cause of Trip

Cause of trip reason is provided on two different Modbus addresses:

- At address 5004 the “last primary trip cause” is available. This means, in case of several simultaneous trip causes the primary cause is selected. If there is another trip later then the new trip cause overwrites the previous one.The trip cause can be read as long as a trip reason is present. In addition, the content of this register can be latched. The trip cause is latched in the same way as other trip signals, that means if the corresponding latching setting in Modbus is active, the content of the register is fixed until it is acknowledged by command.
- At address 50000 and up the last trip and alarm reason is available with related record, fault, net number and time stamp.It is possible to read an arbitrary saved records by requesting corresponding record number. For requesting of a certain saved record user has to send the record number on corresponding register. Be aware that the content of these registers can only be read entirely and that the content changes every time a new fault occurs in the fault recorder.

Fault values can be read on addresses greater than 50000. Addresses of fault values corresponds to addresses of instantaneous values plus offset of 30000, for example Current instantaneous value IE1 is 20100, corresponding fault value address is 50100. This address area need not be read entirely, each address can be read separately. If not a specific fault is selected, last fault value is presented on these addresses.

The following table is showing the “trip cause code” and its relation to the “trip cause reason”.

Trip Cause	Description	Module
1	**NORM**	
1201		**IG[1]**
1202		**IG[2]**
1203		**IG[3]**
1204		**IG[4]**
1306		**ExP[1]**
1307		**ExP[2]**
1308		**ExP[3]**
1309		**ExP[4]**

Trip Cause	Description	Module
2901		**I2>[1]**
2902		**I2>[2]**
3201		**I[1]**
3202		**I[2]**
3203		**I[3]**
3204		**I[4]**
3205		**I[5]**
3206		**I[6]**
3801		**ThR**

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