

# Modbus – Data Point List

High **PROTEC** | PROTECTION TECHNOLOGY  
MADE SIMPLE

MCA4 |

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# Table of Contents

|          |   |           |
|----------|---|-----------|
| <b>1</b> | <b>Modbus Parameters</b> .....              | <b>4</b>  |
| 1.1      | Notes for the SCADA-System .....            | 5         |
| <b>2</b> | <b>Specific Modbus Function Codes</b> ..... | <b>6</b>  |
| 2.1      | Function Code 3/4 .....                     | 7         |
| 2.2      | Float Values IEEE 754 .....                 | 8         |
| 2.3      | Function Code 5 .....                       | 10        |
| 2.4      | Function Code 8 .....                       | 11        |
| 2.5      | Function Code 16 .....                      | 12        |
| 2.6      | Setting Date and Time .....                 | 13        |
| 2.7      | Supported MODBUS Error Messages .....       | 14        |
| <b>3</b> | <b>Appendix - Data Point Lists</b> .....    | <b>15</b> |
| 3.1      | Signals .....                               | 15        |
| 3.2      | Measuring Values .....                      | 186       |
| 3.3      | Commands .....                              | 212       |
| 3.4      | Settings .....                              | 215       |
| 3.5      | Cause of Trip .....                         | 217       |

# 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 | Register address | Register number | Register number | Check-sum | Check-sum |
|               |     | HI               | LO               | HI              | LO              | HI        | LO        |

### Response

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

### Response

|               |   |                  |                  |               |               |           |           |
|---------------|---|------------------|------------------|---------------|---------------|-----------|-----------|
| Slave address | 5 | Register address | Register address | Register data | Register data | Check-sum | Check-sum |
|               |   | HI               | LO               | HI            | LO            | HI        | 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<br>Code HI<br>0x00 | Data Diag<br>Code LO<br>0x00 | Test data | Test data | Check-sum<br>HI | Check-sum<br>LO |
|---------------|---|------------------------------|------------------------------|-----------|-----------|-----------------|-----------------|

### Response

|               |   |                      |                      |           |           |                 |                 |
|---------------|---|----------------------|----------------------|-----------|-----------|-----------------|-----------------|
| Slave address | 8 | Data Diag<br>Code HI | Data Diag<br>Code LO | Test data | Test data | Check-sum<br>HI | Check-sum<br>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 | Register address | Register number | Register number | Byte number | Register 0 | Register 0 | ... | Check-sum | Check-sum |
|               |    | HI               | LO               | HI              | LO              |             | HI         | LO         |     | HI        | LO        |

### Response

|               |    |                  |                  |                 |                 |           |           |
|---------------|----|------------------|------------------|-----------------|-----------------|-----------|-----------|
| Slave address | 16 | Register address | Register address | Register number | Register number | Check-sum | Check-sum |
|               |    | HI               | LO               | HI              | LO              | HI        | 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            | Exception Code | Check-sum | Check-sum |
|               | + Function Code |                | HI        | 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<br>(ANSI / IEEE) | Name<br>Function | Start<br>Register<br>Address | No. of<br>Modbus<br>Registers | Function<br>code | Format        | Bit Mask<br>(Bit<br>position) | Unit | Description  |
|-------------------------|------------------|------------------------------|-------------------------------|------------------|---------------|-------------------------------|------|--|
| <b>AR - 79</b>          |                  | <b>46</b>                    | <b>1</b>                      | <b>3</b>         | <b>Struct</b> |                               |      |  |
|                         | active           | 46                           | 1                             | 3                | Bit           | 0x1<br>(1)                    | -    | Signal: active                                       |
|                         | ExBlo            | 46                           | 1                             | 3                | Bit           | 0x2<br>(2)                    | -    | Signal: External Blocking                            |
|                         | running          | 46                           | 1                             | 3                | Bit           | 0x8<br>(4)                    | -    | Signal: Auto Reclosing running                       |
|                         | t-dead           | 46                           | 1                             | 3                | Bit           | 0x10<br>(5)                   | -    | Signal: Dead time between trip and reclosure attempt |
|                         | successful (*)   | 46                           | 1                             | 3                | Bit           | 0x100<br>(9)                  | -    | Signal: Auto Reclosing successful                    |
|                         | failed (*)       | 46                           | 1                             | 3                | Bit           | 0x200<br>(10)                 | -    | Signal: Auto Reclosing failure                       |
|                         | t-AR Supervision | 46                           | 1                             | 3                | Bit           | 0x1000<br>(13)                | -    | Signal: AR Supervision                               |
| <b>AR - 79</b>          |                  | <b>47</b>                    | <b>1</b>                      | <b>3</b>         | <b>Struct</b> |                               |      |  |

### 3 Appendix - Data Point Lists

#### 3.1 Signals

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



| Module<br>(ANSI / IEEE) | Name<br>Function         | Start<br>Register<br>Address | No. of<br>Modbus<br>Registers | Function<br>code | Format | Bit Mask<br>(Bit<br>position) | Unit | Description   |
|-------------------------|--------------------------|------------------------------|-------------------------------|------------------|--------|-------------------------------|------|---|
|                         | Ex Lock-I                | 156                          | 1                             | 3                | Bit    | 0x1<br>(1)                    | -    | Module input state: External AR lockout.  |
|                         | Ex Shot Inc-I            | 156                          | 1                             | 3                | Bit    | 0x2<br>(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<br>(3)                    | -    | Signal: Auto Reclosure is blocked   |
|                         | t-Blo after CB man<br>ON | 156                          | 1                             | 3                | Bit    | 0x8<br>(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<br>(5)                   | -    | Signal: Auto Reclosure is locked out  |
|                         | t-Reset Lockout          | 156                          | 1                             | 3                | Bit    | 0x20<br>(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<br>(7)                   | -    | Signal: Ready to shoot  |
|                         | t-Run2Ready              | 156                          | 1                             | 3                | Bit    | 0x80<br>(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   |

### 3 Appendix - Data Point Lists

#### 3.1 Signals

| Module<br>(ANSI / IEEE) | Name<br>Function       | Start<br>Register<br>Address | No. of<br>Modbus<br>Registers | Function<br>code | Format        | Bit Mask<br>(Bit<br>position) | Unit | Description  |
|-------------------------|------------------------|------------------------------|-------------------------------|------------------|---------------|-------------------------------|------|--|
|                         |                        |                              |                               |                  |               | (9)                           |      |  |
|                         | Service Alarm 1        | 156                          | 1                             | 3                | Bit           | 0x200<br>(10)                 | -    | Signal: AR - Service Alarm 1, too many switching operations  |
|                         | Service Alarm 2        | 156                          | 1                             | 3                | Bit           | 0x400<br>(11)                 | -    | Signal: AR - Service Alarm 2 - too many switching operations   |
|                         | Max Shots / h exceeded | 156                          | 1                             | 3                | Bit           | 0x800<br>(12)                 | -    | Signal: The maximum allowed number of shots per hour has been exceeded.  |
| <b>AnIn[1]</b>          |                        | <b>247</b>                   | <b>1</b>                      | <b>3</b>         | <b>Struct</b> |                               |      |  |
|                         | Broken wire            | 247                          | 1                             | 3                | Bit           | 0x1<br>(1)                    | -    | Signal: Broken wire. This signal is only valid, if the analog input is used in the 4...20 mA mode.   |
|                         | Input forced           | 247                          | 1                             | 3                | Bit           | 0x2<br>(2)                    | -    | The value of analog Input has been set by force. That means that the value of the analog Input is forced and does not represent the real measured value. |
| <b>AnIn[2]</b>          |                        | <b>248</b>                   | <b>1</b>                      | <b>3</b>         | <b>Struct</b> |                               |      |  |
|                         | Broken wire            | 248                          | 1                             | 3                | Bit           | 0x4<br>(3)                    | -    | Signal: Broken wire. This signal is only valid, if the analog input is used in the 4...20 mA mode.   |
|                         | Input forced           | 248                          | 1                             | 3                | Bit           | 0x8<br>(4)                    | -    | The value of analog Input has been set by force. That means that the value of the analog Input is forced and does not represent the real measured value. |
| <b>AnaP[1]</b>          |                        | <b>224</b>                   | <b>1</b>                      | <b>3</b>         | <b>Struct</b> |                               |      |  |
|                         | ExBlo1-I               | 224                          | 1                             | 3                | Bit           | 0x1<br>(1)                    | -    | Module input state: External blocking1   |
|                         | ExBlo2-I               | 224                          | 1                             | 3                | Bit           | 0x2                           | -    | Module input state: External blocking2   |

| Module<br>(ANSI / IEEE) | Name<br>Function | Start<br>Register<br>Address | No. of<br>Modbus<br>Registers | Function<br>code | Format        | Bit Mask<br>(Bit<br>position) | Unit | Description   |
|-------------------------|------------------|------------------------------|-------------------------------|------------------|---------------|-------------------------------|------|---|
|                         |                  |                              |                               |                  |               | (2)                           |      |   |
|                         | ExBlo TripCmd-I  | 224                          | 1                             | 3                | Bit           | 0x4<br>(3)                    | -    | Module input state: External Blocking of the Trip Command |
|                         | active           | 224                          | 1                             | 3                | Bit           | 0x8<br>(4)                    | -    | Signal: active  |
|                         | ExBlo            | 224                          | 1                             | 3                | Bit           | 0x10<br>(5)                   | -    | Signal: External Blocking                                 |
|                         | Blo TripCmd      | 224                          | 1                             | 3                | Bit           | 0x20<br>(6)                   | -    | Signal: Trip Command blocked                              |
|                         | ExBlo TripCmd    | 224                          | 1                             | 3                | Bit           | 0x40<br>(7)                   | -    | Signal: External Blocking of the Trip Command             |
|                         | Pickup           | 224                          | 1                             | 3                | Bit           | 0x80<br>(8)                   | -    | Signal: Alarm Analog Input                                |
|                         | Trip (*)         | 224                          | 1                             | 3                | Bit           | 0x100<br>(9)                  | -    | Signal: Trip  |
|                         | TripCmd (*)      | 224                          | 1                             | 3                | Bit           | 0x200<br>(10)                 | -    | Signal: Trip Command                                      |
| <b>AnaP[2]</b>          |                  | <b>225</b>                   | <b>1</b>                      | <b>3</b>         | <b>Struct</b> |                               |      |   |
|                         | ExBlo1-I         | 225                          | 1                             | 3                | Bit           | 0x1<br>(1)                    | -    | Module input state: External blocking1                    |
|                         | ExBlo2-I         | 225                          | 1                             | 3                | Bit           | 0x2                           | -    | Module input state: External blocking2                    |

### 3 Appendix - Data Point Lists

#### 3.1 Signals

| Module<br>(ANSI / IEEE) | Name<br>Function | Start<br>Register<br>Address | No. of<br>Modbus<br>Registers | Function<br>code | Format        | Bit Mask<br>(Bit<br>position) | Unit | Description   |
|-------------------------|------------------|------------------------------|-------------------------------|------------------|---------------|-------------------------------|------|---|
|                         |                  |                              |                               |                  |               | (2)                           |      |   |
|                         | ExBlo TripCmd-I  | 225                          | 1                             | 3                | Bit           | 0x4<br>(3)                    | -    | Module input state: External Blocking of the Trip Command |
|                         | active           | 225                          | 1                             | 3                | Bit           | 0x8<br>(4)                    | -    | Signal: active  |
|                         | ExBlo            | 225                          | 1                             | 3                | Bit           | 0x10<br>(5)                   | -    | Signal: External Blocking                                 |
|                         | Blo TripCmd      | 225                          | 1                             | 3                | Bit           | 0x20<br>(6)                   | -    | Signal: Trip Command blocked                              |
|                         | ExBlo TripCmd    | 225                          | 1                             | 3                | Bit           | 0x40<br>(7)                   | -    | Signal: External Blocking of the Trip Command             |
|                         | Pickup           | 225                          | 1                             | 3                | Bit           | 0x80<br>(8)                   | -    | Signal: Alarm Analog Input                                |
|                         | Trip (*)         | 225                          | 1                             | 3                | Bit           | 0x100<br>(9)                  | -    | Signal: Trip  |
|                         | TripCmd (*)      | 225                          | 1                             | 3                | Bit           | 0x200<br>(10)                 | -    | Signal: Trip Command                                      |
| <b>AnaP[3]</b>          |                  | <b>226</b>                   | <b>1</b>                      | <b>3</b>         | <b>Struct</b> |                               |      |   |
|                         | ExBlo1-I         | 226                          | 1                             | 3                | Bit           | 0x1<br>(1)                    | -    | Module input state: External blocking1                    |
|                         | ExBlo2-I         | 226                          | 1                             | 3                | Bit           | 0x2                           | -    | Module input state: External blocking2                    |

| Module<br>(ANSI / IEEE) | Name<br>Function | Start<br>Register<br>Address | No. of<br>Modbus<br>Registers | Function<br>code | Format        | Bit Mask<br>(Bit<br>position) | Unit | Description   |
|-------------------------|------------------|------------------------------|-------------------------------|------------------|---------------|-------------------------------|------|---|
|                         |                  |                              |                               |                  |               | (2)                           |      |   |
|                         | ExBlo TripCmd-I  | 226                          | 1                             | 3                | Bit           | 0x4<br>(3)                    | -    | Module input state: External Blocking of the Trip Command |
|                         | active           | 226                          | 1                             | 3                | Bit           | 0x8<br>(4)                    | -    | Signal: active  |
|                         | ExBlo            | 226                          | 1                             | 3                | Bit           | 0x10<br>(5)                   | -    | Signal: External Blocking                                 |
|                         | Blo TripCmd      | 226                          | 1                             | 3                | Bit           | 0x20<br>(6)                   | -    | Signal: Trip Command blocked                              |
|                         | ExBlo TripCmd    | 226                          | 1                             | 3                | Bit           | 0x40<br>(7)                   | -    | Signal: External Blocking of the Trip Command             |
|                         | Pickup           | 226                          | 1                             | 3                | Bit           | 0x80<br>(8)                   | -    | Signal: Alarm Analog Input                                |
|                         | Trip (*)         | 226                          | 1                             | 3                | Bit           | 0x100<br>(9)                  | -    | Signal: Trip  |
|                         | TripCmd (*)      | 226                          | 1                             | 3                | Bit           | 0x200<br>(10)                 | -    | Signal: Trip Command                                      |
| <b>AnaP[4]</b>          |                  | <b>227</b>                   | <b>1</b>                      | <b>3</b>         | <b>Struct</b> |                               |      |   |
|                         | ExBlo1-I         | 227                          | 1                             | 3                | Bit           | 0x1<br>(1)                    | -    | Module input state: External blocking1                    |
|                         | ExBlo2-I         | 227                          | 1                             | 3                | Bit           | 0x2                           | -    | Module input state: External blocking2                    |

### 3 Appendix - Data Point Lists

#### 3.1 Signals

| Module<br>(ANSI / IEEE) | Name<br>Function | Start<br>Register<br>Address | No. of<br>Modbus<br>Registers | Function<br>code | Format        | Bit Mask<br>(Bit<br>position) | Unit | Description   |
|-------------------------|------------------|------------------------------|-------------------------------|------------------|---------------|-------------------------------|------|---|
|                         |                  |                              |                               |                  |               | (2)                           |      |   |
|                         | ExBlo TripCmd-I  | 227                          | 1                             | 3                | Bit           | 0x4<br>(3)                    | -    | Module input state: External Blocking of the Trip Command |
|                         | active           | 227                          | 1                             | 3                | Bit           | 0x8<br>(4)                    | -    | Signal: active  |
|                         | ExBlo            | 227                          | 1                             | 3                | Bit           | 0x10<br>(5)                   | -    | Signal: External Blocking                                 |
|                         | Blo TripCmd      | 227                          | 1                             | 3                | Bit           | 0x20<br>(6)                   | -    | Signal: Trip Command blocked                              |
|                         | ExBlo TripCmd    | 227                          | 1                             | 3                | Bit           | 0x40<br>(7)                   | -    | Signal: External Blocking of the Trip Command             |
|                         | Pickup           | 227                          | 1                             | 3                | Bit           | 0x80<br>(8)                   | -    | Signal: Alarm Analog Input                                |
|                         | Trip (*)         | 227                          | 1                             | 3                | Bit           | 0x100<br>(9)                  | -    | Signal: Trip  |
|                         | TripCmd (*)      | 227                          | 1                             | 3                | Bit           | 0x200<br>(10)                 | -    | Signal: Trip Command                                      |
| <b>BO Slot X2</b>       |                  | <b>1003</b>                  | <b>1</b>                      | <b>3</b>         | <b>Struct</b> |                               |      |   |
|                         | BO 1             | 1003                         | 1                             | 3                | Bit           | 0x1<br>(1)                    | -    | Signal: Binary Output Relay                               |
|                         | BO 2             | 1003                         | 1                             | 3                | Bit           | 0x2                           | -    | Signal: Binary Output Relay                               |

| Module<br>(ANSI / IEEE) | Name<br>Function | Start<br>Register<br>Address | No. of<br>Modbus<br>Registers | Function<br>code | Format        | Bit Mask<br>(Bit<br>position) | Unit | Description   |
|-------------------------|------------------|------------------------------|-------------------------------|------------------|---------------|-------------------------------|------|---|
|                         |                  |                              |                               |                  |               | (2)                           |      |   |
|                         | BO 3             | 1003                         | 1                             | 3                | Bit           | 0x4<br>(3)                    | -    | Signal: Binary Output Relay   |
|                         | BO 4             | 1003                         | 1                             | 3                | Bit           | 0x8<br>(4)                    | -    | Signal: Binary Output Relay   |
|                         | BO 5             | 1003                         | 1                             | 3                | Bit           | 0x10<br>(5)                   | -    | Signal: Binary Output Relay   |
|                         | BO 6             | 1003                         | 1                             | 3                | Bit           | 0x20<br>(6)                   | -    | Signal: Binary Output Relay   |
|                         | DISARMED!        | 1003                         | 1                             | 3                | Bit           | 0x40<br>(7)                   | -    | Signal: CAUTION! RELAYS DISARMED in order to safely perform maintenance while eliminating the risk of taking an entire process off-line. (Note: The Self Supervision Contact cannot be disarmed). YOU MUST ENSURE that the relays are ARMED AGAIN after maintenance |
|                         | Outs forced      | 1003                         | 1                             | 3                | Bit           | 0x80<br>(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.  |
| <b>BO Slot X4</b>       |                  | <b>1015</b>                  | <b>1</b>                      | <b>3</b>         | <b>Struct</b> |                               |      |   |
|                         | BO 1             | 1015                         | 1                             | 3                | Bit           | 0x1<br>(1)                    | -    | Signal: Binary Output Relay   |
|                         | BO 2             | 1015                         | 1                             | 3                | Bit           | 0x2<br>(2)                    | -    | Signal: Binary Output Relay   |
|                         | BO 3             | 1015                         | 1                             | 3                | Bit           | 0x4                           | -    | Signal: Binary Output Relay   |

3 Appendix - Data Point Lists

3.1 Signals

| Module<br>(ANSI / IEEE) | Name<br>Function | Start<br>Register<br>Address | No. of<br>Modbus<br>Registers | Function<br>code | Format        | Bit Mask<br>(Bit<br>position) | Unit | Description   |
|-------------------------|------------------|------------------------------|-------------------------------|------------------|---------------|-------------------------------|------|---|
|                         |                  |                              |                               |                  |               | (3)                           |      |   |
|                         | BO 4             | 1015                         | 1                             | 3                | Bit           | 0x8<br>(4)                    | -    | Signal: Binary Output Relay   |
|                         | BO 5             | 1015                         | 1                             | 3                | Bit           | 0x10<br>(5)                   | -    | Signal: Binary Output Relay   |
|                         | DISARMED!        | 1015                         | 1                             | 3                | Bit           | 0x40<br>(7)                   | -    | Signal: CAUTION! RELAYS DISARMED in order to safely perform maintenance while eliminating the risk of taking an entire process off-line. (Note: The Self Supervision Contact cannot be disarmed). YOU MUST ENSURE that the relays are ARMED AGAIN after maintenance |
|                         | Outs forced      | 1015                         | 1                             | 3                | Bit           | 0x80<br>(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.  |
| <b>BO Slot X5</b>       |                  | <b>1004</b>                  | <b>1</b>                      | <b>3</b>         | <b>Struct</b> |                               |      |   |
|                         | BO 1             | 1004                         | 1                             | 3                | Bit           | 0x1<br>(1)                    | -    | Signal: Binary Output Relay   |
|                         | BO 2             | 1004                         | 1                             | 3                | Bit           | 0x2<br>(2)                    | -    | Signal: Binary Output Relay   |
|                         | BO 3             | 1004                         | 1                             | 3                | Bit           | 0x4<br>(3)                    | -    | Signal: Binary Output Relay   |
|                         | BO 4             | 1004                         | 1                             | 3                | Bit           | 0x8<br>(4)                    | -    | Signal: Binary Output Relay   |
|                         | BO 5             | 1004                         | 1                             | 3                | Bit           | 0x10                          | -    | Signal: Binary Output Relay   |



| Module<br>(ANSI / IEEE) | Name<br>Function | Start<br>Register<br>Address | No. of<br>Modbus<br>Registers | Function<br>code | Format        | Bit Mask<br>(Bit<br>position) | Unit | Description   |
|-------------------------|------------------|------------------------------|-------------------------------|------------------|---------------|-------------------------------|------|---|
|                         |                  |                              |                               |                  |               | (5)                           |      |   |
|                         | BO 6             | 1004                         | 1                             | 3                | Bit           | 0x20<br>(6)                   | -    | Signal: Binary Output Relay   |
|                         | DISARMED!        | 1004                         | 1                             | 3                | Bit           | 0x40<br>(7)                   | -    | Signal: CAUTION! RELAYS DISARMED in order to safely perform maintenance while eliminating the risk of taking an entire process off-line. (Note: The Self Supervision Contact cannot be disarmed). YOU MUST ENSURE that the relays are ARMED AGAIN after maintenance |
|                         | Outs forced      | 1004                         | 1                             | 3                | Bit           | 0x80<br>(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.  |
| <b>BO Slot X5</b>       |                  | <b>1013</b>                  | <b>1</b>                      | <b>3</b>         | <b>Struct</b> |                               |      |   |
|                         | BO 1             | 1013                         | 1                             | 3                | Bit           | 0x1<br>(1)                    | -    | Signal: Binary Output Relay   |
|                         | BO 2             | 1013                         | 1                             | 3                | Bit           | 0x2<br>(2)                    | -    | Signal: Binary Output Relay   |
|                         | BO 3             | 1013                         | 1                             | 3                | Bit           | 0x4<br>(3)                    | -    | Signal: Binary Output Relay   |
|                         | BO 4             | 1013                         | 1                             | 3                | Bit           | 0x8<br>(4)                    | -    | Signal: Binary Output Relay   |
|                         | DISARMED!        | 1013                         | 1                             | 3                | Bit           | 0x40<br>(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  |

### 3 Appendix - Data Point Lists

#### 3.1 Signals

| Module<br>(ANSI / IEEE) | Name<br>Function | Start<br>Register<br>Address | No. of<br>Modbus<br>Registers | Function<br>code | Format        | Bit Mask<br>(Bit<br>position) | Unit | Description   |
|-------------------------|------------------|------------------------------|-------------------------------|------------------|---------------|-------------------------------|------|---|
|                         |                  |                              |                               |                  |               |                               |      | ENSURE that the relays are ARMED AGAIN after maintenance  |
|                         | Outs forced      | 1013                         | 1                             | 3                | Bit           | 0x80<br>(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.  |
| <b>BO Slot X6</b>       |                  | <b>1016</b>                  | <b>1</b>                      | <b>3</b>         | <b>Struct</b> |                               |      |   |
|                         | BO 1             | 1016                         | 1                             | 3                | Bit           | 0x1<br>(1)                    | -    | Signal: Binary Output Relay   |
|                         | BO 2             | 1016                         | 1                             | 3                | Bit           | 0x2<br>(2)                    | -    | Signal: Binary Output Relay   |
|                         | BO 3             | 1016                         | 1                             | 3                | Bit           | 0x4<br>(3)                    | -    | Signal: Binary Output Relay   |
|                         | BO 4             | 1016                         | 1                             | 3                | Bit           | 0x8<br>(4)                    | -    | Signal: Binary Output Relay   |
|                         | DISARMED!        | 1016                         | 1                             | 3                | Bit           | 0x40<br>(7)                   | -    | Signal: CAUTION! RELAYS DISARMED in order to safely perform maintenance while eliminating the risk of taking an entire process off-line. (Note: The Self Supervision Contact cannot be disarmed). YOU MUST ENSURE that the relays are ARMED AGAIN after maintenance |
|                         | Outs forced      | 1016                         | 1                             | 3                | Bit           | 0x80<br>(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.  |
| <b>CBF - 50BF, 62BF</b> |                  | <b>53</b>                    | <b>1</b>                      | <b>3</b>         | <b>Struct</b> |                               |      |   |
|                         | ExBlo1-I         | 53                           | 1                             | 3                | Bit           | 0x1                           | -    | Module input state: External blocking1  |

| Module<br>(ANSI / IEEE) | Name<br>Function           | Start<br>Register<br>Address | No. of<br>Modbus<br>Registers | Function<br>code | Format | Bit Mask<br>(Bit<br>position) | Unit | Description                                   |
|-------------------------|----------------------------|------------------------------|-------------------------------|------------------|--------|-------------------------------|------|---|
|                         |                            |                              |                               |                  |        | (1)                           |      |   |
|                         | ExBlo2-l                   | 53                           | 1                             | 3                | Bit    | 0x2<br>(2)                    | -    | Module input state: External blocking2        |
|                         | active                     | 53                           | 1                             | 3                | Bit    | 0x4<br>(3)                    | -    | Signal: active                                |
|                         | ExBlo                      | 53                           | 1                             | 3                | Bit    | 0x8<br>(4)                    | -    | Signal: External Blocking                     |
|                         | Trigger1-l                 | 53                           | 1                             | 3                | Bit    | 0x10<br>(5)                   | -    | Module Input: Trigger that will start the CBF |
|                         | Trigger2-l                 | 53                           | 1                             | 3                | Bit    | 0x20<br>(6)                   | -    | Module Input: Trigger that will start the CBF |
|                         | Trigger3-l                 | 53                           | 1                             | 3                | Bit    | 0x40<br>(7)                   | -    | Module Input: Trigger that will start the CBF |
|                         | running                    | 53                           | 1                             | 3                | Bit    | 0x80<br>(8)                   | -    | Signal: CBF-Module started                    |
|                         | Alarm (*)                  | 53                           | 1                             | 3                | Bit    | 0x100<br>(9)                  | -    | Signal: Circuit Breaker Failure               |
|                         | Lockout (*)                | 53                           | 1                             | 3                | Bit    | 0x200<br>(10)                 | -    | Signal: Lockout                               |
|                         | Waiting for Trigger<br>(*) | 53                           | 1                             | 3                | Bit    | 0x400<br>(11)                 | -    | Waiting for Trigger                           |

### 3 Appendix - Data Point Lists

#### 3.1 Signals

| Module<br>(ANSI / IEEE) | Name<br>Function | Start<br>Register<br>Address | No. of<br>Modbus<br>Registers | Function<br>code | Format        | Bit Mask<br>(Bit<br>position) | Unit | Description                                       |
|-------------------------|------------------|------------------------------|-------------------------------|------------------|---------------|-------------------------------|------|---|
| <b>CLPU</b>             |                  | <b>66</b>                    | <b>1</b>                      | <b>3</b>         | <b>Struct</b> |                               |      |   |
|                         | ExBlo1-I         | 66                           | 1                             | 3                | Bit           | 0x1<br>(1)                    | -    | Module input state: External blocking             |
|                         | ExBlo2-I         | 66                           | 1                             | 3                | Bit           | 0x2<br>(2)                    | -    | Module input state: External blocking             |
|                         | Ex rev Interl-I  | 66                           | 1                             | 3                | Bit           | 0x4<br>(3)                    | -    | Module input state: External reverse interlocking |
|                         | active           | 66                           | 1                             | 3                | Bit           | 0x8<br>(4)                    | -    | Signal: active                                    |
|                         | ExBlo            | 66                           | 1                             | 3                | Bit           | 0x10<br>(5)                   | -    | Signal: External Blocking                         |
|                         | Ex rev Interl    | 66                           | 1                             | 3                | Bit           | 0x20<br>(6)                   | -    | Signal: External reverse Interlocking             |
|                         | enabled          | 66                           | 1                             | 3                | Bit           | 0x200<br>(10)                 | -    | Signal: Cold Load enabled                         |
|                         | detected (*)     | 66                           | 1                             | 3                | Bit           | 0x400<br>(11)                 | -    | Signal: Cold Load detected                        |
|                         | I<               | 66                           | 1                             | 3                | Bit           | 0x800<br>(12)                 | -    | Signal: No Load Current.                          |
|                         | AR Blo           | 66                           | 1                             | 3                | Bit           | 0x1000<br>(13)                | -    | Signal: Blocked by AR                             |

| Module<br>(ANSI / IEEE) | Name<br>Function | Start<br>Register<br>Address | No. of<br>Modbus<br>Registers | Function<br>code | Format        | Bit Mask<br>(Bit<br>position) | Unit | Description  |
|-------------------------|------------------|------------------------------|-------------------------------|------------------|---------------|-------------------------------|------|--|
|                         | Load Inrush      | 66                           | 1                             | 3                | Bit           | 0x2000<br>(14)                | -    | Signal: Load Inrush  |
|                         | Settle Time      | 66                           | 1                             | 3                | Bit           | 0x4000<br>(15)                | -    | Signal: Settle Time  |
| <b>CTS - 60L</b>        |                  | <b>137</b>                   | <b>1</b>                      | <b>3</b>         | <b>Struct</b> |                               |      |  |
|                         | ExBlo1-I         | 137                          | 1                             | 3                | Bit           | 0x1<br>(1)                    | -    | Module input state: External blocking1                             |
|                         | ExBlo2-I         | 137                          | 1                             | 3                | Bit           | 0x2<br>(2)                    | -    | Module input state: External blocking2                             |
|                         | active           | 137                          | 1                             | 3                | Bit           | 0x4<br>(3)                    | -    | Signal: active   |
|                         | ExBlo            | 137                          | 1                             | 3                | Bit           | 0x8<br>(4)                    | -    | Signal: External Blocking  |
|                         | Alarm            | 137                          | 1                             | 3                | Bit           | 0x10<br>(5)                   | -    | Signal: Alarm Current Transformer<br>Measuring Circuit Supervision |
| <b>Ctrl</b>             |                  | <b>176</b>                   | <b>1</b>                      | <b>3</b>         | <b>Struct</b> |                               |      |  |
|                         | Local            | 176                          | 1                             | 3                | Bit           | 0x1<br>(1)                    | -    | Switching Authority: Local   |
|                         | Remote           | 176                          | 1                             | 3                | Bit           | 0x2<br>(2)                    | -    | Switching Authority: Remote  |
|                         | NonInterl        | 176                          | 1                             | 3                | Bit           | 0x4                           | -    | Non-Interlocking is active   |

3 Appendix - Data Point Lists

3.1 Signals

| Module<br>(ANSI / IEEE) | Name<br>Function | Start<br>Register<br>Address | No. of<br>Modbus<br>Registers | Function<br>code | Format        | Bit Mask<br>(Bit<br>position) | Unit | Description   |
|-------------------------|------------------|------------------------------|-------------------------------|------------------|---------------|-------------------------------|------|---|
|                         |                  |                              |                               |                  |               | (3)                           |      |   |
|                         | SG Disturb       | 176                          | 1                             | 3                | Bit           | 0x8<br>(4)                    | -    | (At least one) Switchgear is disturbed.                                 |
|                         | SG Indeterm      | 176                          | 1                             | 3                | Bit           | 0x10<br>(5)                   | -    | (At least one) Switchgear is moving<br>(Position cannot be determined). |
| <b>DI Slot X1</b>       |                  | <b>1000</b>                  | <b>1</b>                      | <b>3</b>         | <b>Struct</b> |                               |      |   |
|                         | DI 1             | 1000                         | 1                             | 3                | Bit           | 0x1<br>(1)                    | -    | Signal: Digital Input   |
|                         | DI 2             | 1000                         | 1                             | 3                | Bit           | 0x2<br>(2)                    | -    | Signal: Digital Input   |
|                         | DI 3             | 1000                         | 1                             | 3                | Bit           | 0x4<br>(3)                    | -    | Signal: Digital Input   |
|                         | DI 4             | 1000                         | 1                             | 3                | Bit           | 0x8<br>(4)                    | -    | Signal: Digital Input   |
|                         | DI 5             | 1000                         | 1                             | 3                | Bit           | 0x10<br>(5)                   | -    | Signal: Digital Input   |
|                         | DI 6             | 1000                         | 1                             | 3                | Bit           | 0x20<br>(6)                   | -    | Signal: Digital Input   |
|                         | DI 7             | 1000                         | 1                             | 3                | Bit           | 0x40<br>(7)                   | -    | Signal: Digital Input   |
|                         | DI 8             | 1000                         | 1                             | 3                | Bit           | 0x80                          | -    | Signal: Digital Input   |

| Module<br>(ANSI / IEEE) | Name<br>Function | Start<br>Register<br>Address | No. of<br>Modbus<br>Registers | Function<br>code | Format        | Bit Mask<br>(Bit<br>position) | Unit | Description           |
|-------------------------|------------------|------------------------------|-------------------------------|------------------|---------------|-------------------------------|------|-----------------------|
|                         |                  |                              |                               |                  |               | (8)                           |      |                       |
| <b>DI Slot X5</b>       |                  | <b>1014</b>                  | <b>1</b>                      | <b>3</b>         | <b>Struct</b> |                               |      |                       |
|                         | DI 1             | 1014                         | 1                             | 3                | Bit           | 0x1<br>(1)                    | -    | Signal: Digital Input |
|                         | DI 2             | 1014                         | 1                             | 3                | Bit           | 0x2<br>(2)                    | -    | Signal: Digital Input |
|                         | DI 3             | 1014                         | 1                             | 3                | Bit           | 0x4<br>(3)                    | -    | Signal: Digital Input |
|                         | DI 4             | 1014                         | 1                             | 3                | Bit           | 0x8<br>(4)                    | -    | Signal: Digital Input |
|                         | DI 5             | 1014                         | 1                             | 3                | Bit           | 0x10<br>(5)                   | -    | Signal: Digital Input |
|                         | DI 6             | 1014                         | 1                             | 3                | Bit           | 0x20<br>(6)                   | -    | Signal: Digital Input |
|                         | DI 7             | 1014                         | 1                             | 3                | Bit           | 0x40<br>(7)                   | -    | Signal: Digital Input |
|                         | DI 8             | 1014                         | 1                             | 3                | Bit           | 0x80<br>(8)                   | -    | Signal: Digital Input |
| <b>DI Slot X6</b>       |                  | <b>1001</b>                  | <b>1</b>                      | <b>3</b>         | <b>Struct</b> |                               |      |                       |
|                         | DI 1             | 1001                         | 1                             | 3                | Bit           | 0x1<br>(1)                    | -    | Signal: Digital Input |

### 3 Appendix - Data Point Lists

#### 3.1 Signals

| Module<br>(ANSI / IEEE) | Name<br>Function | Start<br>Register<br>Address | No. of<br>Modbus<br>Registers | Function<br>code | Format        | Bit Mask<br>(Bit<br>position) | Unit | Description   |
|-------------------------|------------------|------------------------------|-------------------------------|------------------|---------------|-------------------------------|------|---|
|                         | DI 2             | 1001                         | 1                             | 3                | Bit           | 0x2<br>(2)                    | -    | Signal: Digital Input                                     |
|                         | DI 3             | 1001                         | 1                             | 3                | Bit           | 0x4<br>(3)                    | -    | Signal: Digital Input                                     |
|                         | DI 4             | 1001                         | 1                             | 3                | Bit           | 0x8<br>(4)                    | -    | Signal: Digital Input                                     |
|                         | DI 5             | 1001                         | 1                             | 3                | Bit           | 0x10<br>(5)                   | -    | Signal: Digital Input                                     |
|                         | DI 6             | 1001                         | 1                             | 3                | Bit           | 0x20<br>(6)                   | -    | Signal: Digital Input                                     |
|                         | DI 7             | 1001                         | 1                             | 3                | Bit           | 0x40<br>(7)                   | -    | Signal: Digital Input                                     |
|                         | DI 8             | 1001                         | 1                             | 3                | Bit           | 0x80<br>(8)                   | -    | Signal: Digital Input                                     |
| <b>ExP[1]</b>           |                  | <b>49</b>                    | <b>1</b>                      | <b>3</b>         | <b>Struct</b> |                               |      |   |
|                         | ExBlo1-I         | 49                           | 1                             | 3                | Bit           | 0x1<br>(1)                    | -    | Module input state: External blocking1                    |
|                         | ExBlo2-I         | 49                           | 1                             | 3                | Bit           | 0x2<br>(2)                    | -    | Module input state: External blocking2                    |
|                         | ExBlo TripCmd-I  | 49                           | 1                             | 3                | Bit           | 0x4<br>(3)                    | -    | Module input state: External Blocking of the Trip Command |



| Module<br>(ANSI / IEEE) | Name<br>Function | Start<br>Register<br>Address | No. of<br>Modbus<br>Registers | Function<br>code | Format        | Bit Mask<br>(Bit<br>position) | Unit | Description                                   |
|-------------------------|------------------|------------------------------|-------------------------------|------------------|---------------|-------------------------------|------|---|
|                         | Alarm-I          | 49                           | 1                             | 3                | Bit           | 0x8<br>(4)                    | -    | Module input state: Alarm                     |
|                         | Trip-I           | 49                           | 1                             | 3                | Bit           | 0x10<br>(5)                   | -    | Module input state: Trip                      |
|                         | active           | 49                           | 1                             | 3                | Bit           | 0x20<br>(6)                   | -    | Signal: active                                |
|                         | ExBlo            | 49                           | 1                             | 3                | Bit           | 0x40<br>(7)                   | -    | Signal: External Blocking                     |
|                         | Blo TripCmd      | 49                           | 1                             | 3                | Bit           | 0x80<br>(8)                   | -    | Signal: Trip Command blocked                  |
|                         | ExBlo TripCmd    | 49                           | 1                             | 3                | Bit           | 0x100<br>(9)                  | -    | Signal: External Blocking of the Trip Command |
|                         | Alarm            | 49                           | 1                             | 3                | Bit           | 0x200<br>(10)                 | -    | Signal: Alarm                                 |
|                         | Trip (*)         | 49                           | 1                             | 3                | Bit           | 0x400<br>(11)                 | -    | Signal: Trip                                  |
|                         | TripCmd (*)      | 49                           | 1                             | 3                | Bit           | 0x800<br>(12)                 | -    | Signal: Trip Command                          |
| <b>Exp[2]</b>           |                  | <b>50</b>                    | <b>1</b>                      | <b>3</b>         | <b>Struct</b> |                               |      |   |
|                         | ExBlo1-I         | 50                           | 1                             | 3                | Bit           | 0x1<br>(1)                    | -    | Module input state: External blocking1        |

### 3 Appendix - Data Point Lists

#### 3.1 Signals

| Module<br>(ANSI / IEEE) | Name<br>Function | Start<br>Register<br>Address | No. of<br>Modbus<br>Registers | Function<br>code | Format | Bit Mask<br>(Bit<br>position) | Unit | Description   |
|-------------------------|------------------|------------------------------|-------------------------------|------------------|--------|-------------------------------|------|---|
|                         | ExBlo2-I         | 50                           | 1                             | 3                | Bit    | 0x2<br>(2)                    | -    | Module input state: External blocking2                    |
|                         | ExBlo TripCmd-I  | 50                           | 1                             | 3                | Bit    | 0x4<br>(3)                    | -    | Module input state: External Blocking of the Trip Command |
|                         | Alarm-I          | 50                           | 1                             | 3                | Bit    | 0x8<br>(4)                    | -    | Module input state: Alarm                                 |
|                         | Trip-I           | 50                           | 1                             | 3                | Bit    | 0x10<br>(5)                   | -    | Module input state: Trip                                  |
|                         | active           | 50                           | 1                             | 3                | Bit    | 0x20<br>(6)                   | -    | Signal: active  |
|                         | ExBlo            | 50                           | 1                             | 3                | Bit    | 0x40<br>(7)                   | -    | Signal: External Blocking                                 |
|                         | Blo TripCmd      | 50                           | 1                             | 3                | Bit    | 0x80<br>(8)                   | -    | Signal: Trip Command blocked                              |
|                         | ExBlo TripCmd    | 50                           | 1                             | 3                | Bit    | 0x100<br>(9)                  | -    | Signal: External Blocking of the Trip Command             |
|                         | Alarm            | 50                           | 1                             | 3                | Bit    | 0x200<br>(10)                 | -    | Signal: Alarm   |
|                         | Trip (*)         | 50                           | 1                             | 3                | Bit    | 0x400<br>(11)                 | -    | Signal: Trip  |
|                         | TripCmd (*)      | 50                           | 1                             | 3                | Bit    | 0x800                         | -    | Signal: Trip Command                                      |

| Module<br>(ANSI / IEEE) | Name<br>Function | Start<br>Register<br>Address | No. of<br>Modbus<br>Registers | Function<br>code | Format        | Bit Mask<br>(Bit<br>position) | Unit | Description   |
|-------------------------|------------------|------------------------------|-------------------------------|------------------|---------------|-------------------------------|------|---|
|                         |                  |                              |                               |                  |               | (12)                          |      |   |
| <b>ExP[3]</b>           |                  | <b>51</b>                    | <b>1</b>                      | <b>3</b>         | <b>Struct</b> |                               |      |   |
|                         | ExBlo1-I         | 51                           | 1                             | 3                | Bit           | 0x1<br>(1)                    | -    | Module input state: External blocking1                    |
|                         | ExBlo2-I         | 51                           | 1                             | 3                | Bit           | 0x2<br>(2)                    | -    | Module input state: External blocking2                    |
|                         | ExBlo TripCmd-I  | 51                           | 1                             | 3                | Bit           | 0x4<br>(3)                    | -    | Module input state: External Blocking of the Trip Command |
|                         | Alarm-I          | 51                           | 1                             | 3                | Bit           | 0x8<br>(4)                    | -    | Module input state: Alarm                                 |
|                         | Trip-I           | 51                           | 1                             | 3                | Bit           | 0x10<br>(5)                   | -    | Module input state: Trip                                  |
|                         | active           | 51                           | 1                             | 3                | Bit           | 0x20<br>(6)                   | -    | Signal: active  |
|                         | ExBlo            | 51                           | 1                             | 3                | Bit           | 0x40<br>(7)                   | -    | Signal: External Blocking                                 |
|                         | Blo TripCmd      | 51                           | 1                             | 3                | Bit           | 0x80<br>(8)                   | -    | Signal: Trip Command blocked                              |
|                         | ExBlo TripCmd    | 51                           | 1                             | 3                | Bit           | 0x100<br>(9)                  | -    | Signal: External Blocking of the Trip Command             |
|                         | Alarm            | 51                           | 1                             | 3                | Bit           | 0x200                         | -    | Signal: Alarm   |

### 3 Appendix - Data Point Lists

#### 3.1 Signals

| Module<br>(ANSI / IEEE) | Name<br>Function | Start<br>Register<br>Address | No. of<br>Modbus<br>Registers | Function<br>code | Format        | Bit Mask<br>(Bit<br>position) | Unit | Description   |
|-------------------------|------------------|------------------------------|-------------------------------|------------------|---------------|-------------------------------|------|---|
|                         |                  |                              |                               |                  |               | (10)                          |      |   |
|                         | Trip (*)         | 51                           | 1                             | 3                | Bit           | 0x400<br>(11)                 | -    | Signal: Trip  |
|                         | TripCmd (*)      | 51                           | 1                             | 3                | Bit           | 0x800<br>(12)                 | -    | Signal: Trip Command                                      |
| <b>Exp[4]</b>           |                  | <b>52</b>                    | <b>1</b>                      | <b>3</b>         | <b>Struct</b> |                               |      |   |
|                         | ExBlo1-I         | 52                           | 1                             | 3                | Bit           | 0x1<br>(1)                    | -    | Module input state: External blocking1                    |
|                         | ExBlo2-I         | 52                           | 1                             | 3                | Bit           | 0x2<br>(2)                    | -    | Module input state: External blocking2                    |
|                         | ExBlo TripCmd-I  | 52                           | 1                             | 3                | Bit           | 0x4<br>(3)                    | -    | Module input state: External Blocking of the Trip Command |
|                         | Alarm-I          | 52                           | 1                             | 3                | Bit           | 0x8<br>(4)                    | -    | Module input state: Alarm                                 |
|                         | Trip-I           | 52                           | 1                             | 3                | Bit           | 0x10<br>(5)                   | -    | Module input state: Trip                                  |
|                         | active           | 52                           | 1                             | 3                | Bit           | 0x20<br>(6)                   | -    | Signal: active  |
|                         | ExBlo            | 52                           | 1                             | 3                | Bit           | 0x40<br>(7)                   | -    | Signal: External Blocking                                 |
|                         | Blo TripCmd      | 52                           | 1                             | 3                | Bit           | 0x80                          | -    | Signal: Trip Command blocked                              |

| Module<br>(ANSI / IEEE)     | Name<br>Function | Start<br>Register<br>Address | No. of<br>Modbus<br>Registers | Function<br>code | Format        | Bit Mask<br>(Bit<br>position) | Unit | Description   |
|-----------------------------|------------------|------------------------------|-------------------------------|------------------|---------------|-------------------------------|------|---|
|                             |                  |                              |                               |                  |               | (8)                           |      |   |
|                             | ExBlo TripCmd    | 52                           | 1                             | 3                | Bit           | 0x100<br>(9)                  | -    | Signal: External Blocking of the Trip Command   |
|                             | Alarm            | 52                           | 1                             | 3                | Bit           | 0x200<br>(10)                 | -    | Signal: Alarm   |
|                             | Trip (*)         | 52                           | 1                             | 3                | Bit           | 0x400<br>(11)                 | -    | Signal: Trip  |
|                             | TripCmd (*)      | 52                           | 1                             | 3                | Bit           | 0x800<br>(12)                 | -    | Signal: Trip Command  |
| <b>Fast Status Register</b> |                  | <b>5000</b>                  | <b>1</b>                      | <b>3</b>         | <b>Struct</b> |                               |      |   |
|                             | Device Type      | 5000                         | 1                             | 3                | Bit           | 0xffff<br>(1)                 | -    | Device Type: Device type code for relationship between device name and its Modbus code.<br><br>Woodward:<br>MRI4 - 1000<br>MRU4 - 1001<br>MRA4 - 1002<br>MCA4 - 1003<br>MRDT4 - 1005<br>MCDTV4 - 1006<br>MCDGV4 - 1007<br>MRM4 - 1009 |

### 3 Appendix - Data Point Lists

#### 3.1 Signals

| Module<br>(ANSI / IEEE)     | Name<br>Function  | Start<br>Register<br>Address | No. of<br>Modbus<br>Registers | Function<br>code | Format        | Bit Mask<br>(Bit<br>position) | Unit | Description  |
|-----------------------------|-------------------|------------------------------|-------------------------------|------------------|---------------|-------------------------------|------|--|
|                             |                   |                              |                               |                  |               |                               |      | MRMV4 - 1010<br>MCDLV4 - 1011  |
| <b>Fast Status Register</b> |                   | <b>5001</b>                  | <b>1</b>                      | <b>3</b>         | <b>Struct</b> |                               |      |  |
|                             | Comm Version      | 5001                         | 1                             | 3                | Bit           | 0xffff<br>(1)                 | -    | Modbus Communication version. This version number changes if something becomes incompatible between different Modbus releases. |
| <b>Fast Status Register</b> |                   | <b>5002</b>                  | <b>1</b>                      | <b>3</b>         | <b>Struct</b> |                               |      |  |
|                             | Config Bin Inp1-l | 5002                         | 1                             | 3                | Bit           | 0x1<br>(1)                    | -    | State of the module input: Config Bin Inp  |
|                             | Config Bin Inp2-l | 5002                         | 1                             | 3                | Bit           | 0x2<br>(2)                    | -    | State of the module input: Config Bin Inp  |
|                             | Config Bin Inp3-l | 5002                         | 1                             | 3                | Bit           | 0x4<br>(3)                    | -    | State of the module input: Config Bin Inp  |
|                             | Config Bin Inp4-l | 5002                         | 1                             | 3                | Bit           | 0x8<br>(4)                    | -    | State of the module input: Config Bin Inp  |
|                             | Config Bin Inp5-l | 5002                         | 1                             | 3                | Bit           | 0x10<br>(5)                   | -    | State of the module input: Config Bin Inp  |
|                             | Config Bin Inp6-l | 5002                         | 1                             | 3                | Bit           | 0x20<br>(6)                   | -    | State of the module input: Config Bin Inp  |
|                             | Config Bin Inp7-l | 5002                         | 1                             | 3                | Bit           | 0x40<br>(7)                   | -    | State of the module input: Config Bin Inp  |

| Module<br>(ANSI / IEEE)         | Name<br>Function   | Start<br>Register<br>Address | No. of<br>Modbus<br>Registers | Function<br>code | Format        | Bit Mask<br>(Bit<br>position) | Unit | Description                               |
|---------------------------------|--------------------|------------------------------|-------------------------------|------------------|---------------|-------------------------------|------|---|
|                                 | Config Bin Inp8-I  | 5002                         | 1                             | 3                | Bit           | 0x80<br>(8)                   | -    | State of the module input: Config Bin Inp |
|                                 | Config Bin Inp9-I  | 5002                         | 1                             | 3                | Bit           | 0x100<br>(9)                  | -    | State of the module input: Config Bin Inp |
|                                 | Config Bin Inp10-I | 5002                         | 1                             | 3                | Bit           | 0x200<br>(10)                 | -    | State of the module input: Config Bin Inp |
|                                 | Config Bin Inp11-I | 5002                         | 1                             | 3                | Bit           | 0x400<br>(11)                 | -    | State of the module input: Config Bin Inp |
|                                 | Config Bin Inp12-I | 5002                         | 1                             | 3                | Bit           | 0x800<br>(12)                 | -    | State of the module input: Config Bin Inp |
|                                 | Config Bin Inp13-I | 5002                         | 1                             | 3                | Bit           | 0x1000<br>(13)                | -    | State of the module input: Config Bin Inp |
|                                 | Config Bin Inp14-I | 5002                         | 1                             | 3                | Bit           | 0x2000<br>(14)                | -    | State of the module input: Config Bin Inp |
|                                 | Config Bin Inp15-I | 5002                         | 1                             | 3                | Bit           | 0x4000<br>(15)                | -    | State of the module input: Config Bin Inp |
|                                 | Config Bin Inp16-I | 5002                         | 1                             | 3                | Bit           | 0x8000<br>(16)                | -    | State of the module input: Config Bin Inp |
| <b>Fast Status<br/>Register</b> |                    | <b>5003</b>                  | <b>1</b>                      | <b>3</b>         | <b>Struct</b> |                               |      |   |
|                                 | Config Bin Inp17-I | 5003                         | 1                             | 3                | Bit           | 0x1                           | -    | State of the module input: Config Bin Inp |

### 3 Appendix - Data Point Lists

#### 3.1 Signals

| Module<br>(ANSI / IEEE) | Name<br>Function   | Start<br>Register<br>Address | No. of<br>Modbus<br>Registers | Function<br>code | Format | Bit Mask<br>(Bit<br>position) | Unit | Description                               |
|-------------------------|--------------------|------------------------------|-------------------------------|------------------|--------|-------------------------------|------|---|
|                         |                    |                              |                               |                  |        | (1)                           |      |   |
|                         | Config Bin Inp18-I | 5003                         | 1                             | 3                | Bit    | 0x2<br>(2)                    | -    | State of the module input: Config Bin Inp |
|                         | Config Bin Inp19-I | 5003                         | 1                             | 3                | Bit    | 0x4<br>(3)                    | -    | State of the module input: Config Bin Inp |
|                         | Config Bin Inp20-I | 5003                         | 1                             | 3                | Bit    | 0x8<br>(4)                    | -    | State of the module input: Config Bin Inp |
|                         | Config Bin Inp21-I | 5003                         | 1                             | 3                | Bit    | 0x10<br>(5)                   | -    | State of the module input: Config Bin Inp |
|                         | Config Bin Inp22-I | 5003                         | 1                             | 3                | Bit    | 0x20<br>(6)                   | -    | State of the module input: Config Bin Inp |
|                         | Config Bin Inp23-I | 5003                         | 1                             | 3                | Bit    | 0x40<br>(7)                   | -    | State of the module input: Config Bin Inp |
|                         | Config Bin Inp24-I | 5003                         | 1                             | 3                | Bit    | 0x80<br>(8)                   | -    | State of the module input: Config Bin Inp |
|                         | Config Bin Inp25-I | 5003                         | 1                             | 3                | Bit    | 0x100<br>(9)                  | -    | State of the module input: Config Bin Inp |
|                         | Config Bin Inp26-I | 5003                         | 1                             | 3                | Bit    | 0x200<br>(10)                 | -    | State of the module input: Config Bin Inp |
|                         | Config Bin Inp27-I | 5003                         | 1                             | 3                | Bit    | 0x400<br>(11)                 | -    | State of the module input: Config Bin Inp |



| Module<br>(ANSI / IEEE)         | Name<br>Function   | Start<br>Register<br>Address | No. of<br>Modbus<br>Registers | Function<br>code | Format        | Bit Mask<br>(Bit<br>position) | Unit | Description   |
|---------------------------------|--------------------|------------------------------|-------------------------------|------------------|---------------|-------------------------------|------|---|
|                                 | Config Bin Inp28-I | 5003                         | 1                             | 3                | Bit           | 0x800<br>(12)                 | -    | State of the module input: Config Bin Inp   |
|                                 | Config Bin Inp29-I | 5003                         | 1                             | 3                | Bit           | 0x1000<br>(13)                | -    | State of the module input: Config Bin Inp   |
|                                 | Config Bin Inp30-I | 5003                         | 1                             | 3                | Bit           | 0x2000<br>(14)                | -    | State of the module input: Config Bin Inp   |
|                                 | Config Bin Inp31-I | 5003                         | 1                             | 3                | Bit           | 0x4000<br>(15)                | -    | State of the module input: Config Bin Inp   |
|                                 | Config Bin Inp32-I | 5003                         | 1                             | 3                | Bit           | 0x8000<br>(16)                | -    | State of the module input: Config Bin Inp   |
| <b>Fast Status<br/>Register</b> |                    | <b>5004</b>                  | <b>1</b>                      | <b>3</b>         | <b>Struct</b> |                               |      |   |
|                                 | Trip Cause (*)     | 5004                         | 1                             | 3                | Bit           | 0xffff<br>(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. |
| <b>HVRT[1] - 59</b>             |                    | <b>298</b>                   | <b>1</b>                      | <b>3</b>         | <b>Struct</b> |                               |      |   |
|                                 | ExBlo1-I           | 298                          | 1                             | 3                | Bit           | 0x1<br>(1)                    | -    | Module input state: External blocking1  |
|                                 | ExBlo2-I           | 298                          | 1                             | 3                | Bit           | 0x2<br>(2)                    | -    | Module input state: External blocking2  |

### 3 Appendix - Data Point Lists

#### 3.1 Signals

| Module<br>(ANSI / IEEE) | Name<br>Function | Start<br>Register<br>Address | No. of<br>Modbus<br>Registers | Function<br>code | Format | Bit Mask<br>(Bit<br>position) | Unit | Description   |
|-------------------------|------------------|------------------------------|-------------------------------|------------------|--------|-------------------------------|------|---|
|                         | ExBlo TripCmd-I  | 298                          | 1                             | 3                | Bit    | 0x4<br>(3)                    | -    | Module input state: External Blocking of the Trip Command |
|                         | active           | 298                          | 1                             | 3                | Bit    | 0x8<br>(4)                    | -    | Signal: active  |
|                         | ExBlo            | 298                          | 1                             | 3                | Bit    | 0x10<br>(5)                   | -    | Signal: External Blocking                                 |
|                         | Alarm            | 298                          | 1                             | 3                | Bit    | 0x20<br>(6)                   | -    | Signal: Alarm voltage stage                               |
|                         | Alarm L1         | 298                          | 1                             | 3                | Bit    | 0x40<br>(7)                   | -    | Signal: Alarm L1  |
|                         | Alarm L2         | 298                          | 1                             | 3                | Bit    | 0x80<br>(8)                   | -    | Signal: Alarm L2  |
|                         | Alarm L3         | 298                          | 1                             | 3                | Bit    | 0x100<br>(9)                  | -    | Signal: Alarm L3  |
|                         | Trip (*)         | 298                          | 1                             | 3                | Bit    | 0x200<br>(10)                 | -    | Signal: Trip  |
|                         | Trip L1 (*)      | 298                          | 1                             | 3                | Bit    | 0x400<br>(11)                 | -    | Signal: General Trip Phase L1                             |
|                         | Trip L2 (*)      | 298                          | 1                             | 3                | Bit    | 0x800<br>(12)                 | -    | Signal: General Trip Phase L2                             |
|                         | Trip L3 (*)      | 298                          | 1                             | 3                | Bit    | 0x1000                        | -    | Signal: General Trip Phase L3                             |

| Module<br>(ANSI / IEEE) | Name<br>Function | Start<br>Register<br>Address | No. of<br>Modbus<br>Registers | Function<br>code | Format        | Bit Mask<br>(Bit<br>position) | Unit | Description   |
|-------------------------|------------------|------------------------------|-------------------------------|------------------|---------------|-------------------------------|------|---|
|                         |                  |                              |                               |                  |               | (13)                          |      |   |
|                         | TripCmd (*)      | 298                          | 1                             | 3                | Bit           | 0x2000<br>(14)                | -    | Signal: Trip Command                                      |
|                         | Blo TripCmd      | 298                          | 1                             | 3                | Bit           | 0x4000<br>(15)                | -    | Signal: Trip Command blocked                              |
|                         | ExBlo TripCmd    | 298                          | 1                             | 3                | Bit           | 0x8000<br>(16)                | -    | Signal: External Blocking of the Trip Command             |
| <b>HVRT[2] - 59</b>     |                  | <b>299</b>                   | <b>1</b>                      | <b>3</b>         | <b>Struct</b> |                               |      |   |
|                         | ExBlo1-I         | 299                          | 1                             | 3                | Bit           | 0x1<br>(1)                    | -    | Module input state: External blocking1                    |
|                         | ExBlo2-I         | 299                          | 1                             | 3                | Bit           | 0x2<br>(2)                    | -    | Module input state: External blocking2                    |
|                         | ExBlo TripCmd-I  | 299                          | 1                             | 3                | Bit           | 0x4<br>(3)                    | -    | Module input state: External Blocking of the Trip Command |
|                         | active           | 299                          | 1                             | 3                | Bit           | 0x8<br>(4)                    | -    | Signal: active  |
|                         | ExBlo            | 299                          | 1                             | 3                | Bit           | 0x10<br>(5)                   | -    | Signal: External Blocking                                 |
|                         | Alarm            | 299                          | 1                             | 3                | Bit           | 0x20<br>(6)                   | -    | Signal: Alarm voltage stage                               |
|                         | Alarm L1         | 299                          | 1                             | 3                | Bit           | 0x40                          | -    | Signal: Alarm L1  |

### 3 Appendix - Data Point Lists

#### 3.1 Signals

| Module<br>(ANSI / IEEE) | Name<br>Function | Start<br>Register<br>Address | No. of<br>Modbus<br>Registers | Function<br>code | Format        | Bit Mask<br>(Bit<br>position) | Unit | Description                                   |
|-------------------------|------------------|------------------------------|-------------------------------|------------------|---------------|-------------------------------|------|---|
|                         |                  |                              |                               |                  |               | (7)                           |      |   |
|                         | Alarm L2         | 299                          | 1                             | 3                | Bit           | 0x80<br>(8)                   | -    | Signal: Alarm L2                              |
|                         | Alarm L3         | 299                          | 1                             | 3                | Bit           | 0x100<br>(9)                  | -    | Signal: Alarm L3                              |
|                         | Trip (*)         | 299                          | 1                             | 3                | Bit           | 0x200<br>(10)                 | -    | Signal: Trip                                  |
|                         | Trip L1 (*)      | 299                          | 1                             | 3                | Bit           | 0x400<br>(11)                 | -    | Signal: General Trip Phase L1                 |
|                         | Trip L2 (*)      | 299                          | 1                             | 3                | Bit           | 0x800<br>(12)                 | -    | Signal: General Trip Phase L2                 |
|                         | Trip L3 (*)      | 299                          | 1                             | 3                | Bit           | 0x1000<br>(13)                | -    | Signal: General Trip Phase L3                 |
|                         | TripCmd (*)      | 299                          | 1                             | 3                | Bit           | 0x2000<br>(14)                | -    | Signal: Trip Command                          |
|                         | Blo TripCmd      | 299                          | 1                             | 3                | Bit           | 0x4000<br>(15)                | -    | Signal: Trip Command blocked                  |
|                         | ExBlo TripCmd    | 299                          | 1                             | 3                | Bit           | 0x8000<br>(16)                | -    | Signal: External Blocking of the Trip Command |
| <b>I2&gt;[1] - 46</b>   |                  | <b>82</b>                    | <b>1</b>                      | <b>3</b>         | <b>Struct</b> |                               |      |   |
|                         | ExBlo1-I         | 82                           | 1                             | 3                | Bit           | 0x1                           | -    | Module input state: External blocking1        |

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

### 3 Appendix - Data Point Lists

#### 3.1 Signals

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

| Module<br>(ANSI / IEEE) | Name<br>Function | Start<br>Register<br>Address | No. of<br>Modbus<br>Registers | Function<br>code | Format | Bit Mask<br>(Bit<br>position) | Unit | Description   |
|-------------------------|------------------|------------------------------|-------------------------------|------------------|--------|-------------------------------|------|---|
|                         |                  |                              |                               |                  |        | (1)                           |      |   |
|                         | ExBlo2-I         | 15                           | 1                             | 3                | Bit    | 0x2<br>(2)                    | -    | Module input state: External blocking2                    |
|                         | ExBlo TripCmd-I  | 15                           | 1                             | 3                | Bit    | 0x4<br>(3)                    | -    | Module input state: External Blocking of the Trip Command |
|                         | Ex rev Interl-I  | 15                           | 1                             | 3                | Bit    | 0x8<br>(4)                    | -    | Module input state: External reverse interlocking         |
|                         | active           | 15                           | 1                             | 3                | Bit    | 0x10<br>(5)                   | -    | Signal: active  |
|                         | ExBlo            | 15                           | 1                             | 3                | Bit    | 0x20<br>(6)                   | -    | Signal: External Blocking                                 |
|                         | Ex rev Interl    | 15                           | 1                             | 3                | Bit    | 0x40<br>(7)                   | -    | Signal: External reverse Interlocking                     |
|                         | Blo TripCmd      | 15                           | 1                             | 3                | Bit    | 0x80<br>(8)                   | -    | Signal: Trip Command blocked                              |
|                         | ExBlo TripCmd    | 15                           | 1                             | 3                | Bit    | 0x100<br>(9)                  | -    | Signal: External Blocking of the Trip Command             |
|                         | IGH2 Blo         | 15                           | 1                             | 3                | Bit    | 0x200<br>(10)                 | -    | Signal: blocked by an inrush                              |
|                         | Alarm            | 15                           | 1                             | 3                | Bit    | 0x400<br>(11)                 | -    | Signal: The alarm threshold has been exceeded.            |

### 3 Appendix - Data Point Lists

#### 3.1 Signals

| Module<br>(ANSI / IEEE) | Name<br>Function | Start<br>Register<br>Address | No. of<br>Modbus<br>Registers | Function<br>code | Format        | Bit Mask<br>(Bit<br>position) | Unit | Description   |
|-------------------------|------------------|------------------------------|-------------------------------|------------------|---------------|-------------------------------|------|---|
|                         | Trip (*)         | 15                           | 1                             | 3                | Bit           | 0x800<br>(12)                 | -    | Signal: Trip  |
|                         | TripCmd (*)      | 15                           | 1                             | 3                | Bit           | 0x1000<br>(13)                | -    | Signal: Trip Command                                      |
| <b>IG[2] - 50N, 51N</b> |                  | <b>16</b>                    | <b>1</b>                      | <b>3</b>         | <b>Struct</b> |                               |      |   |
|                         | ExBlo1-I         | 16                           | 1                             | 3                | Bit           | 0x1<br>(1)                    | -    | Module input state: External blocking1                    |
|                         | ExBlo2-I         | 16                           | 1                             | 3                | Bit           | 0x2<br>(2)                    | -    | Module input state: External blocking2                    |
|                         | ExBlo TripCmd-I  | 16                           | 1                             | 3                | Bit           | 0x4<br>(3)                    | -    | Module input state: External Blocking of the Trip Command |
|                         | Ex rev Interl-I  | 16                           | 1                             | 3                | Bit           | 0x8<br>(4)                    | -    | Module input state: External reverse interlocking         |
|                         | active           | 16                           | 1                             | 3                | Bit           | 0x10<br>(5)                   | -    | Signal: active  |
|                         | ExBlo            | 16                           | 1                             | 3                | Bit           | 0x20<br>(6)                   | -    | Signal: External Blocking                                 |
|                         | Ex rev Interl    | 16                           | 1                             | 3                | Bit           | 0x40<br>(7)                   | -    | Signal: External reverse Interlocking                     |
|                         | Blo TripCmd      | 16                           | 1                             | 3                | Bit           | 0x80<br>(8)                   | -    | Signal: Trip Command blocked                              |



| Module<br>(ANSI / IEEE) | Name<br>Function | Start<br>Register<br>Address | No. of<br>Modbus<br>Registers | Function<br>code | Format        | Bit Mask<br>(Bit<br>position) | Unit | Description   |
|-------------------------|------------------|------------------------------|-------------------------------|------------------|---------------|-------------------------------|------|---|
|                         | ExBlo TripCmd    | 16                           | 1                             | 3                | Bit           | 0x100<br>(9)                  | -    | Signal: External Blocking of the Trip Command             |
|                         | IGH2 Blo         | 16                           | 1                             | 3                | Bit           | 0x200<br>(10)                 | -    | Signal: blocked by an inrush                              |
|                         | Alarm            | 16                           | 1                             | 3                | Bit           | 0x400<br>(11)                 | -    | Signal: The alarm threshold has been exceeded.            |
|                         | Trip (*)         | 16                           | 1                             | 3                | Bit           | 0x800<br>(12)                 | -    | Signal: Trip  |
|                         | TripCmd (*)      | 16                           | 1                             | 3                | Bit           | 0x1000<br>(13)                | -    | Signal: Trip Command                                      |
| <b>IG[3] - 50N, 51N</b> |                  | <b>17</b>                    | <b>1</b>                      | <b>3</b>         | <b>Struct</b> |                               |      |   |
|                         | ExBlo1-I         | 17                           | 1                             | 3                | Bit           | 0x1<br>(1)                    | -    | Module input state: External blocking1                    |
|                         | ExBlo2-I         | 17                           | 1                             | 3                | Bit           | 0x2<br>(2)                    | -    | Module input state: External blocking2                    |
|                         | ExBlo TripCmd-I  | 17                           | 1                             | 3                | Bit           | 0x4<br>(3)                    | -    | Module input state: External Blocking of the Trip Command |
|                         | Ex rev Interl-I  | 17                           | 1                             | 3                | Bit           | 0x8<br>(4)                    | -    | Module input state: External reverse interlocking         |
|                         | active           | 17                           | 1                             | 3                | Bit           | 0x10<br>(5)                   | -    | Signal: active  |

### 3 Appendix - Data Point Lists

#### 3.1 Signals

| Module<br>(ANSI / IEEE) | Name<br>Function | Start<br>Register<br>Address | No. of<br>Modbus<br>Registers | Function<br>code | Format        | Bit Mask<br>(Bit<br>position) | Unit | Description                                    |
|-------------------------|------------------|------------------------------|-------------------------------|------------------|---------------|-------------------------------|------|--|
|                         | ExBlo            | 17                           | 1                             | 3                | Bit           | 0x20<br>(6)                   | -    | Signal: External Blocking                      |
|                         | Ex rev Interl    | 17                           | 1                             | 3                | Bit           | 0x40<br>(7)                   | -    | Signal: External reverse Interlocking          |
|                         | Blo TripCmd      | 17                           | 1                             | 3                | Bit           | 0x80<br>(8)                   | -    | Signal: Trip Command blocked                   |
|                         | ExBlo TripCmd    | 17                           | 1                             | 3                | Bit           | 0x100<br>(9)                  | -    | Signal: External Blocking of the Trip Command  |
|                         | IGH2 Blo         | 17                           | 1                             | 3                | Bit           | 0x200<br>(10)                 | -    | Signal: blocked by an inrush                   |
|                         | Alarm            | 17                           | 1                             | 3                | Bit           | 0x400<br>(11)                 | -    | Signal: The alarm threshold has been exceeded. |
|                         | Trip (*)         | 17                           | 1                             | 3                | Bit           | 0x800<br>(12)                 | -    | Signal: Trip                                   |
|                         | TripCmd (*)      | 17                           | 1                             | 3                | Bit           | 0x1000<br>(13)                | -    | Signal: Trip Command                           |
| <b>IG[4] - 50N, 51N</b> |                  | <b>18</b>                    | <b>1</b>                      | <b>3</b>         | <b>Struct</b> |                               |      |  |
|                         | ExBlo1-l         | 18                           | 1                             | 3                | Bit           | 0x1<br>(1)                    | -    | Module input state: External blocking1         |
|                         | ExBlo2-l         | 18                           | 1                             | 3                | Bit           | 0x2<br>(2)                    | -    | Module input state: External blocking2         |

| Module<br>(ANSI / IEEE) | Name<br>Function | Start<br>Register<br>Address | No. of<br>Modbus<br>Registers | Function<br>code | Format | Bit Mask<br>(Bit<br>position) | Unit | Description   |
|-------------------------|------------------|------------------------------|-------------------------------|------------------|--------|-------------------------------|------|---|
|                         | ExBlo TripCmd-I  | 18                           | 1                             | 3                | Bit    | 0x4<br>(3)                    | -    | Module input state: External Blocking of the Trip Command |
|                         | Ex rev Interl-I  | 18                           | 1                             | 3                | Bit    | 0x8<br>(4)                    | -    | Module input state: External reverse interlocking         |
|                         | active           | 18                           | 1                             | 3                | Bit    | 0x10<br>(5)                   | -    | Signal: active  |
|                         | ExBlo            | 18                           | 1                             | 3                | Bit    | 0x20<br>(6)                   | -    | Signal: External Blocking                                 |
|                         | Ex rev Interl    | 18                           | 1                             | 3                | Bit    | 0x40<br>(7)                   | -    | Signal: External reverse Interlocking                     |
|                         | Blo TripCmd      | 18                           | 1                             | 3                | Bit    | 0x80<br>(8)                   | -    | Signal: Trip Command blocked                              |
|                         | ExBlo TripCmd    | 18                           | 1                             | 3                | Bit    | 0x100<br>(9)                  | -    | Signal: External Blocking of the Trip Command             |
|                         | IGH2 Blo         | 18                           | 1                             | 3                | Bit    | 0x200<br>(10)                 | -    | Signal: blocked by an inrush                              |
|                         | Alarm            | 18                           | 1                             | 3                | Bit    | 0x400<br>(11)                 | -    | Signal: The alarm threshold has been exceeded.            |
|                         | Trip (*)         | 18                           | 1                             | 3                | Bit    | 0x800<br>(12)                 | -    | Signal: Trip  |
|                         | TripCmd (*)      | 18                           | 1                             | 3                | Bit    | 0x1000                        | -    | Signal: Trip Command                                      |

### 3 Appendix - Data Point Lists

#### 3.1 Signals

| Module<br>(ANSI / IEEE) | Name<br>Function | Start<br>Register<br>Address | No. of<br>Modbus<br>Registers | Function<br>code | Format        | Bit Mask<br>(Bit<br>position) | Unit | Description  |
|-------------------------|------------------|------------------------------|-------------------------------|------------------|---------------|-------------------------------|------|--|
|                         |                  |                              |                               |                  |               | (13)                          |      |  |
| <b>IH2</b>              |                  | <b>22</b>                    | <b>1</b>                      | <b>3</b>         | <b>Struct</b> |                               |      |  |
|                         | ExBlo1-l         | 22                           | 1                             | 3                | Bit           | 0x1<br>(1)                    | -    | Module input state: External blocking1   |
|                         | ExBlo2-l         | 22                           | 1                             | 3                | Bit           | 0x2<br>(2)                    | -    | Module input state: External blocking2   |
|                         | active           | 22                           | 1                             | 3                | Bit           | 0x4<br>(3)                    | -    | Signal: active   |
|                         | ExBlo            | 22                           | 1                             | 3                | Bit           | 0x8<br>(4)                    | -    | Signal: External Blocking  |
|                         | Blo L1           | 22                           | 1                             | 3                | Bit           | 0x10<br>(5)                   | -    | Signal: Blocked L1   |
|                         | Blo L2           | 22                           | 1                             | 3                | Bit           | 0x20<br>(6)                   | -    | Signal: Blocked L2   |
|                         | Blo L3           | 22                           | 1                             | 3                | Bit           | 0x40<br>(7)                   | -    | Signal: Blocked L3   |
|                         | Blo IG meas      | 22                           | 1                             | 3                | Bit           | 0x80<br>(8)                   | -    | Signal: Blocking of the ground (earth) protection module (measured ground current) |
|                         | 3-ph Blo         | 22                           | 1                             | 3                | Bit           | 0x100<br>(9)                  | -    | Signal: Inrush was detected in at least one phase - trip command blocked.          |

| Module<br>(ANSI / IEEE) | Name<br>Function | Start<br>Register<br>Address | No. of<br>Modbus<br>Registers | Function<br>code | Format        | Bit Mask<br>(Bit<br>position) | Unit | Description   |
|-------------------------|------------------|------------------------------|-------------------------------|------------------|---------------|-------------------------------|------|---|
|                         | Blo IG calc      | 22                           | 1                             | 3                | Bit           | 0x200<br>(10)                 | -    | Signal: Blocking of the ground (earth) protection module (calculated ground current)  |
| <b>IRIG-B</b>           |                  | <b>148</b>                   | <b>1</b>                      | <b>3</b>         | <b>Struct</b> |                               |      |   |
|                         | IRIG-B active    | 148                          | 1                             | 3                | Bit           | 0x1<br>(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<br>(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. |
| <b>I[1] - 50, 51</b>    |                  | <b>3</b>                     | <b>1</b>                      | <b>3</b>         | <b>Struct</b> |                               |      |   |
|                         | ExBlo1-I         | 3                            | 1                             | 3                | Bit           | 0x1<br>(1)                    | -    | Module input state: External blocking1  |
|                         | ExBlo2-I         | 3                            | 1                             | 3                | Bit           | 0x2<br>(2)                    | -    | Module input state: External blocking2  |
|                         | ExBlo TripCmd-I  | 3                            | 1                             | 3                | Bit           | 0x4<br>(3)                    | -    | Module input state: External Blocking of the Trip Command   |
|                         | Ex rev Interl-I  | 3                            | 1                             | 3                | Bit           | 0x8<br>(4)                    | -    | Module input state: External reverse interlocking   |
|                         | active           | 3                            | 1                             | 3                | Bit           | 0x10<br>(5)                   | -    | Signal: active  |
|                         | ExBlo            | 3                            | 1                             | 3                | Bit           | 0x20<br>(6)                   | -    | Signal: External Blocking   |
|                         | Ex rev Interl    | 3                            | 1                             | 3                | Bit           | 0x40                          | -    | Signal: External reverse Interlocking   |

### 3 Appendix - Data Point Lists

#### 3.1 Signals

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

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

### 3 Appendix - Data Point Lists

#### 3.1 Signals

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



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

### 3 Appendix - Data Point Lists

#### 3.1 Signals

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

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

### 3 Appendix - Data Point Lists

#### 3.1 Signals

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

| Module<br>(ANSI / IEEE) | Name<br>Function | Start<br>Register<br>Address | No. of<br>Modbus<br>Registers | Function<br>code | Format        | Bit Mask<br>(Bit<br>position) | Unit | Description   |
|-------------------------|------------------|------------------------------|-------------------------------|------------------|---------------|-------------------------------|------|---|
| <b>I[5] - 50, 51</b>    |                  | <b>11</b>                    | <b>1</b>                      | <b>3</b>         | <b>Struct</b> |                               |      |   |
|                         | ExBlo1-I         | 11                           | 1                             | 3                | Bit           | 0x1<br>(1)                    | -    | Module input state: External blocking1                    |
|                         | ExBlo2-I         | 11                           | 1                             | 3                | Bit           | 0x2<br>(2)                    | -    | Module input state: External blocking2                    |
|                         | ExBlo TripCmd-I  | 11                           | 1                             | 3                | Bit           | 0x4<br>(3)                    | -    | Module input state: External Blocking of the Trip Command |
|                         | Ex rev Interl-I  | 11                           | 1                             | 3                | Bit           | 0x8<br>(4)                    | -    | Module input state: External reverse interlocking         |
|                         | active           | 11                           | 1                             | 3                | Bit           | 0x10<br>(5)                   | -    | Signal: active  |
|                         | ExBlo            | 11                           | 1                             | 3                | Bit           | 0x20<br>(6)                   | -    | Signal: External Blocking                                 |
|                         | Ex rev Interl    | 11                           | 1                             | 3                | Bit           | 0x40<br>(7)                   | -    | Signal: External reverse Interlocking                     |
|                         | Blo TripCmd      | 11                           | 1                             | 3                | Bit           | 0x80<br>(8)                   | -    | Signal: Trip Command blocked                              |
|                         | ExBlo TripCmd    | 11                           | 1                             | 3                | Bit           | 0x100<br>(9)                  | -    | Signal: External Blocking of the Trip Command             |
|                         | IH2 Blo          | 11                           | 1                             | 3                | Bit           | 0x200<br>(10)                 | -    | Signal: Blocking the trip command by an inrush            |

### 3 Appendix - Data Point Lists

#### 3.1 Signals

| Module<br>(ANSI / IEEE) | Name<br>Function | Start<br>Register<br>Address | No. of<br>Modbus<br>Registers | Function<br>code | Format        | Bit Mask<br>(Bit<br>position) | Unit | Description                            |
|-------------------------|------------------|------------------------------|-------------------------------|------------------|---------------|-------------------------------|------|--|
| <b>I[5] - 50, 51</b>    |                  | <b>12</b>                    | <b>1</b>                      | <b>3</b>         | <b>Struct</b> |                               |      |  |
|                         | Alarm L1         | 12                           | 1                             | 3                | Bit           | 0x1<br>(1)                    | -    | Signal: Alarm L1                       |
|                         | Alarm L2         | 12                           | 1                             | 3                | Bit           | 0x2<br>(2)                    | -    | Signal: Alarm L2                       |
|                         | Alarm L3         | 12                           | 1                             | 3                | Bit           | 0x4<br>(3)                    | -    | Signal: Alarm L3                       |
|                         | Alarm            | 12                           | 1                             | 3                | Bit           | 0x8<br>(4)                    | -    | Signal: Alarm                          |
|                         | Trip L1 (*)      | 12                           | 1                             | 3                | Bit           | 0x10<br>(5)                   | -    | Signal: General Trip Phase L1          |
|                         | Trip L2 (*)      | 12                           | 1                             | 3                | Bit           | 0x20<br>(6)                   | -    | Signal: General Trip Phase L2          |
|                         | Trip L3 (*)      | 12                           | 1                             | 3                | Bit           | 0x40<br>(7)                   | -    | Signal: General Trip Phase L3          |
|                         | Trip (*)         | 12                           | 1                             | 3                | Bit           | 0x80<br>(8)                   | -    | Signal: Trip                           |
|                         | TripCmd (*)      | 12                           | 1                             | 3                | Bit           | 0x100<br>(9)                  | -    | Signal: Trip Command                   |
| <b>I[6] - 50, 51</b>    |                  | <b>13</b>                    | <b>1</b>                      | <b>3</b>         | <b>Struct</b> |                               |      |  |
|                         | ExBlo1-I         | 13                           | 1                             | 3                | Bit           | 0x1                           | -    | Module input state: External blocking1 |

| Module<br>(ANSI / IEEE) | Name<br>Function | Start<br>Register<br>Address | No. of<br>Modbus<br>Registers | Function<br>code | Format        | Bit Mask<br>(Bit<br>position) | Unit | Description   |
|-------------------------|------------------|------------------------------|-------------------------------|------------------|---------------|-------------------------------|------|---|
|                         |                  |                              |                               |                  |               | (1)                           |      |   |
|                         | ExBlo2-I         | 13                           | 1                             | 3                | Bit           | 0x2<br>(2)                    | -    | Module input state: External blocking2                    |
|                         | ExBlo TripCmd-I  | 13                           | 1                             | 3                | Bit           | 0x4<br>(3)                    | -    | Module input state: External Blocking of the Trip Command |
|                         | Ex rev Interl-I  | 13                           | 1                             | 3                | Bit           | 0x8<br>(4)                    | -    | Module input state: External reverse interlocking         |
|                         | active           | 13                           | 1                             | 3                | Bit           | 0x10<br>(5)                   | -    | Signal: active  |
|                         | ExBlo            | 13                           | 1                             | 3                | Bit           | 0x20<br>(6)                   | -    | Signal: External Blocking                                 |
|                         | Ex rev Interl    | 13                           | 1                             | 3                | Bit           | 0x40<br>(7)                   | -    | Signal: External reverse Interlocking                     |
|                         | Blo TripCmd      | 13                           | 1                             | 3                | Bit           | 0x80<br>(8)                   | -    | Signal: Trip Command blocked                              |
|                         | ExBlo TripCmd    | 13                           | 1                             | 3                | Bit           | 0x100<br>(9)                  | -    | Signal: External Blocking of the Trip Command             |
|                         | IH2 Blo          | 13                           | 1                             | 3                | Bit           | 0x200<br>(10)                 | -    | Signal: Blocking the trip command by an inrush            |
| <b>I[6] - 50, 51</b>    |                  | <b>14</b>                    | <b>1</b>                      | <b>3</b>         | <b>Struct</b> |                               |      |   |
|                         | Alarm L1         | 14                           | 1                             | 3                | Bit           | 0x1                           | -    | Signal: Alarm L1  |

### 3 Appendix - Data Point Lists

#### 3.1 Signals

| Module<br>(ANSI / IEEE) | Name<br>Function | Start<br>Register<br>Address | No. of<br>Modbus<br>Registers | Function<br>code | Format        | Bit Mask<br>(Bit<br>position) | Unit | Description                            |
|-------------------------|------------------|------------------------------|-------------------------------|------------------|---------------|-------------------------------|------|--|
|                         |                  |                              |                               |                  |               | (1)                           |      |  |
|                         | Alarm L2         | 14                           | 1                             | 3                | Bit           | 0x2<br>(2)                    | -    | Signal: Alarm L2                       |
|                         | Alarm L3         | 14                           | 1                             | 3                | Bit           | 0x4<br>(3)                    | -    | Signal: Alarm L3                       |
|                         | Alarm            | 14                           | 1                             | 3                | Bit           | 0x8<br>(4)                    | -    | Signal: Alarm                          |
|                         | Trip L1 (*)      | 14                           | 1                             | 3                | Bit           | 0x10<br>(5)                   | -    | Signal: General Trip Phase L1          |
|                         | Trip L2 (*)      | 14                           | 1                             | 3                | Bit           | 0x20<br>(6)                   | -    | Signal: General Trip Phase L2          |
|                         | Trip L3 (*)      | 14                           | 1                             | 3                | Bit           | 0x40<br>(7)                   | -    | Signal: General Trip Phase L3          |
|                         | Trip (*)         | 14                           | 1                             | 3                | Bit           | 0x80<br>(8)                   | -    | Signal: Trip                           |
|                         | TripCmd (*)      | 14                           | 1                             | 3                | Bit           | 0x100<br>(9)                  | -    | Signal: Trip Command                   |
| <b>Intertipping</b>     |                  | <b>253</b>                   | <b>1</b>                      | <b>3</b>         | <b>Struct</b> |                               |      |  |
|                         | ExBlo1-I         | 253                          | 1                             | 3                | Bit           | 0x1<br>(1)                    | -    | Module input state: External blocking1 |
|                         | ExBlo2-I         | 253                          | 1                             | 3                | Bit           | 0x2                           | -    | Module input state: External blocking2 |



| Module<br>(ANSI / IEEE) | Name<br>Function | Start<br>Register<br>Address | No. of<br>Modbus<br>Registers | Function<br>code | Format | Bit Mask<br>(Bit<br>position) | Unit | Description   |
|-------------------------|------------------|------------------------------|-------------------------------|------------------|--------|-------------------------------|------|---|
|                         |                  |                              |                               |                  |        | (2)                           |      |   |
|                         | ExBlo TripCmd-I  | 253                          | 1                             | 3                | Bit    | 0x4<br>(3)                    | -    | Module input state: External Blocking of the Trip Command |
|                         | Alarm-I          | 253                          | 1                             | 3                | Bit    | 0x8<br>(4)                    | -    | Module input state: Alarm                                 |
|                         | Trip-I           | 253                          | 1                             | 3                | Bit    | 0x10<br>(5)                   | -    | Module input state: Trip                                  |
|                         | active           | 253                          | 1                             | 3                | Bit    | 0x20<br>(6)                   | -    | Signal: active  |
|                         | ExBlo            | 253                          | 1                             | 3                | Bit    | 0x40<br>(7)                   | -    | Signal: External Blocking                                 |
|                         | Blo TripCmd      | 253                          | 1                             | 3                | Bit    | 0x80<br>(8)                   | -    | Signal: Trip Command blocked                              |
|                         | ExBlo TripCmd    | 253                          | 1                             | 3                | Bit    | 0x100<br>(9)                  | -    | Signal: External Blocking of the Trip Command             |
|                         | Alarm            | 253                          | 1                             | 3                | Bit    | 0x200<br>(10)                 | -    | Signal: Alarm   |
|                         | Trip (*)         | 253                          | 1                             | 3                | Bit    | 0x400<br>(11)                 | -    | Signal: Trip  |
|                         | TripCmd (*)      | 253                          | 1                             | 3                | Bit    | 0x800<br>(12)                 | -    | Signal: Trip Command                                      |

### 3 Appendix - Data Point Lists

#### 3.1 Signals

| Module<br>(ANSI / IEEE) | Name<br>Function | Start<br>Register<br>Address | No. of<br>Modbus<br>Registers | Function<br>code | Format        | Bit Mask<br>(Bit<br>position) | Unit | Description  |
|-------------------------|------------------|------------------------------|-------------------------------|------------------|---------------|-------------------------------|------|--|
| <b>LOP</b>              |                  | <b>81</b>                    | <b>1</b>                      | <b>3</b>         | <b>Struct</b> |                               |      |  |
|                         | ExBlo1-I         | 81                           | 1                             | 3                | Bit           | 0x1<br>(1)                    | -    | Module input state: External blocking1                                   |
|                         | ExBlo2-I         | 81                           | 1                             | 3                | Bit           | 0x2<br>(2)                    | -    | Module input state: External blocking2                                   |
|                         | active           | 81                           | 1                             | 3                | Bit           | 0x4<br>(3)                    | -    | Signal: active   |
|                         | ExBlo            | 81                           | 1                             | 3                | Bit           | 0x8<br>(4)                    | -    | Signal: External Blocking  |
|                         | LOP Blo          | 81                           | 1                             | 3                | Bit           | 0x10<br>(5)                   | -    | Signal: Loss of Potential blocks other elements.                         |
|                         | Alarm            | 81                           | 1                             | 3                | Bit           | 0x20<br>(6)                   | -    | Signal: Alarm Loss of Potential  |
|                         | Ex FF EVT        | 81                           | 1                             | 3                | Bit           | 0x1000<br>(13)                | -    | Signal: Alarm Fuse Failure Earth Voltage Transformers                    |
|                         | Ex FF VT         | 81                           | 1                             | 3                | Bit           | 0x2000<br>(14)                | -    | Signal: Ex FF VT   |
| <b>LOP</b>              |                  | <b>202</b>                   | <b>1</b>                      | <b>3</b>         | <b>Struct</b> |                               |      |  |
|                         | Ex FF EVT-I      | 202                          | 1                             | 3                | Bit           | 0x1<br>(1)                    | -    | State of the module input: Alarm Fuse Failure Earth Voltage Transformers |
|                         | Ex FF VT-I       | 202                          | 1                             | 3                | Bit           | 0x2                           | -    | State of the module input: Alarm Fuse Failure Voltage Transformers       |

| Module<br>(ANSI / IEEE) | Name<br>Function | Start<br>Register<br>Address | No. of<br>Modbus<br>Registers | Function<br>code | Format        | Bit Mask<br>(Bit<br>position) | Unit | Description  |
|-------------------------|------------------|------------------------------|-------------------------------|------------------|---------------|-------------------------------|------|--|
|                         |                  |                              |                               |                  |               | (2)                           |      |  |
|                         | Blo Trigger1-I   | 202                          | 1                             | 3                | Bit           | 0x4<br>(3)                    | -    | State of the module input: An Alarm of this protective element will block the Loss of Potential Detection. |
|                         | Blo Trigger2-I   | 202                          | 1                             | 3                | Bit           | 0x8<br>(4)                    | -    | State of the module input: An Alarm of this protective element will block the Loss of Potential Detection. |
|                         | Blo Trigger3-I   | 202                          | 1                             | 3                | Bit           | 0x10<br>(5)                   | -    | State of the module input: An Alarm of this protective element will block the Loss of Potential Detection. |
|                         | Blo Trigger4-I   | 202                          | 1                             | 3                | Bit           | 0x20<br>(6)                   | -    | State of the module input: An Alarm of this protective element will block the Loss of Potential Detection. |
|                         | Blo Trigger5-I   | 202                          | 1                             | 3                | Bit           | 0x40<br>(7)                   | -    | State of the module input: An Alarm of this protective element will block the Loss of Potential Detection. |
| <b>LVRT[1] - 27</b>     |                  | <b>254</b>                   | <b>1</b>                      | <b>3</b>         | <b>Struct</b> |                               |      |  |
|                         | ExBlo1-I         | 254                          | 1                             | 3                | Bit           | 0x1<br>(1)                    | -    | Module input state: External blocking1   |
|                         | ExBlo2-I         | 254                          | 1                             | 3                | Bit           | 0x2<br>(2)                    | -    | Module input state: External blocking2   |
|                         | ExBlo TripCmd-I  | 254                          | 1                             | 3                | Bit           | 0x4<br>(3)                    | -    | Module input state: External Blocking of the Trip Command  |
|                         | active           | 254                          | 1                             | 3                | Bit           | 0x8<br>(4)                    | -    | Signal: active   |
|                         | ExBlo            | 254                          | 1                             | 3                | Bit           | 0x10                          | -    | Signal: External Blocking  |

### 3 Appendix - Data Point Lists

#### 3.1 Signals

| Module<br>(ANSI / IEEE) | Name<br>Function | Start<br>Register<br>Address | No. of<br>Modbus<br>Registers | Function<br>code | Format        | Bit Mask<br>(Bit<br>position) | Unit | Description                                   |
|-------------------------|------------------|------------------------------|-------------------------------|------------------|---------------|-------------------------------|------|---|
|                         |                  |                              |                               |                  |               | (5)                           |      |   |
|                         | Blo TripCmd      | 254                          | 1                             | 3                | Bit           | 0x20<br>(6)                   | -    | Signal: Trip Command blocked                  |
|                         | ExBlo TripCmd    | 254                          | 1                             | 3                | Bit           | 0x40<br>(7)                   | -    | Signal: External Blocking of the Trip Command |
| <b>LVRT[1] - 27</b>     |                  | <b>255</b>                   | <b>1</b>                      | <b>3</b>         | <b>Struct</b> |                               |      |   |
|                         | Alarm L1         | 255                          | 1                             | 3                | Bit           | 0x1<br>(1)                    | -    | Signal: Alarm L1                              |
|                         | Alarm L2         | 255                          | 1                             | 3                | Bit           | 0x2<br>(2)                    | -    | Signal: Alarm L2                              |
|                         | Alarm L3         | 255                          | 1                             | 3                | Bit           | 0x4<br>(3)                    | -    | Signal: Alarm L3                              |
|                         | Alarm            | 255                          | 1                             | 3                | Bit           | 0x8<br>(4)                    | -    | Signal: Alarm voltage stage                   |
|                         | Trip L1 (*)      | 255                          | 1                             | 3                | Bit           | 0x10<br>(5)                   | -    | Signal: General Trip Phase L1                 |
|                         | Trip L2 (*)      | 255                          | 1                             | 3                | Bit           | 0x20<br>(6)                   | -    | Signal: General Trip Phase L2                 |
|                         | Trip L3 (*)      | 255                          | 1                             | 3                | Bit           | 0x40<br>(7)                   | -    | Signal: General Trip Phase L3                 |
|                         | Trip (*)         | 255                          | 1                             | 3                | Bit           | 0x80                          | -    | Signal: Trip                                  |

| Module<br>(ANSI / IEEE) | Name<br>Function      | Start<br>Register<br>Address | No. of<br>Modbus<br>Registers | Function<br>code | Format        | Bit Mask<br>(Bit<br>position) | Unit | Description   |
|-------------------------|-----------------------|------------------------------|-------------------------------|------------------|---------------|-------------------------------|------|---|
|                         |                       |                              |                               |                  |               | (8)                           |      |   |
|                         | TripCmd (*)           | 255                          | 1                             | 3                | Bit           | 0x100<br>(9)                  | -    | Signal: Trip Command                                      |
|                         | t-LVRT is running (*) | 255                          | 1                             | 3                | Bit           | 0x200<br>(10)                 | -    | Signal: t-LVRT is running                                 |
| <b>LVRT[2] - 27</b>     |                       | <b>270</b>                   | <b>1</b>                      | <b>3</b>         | <b>Struct</b> |                               |      |   |
|                         | ExBlo1-I              | 270                          | 1                             | 3                | Bit           | 0x1<br>(1)                    | -    | Module input state: External blocking1                    |
|                         | ExBlo2-I              | 270                          | 1                             | 3                | Bit           | 0x2<br>(2)                    | -    | Module input state: External blocking2                    |
|                         | ExBlo TripCmd-I       | 270                          | 1                             | 3                | Bit           | 0x4<br>(3)                    | -    | Module input state: External Blocking of the Trip Command |
|                         | active                | 270                          | 1                             | 3                | Bit           | 0x8<br>(4)                    | -    | Signal: active  |
|                         | ExBlo                 | 270                          | 1                             | 3                | Bit           | 0x10<br>(5)                   | -    | Signal: External Blocking                                 |
|                         | Blo TripCmd           | 270                          | 1                             | 3                | Bit           | 0x20<br>(6)                   | -    | Signal: Trip Command blocked                              |
|                         | ExBlo TripCmd         | 270                          | 1                             | 3                | Bit           | 0x40<br>(7)                   | -    | Signal: External Blocking of the Trip Command             |
| <b>LVRT[2] - 27</b>     |                       | <b>271</b>                   | <b>1</b>                      | <b>3</b>         | <b>Struct</b> |                               |      |   |

### 3 Appendix - Data Point Lists

#### 3.1 Signals

| Module<br>(ANSI / IEEE) | Name<br>Function      | Start<br>Register<br>Address | No. of<br>Modbus<br>Registers | Function<br>code | Format        | Bit Mask<br>(Bit<br>position) | Unit | Description                   |
|-------------------------|-----------------------|------------------------------|-------------------------------|------------------|---------------|-------------------------------|------|-------------------------------|
|                         | Alarm L1              | 271                          | 1                             | 3                | Bit           | 0x1<br>(1)                    | -    | Signal: Alarm L1              |
|                         | Alarm L2              | 271                          | 1                             | 3                | Bit           | 0x2<br>(2)                    | -    | Signal: Alarm L2              |
|                         | Alarm L3              | 271                          | 1                             | 3                | Bit           | 0x4<br>(3)                    | -    | Signal: Alarm L3              |
|                         | Alarm                 | 271                          | 1                             | 3                | Bit           | 0x8<br>(4)                    | -    | Signal: Alarm voltage stage   |
|                         | Trip L1 (*)           | 271                          | 1                             | 3                | Bit           | 0x10<br>(5)                   | -    | Signal: General Trip Phase L1 |
|                         | Trip L2 (*)           | 271                          | 1                             | 3                | Bit           | 0x20<br>(6)                   | -    | Signal: General Trip Phase L2 |
|                         | Trip L3 (*)           | 271                          | 1                             | 3                | Bit           | 0x40<br>(7)                   | -    | Signal: General Trip Phase L3 |
|                         | Trip (*)              | 271                          | 1                             | 3                | Bit           | 0x80<br>(8)                   | -    | Signal: Trip                  |
|                         | TripCmd (*)           | 271                          | 1                             | 3                | Bit           | 0x100<br>(9)                  | -    | Signal: Trip Command          |
|                         | t-LVRT is running (*) | 271                          | 1                             | 3                | Bit           | 0x200<br>(10)                 | -    | Signal: t-LVRT is running     |
| <b>Logics</b>           |                       | <b>1100</b>                  | <b>1</b>                      | <b>3</b>         | <b>Struct</b> |                               |      |                               |

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

### 3 Appendix - Data Point Lists

#### 3.1 Signals

| Module<br>(ANSI / IEEE) | Name<br>Function  | Start<br>Register<br>Address | No. of<br>Modbus<br>Registers | Function<br>code | Format        | Bit Mask<br>(Bit<br>position) | Unit | Description   |
|-------------------------|-------------------|------------------------------|-------------------------------|------------------|---------------|-------------------------------|------|---|
|                         | LE2.Timer Out     | 1101                         | 1                             | 3                | Bit           | 0x2<br>(2)                    | -    | Signal: Timer Output                                      |
|                         | LE2.Out           | 1101                         | 1                             | 3                | Bit           | 0x4<br>(3)                    | -    | Signal: Latched Output (Q)                                |
|                         | LE2.Out inverted  | 1101                         | 1                             | 3                | Bit           | 0x8<br>(4)                    | -    | Signal: Negated Latched Output (Q NOT)                    |
|                         | LE2.Gate In1-I    | 1101                         | 1                             | 3                | Bit           | 0x10<br>(5)                   | -    | State of the module input: Assignment of the Input Signal |
|                         | LE2.Gate In2-I    | 1101                         | 1                             | 3                | Bit           | 0x20<br>(6)                   | -    | State of the module input: Assignment of the Input Signal |
|                         | LE2.Gate In3-I    | 1101                         | 1                             | 3                | Bit           | 0x40<br>(7)                   | -    | State of the module input: Assignment of the Input Signal |
|                         | LE2.Gate In4-I    | 1101                         | 1                             | 3                | Bit           | 0x80<br>(8)                   | -    | State of the module input: Assignment of the Input Signal |
|                         | LE2.Reset Latch-I | 1101                         | 1                             | 3                | Bit           | 0x100<br>(9)                  | -    | State of the module input: Reset Signal for the Latching  |
| <b>Logics</b>           |                   | <b>1102</b>                  | <b>1</b>                      | <b>3</b>         | <b>Struct</b> |                               |      |   |
|                         | LE3.Gate Out      | 1102                         | 1                             | 3                | Bit           | 0x1<br>(1)                    | -    | Signal: Output of the logic gate                          |
|                         | LE3.Timer Out     | 1102                         | 1                             | 3                | Bit           | 0x2<br>(2)                    | -    | Signal: Timer Output                                      |



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

### 3 Appendix - Data Point Lists

#### 3.1 Signals

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

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

### 3 Appendix - Data Point Lists

#### 3.1 Signals

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

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

### 3 Appendix - Data Point Lists

#### 3.1 Signals

| Module<br>(ANSI / IEEE) | Name<br>Function  | Start<br>Register<br>Address | No. of<br>Modbus<br>Registers | Function<br>code | Format        | Bit Mask<br>(Bit<br>position) | Unit | Description   |
|-------------------------|-------------------|------------------------------|-------------------------------|------------------|---------------|-------------------------------|------|---|
|                         | LE8.Gate In4-I    | 1107                         | 1                             | 3                | Bit           | 0x80<br>(8)                   | -    | State of the module input: Assignment of the Input Signal |
|                         | LE8.Reset Latch-I | 1107                         | 1                             | 3                | Bit           | 0x100<br>(9)                  | -    | State of the module input: Reset Signal for the Latching  |
| <b>Logics</b>           |                   | <b>1108</b>                  | <b>1</b>                      | <b>3</b>         | <b>Struct</b> |                               |      |   |
|                         | LE9.Gate Out      | 1108                         | 1                             | 3                | Bit           | 0x1<br>(1)                    | -    | Signal: Output of the logic gate                          |
|                         | LE9.Timer Out     | 1108                         | 1                             | 3                | Bit           | 0x2<br>(2)                    | -    | Signal: Timer Output                                      |
|                         | LE9.Out           | 1108                         | 1                             | 3                | Bit           | 0x4<br>(3)                    | -    | Signal: Latched Output (Q)                                |
|                         | LE9.Out inverted  | 1108                         | 1                             | 3                | Bit           | 0x8<br>(4)                    | -    | Signal: Negated Latched Output (Q NOT)                    |
|                         | LE9.Gate In1-I    | 1108                         | 1                             | 3                | Bit           | 0x10<br>(5)                   | -    | State of the module input: Assignment of the Input Signal |
|                         | LE9.Gate In2-I    | 1108                         | 1                             | 3                | Bit           | 0x20<br>(6)                   | -    | State of the module input: Assignment of the Input Signal |
|                         | LE9.Gate In3-I    | 1108                         | 1                             | 3                | Bit           | 0x40<br>(7)                   | -    | State of the module input: Assignment of the Input Signal |
|                         | LE9.Gate In4-I    | 1108                         | 1                             | 3                | Bit           | 0x80<br>(8)                   | -    | State of the module input: Assignment of the Input Signal |

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

### 3 Appendix - Data Point Lists

#### 3.1 Signals

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



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

### 3 Appendix - Data Point Lists

#### 3.1 Signals

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

| Module<br>(ANSI / IEEE) | Name<br>Function   | Start<br>Register<br>Address | No. of<br>Modbus<br>Registers | Function<br>code | Format        | Bit Mask<br>(Bit<br>position) | Unit | Description   |
|-------------------------|--------------------|------------------------------|-------------------------------|------------------|---------------|-------------------------------|------|---|
|                         |                    |                              |                               |                  |               | (3)                           |      |   |
|                         | LE14.Out inverted  | 1113                         | 1                             | 3                | Bit           | 0x8<br>(4)                    | -    | Signal: Negated Latched Output (Q NOT)                    |
|                         | LE14.Gate In1-I    | 1113                         | 1                             | 3                | Bit           | 0x10<br>(5)                   | -    | State of the module input: Assignment of the Input Signal |
|                         | LE14.Gate In2-I    | 1113                         | 1                             | 3                | Bit           | 0x20<br>(6)                   | -    | State of the module input: Assignment of the Input Signal |
|                         | LE14.Gate In3-I    | 1113                         | 1                             | 3                | Bit           | 0x40<br>(7)                   | -    | State of the module input: Assignment of the Input Signal |
|                         | LE14.Gate In4-I    | 1113                         | 1                             | 3                | Bit           | 0x80<br>(8)                   | -    | State of the module input: Assignment of the Input Signal |
|                         | LE14.Reset Latch-I | 1113                         | 1                             | 3                | Bit           | 0x100<br>(9)                  | -    | State of the module input: Reset Signal for the Latching  |
| <b>Logics</b>           |                    | <b>1114</b>                  | <b>1</b>                      | <b>3</b>         | <b>Struct</b> |                               |      |   |
|                         | LE15.Gate Out      | 1114                         | 1                             | 3                | Bit           | 0x1<br>(1)                    | -    | Signal: Output of the logic gate                          |
|                         | LE15.Timer Out     | 1114                         | 1                             | 3                | Bit           | 0x2<br>(2)                    | -    | Signal: Timer Output                                      |
|                         | LE15.Out           | 1114                         | 1                             | 3                | Bit           | 0x4<br>(3)                    | -    | Signal: Latched Output (Q)                                |
|                         | LE15.Out inverted  | 1114                         | 1                             | 3                | Bit           | 0x8                           | -    | Signal: Negated Latched Output (Q NOT)                    |

### 3 Appendix - Data Point Lists

#### 3.1 Signals

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

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

### 3 Appendix - Data Point Lists

#### 3.1 Signals

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

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

### 3 Appendix - Data Point Lists

#### 3.1 Signals

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



| Module<br>(ANSI / IEEE) | Name<br>Function   | Start<br>Register<br>Address | No. of<br>Modbus<br>Registers | Function<br>code | Format        | Bit Mask<br>(Bit<br>position) | Unit | Description  |
|-------------------------|--------------------|------------------------------|-------------------------------|------------------|---------------|-------------------------------|------|--|
|                         | LE20.Reset Latch-I | 1119                         | 1                             | 3                | Bit           | 0x100<br>(9)                  | -    | State of the module input: Reset Signal for the Latching |
| <b>Modbus</b>           |                    | <b>1005</b>                  | <b>1</b>                      | <b>3</b>         | <b>Struct</b> |                               |      |  |
|                         | Scada Cmd 1        | 1005                         | 1                             | 3                | Bit           | 0x1<br>(1)                    | -    | Scada Command  |
|                         | Scada Cmd 2        | 1005                         | 1                             | 3                | Bit           | 0x2<br>(2)                    | -    | Scada Command  |
|                         | Scada Cmd 3        | 1005                         | 1                             | 3                | Bit           | 0x4<br>(3)                    | -    | Scada Command  |
|                         | Scada Cmd 4        | 1005                         | 1                             | 3                | Bit           | 0x8<br>(4)                    | -    | Scada Command  |
|                         | Scada Cmd 5        | 1005                         | 1                             | 3                | Bit           | 0x10<br>(5)                   | -    | Scada Command  |
|                         | Scada Cmd 6        | 1005                         | 1                             | 3                | Bit           | 0x20<br>(6)                   | -    | Scada Command  |
|                         | Scada Cmd 7        | 1005                         | 1                             | 3                | Bit           | 0x40<br>(7)                   | -    | Scada Command  |
|                         | Scada Cmd 8        | 1005                         | 1                             | 3                | Bit           | 0x80<br>(8)                   | -    | Scada Command  |
|                         | Scada Cmd 9        | 1005                         | 1                             | 3                | Bit           | 0x100<br>(9)                  | -    | Scada Command  |

### 3 Appendix - Data Point Lists

#### 3.1 Signals

| Module<br>(ANSI / IEEE) | Name<br>Function | Start<br>Register<br>Address | No. of<br>Modbus<br>Registers | Function<br>code | Format        | Bit Mask<br>(Bit<br>position) | Unit | Description   |
|-------------------------|------------------|------------------------------|-------------------------------|------------------|---------------|-------------------------------|------|---|
|                         | Scada Cmd 10     | 1005                         | 1                             | 3                | Bit           | 0x200<br>(10)                 | -    | Scada Command   |
|                         | Scada Cmd 11     | 1005                         | 1                             | 3                | Bit           | 0x400<br>(11)                 | -    | Scada Command   |
|                         | Scada Cmd 12     | 1005                         | 1                             | 3                | Bit           | 0x800<br>(12)                 | -    | Scada Command   |
|                         | Scada Cmd 13     | 1005                         | 1                             | 3                | Bit           | 0x1000<br>(13)                | -    | Scada Command   |
|                         | Scada Cmd 14     | 1005                         | 1                             | 3                | Bit           | 0x2000<br>(14)                | -    | Scada Command   |
|                         | Scada Cmd 15     | 1005                         | 1                             | 3                | Bit           | 0x4000<br>(15)                | -    | Scada Command   |
|                         | Scada Cmd 16     | 1005                         | 1                             | 3                | Bit           | 0x8000<br>(16)                | -    | Scada Command   |
| <b>P - 32R</b>          |                  | <b>251</b>                   | <b>1</b>                      | <b>3</b>         | <b>Struct</b> |                               |      |   |
|                         | ExBlo1-I         | 251                          | 1                             | 3                | Bit           | 0x1<br>(1)                    | -    | Module input state: External blocking                     |
|                         | ExBlo2-I         | 251                          | 1                             | 3                | Bit           | 0x2<br>(2)                    | -    | Module input state: External blocking                     |
|                         | ExBlo TripCmd-I  | 251                          | 1                             | 3                | Bit           | 0x4<br>(3)                    | -    | Module input state: External Blocking of the Trip Command |

| Module<br>(ANSI / IEEE) | Name<br>Function | Start<br>Register<br>Address | No. of<br>Modbus<br>Registers | Function<br>code | Format        | Bit Mask<br>(Bit<br>position) | Unit | Description   |
|-------------------------|------------------|------------------------------|-------------------------------|------------------|---------------|-------------------------------|------|---|
|                         | active           | 251                          | 1                             | 3                | Bit           | 0x8<br>(4)                    | -    | Signal: active  |
|                         | ExBlo            | 251                          | 1                             | 3                | Bit           | 0x10<br>(5)                   | -    | Signal: External Blocking                                 |
|                         | Blo TripCmd      | 251                          | 1                             | 3                | Bit           | 0x20<br>(6)                   | -    | Signal: Trip Command blocked                              |
|                         | ExBlo TripCmd    | 251                          | 1                             | 3                | Bit           | 0x40<br>(7)                   | -    | Signal: External Blocking of the Trip Command             |
|                         | Alarm            | 251                          | 1                             | 3                | Bit           | 0x80<br>(8)                   | -    | Signal: Alarm Power Protection                            |
|                         | Trip (*)         | 251                          | 1                             | 3                | Bit           | 0x100<br>(9)                  | -    | Signal: Trip Power Protection                             |
|                         | TripCmd (*)      | 251                          | 1                             | 3                | Bit           | 0x200<br>(10)                 | -    | Signal: Trip Command                                      |
| <b>PF[1] - 55</b>       |                  | <b>73</b>                    | <b>1</b>                      | <b>3</b>         | <b>Struct</b> |                               |      |   |
|                         | ExBlo1-l         | 73                           | 1                             | 3                | Bit           | 0x1<br>(1)                    | -    | Module input state: External blocking                     |
|                         | ExBlo2-l         | 73                           | 1                             | 3                | Bit           | 0x2<br>(2)                    | -    | Module input state: External blocking                     |
|                         | ExBlo TripCmd-l  | 73                           | 1                             | 3                | Bit           | 0x4<br>(3)                    | -    | Module input state: External Blocking of the Trip Command |

### 3 Appendix - Data Point Lists

#### 3.1 Signals

| Module<br>(ANSI / IEEE) | Name<br>Function | Start<br>Register<br>Address | No. of<br>Modbus<br>Registers | Function<br>code | Format        | Bit Mask<br>(Bit<br>position) | Unit | Description                                   |
|-------------------------|------------------|------------------------------|-------------------------------|------------------|---------------|-------------------------------|------|---|
|                         | active           | 73                           | 1                             | 3                | Bit           | 0x8<br>(4)                    | -    | Signal: active                                |
|                         | ExBlo            | 73                           | 1                             | 3                | Bit           | 0x10<br>(5)                   | -    | Signal: External Blocking                     |
|                         | Blo TripCmd      | 73                           | 1                             | 3                | Bit           | 0x20<br>(6)                   | -    | Signal: Trip Command blocked                  |
|                         | ExBlo TripCmd    | 73                           | 1                             | 3                | Bit           | 0x40<br>(7)                   | -    | Signal: External Blocking of the Trip Command |
|                         | Alarm            | 73                           | 1                             | 3                | Bit           | 0x80<br>(8)                   | -    | Signal: Alarm Power Factor                    |
|                         | Trip (*)         | 73                           | 1                             | 3                | Bit           | 0x100<br>(9)                  | -    | Signal: Trip Power Factor                     |
|                         | TripCmd (*)      | 73                           | 1                             | 3                | Bit           | 0x200<br>(10)                 | -    | Signal: Trip Command                          |
|                         | Compensator      | 73                           | 1                             | 3                | Bit           | 0x400<br>(11)                 | -    | Signal: Compensation Signal                   |
|                         | Impossible       | 73                           | 1                             | 3                | Bit           | 0x800<br>(12)                 | -    | Signal: Alarm Power Factor Impossible         |
| <b>PF[2] - 55</b>       |                  | <b>74</b>                    | <b>1</b>                      | <b>3</b>         | <b>Struct</b> |                               |      |   |
|                         | ExBlo1-l         | 74                           | 1                             | 3                | Bit           | 0x1<br>(1)                    | -    | Module input state: External blocking         |

| Module<br>(ANSI / IEEE) | Name<br>Function | Start<br>Register<br>Address | No. of<br>Modbus<br>Registers | Function<br>code | Format | Bit Mask<br>(Bit<br>position) | Unit | Description   |
|-------------------------|------------------|------------------------------|-------------------------------|------------------|--------|-------------------------------|------|---|
|                         | ExBlo2-I         | 74                           | 1                             | 3                | Bit    | 0x2<br>(2)                    | -    | Module input state: External blocking                     |
|                         | ExBlo TripCmd-I  | 74                           | 1                             | 3                | Bit    | 0x4<br>(3)                    | -    | Module input state: External Blocking of the Trip Command |
|                         | active           | 74                           | 1                             | 3                | Bit    | 0x8<br>(4)                    | -    | Signal: active  |
|                         | ExBlo            | 74                           | 1                             | 3                | Bit    | 0x10<br>(5)                   | -    | Signal: External Blocking                                 |
|                         | Blo TripCmd      | 74                           | 1                             | 3                | Bit    | 0x20<br>(6)                   | -    | Signal: Trip Command blocked                              |
|                         | ExBlo TripCmd    | 74                           | 1                             | 3                | Bit    | 0x40<br>(7)                   | -    | Signal: External Blocking of the Trip Command             |
|                         | Alarm            | 74                           | 1                             | 3                | Bit    | 0x80<br>(8)                   | -    | Signal: Alarm Power Factor                                |
|                         | Trip (*)         | 74                           | 1                             | 3                | Bit    | 0x100<br>(9)                  | -    | Signal: Trip Power Factor                                 |
|                         | TripCmd (*)      | 74                           | 1                             | 3                | Bit    | 0x200<br>(10)                 | -    | Signal: Trip Command                                      |
|                         | Compensator      | 74                           | 1                             | 3                | Bit    | 0x400<br>(11)                 | -    | Signal: Compensation Signal                               |
|                         | Impossible       | 74                           | 1                             | 3                | Bit    | 0x800                         | -    | Signal: Alarm Power Factor Impossible                     |

3 Appendix – Data Point Lists

3.1 Signals

| Module<br>(ANSI / IEEE) | Name<br>Function | Start<br>Register<br>Address | No. of<br>Modbus<br>Registers | Function<br>code | Format        | Bit Mask<br>(Bit<br>position) | Unit | Description                            |
|-------------------------|------------------|------------------------------|-------------------------------|------------------|---------------|-------------------------------|------|--|
|                         |                  |                              |                               |                  |               | (12)                          |      |  |
| <b>PQSCr</b>            |                  | <b>60</b>                    | <b>1</b>                      | <b>3</b>         | <b>Struct</b> |                               |      |  |
|                         | Cr Oflw Wp+      | 60                           | 1                             | 3                | Bit           | 0x1<br>(1)                    | -    | Signal: Counter Overflow Wp+           |
|                         | Cr Oflw Wp-      | 60                           | 1                             | 3                | Bit           | 0x2<br>(2)                    | -    | Signal: Counter Overflow Wp-           |
|                         | Cr Oflw Wq+      | 60                           | 1                             | 3                | Bit           | 0x4<br>(3)                    | -    | Signal: Counter Overflow Wq+           |
|                         | Cr Oflw Wq-      | 60                           | 1                             | 3                | Bit           | 0x8<br>(4)                    | -    | Signal: Counter Overflow Wq-           |
|                         | Cr Oflw Wp Net   | 60                           | 1                             | 3                | Bit           | 0x10<br>(5)                   | -    | Signal: Counter Overflow Wp Net        |
|                         | Cr Oflw Wq Net   | 60                           | 1                             | 3                | Bit           | 0x20<br>(6)                   | -    | Signal: Counter Overflow Wq Net        |
|                         | Cr Oflw Ws Net   | 60                           | 1                             | 3                | Bit           | 0x40<br>(7)                   | -    | Signal: Counter Overflow Ws Net        |
|                         | Cr OflwW Wp+     | 60                           | 1                             | 3                | Bit           | 0x80<br>(8)                   | -    | Signal: Counter Wp+ will overflow soon |
|                         | Cr OflwW Wp-     | 60                           | 1                             | 3                | Bit           | 0x100<br>(9)                  | -    | Signal: Counter Wp- will overflow soon |
|                         | Cr OflwW Wq+     | 60                           | 1                             | 3                | Bit           | 0x200                         | -    | Signal: Counter Wq+ will overflow soon |

| Module<br>(ANSI / IEEE) | Name<br>Function | Start<br>Register<br>Address | No. of<br>Modbus<br>Registers | Function<br>code | Format        | Bit Mask<br>(Bit<br>position) | Unit | Description   |
|-------------------------|------------------|------------------------------|-------------------------------|------------------|---------------|-------------------------------|------|---|
|                         |                  |                              |                               |                  |               | (10)                          |      |   |
|                         | Cr OflwW Wq-     | 60                           | 1                             | 3                | Bit           | 0x400<br>(11)                 | -    | Signal: Counter Wq- will overflow soon                    |
|                         | Cr OflwW Wp Net  | 60                           | 1                             | 3                | Bit           | 0x800<br>(12)                 | -    | Signal: Counter Wp Net will overflow soon                 |
|                         | Cr OflwW Wq Net  | 60                           | 1                             | 3                | Bit           | 0x1000<br>(13)                | -    | Signal: Counter Wq Net will overflow soon                 |
|                         | Cr OflwW Ws Net  | 60                           | 1                             | 3                | Bit           | 0x2000<br>(14)                | -    | Signal: Counter Ws Net will overflow soon                 |
| <b>PQS[1] - 32, 37</b>  |                  | <b>67</b>                    | <b>1</b>                      | <b>3</b>         | <b>Struct</b> |                               |      |   |
|                         | ExBlo1-l         | 67                           | 1                             | 3                | Bit           | 0x1<br>(1)                    | -    | Module input state: External blocking                     |
|                         | ExBlo2-l         | 67                           | 1                             | 3                | Bit           | 0x2<br>(2)                    | -    | Module input state: External blocking                     |
|                         | ExBlo TripCmd-l  | 67                           | 1                             | 3                | Bit           | 0x4<br>(3)                    | -    | Module input state: External Blocking of the Trip Command |
|                         | active           | 67                           | 1                             | 3                | Bit           | 0x8<br>(4)                    | -    | Signal: active  |
|                         | ExBlo            | 67                           | 1                             | 3                | Bit           | 0x10<br>(5)                   | -    | Signal: External Blocking                                 |
|                         | Blo TripCmd      | 67                           | 1                             | 3                | Bit           | 0x20                          | -    | Signal: Trip Command blocked                              |

### 3 Appendix - Data Point Lists

#### 3.1 Signals

| Module<br>(ANSI / IEEE) | Name<br>Function | Start<br>Register<br>Address | No. of<br>Modbus<br>Registers | Function<br>code | Format        | Bit Mask<br>(Bit<br>position) | Unit | Description   |
|-------------------------|------------------|------------------------------|-------------------------------|------------------|---------------|-------------------------------|------|---|
|                         |                  |                              |                               |                  |               | (6)                           |      |   |
|                         | ExBlo TripCmd    | 67                           | 1                             | 3                | Bit           | 0x40<br>(7)                   | -    | Signal: External Blocking of the Trip Command             |
|                         | Alarm            | 67                           | 1                             | 3                | Bit           | 0x80<br>(8)                   | -    | Signal: Alarm Power Protection                            |
|                         | Trip (*)         | 67                           | 1                             | 3                | Bit           | 0x100<br>(9)                  | -    | Signal: Trip Power Protection                             |
|                         | TripCmd (*)      | 67                           | 1                             | 3                | Bit           | 0x200<br>(10)                 | -    | Signal: Trip Command                                      |
| <b>PQS[2] - 32, 37</b>  |                  | <b>68</b>                    | <b>1</b>                      | <b>3</b>         | <b>Struct</b> |                               |      |   |
|                         | ExBlo1-l         | 68                           | 1                             | 3                | Bit           | 0x1<br>(1)                    | -    | Module input state: External blocking                     |
|                         | ExBlo2-l         | 68                           | 1                             | 3                | Bit           | 0x2<br>(2)                    | -    | Module input state: External blocking                     |
|                         | ExBlo TripCmd-l  | 68                           | 1                             | 3                | Bit           | 0x4<br>(3)                    | -    | Module input state: External Blocking of the Trip Command |
|                         | active           | 68                           | 1                             | 3                | Bit           | 0x8<br>(4)                    | -    | Signal: active  |
|                         | ExBlo            | 68                           | 1                             | 3                | Bit           | 0x10<br>(5)                   | -    | Signal: External Blocking                                 |
|                         | Blo TripCmd      | 68                           | 1                             | 3                | Bit           | 0x20                          | -    | Signal: Trip Command blocked                              |



| Module<br>(ANSI / IEEE) | Name<br>Function | Start<br>Register<br>Address | No. of<br>Modbus<br>Registers | Function<br>code | Format        | Bit Mask<br>(Bit<br>position) | Unit | Description   |
|-------------------------|------------------|------------------------------|-------------------------------|------------------|---------------|-------------------------------|------|---|
|                         |                  |                              |                               |                  |               | (6)                           |      |   |
|                         | ExBlo TripCmd    | 68                           | 1                             | 3                | Bit           | 0x40<br>(7)                   | -    | Signal: External Blocking of the Trip Command             |
|                         | Alarm            | 68                           | 1                             | 3                | Bit           | 0x80<br>(8)                   | -    | Signal: Alarm Power Protection                            |
|                         | Trip (*)         | 68                           | 1                             | 3                | Bit           | 0x100<br>(9)                  | -    | Signal: Trip Power Protection                             |
|                         | TripCmd (*)      | 68                           | 1                             | 3                | Bit           | 0x200<br>(10)                 | -    | Signal: Trip Command                                      |
| <b>PQS[3] - 32, 37</b>  |                  | <b>69</b>                    | <b>1</b>                      | <b>3</b>         | <b>Struct</b> |                               |      |   |
|                         | ExBlo1-l         | 69                           | 1                             | 3                | Bit           | 0x1<br>(1)                    | -    | Module input state: External blocking                     |
|                         | ExBlo2-l         | 69                           | 1                             | 3                | Bit           | 0x2<br>(2)                    | -    | Module input state: External blocking                     |
|                         | ExBlo TripCmd-l  | 69                           | 1                             | 3                | Bit           | 0x4<br>(3)                    | -    | Module input state: External Blocking of the Trip Command |
|                         | active           | 69                           | 1                             | 3                | Bit           | 0x8<br>(4)                    | -    | Signal: active  |
|                         | ExBlo            | 69                           | 1                             | 3                | Bit           | 0x10<br>(5)                   | -    | Signal: External Blocking                                 |
|                         | Blo TripCmd      | 69                           | 1                             | 3                | Bit           | 0x20                          | -    | Signal: Trip Command blocked                              |

### 3 Appendix - Data Point Lists

#### 3.1 Signals

| Module<br>(ANSI / IEEE) | Name<br>Function | Start<br>Register<br>Address | No. of<br>Modbus<br>Registers | Function<br>code | Format        | Bit Mask<br>(Bit<br>position) | Unit | Description   |
|-------------------------|------------------|------------------------------|-------------------------------|------------------|---------------|-------------------------------|------|---|
|                         |                  |                              |                               |                  |               | (6)                           |      |   |
|                         | ExBlo TripCmd    | 69                           | 1                             | 3                | Bit           | 0x40<br>(7)                   | -    | Signal: External Blocking of the Trip Command             |
|                         | Alarm            | 69                           | 1                             | 3                | Bit           | 0x80<br>(8)                   | -    | Signal: Alarm Power Protection                            |
|                         | Trip (*)         | 69                           | 1                             | 3                | Bit           | 0x100<br>(9)                  | -    | Signal: Trip Power Protection                             |
|                         | TripCmd (*)      | 69                           | 1                             | 3                | Bit           | 0x200<br>(10)                 | -    | Signal: Trip Command                                      |
| <b>PQS[4] - 32, 37</b>  |                  | <b>70</b>                    | <b>1</b>                      | <b>3</b>         | <b>Struct</b> |                               |      |   |
|                         | ExBlo1-l         | 70                           | 1                             | 3                | Bit           | 0x1<br>(1)                    | -    | Module input state: External blocking                     |
|                         | ExBlo2-l         | 70                           | 1                             | 3                | Bit           | 0x2<br>(2)                    | -    | Module input state: External blocking                     |
|                         | ExBlo TripCmd-l  | 70                           | 1                             | 3                | Bit           | 0x4<br>(3)                    | -    | Module input state: External Blocking of the Trip Command |
|                         | active           | 70                           | 1                             | 3                | Bit           | 0x8<br>(4)                    | -    | Signal: active  |
|                         | ExBlo            | 70                           | 1                             | 3                | Bit           | 0x10<br>(5)                   | -    | Signal: External Blocking                                 |
|                         | Blo TripCmd      | 70                           | 1                             | 3                | Bit           | 0x20                          | -    | Signal: Trip Command blocked                              |

| Module<br>(ANSI / IEEE) | Name<br>Function | Start<br>Register<br>Address | No. of<br>Modbus<br>Registers | Function<br>code | Format        | Bit Mask<br>(Bit<br>position) | Unit | Description   |
|-------------------------|------------------|------------------------------|-------------------------------|------------------|---------------|-------------------------------|------|---|
|                         |                  |                              |                               |                  |               | (6)                           |      |   |
|                         | ExBlo TripCmd    | 70                           | 1                             | 3                | Bit           | 0x40<br>(7)                   | -    | Signal: External Blocking of the Trip Command             |
|                         | Alarm            | 70                           | 1                             | 3                | Bit           | 0x80<br>(8)                   | -    | Signal: Alarm Power Protection                            |
|                         | Trip (*)         | 70                           | 1                             | 3                | Bit           | 0x100<br>(9)                  | -    | Signal: Trip Power Protection                             |
|                         | TripCmd (*)      | 70                           | 1                             | 3                | Bit           | 0x200<br>(10)                 | -    | Signal: Trip Command                                      |
| <b>PQS[5] - 32, 37</b>  |                  | <b>71</b>                    | <b>1</b>                      | <b>3</b>         | <b>Struct</b> |                               |      |   |
|                         | ExBlo1-I         | 71                           | 1                             | 3                | Bit           | 0x1<br>(1)                    | -    | Module input state: External blocking                     |
|                         | ExBlo2-I         | 71                           | 1                             | 3                | Bit           | 0x2<br>(2)                    | -    | Module input state: External blocking                     |
|                         | ExBlo TripCmd-I  | 71                           | 1                             | 3                | Bit           | 0x4<br>(3)                    | -    | Module input state: External Blocking of the Trip Command |
|                         | active           | 71                           | 1                             | 3                | Bit           | 0x8<br>(4)                    | -    | Signal: active  |
|                         | ExBlo            | 71                           | 1                             | 3                | Bit           | 0x10<br>(5)                   | -    | Signal: External Blocking                                 |
|                         | Blo TripCmd      | 71                           | 1                             | 3                | Bit           | 0x20                          | -    | Signal: Trip Command blocked                              |

### 3 Appendix - Data Point Lists

#### 3.1 Signals

| Module<br>(ANSI / IEEE) | Name<br>Function | Start<br>Register<br>Address | No. of<br>Modbus<br>Registers | Function<br>code | Format        | Bit Mask<br>(Bit<br>position) | Unit | Description   |
|-------------------------|------------------|------------------------------|-------------------------------|------------------|---------------|-------------------------------|------|---|
|                         |                  |                              |                               |                  |               | (6)                           |      |   |
|                         | ExBlo TripCmd    | 71                           | 1                             | 3                | Bit           | 0x40<br>(7)                   | -    | Signal: External Blocking of the Trip Command             |
|                         | Alarm            | 71                           | 1                             | 3                | Bit           | 0x80<br>(8)                   | -    | Signal: Alarm Power Protection                            |
|                         | Trip (*)         | 71                           | 1                             | 3                | Bit           | 0x100<br>(9)                  | -    | Signal: Trip Power Protection                             |
|                         | TripCmd (*)      | 71                           | 1                             | 3                | Bit           | 0x200<br>(10)                 | -    | Signal: Trip Command                                      |
| <b>PQS[6] - 32, 37</b>  |                  | <b>72</b>                    | <b>1</b>                      | <b>3</b>         | <b>Struct</b> |                               |      |   |
|                         | ExBlo1-l         | 72                           | 1                             | 3                | Bit           | 0x1<br>(1)                    | -    | Module input state: External blocking                     |
|                         | ExBlo2-l         | 72                           | 1                             | 3                | Bit           | 0x2<br>(2)                    | -    | Module input state: External blocking                     |
|                         | ExBlo TripCmd-l  | 72                           | 1                             | 3                | Bit           | 0x4<br>(3)                    | -    | Module input state: External Blocking of the Trip Command |
|                         | active           | 72                           | 1                             | 3                | Bit           | 0x8<br>(4)                    | -    | Signal: active  |
|                         | ExBlo            | 72                           | 1                             | 3                | Bit           | 0x10<br>(5)                   | -    | Signal: External Blocking                                 |
|                         | Blo TripCmd      | 72                           | 1                             | 3                | Bit           | 0x20                          | -    | Signal: Trip Command blocked                              |

| Module<br>(ANSI / IEEE) | Name<br>Function | Start<br>Register<br>Address | No. of<br>Modbus<br>Registers | Function<br>code | Format        | Bit Mask<br>(Bit<br>position) | Unit | Description  |
|-------------------------|------------------|------------------------------|-------------------------------|------------------|---------------|-------------------------------|------|--|
|                         |                  |                              |                               |                  |               | (6)                           |      |  |
|                         | ExBlo TripCmd    | 72                           | 1                             | 3                | Bit           | 0x40<br>(7)                   | -    | Signal: External Blocking of the Trip Command                                      |
|                         | Alarm            | 72                           | 1                             | 3                | Bit           | 0x80<br>(8)                   | -    | Signal: Alarm Power Protection   |
|                         | Trip (*)         | 72                           | 1                             | 3                | Bit           | 0x100<br>(9)                  | -    | Signal: Trip Power Protection  |
|                         | TripCmd (*)      | 72                           | 1                             | 3                | Bit           | 0x200<br>(10)                 | -    | Signal: Trip Command   |
| <b>PSet-Switch</b>      |                  | <b>59</b>                    | <b>1</b>                      | <b>3</b>         | <b>Struct</b> |                               |      |  |
|                         | PS 1             | 59                           | 1                             | 3                | Bit           | 0x1<br>(1)                    | -    | Signal: The currently active Parameter Set is PS 1                                 |
|                         | PS 2             | 59                           | 1                             | 3                | Bit           | 0x2<br>(2)                    | -    | Signal: The currently active Parameter Set is PS 2                                 |
|                         | PS 3             | 59                           | 1                             | 3                | Bit           | 0x4<br>(3)                    | -    | Signal: The currently active Parameter Set is PS 3                                 |
|                         | PS 4             | 59                           | 1                             | 3                | Bit           | 0x8<br>(4)                    | -    | Signal: The currently active Parameter Set is PS 4                                 |
|                         | PSS manual       | 59                           | 1                             | 3                | Bit           | 0x10<br>(5)                   | -    | Signal: Manual Switch over of a Parameter Set                                      |
|                         | PSS via Scada    | 59                           | 1                             | 3                | Bit           | 0x20                          | -    | Signal: Parameter Set Switch via Scada. Write into this output byte the integer of |

### 3 Appendix - Data Point Lists

#### 3.1 Signals

| Module<br>(ANSI / IEEE) | Name<br>Function           | Start<br>Register<br>Address | No. of<br>Modbus<br>Registers | Function<br>code | Format        | Bit Mask<br>(Bit<br>position) | Unit | Description  |
|-------------------------|----------------------------|------------------------------|-------------------------------|------------------|---------------|-------------------------------|------|--|
|                         |                            |                              |                               |                  |               | (6)                           |      | the parameter set that should become active (e.g. 4 => Switch onto parameter set 4).                     |
|                         | PSS via Inp fct            | 59                           | 1                             | 3                | Bit           | 0x40<br>(7)                   | -    | Signal: Parameter Set Switch via input function  |
|                         | PS1-I                      | 59                           | 1                             | 3                | Bit           | 0x80<br>(8)                   | -    | State of the module input respectively of the signal, that should activate this Parameter Setting Group. |
|                         | PS2-I                      | 59                           | 1                             | 3                | Bit           | 0x100<br>(9)                  | -    | State of the module input respectively of the signal, that should activate this Parameter Setting Group. |
|                         | PS3-I                      | 59                           | 1                             | 3                | Bit           | 0x200<br>(10)                 | -    | State of the module input respectively of the signal, that should activate this Parameter Setting Group. |
|                         | PS4-I                      | 59                           | 1                             | 3                | Bit           | 0x400<br>(11)                 | -    | State of the module input respectively of the signal, that should activate this Parameter Setting Group. |
|                         | min 1 param<br>changed (*) | 59                           | 1                             | 3                | Bit           | 0x800<br>(12)                 | -    | Signal: At least one parameter has been changed  |
| <b>Prot</b>             |                            | <b>1</b>                     | <b>1</b>                      | <b>3</b>         | <b>Struct</b> |                               |      |  |
|                         | ExBlo1-I                   | 1                            | 1                             | 3                | Bit           | 0x1<br>(1)                    | -    | Module input state: External blocking1   |
|                         | ExBlo2-I                   | 1                            | 1                             | 3                | Bit           | 0x2<br>(2)                    | -    | Module input state: External blocking2   |
|                         | active                     | 1                            | 1                             | 3                | Bit           | 0x4<br>(3)                    | -    | Signal: active   |

| Module<br>(ANSI / IEEE) | Name<br>Function | Start<br>Register<br>Address | No. of<br>Modbus<br>Registers | Function<br>code | Format | Bit Mask<br>(Bit<br>position) | Unit | Description                         |
|-------------------------|------------------|------------------------------|-------------------------------|------------------|--------|-------------------------------|------|-------------------------------------|
|                         | ExBlo            | 1                            | 1                             | 3                | Bit    | 0x8<br>(4)                    | -    | Signal: External Blocking           |
|                         | Alarm L1         | 1                            | 1                             | 3                | Bit    | 0x10<br>(5)                   | -    | Signal: General-Alarm L1            |
|                         | Alarm L2         | 1                            | 1                             | 3                | Bit    | 0x20<br>(6)                   | -    | Signal: General-Alarm L2            |
|                         | Alarm L3         | 1                            | 1                             | 3                | Bit    | 0x40<br>(7)                   | -    | Signal: General-Alarm L3            |
|                         | Alarm G          | 1                            | 1                             | 3                | Bit    | 0x80<br>(8)                   | -    | Signal: General-Alarm - Earth fault |
|                         | Alarm            | 1                            | 1                             | 3                | Bit    | 0x100<br>(9)                  | -    | Signal: General Alarm               |
|                         | Trip L1 (*)      | 1                            | 1                             | 3                | Bit    | 0x200<br>(10)                 | -    | Signal: General Trip L1             |
|                         | Trip L2 (*)      | 1                            | 1                             | 3                | Bit    | 0x400<br>(11)                 | -    | Signal: General Trip L2             |
|                         | Trip L3 (*)      | 1                            | 1                             | 3                | Bit    | 0x800<br>(12)                 | -    | Signal: General Trip L3             |
|                         | Trip G (*)       | 1                            | 1                             | 3                | Bit    | 0x1000<br>(13)                | -    | Signal: General Trip Ground fault   |
|                         | Trip (*)         | 1                            | 1                             | 3                | Bit    | 0x2000                        | -    | Signal: General Trip                |

### 3 Appendix - Data Point Lists

#### 3.1 Signals

| Module<br>(ANSI / IEEE) | Name<br>Function   | Start<br>Register<br>Address | No. of<br>Modbus<br>Registers | Function<br>code | Format        | Bit Mask<br>(Bit<br>position) | Unit | Description   |
|-------------------------|--------------------|------------------------------|-------------------------------|------------------|---------------|-------------------------------|------|---|
|                         |                    |                              |                               |                  |               | (14)                          |      |   |
| <b>Prot</b>             |                    | <b>2</b>                     | <b>1</b>                      | <b>3</b>         | <b>Struct</b> |                               |      |   |
|                         | Blo TripCmd        | 2                            | 1                             | 3                | Bit           | 0x1<br>(1)                    | -    | Signal: Trip Command blocked  |
|                         | ExBlo TripCmd-I    | 2                            | 1                             | 3                | Bit           | 0x2<br>(2)                    | -    | Module input state: External Blocking of the Trip Command   |
|                         | ExBlo TripCmd      | 2                            | 1                             | 3                | Bit           | 0x4<br>(3)                    | -    | Signal: External Blocking of the Trip Command   |
|                         | I dir fwd          | 2                            | 1                             | 3                | Bit           | 0x80<br>(8)                   | -    | Signal: Phase current failure forward direction   |
|                         | I dir rev          | 2                            | 1                             | 3                | Bit           | 0x100<br>(9)                  | -    | Signal: Phase current failure reverse direction   |
|                         | I dir n poss       | 2                            | 1                             | 3                | Bit           | 0x200<br>(10)                 | -    | Signal: Phase fault - missing reference voltage   |
| <b>Prot</b>             |                    | <b>57</b>                    | <b>1</b>                      | <b>3</b>         | <b>Struct</b> |                               |      |   |
|                         | Fault No.          | 57                           | 1                             | 3                | Bit           | 0xffff<br>(1)                 | -    | Fault number  |
| <b>Prot</b>             |                    | <b>58</b>                    | <b>1</b>                      | <b>3</b>         | <b>Struct</b> |                               |      |   |
|                         | No. of Grid Faults | 58                           | 1                             | 3                | Bit           | 0xffff<br>(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 |



| Module<br>(ANSI / IEEE) | Name<br>Function   | Start<br>Register<br>Address | No. of<br>Modbus<br>Registers | Function<br>code | Format        | Bit Mask<br>(Bit<br>position) | Unit | Description   |
|-------------------------|--------------------|------------------------------|-------------------------------|------------------|---------------|-------------------------------|------|---|
|                         |                    |                              |                               |                  |               |                               |      | for protective devices without AR module these two counters are equivalent.)  |
| <b>Prot</b>             |                    | <b>200</b>                   | <b>1</b>                      | <b>3</b>         | <b>Struct</b> |                               |      |   |
|                         | IG calc dir rev    | 200                          | 1                             | 3                | Bit           | 0x1<br>(1)                    | -    | Signal: Ground fault (calculated) reverse direction   |
|                         | IG calc dir fwd    | 200                          | 1                             | 3                | Bit           | 0x2<br>(2)                    | -    | Signal: Ground fault (calculated) forward   |
|                         | IG calc dir n poss | 200                          | 1                             | 3                | Bit           | 0x4<br>(3)                    | -    | Signal: Ground fault (calculated) direction detection not possible  |
|                         | IG meas dir rev    | 200                          | 1                             | 3                | Bit           | 0x8<br>(4)                    | -    | Signal: Ground fault (measured) reverse direction   |
|                         | IG meas dir fwd    | 200                          | 1                             | 3                | Bit           | 0x10<br>(5)                   | -    | Signal: Ground fault (measured) forward   |
|                         | IG meas dir n poss | 200                          | 1                             | 3                | Bit           | 0x20<br>(6)                   | -    | Signal: Ground fault (measured) direction detection not possible  |
|                         | DFT Invalid        | 200                          | 1                             | 3                | Bit           | 0x40<br>(7)                   | -    | DFT values of fundamental and harmonics (except VX) are not valid. They depend on period time of frequency and measured channels 1-3 (VL1,VL2,VL3). |
|                         | f(VL123)>10Hz      | 200                          | 1                             | 3                | Bit           | 0x80<br>(8)                   | -    | Frequency of the measuring channels 1-3 (VL1,VL2,VL3) is greater than 10Hz.   |
|                         | f(VL123)>70Hz      | 200                          | 1                             | 3                | Bit           | 0x100<br>(9)                  | -    | Frequency of the measuring channels 1-3 (VL1,VL2,VL3) is greater than 70Hz.   |

### 3 Appendix - Data Point Lists

#### 3.1 Signals

| Module<br>(ANSI / IEEE) | Name<br>Function | Start<br>Register<br>Address | No. of<br>Modbus<br>Registers | Function<br>code | Format        | Bit Mask<br>(Bit<br>position) | Unit | Description   |
|-------------------------|------------------|------------------------------|-------------------------------|------------------|---------------|-------------------------------|------|---|
|                         | f(VL123)<10Hz    | 200                          | 1                             | 3                | Bit           | 0x200<br>(10)                 | -    | Frequency of the measuring channels 1-3 (VL1,VL2,VL3) is lower than 10Hz. |
|                         | f(VL123)<70Hz    | 200                          | 1                             | 3                | Bit           | 0x400<br>(11)                 | -    | Frequency of the measuring channels 1-3 (VL1,VL2,VL3) is lower than 70Hz. |
|                         | DFT Invalid (VX) | 200                          | 1                             | 3                | Bit           | 0x800<br>(12)                 | -    | DFT values of fundamental and harmonics of VX (only) are not valid.       |
|                         | f(VX)>10Hz       | 200                          | 1                             | 3                | Bit           | 0x1000<br>(13)                | -    | Frequency of the measuring channel 4 (VX) is greater than 10Hz.           |
|                         | f(VX)>70Hz       | 200                          | 1                             | 3                | Bit           | 0x2000<br>(14)                | -    | Frequency of the measuring channel 4 (VX) is greater than 70Hz.           |
|                         | f(VX)<10Hz       | 200                          | 1                             | 3                | Bit           | 0x4000<br>(15)                | -    | Frequency of the measuring channel 4 (VX) is lower than 10Hz.             |
|                         | f(VX)<70Hz       | 200                          | 1                             | 3                | Bit           | 0x8000<br>(16)                | -    | Frequency of the measuring channel 4 (VX) is lower than 70Hz.             |
| <b>Q - 32</b>           |                  | <b>252</b>                   | <b>1</b>                      | <b>3</b>         | <b>Struct</b> |                               |      |   |
|                         | ExBlo1-l         | 252                          | 1                             | 3                | Bit           | 0x1<br>(1)                    | -    | Module input state: External blocking                                     |
|                         | ExBlo2-l         | 252                          | 1                             | 3                | Bit           | 0x2<br>(2)                    | -    | Module input state: External blocking                                     |
|                         | ExBlo TripCmd-l  | 252                          | 1                             | 3                | Bit           | 0x4<br>(3)                    | -    | Module input state: External Blocking of the Trip Command                 |

| Module<br>(ANSI / IEEE) | Name<br>Function | Start<br>Register<br>Address | No. of<br>Modbus<br>Registers | Function<br>code | Format        | Bit Mask<br>(Bit<br>position) | Unit | Description                                      |
|-------------------------|------------------|------------------------------|-------------------------------|------------------|---------------|-------------------------------|------|--|
|                         | active           | 252                          | 1                             | 3                | Bit           | 0x8<br>(4)                    | -    | Signal: active                                   |
|                         | ExBlo            | 252                          | 1                             | 3                | Bit           | 0x10<br>(5)                   | -    | Signal: External Blocking                        |
|                         | Blo TripCmd      | 252                          | 1                             | 3                | Bit           | 0x20<br>(6)                   | -    | Signal: Trip Command blocked                     |
|                         | ExBlo TripCmd    | 252                          | 1                             | 3                | Bit           | 0x40<br>(7)                   | -    | Signal: External Blocking of the Trip<br>Command |
|                         | Alarm            | 252                          | 1                             | 3                | Bit           | 0x80<br>(8)                   | -    | Signal: Alarm Power Protection                   |
|                         | Trip (*)         | 252                          | 1                             | 3                | Bit           | 0x100<br>(9)                  | -    | Signal: Trip Power Protection                    |
|                         | TripCmd (*)      | 252                          | 1                             | 3                | Bit           | 0x200<br>(10)                 | -    | Signal: Trip Command                             |
| <b>Q-&gt;&amp;V&lt;</b> |                  | <b>157</b>                   | <b>1</b>                      | <b>3</b>         | <b>Struct</b> |                               |      |  |
|                         | ExBlo1-l         | 157                          | 1                             | 3                | Bit           | 0x1<br>(1)                    | -    | Module input state: External blocking1           |
|                         | ExBlo2-l         | 157                          | 1                             | 3                | Bit           | 0x2<br>(2)                    | -    | Module input state: External blocking2           |
|                         | active           | 157                          | 1                             | 3                | Bit           | 0x4<br>(3)                    | -    | Signal: active                                   |

### 3 Appendix - Data Point Lists

#### 3.1 Signals

| Module<br>(ANSI / IEEE) | Name<br>Function            | Start<br>Register<br>Address | No. of<br>Modbus<br>Registers | Function<br>code | Format        | Bit Mask<br>(Bit<br>position) | Unit | Description   |
|-------------------------|-----------------------------|------------------------------|-------------------------------|------------------|---------------|-------------------------------|------|---|
|                         | ExBlo                       | 157                          | 1                             | 3                | Bit           | 0x8<br>(4)                    | -    | Signal: External Blocking                                   |
|                         | Fuse Fail VT Blo            | 157                          | 1                             | 3                | Bit           | 0x10<br>(5)                   | -    | Signal: Blocked by Fuse Failure (VT)                        |
|                         | Alarm                       | 157                          | 1                             | 3                | Bit           | 0x20<br>(6)                   | -    | Signal: Alarm Reactive Power Undervoltage Protection        |
|                         | Decoupling PCC              | 157                          | 1                             | 3                | Bit           | 0x200<br>(10)                 | -    | Signal: Decoupling at the Point of Common Coupling          |
|                         | Decoupling Distr. Generator | 157                          | 1                             | 3                | Bit           | 0x400<br>(11)                 | -    | Signal: Decoupling of the (local) Energy Generator/Resource |
| <b>ReCon[1]</b>         |                             | <b>158</b>                   | <b>1</b>                      | <b>3</b>         | <b>Struct</b> |                               |      |   |
|                         | ExBlo1-l                    | 158                          | 1                             | 3                | Bit           | 0x1<br>(1)                    | -    | Module input state: External blocking1                      |
|                         | ExBlo2-l                    | 158                          | 1                             | 3                | Bit           | 0x2<br>(2)                    | -    | Module input state: External blocking2                      |
|                         | active                      | 158                          | 1                             | 3                | Bit           | 0x4<br>(3)                    | -    | Signal: active  |
|                         | ExBlo                       | 158                          | 1                             | 3                | Bit           | 0x8<br>(4)                    | -    | Signal: External Blocking                                   |
|                         | Blo by Meas Circuit Superv  | 158                          | 1                             | 3                | Bit           | 0x10<br>(5)                   | -    | Signal: Module blocked by measuring circuit supervision     |

| Module<br>(ANSI / IEEE) | Name<br>Function        | Start<br>Register<br>Address | No. of<br>Modbus<br>Registers | Function<br>code | Format        | Bit Mask<br>(Bit<br>position) | Unit | Description  |
|-------------------------|-------------------------|------------------------------|-------------------------------|------------------|---------------|-------------------------------|------|--|
|                         | reconnected-I           | 158                          | 1                             | 3                | Bit           | 0x20<br>(6)                   | -    | This signal indicates the state "reconnected" (mains parallel).                                  |
|                         | V Ext Release PCC-I     | 158                          | 1                             | 3                | Bit           | 0x40<br>(7)                   | -    | Module input state: Release signal is being generated by the PCC (External Release)              |
|                         | PCC Fuse Fail VT-I      | 158                          | 1                             | 3                | Bit           | 0x80<br>(8)                   | -    | State of the module input: Blocking if the fuse of a voltage transformer has tripped at the PCC. |
|                         | Release Energy Resource | 158                          | 1                             | 3                | Bit           | 0x100<br>(9)                  | -    | Signal: Release Energy Resource.   |
|                         | Decoupling1-I           | 158                          | 1                             | 3                | Bit           | 0x200<br>(10)                 | -    | Decoupling function, that blocks the reconnection.   |
|                         | Decoupling2-I           | 158                          | 1                             | 3                | Bit           | 0x400<br>(11)                 | -    | Decoupling function, that blocks the reconnection.   |
|                         | Decoupling3-I           | 158                          | 1                             | 3                | Bit           | 0x800<br>(12)                 | -    | Decoupling function, that blocks the reconnection.   |
|                         | Decoupling4-I           | 158                          | 1                             | 3                | Bit           | 0x1000<br>(13)                | -    | Decoupling function, that blocks the reconnection.   |
|                         | Decoupling5-I           | 158                          | 1                             | 3                | Bit           | 0x2000<br>(14)                | -    | Decoupling function, that blocks the reconnection.   |
|                         | Decoupling6-I           | 158                          | 1                             | 3                | Bit           | 0x4000<br>(15)                | -    | Decoupling function, that blocks the reconnection.   |
| <b>ReCon[2]</b>         |                         | <b>159</b>                   | <b>1</b>                      | <b>3</b>         | <b>Struct</b> |                               |      |  |

### 3 Appendix - Data Point Lists

#### 3.1 Signals

| Module<br>(ANSI / IEEE) | Name<br>Function              | Start<br>Register<br>Address | No. of<br>Modbus<br>Registers | Function<br>code | Format | Bit Mask<br>(Bit<br>position) | Unit | Description  |
|-------------------------|-------------------------------|------------------------------|-------------------------------|------------------|--------|-------------------------------|------|--|
|                         | ExBlo1-I                      | 159                          | 1                             | 3                | Bit    | 0x1<br>(1)                    | -    | Module input state: External blocking1   |
|                         | ExBlo2-I                      | 159                          | 1                             | 3                | Bit    | 0x2<br>(2)                    | -    | Module input state: External blocking2   |
|                         | active                        | 159                          | 1                             | 3                | Bit    | 0x4<br>(3)                    | -    | Signal: active   |
|                         | ExBlo                         | 159                          | 1                             | 3                | Bit    | 0x8<br>(4)                    | -    | Signal: External Blocking  |
|                         | Blo by Meas Circuit<br>Superv | 159                          | 1                             | 3                | Bit    | 0x10<br>(5)                   | -    | Signal: Module blocked by measuring<br>circuit supervision   |
|                         | reconnected-I                 | 159                          | 1                             | 3                | Bit    | 0x20<br>(6)                   | -    | This signal indicates the state<br>"reconnected" (mains parallel).                                     |
|                         | V Ext Release PCC-I           | 159                          | 1                             | 3                | Bit    | 0x40<br>(7)                   | -    | Module input state: Release signal is being<br>generated by the PCC (External Release)                 |
|                         | PCC Fuse Fail VT-I            | 159                          | 1                             | 3                | Bit    | 0x80<br>(8)                   | -    | State of the module input: Blocking if the<br>fuse of a voltage transformer has tripped at<br>the PCC. |
|                         | Release Energy<br>Resource    | 159                          | 1                             | 3                | Bit    | 0x100<br>(9)                  | -    | Signal: Release Energy Resource.   |
|                         | Decoupling1-I                 | 159                          | 1                             | 3                | Bit    | 0x200<br>(10)                 | -    | Decoupling function, that blocks the<br>reconnection.  |

| Module<br>(ANSI / IEEI) | Name<br>Function | Start<br>Register<br>Address | No. of<br>Modbus<br>Registers | Function<br>code | Format        | Bit Mask<br>(Bit<br>position) | Unit | Description  |
|-------------------------|------------------|------------------------------|-------------------------------|------------------|---------------|-------------------------------|------|--|
|                         | Decoupling2-l    | 159                          | 1                             | 3                | Bit           | 0x400<br>(11)                 | -    | Decoupling function, that blocks the reconnection.   |
|                         | Decoupling3-l    | 159                          | 1                             | 3                | Bit           | 0x800<br>(12)                 | -    | Decoupling function, that blocks the reconnection.   |
|                         | Decoupling4-l    | 159                          | 1                             | 3                | Bit           | 0x1000<br>(13)                | -    | Decoupling function, that blocks the reconnection.   |
|                         | Decoupling5-l    | 159                          | 1                             | 3                | Bit           | 0x2000<br>(14)                | -    | Decoupling function, that blocks the reconnection.   |
|                         | Decoupling6-l    | 159                          | 1                             | 3                | Bit           | 0x4000<br>(15)                | -    | Decoupling function, that blocks the reconnection.   |
| <b>SG[1]</b>            |                  | <b>177</b>                   | <b>1</b>                      | <b>3</b>         | <b>Struct</b> |                               |      |  |
|                         | Aux OFF-l        | 177                          | 1                             | 3                | Bit           | 0x1<br>(1)                    | -    | Module input state: Position indicator/<br>check-back signal of the CB (52b)   |
|                         | Aux ON-l         | 177                          | 1                             | 3                | Bit           | 0x2<br>(2)                    | -    | Module Input State: Position indicator/<br>check-back signal of the CB (52a)   |
|                         | Ready-l          | 177                          | 1                             | 3                | Bit           | 0x4<br>(3)                    | -    | Module input state: CB ready   |
|                         | Sys-in-Sync-l    | 177                          | 1                             | 3                | Bit           | 0x8<br>(4)                    | -    | State of the module input: This signals has<br>to become true within the synchronization<br>time. If not, switching is unsuccessful. |
|                         | Interl OFF1-l    | 177                          | 1                             | 3                | Bit           | 0x10<br>(5)                   | -    | State of the module input: Interlocking of<br>the OFF command  |

### 3 Appendix - Data Point Lists

#### 3.1 Signals

| Module<br>(ANSI / IEEI) | Name<br>Function | Start<br>Register<br>Address | No. of<br>Modbus<br>Registers | Function<br>code | Format | Bit Mask<br>(Bit<br>position) | Unit | Description   |
|-------------------------|------------------|------------------------------|-------------------------------|------------------|--------|-------------------------------|------|---|
|                         | Interl OFF2-I    | 177                          | 1                             | 3                | Bit    | 0x20<br>(6)                   | -    | State of the module input: Interlocking of the OFF command  |
|                         | Interl OFF3-I    | 177                          | 1                             | 3                | Bit    | 0x40<br>(7)                   | -    | State of the module input: Interlocking of the OFF command  |
|                         | Interl ON1-I     | 177                          | 1                             | 3                | Bit    | 0x80<br>(8)                   | -    | State of the module input: Interlocking of the ON command   |
|                         | Interl ON2-I     | 177                          | 1                             | 3                | Bit    | 0x100<br>(9)                  | -    | State of the module input: Interlocking of the ON command   |
|                         | Interl ON3-I     | 177                          | 1                             | 3                | Bit    | 0x200<br>(10)                 | -    | State of the module input: Interlocking of the ON command   |
|                         | SCmd OFF-I       | 177                          | 1                             | 3                | Bit    | 0x800<br>(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<br>(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<br>(14)                | -    | Signal: Trip Command  |
|                         | OFF Cmd          | 177                          | 1                             | 3                | Bit    | 0x4000<br>(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<br>(16)                | -    | Signal: OFF Cmd manual  |



| Module<br>(ANSI / IEEE) | Name<br>Function | Start<br>Register<br>Address | No. of<br>Modbus<br>Registers | Function<br>code | Format        | Bit Mask<br>(Bit<br>position) | Unit | Description   |
|-------------------------|------------------|------------------------------|-------------------------------|------------------|---------------|-------------------------------|------|---|
| <b>SG[1]</b>            |                  | <b>178</b>                   | <b>1</b>                      | <b>3</b>         | <b>Struct</b> |                               |      |   |
|                         | ON Cmd           | 178                          | 1                             | 3                | Bit           | 0x1<br>(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<br>(2)                    | -    | Signal: ON Cmd manual   |
|                         | Sync ON request  | 178                          | 1                             | 3                | Bit           | 0x4<br>(3)                    | -    | Signal: Synchronous ON request  |
|                         | SGwear Slow SG   | 178                          | 1                             | 3                | Bit           | 0x8<br>(4)                    | -    | Signal: Alarm, the circuit breaker (load-break switch) becomes slower   |
|                         | Res SGwear SI SG | 178                          | 1                             | 3                | Bit           | 0x10<br>(5)                   | -    | Signal: Resetting the slow Switchgear Alarm   |
|                         | CES Disturbed    | 178                          | 1                             | 3                | Bit           | 0x40<br>(7)                   | -    | Signal: Command Execution Supervision: Switching Command unsuccessful. Switchgear in disturbed position.  |
|                         | CES Fiel Interl  | 178                          | 1                             | 3                | Bit           | 0x80<br>(8)                   | -    | Signal: Command Execution Supervision: Switching Command not executed because of field interlocking.  |
|                         | CES ON d OFF     | 178                          | 1                             | 3                | Bit           | 0x400<br>(11)                 | -    | Signal: Command Execution Supervision: On Command during a pending OFF Command.   |
|                         | CES SwitchDir    | 178                          | 1                             | 3                | Bit           | 0x800<br>(12)                 | -    | Signal: Command Execution Supervision respectively Switching Direction Control: This signal becomes true, if a switch command is issued even though the switchgear is already in the requested position. Example: A switchgear that is already OFF should be switched OFF again |

3 Appendix - Data Point Lists

3.1 Signals

| Module<br>(ANSI / IEEE) | Name<br>Function | Start<br>Register<br>Address | No. of<br>Modbus<br>Registers | Function<br>code | Format        | Bit Mask<br>(Bit<br>position) | Unit | Description  |
|-------------------------|------------------|------------------------------|-------------------------------|------------------|---------------|-------------------------------|------|--|
|                         |                  |                              |                               |                  |               |                               |      | (doubly). The same applies to CLOSE commands.  |
|                         | CES SG not ready | 178                          | 1                             | 3                | Bit           | 0x1000<br>(13)                | -    | Signal: Command Execution Supervision: Switchgear not ready  |
|                         | CES SyncTimeout  | 178                          | 1                             | 3                | Bit           | 0x2000<br>(14)                | -    | Signal: Command Execution Supervision: Switching Command not executed. No Synchronization signal while t-sync was running.   |
|                         | CES succesf      | 178                          | 1                             | 3                | Bit           | 0x4000<br>(15)                | -    | Signal: Command Execution Supervision: Switching command executed successfully.  |
|                         | Prot ON          | 178                          | 1                             | 3                | Bit           | 0x8000<br>(16)                | -    | Signal: ON Command issued by the Prot module   |
| <b>SG[1]</b>            |                  | <b>179</b>                   | <b>1</b>                      | <b>3</b>         | <b>Struct</b> |                               |      |  |
|                         | Pos Disturb      | 179                          | 1                             | 3                | Bit           | 0x1<br>(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<br>(2)                    | -    | Signal: Dwell time   |
|                         | Pos Indeterm     | 179                          | 1                             | 3                | Bit           | 0x4<br>(3)                    | -    | Signal: Circuit Breaker is in Indeterminate Position   |
|                         | Pos OFF          | 179                          | 1                             | 3                | Bit           | 0x8<br>(4)                    | -    | Signal: Circuit Breaker is in OFF-Position   |
|                         | Pos ON           | 179                          | 1                             | 3                | Bit           | 0x10<br>(5)                   | -    | Signal: Circuit Breaker is in ON-Position  |

| Module<br>(ANSI / IEEE) | Name<br>Function     | Start<br>Register<br>Address | No. of<br>Modbus<br>Registers | Function<br>code | Format        | Bit Mask<br>(Bit<br>position) | Unit | Description   |
|-------------------------|----------------------|------------------------------|-------------------------------|------------------|---------------|-------------------------------|------|---|
|                         | Ready                | 179                          | 1                             | 3                | Bit           | 0x20<br>(6)                   | -    | Signal: Circuit breaker is ready for operation.   |
|                         | Pos not ON           | 179                          | 1                             | 3                | Bit           | 0x40<br>(7)                   | -    | Signal: Pos not ON  |
|                         | SI SingleContactInd  | 179                          | 1                             | 3                | Bit           | 0x80<br>(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<br>(9)                  | -    | Signal: Position Indicators faked   |
|                         | OFF incl TripCmd     | 179                          | 1                             | 3                | Bit           | 0x200<br>(10)                 | -    | Signal: The OFF Command includes the OFF Command issued by the Protection module.   |
|                         | ON incl Prot ON      | 179                          | 1                             | 3                | Bit           | 0x400<br>(11)                 | -    | Signal: The ON Command includes the ON Command issued by the Protection module.   |
|                         | CES Fail TripCmd     | 179                          | 1                             | 3                | Bit           | 0x800<br>(12)                 | -    | Signal: Command Execution Supervision: Command execution failed because trip command is pending.  |
|                         | Interl OFF           | 179                          | 1                             | 3                | Bit           | 0x1000<br>(13)                | -    | Signal: One or more IL_Off inputs are active.   |
|                         | Interl ON            | 179                          | 1                             | 3                | Bit           | 0x2000<br>(14)                | -    | Signal: One or more IL_On inputs are active.  |
| <b>SG[1]</b>            |                      | <b>195</b>                   | <b>1</b>                      | <b>3</b>         | <b>Struct</b> |                               |      |   |
|                         | Isum Intr trip       | 195                          | 1                             | 3                | Bit           | 0x10                          | -    | Signal: Maximum permissible Summation of the interrupting (tripping) currents exceeded in at least one phase.   |

### 3 Appendix - Data Point Lists

#### 3.1 Signals

| Module<br>(ANSI / IEEE) | Name<br>Function    | Start<br>Register<br>Address | No. of<br>Modbus<br>Registers | Function<br>code | Format        | Bit Mask<br>(Bit<br>position) | Unit | Description  |
|-------------------------|---------------------|------------------------------|-------------------------------|------------------|---------------|-------------------------------|------|--|
|                         |                     |                              |                               |                  |               | (5)                           |      |  |
|                         | Isum Intr trip: IL1 | 195                          | 1                             | 3                | Bit           | 0x20<br>(6)                   | -    | Signal: Maximum permissible Summation of the interrupting (tripping) currents exceeded: IL1                          |
|                         | Isum Intr trip: IL2 | 195                          | 1                             | 3                | Bit           | 0x40<br>(7)                   | -    | Signal: Maximum permissible Summation of the interrupting (tripping) currents exceeded: IL2                          |
|                         | Isum Intr trip: IL3 | 195                          | 1                             | 3                | Bit           | 0x80<br>(8)                   | -    | Signal: Maximum permissible Summation of the interrupting (tripping) currents exceeded: IL3                          |
|                         | Operations Alarm    | 195                          | 1                             | 3                | Bit           | 0x100<br>(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<br>(10)                 | -    | Signal: Threshold for the Alarm  |
|                         | WearLevel Lockout   | 195                          | 1                             | 3                | Bit           | 0x400<br>(11)                 | -    | Signal: Threshold for the Lockout Level  |
|                         | Isum Intr ph Alm    | 195                          | 1                             | 3                | Bit           | 0x800<br>(12)                 | -    | Signal: Alarm, the per hour Sum (Limit) of interrupting currents has been exceeded.                                  |
| <b>SG[1]</b>            |                     | <b>256</b>                   | <b>1</b>                      | <b>3</b>         | <b>Struct</b> |                               |      |  |
|                         | Removed-I           | 256                          | 1                             | 3                | Bit           | 0x1<br>(1)                    | -    | State of the module input: The withdrawable circuit breaker is Removed   |
|                         | CES SG removed      | 256                          | 1                             | 3                | Bit           | 0x2<br>(2)                    | -    | Signal: Command Execution Supervision: Switching Command unsuccessful, Switchgear removed.                           |

| Module<br>(ANSI / IEEE) | Name<br>Function | Start<br>Register<br>Address | No. of<br>Modbus<br>Registers | Function<br>code | Format        | Bit Mask<br>(Bit<br>position) | Unit | Description  |
|-------------------------|------------------|------------------------------|-------------------------------|------------------|---------------|-------------------------------|------|--|
|                         | Removed          | 256                          | 1                             | 3                | Bit           | 0x4<br>(3)                    | -    | Signal: The withdrawable circuit breaker is Removed  |
| <b>SG[2]</b>            |                  | <b>180</b>                   | <b>1</b>                      | <b>3</b>         | <b>Struct</b> |                               |      |  |
|                         | Aux OFF-I        | 180                          | 1                             | 3                | Bit           | 0x1<br>(1)                    | -    | Module input state: Position indicator/<br>check-back signal of the CB (52b)   |
|                         | Aux ON-I         | 180                          | 1                             | 3                | Bit           | 0x2<br>(2)                    | -    | Module Input State: Position indicator/<br>check-back signal of the CB (52a)   |
|                         | Ready-I          | 180                          | 1                             | 3                | Bit           | 0x4<br>(3)                    | -    | Module input state: CB ready   |
|                         | Sys-in-Sync-I    | 180                          | 1                             | 3                | Bit           | 0x8<br>(4)                    | -    | State of the module input: This signals has<br>to become true within the synchronization<br>time. If not, switching is unsuccessful. |
|                         | Interl OFF1-I    | 180                          | 1                             | 3                | Bit           | 0x10<br>(5)                   | -    | State of the module input: Interlocking of<br>the OFF command  |
|                         | Interl OFF2-I    | 180                          | 1                             | 3                | Bit           | 0x20<br>(6)                   | -    | State of the module input: Interlocking of<br>the OFF command  |
|                         | Interl OFF3-I    | 180                          | 1                             | 3                | Bit           | 0x40<br>(7)                   | -    | State of the module input: Interlocking of<br>the OFF command  |
|                         | Interl ON1-I     | 180                          | 1                             | 3                | Bit           | 0x80<br>(8)                   | -    | State of the module input: Interlocking of<br>the ON command   |
|                         | Interl ON2-I     | 180                          | 1                             | 3                | Bit           | 0x100<br>(9)                  | -    | State of the module input: Interlocking of<br>the ON command   |

### 3 Appendix – Data Point Lists

#### 3.1 Signals

| Module<br>(ANSI / IEEE) | Name<br>Function | Start<br>Register<br>Address | No. of<br>Modbus<br>Registers | Function<br>code | Format        | Bit Mask<br>(Bit<br>position) | Unit | Description   |
|-------------------------|------------------|------------------------------|-------------------------------|------------------|---------------|-------------------------------|------|---|
|                         | Interl ON3-I     | 180                          | 1                             | 3                | Bit           | 0x200<br>(10)                 | -    | State of the module input: Interlocking of the ON command   |
|                         | SCmd OFF-I       | 180                          | 1                             | 3                | Bit           | 0x800<br>(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        | 180                          | 1                             | 3                | Bit           | 0x1000<br>(13)                | -    | State of the module input: Switching ON Command, e.g. the state of the Logics or the state of the digital input                   |
|                         | TripCmd (*)      | 180                          | 1                             | 3                | Bit           | 0x2000<br>(14)                | -    | Signal: Trip Command  |
|                         | OFF Cmd          | 180                          | 1                             | 3                | Bit           | 0x4000<br>(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   | 180                          | 1                             | 3                | Bit           | 0x8000<br>(16)                | -    | Signal: OFF Cmd manual  |
| <b>SG[2]</b>            |                  | <b>181</b>                   | <b>1</b>                      | <b>3</b>         | <b>Struct</b> |                               |      |   |
|                         | ON Cmd           | 181                          | 1                             | 3                | Bit           | 0x1<br>(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    | 181                          | 1                             | 3                | Bit           | 0x2<br>(2)                    | -    | Signal: ON Cmd manual   |
|                         | Sync ON request  | 181                          | 1                             | 3                | Bit           | 0x4<br>(3)                    | -    | Signal: Synchronous ON request  |
|                         | SGwear Slow SG   | 181                          | 1                             | 3                | Bit           | 0x8                           | -    | Signal: Alarm, the circuit breaker (load-break switch) becomes slower   |

| Module<br>(ANSI / IEEE) | Name<br>Function | Start<br>Register<br>Address | No. of<br>Modbus<br>Registers | Function<br>code | Format | Bit Mask<br>(Bit<br>position) | Unit | Description   |
|-------------------------|------------------|------------------------------|-------------------------------|------------------|--------|-------------------------------|------|---|
|                         |                  |                              |                               |                  |        | (4)                           |      |   |
|                         | Res SGwear SI SG | 181                          | 1                             | 3                | Bit    | 0x10<br>(5)                   | -    | Signal: Resetting the slow Switchgear Alarm   |
|                         | CES Disturbed    | 181                          | 1                             | 3                | Bit    | 0x40<br>(7)                   | -    | Signal: Command Execution Supervision: Switching Command unsuccessful. Switchgear in disturbed position.  |
|                         | CES Fiel Interl  | 181                          | 1                             | 3                | Bit    | 0x80<br>(8)                   | -    | Signal: Command Execution Supervision: Switching Command not executed because of field interlocking.  |
|                         | CES ON d OFF     | 181                          | 1                             | 3                | Bit    | 0x400<br>(11)                 | -    | Signal: Command Execution Supervision: On Command during a pending OFF Command.   |
|                         | CES SwitchDir    | 181                          | 1                             | 3                | Bit    | 0x800<br>(12)                 | -    | Signal: Command Execution Supervision respectively Switching Direction Control: This signal becomes true, if a switch command is issued even though the switchgear is already in the requested position. Example: A switchgear that is already OFF should be switched OFF again (doubly). The same applies to CLOSE commands. |
|                         | CES SG not ready | 181                          | 1                             | 3                | Bit    | 0x1000<br>(13)                | -    | Signal: Command Execution Supervision: Switchgear not ready   |
|                         | CES SyncTimeout  | 181                          | 1                             | 3                | Bit    | 0x2000<br>(14)                | -    | Signal: Command Execution Supervision: Switching Command not executed. No Synchronization signal while t-sync was running.  |
|                         | CES succesf      | 181                          | 1                             | 3                | Bit    | 0x4000<br>(15)                | -    | Signal: Command Execution Supervision: Switching command executed successfully.   |
|                         | Prot ON          | 181                          | 1                             | 3                | Bit    | 0x8000                        | -    | Signal: ON Command issued by the Prot module  |

### 3 Appendix - Data Point Lists

#### 3.1 Signals

| Module<br>(ANSI / IEEE) | Name<br>Function     | Start<br>Register<br>Address | No. of<br>Modbus<br>Registers | Function<br>code | Format        | Bit Mask<br>(Bit<br>position) | Unit | Description  |
|-------------------------|----------------------|------------------------------|-------------------------------|------------------|---------------|-------------------------------|------|--|
|                         |                      |                              |                               |                  |               | (16)                          |      |  |
| <b>SG[2]</b>            |                      | <b>182</b>                   | <b>1</b>                      | <b>3</b>         | <b>Struct</b> |                               |      |  |
|                         | Pos Disturb          | 182                          | 1                             | 3                | Bit           | 0x1<br>(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              | 182                          | 1                             | 3                | Bit           | 0x2<br>(2)                    | -    | Signal: Dwell time   |
|                         | Pos Indeterm         | 182                          | 1                             | 3                | Bit           | 0x4<br>(3)                    | -    | Signal: Circuit Breaker is in Indeterminate Position   |
|                         | Pos OFF              | 182                          | 1                             | 3                | Bit           | 0x8<br>(4)                    | -    | Signal: Circuit Breaker is in OFF-Position   |
|                         | Pos ON               | 182                          | 1                             | 3                | Bit           | 0x10<br>(5)                   | -    | Signal: Circuit Breaker is in ON-Position  |
|                         | Ready                | 182                          | 1                             | 3                | Bit           | 0x20<br>(6)                   | -    | Signal: Circuit breaker is ready for operation.  |
|                         | Pos not ON           | 182                          | 1                             | 3                | Bit           | 0x40<br>(7)                   | -    | Signal: Pos not ON   |
|                         | SI SingleContactInd  | 182                          | 1                             | 3                | Bit           | 0x80<br>(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 | 182                          | 1                             | 3                | Bit           | 0x100<br>(9)                  | -    | Signal: Position Indicators faked  |



| Module<br>(ANSI / IEEE) | Name<br>Function    | Start<br>Register<br>Address | No. of<br>Modbus<br>Registers | Function<br>code | Format        | Bit Mask<br>(Bit<br>position) | Unit | Description   |
|-------------------------|---------------------|------------------------------|-------------------------------|------------------|---------------|-------------------------------|------|---|
|                         | OFF incl TripCmd    | 182                          | 1                             | 3                | Bit           | 0x200<br>(10)                 | -    | Signal: The OFF Command includes the OFF Command issued by the Protection module.                             |
|                         | ON incl Prot ON     | 182                          | 1                             | 3                | Bit           | 0x400<br>(11)                 | -    | Signal: The ON Command includes the ON Command issued by the Protection module.                               |
|                         | CES Fail TripCmd    | 182                          | 1                             | 3                | Bit           | 0x800<br>(12)                 | -    | Signal: Command Execution Supervision: Command execution failed because trip command is pending.              |
|                         | Interl OFF          | 182                          | 1                             | 3                | Bit           | 0x1000<br>(13)                | -    | Signal: One or more IL_Off inputs are active.   |
|                         | Interl ON           | 182                          | 1                             | 3                | Bit           | 0x2000<br>(14)                | -    | Signal: One or more IL_On inputs are active.  |
| <b>SG[2]</b>            |                     | <b>196</b>                   | <b>1</b>                      | <b>3</b>         | <b>Struct</b> |                               |      |   |
|                         | Isum Intr trip      | 196                          | 1                             | 3                | Bit           | 0x10<br>(5)                   | -    | Signal: Maximum permissible Summation of the interrupting (tripping) currents exceeded in at least one phase. |
|                         | Isum Intr trip: IL1 | 196                          | 1                             | 3                | Bit           | 0x20<br>(6)                   | -    | Signal: Maximum permissible Summation of the interrupting (tripping) currents exceeded: IL1                   |
|                         | Isum Intr trip: IL2 | 196                          | 1                             | 3                | Bit           | 0x40<br>(7)                   | -    | Signal: Maximum permissible Summation of the interrupting (tripping) currents exceeded: IL2                   |
|                         | Isum Intr trip: IL3 | 196                          | 1                             | 3                | Bit           | 0x80<br>(8)                   | -    | Signal: Maximum permissible Summation of the interrupting (tripping) currents exceeded: IL3                   |
|                         | Operations Alarm    | 196                          | 1                             | 3                | Bit           | 0x100<br>(9)                  | -    | Signal: Too many Operations. (The operations counter »TripCmd Cr« has   |

### 3 Appendix - Data Point Lists

#### 3.1 Signals

| Module<br>(ANSI / IEEE) | Name<br>Function  | Start<br>Register<br>Address | No. of<br>Modbus<br>Registers | Function<br>code | Format        | Bit Mask<br>(Bit<br>position) | Unit | Description  |
|-------------------------|-------------------|------------------------------|-------------------------------|------------------|---------------|-------------------------------|------|--|
|                         |                   |                              |                               |                  |               |                               |      | exceeded the limit set at »Operations Alarm«.)   |
|                         | WearLevel Alarm   | 196                          | 1                             | 3                | Bit           | 0x200<br>(10)                 | -    | Signal: Threshold for the Alarm  |
|                         | WearLevel Lockout | 196                          | 1                             | 3                | Bit           | 0x400<br>(11)                 | -    | Signal: Threshold for the Lockout Level  |
|                         | Isum Intr ph Alm  | 196                          | 1                             | 3                | Bit           | 0x800<br>(12)                 | -    | Signal: Alarm, the per hour Sum (Limit) of interrupting currents has been exceeded.        |
| <b>SG[2]</b>            |                   | <b>257</b>                   | <b>1</b>                      | <b>3</b>         | <b>Struct</b> |                               |      |  |
|                         | Removed-I         | 257                          | 1                             | 3                | Bit           | 0x1<br>(1)                    | -    | State of the module input: The withdrawable circuit breaker is Removed                     |
|                         | CES SG removed    | 257                          | 1                             | 3                | Bit           | 0x2<br>(2)                    | -    | Signal: Command Execution Supervision: Switching Command unsuccessful, Switchgear removed. |
|                         | Removed           | 257                          | 1                             | 3                | Bit           | 0x4<br>(3)                    | -    | Signal: The withdrawable circuit breaker is Removed  |
| <b>SG[3]</b>            |                   | <b>183</b>                   | <b>1</b>                      | <b>3</b>         | <b>Struct</b> |                               |      |  |
|                         | Aux OFF-I         | 183                          | 1                             | 3                | Bit           | 0x1<br>(1)                    | -    | Module input state: Position indicator/ check-back signal of the CB (52b)                  |
|                         | Aux ON-I          | 183                          | 1                             | 3                | Bit           | 0x2<br>(2)                    | -    | Module Input State: Position indicator/ check-back signal of the CB (52a)                  |
|                         | Ready-I           | 183                          | 1                             | 3                | Bit           | 0x4<br>(3)                    | -    | Module input state: CB ready   |

| Module<br>(ANSI / IEEE) | Name<br>Function | Start<br>Register<br>Address | No. of<br>Modbus<br>Registers | Function<br>code | Format | Bit Mask<br>(Bit<br>position) | Unit | Description  |
|-------------------------|------------------|------------------------------|-------------------------------|------------------|--------|-------------------------------|------|--|
|                         | Sys-in-Sync-I    | 183                          | 1                             | 3                | Bit    | 0x8<br>(4)                    | -    | State of the module input: This signals has to become true within the synchronization time. If not, switching is unsuccessful. |
|                         | Interl OFF1-I    | 183                          | 1                             | 3                | Bit    | 0x10<br>(5)                   | -    | State of the module input: Interlocking of the OFF command   |
|                         | Interl OFF2-I    | 183                          | 1                             | 3                | Bit    | 0x20<br>(6)                   | -    | State of the module input: Interlocking of the OFF command   |
|                         | Interl OFF3-I    | 183                          | 1                             | 3                | Bit    | 0x40<br>(7)                   | -    | State of the module input: Interlocking of the OFF command   |
|                         | Interl ON1-I     | 183                          | 1                             | 3                | Bit    | 0x80<br>(8)                   | -    | State of the module input: Interlocking of the ON command  |
|                         | Interl ON2-I     | 183                          | 1                             | 3                | Bit    | 0x100<br>(9)                  | -    | State of the module input: Interlocking of the ON command  |
|                         | Interl ON3-I     | 183                          | 1                             | 3                | Bit    | 0x200<br>(10)                 | -    | State of the module input: Interlocking of the ON command  |
|                         | SCmd OFF-I       | 183                          | 1                             | 3                | Bit    | 0x800<br>(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        | 183                          | 1                             | 3                | Bit    | 0x1000<br>(13)                | -    | State of the module input: Switching ON Command, e.g. the state of the Logics or the state of the digital input                |
|                         | TripCmd (*)      | 183                          | 1                             | 3                | Bit    | 0x2000<br>(14)                | -    | Signal: Trip Command   |
|                         | OFF Cmd          | 183                          | 1                             | 3                | Bit    | 0x4000                        | -    | Signal: OFF Command issued to the switchgear. Depending on the setting the   |

### 3 Appendix - Data Point Lists

#### 3.1 Signals

| Module<br>(ANSI / IEEE) | Name<br>Function | Start<br>Register<br>Address | No. of<br>Modbus<br>Registers | Function<br>code | Format        | Bit Mask<br>(Bit<br>position) | Unit | Description   |
|-------------------------|------------------|------------------------------|-------------------------------|------------------|---------------|-------------------------------|------|---|
|                         |                  |                              |                               |                  |               | (15)                          |      | signal may include the OFF command of the Prot module.  |
|                         | OFF Cmd manual   | 183                          | 1                             | 3                | Bit           | 0x8000<br>(16)                | -    | Signal: OFF Cmd manual  |
| <b>SG[3]</b>            |                  | <b>184</b>                   | <b>1</b>                      | <b>3</b>         | <b>Struct</b> |                               |      |   |
|                         | ON Cmd           | 184                          | 1                             | 3                | Bit           | 0x1<br>(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    | 184                          | 1                             | 3                | Bit           | 0x2<br>(2)                    | -    | Signal: ON Cmd manual   |
|                         | Sync ON request  | 184                          | 1                             | 3                | Bit           | 0x4<br>(3)                    | -    | Signal: Synchronous ON request  |
|                         | SGwear Slow SG   | 184                          | 1                             | 3                | Bit           | 0x8<br>(4)                    | -    | Signal: Alarm, the circuit breaker (load-break switch) becomes slower   |
|                         | Res SGwear SI SG | 184                          | 1                             | 3                | Bit           | 0x10<br>(5)                   | -    | Signal: Resetting the slow Switchgear Alarm   |
|                         | CES Disturbed    | 184                          | 1                             | 3                | Bit           | 0x40<br>(7)                   | -    | Signal: Command Execution Supervision: Switching Command unsuccessful. Switchgear in disturbed position.                        |
|                         | CES Fiel Interl  | 184                          | 1                             | 3                | Bit           | 0x80<br>(8)                   | -    | Signal: Command Execution Supervision: Switching Command not executed because of field interlocking.                            |
|                         | CES ON d OFF     | 184                          | 1                             | 3                | Bit           | 0x400<br>(11)                 | -    | Signal: Command Execution Supervision: On Command during a pending OFF Command.   |

| Module<br>(ANSI / IEEE) | Name<br>Function | Start<br>Register<br>Address | No. of<br>Modbus<br>Registers | Function<br>code | Format        | Bit Mask<br>(Bit<br>position) | Unit | Description   |
|-------------------------|------------------|------------------------------|-------------------------------|------------------|---------------|-------------------------------|------|---|
|                         | CES SwitchDir    | 184                          | 1                             | 3                | Bit           | 0x800<br>(12)                 | -    | Signal: Command Execution Supervision respectively Switching Direction Control: This signal becomes true, if a switch command is issued even though the switchgear is already in the requested position. Example: A switchgear that is already OFF should be switched OFF again (doubly). The same applies to CLOSE commands. |
|                         | CES SG not ready | 184                          | 1                             | 3                | Bit           | 0x1000<br>(13)                | -    | Signal: Command Execution Supervision: Switchgear not ready   |
|                         | CES SyncTimeout  | 184                          | 1                             | 3                | Bit           | 0x2000<br>(14)                | -    | Signal: Command Execution Supervision: Switching Command not executed. No Synchronization signal while t-sync was running.  |
|                         | CES succesf      | 184                          | 1                             | 3                | Bit           | 0x4000<br>(15)                | -    | Signal: Command Execution Supervision: Switching command executed successfully.   |
|                         | Prot ON          | 184                          | 1                             | 3                | Bit           | 0x8000<br>(16)                | -    | Signal: ON Command issued by the Prot module  |
| <b>SG[3]</b>            |                  | <b>185</b>                   | <b>1</b>                      | <b>3</b>         | <b>Struct</b> |                               |      |   |
|                         | Pos Disturb      | 185                          | 1                             | 3                | Bit           | 0x1<br>(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          | 185                          | 1                             | 3                | Bit           | 0x2<br>(2)                    | -    | Signal: Dwell time  |
|                         | Pos Indeterm     | 185                          | 1                             | 3                | Bit           | 0x4<br>(3)                    | -    | Signal: Circuit Breaker is in Indeterminate Position  |

### 3 Appendix - Data Point Lists

#### 3.1 Signals

| Module<br>(ANSI / IEEI) | Name<br>Function     | Start<br>Register<br>Address | No. of<br>Modbus<br>Registers | Function<br>code | Format | Bit Mask<br>(Bit<br>position) | Unit | Description   |
|-------------------------|----------------------|------------------------------|-------------------------------|------------------|--------|-------------------------------|------|---|
|                         | Pos OFF              | 185                          | 1                             | 3                | Bit    | 0x8<br>(4)                    | -    | Signal: Circuit Breaker is in OFF-Position  |
|                         | Pos ON               | 185                          | 1                             | 3                | Bit    | 0x10<br>(5)                   | -    | Signal: Circuit Breaker is in ON-Position   |
|                         | Ready                | 185                          | 1                             | 3                | Bit    | 0x20<br>(6)                   | -    | Signal: Circuit breaker is ready for operation.   |
|                         | Pos not ON           | 185                          | 1                             | 3                | Bit    | 0x40<br>(7)                   | -    | Signal: Pos not ON  |
|                         | SI SingleContactInd  | 185                          | 1                             | 3                | Bit    | 0x80<br>(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 | 185                          | 1                             | 3                | Bit    | 0x100<br>(9)                  | -    | Signal: Position Indicators faked   |
|                         | OFF incl TripCmd     | 185                          | 1                             | 3                | Bit    | 0x200<br>(10)                 | -    | Signal: The OFF Command includes the OFF Command issued by the Protection module.   |
|                         | ON incl Prot ON      | 185                          | 1                             | 3                | Bit    | 0x400<br>(11)                 | -    | Signal: The ON Command includes the ON Command issued by the Protection module.   |
|                         | CES Fail TripCmd     | 185                          | 1                             | 3                | Bit    | 0x800<br>(12)                 | -    | Signal: Command Execution Supervision: Command execution failed because trip command is pending.  |
|                         | Interl OFF           | 185                          | 1                             | 3                | Bit    | 0x1000<br>(13)                | -    | Signal: One or more IL_Off inputs are active.   |

| Module<br>(ANSI / IEEE) | Name<br>Function    | Start<br>Register<br>Address | No. of<br>Modbus<br>Registers | Function<br>code | Format        | Bit Mask<br>(Bit<br>position) | Unit | Description  |
|-------------------------|---------------------|------------------------------|-------------------------------|------------------|---------------|-------------------------------|------|--|
|                         | Interl ON           | 185                          | 1                             | 3                | Bit           | 0x2000<br>(14)                | -    | Signal: One or more IL_On inputs are active.   |
| <b>SG[3]</b>            |                     | <b>197</b>                   | <b>1</b>                      | <b>3</b>         | <b>Struct</b> |                               |      |  |
|                         | Isum Intr trip      | 197                          | 1                             | 3                | Bit           | 0x10<br>(5)                   | -    | Signal: Maximum permissible Summation of the interrupting (tripping) currents exceeded in at least one phase.        |
|                         | Isum Intr trip: IL1 | 197                          | 1                             | 3                | Bit           | 0x20<br>(6)                   | -    | Signal: Maximum permissible Summation of the interrupting (tripping) currents exceeded: IL1                          |
|                         | Isum Intr trip: IL2 | 197                          | 1                             | 3                | Bit           | 0x40<br>(7)                   | -    | Signal: Maximum permissible Summation of the interrupting (tripping) currents exceeded: IL2                          |
|                         | Isum Intr trip: IL3 | 197                          | 1                             | 3                | Bit           | 0x80<br>(8)                   | -    | Signal: Maximum permissible Summation of the interrupting (tripping) currents exceeded: IL3                          |
|                         | Operations Alarm    | 197                          | 1                             | 3                | Bit           | 0x100<br>(9)                  | -    | Signal: Too many Operations. (The operations counter »TripCmd Cr« has exceeded the limit set at »Operations Alarm«.) |
|                         | WearLevel Alarm     | 197                          | 1                             | 3                | Bit           | 0x200<br>(10)                 | -    | Signal: Threshold for the Alarm  |
|                         | WearLevel Lockout   | 197                          | 1                             | 3                | Bit           | 0x400<br>(11)                 | -    | Signal: Threshold for the Lockout Level  |
|                         | Isum Intr ph Alm    | 197                          | 1                             | 3                | Bit           | 0x800<br>(12)                 | -    | Signal: Alarm, the per hour Sum (Limit) of interrupting currents has been exceeded.                                  |
| <b>SG[3]</b>            |                     | <b>258</b>                   | <b>1</b>                      | <b>3</b>         | <b>Struct</b> |                               |      |  |

### 3 Appendix - Data Point Lists

#### 3.1 Signals

| Module<br>(ANSI / IEEE) | Name<br>Function | Start<br>Register<br>Address | No. of<br>Modbus<br>Registers | Function<br>code | Format        | Bit Mask<br>(Bit<br>position) | Unit | Description  |
|-------------------------|------------------|------------------------------|-------------------------------|------------------|---------------|-------------------------------|------|--|
|                         | Removed-I        | 258                          | 1                             | 3                | Bit           | 0x1<br>(1)                    | -    | State of the module input: The withdrawable circuit breaker is Removed   |
|                         | CES SG removed   | 258                          | 1                             | 3                | Bit           | 0x2<br>(2)                    | -    | Signal: Command Execution Supervision: Switching Command unsuccessful, Switchgear removed.                                     |
|                         | Removed          | 258                          | 1                             | 3                | Bit           | 0x4<br>(3)                    | -    | Signal: The withdrawable circuit breaker is Removed  |
| <b>SG[4]</b>            |                  | <b>186</b>                   | <b>1</b>                      | <b>3</b>         | <b>Struct</b> |                               |      |  |
|                         | Aux OFF-I        | 186                          | 1                             | 3                | Bit           | 0x1<br>(1)                    | -    | Module input state: Position indicator/ check-back signal of the CB (52b)  |
|                         | Aux ON-I         | 186                          | 1                             | 3                | Bit           | 0x2<br>(2)                    | -    | Module Input State: Position indicator/ check-back signal of the CB (52a)  |
|                         | Ready-I          | 186                          | 1                             | 3                | Bit           | 0x4<br>(3)                    | -    | Module input state: CB ready   |
|                         | Sys-in-Sync-I    | 186                          | 1                             | 3                | Bit           | 0x8<br>(4)                    | -    | State of the module input: This signals has to become true within the synchronization time. If not, switching is unsuccessful. |
|                         | Interl OFF1-I    | 186                          | 1                             | 3                | Bit           | 0x10<br>(5)                   | -    | State of the module input: Interlocking of the OFF command   |
|                         | Interl OFF2-I    | 186                          | 1                             | 3                | Bit           | 0x20<br>(6)                   | -    | State of the module input: Interlocking of the OFF command   |
|                         | Interl OFF3-I    | 186                          | 1                             | 3                | Bit           | 0x40<br>(7)                   | -    | State of the module input: Interlocking of the OFF command   |



| Module<br>(ANSI / IEEE) | Name<br>Function | Start<br>Register<br>Address | No. of<br>Modbus<br>Registers | Function<br>code | Format        | Bit Mask<br>(Bit<br>position) | Unit | Description   |
|-------------------------|------------------|------------------------------|-------------------------------|------------------|---------------|-------------------------------|------|---|
|                         | Interl ON1-I     | 186                          | 1                             | 3                | Bit           | 0x80<br>(8)                   | -    | State of the module input: Interlocking of the ON command   |
|                         | Interl ON2-I     | 186                          | 1                             | 3                | Bit           | 0x100<br>(9)                  | -    | State of the module input: Interlocking of the ON command   |
|                         | Interl ON3-I     | 186                          | 1                             | 3                | Bit           | 0x200<br>(10)                 | -    | State of the module input: Interlocking of the ON command   |
|                         | SCmd OFF-I       | 186                          | 1                             | 3                | Bit           | 0x800<br>(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        | 186                          | 1                             | 3                | Bit           | 0x1000<br>(13)                | -    | State of the module input: Switching ON Command, e.g. the state of the Logics or the state of the digital input                   |
|                         | TripCmd (*)      | 186                          | 1                             | 3                | Bit           | 0x2000<br>(14)                | -    | Signal: Trip Command  |
|                         | OFF Cmd          | 186                          | 1                             | 3                | Bit           | 0x4000<br>(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   | 186                          | 1                             | 3                | Bit           | 0x8000<br>(16)                | -    | Signal: OFF Cmd manual  |
| <b>SG[4]</b>            |                  | <b>187</b>                   | <b>1</b>                      | <b>3</b>         | <b>Struct</b> |                               |      |   |
|                         | ON Cmd           | 187                          | 1                             | 3                | Bit           | 0x1<br>(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    | 187                          | 1                             | 3                | Bit           | 0x2                           | -    | Signal: ON Cmd manual   |

### 3 Appendix - Data Point Lists

#### 3.1 Signals

| Module<br>(ANSI / IEEE) | Name<br>Function | Start<br>Register<br>Address | No. of<br>Modbus<br>Registers | Function<br>code | Format | Bit Mask<br>(Bit<br>position) | Unit | Description   |
|-------------------------|------------------|------------------------------|-------------------------------|------------------|--------|-------------------------------|------|---|
|                         |                  |                              |                               |                  |        | (2)                           |      |   |
|                         | Sync ON request  | 187                          | 1                             | 3                | Bit    | 0x4<br>(3)                    | -    | Signal: Synchronous ON request  |
|                         | SGwear Slow SG   | 187                          | 1                             | 3                | Bit    | 0x8<br>(4)                    | -    | Signal: Alarm, the circuit breaker (load-break switch) becomes slower   |
|                         | Res SGwear SI SG | 187                          | 1                             | 3                | Bit    | 0x10<br>(5)                   | -    | Signal: Resetting the slow Switchgear Alarm   |
|                         | CES Disturbed    | 187                          | 1                             | 3                | Bit    | 0x40<br>(7)                   | -    | Signal: Command Execution Supervision: Switching Command unsuccessful. Switchgear in disturbed position.  |
|                         | CES Fiel Interl  | 187                          | 1                             | 3                | Bit    | 0x80<br>(8)                   | -    | Signal: Command Execution Supervision: Switching Command not executed because of field interlocking.  |
|                         | CES ON d OFF     | 187                          | 1                             | 3                | Bit    | 0x400<br>(11)                 | -    | Signal: Command Execution Supervision: On Command during a pending OFF Command.   |
|                         | CES SwitchDir    | 187                          | 1                             | 3                | Bit    | 0x800<br>(12)                 | -    | Signal: Command Execution Supervision respectively Switching Direction Control: This signal becomes true, if a switch command is issued even though the switchgear is already in the requested position. Example: A switchgear that is already OFF should be switched OFF again (doubly). The same applies to CLOSE commands. |
|                         | CES SG not ready | 187                          | 1                             | 3                | Bit    | 0x1000<br>(13)                | -    | Signal: Command Execution Supervision: Switchgear not ready   |
|                         | CES SyncTimeout  | 187                          | 1                             | 3                | Bit    | 0x2000                        | -    | Signal: Command Execution Supervision: Switching Command not executed. No   |

| Module<br>(ANSI / IEEE) | Name<br>Function | Start<br>Register<br>Address | No. of<br>Modbus<br>Registers | Function<br>code | Format        | Bit Mask<br>(Bit<br>position) | Unit | Description  |
|-------------------------|------------------|------------------------------|-------------------------------|------------------|---------------|-------------------------------|------|--|
|                         |                  |                              |                               |                  |               | (14)                          |      | Synchronization signal while t-sync was running.   |
|                         | CES succesf      | 187                          | 1                             | 3                | Bit           | 0x4000<br>(15)                | -    | Signal: Command Execution Supervision: Switching command executed successfully.  |
|                         | Prot ON          | 187                          | 1                             | 3                | Bit           | 0x8000<br>(16)                | -    | Signal: ON Command issued by the Prot module   |
| <b>SG[4]</b>            |                  | <b>188</b>                   | <b>1</b>                      | <b>3</b>         | <b>Struct</b> |                               |      |  |
|                         | Pos Disturb      | 188                          | 1                             | 3                | Bit           | 0x1<br>(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          | 188                          | 1                             | 3                | Bit           | 0x2<br>(2)                    | -    | Signal: Dwell time   |
|                         | Pos Indeterm     | 188                          | 1                             | 3                | Bit           | 0x4<br>(3)                    | -    | Signal: Circuit Breaker is in Indeterminate Position   |
|                         | Pos OFF          | 188                          | 1                             | 3                | Bit           | 0x8<br>(4)                    | -    | Signal: Circuit Breaker is in OFF-Position   |
|                         | Pos ON           | 188                          | 1                             | 3                | Bit           | 0x10<br>(5)                   | -    | Signal: Circuit Breaker is in ON-Position  |
|                         | Ready            | 188                          | 1                             | 3                | Bit           | 0x20<br>(6)                   | -    | Signal: Circuit breaker is ready for operation.  |
|                         | Pos not ON       | 188                          | 1                             | 3                | Bit           | 0x40<br>(7)                   | -    | Signal: Pos not ON   |

### 3 Appendix - Data Point Lists

#### 3.1 Signals

| Module<br>(ANSI / IEEE) | Name<br>Function     | Start<br>Register<br>Address | No. of<br>Modbus<br>Registers | Function<br>code | Format        | Bit Mask<br>(Bit<br>position) | Unit | Description   |
|-------------------------|----------------------|------------------------------|-------------------------------|------------------|---------------|-------------------------------|------|---|
|                         | SI SingleContactInd  | 188                          | 1                             | 3                | Bit           | 0x80<br>(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 | 188                          | 1                             | 3                | Bit           | 0x100<br>(9)                  | -    | Signal: Position Indicators faked   |
|                         | OFF incl TripCmd     | 188                          | 1                             | 3                | Bit           | 0x200<br>(10)                 | -    | Signal: The OFF Command includes the OFF Command issued by the Protection module.   |
|                         | ON incl Prot ON      | 188                          | 1                             | 3                | Bit           | 0x400<br>(11)                 | -    | Signal: The ON Command includes the ON Command issued by the Protection module.   |
|                         | CES Fail TripCmd     | 188                          | 1                             | 3                | Bit           | 0x800<br>(12)                 | -    | Signal: Command Execution Supervision: Command execution failed because trip command is pending.  |
|                         | Interl OFF           | 188                          | 1                             | 3                | Bit           | 0x1000<br>(13)                | -    | Signal: One or more IL_Off inputs are active.   |
|                         | Interl ON            | 188                          | 1                             | 3                | Bit           | 0x2000<br>(14)                | -    | Signal: One or more IL_On inputs are active.  |
| <b>SG[4]</b>            |                      | <b>198</b>                   | <b>1</b>                      | <b>3</b>         | <b>Struct</b> |                               |      |   |
|                         | Isum Intr trip       | 198                          | 1                             | 3                | Bit           | 0x10<br>(5)                   | -    | Signal: Maximum permissible Summation of the interrupting (tripping) currents exceeded in at least one phase.   |
|                         | Isum Intr trip: IL1  | 198                          | 1                             | 3                | Bit           | 0x20<br>(6)                   | -    | Signal: Maximum permissible Summation of the interrupting (tripping) currents exceeded: IL1   |
|                         | Isum Intr trip: IL2  | 198                          | 1                             | 3                | Bit           | 0x40                          | -    | Signal: Maximum permissible Summation of the interrupting (tripping) currents exceeded: IL2   |

| Module<br>(ANSI / IEEE) | Name<br>Function    | Start<br>Register<br>Address | No. of<br>Modbus<br>Registers | Function<br>code | Format        | Bit Mask<br>(Bit<br>position) | Unit | Description  |
|-------------------------|---------------------|------------------------------|-------------------------------|------------------|---------------|-------------------------------|------|--|
|                         |                     |                              |                               |                  |               | (7)                           |      |  |
|                         | Isum Intr trip: IL3 | 198                          | 1                             | 3                | Bit           | 0x80<br>(8)                   | -    | Signal: Maximum permissible Summation of the interrupting (tripping) currents exceeded: IL3                          |
|                         | Operations Alarm    | 198                          | 1                             | 3                | Bit           | 0x100<br>(9)                  | -    | Signal: Too many Operations. (The operations counter »TripCmd Cr« has exceeded the limit set at »Operations Alarm«.) |
|                         | WearLevel Alarm     | 198                          | 1                             | 3                | Bit           | 0x200<br>(10)                 | -    | Signal: Threshold for the Alarm  |
|                         | WearLevel Lockout   | 198                          | 1                             | 3                | Bit           | 0x400<br>(11)                 | -    | Signal: Threshold for the Lockout Level  |
|                         | Isum Intr ph Alm    | 198                          | 1                             | 3                | Bit           | 0x800<br>(12)                 | -    | Signal: Alarm, the per hour Sum (Limit) of interrupting currents has been exceeded.                                  |
| <b>SG[4]</b>            |                     | <b>259</b>                   | <b>1</b>                      | <b>3</b>         | <b>Struct</b> |                               |      |  |
|                         | Removed-I           | 259                          | 1                             | 3                | Bit           | 0x1<br>(1)                    | -    | State of the module input: The withdrawable circuit breaker is Removed   |
|                         | CES SG removed      | 259                          | 1                             | 3                | Bit           | 0x2<br>(2)                    | -    | Signal: Command Execution Supervision: Switching Command unsuccessful, Switchgear removed.                           |
|                         | Removed             | 259                          | 1                             | 3                | Bit           | 0x4<br>(3)                    | -    | Signal: The withdrawable circuit breaker is Removed  |
| <b>SG[5]</b>            |                     | <b>189</b>                   | <b>1</b>                      | <b>3</b>         | <b>Struct</b> |                               |      |  |
|                         | Aux OFF-I           | 189                          | 1                             | 3                | Bit           | 0x1<br>(1)                    | -    | Module input state: Position indicator/ check-back signal of the CB (52b)  |

### 3 Appendix - Data Point Lists

#### 3.1 Signals

| Module<br>(ANSI / IEC) | Name<br>Function | Start<br>Register<br>Address | No. of<br>Modbus<br>Registers | Function<br>code | Format | Bit Mask<br>(Bit<br>position) | Unit | Description  |
|------------------------|------------------|------------------------------|-------------------------------|------------------|--------|-------------------------------|------|--|
|                        | Aux ON-I         | 189                          | 1                             | 3                | Bit    | 0x2<br>(2)                    | -    | Module Input State: Position indicator/<br>check-back signal of the CB (52a)   |
|                        | Ready-I          | 189                          | 1                             | 3                | Bit    | 0x4<br>(3)                    | -    | Module input state: CB ready   |
|                        | Sys-in-Sync-I    | 189                          | 1                             | 3                | Bit    | 0x8<br>(4)                    | -    | State of the module input: This signals has<br>to become true within the synchronization<br>time. If not, switching is unsuccessful. |
|                        | Interl OFF1-I    | 189                          | 1                             | 3                | Bit    | 0x10<br>(5)                   | -    | State of the module input: Interlocking of<br>the OFF command  |
|                        | Interl OFF2-I    | 189                          | 1                             | 3                | Bit    | 0x20<br>(6)                   | -    | State of the module input: Interlocking of<br>the OFF command  |
|                        | Interl OFF3-I    | 189                          | 1                             | 3                | Bit    | 0x40<br>(7)                   | -    | State of the module input: Interlocking of<br>the OFF command  |
|                        | Interl ON1-I     | 189                          | 1                             | 3                | Bit    | 0x80<br>(8)                   | -    | State of the module input: Interlocking of<br>the ON command   |
|                        | Interl ON2-I     | 189                          | 1                             | 3                | Bit    | 0x100<br>(9)                  | -    | State of the module input: Interlocking of<br>the ON command   |
|                        | Interl ON3-I     | 189                          | 1                             | 3                | Bit    | 0x200<br>(10)                 | -    | State of the module input: Interlocking of<br>the ON command   |
|                        | SCmd OFF-I       | 189                          | 1                             | 3                | Bit    | 0x800<br>(12)                 | -    | State of the module input: Switching OFF<br>Command, e.g. the state of the Logics or<br>the state of the digital input               |

| Module<br>(ANSI / IEEE) | Name<br>Function | Start<br>Register<br>Address | No. of<br>Modbus<br>Registers | Function<br>code | Format        | Bit Mask<br>(Bit<br>position) | Unit | Description   |
|-------------------------|------------------|------------------------------|-------------------------------|------------------|---------------|-------------------------------|------|---|
|                         | SCmd ON-I        | 189                          | 1                             | 3                | Bit           | 0x1000<br>(13)                | -    | State of the module input: Switching ON Command, e.g. the state of the Logics or the state of the digital input                   |
|                         | TripCmd (*)      | 189                          | 1                             | 3                | Bit           | 0x2000<br>(14)                | -    | Signal: Trip Command  |
|                         | OFF Cmd          | 189                          | 1                             | 3                | Bit           | 0x4000<br>(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   | 189                          | 1                             | 3                | Bit           | 0x8000<br>(16)                | -    | Signal: OFF Cmd manual  |
| <b>SG[5]</b>            |                  | <b>190</b>                   | <b>1</b>                      | <b>3</b>         | <b>Struct</b> |                               |      |   |
|                         | ON Cmd           | 190                          | 1                             | 3                | Bit           | 0x1<br>(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    | 190                          | 1                             | 3                | Bit           | 0x2<br>(2)                    | -    | Signal: ON Cmd manual   |
|                         | Sync ON request  | 190                          | 1                             | 3                | Bit           | 0x4<br>(3)                    | -    | Signal: Synchronous ON request  |
|                         | SGwear Slow SG   | 190                          | 1                             | 3                | Bit           | 0x8<br>(4)                    | -    | Signal: Alarm, the circuit breaker (load-break switch) becomes slower   |
|                         | Res SGwear SI SG | 190                          | 1                             | 3                | Bit           | 0x10<br>(5)                   | -    | Signal: Resetting the slow Switchgear Alarm   |

### 3 Appendix - Data Point Lists

#### 3.1 Signals

| Module<br>(ANSI / IEEE) | Name<br>Function | Start<br>Register<br>Address | No. of<br>Modbus<br>Registers | Function<br>code | Format        | Bit Mask<br>(Bit<br>position) | Unit | Description   |
|-------------------------|------------------|------------------------------|-------------------------------|------------------|---------------|-------------------------------|------|---|
|                         | CES Disturbed    | 190                          | 1                             | 3                | Bit           | 0x40<br>(7)                   | -    | Signal: Command Execution Supervision:<br>Switching Command unsuccessful.<br>Switchgear in disturbed position.  |
|                         | CES Fiel Interl  | 190                          | 1                             | 3                | Bit           | 0x80<br>(8)                   | -    | Signal: Command Execution Supervision:<br>Switching Command not executed because<br>of field interlocking.  |
|                         | CES ON d OFF     | 190                          | 1                             | 3                | Bit           | 0x400<br>(11)                 | -    | Signal: Command Execution Supervision:<br>On Command during a pending OFF<br>Command.   |
|                         | CES SwitchDir    | 190                          | 1                             | 3                | Bit           | 0x800<br>(12)                 | -    | Signal: Command Execution Supervision<br>respectively Switching Direction Control:<br>This signal becomes true, if a switch<br>command is issued even though the<br>switchgear is already in the requested<br>position. Example: A switchgear that is<br>already OFF should be switched OFF again<br>(doubly). The same applies to CLOSE<br>commands. |
|                         | CES SG not ready | 190                          | 1                             | 3                | Bit           | 0x1000<br>(13)                | -    | Signal: Command Execution Supervision:<br>Switchgear not ready  |
|                         | CES SyncTimeout  | 190                          | 1                             | 3                | Bit           | 0x2000<br>(14)                | -    | Signal: Command Execution Supervision:<br>Switching Command not executed. No<br>Synchronization signal while t-sync was<br>running.   |
|                         | CES succesf      | 190                          | 1                             | 3                | Bit           | 0x4000<br>(15)                | -    | Signal: Command Execution Supervision:<br>Switching command executed successfully.  |
|                         | Prot ON          | 190                          | 1                             | 3                | Bit           | 0x8000<br>(16)                | -    | Signal: ON Command issued by the Prot<br>module   |
| <b>SG[5]</b>            |                  | <b>191</b>                   | <b>1</b>                      | <b>3</b>         | <b>Struct</b> |                               |      |   |
|                         | Pos Disturb      | 191                          | 1                             | 3                | Bit           | 0x1                           | -    | Signal: Circuit Breaker Disturbed -<br>Undefined Breaker Position. The Position   |



| Module<br>(ANSI / IEEE) | Name<br>Function     | Start<br>Register<br>Address | No. of<br>Modbus<br>Registers | Function<br>code | Format | Bit Mask<br>(Bit<br>position) | Unit | Description   |
|-------------------------|----------------------|------------------------------|-------------------------------|------------------|--------|-------------------------------|------|---|
|                         |                      |                              |                               |                  |        | (1)                           |      | Indicators contradict themselves. After expiring of a supervision timer this signal becomes true.   |
|                         | t-Dwell              | 191                          | 1                             | 3                | Bit    | 0x2<br>(2)                    | -    | Signal: Dwell time  |
|                         | Pos Indeterm         | 191                          | 1                             | 3                | Bit    | 0x4<br>(3)                    | -    | Signal: Circuit Breaker is in Indeterminate Position  |
|                         | Pos OFF              | 191                          | 1                             | 3                | Bit    | 0x8<br>(4)                    | -    | Signal: Circuit Breaker is in OFF-Position  |
|                         | Pos ON               | 191                          | 1                             | 3                | Bit    | 0x10<br>(5)                   | -    | Signal: Circuit Breaker is in ON-Position   |
|                         | Ready                | 191                          | 1                             | 3                | Bit    | 0x20<br>(6)                   | -    | Signal: Circuit breaker is ready for operation.   |
|                         | Pos not ON           | 191                          | 1                             | 3                | Bit    | 0x40<br>(7)                   | -    | Signal: Pos not ON  |
|                         | SI SingleContactInd  | 191                          | 1                             | 3                | Bit    | 0x80<br>(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 | 191                          | 1                             | 3                | Bit    | 0x100<br>(9)                  | -    | Signal: Position Indicators faked   |
|                         | OFF incl TripCmd     | 191                          | 1                             | 3                | Bit    | 0x200<br>(10)                 | -    | Signal: The OFF Command includes the OFF Command issued by the Protection module.   |
|                         | ON incl Prot ON      | 191                          | 1                             | 3                | Bit    | 0x400                         | -    | Signal: The ON Command includes the ON Command issued by the Protection module.   |

### 3 Appendix - Data Point Lists

#### 3.1 Signals

| Module<br>(ANSI / IEEE) | Name<br>Function    | Start<br>Register<br>Address | No. of<br>Modbus<br>Registers | Function<br>code | Format        | Bit Mask<br>(Bit<br>position) | Unit | Description   |
|-------------------------|---------------------|------------------------------|-------------------------------|------------------|---------------|-------------------------------|------|---|
|                         |                     |                              |                               |                  |               | (11)                          |      |   |
|                         | CES Fail TripCmd    | 191                          | 1                             | 3                | Bit           | 0x800<br>(12)                 | -    | Signal: Command Execution Supervision:<br>Command execution failed because trip<br>command is pending.                        |
|                         | Interl OFF          | 191                          | 1                             | 3                | Bit           | 0x1000<br>(13)                | -    | Signal: One or more IL_Off inputs are<br>active.  |
|                         | Interl ON           | 191                          | 1                             | 3                | Bit           | 0x2000<br>(14)                | -    | Signal: One or more IL_On inputs are<br>active.   |
| <b>SG[5]</b>            |                     | <b>199</b>                   | <b>1</b>                      | <b>3</b>         | <b>Struct</b> |                               |      |   |
|                         | Isum Intr trip      | 199                          | 1                             | 3                | Bit           | 0x10<br>(5)                   | -    | Signal: Maximum permissible Summation<br>of the interrupting (tripping) currents<br>exceeded in at least one phase.           |
|                         | Isum Intr trip: IL1 | 199                          | 1                             | 3                | Bit           | 0x20<br>(6)                   | -    | Signal: Maximum permissible Summation<br>of the interrupting (tripping) currents<br>exceeded: IL1                             |
|                         | Isum Intr trip: IL2 | 199                          | 1                             | 3                | Bit           | 0x40<br>(7)                   | -    | Signal: Maximum permissible Summation<br>of the interrupting (tripping) currents<br>exceeded: IL2                             |
|                         | Isum Intr trip: IL3 | 199                          | 1                             | 3                | Bit           | 0x80<br>(8)                   | -    | Signal: Maximum permissible Summation<br>of the interrupting (tripping) currents<br>exceeded: IL3                             |
|                         | Operations Alarm    | 199                          | 1                             | 3                | Bit           | 0x100<br>(9)                  | -    | Signal: Too many Operations. (The<br>operations counter »TripCmd Cr« has<br>exceeded the limit set at »Operations<br>Alarm«.) |
|                         | WearLevel Alarm     | 199                          | 1                             | 3                | Bit           | 0x200<br>(10)                 | -    | Signal: Threshold for the Alarm   |
|                         | WearLevel Lockout   | 199                          | 1                             | 3                | Bit           | 0x400                         | -    | Signal: Threshold for the Lockout Level   |

| Module<br>(ANSI / IEEE) | Name<br>Function | Start<br>Register<br>Address | No. of<br>Modbus<br>Registers | Function<br>code | Format        | Bit Mask<br>(Bit<br>position) | Unit | Description  |
|-------------------------|------------------|------------------------------|-------------------------------|------------------|---------------|-------------------------------|------|--|
|                         |                  |                              |                               |                  |               | (11)                          |      |  |
|                         | Isum Intr ph Alm | 199                          | 1                             | 3                | Bit           | 0x800<br>(12)                 | -    | Signal: Alarm, the per hour Sum (Limit) of interrupting currents has been exceeded.  |
| <b>SG[5]</b>            |                  | <b>260</b>                   | <b>1</b>                      | <b>3</b>         | <b>Struct</b> |                               |      |  |
|                         | Removed-I        | 260                          | 1                             | 3                | Bit           | 0x1<br>(1)                    | -    | State of the module input: The withdrawable circuit breaker is Removed   |
|                         | CES SG removed   | 260                          | 1                             | 3                | Bit           | 0x2<br>(2)                    | -    | Signal: Command Execution Supervision: Switching Command unsuccessful, Switchgear removed.                                     |
|                         | Removed          | 260                          | 1                             | 3                | Bit           | 0x4<br>(3)                    | -    | Signal: The withdrawable circuit breaker is Removed  |
| <b>SG[6]</b>            |                  | <b>192</b>                   | <b>1</b>                      | <b>3</b>         | <b>Struct</b> |                               |      |  |
|                         | Aux OFF-I        | 192                          | 1                             | 3                | Bit           | 0x1<br>(1)                    | -    | Module input state: Position indicator/ check-back signal of the CB (52b)  |
|                         | Aux ON-I         | 192                          | 1                             | 3                | Bit           | 0x2<br>(2)                    | -    | Module Input State: Position indicator/ check-back signal of the CB (52a)  |
|                         | Ready-I          | 192                          | 1                             | 3                | Bit           | 0x4<br>(3)                    | -    | Module input state: CB ready   |
|                         | Sys-in-Sync-I    | 192                          | 1                             | 3                | Bit           | 0x8<br>(4)                    | -    | State of the module input: This signals has to become true within the synchronization time. If not, switching is unsuccessful. |
|                         | Interl OFF1-I    | 192                          | 1                             | 3                | Bit           | 0x10<br>(5)                   | -    | State of the module input: Interlocking of the OFF command   |

### 3 Appendix - Data Point Lists

#### 3.1 Signals

| Module<br>(ANSI / IEEI) | Name<br>Function | Start<br>Register<br>Address | No. of<br>Modbus<br>Registers | Function<br>code | Format | Bit Mask<br>(Bit<br>position) | Unit | Description   |
|-------------------------|------------------|------------------------------|-------------------------------|------------------|--------|-------------------------------|------|---|
|                         | Interl OFF2-I    | 192                          | 1                             | 3                | Bit    | 0x20<br>(6)                   | -    | State of the module input: Interlocking of the OFF command  |
|                         | Interl OFF3-I    | 192                          | 1                             | 3                | Bit    | 0x40<br>(7)                   | -    | State of the module input: Interlocking of the OFF command  |
|                         | Interl ON1-I     | 192                          | 1                             | 3                | Bit    | 0x80<br>(8)                   | -    | State of the module input: Interlocking of the ON command   |
|                         | Interl ON2-I     | 192                          | 1                             | 3                | Bit    | 0x100<br>(9)                  | -    | State of the module input: Interlocking of the ON command   |
|                         | Interl ON3-I     | 192                          | 1                             | 3                | Bit    | 0x200<br>(10)                 | -    | State of the module input: Interlocking of the ON command   |
|                         | SCmd OFF-I       | 192                          | 1                             | 3                | Bit    | 0x800<br>(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        | 192                          | 1                             | 3                | Bit    | 0x1000<br>(13)                | -    | State of the module input: Switching ON Command, e.g. the state of the Logics or the state of the digital input                   |
|                         | TripCmd (*)      | 192                          | 1                             | 3                | Bit    | 0x2000<br>(14)                | -    | Signal: Trip Command  |
|                         | OFF Cmd          | 192                          | 1                             | 3                | Bit    | 0x4000<br>(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   | 192                          | 1                             | 3                | Bit    | 0x8000<br>(16)                | -    | Signal: OFF Cmd manual  |

| Module<br>(ANSI / IEEE) | Name<br>Function | Start<br>Register<br>Address | No. of<br>Modbus<br>Registers | Function<br>code | Format        | Bit Mask<br>(Bit<br>position) | Unit | Description   |
|-------------------------|------------------|------------------------------|-------------------------------|------------------|---------------|-------------------------------|------|---|
| <b>SG[6]</b>            |                  | <b>193</b>                   | <b>1</b>                      | <b>3</b>         | <b>Struct</b> |                               |      |   |
|                         | ON Cmd           | 193                          | 1                             | 3                | Bit           | 0x1<br>(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    | 193                          | 1                             | 3                | Bit           | 0x2<br>(2)                    | -    | Signal: ON Cmd manual   |
|                         | Sync ON request  | 193                          | 1                             | 3                | Bit           | 0x4<br>(3)                    | -    | Signal: Synchronous ON request  |
|                         | SGwear Slow SG   | 193                          | 1                             | 3                | Bit           | 0x8<br>(4)                    | -    | Signal: Alarm, the circuit breaker (load-break switch) becomes slower   |
|                         | Res SGwear SI SG | 193                          | 1                             | 3                | Bit           | 0x10<br>(5)                   | -    | Signal: Resetting the slow Switchgear Alarm   |
|                         | CES Disturbed    | 193                          | 1                             | 3                | Bit           | 0x40<br>(7)                   | -    | Signal: Command Execution Supervision: Switching Command unsuccessful. Switchgear in disturbed position.  |
|                         | CES Fiel Interl  | 193                          | 1                             | 3                | Bit           | 0x80<br>(8)                   | -    | Signal: Command Execution Supervision: Switching Command not executed because of field interlocking.  |
|                         | CES ON d OFF     | 193                          | 1                             | 3                | Bit           | 0x400<br>(11)                 | -    | Signal: Command Execution Supervision: On Command during a pending OFF Command.   |
|                         | CES SwitchDir    | 193                          | 1                             | 3                | Bit           | 0x800<br>(12)                 | -    | Signal: Command Execution Supervision respectively Switching Direction Control: This signal becomes true, if a switch command is issued even though the switchgear is already in the requested position. Example: A switchgear that is already OFF should be switched OFF again |

### 3 Appendix - Data Point Lists

#### 3.1 Signals

| Module<br>(ANSI / IEEE) | Name<br>Function | Start<br>Register<br>Address | No. of<br>Modbus<br>Registers | Function<br>code | Format        | Bit Mask<br>(Bit<br>position) | Unit | Description  |
|-------------------------|------------------|------------------------------|-------------------------------|------------------|---------------|-------------------------------|------|--|
|                         |                  |                              |                               |                  |               |                               |      | (doubly). The same applies to CLOSE commands.  |
|                         | CES SG not ready | 193                          | 1                             | 3                | Bit           | 0x1000<br>(13)                | -    | Signal: Command Execution Supervision: Switchgear not ready  |
|                         | CES SyncTimeout  | 193                          | 1                             | 3                | Bit           | 0x2000<br>(14)                | -    | Signal: Command Execution Supervision: Switching Command not executed. No Synchronization signal while t-sync was running.   |
|                         | CES succesf      | 193                          | 1                             | 3                | Bit           | 0x4000<br>(15)                | -    | Signal: Command Execution Supervision: Switching command executed successfully.  |
|                         | Prot ON          | 193                          | 1                             | 3                | Bit           | 0x8000<br>(16)                | -    | Signal: ON Command issued by the Prot module   |
| <b>SG[6]</b>            |                  | <b>194</b>                   | <b>1</b>                      | <b>3</b>         | <b>Struct</b> |                               |      |  |
|                         | Pos Disturb      | 194                          | 1                             | 3                | Bit           | 0x1<br>(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          | 194                          | 1                             | 3                | Bit           | 0x2<br>(2)                    | -    | Signal: Dwell time   |
|                         | Pos Indeterm     | 194                          | 1                             | 3                | Bit           | 0x4<br>(3)                    | -    | Signal: Circuit Breaker is in Indeterminate Position   |
|                         | Pos OFF          | 194                          | 1                             | 3                | Bit           | 0x8<br>(4)                    | -    | Signal: Circuit Breaker is in OFF-Position   |
|                         | Pos ON           | 194                          | 1                             | 3                | Bit           | 0x10<br>(5)                   | -    | Signal: Circuit Breaker is in ON-Position  |

| Module<br>(ANSI / IEEE) | Name<br>Function     | Start<br>Register<br>Address | No. of<br>Modbus<br>Registers | Function<br>code | Format        | Bit Mask<br>(Bit<br>position) | Unit | Description   |
|-------------------------|----------------------|------------------------------|-------------------------------|------------------|---------------|-------------------------------|------|---|
|                         | Ready                | 194                          | 1                             | 3                | Bit           | 0x20<br>(6)                   | -    | Signal: Circuit breaker is ready for operation.   |
|                         | Pos not ON           | 194                          | 1                             | 3                | Bit           | 0x40<br>(7)                   | -    | Signal: Pos not ON  |
|                         | SI SingleContactInd  | 194                          | 1                             | 3                | Bit           | 0x80<br>(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 | 194                          | 1                             | 3                | Bit           | 0x100<br>(9)                  | -    | Signal: Position Indicators faked   |
|                         | OFF incl TripCmd     | 194                          | 1                             | 3                | Bit           | 0x200<br>(10)                 | -    | Signal: The OFF Command includes the OFF Command issued by the Protection module.   |
|                         | ON incl Prot ON      | 194                          | 1                             | 3                | Bit           | 0x400<br>(11)                 | -    | Signal: The ON Command includes the ON Command issued by the Protection module.   |
|                         | CES Fail TripCmd     | 194                          | 1                             | 3                | Bit           | 0x800<br>(12)                 | -    | Signal: Command Execution Supervision: Command execution failed because trip command is pending.  |
|                         | Interl OFF           | 194                          | 1                             | 3                | Bit           | 0x1000<br>(13)                | -    | Signal: One or more IL_Off inputs are active.   |
|                         | Interl ON            | 194                          | 1                             | 3                | Bit           | 0x2000<br>(14)                | -    | Signal: One or more IL_On inputs are active.  |
| <b>SG[6]</b>            |                      | <b>201</b>                   | <b>1</b>                      | <b>3</b>         | <b>Struct</b> |                               |      |   |
|                         | Isum Intr trip       | 201                          | 1                             | 3                | Bit           | 0x10                          | -    | Signal: Maximum permissible Summation of the interrupting (tripping) currents exceeded in at least one phase.   |

### 3 Appendix - Data Point Lists

#### 3.1 Signals

| Module<br>(ANSI / IEEE) | Name<br>Function    | Start<br>Register<br>Address | No. of<br>Modbus<br>Registers | Function<br>code | Format        | Bit Mask<br>(Bit<br>position) | Unit | Description  |
|-------------------------|---------------------|------------------------------|-------------------------------|------------------|---------------|-------------------------------|------|--|
|                         |                     |                              |                               |                  |               | (5)                           |      |  |
|                         | Isum Intr trip: IL1 | 201                          | 1                             | 3                | Bit           | 0x20<br>(6)                   | -    | Signal: Maximum permissible Summation of the interrupting (tripping) currents exceeded: IL1                          |
|                         | Isum Intr trip: IL2 | 201                          | 1                             | 3                | Bit           | 0x40<br>(7)                   | -    | Signal: Maximum permissible Summation of the interrupting (tripping) currents exceeded: IL2                          |
|                         | Isum Intr trip: IL3 | 201                          | 1                             | 3                | Bit           | 0x80<br>(8)                   | -    | Signal: Maximum permissible Summation of the interrupting (tripping) currents exceeded: IL3                          |
|                         | Operations Alarm    | 201                          | 1                             | 3                | Bit           | 0x100<br>(9)                  | -    | Signal: Too many Operations. (The operations counter »TripCmd Cr« has exceeded the limit set at »Operations Alarm«.) |
|                         | WearLevel Alarm     | 201                          | 1                             | 3                | Bit           | 0x200<br>(10)                 | -    | Signal: Threshold for the Alarm  |
|                         | WearLevel Lockout   | 201                          | 1                             | 3                | Bit           | 0x400<br>(11)                 | -    | Signal: Threshold for the Lockout Level  |
|                         | Isum Intr ph Alm    | 201                          | 1                             | 3                | Bit           | 0x800<br>(12)                 | -    | Signal: Alarm, the per hour Sum (Limit) of interrupting currents has been exceeded.                                  |
| <b>SG[6]</b>            |                     | <b>261</b>                   | <b>1</b>                      | <b>3</b>         | <b>Struct</b> |                               |      |  |
|                         | Removed-I           | 261                          | 1                             | 3                | Bit           | 0x1<br>(1)                    | -    | State of the module input: The withdrawable circuit breaker is Removed   |
|                         | CES SG removed      | 261                          | 1                             | 3                | Bit           | 0x2<br>(2)                    | -    | Signal: Command Execution Supervision: Switching Command unsuccessful, Switchgear removed.                           |



| Module<br>(ANSI / IEEE) | Name<br>Function | Start<br>Register<br>Address | No. of<br>Modbus<br>Registers | Function<br>code | Format        | Bit Mask<br>(Bit<br>position) | Unit | Description   |
|-------------------------|------------------|------------------------------|-------------------------------|------------------|---------------|-------------------------------|------|---|
|                         | Removed          | 261                          | 1                             | 3                | Bit           | 0x4<br>(3)                    | -    | Signal: The withdrawable circuit breaker is Removed   |
| <b>SOTF</b>             |                  | <b>65</b>                    | <b>1</b>                      | <b>3</b>         | <b>Struct</b> |                               |      |   |
|                         | ExBlo1-I         | 65                           | 1                             | 3                | Bit           | 0x1<br>(1)                    | -    | Module input state: External blocking   |
|                         | ExBlo2-I         | 65                           | 1                             | 3                | Bit           | 0x2<br>(2)                    | -    | Module input state: External blocking   |
|                         | Ext SOTF-I       | 65                           | 1                             | 3                | Bit           | 0x4<br>(3)                    | -    | Module input state: External Switch Onto Fault Alarm  |
|                         | Ex rev Interl-I  | 65                           | 1                             | 3                | Bit           | 0x8<br>(4)                    | -    | Module input state: External reverse interlocking   |
|                         | active           | 65                           | 1                             | 3                | Bit           | 0x10<br>(5)                   | -    | Signal: active  |
|                         | ExBlo            | 65                           | 1                             | 3                | Bit           | 0x20<br>(6)                   | -    | Signal: External Blocking   |
|                         | Ex rev Interl    | 65                           | 1                             | 3                | Bit           | 0x40<br>(7)                   | -    | Signal: External reverse Interlocking   |
|                         | AR Blo           | 65                           | 1                             | 3                | Bit           | 0x400<br>(11)                 | -    | Signal: Blocked by AR   |
|                         | enabled          | 65                           | 1                             | 3                | Bit           | 0x800<br>(12)                 | -    | Signal: Switch Onto Fault enabled. This Signal can be used to modify Overcurrent Protection Settings. |

### 3 Appendix - Data Point Lists

#### 3.1 Signals

| Module<br>(ANSI / IEEE) | Name<br>Function | Start<br>Register<br>Address | No. of<br>Modbus<br>Registers | Function<br>code | Format        | Bit Mask<br>(Bit<br>position) | Unit | Description  |
|-------------------------|------------------|------------------------------|-------------------------------|------------------|---------------|-------------------------------|------|--|
|                         | I<               | 65                           | 1                             | 3                | Bit           | 0x2000<br>(14)                | -    | Signal: No Load Current.   |
| <b>SSV</b>              |                  | <b>273</b>                   | <b>1</b>                      | <b>3</b>         | <b>Struct</b> |                               |      |  |
|                         | System Error     | 273                          | 1                             | 3                | Bit           | 0x1<br>(1)                    | -    | Signal: Device Failure   |
|                         | New error (*)    | 273                          | 1                             | 3                | Bit           | 0x8<br>(4)                    | -    | Signal: A new error message has been issued.   |
|                         | New warning (*)  | 273                          | 1                             | 3                | Bit           | 0x10<br>(5)                   | -    | Signal: A new warning message has been issued.                                       |
|                         | active           | 273                          | 1                             | 3                | Bit           | 0x20<br>(6)                   | -    | Signal: active   |
| <b>Sgen</b>             |                  | <b>1012</b>                  | <b>1</b>                      | <b>3</b>         | <b>Struct</b> |                               |      |  |
|                         | ExBlo1-I         | 1012                         | 1                             | 3                | Bit           | 0x1<br>(1)                    | -    | Module input state: External blocking1   |
|                         | Ex ForcePost-I   | 1012                         | 1                             | 3                | Bit           | 0x2<br>(2)                    | -    | State of the module input:Force Post state. Abort simulation.                        |
|                         | Running          | 1012                         | 1                             | 3                | Bit           | 0x10<br>(5)                   | -    | Signal; Measuring value simulation is running  |
|                         | State            | 1012                         | 1                             | 3                | Bit           | 0xe0<br>(6)                   | -    | Signal: Wave generation states: 0=Off, 1=PreFault, 2=Fault, 3=PostFault, 4=InitReset |

| Module<br>(ANSI / IEEE) | Name<br>Function          | Start<br>Register<br>Address | No. of<br>Modbus<br>Registers | Function<br>code | Format        | Bit Mask<br>(Bit<br>position) | Unit | Description  |
|-------------------------|---------------------------|------------------------------|-------------------------------|------------------|---------------|-------------------------------|------|--|
|                         | Ex Start Simulation-<br>1 | 1012                         | 1                             | 3                | Bit           | 0x100<br>(9)                  | -    | State of the module input:External Start of Fault Simulation (Using the test parameters) |
|                         | ExBlo2-I                  | 1012                         | 1                             | 3                | Bit           | 0x200<br>(10)                 | -    | Module input state: External blocking2   |
|                         | Manual Start              | 1012                         | 1                             | 3                | Bit           | 0x400<br>(11)                 | -    | Fault Simulation has been started manually.  |
|                         | Manual Stop               | 1012                         | 1                             | 3                | Bit           | 0x800<br>(12)                 | -    | Fault Simulation has been stopped manually.  |
|                         | Started                   | 1012                         | 1                             | 3                | Bit           | 0x1000<br>(13)                | -    | Fault Simulation has been started  |
|                         | Stopped                   | 1012                         | 1                             | 3                | Bit           | 0x2000<br>(14)                | -    | Fault Simulation has been stopped  |
| <b>Sync - 25</b>        |                           | <b>175</b>                   | <b>1</b>                      | <b>3</b>         | <b>Struct</b> |                               |      |  |
|                         | active                    | 175                          | 1                             | 3                | Bit           | 0x1<br>(1)                    | -    | Signal: active   |
|                         | ExBlo1-I                  | 175                          | 1                             | 3                | Bit           | 0x2<br>(2)                    | -    | Module input state: External blocking1   |
|                         | ExBlo2-I                  | 175                          | 1                             | 3                | Bit           | 0x4<br>(3)                    | -    | Module input state: External blocking2   |
|                         | ExBlo                     | 175                          | 1                             | 3                | Bit           | 0x8<br>(4)                    | -    | Signal: External Blocking  |

### 3 Appendix - Data Point Lists

#### 3.1 Signals

| Module<br>(ANSI / IEEE) | Name<br>Function  | Start<br>Register<br>Address | No. of<br>Modbus<br>Registers | Function<br>code | Format | Bit Mask<br>(Bit<br>position) | Unit | Description   |
|-------------------------|-------------------|------------------------------|-------------------------------|------------------|--------|-------------------------------|------|---|
|                         | Bypass-I          | 175                          | 1                             | 3                | Bit    | 0x10<br>(5)                   | -    | State of the module input: The Synchrocheck will be bypassed if the state of the assigned signal (logic input) becomes true.  |
|                         | CBCloseInitiate-I | 175                          | 1                             | 3                | Bit    | 0x20<br>(6)                   | -    | State of the module input: Breaker Close Initiate with synchronism check from any control sources (e.g. HMI / SCADA). If the state of the assigned signal becomes true, a Breaker Close will be initiated (Trigger Source). |
|                         | AngleDiffTooHigh  | 175                          | 1                             | 3                | Bit    | 0x40<br>(7)                   | -    | Signal: Phase Angle difference between bus and line voltages too high.  |
|                         | Sys-in-Sync       | 175                          | 1                             | 3                | Bit    | 0x80<br>(8)                   | -    | Signal: Bus and line voltages are in synchronism according to the system synchronism criteria.  |
|                         | LiveBus           | 175                          | 1                             | 3                | Bit    | 0x100<br>(9)                  | -    | Signal: Live-Bus flag: 1=Live-Bus, 0=Voltage is below the LiveBus threshold   |
|                         | LiveLine          | 175                          | 1                             | 3                | Bit    | 0x200<br>(10)                 | -    | Signal: Live Line flag: 1=Live-Line, 0=Voltage is below the LiveLine threshold  |
|                         | SlipTooHigh       | 175                          | 1                             | 3                | Bit    | 0x400<br>(11)                 | -    | Signal: Frequency difference (slip frequency) between bus and line voltages too high.   |
|                         | SyncOverridden    | 175                          | 1                             | 3                | Bit    | 0x800<br>(12)                 | -    | Signal: Synchronism Check is overridden because one of the Synchronism overriding conditions (DB/DL or ExtBypass) is met.   |
|                         | Ready to Close    | 175                          | 1                             | 3                | Bit    | 0x1000<br>(13)                | -    | Signal: Ready to Close  |
|                         | SynchronFailed    | 175                          | 1                             | 3                | Bit    | 0x2000                        | -    | Signal: This signal indicates a failed synchronization. It is set for 5s when the   |

| Module<br>(ANSI / IEEE) | Name<br>Function          | Start<br>Register<br>Address | No. of<br>Modbus<br>Registers | Function<br>code | Format        | Bit Mask<br>(Bit<br>position) | Unit | Description  |
|-------------------------|---------------------------|------------------------------|-------------------------------|------------------|---------------|-------------------------------|------|--|
|                         |                           |                              |                               |                  |               | (14)                          |      | circuit breaker is still open after the Synchron-Run-timer has timed out.  |
|                         | SynchronRunTiming         | 175                          | 1                             | 3                | Bit           | 0x4000<br>(15)                | -    | Signal: Synchron-Run-timer is timing (This timer starts when Close-Initiate is coming and stops if breaker is closed. Timeout means synchronizing failed.) |
|                         | VDiffTooHigh              | 175                          | 1                             | 3                | Bit           | 0x8000<br>(16)                | -    | Signal: Voltage difference between bus and line too high.  |
| <b>Sys</b>              |                           | <b>154</b>                   | <b>1</b>                      | <b>3</b>         | <b>Struct</b> |                               |      |  |
|                         | Setting Lock-l            | 154                          | 1                             | 3                | Bit           | 0x40<br>(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<br>(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<br>(9)                  | -    | Signal: Short-period unlock of the Setting Lock  |
| <b>SysA</b>             |                           | <b>173</b>                   | <b>1</b>                      | <b>3</b>         | <b>Struct</b> |                               |      |  |
|                         | ExBlo-l                   | 173                          | 1                             | 3                | Bit           | 0x1<br>(1)                    | -    | Module input state: External blocking  |
|                         | ExBlo                     | 173                          | 1                             | 3                | Bit           | 0x2<br>(2)                    | -    | Signal: External Blocking  |
|                         | Alm Current avg<br>(Demd) | 173                          | 1                             | 3                | Bit           | 0x4<br>(3)                    | -    | Signal: Alarm: Averaged demand current exceeded  |
|                         | active                    | 173                          | 1                             | 3                | Bit           | 0x8<br>(4)                    | -    | Signal: active   |

### 3 Appendix - Data Point Lists

#### 3.1 Signals

| Module<br>(ANSI / IEEE) | Name<br>Function            | Start<br>Register<br>Address | No. of<br>Modbus<br>Registers | Function<br>code | Format | Bit Mask<br>(Bit<br>position) | Unit | Description                                      |
|-------------------------|-----------------------------|------------------------------|-------------------------------|------------------|--------|-------------------------------|------|--|
|                         | Alarm I THD                 | 173                          | 1                             | 3                | Bit    | 0x10<br>(5)                   | -    | Signal: Alarm Total Harmonic Distortion Current  |
|                         | Alarm VA Power max          | 173                          | 1                             | 3                | Bit    | 0x20<br>(6)                   | -    | Signal: Alarm: Permitted Apparent Power exceeded |
|                         | Alarm VA avg (Demand)       | 173                          | 1                             | 3                | Bit    | 0x40<br>(7)                   | -    | Signal: Alarm: Averaged Apparent Power exceeded  |
|                         | Alarm VAr Power max         | 173                          | 1                             | 3                | Bit    | 0x80<br>(8)                   | -    | Signal: Alarm: Permitted Reactive Power exceeded |
|                         | Alarm VAr avg (Demand)      | 173                          | 1                             | 3                | Bit    | 0x100<br>(9)                  | -    | Signal: Alarm: Averaged Reactive Power exceeded  |
|                         | Alarm V THD                 | 173                          | 1                             | 3                | Bit    | 0x200<br>(10)                 | -    | Signal: Alarm Total Harmonic Distortion Voltage  |
|                         | Alarm Watt Power max        | 173                          | 1                             | 3                | Bit    | 0x400<br>(11)                 | -    | Signal: Alarm: Permitted Active Power exceeded   |
|                         | Alarm Watt avg (Demand)     | 173                          | 1                             | 3                | Bit    | 0x800<br>(12)                 | -    | Signal: Alarm: Averaged Active Power exceeded    |
|                         | Trip Current avg (Demd) (*) | 173                          | 1                             | 3                | Bit    | 0x1000<br>(13)                | -    | Signal: Trip: Averaged demand current exceeded   |
|                         | Trip I THD (*)              | 173                          | 1                             | 3                | Bit    | 0x2000<br>(14)                | -    | Signal: Trip Total Harmonic Distortion Current   |

| Module<br>(ANSI / IEEE) | Name<br>Function              | Start<br>Register<br>Address | No. of<br>Modbus<br>Registers | Function<br>code | Format        | Bit Mask<br>(Bit<br>position) | Unit | Description  |
|-------------------------|-------------------------------|------------------------------|-------------------------------|------------------|---------------|-------------------------------|------|--|
|                         | Trip VA avg<br>(Demand) (*)   | 173                          | 1                             | 3                | Bit           | 0x4000<br>(15)                | -    | Signal: Trip: Averaged Apparent Power exceeded         |
|                         | Trip VA Power max<br>(*)      | 173                          | 1                             | 3                | Bit           | 0x8000<br>(16)                | -    | Signal: Trip maximum permitted Apparent Power exceeded |
| <b>SysA</b>             |                               | <b>174</b>                   | <b>1</b>                      | <b>3</b>         | <b>Struct</b> |                               |      |  |
|                         | Trip VAr avg<br>(Demand) (*)  | 174                          | 1                             | 3                | Bit           | 0x1<br>(1)                    | -    | Signal: Trip: Averaged Reactive Power exceeded         |
|                         | Trip VAr Power max<br>(*)     | 174                          | 1                             | 3                | Bit           | 0x2<br>(2)                    | -    | Signal: Trip maximum permitted Reactive Power exceeded |
|                         | Trip V THD (*)                | 174                          | 1                             | 3                | Bit           | 0x4<br>(3)                    | -    | Signal: Trip Total Harmonic Distortion Voltage         |
|                         | Trip Watt avg<br>(Demand) (*) | 174                          | 1                             | 3                | Bit           | 0x8<br>(4)                    | -    | Signal: Trip: Averaged Active Power exceeded           |
|                         | Trip Watt Power<br>max (*)    | 174                          | 1                             | 3                | Bit           | 0x10<br>(5)                   | -    | Signal: Trip maximum permitted Active Power exceeded   |
| <b>TCS - 74TC</b>       |                               | <b>150</b>                   | <b>1</b>                      | <b>3</b>         | <b>Struct</b> |                               |      |  |
|                         | ExBlo1-l                      | 150                          | 1                             | 3                | Bit           | 0x1<br>(1)                    | -    | Module input state: External blocking1                 |
|                         | ExBlo2-l                      | 150                          | 1                             | 3                | Bit           | 0x2<br>(2)                    | -    | Module input state: External blocking2                 |
|                         | active                        | 150                          | 1                             | 3                | Bit           | 0x4                           | -    | Signal: active   |

### 3 Appendix - Data Point Lists

#### 3.1 Signals

| Module<br>(ANSI / IEEE) | Name<br>Function | Start<br>Register<br>Address | No. of<br>Modbus<br>Registers | Function<br>code | Format        | Bit Mask<br>(Bit<br>position) | Unit | Description  |
|-------------------------|------------------|------------------------------|-------------------------------|------------------|---------------|-------------------------------|------|--|
|                         |                  |                              |                               |                  |               | (3)                           |      |  |
|                         | ExBlo            | 150                          | 1                             | 3                | Bit           | 0x8<br>(4)                    | -    | Signal: External Blocking  |
|                         | Alarm            | 150                          | 1                             | 3                | Bit           | 0x10<br>(5)                   | -    | Signal: Alarm Trip Circuit Supervision                                       |
|                         | Not Possible     | 150                          | 1                             | 3                | Bit           | 0x20<br>(6)                   | -    | Not possible because no state indicator assigned to the breaker.             |
|                         | Aux ON-I         | 150                          | 1                             | 3                | Bit           | 0x100<br>(9)                  | -    | Module Input State: Position indicator/<br>check-back signal of the CB (52a) |
|                         | Aux OFF-I        | 150                          | 1                             | 3                | Bit           | 0x200<br>(10)                 | -    | Module input state: Position indicator/<br>check-back signal of the CB (52b) |
| <b>ThR - 49</b>         |                  | <b>19</b>                    | <b>1</b>                      | <b>3</b>         | <b>Struct</b> |                               |      |  |
|                         | ExBlo1-I         | 19                           | 1                             | 3                | Bit           | 0x1<br>(1)                    | -    | Module input state: External blocking1                                       |
|                         | ExBlo2-I         | 19                           | 1                             | 3                | Bit           | 0x2<br>(2)                    | -    | Module input state: External blocking2                                       |
|                         | ExBlo TripCmd-I  | 19                           | 1                             | 3                | Bit           | 0x4<br>(3)                    | -    | Module input state: External Blocking of<br>the Trip Command                 |
|                         | active           | 19                           | 1                             | 3                | Bit           | 0x8<br>(4)                    | -    | Signal: active   |
|                         | ExBlo            | 19                           | 1                             | 3                | Bit           | 0x10                          | -    | Signal: External Blocking  |



| Module<br>(ANSI / IEEE) | Name<br>Function | Start<br>Register<br>Address | No. of<br>Modbus<br>Registers | Function<br>code | Format        | Bit Mask<br>(Bit<br>position) | Unit | Description  |
|-------------------------|------------------|------------------------------|-------------------------------|------------------|---------------|-------------------------------|------|--|
|                         |                  |                              |                               |                  |               | (5)                           |      |  |
|                         | Blo TripCmd      | 19                           | 1                             | 3                | Bit           | 0x20<br>(6)                   | -    | Signal: Trip Command blocked   |
|                         | ExBlo TripCmd    | 19                           | 1                             | 3                | Bit           | 0x40<br>(7)                   | -    | Signal: External Blocking of the Trip Command  |
|                         | Alarm            | 19                           | 1                             | 3                | Bit           | 0x80<br>(8)                   | -    | Signal: Alarm Thermal Overload   |
|                         | Trip (*)         | 19                           | 1                             | 3                | Bit           | 0x100<br>(9)                  | -    | Signal: Trip   |
|                         | TripCmd (*)      | 19                           | 1                             | 3                | Bit           | 0x200<br>(10)                 | -    | Signal: Trip Command   |
| <b>TimeSync</b>         |                  | <b>54</b>                    | <b>1</b>                      | <b>3</b>         | <b>Struct</b> |                               |      |  |
|                         | synchronized     | 54                           | 1                             | 3                | Bit           | 0x1<br>(1)                    | -    | Clock is synchronized.   |
| <b>UFLS</b>             |                  | <b>272</b>                   | <b>1</b>                      | <b>3</b>         | <b>Struct</b> |                               |      |  |
|                         | ExBlo1-I         | 272                          | 1                             | 3                | Bit           | 0x1<br>(1)                    | -    | Module input state: External blocking1   |
|                         | ExBlo2-I         | 272                          | 1                             | 3                | Bit           | 0x2<br>(2)                    | -    | Module input state: External blocking2   |
|                         | Ex Pdir-I        | 272                          | 1                             | 3                | Bit           | 0x4<br>(3)                    | -    | Ignore (block) the evaluation of the power flow direction. This results in classical frequency based load shedding functionality. When this feature is set and |

### 3 Appendix - Data Point Lists

#### 3.1 Signals

| Module<br>(ANSI / IEEE) | Name<br>Function | Start<br>Register<br>Address | No. of<br>Modbus<br>Registers | Function<br>code | Format        | Bit Mask<br>(Bit<br>position) | Unit | Description  |
|-------------------------|------------------|------------------------------|-------------------------------|------------------|---------------|-------------------------------|------|--|
|                         |                  |                              |                               |                  |               |                               |      | active, the functionality of the module turns into conventional, only frequency based load shedding. |
|                         | active           | 272                          | 1                             | 3                | Bit           | 0x8<br>(4)                    | -    | Signal: active   |
|                         | ExBlo            | 272                          | 1                             | 3                | Bit           | 0x10<br>(5)                   | -    | Signal: External Blocking  |
|                         | Fuse Fail VT Blo | 272                          | 1                             | 3                | Bit           | 0x20<br>(6)                   | -    | Signal: Blocked by Fuse Failure (VT)   |
|                         | Trip             | 272                          | 1                             | 3                | Bit           | 0x40<br>(7)                   | -    | Signal: Signal: Trip   |
|                         | Alarm            | 272                          | 1                             | 3                | Bit           | 0x80<br>(8)                   | -    | Signal: Alarm P->&f<   |
| <b>V012[1] - 47</b>     |                  | <b>100</b>                   | <b>1</b>                      | <b>3</b>         | <b>Struct</b> |                               |      |  |
|                         | ExBlo1-I         | 100                          | 1                             | 3                | Bit           | 0x1<br>(1)                    | -    | Module input state: External blocking1   |
|                         | ExBlo2-I         | 100                          | 1                             | 3                | Bit           | 0x2<br>(2)                    | -    | Module input state: External blocking2   |
|                         | ExBlo TripCmd-I  | 100                          | 1                             | 3                | Bit           | 0x4<br>(3)                    | -    | Module input state: External Blocking of the Trip Command  |
|                         | active           | 100                          | 1                             | 3                | Bit           | 0x8<br>(4)                    | -    | Signal: active   |

| Module<br>(ANSI / IEEE) | Name<br>Function | Start<br>Register<br>Address | No. of<br>Modbus<br>Registers | Function<br>code | Format        | Bit Mask<br>(Bit<br>position) | Unit | Description   |
|-------------------------|------------------|------------------------------|-------------------------------|------------------|---------------|-------------------------------|------|---|
|                         | ExBlo            | 100                          | 1                             | 3                | Bit           | 0x10<br>(5)                   | -    | Signal: External Blocking                                 |
|                         | Blo TripCmd      | 100                          | 1                             | 3                | Bit           | 0x20<br>(6)                   | -    | Signal: Trip Command blocked                              |
|                         | ExBlo TripCmd    | 100                          | 1                             | 3                | Bit           | 0x40<br>(7)                   | -    | Signal: External Blocking of the Trip Command             |
|                         | Alarm            | 100                          | 1                             | 3                | Bit           | 0x80<br>(8)                   | -    | Signal: Alarm voltage asymmetry                           |
|                         | Trip (*)         | 100                          | 1                             | 3                | Bit           | 0x100<br>(9)                  | -    | Signal: Trip  |
|                         | TripCmd (*)      | 100                          | 1                             | 3                | Bit           | 0x200<br>(10)                 | -    | Signal: Trip Command                                      |
| <b>V012[2] - 47</b>     |                  | <b>101</b>                   | <b>1</b>                      | <b>3</b>         | <b>Struct</b> |                               |      |   |
|                         | ExBlo1-I         | 101                          | 1                             | 3                | Bit           | 0x1<br>(1)                    | -    | Module input state: External blocking1                    |
|                         | ExBlo2-I         | 101                          | 1                             | 3                | Bit           | 0x2<br>(2)                    | -    | Module input state: External blocking2                    |
|                         | ExBlo TripCmd-I  | 101                          | 1                             | 3                | Bit           | 0x4<br>(3)                    | -    | Module input state: External Blocking of the Trip Command |
|                         | active           | 101                          | 1                             | 3                | Bit           | 0x8<br>(4)                    | -    | Signal: active  |

### 3 Appendix - Data Point Lists

#### 3.1 Signals

| Module<br>(ANSI / IEEE) | Name<br>Function | Start<br>Register<br>Address | No. of<br>Modbus<br>Registers | Function<br>code | Format        | Bit Mask<br>(Bit<br>position) | Unit | Description   |
|-------------------------|------------------|------------------------------|-------------------------------|------------------|---------------|-------------------------------|------|---|
|                         | ExBlo            | 101                          | 1                             | 3                | Bit           | 0x10<br>(5)                   | -    | Signal: External Blocking                                 |
|                         | Blo TripCmd      | 101                          | 1                             | 3                | Bit           | 0x20<br>(6)                   | -    | Signal: Trip Command blocked                              |
|                         | ExBlo TripCmd    | 101                          | 1                             | 3                | Bit           | 0x40<br>(7)                   | -    | Signal: External Blocking of the Trip Command             |
|                         | Alarm            | 101                          | 1                             | 3                | Bit           | 0x80<br>(8)                   | -    | Signal: Alarm voltage asymmetry                           |
|                         | Trip (*)         | 101                          | 1                             | 3                | Bit           | 0x100<br>(9)                  | -    | Signal: Trip  |
|                         | TripCmd (*)      | 101                          | 1                             | 3                | Bit           | 0x200<br>(10)                 | -    | Signal: Trip Command                                      |
| <b>V012[3] - 47</b>     |                  | <b>102</b>                   | <b>1</b>                      | <b>3</b>         | <b>Struct</b> |                               |      |   |
|                         | ExBlo1-l         | 102                          | 1                             | 3                | Bit           | 0x1<br>(1)                    | -    | Module input state: External blocking1                    |
|                         | ExBlo2-l         | 102                          | 1                             | 3                | Bit           | 0x2<br>(2)                    | -    | Module input state: External blocking2                    |
|                         | ExBlo TripCmd-l  | 102                          | 1                             | 3                | Bit           | 0x4<br>(3)                    | -    | Module input state: External Blocking of the Trip Command |
|                         | active           | 102                          | 1                             | 3                | Bit           | 0x8<br>(4)                    | -    | Signal: active  |

| Module<br>(ANSI / IEEE) | Name<br>Function | Start<br>Register<br>Address | No. of<br>Modbus<br>Registers | Function<br>code | Format        | Bit Mask<br>(Bit<br>position) | Unit | Description   |
|-------------------------|------------------|------------------------------|-------------------------------|------------------|---------------|-------------------------------|------|---|
|                         | ExBlo            | 102                          | 1                             | 3                | Bit           | 0x10<br>(5)                   | -    | Signal: External Blocking                                 |
|                         | Blo TripCmd      | 102                          | 1                             | 3                | Bit           | 0x20<br>(6)                   | -    | Signal: Trip Command blocked                              |
|                         | ExBlo TripCmd    | 102                          | 1                             | 3                | Bit           | 0x40<br>(7)                   | -    | Signal: External Blocking of the Trip Command             |
|                         | Alarm            | 102                          | 1                             | 3                | Bit           | 0x80<br>(8)                   | -    | Signal: Alarm voltage asymmetry                           |
|                         | Trip (*)         | 102                          | 1                             | 3                | Bit           | 0x100<br>(9)                  | -    | Signal: Trip  |
|                         | TripCmd (*)      | 102                          | 1                             | 3                | Bit           | 0x200<br>(10)                 | -    | Signal: Trip Command                                      |
| <b>V012[4] - 47</b>     |                  | <b>103</b>                   | <b>1</b>                      | <b>3</b>         | <b>Struct</b> |                               |      |   |
|                         | ExBlo1-I         | 103                          | 1                             | 3                | Bit           | 0x1<br>(1)                    | -    | Module input state: External blocking1                    |
|                         | ExBlo2-I         | 103                          | 1                             | 3                | Bit           | 0x2<br>(2)                    | -    | Module input state: External blocking2                    |
|                         | ExBlo TripCmd-I  | 103                          | 1                             | 3                | Bit           | 0x4<br>(3)                    | -    | Module input state: External Blocking of the Trip Command |
|                         | active           | 103                          | 1                             | 3                | Bit           | 0x8<br>(4)                    | -    | Signal: active  |

### 3 Appendix - Data Point Lists

#### 3.1 Signals

| Module<br>(ANSI / IEEE) | Name<br>Function | Start<br>Register<br>Address | No. of<br>Modbus<br>Registers | Function<br>code | Format        | Bit Mask<br>(Bit<br>position) | Unit | Description   |
|-------------------------|------------------|------------------------------|-------------------------------|------------------|---------------|-------------------------------|------|---|
|                         | ExBlo            | 103                          | 1                             | 3                | Bit           | 0x10<br>(5)                   | -    | Signal: External Blocking                                 |
|                         | Blo TripCmd      | 103                          | 1                             | 3                | Bit           | 0x20<br>(6)                   | -    | Signal: Trip Command blocked                              |
|                         | ExBlo TripCmd    | 103                          | 1                             | 3                | Bit           | 0x40<br>(7)                   | -    | Signal: External Blocking of the Trip Command             |
|                         | Alarm            | 103                          | 1                             | 3                | Bit           | 0x80<br>(8)                   | -    | Signal: Alarm voltage asymmetry                           |
|                         | Trip (*)         | 103                          | 1                             | 3                | Bit           | 0x100<br>(9)                  | -    | Signal: Trip  |
|                         | TripCmd (*)      | 103                          | 1                             | 3                | Bit           | 0x200<br>(10)                 | -    | Signal: Trip Command                                      |
| <b>V012[5] - 47</b>     |                  | <b>104</b>                   | <b>1</b>                      | <b>3</b>         | <b>Struct</b> |                               |      |   |
|                         | ExBlo1-l         | 104                          | 1                             | 3                | Bit           | 0x1<br>(1)                    | -    | Module input state: External blocking1                    |
|                         | ExBlo2-l         | 104                          | 1                             | 3                | Bit           | 0x2<br>(2)                    | -    | Module input state: External blocking2                    |
|                         | ExBlo TripCmd-l  | 104                          | 1                             | 3                | Bit           | 0x4<br>(3)                    | -    | Module input state: External Blocking of the Trip Command |
|                         | active           | 104                          | 1                             | 3                | Bit           | 0x8<br>(4)                    | -    | Signal: active  |

| Module<br>(ANSI / IEEE) | Name<br>Function | Start<br>Register<br>Address | No. of<br>Modbus<br>Registers | Function<br>code | Format        | Bit Mask<br>(Bit<br>position) | Unit | Description   |
|-------------------------|------------------|------------------------------|-------------------------------|------------------|---------------|-------------------------------|------|---|
|                         | ExBlo            | 104                          | 1                             | 3                | Bit           | 0x10<br>(5)                   | -    | Signal: External Blocking                                 |
|                         | Blo TripCmd      | 104                          | 1                             | 3                | Bit           | 0x20<br>(6)                   | -    | Signal: Trip Command blocked                              |
|                         | ExBlo TripCmd    | 104                          | 1                             | 3                | Bit           | 0x40<br>(7)                   | -    | Signal: External Blocking of the Trip Command             |
|                         | Alarm            | 104                          | 1                             | 3                | Bit           | 0x80<br>(8)                   | -    | Signal: Alarm voltage asymmetry                           |
|                         | Trip (*)         | 104                          | 1                             | 3                | Bit           | 0x100<br>(9)                  | -    | Signal: Trip  |
|                         | TripCmd (*)      | 104                          | 1                             | 3                | Bit           | 0x200<br>(10)                 | -    | Signal: Trip Command                                      |
| <b>V012[6] - 47</b>     |                  | <b>105</b>                   | <b>1</b>                      | <b>3</b>         | <b>Struct</b> |                               |      |   |
|                         | ExBlo1-I         | 105                          | 1                             | 3                | Bit           | 0x1<br>(1)                    | -    | Module input state: External blocking1                    |
|                         | ExBlo2-I         | 105                          | 1                             | 3                | Bit           | 0x2<br>(2)                    | -    | Module input state: External blocking2                    |
|                         | ExBlo TripCmd-I  | 105                          | 1                             | 3                | Bit           | 0x4<br>(3)                    | -    | Module input state: External Blocking of the Trip Command |
|                         | active           | 105                          | 1                             | 3                | Bit           | 0x8<br>(4)                    | -    | Signal: active  |

### 3 Appendix - Data Point Lists

#### 3.1 Signals

| Module<br>(ANSI / IEEE)       | Name<br>Function | Start<br>Register<br>Address | No. of<br>Modbus<br>Registers | Function<br>code | Format        | Bit Mask<br>(Bit<br>position) | Unit | Description   |
|-------------------------------|------------------|------------------------------|-------------------------------|------------------|---------------|-------------------------------|------|---|
|                               | ExBlo            | 105                          | 1                             | 3                | Bit           | 0x10<br>(5)                   | -    | Signal: External Blocking                                 |
|                               | Blo TripCmd      | 105                          | 1                             | 3                | Bit           | 0x20<br>(6)                   | -    | Signal: Trip Command blocked                              |
|                               | ExBlo TripCmd    | 105                          | 1                             | 3                | Bit           | 0x40<br>(7)                   | -    | Signal: External Blocking of the Trip Command             |
|                               | Alarm            | 105                          | 1                             | 3                | Bit           | 0x80<br>(8)                   | -    | Signal: Alarm voltage asymmetry                           |
|                               | Trip (*)         | 105                          | 1                             | 3                | Bit           | 0x100<br>(9)                  | -    | Signal: Trip  |
|                               | TripCmd (*)      | 105                          | 1                             | 3                | Bit           | 0x200<br>(10)                 | -    | Signal: Trip Command                                      |
| <b>VG[1] - 27A,<br/>59N,A</b> |                  | <b>32</b>                    | <b>1</b>                      | <b>3</b>         | <b>Struct</b> |                               |      |   |
|                               | ExBlo1-I         | 32                           | 1                             | 3                | Bit           | 0x1<br>(1)                    | -    | Module input state: External blocking1                    |
|                               | ExBlo2-I         | 32                           | 1                             | 3                | Bit           | 0x2<br>(2)                    | -    | Module input state: External blocking2                    |
|                               | ExBlo TripCmd-I  | 32                           | 1                             | 3                | Bit           | 0x4<br>(3)                    | -    | Module input state: External Blocking of the Trip Command |
|                               | active           | 32                           | 1                             | 3                | Bit           | 0x8                           | -    | Signal: active  |



| Module<br>(ANSI / IEEE)       | Name<br>Function | Start<br>Register<br>Address | No. of<br>Modbus<br>Registers | Function<br>code | Format        | Bit Mask<br>(Bit<br>position) | Unit | Description   |
|-------------------------------|------------------|------------------------------|-------------------------------|------------------|---------------|-------------------------------|------|---|
|                               |                  |                              |                               |                  |               | (4)                           |      |   |
|                               | ExBlo            | 32                           | 1                             | 3                | Bit           | 0x10<br>(5)                   | -    | Signal: External Blocking                                 |
|                               | Blo TripCmd      | 32                           | 1                             | 3                | Bit           | 0x20<br>(6)                   | -    | Signal: Trip Command blocked                              |
|                               | ExBlo TripCmd    | 32                           | 1                             | 3                | Bit           | 0x40<br>(7)                   | -    | Signal: External Blocking of the Trip Command             |
|                               | Alarm            | 32                           | 1                             | 3                | Bit           | 0x80<br>(8)                   | -    | Signal: Alarm Residual Voltage Supervision-stage          |
|                               | Trip (*)         | 32                           | 1                             | 3                | Bit           | 0x100<br>(9)                  | -    | Signal: Trip  |
|                               | TripCmd (*)      | 32                           | 1                             | 3                | Bit           | 0x200<br>(10)                 | -    | Signal: Trip Command                                      |
| <b>VG[2] - 27A,<br/>59N,A</b> |                  | <b>33</b>                    | <b>1</b>                      | <b>3</b>         | <b>Struct</b> |                               |      |   |
|                               | ExBlo1-I         | 33                           | 1                             | 3                | Bit           | 0x1<br>(1)                    | -    | Module input state: External blocking1                    |
|                               | ExBlo2-I         | 33                           | 1                             | 3                | Bit           | 0x2<br>(2)                    | -    | Module input state: External blocking2                    |
|                               | ExBlo TripCmd-I  | 33                           | 1                             | 3                | Bit           | 0x4<br>(3)                    | -    | Module input state: External Blocking of the Trip Command |

### 3 Appendix - Data Point Lists

#### 3.1 Signals

| Module<br>(ANSI / IEEE) | Name<br>Function | Start<br>Register<br>Address | No. of<br>Modbus<br>Registers | Function<br>code | Format        | Bit Mask<br>(Bit<br>position) | Unit | Description   |
|-------------------------|------------------|------------------------------|-------------------------------|------------------|---------------|-------------------------------|------|---|
|                         | active           | 33                           | 1                             | 3                | Bit           | 0x8<br>(4)                    | -    | Signal: active  |
|                         | ExBlo            | 33                           | 1                             | 3                | Bit           | 0x10<br>(5)                   | -    | Signal: External Blocking                                 |
|                         | Blo TripCmd      | 33                           | 1                             | 3                | Bit           | 0x20<br>(6)                   | -    | Signal: Trip Command blocked                              |
|                         | ExBlo TripCmd    | 33                           | 1                             | 3                | Bit           | 0x40<br>(7)                   | -    | Signal: External Blocking of the Trip Command             |
|                         | Alarm            | 33                           | 1                             | 3                | Bit           | 0x80<br>(8)                   | -    | Signal: Alarm Residual Voltage Supervision-stage          |
|                         | Trip (*)         | 33                           | 1                             | 3                | Bit           | 0x100<br>(9)                  | -    | Signal: Trip  |
|                         | TripCmd (*)      | 33                           | 1                             | 3                | Bit           | 0x200<br>(10)                 | -    | Signal: Trip Command                                      |
| <b>V[1] - 27, 59</b>    |                  | <b>24</b>                    | <b>1</b>                      | <b>3</b>         | <b>Struct</b> |                               |      |   |
|                         | ExBlo1-l         | 24                           | 1                             | 3                | Bit           | 0x1<br>(1)                    | -    | Module input state: External blocking1                    |
|                         | ExBlo2-l         | 24                           | 1                             | 3                | Bit           | 0x2<br>(2)                    | -    | Module input state: External blocking2                    |
|                         | ExBlo TripCmd-l  | 24                           | 1                             | 3                | Bit           | 0x4<br>(3)                    | -    | Module input state: External Blocking of the Trip Command |

| Module<br>(ANSI / IEEE) | Name<br>Function | Start<br>Register<br>Address | No. of<br>Modbus<br>Registers | Function<br>code | Format        | Bit Mask<br>(Bit<br>position) | Unit | Description                                   |
|-------------------------|------------------|------------------------------|-------------------------------|------------------|---------------|-------------------------------|------|---|
|                         | active           | 24                           | 1                             | 3                | Bit           | 0x8<br>(4)                    | -    | Signal: active                                |
|                         | ExBlo            | 24                           | 1                             | 3                | Bit           | 0x10<br>(5)                   | -    | Signal: External Blocking                     |
|                         | Blo TripCmd      | 24                           | 1                             | 3                | Bit           | 0x20<br>(6)                   | -    | Signal: Trip Command blocked                  |
|                         | ExBlo TripCmd    | 24                           | 1                             | 3                | Bit           | 0x40<br>(7)                   | -    | Signal: External Blocking of the Trip Command |
| <b>V[1] - 27, 59</b>    |                  | <b>25</b>                    | <b>1</b>                      | <b>3</b>         | <b>Struct</b> |                               |      |   |
|                         | Alarm L1         | 25                           | 1                             | 3                | Bit           | 0x1<br>(1)                    | -    | Signal: Alarm L1                              |
|                         | Alarm L2         | 25                           | 1                             | 3                | Bit           | 0x2<br>(2)                    | -    | Signal: Alarm L2                              |
|                         | Alarm L3         | 25                           | 1                             | 3                | Bit           | 0x4<br>(3)                    | -    | Signal: Alarm L3                              |
|                         | Alarm            | 25                           | 1                             | 3                | Bit           | 0x8<br>(4)                    | -    | Signal: Alarm voltage stage                   |
|                         | Trip L1 (*)      | 25                           | 1                             | 3                | Bit           | 0x10<br>(5)                   | -    | Signal: General Trip Phase L1                 |
|                         | Trip L2 (*)      | 25                           | 1                             | 3                | Bit           | 0x20<br>(6)                   | -    | Signal: General Trip Phase L2                 |

### 3 Appendix - Data Point Lists

#### 3.1 Signals

| Module<br>(ANSI / IEEE) | Name<br>Function    | Start<br>Register<br>Address | No. of<br>Modbus<br>Registers | Function<br>code | Format        | Bit Mask<br>(Bit<br>position) | Unit | Description  |
|-------------------------|---------------------|------------------------------|-------------------------------|------------------|---------------|-------------------------------|------|--|
|                         | Trip L3 (*)         | 25                           | 1                             | 3                | Bit           | 0x40<br>(7)                   | -    | Signal: General Trip Phase L3  |
|                         | Trip (*)            | 25                           | 1                             | 3                | Bit           | 0x80<br>(8)                   | -    | Signal: Trip   |
|                         | TripCmd (*)         | 25                           | 1                             | 3                | Bit           | 0x100<br>(9)                  | -    | Signal: Trip Command   |
|                         | Imin release active | 25                           | 1                             | 3                | Bit           | 0x200<br>(10)                 | -    | Signal that the Imin release (minimum current) check is enabled and does not block the undervoltage detection at the moment. |
| <b>V[2] - 27, 59</b>    |                     | <b>26</b>                    | <b>1</b>                      | <b>3</b>         | <b>Struct</b> |                               |      |  |
|                         | ExBlo1-I            | 26                           | 1                             | 3                | Bit           | 0x1<br>(1)                    | -    | Module input state: External blocking1   |
|                         | ExBlo2-I            | 26                           | 1                             | 3                | Bit           | 0x2<br>(2)                    | -    | Module input state: External blocking2   |
|                         | ExBlo TripCmd-I     | 26                           | 1                             | 3                | Bit           | 0x4<br>(3)                    | -    | Module input state: External Blocking of the Trip Command  |
|                         | active              | 26                           | 1                             | 3                | Bit           | 0x8<br>(4)                    | -    | Signal: active   |
|                         | ExBlo               | 26                           | 1                             | 3                | Bit           | 0x10<br>(5)                   | -    | Signal: External Blocking  |
|                         | Blo TripCmd         | 26                           | 1                             | 3                | Bit           | 0x20                          | -    | Signal: Trip Command blocked   |

| Module<br>(ANSI / IEEE) | Name<br>Function | Start<br>Register<br>Address | No. of<br>Modbus<br>Registers | Function<br>code | Format        | Bit Mask<br>(Bit<br>position) | Unit | Description                                   |
|-------------------------|------------------|------------------------------|-------------------------------|------------------|---------------|-------------------------------|------|---|
|                         |                  |                              |                               |                  |               | (6)                           |      |   |
|                         | ExBlo TripCmd    | 26                           | 1                             | 3                | Bit           | 0x40<br>(7)                   | -    | Signal: External Blocking of the Trip Command |
| <b>V[2] - 27, 59</b>    |                  | <b>27</b>                    | <b>1</b>                      | <b>3</b>         | <b>Struct</b> |                               |      |   |
|                         | Alarm L1         | 27                           | 1                             | 3                | Bit           | 0x1<br>(1)                    | -    | Signal: Alarm L1                              |
|                         | Alarm L2         | 27                           | 1                             | 3                | Bit           | 0x2<br>(2)                    | -    | Signal: Alarm L2                              |
|                         | Alarm L3         | 27                           | 1                             | 3                | Bit           | 0x4<br>(3)                    | -    | Signal: Alarm L3                              |
|                         | Alarm            | 27                           | 1                             | 3                | Bit           | 0x8<br>(4)                    | -    | Signal: Alarm voltage stage                   |
|                         | Trip L1 (*)      | 27                           | 1                             | 3                | Bit           | 0x10<br>(5)                   | -    | Signal: General Trip Phase L1                 |
|                         | Trip L2 (*)      | 27                           | 1                             | 3                | Bit           | 0x20<br>(6)                   | -    | Signal: General Trip Phase L2                 |
|                         | Trip L3 (*)      | 27                           | 1                             | 3                | Bit           | 0x40<br>(7)                   | -    | Signal: General Trip Phase L3                 |
|                         | Trip (*)         | 27                           | 1                             | 3                | Bit           | 0x80<br>(8)                   | -    | Signal: Trip                                  |
|                         | TripCmd (*)      | 27                           | 1                             | 3                | Bit           | 0x100                         | -    | Signal: Trip Command                          |

### 3 Appendix - Data Point Lists

#### 3.1 Signals

| Module<br>(ANSI / IEEE) | Name<br>Function    | Start<br>Register<br>Address | No. of<br>Modbus<br>Registers | Function<br>code | Format        | Bit Mask<br>(Bit<br>position) | Unit | Description  |
|-------------------------|---------------------|------------------------------|-------------------------------|------------------|---------------|-------------------------------|------|--|
|                         |                     |                              |                               |                  |               | (9)                           |      |  |
|                         | Imin release active | 27                           | 1                             | 3                | Bit           | 0x200<br>(10)                 | -    | Signal that the Imin release (minimum current) check is enabled and does not block the undervoltage detection at the moment. |
| <b>V[3] - 27, 59</b>    |                     | <b>28</b>                    | <b>1</b>                      | <b>3</b>         | <b>Struct</b> |                               |      |  |
|                         | ExBlo1-I            | 28                           | 1                             | 3                | Bit           | 0x1<br>(1)                    | -    | Module input state: External blocking1   |
|                         | ExBlo2-I            | 28                           | 1                             | 3                | Bit           | 0x2<br>(2)                    | -    | Module input state: External blocking2   |
|                         | ExBlo TripCmd-I     | 28                           | 1                             | 3                | Bit           | 0x4<br>(3)                    | -    | Module input state: External Blocking of the Trip Command  |
|                         | active              | 28                           | 1                             | 3                | Bit           | 0x8<br>(4)                    | -    | Signal: active   |
|                         | ExBlo               | 28                           | 1                             | 3                | Bit           | 0x10<br>(5)                   | -    | Signal: External Blocking  |
|                         | Blo TripCmd         | 28                           | 1                             | 3                | Bit           | 0x20<br>(6)                   | -    | Signal: Trip Command blocked   |
|                         | ExBlo TripCmd       | 28                           | 1                             | 3                | Bit           | 0x40<br>(7)                   | -    | Signal: External Blocking of the Trip Command  |
| <b>V[3] - 27, 59</b>    |                     | <b>29</b>                    | <b>1</b>                      | <b>3</b>         | <b>Struct</b> |                               |      |  |
|                         | Alarm L1            | 29                           | 1                             | 3                | Bit           | 0x1<br>(1)                    | -    | Signal: Alarm L1   |

| Module<br>(ANSI / IEEE) | Name<br>Function    | Start<br>Register<br>Address | No. of<br>Modbus<br>Registers | Function<br>code | Format        | Bit Mask<br>(Bit<br>position) | Unit | Description  |
|-------------------------|---------------------|------------------------------|-------------------------------|------------------|---------------|-------------------------------|------|--|
|                         | Alarm L2            | 29                           | 1                             | 3                | Bit           | 0x2<br>(2)                    | -    | Signal: Alarm L2   |
|                         | Alarm L3            | 29                           | 1                             | 3                | Bit           | 0x4<br>(3)                    | -    | Signal: Alarm L3   |
|                         | Alarm               | 29                           | 1                             | 3                | Bit           | 0x8<br>(4)                    | -    | Signal: Alarm voltage stage  |
|                         | Trip L1 (*)         | 29                           | 1                             | 3                | Bit           | 0x10<br>(5)                   | -    | Signal: General Trip Phase L1  |
|                         | Trip L2 (*)         | 29                           | 1                             | 3                | Bit           | 0x20<br>(6)                   | -    | Signal: General Trip Phase L2  |
|                         | Trip L3 (*)         | 29                           | 1                             | 3                | Bit           | 0x40<br>(7)                   | -    | Signal: General Trip Phase L3  |
|                         | Trip (*)            | 29                           | 1                             | 3                | Bit           | 0x80<br>(8)                   | -    | Signal: Trip   |
|                         | TripCmd (*)         | 29                           | 1                             | 3                | Bit           | 0x100<br>(9)                  | -    | Signal: Trip Command   |
|                         | Imin release active | 29                           | 1                             | 3                | Bit           | 0x200<br>(10)                 | -    | Signal that the Imin release (minimum current) check is enabled and does not block the undervoltage detection at the moment. |
| <b>V[4] - 27, 59</b>    |                     | <b>30</b>                    | <b>1</b>                      | <b>3</b>         | <b>Struct</b> |                               |      |  |
|                         | ExBlo1-I            | 30                           | 1                             | 3                | Bit           | 0x1                           | -    | Module input state: External blocking1   |

### 3 Appendix - Data Point Lists

#### 3.1 Signals

| Module<br>(ANSI / IEEE) | Name<br>Function | Start<br>Register<br>Address | No. of<br>Modbus<br>Registers | Function<br>code | Format        | Bit Mask<br>(Bit<br>position) | Unit | Description   |
|-------------------------|------------------|------------------------------|-------------------------------|------------------|---------------|-------------------------------|------|---|
|                         |                  |                              |                               |                  |               | (1)                           |      |   |
|                         | ExBlo2-I         | 30                           | 1                             | 3                | Bit           | 0x2<br>(2)                    | -    | Module input state: External blocking2                    |
|                         | ExBlo TripCmd-I  | 30                           | 1                             | 3                | Bit           | 0x4<br>(3)                    | -    | Module input state: External Blocking of the Trip Command |
|                         | active           | 30                           | 1                             | 3                | Bit           | 0x8<br>(4)                    | -    | Signal: active  |
|                         | ExBlo            | 30                           | 1                             | 3                | Bit           | 0x10<br>(5)                   | -    | Signal: External Blocking                                 |
|                         | Blo TripCmd      | 30                           | 1                             | 3                | Bit           | 0x20<br>(6)                   | -    | Signal: Trip Command blocked                              |
|                         | ExBlo TripCmd    | 30                           | 1                             | 3                | Bit           | 0x40<br>(7)                   | -    | Signal: External Blocking of the Trip Command             |
| <b>V[4] - 27, 59</b>    |                  | <b>31</b>                    | <b>1</b>                      | <b>3</b>         | <b>Struct</b> |                               |      |   |
|                         | Alarm L1         | 31                           | 1                             | 3                | Bit           | 0x1<br>(1)                    | -    | Signal: Alarm L1  |
|                         | Alarm L2         | 31                           | 1                             | 3                | Bit           | 0x2<br>(2)                    | -    | Signal: Alarm L2  |
|                         | Alarm L3         | 31                           | 1                             | 3                | Bit           | 0x4<br>(3)                    | -    | Signal: Alarm L3  |
|                         | Alarm            | 31                           | 1                             | 3                | Bit           | 0x8                           | -    | Signal: Alarm voltage stage                               |



| Module<br>(ANSI / IEEE) | Name<br>Function    | Start<br>Register<br>Address | No. of<br>Modbus<br>Registers | Function<br>code | Format        | Bit Mask<br>(Bit<br>position) | Unit | Description  |
|-------------------------|---------------------|------------------------------|-------------------------------|------------------|---------------|-------------------------------|------|--|
|                         |                     |                              |                               |                  |               | (4)                           |      |  |
|                         | Trip L1 (*)         | 31                           | 1                             | 3                | Bit           | 0x10<br>(5)                   | -    | Signal: General Trip Phase L1  |
|                         | Trip L2 (*)         | 31                           | 1                             | 3                | Bit           | 0x20<br>(6)                   | -    | Signal: General Trip Phase L2  |
|                         | Trip L3 (*)         | 31                           | 1                             | 3                | Bit           | 0x40<br>(7)                   | -    | Signal: General Trip Phase L3  |
|                         | Trip (*)            | 31                           | 1                             | 3                | Bit           | 0x80<br>(8)                   | -    | Signal: Trip   |
|                         | TripCmd (*)         | 31                           | 1                             | 3                | Bit           | 0x100<br>(9)                  | -    | Signal: Trip Command   |
|                         | Imin release active | 31                           | 1                             | 3                | Bit           | 0x200<br>(10)                 | -    | Signal that the Imin release (minimum current) check is enabled and does not block the undervoltage detection at the moment. |
| <b>V[5] - 27, 59</b>    |                     | <b>92</b>                    | <b>1</b>                      | <b>3</b>         | <b>Struct</b> |                               |      |  |
|                         | ExBlo1-I            | 92                           | 1                             | 3                | Bit           | 0x1<br>(1)                    | -    | Module input state: External blocking1   |
|                         | ExBlo2-I            | 92                           | 1                             | 3                | Bit           | 0x2<br>(2)                    | -    | Module input state: External blocking2   |
|                         | ExBlo TripCmd-I     | 92                           | 1                             | 3                | Bit           | 0x4<br>(3)                    | -    | Module input state: External Blocking of the Trip Command  |
|                         | active              | 92                           | 1                             | 3                | Bit           | 0x8                           | -    | Signal: active   |

### 3 Appendix - Data Point Lists

#### 3.1 Signals

| Module<br>(ANSI / IEEE) | Name<br>Function | Start<br>Register<br>Address | No. of<br>Modbus<br>Registers | Function<br>code | Format | Bit Mask<br>(Bit<br>position) | Unit | Description                                   |
|-------------------------|------------------|------------------------------|-------------------------------|------------------|--------|-------------------------------|------|---|
|                         |                  |                              |                               |                  |        | (4)                           |      |   |
|                         | ExBlo            | 92                           | 1                             | 3                | Bit    | 0x10<br>(5)                   | -    | Signal: External Blocking                     |
|                         | Blo TripCmd      | 92                           | 1                             | 3                | Bit    | 0x20<br>(6)                   | -    | Signal: Trip Command blocked                  |
|                         | ExBlo TripCmd    | 92                           | 1                             | 3                | Bit    | 0x40<br>(7)                   | -    | Signal: External Blocking of the Trip Command |
|                         | Alarm            | 92                           | 1                             | 3                | Bit    | 0x80<br>(8)                   | -    | Signal: Alarm voltage stage                   |
|                         | Alarm L1         | 92                           | 1                             | 3                | Bit    | 0x100<br>(9)                  | -    | Signal: Alarm L1                              |
|                         | Alarm L2         | 92                           | 1                             | 3                | Bit    | 0x200<br>(10)                 | -    | Signal: Alarm L2                              |
|                         | Alarm L3         | 92                           | 1                             | 3                | Bit    | 0x400<br>(11)                 | -    | Signal: Alarm L3                              |
|                         | Trip (*)         | 92                           | 1                             | 3                | Bit    | 0x800<br>(12)                 | -    | Signal: Trip                                  |
|                         | Trip L1 (*)      | 92                           | 1                             | 3                | Bit    | 0x1000<br>(13)                | -    | Signal: General Trip Phase L1                 |
|                         | Trip L2 (*)      | 92                           | 1                             | 3                | Bit    | 0x2000<br>(14)                | -    | Signal: General Trip Phase L2                 |

| Module<br>(ANSI / IEEE) | Name<br>Function    | Start<br>Register<br>Address | No. of<br>Modbus<br>Registers | Function<br>code | Format        | Bit Mask<br>(Bit<br>position) | Unit | Description  |
|-------------------------|---------------------|------------------------------|-------------------------------|------------------|---------------|-------------------------------|------|--|
|                         | Trip L3 (*)         | 92                           | 1                             | 3                | Bit           | 0x4000<br>(15)                | -    | Signal: General Trip Phase L3  |
|                         | TripCmd (*)         | 92                           | 1                             | 3                | Bit           | 0x8000<br>(16)                | -    | Signal: Trip Command   |
| <b>V[5] - 27, 59</b>    |                     | <b>94</b>                    | <b>1</b>                      | <b>3</b>         | <b>Struct</b> |                               |      |  |
|                         | Imin release active | 94                           | 1                             | 3                | Bit           | 0x1<br>(1)                    | -    | Signal that the Imin release (minimum current) check is enabled and does not block the undervoltage detection at the moment. |
| <b>V[6] - 27, 59</b>    |                     | <b>93</b>                    | <b>1</b>                      | <b>3</b>         | <b>Struct</b> |                               |      |  |
|                         | ExBlo1-I            | 93                           | 1                             | 3                | Bit           | 0x1<br>(1)                    | -    | Module input state: External blocking1   |
|                         | ExBlo2-I            | 93                           | 1                             | 3                | Bit           | 0x2<br>(2)                    | -    | Module input state: External blocking2   |
|                         | ExBlo TripCmd-I     | 93                           | 1                             | 3                | Bit           | 0x4<br>(3)                    | -    | Module input state: External Blocking of the Trip Command  |
|                         | active              | 93                           | 1                             | 3                | Bit           | 0x8<br>(4)                    | -    | Signal: active   |
|                         | ExBlo               | 93                           | 1                             | 3                | Bit           | 0x10<br>(5)                   | -    | Signal: External Blocking  |
|                         | Blo TripCmd         | 93                           | 1                             | 3                | Bit           | 0x20<br>(6)                   | -    | Signal: Trip Command blocked   |

### 3 Appendix - Data Point Lists

#### 3.1 Signals

| Module<br>(ANSI / IEEE) | Name<br>Function | Start<br>Register<br>Address | No. of<br>Modbus<br>Registers | Function<br>code | Format        | Bit Mask<br>(Bit<br>position) | Unit | Description                                   |
|-------------------------|------------------|------------------------------|-------------------------------|------------------|---------------|-------------------------------|------|---|
|                         | ExBlo TripCmd    | 93                           | 1                             | 3                | Bit           | 0x40<br>(7)                   | -    | Signal: External Blocking of the Trip Command |
|                         | Alarm            | 93                           | 1                             | 3                | Bit           | 0x80<br>(8)                   | -    | Signal: Alarm voltage stage                   |
|                         | Alarm L1         | 93                           | 1                             | 3                | Bit           | 0x100<br>(9)                  | -    | Signal: Alarm L1                              |
|                         | Alarm L2         | 93                           | 1                             | 3                | Bit           | 0x200<br>(10)                 | -    | Signal: Alarm L2                              |
|                         | Alarm L3         | 93                           | 1                             | 3                | Bit           | 0x400<br>(11)                 | -    | Signal: Alarm L3                              |
|                         | Trip (*)         | 93                           | 1                             | 3                | Bit           | 0x800<br>(12)                 | -    | Signal: Trip                                  |
|                         | Trip L1 (*)      | 93                           | 1                             | 3                | Bit           | 0x1000<br>(13)                | -    | Signal: General Trip Phase L1                 |
|                         | Trip L2 (*)      | 93                           | 1                             | 3                | Bit           | 0x2000<br>(14)                | -    | Signal: General Trip Phase L2                 |
|                         | Trip L3 (*)      | 93                           | 1                             | 3                | Bit           | 0x4000<br>(15)                | -    | Signal: General Trip Phase L3                 |
|                         | TripCmd (*)      | 93                           | 1                             | 3                | Bit           | 0x8000<br>(16)                | -    | Signal: Trip Command                          |
| <b>V[6] - 27, 59</b>    |                  | <b>95</b>                    | <b>1</b>                      | <b>3</b>         | <b>Struct</b> |                               |      |   |

| Module<br>(ANSI / IEEE) | Name<br>Function    | Start<br>Register<br>Address | No. of<br>Modbus<br>Registers | Function<br>code | Format        | Bit Mask<br>(Bit<br>position) | Unit | Description  |
|-------------------------|---------------------|------------------------------|-------------------------------|------------------|---------------|-------------------------------|------|--|
|                         | Imin release active | 95                           | 1                             | 3                | Bit           | 0x1<br>(1)                    | -    | Signal that the Imin release (minimum current) check is enabled and does not block the undervoltage detection at the moment. |
| <b>delta phi - 78V</b>  |                     | <b>249</b>                   | <b>1</b>                      | <b>3</b>         | <b>Struct</b> |                               |      |  |
|                         | ExBlo1-I            | 249                          | 1                             | 3                | Bit           | 0x1<br>(1)                    | -    | Module input state: External blocking1   |
|                         | ExBlo2-I            | 249                          | 1                             | 3                | Bit           | 0x2<br>(2)                    | -    | Module input state: External blocking2   |
|                         | ExBlo TripCmd-I     | 249                          | 1                             | 3                | Bit           | 0x4<br>(3)                    | -    | Module input state: External Blocking of the Trip Command  |
|                         | active              | 249                          | 1                             | 3                | Bit           | 0x8<br>(4)                    | -    | Signal: active   |
|                         | ExBlo               | 249                          | 1                             | 3                | Bit           | 0x10<br>(5)                   | -    | Signal: External Blocking  |
|                         | Blo TripCmd         | 249                          | 1                             | 3                | Bit           | 0x20<br>(6)                   | -    | Signal: Trip Command blocked   |
|                         | ExBlo TripCmd       | 249                          | 1                             | 3                | Bit           | 0x40<br>(7)                   | -    | Signal: External Blocking of the Trip Command  |
|                         | Alarm               | 249                          | 1                             | 3                | Bit           | 0x80<br>(8)                   | -    | Signal: Alarm Frequency Protection (collective signal)   |
|                         | Trip (*)            | 249                          | 1                             | 3                | Bit           | 0x100                         | -    | Signal: Trip Frequency Protection (collective signal)  |

### 3 Appendix - Data Point Lists

#### 3.1 Signals

| Module<br>(ANSI / IEEE) | Name<br>Function | Start<br>Register<br>Address | No. of<br>Modbus<br>Registers | Function<br>code | Format        | Bit Mask<br>(Bit<br>position) | Unit | Description   |
|-------------------------|------------------|------------------------------|-------------------------------|------------------|---------------|-------------------------------|------|---|
|                         |                  |                              |                               |                  |               | (9)                           |      |   |
|                         | TripCmd (*)      | 249                          | 1                             | 3                | Bit           | 0x200<br>(10)                 | -    | Signal: Trip Command                                      |
|                         | Blo by V<        | 249                          | 1                             | 3                | Bit           | 0x400<br>(11)                 | -    | Signal: Module is blocked by undervoltage.                |
| <b>df/dt - 81R</b>      |                  | <b>250</b>                   | <b>1</b>                      | <b>3</b>         | <b>Struct</b> |                               |      |   |
|                         | ExBlo1-l         | 250                          | 1                             | 3                | Bit           | 0x1<br>(1)                    | -    | Module input state: External blocking1                    |
|                         | ExBlo2-l         | 250                          | 1                             | 3                | Bit           | 0x2<br>(2)                    | -    | Module input state: External blocking2                    |
|                         | ExBlo TripCmd-l  | 250                          | 1                             | 3                | Bit           | 0x4<br>(3)                    | -    | Module input state: External Blocking of the Trip Command |
|                         | active           | 250                          | 1                             | 3                | Bit           | 0x8<br>(4)                    | -    | Signal: active  |
|                         | ExBlo            | 250                          | 1                             | 3                | Bit           | 0x10<br>(5)                   | -    | Signal: External Blocking                                 |
|                         | Blo TripCmd      | 250                          | 1                             | 3                | Bit           | 0x20<br>(6)                   | -    | Signal: Trip Command blocked                              |
|                         | ExBlo TripCmd    | 250                          | 1                             | 3                | Bit           | 0x40<br>(7)                   | -    | Signal: External Blocking of the Trip Command             |

| Module<br>(ANSI / IEEE) | Name<br>Function | Start<br>Register<br>Address | No. of<br>Modbus<br>Registers | Function<br>code | Format        | Bit Mask<br>(Bit<br>position) | Unit | Description  |
|-------------------------|------------------|------------------------------|-------------------------------|------------------|---------------|-------------------------------|------|--|
|                         | Alarm            | 250                          | 1                             | 3                | Bit           | 0x80<br>(8)                   | -    | Signal: Alarm Frequency Protection<br>(collective signal)    |
|                         | Trip (*)         | 250                          | 1                             | 3                | Bit           | 0x100<br>(9)                  | -    | Signal: Trip Frequency Protection (collective<br>signal)     |
|                         | TripCmd (*)      | 250                          | 1                             | 3                | Bit           | 0x200<br>(10)                 | -    | Signal: Trip Command   |
|                         | Blo by V<        | 250                          | 1                             | 3                | Bit           | 0x400<br>(11)                 | -    | Signal: Module is blocked by undervoltage.                   |
| <b>f[1] - 81</b>        |                  | <b>34</b>                    | <b>1</b>                      | <b>3</b>         | <b>Struct</b> |                               |      |  |
|                         | ExBlo1-I         | 34                           | 1                             | 3                | Bit           | 0x1<br>(1)                    | -    | Module input state: External blocking1                       |
|                         | ExBlo2-I         | 34                           | 1                             | 3                | Bit           | 0x2<br>(2)                    | -    | Module input state: External blocking2                       |
|                         | ExBlo TripCmd-I  | 34                           | 1                             | 3                | Bit           | 0x4<br>(3)                    | -    | Module input state: External Blocking of<br>the Trip Command |
|                         | active           | 34                           | 1                             | 3                | Bit           | 0x8<br>(4)                    | -    | Signal: active   |
|                         | ExBlo            | 34                           | 1                             | 3                | Bit           | 0x10<br>(5)                   | -    | Signal: External Blocking                                    |
|                         | Blo by V<        | 34                           | 1                             | 3                | Bit           | 0x20<br>(6)                   | -    | Signal: Module is blocked by undervoltage.                   |

### 3 Appendix - Data Point Lists

#### 3.1 Signals

| Module<br>(ANSI / IEEE) | Name<br>Function       | Start<br>Register<br>Address | No. of<br>Modbus<br>Registers | Function<br>code | Format        | Bit Mask<br>(Bit<br>position) | Unit | Description  |
|-------------------------|------------------------|------------------------------|-------------------------------|------------------|---------------|-------------------------------|------|--|
|                         | Blo TripCmd            | 34                           | 1                             | 3                | Bit           | 0x40<br>(7)                   | -    | Signal: Trip Command blocked   |
|                         | ExBlo TripCmd          | 34                           | 1                             | 3                | Bit           | 0x80<br>(8)                   | -    | Signal: External Blocking of the Trip Command                        |
| <b>f[1] - 81</b>        |                        | <b>35</b>                    | <b>1</b>                      | <b>3</b>         | <b>Struct</b> |                               |      |  |
|                         | Alarm f                | 35                           | 1                             | 3                | Bit           | 0x1<br>(1)                    | -    | Signal: Alarm Frequency Protection                                   |
|                         | Alarm df/dt   DF/DT    | 35                           | 1                             | 3                | Bit           | 0x2<br>(2)                    | -    | Alarm instantaneous or average value of the rate-of-frequency-change |
|                         | Trip f (*)             | 35                           | 1                             | 3                | Bit           | 0x4<br>(3)                    | -    | Signal: Frequency has exceeded the limit.                            |
|                         | Trip df/dt   DF/DT (*) | 35                           | 1                             | 3                | Bit           | 0x8<br>(4)                    | -    | Signal: Trip df/dt or DF/DT  |
|                         | Alarm                  | 35                           | 1                             | 3                | Bit           | 0x10<br>(5)                   | -    | Signal: Alarm Frequency Protection (collective signal)               |
|                         | Alarm delta phi        | 35                           | 1                             | 3                | Bit           | 0x20<br>(6)                   | -    | Signal: Alarm Vector Surge   |
|                         | Trip (*)               | 35                           | 1                             | 3                | Bit           | 0x40<br>(7)                   | -    | Signal: Trip Frequency Protection (collective signal)                |
|                         | Trip delta phi (*)     | 35                           | 1                             | 3                | Bit           | 0x80<br>(8)                   | -    | Signal: Trip Vector Surge  |



| Module<br>(ANSI / IEEE) | Name<br>Function | Start<br>Register<br>Address | No. of<br>Modbus<br>Registers | Function<br>code | Format        | Bit Mask<br>(Bit<br>position) | Unit | Description   |
|-------------------------|------------------|------------------------------|-------------------------------|------------------|---------------|-------------------------------|------|---|
|                         | TripCmd (*)      | 35                           | 1                             | 3                | Bit           | 0x100<br>(9)                  | -    | Signal: Trip Command                                      |
| <b>f[2] - 81</b>        |                  | <b>36</b>                    | <b>1</b>                      | <b>3</b>         | <b>Struct</b> |                               |      |   |
|                         | ExBlo1-I         | 36                           | 1                             | 3                | Bit           | 0x1<br>(1)                    | -    | Module input state: External blocking1                    |
|                         | ExBlo2-I         | 36                           | 1                             | 3                | Bit           | 0x2<br>(2)                    | -    | Module input state: External blocking2                    |
|                         | ExBlo TripCmd-I  | 36                           | 1                             | 3                | Bit           | 0x4<br>(3)                    | -    | Module input state: External Blocking of the Trip Command |
|                         | active           | 36                           | 1                             | 3                | Bit           | 0x8<br>(4)                    | -    | Signal: active  |
|                         | ExBlo            | 36                           | 1                             | 3                | Bit           | 0x10<br>(5)                   | -    | Signal: External Blocking                                 |
|                         | Blo by V<        | 36                           | 1                             | 3                | Bit           | 0x20<br>(6)                   | -    | Signal: Module is blocked by undervoltage.                |
|                         | Blo TripCmd      | 36                           | 1                             | 3                | Bit           | 0x40<br>(7)                   | -    | Signal: Trip Command blocked                              |
|                         | ExBlo TripCmd    | 36                           | 1                             | 3                | Bit           | 0x80<br>(8)                   | -    | Signal: External Blocking of the Trip Command             |
| <b>f[2] - 81</b>        |                  | <b>37</b>                    | <b>1</b>                      | <b>3</b>         | <b>Struct</b> |                               |      |   |
|                         | Alarm f          | 37                           | 1                             | 3                | Bit           | 0x1                           | -    | Signal: Alarm Frequency Protection                        |

### 3 Appendix - Data Point Lists

#### 3.1 Signals

| Module<br>(ANSI / IEEE) | Name<br>Function       | Start<br>Register<br>Address | No. of<br>Modbus<br>Registers | Function<br>code | Format        | Bit Mask<br>(Bit<br>position) | Unit | Description  |
|-------------------------|------------------------|------------------------------|-------------------------------|------------------|---------------|-------------------------------|------|--|
|                         |                        |                              |                               |                  |               | (1)                           |      |  |
|                         | Alarm df/dt   DF/DT    | 37                           | 1                             | 3                | Bit           | 0x2<br>(2)                    | -    | Alarm instantaneous or average value of the rate-of-frequency-change |
|                         | Trip f (*)             | 37                           | 1                             | 3                | Bit           | 0x4<br>(3)                    | -    | Signal: Frequency has exceeded the limit.                            |
|                         | Trip df/dt   DF/DT (*) | 37                           | 1                             | 3                | Bit           | 0x8<br>(4)                    | -    | Signal: Trip df/dt or DF/DT  |
|                         | Alarm                  | 37                           | 1                             | 3                | Bit           | 0x10<br>(5)                   | -    | Signal: Alarm Frequency Protection (collective signal)               |
|                         | Alarm delta phi        | 37                           | 1                             | 3                | Bit           | 0x20<br>(6)                   | -    | Signal: Alarm Vector Surge   |
|                         | Trip (*)               | 37                           | 1                             | 3                | Bit           | 0x40<br>(7)                   | -    | Signal: Trip Frequency Protection (collective signal)                |
|                         | Trip delta phi (*)     | 37                           | 1                             | 3                | Bit           | 0x80<br>(8)                   | -    | Signal: Trip Vector Surge  |
|                         | TripCmd (*)            | 37                           | 1                             | 3                | Bit           | 0x100<br>(9)                  | -    | Signal: Trip Command   |
| <b>f[3] - 81</b>        |                        | <b>38</b>                    | <b>1</b>                      | <b>3</b>         | <b>Struct</b> |                               |      |  |
|                         | ExBlo1-l               | 38                           | 1                             | 3                | Bit           | 0x1<br>(1)                    | -    | Module input state: External blocking1                               |
|                         | ExBlo2-l               | 38                           | 1                             | 3                | Bit           | 0x2                           | -    | Module input state: External blocking2                               |

| Module<br>(ANSI / IEEE) | Name<br>Function       | Start<br>Register<br>Address | No. of<br>Modbus<br>Registers | Function<br>code | Format        | Bit Mask<br>(Bit<br>position) | Unit | Description  |
|-------------------------|------------------------|------------------------------|-------------------------------|------------------|---------------|-------------------------------|------|--|
|                         |                        |                              |                               |                  |               | (2)                           |      |  |
|                         | ExBlo TripCmd-I        | 38                           | 1                             | 3                | Bit           | 0x4<br>(3)                    | -    | Module input state: External Blocking of the Trip Command            |
|                         | active                 | 38                           | 1                             | 3                | Bit           | 0x8<br>(4)                    | -    | Signal: active   |
|                         | ExBlo                  | 38                           | 1                             | 3                | Bit           | 0x10<br>(5)                   | -    | Signal: External Blocking  |
|                         | Blo by V<              | 38                           | 1                             | 3                | Bit           | 0x20<br>(6)                   | -    | Signal: Module is blocked by undervoltage.                           |
|                         | Blo TripCmd            | 38                           | 1                             | 3                | Bit           | 0x40<br>(7)                   | -    | Signal: Trip Command blocked   |
|                         | ExBlo TripCmd          | 38                           | 1                             | 3                | Bit           | 0x80<br>(8)                   | -    | Signal: External Blocking of the Trip Command                        |
| <b>f[3] - 81</b>        |                        | <b>39</b>                    | <b>1</b>                      | <b>3</b>         | <b>Struct</b> |                               |      |  |
|                         | Alarm f                | 39                           | 1                             | 3                | Bit           | 0x1<br>(1)                    | -    | Signal: Alarm Frequency Protection                                   |
|                         | Alarm df/dt   DF/DT    | 39                           | 1                             | 3                | Bit           | 0x2<br>(2)                    | -    | Alarm instantaneous or average value of the rate-of-frequency-change |
|                         | Trip f (*)             | 39                           | 1                             | 3                | Bit           | 0x4<br>(3)                    | -    | Signal: Frequency has exceeded the limit.                            |
|                         | Trip df/dt   DF/DT (*) | 39                           | 1                             | 3                | Bit           | 0x8                           | -    | Signal: Trip df/dt or DF/DT  |

### 3 Appendix - Data Point Lists

#### 3.1 Signals

| Module<br>(ANSI / IEEE) | Name<br>Function   | Start<br>Register<br>Address | No. of<br>Modbus<br>Registers | Function<br>code | Format        | Bit Mask<br>(Bit<br>position) | Unit | Description  |
|-------------------------|--------------------|------------------------------|-------------------------------|------------------|---------------|-------------------------------|------|--|
|                         |                    |                              |                               |                  |               | (4)                           |      |  |
|                         | Alarm              | 39                           | 1                             | 3                | Bit           | 0x10<br>(5)                   | -    | Signal: Alarm Frequency Protection<br>(collective signal)    |
|                         | Alarm delta phi    | 39                           | 1                             | 3                | Bit           | 0x20<br>(6)                   | -    | Signal: Alarm Vector Surge                                   |
|                         | Trip (*)           | 39                           | 1                             | 3                | Bit           | 0x40<br>(7)                   | -    | Signal: Trip Frequency Protection (collective<br>signal)     |
|                         | Trip delta phi (*) | 39                           | 1                             | 3                | Bit           | 0x80<br>(8)                   | -    | Signal: Trip Vector Surge                                    |
|                         | TripCmd (*)        | 39                           | 1                             | 3                | Bit           | 0x100<br>(9)                  | -    | Signal: Trip Command   |
| <b>f[4] - 81</b>        |                    | <b>40</b>                    | <b>1</b>                      | <b>3</b>         | <b>Struct</b> |                               |      |  |
|                         | ExBlo1-l           | 40                           | 1                             | 3                | Bit           | 0x1<br>(1)                    | -    | Module input state: External blocking1                       |
|                         | ExBlo2-l           | 40                           | 1                             | 3                | Bit           | 0x2<br>(2)                    | -    | Module input state: External blocking2                       |
|                         | ExBlo TripCmd-l    | 40                           | 1                             | 3                | Bit           | 0x4<br>(3)                    | -    | Module input state: External Blocking of<br>the Trip Command |
|                         | active             | 40                           | 1                             | 3                | Bit           | 0x8<br>(4)                    | -    | Signal: active   |
|                         | ExBlo              | 40                           | 1                             | 3                | Bit           | 0x10                          | -    | Signal: External Blocking                                    |

| Module<br>(ANSI / IEEE) | Name<br>Function       | Start<br>Register<br>Address | No. of<br>Modbus<br>Registers | Function<br>code | Format        | Bit Mask<br>(Bit<br>position) | Unit | Description  |
|-------------------------|------------------------|------------------------------|-------------------------------|------------------|---------------|-------------------------------|------|--|
|                         |                        |                              |                               |                  |               | (5)                           |      |  |
|                         | Blo by V<              | 40                           | 1                             | 3                | Bit           | 0x20<br>(6)                   | -    | Signal: Module is blocked by undervoltage.                           |
|                         | Blo TripCmd            | 40                           | 1                             | 3                | Bit           | 0x40<br>(7)                   | -    | Signal: Trip Command blocked   |
|                         | ExBlo TripCmd          | 40                           | 1                             | 3                | Bit           | 0x80<br>(8)                   | -    | Signal: External Blocking of the Trip Command                        |
| <b>f[4] - 81</b>        |                        | <b>41</b>                    | <b>1</b>                      | <b>3</b>         | <b>Struct</b> |                               |      |  |
|                         | Alarm f                | 41                           | 1                             | 3                | Bit           | 0x1<br>(1)                    | -    | Signal: Alarm Frequency Protection                                   |
|                         | Alarm df/dt   DF/DT    | 41                           | 1                             | 3                | Bit           | 0x2<br>(2)                    | -    | Alarm instantaneous or average value of the rate-of-frequency-change |
|                         | Trip f (*)             | 41                           | 1                             | 3                | Bit           | 0x4<br>(3)                    | -    | Signal: Frequency has exceeded the limit.                            |
|                         | Trip df/dt   DF/DT (*) | 41                           | 1                             | 3                | Bit           | 0x8<br>(4)                    | -    | Signal: Trip df/dt or DF/DT  |
|                         | Alarm                  | 41                           | 1                             | 3                | Bit           | 0x10<br>(5)                   | -    | Signal: Alarm Frequency Protection (collective signal)               |
|                         | Alarm delta phi        | 41                           | 1                             | 3                | Bit           | 0x20<br>(6)                   | -    | Signal: Alarm Vector Surge   |

### 3 Appendix - Data Point Lists

#### 3.1 Signals

| Module<br>(ANSI / IEEE) | Name<br>Function   | Start<br>Register<br>Address | No. of<br>Modbus<br>Registers | Function<br>code | Format        | Bit Mask<br>(Bit<br>position) | Unit | Description   |
|-------------------------|--------------------|------------------------------|-------------------------------|------------------|---------------|-------------------------------|------|---|
|                         | Trip (*)           | 41                           | 1                             | 3                | Bit           | 0x40<br>(7)                   | -    | Signal: Trip Frequency Protection (collective signal)     |
|                         | Trip delta phi (*) | 41                           | 1                             | 3                | Bit           | 0x80<br>(8)                   | -    | Signal: Trip Vector Surge                                 |
|                         | TripCmd (*)        | 41                           | 1                             | 3                | Bit           | 0x100<br>(9)                  | -    | Signal: Trip Command                                      |
| <b>f[5] - 81</b>        |                    | <b>42</b>                    | <b>1</b>                      | <b>3</b>         | <b>Struct</b> |                               |      |   |
|                         | ExBlo1-I           | 42                           | 1                             | 3                | Bit           | 0x1<br>(1)                    | -    | Module input state: External blocking1                    |
|                         | ExBlo2-I           | 42                           | 1                             | 3                | Bit           | 0x2<br>(2)                    | -    | Module input state: External blocking2                    |
|                         | ExBlo TripCmd-I    | 42                           | 1                             | 3                | Bit           | 0x4<br>(3)                    | -    | Module input state: External Blocking of the Trip Command |
|                         | active             | 42                           | 1                             | 3                | Bit           | 0x8<br>(4)                    | -    | Signal: active  |
|                         | ExBlo              | 42                           | 1                             | 3                | Bit           | 0x10<br>(5)                   | -    | Signal: External Blocking                                 |
|                         | Blo by V<          | 42                           | 1                             | 3                | Bit           | 0x20<br>(6)                   | -    | Signal: Module is blocked by undervoltage.                |
|                         | Blo TripCmd        | 42                           | 1                             | 3                | Bit           | 0x40<br>(7)                   | -    | Signal: Trip Command blocked                              |

| Module<br>(ANSI / IEEE) | Name<br>Function       | Start<br>Register<br>Address | No. of<br>Modbus<br>Registers | Function<br>code | Format        | Bit Mask<br>(Bit<br>position) | Unit | Description  |
|-------------------------|------------------------|------------------------------|-------------------------------|------------------|---------------|-------------------------------|------|--|
|                         | ExBlo TripCmd          | 42                           | 1                             | 3                | Bit           | 0x80<br>(8)                   | -    | Signal: External Blocking of the Trip Command                        |
| <b>f[5] - 81</b>        |                        | <b>43</b>                    | <b>1</b>                      | <b>3</b>         | <b>Struct</b> |                               |      |  |
|                         | Alarm f                | 43                           | 1                             | 3                | Bit           | 0x1<br>(1)                    | -    | Signal: Alarm Frequency Protection                                   |
|                         | Alarm df/dt   DF/DT    | 43                           | 1                             | 3                | Bit           | 0x2<br>(2)                    | -    | Alarm instantaneous or average value of the rate-of-frequency-change |
|                         | Trip f (*)             | 43                           | 1                             | 3                | Bit           | 0x4<br>(3)                    | -    | Signal: Frequency has exceeded the limit.                            |
|                         | Trip df/dt   DF/DT (*) | 43                           | 1                             | 3                | Bit           | 0x8<br>(4)                    | -    | Signal: Trip df/dt or DF/DT  |
|                         | Alarm                  | 43                           | 1                             | 3                | Bit           | 0x10<br>(5)                   | -    | Signal: Alarm Frequency Protection (collective signal)               |
|                         | Alarm delta phi        | 43                           | 1                             | 3                | Bit           | 0x20<br>(6)                   | -    | Signal: Alarm Vector Surge   |
|                         | Trip (*)               | 43                           | 1                             | 3                | Bit           | 0x40<br>(7)                   | -    | Signal: Trip Frequency Protection (collective signal)                |
|                         | Trip delta phi (*)     | 43                           | 1                             | 3                | Bit           | 0x80<br>(8)                   | -    | Signal: Trip Vector Surge  |
|                         | TripCmd (*)            | 43                           | 1                             | 3                | Bit           | 0x100<br>(9)                  | -    | Signal: Trip Command   |

### 3 Appendix - Data Point Lists

#### 3.1 Signals

| Module<br>(ANSI / IEEE) | Name<br>Function    | Start<br>Register<br>Address | No. of<br>Modbus<br>Registers | Function<br>code | Format        | Bit Mask<br>(Bit<br>position) | Unit | Description  |
|-------------------------|---------------------|------------------------------|-------------------------------|------------------|---------------|-------------------------------|------|--|
| <b>f[6] - 81</b>        |                     | <b>44</b>                    | <b>1</b>                      | <b>3</b>         | <b>Struct</b> |                               |      |  |
|                         | ExBlo1-I            | 44                           | 1                             | 3                | Bit           | 0x1<br>(1)                    | -    | Module input state: External blocking1                               |
|                         | ExBlo2-I            | 44                           | 1                             | 3                | Bit           | 0x2<br>(2)                    | -    | Module input state: External blocking2                               |
|                         | ExBlo TripCmd-I     | 44                           | 1                             | 3                | Bit           | 0x4<br>(3)                    | -    | Module input state: External Blocking of the Trip Command            |
|                         | active              | 44                           | 1                             | 3                | Bit           | 0x8<br>(4)                    | -    | Signal: active   |
|                         | ExBlo               | 44                           | 1                             | 3                | Bit           | 0x10<br>(5)                   | -    | Signal: External Blocking  |
|                         | Blo by V<           | 44                           | 1                             | 3                | Bit           | 0x20<br>(6)                   | -    | Signal: Module is blocked by undervoltage.                           |
|                         | Blo TripCmd         | 44                           | 1                             | 3                | Bit           | 0x40<br>(7)                   | -    | Signal: Trip Command blocked   |
|                         | ExBlo TripCmd       | 44                           | 1                             | 3                | Bit           | 0x80<br>(8)                   | -    | Signal: External Blocking of the Trip Command                        |
| <b>f[6] - 81</b>        |                     | <b>45</b>                    | <b>1</b>                      | <b>3</b>         | <b>Struct</b> |                               |      |  |
|                         | Alarm f             | 45                           | 1                             | 3                | Bit           | 0x1<br>(1)                    | -    | Signal: Alarm Frequency Protection                                   |
|                         | Alarm df/dt   DF/DT | 45                           | 1                             | 3                | Bit           | 0x2                           | -    | Alarm instantaneous or average value of the rate-of-frequency-change |



| Module<br>(ANSI / IEEE) | Name<br>Function       | Start<br>Register<br>Address | No. of<br>Modbus<br>Registers | Function<br>code | Format | Bit Mask<br>(Bit<br>position) | Unit | Description   |
|-------------------------|------------------------|------------------------------|-------------------------------|------------------|--------|-------------------------------|------|---|
|                         |                        |                              |                               |                  |        | (2)                           |      |   |
|                         | Trip f (*)             | 45                           | 1                             | 3                | Bit    | 0x4<br>(3)                    | -    | Signal: Frequency has exceeded the limit.                 |
|                         | Trip df/dt   DF/DT (*) | 45                           | 1                             | 3                | Bit    | 0x8<br>(4)                    | -    | Signal: Trip df/dt or DF/DT                               |
|                         | Alarm                  | 45                           | 1                             | 3                | Bit    | 0x10<br>(5)                   | -    | Signal: Alarm Frequency Protection<br>(collective signal) |
|                         | Alarm delta phi        | 45                           | 1                             | 3                | Bit    | 0x20<br>(6)                   | -    | Signal: Alarm Vector Surge                                |
|                         | Trip (*)               | 45                           | 1                             | 3                | Bit    | 0x40<br>(7)                   | -    | Signal: Trip Frequency Protection (collective<br>signal)  |
|                         | Trip delta phi (*)     | 45                           | 1                             | 3                | Bit    | 0x80<br>(8)                   | -    | Signal: Trip Vector Surge                                 |
|                         | TripCmd (*)            | 45                           | 1                             | 3                | Bit    | 0x100<br>(9)                  | -    | Signal: Trip Command                                      |

## 3.2 Measuring Values

| Module<br>(ANSI / IEEEE) | Name<br>Function  | Start<br>Register<br>Address | No. of<br>Modbus<br>Registers | Function<br>code | Format       | Bit Mask<br>(Bit<br>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.                            |
| AnIn[1]                  | Value             | 20896                        | 2                             | 4                | Float IEE754 |                               | %    | Measured value of the Input in percent                                     |
| AnIn[2]                  | Value             | 20900                        | 2                             | 4                | Float IEE754 |                               | %    | Measured value of the Input in percent                                     |
| 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) |

| Module<br>(ANSI / IEEE) | Name<br>Function | Start<br>Register<br>Address | No. of<br>Modbus<br>Registers | Function<br>code | Format       | Bit Mask<br>(Bit<br>position) | Unit | Description  |
|-------------------------|------------------|------------------------------|-------------------------------|------------------|--------------|-------------------------------|------|--|
| CT                      | I2               | 20118                        | 2                             | 4                | Float IEE754 |                               | A    | Measured value (calculated): Unbalanced load current (fundamental)   |
| 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<br><br>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<br><br>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<br><br>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   |

3 Appendix - Data Point Lists

3.2 Measuring Values

| Module<br>(ANSI / IEEE) | Name<br>Function | Start<br>Register<br>Address | No. of<br>Modbus<br>Registers | Function<br>code | Format       | Bit Mask<br>(Bit<br>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 IL3          | 20208                        | 2                             | 4                | Float IEE754 |                               | °    | Measured value (calculated): Angle of Phasor IL3<br><br>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.   |

| Module<br>(ANSI / IEEE) | Name<br>Function | Start<br>Register<br>Address | No. of<br>Modbus<br>Registers | Function<br>code | Format       | Bit Mask<br>(Bit<br>position) | Unit | Description  |
|-------------------------|------------------|------------------------------|-------------------------------|------------------|--------------|-------------------------------|------|--|
| CT                      | phi I0           | 20378                        | 2                             | 4                | Float IEE754 |                               | °    | Measured value (calculated): Angle Zero Sequence System<br><br>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<br><br>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<br><br>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)  |

### 3 Appendix - Data Point Lists

#### 3.2 Measuring Values

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

| Module<br>(ANSI / IEEE) | Name<br>Function  | Start<br>Register<br>Address | No. of<br>Modbus<br>Registers | Function<br>code | Format       | Bit Mask<br>(Bit<br>position) | Unit | Description  |
|-------------------------|-------------------|------------------------------|-------------------------------|------------------|--------------|-------------------------------|------|--|
| CT                      | IG meas min RMS   | 21464                        | 2                             | 4                | Float IEE754 |                               | A    | Measured value: IG minimum value (RMS)   |
| 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 |

### 3 Appendix - Data Point Lists

#### 3.2 Measuring Values

| Module<br>(ANSI / IEEE) | Name<br>Function | Start<br>Register<br>Address | No. of<br>Modbus<br>Registers | Function<br>code | Format       | Bit Mask<br>(Bit<br>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<br><br>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<br><br>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<br>(ANSI / IEEE) | Name<br>Function | Start<br>Register<br>Address | No. of<br>Modbus<br>Registers | Function<br>code | Format       | Bit Mask<br>(Bit<br>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<br><br>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<br><br>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   |

### 3 Appendix - Data Point Lists

#### 3.2 Measuring Values

| Module<br>(ANSI / IEEE) | Name<br>Function        | Start<br>Register<br>Address | No. of<br>Modbus<br>Registers | Function<br>code | Format        | Bit Mask<br>(Bit<br>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          |
| <b>Date and Time</b>    |                         | <b>20000</b>                 | <b>6</b>                      | <b>4</b>         | <b>Struct</b> |                               |      |  |
|                         | y                       | 20000                        | 6                             | 4                | Short         | Word 0<br>(1)                 | -    | year   |
|                         | m                       | 20000                        | 6                             | 4                | Short         | Word 1<br>(17)                | -    | month  |
|                         | d                       | 20000                        | 6                             | 4                | Short         | Word 2<br>(33)                | -    | days   |
|                         | h                       | 20000                        | 6                             | 4                | Short         | Word 3<br>(49)                | -    | hours  |
|                         | min                     | 20000                        | 6                             | 4                | Short         | Word 4<br>(65)                | -    | minute   |
|                         | ms                      | 20000                        | 6                             | 4                | Short         | Word 5<br>(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.   |
| LVRT[1] - 27            | Cr Tot Numb of<br>Vdips | 24092                        | 2                             | 4                | Float IEE754  |                               | -    | Counter Total number of voltage dips.  |

| Module<br>(ANSI / IEEE) | Name<br>Function             | Start<br>Register<br>Address | No. of<br>Modbus<br>Registers | Function<br>code | Format       | Bit Mask<br>(Bit<br>position) | Unit | Description   |
|-------------------------|------------------------------|------------------------------|-------------------------------|------------------|--------------|-------------------------------|------|---|
| LVRT[1] – 27            | NumOf Vdips in t-LVRT        | 24094                        | 2                             | 4                | Float IEE754 |                               | -    | Number of Voltage dips during t-LVRT  |
| LVRT[1] – 27            | Cr Tot Numb of Vdips to Trip | 24096                        | 2                             | 4                | Float IEE754 |                               | -    | Counter Total number of voltage dips that caused a Trip.                                  |
| LVRT[2] – 27            | Cr Tot Numb of Vdips         | 24138                        | 2                             | 4                | Float IEE754 |                               | -    | Counter Total number of voltage dips.   |
| LVRT[2] – 27            | NumOf Vdips in t-LVRT        | 24140                        | 2                             | 4                | Float IEE754 |                               | -    | Number of Voltage dips during t-LVRT  |
| LVRT[2] – 27            | Cr Tot Numb of Vdips to Trip | 24142                        | 2                             | 4                | Float IEE754 |                               | -    | Counter Total number of voltage dips that caused a Trip.                                  |
| Modbus                  | Mapped Meas 1                | 23000                        | 2                             | 4                | Float IEE754 |                               | -    | Mapped Measured Values. They can be used to provide measured values to the Modbus Master. |
| 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. |

### 3 Appendix - Data Point Lists

#### 3.2 Measuring Values

| Module<br>(ANSI / IEEE) | Name<br>Function | Start<br>Register<br>Address | No. of<br>Modbus<br>Registers | Function<br>code | Format       | Bit Mask<br>(Bit<br>position) | Unit | Description  |
|-------------------------|------------------|------------------------------|-------------------------------|------------------|--------------|-------------------------------|------|--|
| 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.                              |
| 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.                              |
| PQSCr                   | cos phi          | 20152                        | 2                             | 4                | Float IEE754 |                               | -    | Measured value (calculated): Power factor:<br>Sign Convention: sign(PF) = sign(P )                                     |
| PQSCr                   | P                | 20154                        | 2                             | 4                | Float IEE754 |                               | W    | Measured value (calculated): Active power<br>(P- = Fed Active Power, P+ = Consumpted Active Power) (fundamental)       |
| PQSCr                   | Q                | 20156                        | 2                             | 4                | Float IEE754 |                               | VAr  | Measured value (calculated): Reactive power<br>(Q- = Fed Reactive Power, Q+ = Consumpted Reactive Power) (fundamental) |
| PQSCr                   | S                | 20158                        | 2                             | 4                | Float IEE754 |                               | VA   | Measured Value (Calculated): Apparent power (fundamental)  |

| Module<br>(ANSI / IEEE) | Name<br>Function | Start<br>Register<br>Address | No. of<br>Modbus<br>Registers | Function<br>code | Format       | Bit Mask<br>(Bit<br>position) | Unit  | Description   |
|-------------------------|------------------|------------------------------|-------------------------------|------------------|--------------|-------------------------------|-------|---|
| PQSCr                   | Wp+              | 20174                        | 2                             | 4                | Float IEE754 |                               | kWh   | Positive Active Power is consumed active energy   |
| PQSCr                   | Wp-              | 20176                        | 2                             | 4                | Float IEE754 |                               | kWh   | Negative Active Power (Fed Energy)  |
| PQSCr                   | Wq+              | 20178                        | 2                             | 4                | Float IEE754 |                               | kVArh | Positive Reactive Power is consumed Reactive Energy   |
| PQSCr                   | Wq-              | 20180                        | 2                             | 4                | Float IEE754 |                               | kVArh | Negative Reactive Power (Fed Energy)  |
| PQSCr                   | P RMS            | 20452                        | 2                             | 4                | Float IEE754 |                               | W     | Measured value (calculated): Active power (P- = Fed Active Power, P+ = Consumpted Active Power) (RMS)                             |
| PQSCr                   | S RMS            | 20454                        | 2                             | 4                | Float IEE754 |                               | VA    | Measured Value (Calculated): Apparent power (RMS)   |
| PQSCr                   | cos phi RMS      | 20456                        | 2                             | 4                | Float IEE754 |                               | -     | Measured value (calculated): Power factor: Sign Convention: sign(PF) = sign(P )   |
| PQSCr                   | Wp Net           | 20460                        | 2                             | 4                | Float IEE754 |                               | kWh   | Absolute Active Power Hours   |
| PQSCr                   | Wq Net           | 20462                        | 2                             | 4                | Float IEE754 |                               | kVArh | Absolute Reactive Power Hours   |
| PQSCr                   | Ws Net           | 20464                        | 2                             | 4                | Float IEE754 |                               | kVAh  | Absolute Apparent Power Hours   |
| PQSCr                   | P 1              | 20496                        | 2                             | 4                | Float IEE754 |                               | W     | Measured value (calculated): Active power in positive sequence system (P- = Fed Active Power, P+ = Consumpted Active Power)       |
| PQSCr                   | Q 1              | 20498                        | 2                             | 4                | Float IEE754 |                               | VAr   | Measured value (calculated): Reactive power in positive sequence system (Q- = Fed Reactive Power, Q+ = Consumpted Reactive Power) |
| PQSCr                   | cos phi max      | 21092                        | 2                             | 4                | Float IEE754 |                               | -     | Maximum value of the power factor: Sign Convention: sign(PF) = sign(P )   |
| PQSCr                   | cos phi min      | 21094                        | 2                             | 4                | Float IEE754 |                               | -     | Minimum value of the power factor: Sign Convention: sign(PF) = sign(P )   |
| PQSCr                   | P avg            | 21556                        | 2                             | 4                | Float IEE754 |                               | W     | Average of the active power   |
| PQSCr                   | P max            | 21558                        | 2                             | 4                | Float IEE754 |                               | W     | Maximum value of the active power   |

### 3 Appendix - Data Point Lists

#### 3.2 Measuring Values

| Module<br>(ANSI / IEEE) | Name<br>Function      | Start<br>Register<br>Address | No. of<br>Modbus<br>Registers | Function<br>code | Format       | Bit Mask<br>(Bit<br>position) | Unit | Description   |
|-------------------------|-----------------------|------------------------------|-------------------------------|------------------|--------------|-------------------------------|------|---|
| PQSCr                   | P min                 | 21560                        | 2                             | 4                | Float IEE754 |                               | W    | Minimum value of the active power   |
| PQSCr                   | S avg (Demand)        | 21562                        | 2                             | 4                | Float IEE754 |                               | VA   | Average of the apparent power   |
| PQSCr                   | S max                 | 21564                        | 2                             | 4                | Float IEE754 |                               | VA   | Maximum value of the apparent power   |
| PQSCr                   | S min                 | 21566                        | 2                             | 4                | Float IEE754 |                               | VA   | Minimum value of the apparent power   |
| PQSCr                   | cos phi max RMS       | 21570                        | 2                             | 4                | Float IEE754 |                               | -    | Maximum value of the power factor: Sign Convention: sign(PF) = sign(P )   |
| PQSCr                   | cos phi min RMS       | 21572                        | 2                             | 4                | Float IEE754 |                               | -    | Minimum value of the power factor: Sign Convention: sign(PF) = sign(P )   |
| PQSCr                   | Q avg (Demand)        | 21574                        | 2                             | 4                | Float IEE754 |                               | VAr  | Average of the reactive power   |
| PQSCr                   | Q max                 | 21576                        | 2                             | 4                | Float IEE754 |                               | VAr  | Maximum value of the reactive power   |
| PQSCr                   | Q min                 | 21578                        | 2                             | 4                | Float IEE754 |                               | VAr  | Minimum value of the reactive power   |
| PQSCr                   | Watt Peak<br>(Demand) | 21790                        | 2                             | 4                | Float IEE754 |                               | W    | WATTS Peak value, RMS value   |
| PQSCr                   | VAr Peak (Demand)     | 21792                        | 2                             | 4                | Float IEE754 |                               | VAr  | VARs Peak value, RMS value  |
| PQSCr                   | VA Peak (Demand)      | 21794                        | 2                             | 4                | Float IEE754 |                               | VA   | VA Peak value, RMS value  |
| PQSCr - fault value     | cos phi               | 50152                        | 2                             | 4                | Float IEE754 |                               | -    | Measured value (calculated): Power factor: Sign Convention: sign(PF) = sign(P ) , as stored in the Fault Recorder                                   |
| PQSCr - fault value     | P                     | 50154                        | 2                             | 4                | Float IEE754 |                               | W    | Measured value (calculated): Active power (P- = Fed Active Power, P+ = Consumed Active Power) (fundamental) , as stored in the Fault Recorder       |
| PQSCr - fault value     | Q                     | 50156                        | 2                             | 4                | Float IEE754 |                               | VAr  | Measured value (calculated): Reactive power (Q- = Fed Reactive Power, Q+ = Consumed Reactive Power) (fundamental) , as stored in the Fault Recorder |
| PQSCr - fault value     | S                     | 50158                        | 2                             | 4                | Float IEE754 |                               | VA   | Measured Value (Calculated): Apparent power (fundamental) , as stored in the Fault Recorder   |

| Module<br>(ANSI / IEEE) | Name<br>Function   | Start<br>Register<br>Address | No. of<br>Modbus<br>Registers | Function<br>code | Format       | Bit Mask<br>(Bit<br>position) | Unit | Description   |
|-------------------------|--------------------|------------------------------|-------------------------------|------------------|--------------|-------------------------------|------|---|
| PQSCr - fault value     | P RMS              | 50452                        | 2                             | 4                | Float IEE754 |                               | W    | Measured value (calculated): Active power (P- = Fed Active Power, P+ = Consumpted Active Power) (RMS) , as stored in the Fault Recorder                             |
| PQSCr - fault value     | S RMS              | 50454                        | 2                             | 4                | Float IEE754 |                               | VA   | Measured Value (Calculated): Apparent power (RMS) , as stored in the Fault Recorder   |
| PQSCr - fault value     | cos phi RMS        | 50456                        | 2                             | 4                | Float IEE754 |                               | -    | Measured value (calculated): Power factor: Sign Convention: sign(PF) = sign(P) , as stored in the Fault Recorder  |
| PQSCr - fault value     | P 1                | 50496                        | 2                             | 4                | Float IEE754 |                               | W    | Measured value (calculated): Active power in positive sequence system (P- = Fed Active Power, P+ = Consumpted Active Power) , as stored in the Fault Recorder       |
| PQSCr - fault value     | Q 1                | 50498                        | 2                             | 4                | Float IEE754 |                               | VAr  | Measured value (calculated): Reactive power in positive sequence system (Q- = Fed Reactive Power, Q+ = Consumpted Reactive Power) , as stored in the Fault Recorder |
| 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.   |
| SG[2]                   | Sum trip IL1       | 20812                        | 2                             | 4                | Float IEE754 |                               | A    | Summation of the tripping currents phase  |
| SG[2]                   | Sum trip IL2       | 20814                        | 2                             | 4                | Float IEE754 |                               | A    | Summation of the tripping currents phase  |
| SG[2]                   | Sum trip IL3       | 20816                        | 2                             | 4                | Float IEE754 |                               | A    | Summation of the tripping currents phase  |
| SG[2]                   | Isum Intr per hour | 20818                        | 2                             | 4                | Float IEE754 |                               | kA   | Sum per hour of interrupting currents.  |

### 3 Appendix - Data Point Lists

#### 3.2 Measuring Values

| Module<br>(ANSI / IEEE) | Name<br>Function   | Start<br>Register<br>Address | No. of<br>Modbus<br>Registers | Function<br>code | Format       | Bit Mask<br>(Bit<br>position) | Unit | Description   |
|-------------------------|--------------------|------------------------------|-------------------------------|------------------|--------------|-------------------------------|------|---|
| SG[2]                   | CB OPEN capacity   | 20820                        | 2                             | 4                | Float IEE754 |                               | %    | Used capacity of the circuit breaker. (100% means that the circuit breaker has to be maintained.) |
| SG[2]                   | TripCmd Cr         | 20822                        | 2                             | 4                | Float IEE754 |                               | -    | Counter: Total number of trips of the switchgear.   |
| SG[3]                   | Sum trip IL1       | 20824                        | 2                             | 4                | Float IEE754 |                               | A    | Summation of the tripping currents phase  |
| SG[3]                   | Sum trip IL2       | 20826                        | 2                             | 4                | Float IEE754 |                               | A    | Summation of the tripping currents phase  |
| SG[3]                   | Sum trip IL3       | 20828                        | 2                             | 4                | Float IEE754 |                               | A    | Summation of the tripping currents phase  |
| SG[3]                   | Isum Intr per hour | 20830                        | 2                             | 4                | Float IEE754 |                               | kA   | Sum per hour of interrupting currents.  |
| SG[3]                   | CB OPEN capacity   | 20832                        | 2                             | 4                | Float IEE754 |                               | %    | Used capacity of the circuit breaker. (100% means that the circuit breaker has to be maintained.) |
| SG[3]                   | TripCmd Cr         | 20834                        | 2                             | 4                | Float IEE754 |                               | -    | Counter: Total number of trips of the switchgear.   |
| SG[4]                   | Sum trip IL1       | 20836                        | 2                             | 4                | Float IEE754 |                               | A    | Summation of the tripping currents phase  |
| SG[4]                   | Sum trip IL2       | 20838                        | 2                             | 4                | Float IEE754 |                               | A    | Summation of the tripping currents phase  |
| SG[4]                   | Sum trip IL3       | 20840                        | 2                             | 4                | Float IEE754 |                               | A    | Summation of the tripping currents phase  |
| SG[4]                   | Isum Intr per hour | 20842                        | 2                             | 4                | Float IEE754 |                               | kA   | Sum per hour of interrupting currents.  |
| SG[4]                   | CB OPEN capacity   | 20844                        | 2                             | 4                | Float IEE754 |                               | %    | Used capacity of the circuit breaker. (100% means that the circuit breaker has to be maintained.) |
| SG[4]                   | TripCmd Cr         | 20846                        | 2                             | 4                | Float IEE754 |                               | -    | Counter: Total number of trips of the switchgear.   |
| SG[5]                   | Sum trip IL1       | 20848                        | 2                             | 4                | Float IEE754 |                               | A    | Summation of the tripping currents phase  |
| SG[5]                   | Sum trip IL2       | 20850                        | 2                             | 4                | Float IEE754 |                               | A    | Summation of the tripping currents phase  |
| SG[5]                   | Sum trip IL3       | 20852                        | 2                             | 4                | Float IEE754 |                               | A    | Summation of the tripping currents phase  |
| SG[5]                   | Isum Intr per hour | 20854                        | 2                             | 4                | Float IEE754 |                               | kA   | Sum per hour of interrupting currents.  |



| Module<br>(ANSI / IEEE) | Name<br>Function   | Start<br>Register<br>Address | No. of<br>Modbus<br>Registers | Function<br>code | Format       | Bit Mask<br>(Bit<br>position) | Unit | Description   |
|-------------------------|--------------------|------------------------------|-------------------------------|------------------|--------------|-------------------------------|------|---|
| SG[5]                   | CB OPEN capacity   | 20856                        | 2                             | 4                | Float IEE754 |                               | %    | Used capacity of the circuit breaker. (100% means that the circuit breaker has to be maintained.) |
| SG[5]                   | TripCmd Cr         | 20858                        | 2                             | 4                | Float IEE754 |                               | -    | Counter: Total number of trips of the switchgear.   |
| SG[6]                   | Sum trip IL1       | 20860                        | 2                             | 4                | Float IEE754 |                               | A    | Summation of the tripping currents phase  |
| SG[6]                   | Sum trip IL2       | 20862                        | 2                             | 4                | Float IEE754 |                               | A    | Summation of the tripping currents phase  |
| SG[6]                   | Sum trip IL3       | 20864                        | 2                             | 4                | Float IEE754 |                               | A    | Summation of the tripping currents phase  |
| SG[6]                   | Isum Intr per hour | 20866                        | 2                             | 4                | Float IEE754 |                               | kA   | Sum per hour of interrupting currents.  |
| SG[6]                   | CB OPEN capacity   | 20868                        | 2                             | 4                | Float IEE754 |                               | %    | Used capacity of the circuit breaker. (100% means that the circuit breaker has to be maintained.) |
| SG[6]                   | TripCmd Cr         | 20870                        | 2                             | 4                | Float IEE754 |                               | -    | Counter: Total number of trips of the switchgear.   |
| Sync – 25               | f Bus              | 20520                        | 2                             | 4                | Float IEE754 |                               | Hz   | Bus frequency   |
| Sync – 25               | V Bus              | 20522                        | 2                             | 4                | Float IEE754 |                               | V    | Bus Voltage   |
| Sync – 25               | Angle Bus          | 20524                        | 2                             | 4                | Float IEE754 |                               | °    | Bus Angle (Reference)   |
| Sync – 25               | Angle Diff         | 20526                        | 2                             | 4                | Float IEE754 |                               | °    | Angle difference between bus and line voltages.   |
| Sync – 25               | Volt Diff          | 20528                        | 2                             | 4                | Float IEE754 |                               | V    | Voltage difference between bus and line.  |
| Sync – 25               | f Line             | 20530                        | 2                             | 4                | Float IEE754 |                               | Hz   | Line frequency  |
| Sync – 25               | V Line             | 20532                        | 2                             | 4                | Float IEE754 |                               | V    | Line Voltage  |
| Sync – 25               | Angle Line         | 20534                        | 2                             | 4                | Float IEE754 |                               | °    | Line Angle  |
| Sync – 25               | Slip Freq          | 20536                        | 2                             | 4                | Float IEE754 |                               | Hz   | Slip frequency  |
| 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  |

### 3 Appendix - Data Point Lists

#### 3.2 Measuring Values

| Module<br>(ANSI / IEEE) | Name<br>Function | Start<br>Register<br>Address | No. of<br>Modbus<br>Registers | Function<br>code | Format       | Bit Mask<br>(Bit<br>position) | Unit | Description  |
|-------------------------|------------------|------------------------------|-------------------------------|------------------|--------------|-------------------------------|------|--|
| 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 |
| VT                      | f                | 20128                        | 2                             | 4                | Float IEE754 |                               | Hz   | Measured value: Frequency  |
| VT                      | VL12             | 20130                        | 2                             | 4                | Float IEE754 |                               | V    | Measured value: Phase-to-phase voltage (fundamental)   |
| VT                      | VL23             | 20132                        | 2                             | 4                | Float IEE754 |                               | V    | Measured value: Phase-to-phase voltage (fundamental)   |
| VT                      | VL31             | 20134                        | 2                             | 4                | Float IEE754 |                               | V    | Measured value: Phase-to-phase voltage (fundamental)   |
| VT                      | VL1              | 20136                        | 2                             | 4                | Float IEE754 |                               | V    | Measured value: Phase-to-neutral voltage (fundamental)   |
| VT                      | VL2              | 20138                        | 2                             | 4                | Float IEE754 |                               | V    | Measured value: Phase-to-neutral voltage (fundamental)   |
| VT                      | VL3              | 20140                        | 2                             | 4                | Float IEE754 |                               | V    | Measured value: Phase-to-neutral voltage (fundamental)   |
| VT                      | VX meas          | 20142                        | 2                             | 4                | Float IEE754 |                               | V    | Measured value (measured): VX measured (fundamental)   |
| VT                      | V0               | 20146                        | 2                             | 4                | Float IEE754 |                               | V    | Measured value (calculated): Symmetrical components Zero voltage(fundamental)  |
| VT                      | V1               | 20148                        | 2                             | 4                | Float IEE754 |                               | V    | Measured value (calculated): Symmetrical components positive phase sequence voltage(fundamental)                                   |
| VT                      | V2               | 20150                        | 2                             | 4                | Float IEE754 |                               | V    | Measured value (calculated): Symmetrical components negative phase sequence voltage(fundamental)                                   |
| VT                      | VG calc          | 20162                        | 2                             | 4                | Float IEE754 |                               | V    | Measured value (calculated): VG (fundamental)  |

| Module<br>(ANSI / IEEE) | Name<br>Function | Start<br>Register<br>Address | No. of<br>Modbus<br>Registers | Function<br>code | Format       | Bit Mask<br>(Bit<br>position) | Unit | Description  |
|-------------------------|------------------|------------------------------|-------------------------------|------------------|--------------|-------------------------------|------|--|
| VT                      | phi VG calc      | 20386                        | 2                             | 4                | Float IEE754 |                               | °    | Measured value (calculated): Angle of Phasor VG calc<br><br>Reference phasor is required to calculate the angle. This is the first measured voltage (or current) channel with sufficiently high amplitude. |
| VT                      | phi VX meas      | 20388                        | 2                             | 4                | Float IEE754 |                               | °    | Measured value: Angle of Phasor VX meas<br><br>Reference phasor is required to calculate the angle. This is the first measured voltage (or current) channel with sufficiently high amplitude.              |
| VT                      | phi VL12         | 20390                        | 2                             | 4                | Float IEE754 |                               | °    | Measured value (calculated): Angle of Phasor VL12<br><br>Reference phasor is required to calculate the angle. This is the first measured voltage (or current) channel with sufficiently high amplitude.    |
| VT                      | phi VL1          | 20392                        | 2                             | 4                | Float IEE754 |                               | °    | Measured value (calculated): Angle of Phasor VL1<br><br>Reference phasor is required to calculate the angle. This is the first measured voltage (or current) channel with sufficiently high amplitude.     |
| VT                      | phi VL23         | 20394                        | 2                             | 4                | Float IEE754 |                               | °    | Measured value (calculated): Angle of Phasor VL23<br><br>Reference phasor is required to calculate the angle. This is the first measured voltage (or current) channel with sufficiently high amplitude.    |
| VT                      | phi VL2          | 20396                        | 2                             | 4                | Float IEE754 |                               | °    | Measured value (calculated): Angle of Phasor VL2   |

### 3 Appendix - Data Point Lists

#### 3.2 Measuring Values

| Module<br>(ANSI / IEEE) | Name<br>Function | Start<br>Register<br>Address | No. of<br>Modbus<br>Registers | Function<br>code | Format       | Bit Mask<br>(Bit<br>position) | Unit | Description  |
|-------------------------|------------------|------------------------------|-------------------------------|------------------|--------------|-------------------------------|------|--|
|                         |                  |                              |                               |                  |              |                               |      | Reference phasor is required to calculate the angle. This is the first measured voltage (or current) channel with sufficiently high amplitude.   |
| VT                      | phi VL31         | 20398                        | 2                             | 4                | Float IEE754 |                               | °    | Measured value (calculated): Angle of Phasor VL31<br><br>Reference phasor is required to calculate the angle. This is the first measured voltage (or current) channel with sufficiently high amplitude.              |
| VT                      | phi VL3          | 20400                        | 2                             | 4                | Float IEE754 |                               | °    | Measured value (calculated): Angle of Phasor VL3<br><br>Reference phasor is required to calculate the angle. This is the first measured voltage (or current) channel with sufficiently high amplitude.               |
| VT                      | phi V0           | 20402                        | 2                             | 4                | Float IEE754 |                               | °    | Measured value (calculated): Angle Zero Sequence System<br><br>Reference phasor is required to calculate the angle. This is the first measured voltage (or current) channel with sufficiently high amplitude.        |
| VT                      | phi V1           | 20404                        | 2                             | 4                | Float IEE754 |                               | °    | Measured value (calculated): Angle of Positive Sequence System<br><br>Reference phasor is required to calculate the angle. This is the first measured voltage (or current) channel with sufficiently high amplitude. |
| VT                      | phi V2           | 20406                        | 2                             | 4                | Float IEE754 |                               | °    | Measured Value (calculated): Angle of Negative Sequence System<br><br>Reference phasor is required to calculate the angle. This is the first measured  |

| Module<br>(ANSI / IEE) | Name<br>Function | Start<br>Register<br>Address | No. of<br>Modbus<br>Registers | Function<br>code | Format       | Bit Mask<br>(Bit<br>position) | Unit | Description  |
|------------------------|------------------|------------------------------|-------------------------------|------------------|--------------|-------------------------------|------|--|
|                        |                  |                              |                               |                  |              |                               |      | voltage (or current) channel with sufficiently high amplitude.           |
| VT                     | VL1 THD          | 20408                        | 2                             | 4                | Float IEE754 |                               | V    | Measured value (calculated): VL1 Total Harmonic Distortion               |
| VT                     | VL12 THD         | 20410                        | 2                             | 4                | Float IEE754 |                               | V    | Measured value (calculated): V12 Total Harmonic Distortion               |
| VT                     | VL2 THD          | 20412                        | 2                             | 4                | Float IEE754 |                               | V    | Measured value (calculated): VL2 Total Harmonic Distortion               |
| VT                     | VL23 THD         | 20414                        | 2                             | 4                | Float IEE754 |                               | V    | Measured value (calculated): V23 Total Harmonic Distortion               |
| VT                     | VL3 THD          | 20416                        | 2                             | 4                | Float IEE754 |                               | V    | Measured value (calculated): VL3 Total Harmonic Distortion               |
| VT                     | VL31 THD         | 20418                        | 2                             | 4                | Float IEE754 |                               | V    | Measured value (calculated): V31 Total Harmonic Distortion               |
| VT                     | %VL1 THD         | 20420                        | 2                             | 4                | Float IEE754 |                               | %    | Measured value (calculated): VL1 Total Harmonic Distortion / Ground wave |
| VT                     | %VL12 THD        | 20422                        | 2                             | 4                | Float IEE754 |                               | %    | Measured value (calculated): V12 Total Harmonic Distortion / Ground wave |
| VT                     | %VL2 THD         | 20424                        | 2                             | 4                | Float IEE754 |                               | %    | Measured value (calculated): VL2 Total Harmonic Distortion / Ground wave |
| VT                     | %VL23 THD        | 20426                        | 2                             | 4                | Float IEE754 |                               | %    | Measured value (calculated): V23 Total Harmonic Distortion / Ground wave |
| VT                     | %VL3 THD         | 20428                        | 2                             | 4                | Float IEE754 |                               | %    | Measured value (calculated): VL3 Total Harmonic Distortion / Ground wave |
| VT                     | %VL31 THD        | 20430                        | 2                             | 4                | Float IEE754 |                               | %    | Measured value (calculated): V31 Total Harmonic Distortion / Ground wave |
| VT                     | VG calc RMS      | 20432                        | 2                             | 4                | Float IEE754 |                               | V    | Measured value (calculated): VG (RMS)                                    |
| VT                     | VX meas RMS      | 20434                        | 2                             | 4                | Float IEE754 |                               | V    | Measured value (measured): VX measured (RMS)                             |
| VT                     | VL1 RMS          | 20436                        | 2                             | 4                | Float IEE754 |                               | V    | Measured value: Phase-to-neutral voltage (RMS)                           |

### 3 Appendix - Data Point Lists

#### 3.2 Measuring Values

| Module<br>(ANSI / IEEE) | Name<br>Function | Start<br>Register<br>Address | No. of<br>Modbus<br>Registers | Function<br>code | Format       | Bit Mask<br>(Bit<br>position) | Unit | Description  |
|-------------------------|------------------|------------------------------|-------------------------------|------------------|--------------|-------------------------------|------|--|
| VT                      | VL12 RMS         | 20438                        | 2                             | 4                | Float IEE754 |                               | V    | Measured value: Phase-to-phase voltage (RMS)   |
| VT                      | VL2 RMS          | 20440                        | 2                             | 4                | Float IEE754 |                               | V    | Measured value: Phase-to-neutral voltage (RMS)   |
| VT                      | VL23 RMS         | 20442                        | 2                             | 4                | Float IEE754 |                               | V    | Measured value: Phase-to-phase voltage (RMS)   |
| VT                      | VL3 RMS          | 20444                        | 2                             | 4                | Float IEE754 |                               | V    | Measured value: Phase-to-neutral voltage (RMS)   |
| VT                      | VL31 RMS         | 20446                        | 2                             | 4                | Float IEE754 |                               | V    | Measured value: Phase-to-phase voltage (RMS)   |
| VT                      | %(V2/V1)         | 20450                        | 2                             | 4                | Float IEE754 |                               | %    | Measured value (calculated): V2/V1, phase sequence will be taken into account automatically. |
| VT                      | f max            | 21002                        | 2                             | 4                | Float IEE754 |                               | Hz   | Max. frequency value   |
| VT                      | f min            | 21004                        | 2                             | 4                | Float IEE754 |                               | Hz   | Min. frequency value   |
| VT                      | V1 max           | 21044                        | 2                             | 4                | Float IEE754 |                               | V    | Maximum value: Symmetrical components positive phase sequence voltage(fundamental)           |
| VT                      | V1 min           | 21046                        | 2                             | 4                | Float IEE754 |                               | V    | Minimum value: Symmetrical components positive phase sequence voltage(fundamental)           |
| VT                      | V2 max           | 21050                        | 2                             | 4                | Float IEE754 |                               | V    | Maximum value: Symmetrical components negative phase sequence voltage(fundamental)           |
| VT                      | V2 min           | 21052                        | 2                             | 4                | Float IEE754 |                               | V    | Minimum value: Symmetrical components negative phase sequence voltage(fundamental)           |
| VT                      | delta phi        | 21126                        | 2                             | 4                | Float IEE754 |                               | °    | Measured value (calculated): Vector surge  |
| VT                      | df/dt            | 21128                        | 2                             | 4                | Float IEE754 |                               | Hz/s | Measured value (calculated): Rate-of-frequency-change.                                       |
| VT                      | VG calc max RMS  | 21498                        | 2                             | 4                | Float IEE754 |                               | V    | Measured value (calculated):VX maximum value (RMS)   |

| Module<br>(ANSI / IEEE) | Name<br>Function | Start<br>Register<br>Address | No. of<br>Modbus<br>Registers | Function<br>code | Format       | Bit Mask<br>(Bit<br>position) | Unit | Description  |
|-------------------------|------------------|------------------------------|-------------------------------|------------------|--------------|-------------------------------|------|--|
| VT                      | VG calc min RMS  | 21500                        | 2                             | 4                | Float IEE754 |                               | V    | Measured value (calculated):VX minimum value (RMS)   |
| VT                      | VX meas max RMS  | 21504                        | 2                             | 4                | Float IEE754 |                               | V    | Measured value: VX maximum value (RMS)   |
| VT                      | VX meas min RMS  | 21506                        | 2                             | 4                | Float IEE754 |                               | V    | Measured value: VX minimum value (RMS)   |
| VT                      | VL12 avg RMS     | 21508                        | 2                             | 4                | Float IEE754 |                               | V    | VL12 average value (RMS)   |
| VT                      | VL12 max RMS     | 21510                        | 2                             | 4                | Float IEE754 |                               | V    | VL12 maximum value (RMS)   |
| VT                      | VL12 min RMS     | 21512                        | 2                             | 4                | Float IEE754 |                               | V    | VL12 minimum value (RMS)   |
| VT                      | VL1 avg RMS      | 21514                        | 2                             | 4                | Float IEE754 |                               | V    | VL1 average value (RMS)  |
| VT                      | VL1 max RMS      | 21516                        | 2                             | 4                | Float IEE754 |                               | V    | VL1 maximum value (RMS)  |
| VT                      | VL1 min RMS      | 21518                        | 2                             | 4                | Float IEE754 |                               | V    | VL1 minimum value (RMS)  |
| VT                      | VL23 avg RMS     | 21520                        | 2                             | 4                | Float IEE754 |                               | V    | VL23 average value (RMS)   |
| VT                      | VL23 max RMS     | 21522                        | 2                             | 4                | Float IEE754 |                               | V    | VL23 maximum value (RMS)   |
| VT                      | VL23 min RMS     | 21524                        | 2                             | 4                | Float IEE754 |                               | V    | VL23 minimum value (RMS)   |
| VT                      | VL2 avg RMS      | 21526                        | 2                             | 4                | Float IEE754 |                               | V    | VL2 average value (RMS)  |
| VT                      | VL2 max RMS      | 21528                        | 2                             | 4                | Float IEE754 |                               | V    | VL2 maximum value (RMS)  |
| VT                      | VL2 min RMS      | 21530                        | 2                             | 4                | Float IEE754 |                               | V    | VL2 minimum value (RMS)  |
| VT                      | VL31 avg RMS     | 21532                        | 2                             | 4                | Float IEE754 |                               | V    | VL31 average value (RMS)   |
| VT                      | VL31 max RMS     | 21534                        | 2                             | 4                | Float IEE754 |                               | V    | VL31 maximum value (RMS)   |
| VT                      | VL31 min RMS     | 21536                        | 2                             | 4                | Float IEE754 |                               | V    | VL31 minimum value (RMS)   |
| VT                      | VL3 avg RMS      | 21538                        | 2                             | 4                | Float IEE754 |                               | V    | VL3 average value (RMS)  |
| VT                      | VL3 max RMS      | 21540                        | 2                             | 4                | Float IEE754 |                               | V    | VL3 maximum value (RMS)  |
| VT                      | VL3 min RMS      | 21542                        | 2                             | 4                | Float IEE754 |                               | V    | VL3 minimum value (RMS)  |
| VT                      | %(V2/V1) max     | 21552                        | 2                             | 4                | Float IEE754 |                               | %    | Measured value (calculated):V2/V1 maximum value, phase sequence will be taken into account automatically |

### 3 Appendix - Data Point Lists

#### 3.2 Measuring Values

| Module<br>(ANSI / IEEE) | Name<br>Function | Start<br>Register<br>Address | No. of<br>Modbus<br>Registers | Function<br>code | Format       | Bit Mask<br>(Bit<br>position) | Unit | Description  |
|-------------------------|------------------|------------------------------|-------------------------------|------------------|--------------|-------------------------------|------|--|
| VT                      | %(V2/V1) min     | 21554                        | 2                             | 4                | Float IEE754 |                               | %    | Measured value (calculated):V2/V1 minimum value , phase sequence will be taken into account automatically                          |
| VT - fault value        | f                | 50128                        | 2                             | 4                | Float IEE754 |                               | Hz   | Measured value: Frequency , as stored in the Fault Recorder  |
| VT - fault value        | VL12             | 50130                        | 2                             | 4                | Float IEE754 |                               | V    | Measured value: Phase-to-phase voltage (fundamental) , as stored in the Fault Recorder   |
| VT - fault value        | VL23             | 50132                        | 2                             | 4                | Float IEE754 |                               | V    | Measured value: Phase-to-phase voltage (fundamental) , as stored in the Fault Recorder   |
| VT - fault value        | VL31             | 50134                        | 2                             | 4                | Float IEE754 |                               | V    | Measured value: Phase-to-phase voltage (fundamental) , as stored in the Fault Recorder   |
| VT - fault value        | VL1              | 50136                        | 2                             | 4                | Float IEE754 |                               | V    | Measured value: Phase-to-neutral voltage (fundamental) , as stored in the Fault Recorder   |
| VT - fault value        | VL2              | 50138                        | 2                             | 4                | Float IEE754 |                               | V    | Measured value: Phase-to-neutral voltage (fundamental) , as stored in the Fault Recorder   |
| VT - fault value        | VL3              | 50140                        | 2                             | 4                | Float IEE754 |                               | V    | Measured value: Phase-to-neutral voltage (fundamental) , as stored in the Fault Recorder   |
| VT - fault value        | VX meas          | 50142                        | 2                             | 4                | Float IEE754 |                               | V    | Measured value (measured): VX measured (fundamental) , as stored in the Fault Recorder   |
| VT - fault value        | V0               | 50146                        | 2                             | 4                | Float IEE754 |                               | V    | Measured value (calculated): Symmetrical components Zero voltage(fundamental) , as stored in the Fault Recorder                    |
| VT - fault value        | V1               | 50148                        | 2                             | 4                | Float IEE754 |                               | V    | Measured value (calculated): Symmetrical components positive phase sequence voltage(fundamental) , as stored in the Fault Recorder |
| VT - fault value        | V2               | 50150                        | 2                             | 4                | Float IEE754 |                               | V    | Measured value (calculated): Symmetrical components negative phase sequence  |



| Module<br>(ANSI / IEEE) | Name<br>Function | Start<br>Register<br>Address | No. of<br>Modbus<br>Registers | Function<br>code | Format       | Bit Mask<br>(Bit<br>position) | Unit | Description  |
|-------------------------|------------------|------------------------------|-------------------------------|------------------|--------------|-------------------------------|------|--|
|                         |                  |                              |                               |                  |              |                               |      | voltage(fundamental) , as stored in the Fault Recorder   |
| VT - fault value        | VG calc          | 50162                        | 2                             | 4                | Float IEE754 |                               | V    | Measured value (calculated): VG (fundamental) , as stored in the Fault Recorder  |
| VT - fault value        | phi VG calc      | 50386                        | 2                             | 4                | Float IEE754 |                               | °    | Measured value (calculated): Angle of Phasor VG calc<br><br>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 |
| VT - fault value        | phi VX meas      | 50388                        | 2                             | 4                | Float IEE754 |                               | °    | Measured value: Angle of Phasor VX meas<br><br>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              |
| VT - fault value        | phi VL12         | 50390                        | 2                             | 4                | Float IEE754 |                               | °    | Measured value (calculated): Angle of Phasor VL12<br><br>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    |
| VT - fault value        | phi VL1          | 50392                        | 2                             | 4                | Float IEE754 |                               | °    | Measured value (calculated): Angle of Phasor VL1<br><br>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     |
| VT - fault value        | phi VL23         | 50394                        | 2                             | 4                | Float IEE754 |                               | °    | Measured value (calculated): Angle of Phasor VL23  |

### 3 Appendix - Data Point Lists

#### 3.2 Measuring Values

| Module<br>(ANSI / IEEE) | Name<br>Function | Start<br>Register<br>Address | No. of<br>Modbus<br>Registers | Function<br>code | Format       | Bit Mask<br>(Bit<br>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  |
| VT - fault value        | phi VL2          | 50396                        | 2                             | 4                | Float IEE754 |                               | °    | Measured value (calculated): Angle of Phasor VL2<br><br>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  |
| VT - fault value        | phi VL31         | 50398                        | 2                             | 4                | Float IEE754 |                               | °    | Measured value (calculated): Angle of Phasor VL31<br><br>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 |
| VT - fault value        | phi VL3          | 50400                        | 2                             | 4                | Float IEE754 |                               | °    | Measured value (calculated): Angle of Phasor VL3<br><br>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  |
| VT - fault value        | VG calc RMS      | 50432                        | 2                             | 4                | Float IEE754 |                               | V    | Measured value (calculated): VG (RMS) , as stored in the Fault Recorder   |
| VT - fault value        | VX meas RMS      | 50434                        | 2                             | 4                | Float IEE754 |                               | V    | Measured value (measured): VX measured (RMS) , as stored in the Fault Recorder  |
| VT - fault value        | VL1 RMS          | 50436                        | 2                             | 4                | Float IEE754 |                               | V    | Measured value: Phase-to-neutral voltage (RMS) , as stored in the Fault Recorder  |
| VT - fault value        | VL12 RMS         | 50438                        | 2                             | 4                | Float IEE754 |                               | V    | Measured value: Phase-to-phase voltage (RMS) , as stored in the Fault Recorder  |

| Module<br>(ANSI / IEEE) | Name<br>Function   | Start<br>Register<br>Address | No. of<br>Modbus<br>Registers | Function<br>code | Format       | Bit Mask<br>(Bit<br>position) | Unit | Description  |
|-------------------------|--------------------|------------------------------|-------------------------------|------------------|--------------|-------------------------------|------|--|
| VT - fault value        | VL2 RMS            | 50440                        | 2                             | 4                | Float IEE754 |                               | V    | Measured value: Phase-to-neutral voltage (RMS) , as stored in the Fault Recorder         |
| VT - fault value        | VL23 RMS           | 50442                        | 2                             | 4                | Float IEE754 |                               | V    | Measured value: Phase-to-phase voltage (RMS) , as stored in the Fault Recorder           |
| VT - fault value        | VL3 RMS            | 50444                        | 2                             | 4                | Float IEE754 |                               | V    | Measured value: Phase-to-neutral voltage (RMS) , as stored in the Fault Recorder         |
| VT - fault value        | VL31 RMS           | 50446                        | 2                             | 4                | Float IEE754 |                               | V    | Measured value: Phase-to-phase voltage (RMS) , as stored in the Fault Recorder           |
| VT - fault value        | delta phi          | 51126                        | 2                             | 4                | Float IEE754 |                               | °    | Measured value (calculated): Vector surge , as stored in the Fault Recorder              |
| VT - fault value        | df/dt              | 51128                        | 2                             | 4                | Float IEE754 |                               | Hz/s | Measured value (calculated): Rate-of-frequency-change. , as stored in the Fault Recorder |
| 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<br>(ANSI / IEC) | Name<br>Function            | Start<br>Register<br>Address | No. of<br>Modbus<br>Registers | Function<br>code | Format                   | Bit Mask<br>(Bit<br>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<br>counter | 22006                        | 1                             | 5                | 0xFF00                   |                               | -    | Modbus diagnosis counter         |
| Reset                  | Res all Energy Cr           | 22011                        | 1                             | 5                | 0xFF00                   |                               | -    | Reset of all Energy Counters     |
| Scada Cmd              | Assbl Scada Cmd 1           | 22020                        | 1                             | 5                | 0xFF00=On,<br>0x0000=Off |                               | -    | Assignable Scada Command         |
| Scada Cmd              | Assbl Scada Cmd 2           | 22021                        | 1                             | 5                | 0xFF00=On,<br>0x0000=Off |                               | -    | Assignable Scada Command         |
| Scada Cmd              | Assbl Scada Cmd 3           | 22022                        | 1                             | 5                | 0xFF00=On,<br>0x0000=Off |                               | -    | Assignable Scada Command         |
| Scada Cmd              | Assbl Scada Cmd 4           | 22023                        | 1                             | 5                | 0xFF00=On,<br>0x0000=Off |                               | -    | Assignable Scada Command         |
| Scada Cmd              | Assbl Scada Cmd 5           | 22024                        | 1                             | 5                | 0xFF00=On,<br>0x0000=Off |                               | -    | Assignable Scada Command         |
| Scada Cmd              | Assbl Scada Cmd 6           | 22025                        | 1                             | 5                | 0xFF00=On,<br>0x0000=Off |                               | -    | Assignable Scada Command         |
| Scada Cmd              | Assbl Scada Cmd 7           | 22026                        | 1                             | 5                | 0xFF00=On,<br>0x0000=Off |                               | -    | Assignable Scada Command         |
| Scada Cmd              | Assbl Scada Cmd 8           | 22027                        | 1                             | 5                | 0xFF00=On,<br>0x0000=Off |                               | -    | Assignable Scada Command         |
| Scada Cmd              | Assbl Scada Cmd 9           | 22028                        | 1                             | 5                | 0xFF00=On,<br>0x0000=Off |                               | -    | Assignable Scada Command         |

| Module<br>(ANSI / IEEE) | Name<br>Function      | Start<br>Register<br>Address | No. of<br>Modbus<br>Registers | Function<br>code | Format                   | Bit Mask<br>(Bit<br>position) | Unit | Description  |
|-------------------------|-----------------------|------------------------------|-------------------------------|------------------|--------------------------|-------------------------------|------|--|
| Scada Cmd               | Assbl Scada Cmd<br>10 | 22029                        | 1                             | 5                | 0xFF00=On,<br>0x0000=Off |                               | -    | Assignable Scada Command                             |
| Scada Cmd               | Assbl Scada Cmd<br>11 | 22030                        | 1                             | 5                | 0xFF00=On,<br>0x0000=Off |                               | -    | Assignable Scada Command                             |
| Scada Cmd               | Assbl Scada Cmd<br>12 | 22031                        | 1                             | 5                | 0xFF00=On,<br>0x0000=Off |                               | -    | Assignable Scada Command                             |
| Scada Cmd               | Assbl Scada Cmd<br>13 | 22032                        | 1                             | 5                | 0xFF00=On,<br>0x0000=Off |                               | -    | Assignable Scada Command                             |
| Scada Cmd               | Assbl Scada Cmd<br>14 | 22033                        | 1                             | 5                | 0xFF00=On,<br>0x0000=Off |                               | -    | Assignable Scada Command                             |
| Scada Cmd               | Assbl Scada Cmd<br>15 | 22034                        | 1                             | 5                | 0xFF00=On,<br>0x0000=Off |                               | -    | Assignable Scada Command                             |
| Scada Cmd               | Assbl Scada Cmd<br>16 | 22035                        | 1                             | 5                | 0xFF00=On,<br>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,<br>0x0000=Off |                               | -    | Signal: Arcflash Reduction Maintenance<br>SCADA Mode |
| SG                      | SG ControlCmd1        | 22100                        | 1                             | 5                | 0xFF00=On,<br>0x0000=Off |                               | -    | Control Command Switchgear                           |
| SG                      | SG ControlCmd2        | 22101                        | 1                             | 5                | 0xFF00=On,<br>0x0000=Off |                               | -    | Control Command Switchgear                           |
| SG                      | SG ControlCmd3        | 22102                        | 1                             | 5                | 0xFF00=On,<br>0x0000=Off |                               | -    | Control Command Switchgear                           |
| SG                      | SG ControlCmd4        | 22103                        | 1                             | 5                | 0xFF00=On,<br>0x0000=Off |                               | -    | Control Command Switchgear                           |

### 3 Appendix - Data Point Lists

#### 3.3 Commands

| <b>Module<br/>(ANSI / IEEE)</b> | <b>Name<br/>Function</b> | <b>Start<br/>Register<br/>Address</b> | <b>No. of<br/>Modbus<br/>Registers</b> | <b>Function<br/>code</b> | <b>Format</b>            | <b>Bit Mask<br/>(Bit<br/>position)</b> | <b>Unit</b> | <b>Description</b>         |
|---------------------------------|--------------------------|---------------------------------------|--|--------------------------|--------------------------|--|-------------|----------------------------|
| SG                              | SG ControlCmd5           | 22104                                 | 1                                      | 5                        | 0xFF00=On,<br>0x0000=Off |  | -           | Control Command Switchgear |
| SG                              | SG ControlCmd6           | 22105                                 | 1                                      | 5                        | 0xFF00=On,<br>0x0000=Off |  | -           | Control Command Switchgear |

## 3.4 Settings

| Module<br>(ANSI / IEEE) | Name<br>Function | Start<br>Register<br>Address | No. of<br>Modbus<br>Registers | Function<br>code | Format        | Bit Mask<br>(Bit<br>position) | Unit | Description   |
|-------------------------|------------------|------------------------------|-------------------------------|------------------|---------------|-------------------------------|------|---|
| <b>Date and Time</b>    |                  | <b>32500</b>                 | <b>6</b>                      | <b>3 16</b>      | <b>Struct</b> |                               |      |   |
|                         | y                | 32500                        | 6                             | 3 16             | Short         | Word 0<br>(1)                 | -    | year  |
|                         | m                | 32500                        | 6                             | 3 16             | Short         | Word 1<br>(17)                | -    | month   |
|                         | d                | 32500                        | 6                             | 3 16             | Short         | Word 2<br>(33)                | -    | days  |
|                         | h                | 32500                        | 6                             | 3 16             | Short         | Word 3<br>(49)                | -    | hours   |
|                         | min              | 32500                        | 6                             | 3 16             | Short         | Word 4<br>(65)                | -    | minute  |
|                         | ms               | 32500                        | 6                             | 3 16             | Short         | Word 5<br>(81)                | -    | milliseconds  |
| <b>Fault rec</b>        |                  | <b>50000</b>                 | <b>9</b>                      | <b>3 16</b>      | <b>Struct</b> |                               |      |   |
|                         | RecordNo         | 50000                        | 9                             | 3 16             | Short         | Word 0<br>(1)                 | -    | Record Number   |
|                         | Trip Cause       | 50000                        | 9                             | 3 16             | Short         | Word 1<br>(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. |

3 Appendix - Data Point Lists

3.4 Settings

| Module<br>(ANSI / IEEE) | Name<br>Function   | Start<br>Register<br>Address | No. of<br>Modbus<br>Registers | Function<br>code | Format    | Bit Mask<br>(Bit<br>position) | Unit | Description  |
|-------------------------|--------------------|------------------------------|-------------------------------|------------------|-----------|-------------------------------|------|--|
|                         | Pickup Cause       | 50000                        | 9                             | 3 16             | Short     | Word 2<br>(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<br>(49)                | -    | Fault number   |
|                         | No. of Grid Faults | 50000                        | 9                             | 3 16             | Short     | Word 4<br>(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-<br>Word 9<br>(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”.

| <b>Trip Cause</b> | <b>Description</b> | <b>Module</b>  |
|-------------------|--------------------|----------------|
| <b>1</b>          | <b>NORM</b>        |                |
| <b>1001</b>       |                    | <b>AnaP[1]</b> |
| <b>1002</b>       |                    | <b>AnaP[2]</b> |
| <b>1003</b>       |                    | <b>AnaP[3]</b> |
| <b>1004</b>       |                    | <b>AnaP[4]</b> |
| <b>1201</b>       |                    | <b>IG[1]</b>   |
| <b>1202</b>       |                    | <b>IG[2]</b>   |
| <b>1203</b>       |                    | <b>IG[3]</b>   |
| <b>1204</b>       |                    | <b>IG[4]</b>   |

| <b>Trip Cause</b> | <b>Description</b> | <b>Module</b>        |
|-------------------|--------------------|----------------------|
| <b>1306</b>       |                    | <b>ExP[1]</b>        |
| <b>1307</b>       |                    | <b>ExP[2]</b>        |
| <b>1308</b>       |                    | <b>ExP[3]</b>        |
| <b>1309</b>       |                    | <b>ExP[4]</b>        |
| <b>1310</b>       |                    | <b>Intertripping</b> |
| <b>1401</b>       |                    | <b>f[1]</b>          |
| <b>1402</b>       |                    | <b>f[2]</b>          |
| <b>1403</b>       |                    | <b>f[3]</b>          |
| <b>1404</b>       |                    | <b>f[4]</b>          |
| <b>1405</b>       |                    | <b>f[5]</b>          |
| <b>1406</b>       |                    | <b>f[6]</b>          |
| <b>1407</b>       |                    | <b>df/dt</b>         |
| <b>1408</b>       |                    | <b>delta phi</b>     |
| <b>2501</b>       |                    | <b>LVRT[1]</b>       |
| <b>2502</b>       |                    | <b>LVRT[2]</b>       |
| <b>2901</b>       |                    | <b>I2&gt;[1]</b>     |
| <b>2902</b>       |                    | <b>I2&gt;[2]</b>     |
| <b>3001</b>       |                    | <b>V012[1]</b>       |
| <b>3002</b>       |                    | <b>V012[2]</b>       |
| <b>3003</b>       |                    | <b>V012[3]</b>       |
| <b>3004</b>       |                    | <b>V012[4]</b>       |

| <b>Trip Cause</b> | <b>Description</b> | <b>Module</b>           |
|-------------------|--------------------|-------------------------|
| <b>3005</b>       |                    | <b>V012[5]</b>          |
| <b>3006</b>       |                    | <b>V012[6]</b>          |
| <b>3201</b>       |                    | <b>I[1]</b>             |
| <b>3202</b>       |                    | <b>I[2]</b>             |
| <b>3203</b>       |                    | <b>I[3]</b>             |
| <b>3204</b>       |                    | <b>I[4]</b>             |
| <b>3205</b>       |                    | <b>I[5]</b>             |
| <b>3206</b>       |                    | <b>I[6]</b>             |
| <b>3401</b>       |                    | <b>PQS[1]</b>           |
| <b>3402</b>       |                    | <b>PQS[2]</b>           |
| <b>3403</b>       |                    | <b>PQS[3]</b>           |
| <b>3404</b>       |                    | <b>PQS[4]</b>           |
| <b>3405</b>       |                    | <b>PQS[5]</b>           |
| <b>3406</b>       |                    | <b>PQS[6]</b>           |
| <b>3407</b>       |                    | <b>P</b>                |
| <b>3408</b>       |                    | <b>Q</b>                |
| <b>3501</b>       |                    | <b>PF[1]</b>            |
| <b>3502</b>       |                    | <b>PF[2]</b>            |
| <b>3601</b>       |                    | <b>Q-&gt;&amp;V&lt;</b> |
| <b>3801</b>       |                    | <b>ThR</b>              |
| <b>4001</b>       |                    | <b>VG[1]</b>            |

| <b>Trip Cause</b> | <b>Description</b> | <b>Module</b>  |
|-------------------|--------------------|----------------|
| <b>4002</b>       |                    | <b>VG[2]</b>   |
| <b>4101</b>       |                    | <b>V[1]</b>    |
| <b>4102</b>       |                    | <b>V[2]</b>    |
| <b>4103</b>       |                    | <b>V[3]</b>    |
| <b>4104</b>       |                    | <b>V[4]</b>    |
| <b>4105</b>       |                    | <b>V[5]</b>    |
| <b>4106</b>       |                    | <b>V[6]</b>    |
| <b>4107</b>       |                    | <b>HVRT[1]</b> |
| <b>4108</b>       |                    | <b>HVRT[2]</b> |

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