



Power Monitoring Device
and
Class A Power Quality
Recorder

SICAM Q100
7KG95xx

V2.00

System Manual

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Open Source Software

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NOTE

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Document version: E50417-C1040-C522-A5.01
Edition 03.2019
Product version: V2.00

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Preface

Purpose of this Manual

This manual describes the communication of the Power Monitoring Device and Power Quality Recorder SICAM Q100 7KG95xx and its connection to SICAM PQS.

Target Group

This manual is intended for project engineers, commissioning and operating personnel in electrical systems and power plants.

Scope of Validity of this Manual

This manual is valid for the Power Monitoring Device and Power Quality Recorder SICAM Q100 7KG95xx.

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DANGER means that death or severe injury **will** occur if the appropriate safety measures are not taken.

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-



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-



NOTE

NOTE is important information about the product, the handling of the product, or the part of the documentation in question to which special attention must be paid.

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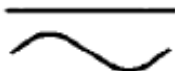
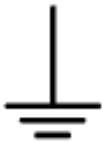
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- Proper storage, setup, and installation
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- The limit values stated in the document may not be exceeded. This must also be considered during testing and commissioning.

Used Symbols

No.	Symbol	Description
1		Direct current IEC 60417-5031
2		Alternating current IEC 60417-5032
3		Direct and alternating current IEC 60417-5033
4		3-phase alternating current
5		Earth (ground) terminal IEC 60417-5017
6		Protective conductor terminal IEC 60417-5019
7		Caution, risk of electric shock
8		Caution, risk of danger ISO 7000-0434

Statement of Conformity

	This product complies with the directive of the Council of the European Communities on the approximation of the laws of the Member States relating to electromagnetic compatibility (EMC Council Directive 2004/108/EC - valid until April 19th, 2016; EMC Council Directive 2014/30/EU - valid as of April 19th, 2016) and concerning electrical equipment for use within specified voltage limits (Lowvoltage Directive 2006/95/EC - valid until April 19th, 2016; Lowvoltage Directive 2014/35/EU - valid as of April 20th, 2016). This conformity has been established by means of tests conducted by Siemens AG according to the Council Directive in agreement with the generic standards EN 61000-6-2 and EN 61000-6-4 for the EMC directives, and with the standard EN 61010-1 for the low-voltage directive. The device has been designed and produced for industrial use. The product conforms to the standard IEC 62586-1, Ed. 1.
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Further Standards

This product is UL-certified to Standard UL 61010-1, third edition, based on the specification stated in chapter 13 (Technical Data) of Device Manual, order no.: E50417-H1040-C482. UL File No.: E228586	
	Open-type Measuring Equipment 2UD1

For further information see UL database on the internet: <http://ul.com>.

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NOTE

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1 User Information

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1.1 General User Information

This manual describes how SICAM Q100 communicates with peripheral devices/systems, the connection to SICAM PQS. For detailed device information, see the device manual.

Communication

To communicate with the systems control and other process automation equipment, SICAM Q100 features an Ethernet interface and an RS485 interface.

Ethernet supports the device parameterization, the transmission of measured data, metered values, load profiles and indications/events, and time synchronization with NTP. Depending on the device model and parameterization, the communication protocols HTTP, Modbus TCP or IEC 61850 are used.

The RS485 interface supports the transmission of the measured data, metered values, load profiles, indications, and time synchronization. The Modbus RTU Master or Modbus RTU Slave protocol is used for communication.

Connection to SICAM PQS

SICAM PQS enables fault records and power quality data generated by SICAM Q100 to be analyzed. The COMTRADE data format is supported by the fault recorder and PQDIF by the trend recorder and measurement recorder. The IEC 61850 protocol is used for communication.

1.2 Contents of this System Manual

The system manual covers all communication and diagnosis options:

- Modbus TCP server
- Modbus RTU slave
- Modbus RTU master
- Modbus TCP to Modbus RTU gateway
- IEC 61850 server

Additionally, it describes the connection of SICAM Q100 to SICAM PQS:

- Installation and licensing of SICAM PQS
- Settings in SICAM PQS
- Settings in SICAM Q100

2 Communication

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2.1 Communication Interfaces

The communication interfaces of SICAM Q100 make 4 communication types possible using the corresponding communication protocols:

- Modbus TCP Server via Ethernet interface
- Modbus RTU Master and Modbus RTU Slave via RS485 interface
- Modbus TCP/RTU Gateway (Modbus Gateway)
- IEC 61850 via Ethernet interface



NOTE

The Modbus specification with a detailed explanation of the Modbus protocol is provided in:

- Modbus over Serial Line
Specification & Implementation Guide
<http://www.modbus.org>
- Modbus Application Protocol Specification
<http://www.modbus.org>
- Modbus Messaging on TCP/IP Implementation Guide
<http://www.modbus.org>

If parameterized accordingly, the device can communicate over the Ethernet interface and simultaneously over the serial interface. It is possible, for example, to parameterize and retrieve data over the Ethernet interface, while the serial interface handles the protocol traffic with a Modbus slave device.

2.1.1 Communication via Ethernet Interface

Via the Ethernet interface the following functions are supported:

- Parameterization, analysis and diagnosis with HTML pages
- DHCP (Dynamic Host Configuration Protocol) to assign the network configuration (IP address etc.) to clients in an Ethernet network with DHCP server
- Time synchronization via NTP
- Data transfer to connected devices via Modbus TCP or IEC 61850-Server
- Data transfer to SICAM PQS for fault record and power quality analysis

2.1.1.1 TCP/IP Protocol Stack

SICAM Q100 supports the following TCP/IP services:

- TCP/IP IPv4
- DHCP client (Dynamic Host Configuration Protocol)
- NTP (Network Time Protocol)
- HTTP server
- SNMP V2 (Simple Network Management Protocol)

2.1.1.2 IP Address

To enable the device to communicate within the Ethernet network, you have to establish a network configuration consisting of IP address, subnet mask and standard gateway.

The device is delivered with a default IP address that can be restored at any time by pressing the F4 softkey. Each device also has a unique MAC address.

The default IP address and the default subnet mask are imprinted on the side panel:

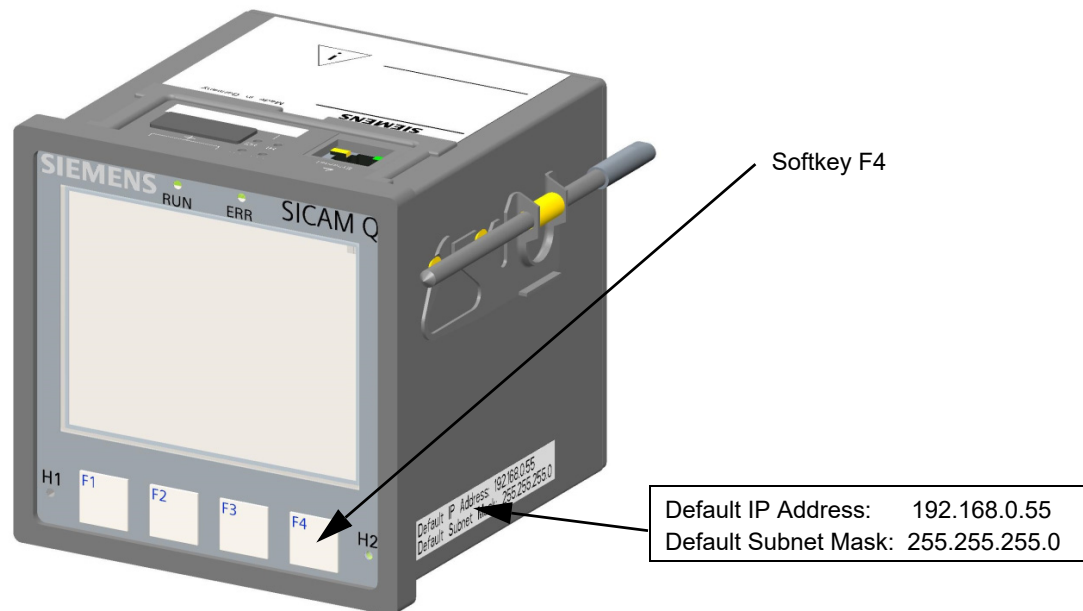


Figure 2-1 Display Side with Softkey F4

Default IP Address and Softkey F4

The F4 softkey (see Figure 2-1) located on the right display side can be used to activate the factory-set default IP address. When pressed (>3 s), this softkey activates the factory-set default IP address. After pressing the softkey F4, the device restarts and the IP address and subnet mask are temporarily activated in the default IP network configuration. The customer-specific IP configuration is not overwritten.

The network configuration settings can be displayed and edited via HTML pages or via the device display (see Device Manual SICAM Q100 7KG95xx, order number E50417-H1040-C522, chapters 8 and 9). After a renewed restart the parameterized network configuration is used again.

Check for Twice Assigned IP Address

Serious problems can occur if the same IP address is assigned more than once in a communication network.

For this reason, an ARP request is sent to the own IP address during start-up of the device. If no response is received from the communication network within 2 s, it is assumed that the IP address is not used in the network.

Otherwise, the LEDs signal the multiple assignment of the IP address as an error message:

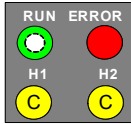


Figure 2-2 Error Message: RUN - Flashing, ERROR - On, H1 and H2 - Any Status

The device is not integrated into the network in this case and a different IP address has to be parameterized.



NOTE

If the device is directly connected to a PC, the PC will need a longer period to be able to detect the connection and therefore to receive the ARP telegram. In this case it may not be detected when PC and device have the same IP address.

Reception of the Network Configuration from the DHCP Server

The network configuration can also be obtained from an external server. Using the DHCP protocol, the device is integrated into an already existing network.

If the IP address 0.0.0.0 is configured, the device sends a query to the external DHCP server requesting the network configuration immediately after booting. Having received the network configuration, the device launches the Ethernet services.

If no DHCP server is available, disconnect the device from the network and start it using the default IP address and subsequently assign a permanent IP address.

2.1.1.3 Ethernet Interface Description

SICAM Q100 is equipped with an Ethernet interface. The data are exchanged via the RJ45 Ethernet plug connector located on the top side of the device.

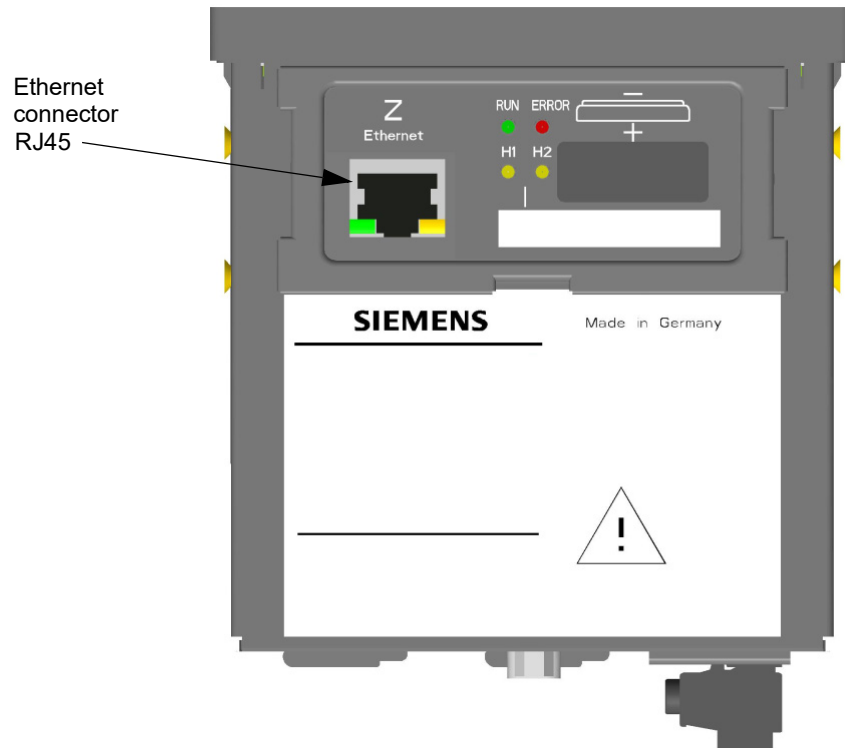


Figure 2-3 RJ45 Ethernet Plug Connector

The Ethernet interface is characterized by the following parameters:

- Transmission rate: 10/100 Mbit/s
- Protocol: IEEE802.3
- Connection: 100Base-T (RJ45), pinout according to DIN EN 50173, automatic patch/crossover cable recognition
- Connecting cable: 100 Ω to 150 Ω STP, CAT5 (shielded twisted-pair cable), max. 100 m if well installed

SICAM Q100 features an internal Ethernet switch. It is therefore possible to connect a Y-cable (see device manual, Accessories section) to the Ethernet interface in order to cascade devices with an Ethernet interface. The internal Ethernet switch can be enabled or disabled in the parameterization.

2.1.2 Communication via RS485 Interface

Devices equipped with an RS485 interface can communicate serially with peripheral devices using the Modbus RTU Master and Modbus RTU Slave bus protocol. The serial interface supports the transmission of measured data and indications. The connection is a 9-pin D-sub connector plug.

Data of the RS485 Interface when Using the Modbus RTU Master Protocol

The RS485 interface comes with the following parameters set by the manufacturer:

- Bus protocol: Modbus RTU Master
- Baud rate: 19 200 bit/s
- Parity: even
- Additional inter-character timeout 1 ms
- Maximum 0x/1x register gap 40
- Maximum 3x/4x register gap 10

You can modify these parameters during the parameterization, see Device Manual SICAM Q100, chapters 8 and 9.

Data of the RS485 Interface when Using the Modbus RTU Slave

The RS485 interface comes with the following parameters set by the manufacturer:

- Bus protocol: Modbus RTU
- Baud rate: 19 200 bit/s
- Parity: even
- Access rights full
- Communication supervision time: 600 * 100 ms

You can modify these parameters during the parameterization, see Device Manual SICAM Q100, chapters 8 and 9.

Location of the RS485 Interface on the Device

The RS485 interface is located on the terminal side.

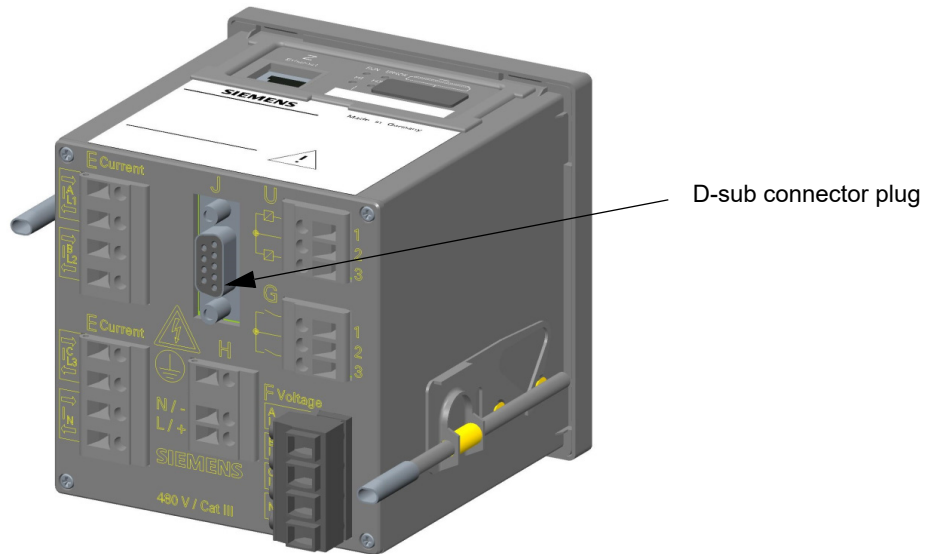


Figure 2-4 D-Sub Connector Plug of SICAM Q100



NOTE

The pinout of the D-sub connector plug is described in Device Manual SICAM Q100, chapter 13.

2.2 Modbus

2.2.1 Modbus Functions for Modbus TCP Server and Modbus RTU Slave



NOTE

The Modbus functions are the same for Modbus TCP (Ethernet) and Modbus RTU (serial).

The Modbus TCP server of SICAM Q100 supports the following Modbus functions:

Table 2-1 Supported Modbus TCP Server Functions

Function Number	Function Name	Description
03 (03H)	Read Holding Registers	Reading one or more holding registers from the Modbus server Up to 125 registers can be read with one message.
06 (06H)	Write Single Register	Writing a holding register Function 16 is used for writing multiple holding register using one Modbus message.
16 (10H)	Write Multiple Registers	Writing one or more holding registers Up to 123 registers can be written with one message.

2.2.2 Exception Responses for Modbus TCP Server and Modbus RTU Slave



NOTE

The exception responses for Modbus TCP (Ethernet) and Modbus RTU (serial) are the same.

The Modbus server performs a series of consistency checks of the Modbus client requests, and if errors (for example request to read a nonexistent register) are detected, it generates Modbus exception codes which are signaled to the Modbus client in exception responses messages.

The messages contain the following codes:

Exception Code 01 ILLEGAL_FUNCTION

- The Modbus client uses a function that is not supported by the Modbus server of the SICAM Q100. The supported Modbus functions are listed in chapter .

Exception Code 02 ILLEGAL_DATA_ADDRESS

- An attempt is made to read out or write to a nonexistent Modbus register (see chapter 2.2.7, Modbus mapping for valid registers).
- An attempt is made to read out or write to too many registers. A Modbus message enables reading out 125 holding registers and writing to 123 holding registers maximum.
- The Modbus client tries to write to a register in the Modbus server for which only read access is allowed according to the Modbus mapping (see chapter 2.2.7).

Exception Code 03 ILLEGAL_DATA_VALUE

- The redundancy client addresses a register that does not allow access to partial data. The register has a complex data structure and is distributed across several registers. The register can be read or written only as a whole.
- The Modbus client tries to write to the Modbus server for which the access rights are set to "read only".

Exception Code 04 SERVER_FAILURE

- Error during the time format conversion in the Modbus server because a faulty date/time format was received via Modbus, for example month format > 12.

2.2.3 Properties and Parameterization of the Modbus TCP Server**Properties of the Modbus TCP Server**

- Connection-oriented Ethernet protocol based on TCP/IP
- Use of IP addresses for addressing individual components connected to the bus (bus nodes)
- The Modbus TCP protocol has the TCP port number 502 reserved on the server side. It is possible to use a parameterized port number.
- All data types in the Modbus TCP messages which are larger than 1 byte are stored in the big-endian format, that is the most significant byte (MSB) is stored at the lowest register address and is transmitted first.
- Communication sequence:
 - The client sends a request to the server to start a data transmission from the server to the client.
 - If the requested data are not available, the server sends an error feedback to the client.
- The Modbus TCP data packet has a maximum size of 260 bytes:
 - 253 bytes max. for data and
 - 7 bytes for the Modbus TCP header

Parameterization

The following parameters can be set for the Modbus TCP bus protocol (see also Device Manual SICAM Q100, chapter 8):

Table 2-2 Modbus TCP Settings

Parameter	Default Setting	Settings
IP address	192.168.0.55	any, 0.0.0.0 for DHCP
Subnet mask	255.255.255.0	any
Default gateway	192.168.0.1	any
Ethernet switch on	no	no yes
Enable SNMP	no	no yes

Table 2-2 Modbus TCP Settings (cont.)

Parameter	Default Setting	Settings
Bus protocol	Modbus TCP	-
Use a user-port number	no	no yes
User-port number (only if <i>Use a user-port number</i> yes has been parameterized)	10000	10000 to 65535
Access rights for user port 502	Full	Full Read only
Access rights for user port (only if <i>Use a user-port number</i> yes has been parameterized)	Full	Full Read only
Keep Alive time	10 s	0 s = switch off 1 s to 65 535 s
Communication supervision time	600 * 100 ms	0 s = none 100 ms to 6 553 400 ms

Number of Connections

Up to four TCP connections are possible:

- Without user port number: 4 connections via standard port 502
- With user port number: 2 connections via standard port 502 and 2 connections via the user port

2.2.4 Modbus RTU Slave

Properties of the Modbus RTU Slave

- Client-server protocol
- All clients have a unique address in the range from 1 to 247.
- Packets with the address = 0 are forwarded to all clients (broadcast).
- The individual data bytes in the messages are transmitted asynchronously with 11 bits:
 - 1 start bit,
 - 8 data bits,
 - 1 parity bit and 1 stop bit or
 - No parity bit and 2 stop bits
- Single messages are separated by bus silent intervals of at least 3.5 character times and end with a CRC code for error detection.
- RS485 is used as interface.
- The Modbus RTU message has a maximum size of 256 bytes:
 - 1 byte server address
 - 253 bytes for data
 - 2 bytes for CRC

The following parameters can be set for the Modbus RTU bus protocol:

Table 2-3 Modbus RTU Settings

Parameter	Default Setting	Setting Range
Device address	1	1 to 247
Baud rate	19 200 bit/s	1200 bit/s, 2400 bit/s 4800 bit/s, 9600 bit/s 19 200 bit/s, 38 400 bit/s 57 600 bit/s, 115 200 bit/s
Parity	Even	no/1 stop bit even odd no/2 stop bits
Access rights	Full	Full Read only
Communication supervision time	600 * 100 ms	0 s = none 100 ms to 6 553 400 ms

2.2.5 Numbering of Modbus Registers

2.2.5.1 Modbus Specifications

Generally, we have to differentiate between the following elements in Modbus:

- the register number
- the register address in Modbus messages

Register Number

The register number characterizes a Modbus register using a 5-digit or 6-digit decimal number where the digit with the highest value defines the register type:

- 0 – coil status register
- 1 – input status register
- 3 – input register
- 4 – holding register

Counting of the register number starts at 1 for each register type, for example, for the 5-digit display:

- 00127 = coil status register 127 (alternatively: coil 127),
- 40108 = holding register 108

Register Address

All address data in Modbus messages refer to the value 0. Therefore, register number and register address are related as follows:

- register address = register number - 1

The following applies to the above examples:

- Coil 127 is addressed as 126 (007E_{hex}) in a Modbus message to query or describe the coil status register.
- 40108 is addressed as 107 (006B_{hex}) in a Modbus message to query or describe the holding register.

2.2.5.2 Mapping Documentation of the SICAM Devices

The Modbus bus mapping documents for the individual SICAM devices use the register number to reference a piece of information in the Modbus register set.

Only holding registers are used for SICAM Q100. All measured values, indications, metered values etc. are stored in these holding registers.

Characterization of the register type (holding register) in the highest digit of the register number is not applicable in the Modbus documentation of SICAM Q100.

2.2.6 Data Types

The following data types are used for storing variables in the Modbus registers.

- Measured value
- Date/time
- Indication
- Controllable indication
- Counter
- String



NOTE

The following convention applies when storing variables consisting of more complex data types to the Modbus holding register (that is variables which are larger than a holding register, for example 32-bit measured values):

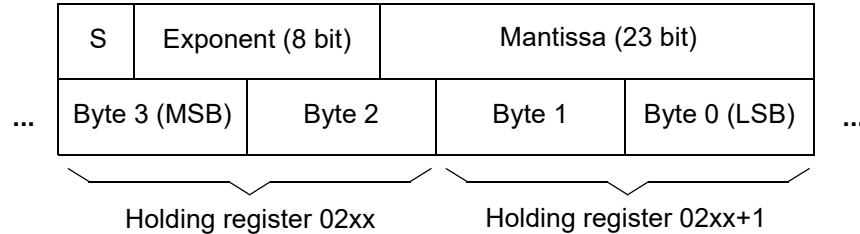
The register with the lowest address contains the most significant byte (MSB), the register with the highest address contains the least significant byte (LSB).

2.2.6.1 Data Type - Measured Value (Read)

The *Measured Value* data type is transferred into 2 holding registers in 32-bit floating-point format (single precision) according to IEEE standard 754.

Structure of the Format

The 32-bit floating-point format consists of a sign bit (S), exponent and mantissa:



Value Range

The 32-bit floating-point format has the value range: $\pm(10^{-38}$ to $10^{+38})$.

Value of the Measured Values

The value of a measured value is obtained as follows:

Exponent = 0: Resulting value = 0

Exponent = 255, mantissa = 0: Resulting value = $(-1)^{\text{sign}} * +\text{Inf}$

Exponent = 255, mantissa not equal to 0: Resulting value = NaN

$0 < \text{Exponent} < 255$: Resulting value = $(-1)^{\text{sign}} * 2^{(\text{exponent} - 127)} * 1, \text{ <mantissa>}$

Status and Quality Information

SICAM Q100 uses floating-point numbers with the exponent 255 (Inf, NaN) to display status information of the measured values:

Table 2-4 Floating-point Numbers

Floating-point Number (Hexadecimal)		State	Remark
7F800000H	+Inf	Overflow	Measured value overflow ($> 1.2 V_{\text{rated}}, > 2 I_{\text{rated}}$)
7F800001H	NaN	invalid	For example, frequency not measured because mains voltage too small ($< 15 \% V_{\text{rated}}$)
7F800002H	NaN	not calculated	Measured value is not calculated, for instance because it does not exist in the selected network type.

Accuracy of the Floating-point Numbers

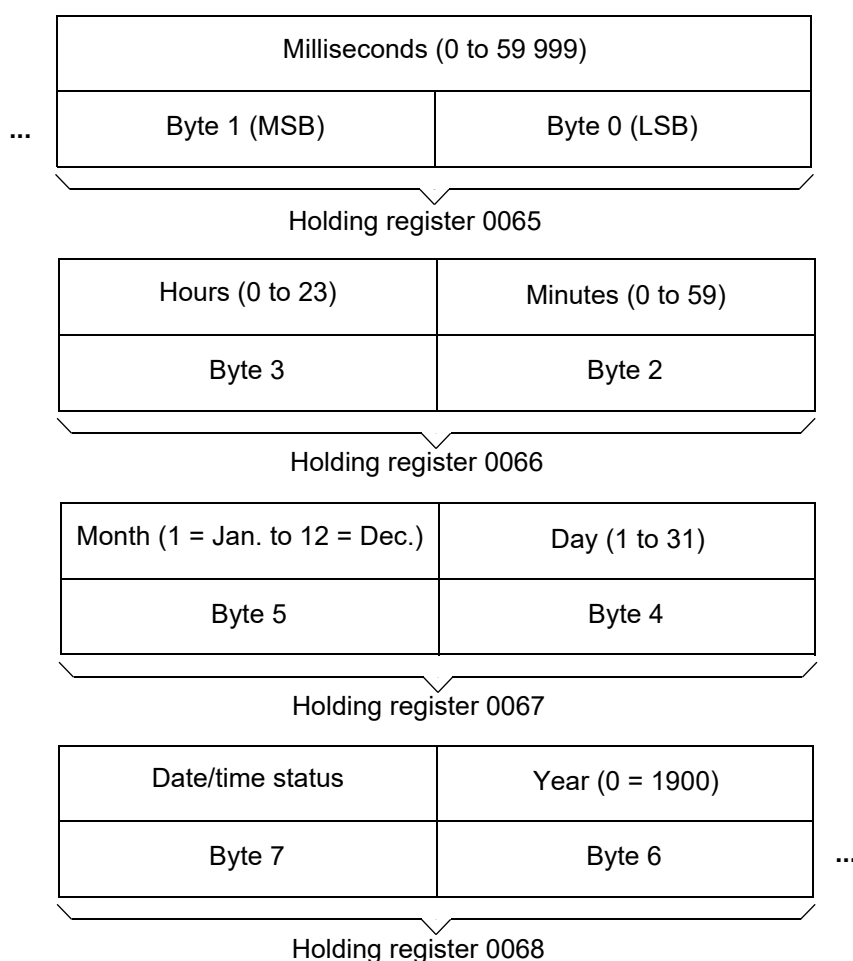
The 32-bit floating-point numbers have a 23-bit mantissa. Integer numbers can be represented in the following ranges without loss of accuracy:

- Binary: $\pm(1)111\ 1111\ 1111\ 1111\ 1111\ 1111$
- Hexadecimal: $\pm FF\ FF\ FF$
- Decimal: ± 16777216

32-bit floating-point numbers are accurate to about 7 decimal digits. An accuracy of 4 decimal digits (0.2 measuring error) is required for measuring alternating current quantities.

2.2.6.2 Data Type - Date/Time (Read and Write)

The *Date/Time* data type is used to transmit the local time. The following format is used:



Date/Time Status

10H set: Daylight saving time active

20H set: Date/time error: equivalent to FAIL bit, see Device Manual SICAM Q100, Time Synchronization.



NOTE

For the time synchronization via Ethernet, Siemens recommends the use of NTP.

2.2.6.3 Data Type - Indications (Read)

The *Indications* data type is represented by two bits in holding registers:

Q	V	Q	V	Q	V	Q	V	Q	V	Q	V	Q	V	Q	V
Indication 8		Indication 7		Indication 6		Indication 5		Indication 4		Indication 3		Indication 2		Indication 1	

for example Holding register 0101

Where:

- Q: status/quality bit: 0 = OK, 1 = invalid
- V: Value bit: 0 = OFF, 1 = ON

Status or Quality Bit Q

If the indication is invalid, the quality bit is set to **1**. The value bit can be ignored in this case.

Example: The power frequency is invalid if the voltage is smaller than 15 % of the rated voltage when measuring the frequency. Any limit violation indication based on this value is also invalid.

Value Bit V

The value bit indicates whether an indication is ON (=1) or OFF (=0).

2.2.6.4 Data Type - Controllable Indications (Read and Write)

The *Controllable Indications* data type is needed for:

- The binary outputs of the SICAM Q100
- Processing internal device commands (for example resetting the energy counters).

The holding register is used for read and write access in this context.

Use as Read Register

Q	V	Q	V	Q	V	Q	V	Q	V	Q	V	Q	V	Q	V
Indication 8		Indication 7		Indication 6		Indication 5		Indication 4		Indication 3		Indication 2		Indication 1	

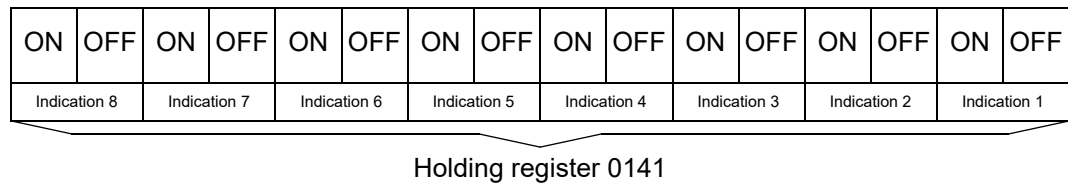
Holding register 0141

Where:

- Q: status/quality bit: 0 = OK, 1 = invalid
- V: Value bit: 0 = OFF, 1 = ON

See also chapter 2.2.6.3.

Use as Write Register



This data format enables up to 8 commands to be transmitted via the holding register for which the ON/OFF bits are set to either 0/1 or to 1/0. If these bits are set to 0/0 or 1/1, no evaluation will be performed.

2.2.6.5 Data Type - Counter (Read)

General

With the *Counter* data type, units of energy are transmitted as counter pulses.

To calculate the primary value, the conversion factor 'Energy per counter pulse' is output as the **Measured Value** data type in addition to the counter pulses (see chapter 2.2.6.1). The primary value is calculated as follows:

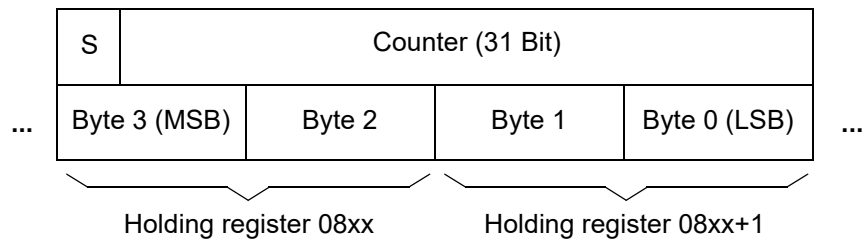
$$\text{Primary value} = \text{number of counter pulses} * \text{energy per counter pulse}$$

The following information is sent to each counter using the Modbus protocol:

- Counter pulses as 32-bit values (with sign)
- Separate status indications for **invalid** and **overflow** for each counter
- Energy per counter pulse in floating-point format for measured values (see chapter 2.2.7.25)

Counter Pulses

32-bit integers with sign allow a maximum of $\pm 2\,147\,483\,647$ counter pulses before the counter overflows. The *Counter* data type is structured as follows:



Bit S (Sign)

Reserved for negative metered values

Quality Information

The two following quality bits are stored for each counter in separate holding registers:

- **Overflow OV:** The internal counter pulse exceeds 31 bits. The Overflow bit is reset once the counter has been reset.
- **Invalid IV:** The counter value is invalid due to a reset/device start. The bit is deleted 1 min after the device start.

OV	IV	OV	IV	OV	IV	OV	IV	OV	IV	OV	IV	OV	IV	OV	IV
Counter 8		Counter 7		Counter 6		Counter 5		Counter 4		Counter 3		Counter 2		Counter 1	

Holding register 08xx

Energy per Counter Pulse

The energy per counter pulse is identical for all energy metered values calculated from the measured AC quantities so that only one value is transmitted for all energy counters. The energy per counter pulse is determined by the AC network configuration.

At the rated value 60 000 counter pulses per hour are recorded for V_{rated} and I_{rated} .

A counter overflow occurs about 4 years after the counters were reset when V_{rated} and I_{rated} are measured continuously.

2.2.7 Data in the Modbus Registers (Data Mapping)

The indications, measured values etc. are stored in Holding registers. The following register groups exist. They are described in the following sections:

- Register 0001 to 0048: Device identification (read only)
- Register 0065 to 0068: Date and time (read and write)
- Register 0071 to 0088: Version information (read only)
- Register 0101/0102: Device status (read only)
- Register 0111/0112: Indications concerning limit violations (read only)
- Register 0113: Group indications (read only)
- Register 0114: PQ events (read only)
- Register 0131: Status of the binary outputs (read only)
- Register 0132: Status of the binary inputs (read only)
- Register 0135: Status of binary inputs of SICAM IO subdevice 1 (read only)
- Register 0136: Status of binary outputs of SICAM IO subdevice 1 (read only)
- Register 0137: Status of binary inputs of SICAM IO subdevice 2 (read only)
- Register 0138: Status of binary outputs of SICAM IO subdevice 2 (read only)
- Register 0141 to 0143: Messages of the communication (read and write)
- Register 0151: Load profiles (write only)
- Register 0152: Load profiles (read only)
- Register 0153: Synchronization of load profile measuring period (read and write)
- Register 0154: Tariffs (read and write)
- Register 0201 to 0390, 6401 to 6484: Measured values (read only), without 0281 to 0292 and 0359 to 0382
- Register 0323 to 0358: Flicker (read only)
- Register 0392 to 0399: Date/Time for last period PQ calculation (read only)
- Register 0401 to 0788, 16001 to 16017^{*)}: PQ Measured (read only)
- Register 0801 to 0846: Energy counters (read only)
- Register 0981 to 0988: Mains signalling voltage evaluation (read only)
- Register 1001 to 1377^{*)}: Harmonics: voltage values (read only)
- Register 1379 to 1755^{*)}: Harmonics: current values (read only)
- Register 1801 to 2098^{*)}: PQ calculation for average harmonic voltage values (read only)
- Register 2201 to 2498^{*)}: PQ calculation for max. harmonic voltage values (read only)
- Register 2601 to 2898^{*)}: PQ calculation for average harmonic current values (read only)
- Register 2903 to 2980: Tariff counters (read only)
- Register 3001 to 3298^{*)}: PQ calculation for max. harmonic current values (read only)

- Register 3405 to 3669: Tarrif Values (read only)
- Register 4001 to 4377: Phase angles of harmonics: voltage values (read only)
- Register 4379 to 4755: Phase angles of harmonics: current values (read only)
- Register 5001 to 5099: Last 10 dips (read only)
- Register 5201 to 5299: Last 10 swells (read only)
- Register 5401 to 5499: Last 10 interrupts (read only)
- Register 5501 to 5691: Last 10 RVC Events (read only)
- Register 6001 to 6004: Number of PQ Voltage events (read only)
- Register 6087 to 6100: Load profile – Management (read only)
- Register 6101 to 6158: Load profile – Measured values (read only)
- Register 7001 to 7377: Prevailing phase angles of harmonics: voltage values (read only)
- Register 7379 to 7755: Prevailing phase angles of harmonics: current values (read only)
- Register 8001 to 8240: Measured values from Modbus slave devices (read only)
- Register 8401 to 8408: Indications from Modbus slave devices (read only)
- Register 10001 to 10377: Prevailing ratio of harmonics: voltage values (read only)
- Register 10379 to 10755: Prevailing ratio of harmonics: current values (read only)
- Register 12001 to 12377: Phase Angle of Harmonic Power (read only)
- Register 13001 to 13377: Harmonic Power - Active power Value (read only)
- Register 14001 to 14377: Harmonic Power - Reactive power Value (read only)
- Register 15001 to 15377: Harmonic Power - Apparent power Value (read only)

*) See the following note:

**NOTE**

For the access to measured values, the measured values read with a telegram must be exclusively in this range. The addressed address range in a requesting telegram must not exceed the register range or fall below this range.

Example:

If the average values of the harmonics of the voltage at the phases a, b, and c must be read, 3 requesting telegrams must be sent. Each of these telegrams contains the register range entered for these values (or a part of it) for phases a, b, and c.

In SICAM PQS, the user must define different corresponding requesting groups for this, for example:

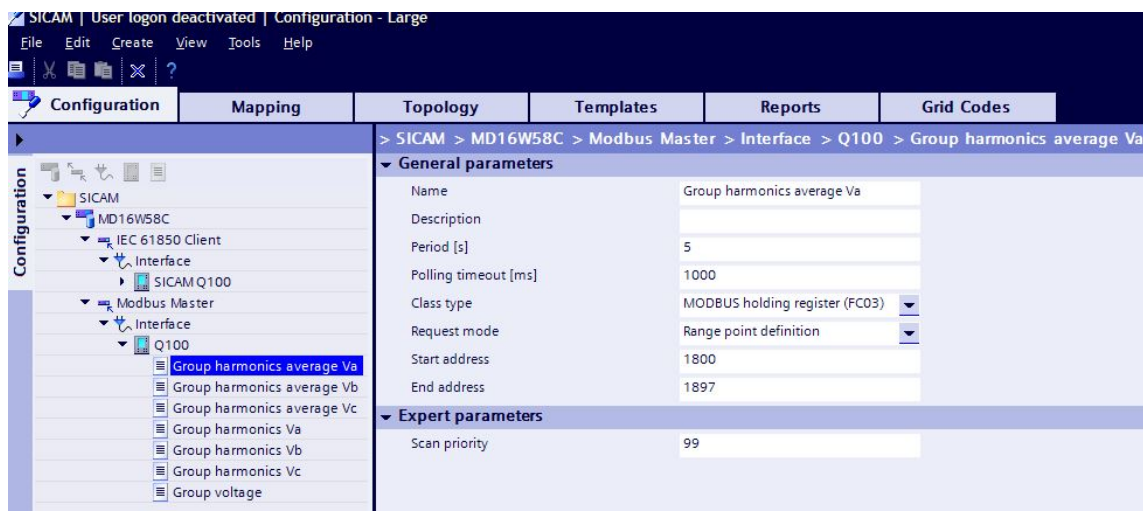


Figure 2-5 Settings in SICAM PQS

2.2.7.1 Registers 0001 to 0048: Device Identification (read only)

These registers are write-protected. A write attempt will be rejected with exception code 02 (ILLEGAL_DATA_ADDRESS).

Data type: String

Table 2-5 Registers 0001 to 0048: Device Identification

Register	Type of Information	Remark
0001 to 0008	Device type (string, max. 16 characters)	Example: SICAM Q100
0009 to 0024	Device ordering code (MLFB) (string, max. 32 characters)	Example: 7KG95010AA311AA0
0025 to 0040	Device name from the configuration (string, max. 32 characters)	Example: SICAM Q100 #1
0041 to 0048	Device serial number (string, max. 16 characters)	Example: BF1309034576

Unused positions in string are filled with character '\0'.

2.2.7.2 Registers 0065 to 0068: Date and Time (read and write)

The date and time can be transmitted in 64-bit format or in 32-bit format.

64-bit Format

The 4 registers 0065 to 0068 (time and date) are transmitted in one message.

32-bit Format

The registers are transmitted in 2 messages. The 1st message contains the registers 0067 and 0068 (date), the 2nd message contains the registers 0065 and 0066 (time).

The time synchronization only takes effect when the time has been completely transmitted.

Data type: Date/time

Table 2-6 Registers 0065 to 0068: Date and Time

Register	Type of Information	Remark
0065	Milliseconds	see chapter 2.2.6.2
0066	Hours/minutes	
0067	Month/day	
0068	Time status/year	

2.2.7.3 Registers 0071 to 0088: Version Information (read only)

These registers are write-protected. A write attempt will be rejected with exception code 02 (ILLEGAL_DATA_ADDRESS).

Data type: String

Table 2-7 Registers 0071 to 0088: Version Information

Register	Type of Information	Remark
0071 to 0076	Boot version (string, max. 22 characters)	Example: V01.10.01
0077 to 0082	Firmware version (string, max. 32 characters)	Example: V01.10.01
0083 to 0088	Parameter set version (string, max. 32 characters)	Example: V01.10.01

Unused positions in string are filled with character '\0'.

2.2.7.4 Registers 0101 and 0102: Device Status Indication (read only)

This register is write-protected. A write attempt will be rejected with exception code 02 (ILLEGAL_DATA_ADDRESS).

Data type: Indication

Table 2-8 Registers 0101 and 0102: Device Status

Register	Type of Information	Remark
0101/2 ⁰	Device OK	1 = Device ready for operation
0101/2 ²	Battery failure	0 = Battery OK, 1 = Battery failure (exchange battery)
0101/2 ⁴	SD card status	1 = SD card error (see notes in device manual, chapter 14, Operational Indications)
0101/2 ⁶	Reserved	= 0
0101/2 ⁸	Settings Load	1 = Parameter load is in progress
0101/2 ¹⁰	Settings Check	1 = Parameter check is in progress
0101/2 ¹²	Settings Activate	1 = Parameter activation is in progress
0101/2 ¹⁴	Reserved	= 0
0102/2 ⁰	Direction of rotation	0 = Anti-clockwise 1 = Clockwise
0102/2 ² to 0102/2 ¹⁴	Reserved	= 0

**NOTE**

Registers between 0103 and 0140 that are not shown can be read too during requests and return the value 0.

2.2.7.5 Registers 0111 and 0112: Measurand Limit Violation Indications (read only)

These registers are write-protected. A write attempt will be rejected with exception code 02 (ILLEGAL_DATA_ADDRESS).

Data type: Indication

Table 2-9 Registers 0111 and 0112: Limit Violation Indications

Register	Type of Information	Remark
0111/2 ⁰	Limit Violation 1	An indication is output (= 1) if a measured value has exceeded or fallen below a configured limiting value. For more information, see the SICAM Q100 device manual, chapter 8.
0111/2 ²	Limit Violation 2	
0111/2 ⁴	Limit Violation 3	
0111/2 ⁶	Limit Violation 4	
0111/2 ⁸	Limit Violation 5	
0111/2 ¹⁰	Limit Violation 6	
0111/2 ¹²	Limit Violation 7	
0111/2 ¹⁴	Limit Violation 8	
0112/2 ⁰	Limit Violation 9	An indication is output (= 1) if a measured value has exceeded or fallen below a configured limiting value. For more information, see the SICAM Q100 device manual, chapter 8.
0112/2 ²	Limit Violation 10	
0112/2 ⁴	Limit Violation 11	
0112/2 ⁶	Limit Violation 12	
0112/2 ⁸	Limit Violation 13	
0112/2 ¹⁰	Limit Violation 14	
0112/2 ¹²	Limit Violation 15	
0112/2 ¹⁴	Limit Violation 16	

2.2.7.6 Register 0113: Group Indications (read only)

These registers are write-protected. A write attempt will be rejected with exception code 02 (ILLEGAL_DATA_ADDRESS).

Data type: Indication

Table 2-10 Register 0113: Group Indications

Register	Type of Information	Remark
0113/2 ⁰	Group indication 1	Up to 4 single-point indications can be linked logically and combined to a group indication. A total of 4 group indications can be parameterized: 0 = Off 1 = On
0113/2 ²	Group indication 2	
0113/2 ⁴	Group indication 3	
0113/2 ⁶	Group indication 4	
0113/2 ⁸	Reserved	= 0
0113/2 ¹⁰	Reserved	= 0
0113/2 ¹²	Reserved	= 0
0113/2 ¹⁴	Reserved	= 0

2.2.7.7 Register 0114: Power Quality Event (read only)

These registers are write-protected. A write attempt will be rejected with exception code 02 (ILLEGAL_DATA_ADDRESS).

Data type: Indication

Table 2-11 Register 0114: Power Quality Event

Register	Type of Information	Remark
0114/2 ⁰	PQ Volt event	1 = Voltage event exists 0 = Voltage event does not exist
0114/2 ²	PQ Freq event	1 = Frequency event exists 0 = Frequency event does not exist
0114/2 ⁴	PQ VoltUnbal event	1 = Voltage unbalance event exists 0 = Voltage unbalance event does not exist
0114/2 ⁶ to 0114/2 ¹⁴	Reserved	= 0



NOTE

If a voltage, frequency or voltage unbalance event happened and ended, the relevant bit of this register will be set to "1" and will be kept until it is reset by using relevant bits in register 141.

2.2.7.8 Register 0131: Status of the Binary Outputs (read only)

This register is write-protected. A write attempt will be rejected with exception code 02 (ILLEGAL_DATA_ADDRESS).

Data type: Indication

Table 2-12 Register 0131: Status of the Binary Outputs

Register	Type of Information	Remark
0131/2 ⁰	Binary Output B1	Binary output B1 at terminal G1/2
0131/2 ²	Binary Output B2	Binary output B2 at terminal G3/2
0131/2 ⁴ to 0131/2 ¹⁴	Reserved	= 0

2.2.7.9 Register 0132: Status of the Binary Inputs (read only)

This register is write-protected. A write attempt will be rejected with exception code 02 (ILLEGAL_DATA_ADDRESS).

Data type: Indication

Table 2-13 Register 0132: Status of the Binary Inputs

Register	Type of Information	Remark
0132/2 ⁰	Binary Input B1	Binary output B1 at terminal U1/2
0132/2 ²	Binary Input B2	Binary output B2 at terminal U3/2
0132/2 ⁴ to 0132/2 ¹⁴	Reserved	= 0

2.2.7.10 Register 0135: Status of Binary Inputs of SICAM IO Subdevice 1 (read only)

This register is write-protected. A write attempt will be rejected with exception code 02 (ILLEGAL_DATA_ADDRESS).

Data type: Indication

Table 2-14 Register 0135: Status of Binary Inputs of SICAM IO Subdevice 1

Register	Type of Information	Remark
0135/2 ⁰	Binary input 1-N SICAM IO 1, terminals N8/9	The statuses of the binary inputs are read from the SICAM IO 7XV5673 connected as subdevice 1. Value = 0 and status = invalid are transmitted when the indication <i>Subdevice 1 OK</i> = 0. The communication to SICAM IO 7XV5673 is interrupted.
0135/2 ²	Binary input 2-N SICAM IO 1, terminals N9/10	
0135/2 ⁴	Binary input 3-N SICAM IO 1, terminals N11/12	
0135/2 ⁶	Binary input 1-P SICAM IO 1, terminals P8/9	
0135/2 ⁸	Binary input 2-P SICAM IO 1, terminals P9/10	
0135/2 ¹⁰	Binary input 3-P SICAM IO 1, terminals P11/12	= 0
0135/2 ¹²	Reserved	
0135/2 ¹⁴	SICAM Subdevice 1 OK	
		Communication with the SICAM IO 7XV5673 is: 0 = interrupted 1 = established

2.2.7.11 Register 0136: Status of Binary Outputs of SICAM IO Subdevice 1 (read only)

This register is write-protected. A write attempt will be rejected with exception code 02 (ILLEGAL_DATA_ADDRESS).

Data type: Indication

Table 2-15 Register 0136: Status of Binary Outputs of SICAM IO Subdevice 1

Register	Type of Information	Remark
0136/2 ⁰	Binary output 1-N SICAM IO 1, terminals N1/2	The statuses of the binary outputs are read from the SICAM IO 7XV5673 connected as subdevice 1. Value = 0 and status = invalid are transmitted when the indication <i>Subdevice 1 OK</i> = 0. The communication to SICAM IO 7XV5673 is interrupted.
0136/2 ²	Binary output 2-N SICAM IO 1, terminals N3/4	
0136/2 ⁴	Binary output 3-N SICAM IO 1, terminals N5/6	
0136/2 ⁶	Binary output 1-P SICAM IO 1, terminals P1/2	
0136/2 ⁸	Binary output 2-P SICAM IO 1, terminals P3/4	
0136/2 ¹⁰	Binary output 3-P SICAM IO 1, terminals P5/6	
0136/2 ¹²	Reserved	
0136/2 ¹⁴	Reserved	

2.2.7.12 Register 0137: Status of Binary Inputs of SICAM IO Subdevice 2 (read only)

This register is write-protected. A write attempt will be rejected with exception code 02 (ILLEGAL_DATA_ADDRESS).

Data type: Indication

Table 2-16 Register 0137: Status of Binary Inputs of SICAM IO Subdevice 2

Register	Type of Information	Remark
0137/2 ⁰	Binary input 1-N SICAM IO 2, terminals N8/9	The statuses of the binary inputs are read from the SICAM IO 7XV5673 connected as subdevice 2. Value = 0 and status = invalid are transmitted when the indication <i>Subdevice 2 OK</i> = 0. The communication to SICAM IO 7XV5673 is interrupted.
0137/2 ²	Binary input 2-N SICAM IO 2, terminals N9/10	
0137/2 ⁴	Binary input 3-N SICAM IO 2, terminals N11/12	
0137/2 ⁶	Binary input 1-P SICAM IO 2, terminals P8/9	
0137/2 ⁸	Binary input 2-P SICAM IO 2, terminals P9/10	
0137/2 ¹⁰	Binary input 3-P SICAM IO 2, terminals P11/12	= 0
0137/2 ¹²	Reserved	
0137/2 ¹⁴	SICAM Subdevice 2 OK	
		Communication with the SICAM IO 7XV5673 (subdevice 2 is: 0 = interrupted 1 = established

2.2.7.13 Register 0138: Status of Binary Outputs of SICAM IO Subdevice 2 (read only)

This register is write-protected. A write attempt will be rejected with exception code 02 (ILLEGAL_DATA_ADDRESS).

Data type: Indication

Table 2-17 Register 0138: Status of Binary Outputs of SICAM IO Subdevice 2

Register	Type of Information	Remark
0138/2 ⁰	Binary output 1-N SICAM IO 2, terminals N1/2	The statuses of the binary outputs are read from the SICAM IO 7XV5673 connected as subdevice 2. Value = 0 and status = invalid are transmitted when the indication <i>Subdevice 2 OK</i> = 0. The communication to SICAM IO 7XV5673 is interrupted.
0138/2 ²	Binary output 2-N SICAM IO 2, terminals N3/4	
0138/2 ⁴	Binary output 3-N SICAM IO 2, terminals N5/6	
0138/2 ⁶	Binary output 1-P SICAM IO 2, terminals P1/2	
0138/2 ⁸	Binary output 2-P SICAM IO 2, terminals P3/4	
0138/2 ¹⁰	Binary output 3-P SICAM IO 2, terminals P5/6	
0138/2 ¹²	Reserved	
0138/2 ¹⁴	Reserved	

2.2.7.14 Registers 0141 to 0150: Indications and Commands of the Communication (read and write)

Data type: Controllable indications

Table 2-18 Registers 0141 to 0150: Indications and Commands of the Communication

Register	Type of Information	Remark
0141/2 ⁰	Indication 1 from Remote	Controllable indications for binary outputs in the SICAM Q100. Indication can also be used to control LEDs of device or can be integrated into a group indication.
0141/2 ²	Indication 2 from Remote	
0141/2 ⁴	Reserved	= 0
0141/2 ⁶	Reset MSV Event	Send binary value "10" to reset PQ Voltage Event and Energy Counters.
0141/2 ⁸	Reset PQ Voltage Event	
0141/2 ¹⁰	Reset PQ Frequency Event	
0141/2 ¹²	Reset PQ VoltUnbal Event	
0141/2 ¹⁴	Reset Energy	
0142/2 ⁰	Indication 3 from Remote	Controllable indications for binary outputs in the SICAM IO subdevices. Indications can also be used to control LEDs of device or can be integrated into a group indication.
0142/2 ²	Indication 4 from Remote	
0142/2 ⁴	Indication 5 from Remote	
0142/2 ⁶	Indication 6 from Remote	
0142/2 ⁸	Indication 7 from Remote	
0142/2 ¹⁰	Indication 8 from Remote	
0142/2 ¹²	Indication 9 from Remote	
0142/2 ¹⁴	Indication 10 from Remote	Controllable indications for binary outputs in the SICAM IO subdevices. Indications can also be used to control LEDs of device or can be integrated into a group indication.
0143/2 ⁰	Indication 11 from Remote	
0143/2 ²	Indication 12 from Remote	
0143/2 ⁴	Indication 13 from Remote	
0143/2 ⁶	Indication 14 from Remote	= 0
0143/2 ⁸	Reserved	
0143/2 ¹⁰	Reserved	

Table 2-18 Registers 0141 to 0150: Indications and Commands of the Communication (cont.)

Register	Type of Information	Remark
0143/2 ¹²	Reserved	= 0
0143/2 ¹⁴	Reserved	= 0
0144/2 ⁰ through 0150/2 ¹⁵	Reserved	= 0

2.2.7.15 Register 0151: Load Profiles (write only)

Data type: Control

Table 2-19 Register 0151: Load Profiles

Register	Type of Information	Remark
0151/2 ⁰	Reset load profile recording	0 → 1: resets the load profile buffer.
0151/2 ² to 0151/2 ¹⁴	Reserved	= 0

2.2.7.16 Register 0152: Load Profiles (read only)

Data type: Indication

Table 2-20 Register 0152: Load Profiles

Register	Type of Information	Remark
0152/2 ⁰	Sync missing	Synchronization of the periods missing (indication can only occur when the binary inputs are parameterized or via protocol).
0152/2 ²	Resynchronized	Following device startup, a synchronization instant is calculated first. This instant does not have to be correct in case of external synchronization. If the synchronization is then performed via binary input or communication and the instant calculated internally differs from it, the period synchronization is re-synchronized accordingly to the external source.
0152/2 ⁴	Load Profile Period Closed	Indication for closing a subperiod/measuring period
0152/2 ⁶ bis 0152/2 ¹⁴	Reserved	= 0

2.2.7.17 Register 0153: Synchronization of load profile measuring period (read and write)

Data type: Controllable indications

Tabelle 2-21 Register 0153: Synchronization of load profile measuring period

Register	Type of Information	Remark
0153	Synchronization of load profile measuring period	Value is given in minutes and lays between 1 and 60. The value in the register must equal the parameterized value. Otherwise, an error message is generated.

2.2.7.18 Register 0154: Tariffs (read and write)

Data type: Controllable indications

Table 2-22 Register 0154: Tariffs

Register	Type of Information	Remark
0154	Write: the tariff valid from the next measuring period on. Read: currently valid tariff.	Value corresponds to tariff 1 through 6.

2.2.7.19 Registers 0201 to 0390, and 6401 to 6484: Measured Values (read only)

These registers are write-protected. A write attempt will be rejected with exception code 02 (ILLEGAL_DATA_ADDRESS).

Data type: Measured value

Table 2-23 Registers 0201 to 0390, and 6401 to 6484: Measured Values

Register	Type of Information	Remark	Unit
0201	Va	Voltage a-N	V
0203	Vb	Voltage b-N	V
0205	Vc	Voltage c-N	V
0207	VN	Voltage neutral conductor	V
0209	Ia	Current a	A
0211	Ib	Current b	A
0213	Ic	Current c	A
0215	IN	Current neutral conductor	A
0217	Vab	Voltage a-b	V
0219	Vbc	Voltage b-c	V
0221	Vca	Voltage c-a	V
0223	Vavg	Mean value of voltage (P-N)	V
0225	Iavg	Mean value of currents	A
0227	Pa	Active power a	W
0229	Pb	Active power b	W

Table 2-23 Registers 0201 to 0390, and 6401 to 6484: Measured Values (cont.)

Register	Type of Information	Remark	Unit
0231	Pc	Active power c	W
0233	P	Active power	W
0235	Qa	Reactive power a	var
0237	Qb	Reactive power b	var
0239	Qc	Reactive power c	var
0241	Q	Reactive power	var
0243	Sa	Apparent power a	VA
0245	Sb	Apparent power b	VA
0247	Sc	Apparent power c	VA
0249	S	Apparent power	VA
0251	$\cos \varphi$ (a)	Active power factor a	-
0253	$\cos \varphi$ (b)	Active power factor b	-
0255	$\cos \varphi$ (c)	Active power factor c	-
0257	$\cos \varphi$	Active power factor	-
0259	PFa	Power factor a	-
0261	PFb	Power factor b	-
0263	PFc	Power factor c	-
0265	PF	Power factor	-
0267	φ_a	Phase angle a	° (degree)
0269	φ_b	Phase angle b	° (degree)
0271	φ_c	Phase angle c	° (degree)
0273	φ	Phase angle	° (degree)
0275	f	Power frequency	Hz
0277	U_2	Neg. seq. comp. V	%
0279	I_2	Neg. seq. comp. I	%
0281 to 0291	-	-	-

Table 2-23 Registers 0201 to 0390, and 6401 to 6484: Measured Values (cont.)

Register	Type of Information	Remark	Unit
0293	f (10 s)	Frequency calculated every 10 s (internal)	Hz
0295	THDS (Va)	Voltage a THDS	%
0297	THDS (Vb)	Voltage b THDS	%
0299	THDS (Vc)	Voltage c THDS	%
0301	THDS (Ia)	Current a THDS	%
0303	THDS (Ib)	Current b THDS	%
0305	THDS (Ic)	Current c THDS	%
0307	Voltage (φ_{12})	Angle Va-Vb	° (degree)
0309	Voltage (φ_{31})	Angle Vc-Va	° (degree)
0311	Current (φ_{12})	Angle Ia-Ib	° (degree)
0313	Current (φ_{31})	Angle Ic-Ia	° (degree)
0315	Q1a	Reactive power (A)_Fundamental	var
0317	Q1b	Reactive power (B)_Fundamental	var
0319	Q1c	Reactive power (C)_Fundamental	var
0321	Q1	Reactive power (Σ)_Fundamental	var
0323 to 0358	Flicker	see chapter 2.2.7.20	-
0359 to 0382	-	-	-
0383	U_0	Zero seq. comp. V	%
0385	I_0	Zero seq. comp. I	%
0387	Voltage (φ_{23})	Angle Vb-Vc	° (degree)
0389	Current (φ_{23})	Angle Ib-Ic	° (degree)
6401	THDS (Vab)	Voltage ab THDS	%
6403	THDS (Vbc)	Voltage bc THDS	%
6405	THDS (Vca)	Voltage ca THDS	%
6407	THDR (Va)	Voltage a THDR	%
6409	THDR (Vb)	Voltage b THDR	%

Table 2-23 Registers 0201 to 0390, and 6401 to 6484: Measured Values (cont.)

Register	Type of Information	Remark	Unit
6411	THDR (Vc)	Voltage c THDR	%
6413	THDR (Ia)	Current a THDR	%
6415	THDR (Ib)	Current b THDR	%
6417	THDR (Ic)	Current c THDR	%
6419	THDR (Vab)	Voltage ab THDR	%
6421	THDR (Vbc)	Voltage bc THDR	%
6423	THDR (Vca)	Voltage ca THDR	%
6425	THDI (Va)	Voltage a THDI	%
6427	THDI (Vb)	Voltage b THDI	%
6429	THDI (Vc)	Voltage c THDI	%
6431	THDI (Ia)	Current a THDI	%
6433	THDI (Ib)	Current b THDI	%
6435	THDI (Ic)	Current c THDI	%
6437	THDI (Vab)	Voltage ab THDI	%
6439	THDI (Vbc)	Voltage bc THDI	%
6441	THDI (Vca)	Voltage ca THDI	%
6443	THD2650 (Va)	Voltage a THD2650	%
6445	THD2650 (Vb)	Voltage b THD2650	%
6447	THD2650 (Vc)	Voltage c THD2650	%
6449	THD2650 (Ia)	Current a THD2650	%
6451	THD2650 (Ib)	Current b THD2650	%
6453	THD2650 (Ic)	Current c THD2650I	%
6455	THD2650 (Vab)	Voltage ab THD2650	%
6457	THD2650 (Vbc)	Voltage bc THD2650	%
6459	THD2650 (Vca)	Voltage ca THD2650	%
6461	K-Factor (Va)	Voltage a K-Factor	%

Table 2-23 Registers 0201 to 0390, and 6401 to 6484: Measured Values (cont.)

Register	Type of Information	Remark	Unit
6463	K-Factor (Vb)	Voltage b K-Factor	%
6465	K-Factor (Vc)	Voltage c K-Factor	%
6467	K-Factor (Ia)	Current a K-Factor	%
6469	K-Factor (Ib)	Current b K-Factor	%
6471	K-Factor (Ic)	Current c K-Factor	%
6473	K-Factor (Vab)	Voltage ab K-Factor	%
6475	K-Factor (Vbc)	Voltage bc K-Factor	%
6477	K-Factor (Vca)	Voltage ca K-Factor	%
6479	TDD (Ia)	Current a TDD	%
6481	TDD (Ib)	Current b TDD	%
6483	TDD (Ic)	Current c TDD	%

2.2.7.20 Registers 0323 to 0358: Flicker (read only)

These registers are write-protected. A write attempt will be rejected with exception code 02 (ILLEGAL_DATA_ADDRESS).

Registers 0323 to 0358: Flicker

Data type: Measured value

Table 2-24 Registers 0323 to 0358: Flicker

Register	Type of Information	Remark
0323	Pinst (a-N)	Flicker instantaneous value voltage Va
0325	Pinst (b-N)	Flicker instantaneous value voltage Vb
0327	Pinst (c-N)	Flicker instantaneous value voltage Vc
0329	Pst (a-N)	Short term flicker voltage Va
0331	Pst (b-N)	Short term flicker voltage Vb
0333	Pst (c-N)	Short term flicker voltage Vc
0335	Plt (a-N)	Long term flicker voltage Va
0337	Plt (b-N)	Long term flicker voltage Vb
0339	Plt (c-N)	Long term flicker voltage Vc
0341	Pinst (a-b)	Flicker instantaneous value voltage Va-b
0343	Pinst (b-c)	Flicker instantaneous value voltage Vb-c
0345	Pinst (c-a)	Flicker instantaneous value voltage Vc-a
0347	Pst (a-b)	Short term flicker voltage Va-b
0349	Pst (b-c)	Short term flicker voltage Vb-c
0351	Pst (c-a)	Short term flicker voltage Vc-a
0353	Plt (a-b)	Long term flicker voltage Va-b
0355	Plt (b-c)	Long term flicker voltage Vb-c
0357	Plt (c-a)	Long term flicker voltage Vc-a



NOTE

It depends on the connection type (ph-ph or ph-n) which measured values are available. Phase-to-phase quantities are available in 3-wire networks; phase-to-ground quantities are available with all other connection types. See SICAM Q100 Device Manual, chapter 4, section "Measurands Depending on the Connection Type".

2.2.7.21 Registers 0392 to 0399: Data/Time for Last Period PQ Calculation (read only)

These registers are write-protected. A write attempt will be rejected with exception code 02 (ILLEGAL_DATA_ADDRESS).

Registers 0392 to 0395: Data/Time for Last Period PQ Calculation

Data type: Data/time

Table 2-25 Registers 0392 to 0395: Data/Time for Last Period PQ Calculation

Register	Type of Information	Remark
0392	Milliseconds	see chapter 2.2.6.2
0393	Hours/minutes	
0394	Month/day	
0395	Time status/year	

Registers 0396 to 0399: Data/Time for Last Period PQ Calculation for Frequency (Configurable Period = 30 s to 2 h)

Data type: Data/time

Table 2-26 Registers 0396 to 0399: Data/Time for Last Period PQ Calculation

Register	Type of Information	Remark
0396	Milliseconds	see chapter 2.2.6.2
0397	Hours/minutes	
0398	Month/day	
0399	Time status/year	

2.2.7.22 Registers 0401 to 0513, 0777, 0783, and 16001 to 16005: PQ Measured Values, Average Values (read only)

These registers are write-protected. A write attempt will be rejected with exception code 02 (ILLEGAL_DATA_ADDRESS).

The data are calculated within the parameterized time (for example 30 s, 1 min etc.).

Data type: Measured value

Table 2-27 Registers 0401 to 0513, 0777, 0783, and 16001 to 16005: PQ Measured Values – Average Values

Register	Type of Information	Remark	Unit
0401	PQ_Va	Voltage a-N	V
0403	PQ_Vb	Voltage b-N	V
0405	PQ_Vc	Voltage c-N	V
0407	PQ_Vab	Voltage a-b	V
0409	PQ_Vbc	Voltage b-c	V
0411	PQ_Vca	Voltage c-a	V
0413	PQ_Ia	Current a	A
0415	PQ_Ib	Current b	A
0417	PQ_Ic	Current c	A
0419	PQ_VN	Voltage neutral conductor	V
0421	PQ_Vavg	Mean value of voltage (P-N)	V
0423	PQ_IN	Current neutral conductor	A
0425	PQ_Iavg	Mean value of currents	A
0427	PQ_Pa	Active power a	W
0429	PQ_Pb	Active power b	W
0431	PQ_Pc	Active power c	W
0433	PQ_P	Active power	W
0435	PQ_Qa	Reactive power a	var
0437	PQ_Qb	Reactive power b	var
0439	PQ_Qc	Reactive power c	var
0441	PQ_Q	Reactive Power	var

Table 2-27 Registers 0401 to 0513, 0777, 0783, and 16001 to 16005: PQ Measured Values – Average Values (cont.)

Register	Type of Information	Remark	Unit
0443	PQ_Sa	Apparent power a	VA
0445	PQ_Sb	Apparent power b	VA
0447	PQ_Sc	Apparent power c	VA
0449	PQ_S	Apparent power	VA
0451	PQ_cos φ (a)	Active power factor a	-
0453	PQ_cos φ (b)	Active power factor b	-
0455	PQ_cos φ (c)	Active power factor c	-
0457	PQ_cos φ	Active power factor	-
0459	PQ_PFa	Power factor a	-
0461	PQ_PFb	Power factor b	-
0463	PQ_PFc	Power factor c	-
0465	PQ_PF	Power factor	-
0467	PQ_ φ a	Phase angle a	° (degree)
0469	PQ_ φ b	Phase angle b	° (degree)
0471	PQ_ φ c	Phase angle c	° (degree)
0473	PQ_ φ	Phase angle	° (degree)
0475	PQ_f	Power frequency	Hz
0477	PQ_U ₂	Neg. seq. comp. V	%
0479	PQ_I ₂	Neg. seq. comp. I	%
0481	PQ_U ₀	Zero seq. comp. V	%
0483	PQ_I ₀	Zero seq. comp. I	%
0485	PQ_Freq_10s	Frequency The period for calculating the power frequency is 10 s.	Hz
0487	PQ_THDS (Va)	Voltage a THDS	%
0489	PQ_THDS (Vb)	Voltage b THDS	%
0491	PQ_THDS (Vc)	Voltage c THDS	%

Table 2-27 Registers 0401 to 0513, 0777, 0783, and 16001 to 16005: PQ Measured Values – Average Values (cont.)

Register	Type of Information	Remark	Unit
0493	PQ_THDS (Ia)	Current a THDS	%
0495	PQ_THDS (Ib)	Current b THDS	%
0497	PQ_THDS (Ic)	Current c THDS	%
0499	PQ_Voltage (φ_{12})	Angle Va-Vb	° (degree)
0501	PQ_Voltage (φ_{31})	Angle Vc-Va	° (degree)
0503	PQ_Current (φ_{12})	Angle Ia-Ib	° (degree)
0505	PQ_Current (φ_{31})	Angle Ic-Ia	° (degree)
0507	PQ_Q1a	Reactive power (A)_Fundamental	var
0509	PQ_Q1b	Reactive power (B)_Fundamental	var
0511	PQ_Q1c	Reactive power (C)_Fundamental	var
0513	PQ_Q1	Reactive power (Σ)_Fundamental	var
0777	PQ_Voltage (φ_{23})	Angle Vb-Vc	° (degree)
0783	PQ_Current (φ_{23})	Angle Ib-Ic	° (degree)
16001	PQ_THDS (Vab)	Voltage ab THDS	%
16003	PQ_THDS (Vbc)	Voltage bc THDS	%
16005	PQ_THDS (Vca)	Voltage ca THDS	%

2.2.7.23 Registers 0531 to 0643, 0779, 0785, and 16007 to 16011: PQ Measured Values, Minimum Values (read only)

These registers are write-protected. A write attempt will be rejected with exception code 02 (ILLEGAL_DATA_ADDRESS).

The data are calculated within the parameterized time (for example 30 s, 1 min etc.).

Data type: Measured value

Table 2-28 Registers 0531 to 0643, 0779, 0786, and 16007 to 16011: PQ Measured Values – Minimum Values

Register	Type of Information	Remark	Unit
0531	PQ_Va_min	Voltage a-N	V
0533	PQ_Vb_min	Voltage b-N	V
0535	PQ_Vc_min	Voltage c-N	V
0537	PQ_Vab_min	Voltage a-b	V
0539	PQ_Vbc_min	Voltage b-c	V
0541	PQ_Vca_min	Voltage c-a	V
0543	PQ_Ia_min	Current a	A
0545	PQ_Ib_min	Current b	A
0547	PQ_Ic_min	Current c	A
0549	PQ_VN_min	Voltage neutral conductor	V
0551	PQ_Vavg_min	Mean value of voltage (P-N)	V
0553	PQ_IN_min	Current neutral conductor	A
0555	PQ_Iavg_min	Mean value of currents	A
0557	PQ_Pa_min	Active power a	W
0559	PQ_Pb_min	Active power b	W
0561	PQ_Pc_min	Active power c	W
0563	PQ_P_min	Active power	W
0565	PQ_Qa_min	Reactive power a	var
0567	PQ_Qb_min	Reactive power b	var
0569	PQ_Qc_min	Reactive power c	var
0571	PQ_Q_min	Reactive power	var

Table 2-28 Registers 0531 to 0643, 0779, 0786, and 16007 to 16011: PQ Measured Values – Minimum Values (cont.)

Register	Type of Information	Remark	Unit
0573	PQ_Sa_min	Apparent power a	VA
0575	PQ_Sb_min	Apparent power b	VA
0577	PQ_Sc_min	Apparent power c	VA
0579	PQ_S_min	Apparent power	VA
0581	PQ_cos φ (a)_min	Active power factor a	-
0583	PQ_cos φ (b)_min	Active power factor b	-
0585	PQ_cos φ (c)_min	Active power factor c	-
0587	PQ_cos φ _min	Active power factor	-
0589	PQ_PFa_min	Power factor a	-
0591	PQ_PFb_min	Power factor b	-
0593	PQ_PFc_min	Power factor c	-
0595	PQ_PF_min	Power factor	-
0597	PQ_ φ a_min	Phase angle a	° (degree)
0599	PQ_ φ b_min	Phase angle b	° (degree)
0601	PQ_ φ c_min	Phase angle c	° (degree)
0603	PQ_ φ _min	Phase angle	° (degree)
0605	PQ_f_min	Power frequency	Hz
0607	PQ_U ₂ _min	Neg. seq. comp. V	%
0609	PQ_I ₂ _min	Neg. seq. comp. I	%
0611	PQ_U ₀ _min	Zero seq. comp. V	%
0613	PQ_I ₀ _min	Zero seq. comp. I	%
0615	PQ_Freq_10s_min	Frequency The period for calculating the power frequency is 10 s.	Hz
0617	PQ_THDS (Va)_min	Voltage a THDS	%
0619	PQ_THDS (Vb)_min	Voltage b THDS	%
0621	PQ_THDS (Vc)_min	Voltage c THDS	%

Table 2-28 Registers 0531 to 0643, 0779, 0786, and 16007 to 16011: PQ Measured Values – Minimum Values (cont.)

Register	Type of Information	Remark	Unit
0623	PQ_THDS (Ia)_min	Current a THDS	%
0625	PQ_THDS (Ib)_min	Current b THDS	%
0627	PQ_THDS (Ic)_min	Current c THDS	%
0629	PQ_Voltage (φ12)_min	Angle Va-Vb	° (degree)
0631	PQ_Voltage (φ31)_min	Angle Vc-Va	° (degree)
0633	PQ_Current (φ12)_min	Angle Ia-Ib	° (degree)
0635	PQ_Current (φ31)_min	Angle Ic-Ia	° (degree)
0637	PQ_Q1a_min	Reactive power (A)_Fundamental	var
0639	PQ_Q1b_min	Reactive power (B)_Fundamental	var
0641	PQ_Q1c_min	Reactive power (C)_Fundamental	var
0643	PQ_Q1_min	Reactive power (Σ)_Fundamental	var
0779	PQ_Voltage (φ23)_min	Angle Vb-Vc	° (degree)
0785	PQ_Current (φ23)_min	Angle Ib-Ic	° (degree)
16007	PQ_THDS (Vab)_min	Voltage ab THDS	%
16009	PQ_THDS (Vbc)_min	Voltage bc THDS	%
16011	PQ_THDS (Vca)_min	Voltage ca THDS	%

2.2.7.24 Registers 0651 to 0763, 0781, 0787, and 16013 to 16017: PQ Measured Values, Maximum Values (read only)

These registers are write-protected. A write attempt will be rejected with exception code 02 (ILLEGAL_DATA_ADDRESS).

The data are calculated within the parameterized time (for example 30 s, 1 min etc.).

Data type: Measured value

Table 2-29 Registers 0651 to 0763, 0781, 0787, and 16013 to 16017: PQ Measured Values – Maximum Values

Register	Type of Information	Remark	Unit
0651	PQ_Va_max	Voltage a-N	V
0653	PQ_Vb_max	Voltage b-N	V
0655	PQ_Vc_max	Voltage c-N	V
0657	PQ_Vab_max	Voltage a-b	V
0659	PQ_Vbc_max	Voltage b-c	V
0661	PQ_Vca_max	Voltage c-a	V
0663	PQ_Ia_max	Current a	A
0665	PQ_Ib_max	Current b	A
0667	PQ_Ic_max	Current c	A
0669	PQ_VN_max	Voltage neutral conductor	V
0671	PQ_Vavg_max	Mean value of voltage (P-N)	V
0673	PQ_IN_max	Current neutral conductor	A
0675	PQ_Iavg_max	Mean value of currents	A
0677	PQ_Pa_max	Active power a	W
0679	PQ_Pb_max	Active power b	W
0681	PQ_Pc_max	Active power c	W
0683	PQ_P_max	Active power	W
0685	PQ_Qa_max	Reactive power a	var
0687	PQ_Qb_max	Reactive power b	var
0689	PQ_Qc_max	Reactive power c	var
0691	PQ_Q_max	Reactive power	var

Table 2-29 Registers 0651 to 0763, 0781, 0787, and 16013 to 16017: PQ Measured Values – Maximum Values (cont.)

Register	Type of Information	Remark	Unit
0693	PQ_Sa_max	Apparent power a	VA
0695	PQ_Sb_max	Apparent power b	VA
0697	PQ_Sc_max	Apparent power c	VA
0699	PQ_S_max	Apparent power	VA
0701	PQ_cos φ (a)_max	Active power factor a	-
0703	PQ_cos φ (b)_max	Active power factor b	-
0705	PQ_cos φ (c)_max	Active power factor c	-
0707	PQ_cos φ _max	Active power factor	-
0709	PQ_PFa_max	Power factor a	-
0711	PQ_PFb_max	Power factor b	-
0713	PQ_PFc_max	Power factor c	-
0715	PQ_PF_max	Power factor	-
0717	PQ_ φ a_max	Phase angle a	° (degree)
0719	PQ_ φ b_max	Phase angle b	° (degree)
0721	PQ_ φ c_max	Phase angle c	° (degree)
0723	PQ_ φ _max	Phase angle	° (degree)
0725	PQ_f_max	Power frequency	Hz
0727	PQ_U ₂ _max	Neg. seq. comp. V	%
0729	PQ_I ₂ _max	Neg. seq. comp. I	%
0731	PQ_U ₀ _max	Zero seq. comp. V	%
0733	PQ_I ₀ _max	Zero seq. comp. I	%
0735	PQ_Freq_10s_max	Frequency The period for calculating the power frequency is 10 s.	Hz
0737	PQ_THDS (Va)_max	Voltage a THDS	%
0739	PQ_THDS (Vb)_max	Voltage b THDS	%
0741	PQ_THDS (Vc)_max	Voltage c THDS	%

Table 2-29 Registers 0651 to 0763, 0781, 0787, and 16013 to 16017: PQ Measured Values – Maximum Values (cont.)

Register	Type of Information	Remark	Unit
0743	PQ_THDS (Ia)_max	Current a THDS	%
0745	PQ_THDS (Ib)_max	Current b THDS	%
0747	PQ_THDS (Ic)_max	Current c THDS	%
0749	PQ_Voltage (φ12)_max	Angle Va-Vb	° (degree)
0751	PQ_Voltage (φ31)_max	Angle Vc-Va	° (degree)
0753	PQ_Current (φ12)_max	Angle Ia-Ib	° (degree)
0755	PQ_Current (φ31)_max	Angle Ic-Ia	° (degree)
0757	PQ_Q1a_max	Reactive power (A)_Fundamental	var
0759	PQ_Q1b_max	Reactive power (B)_Fundamental	var
0761	PQ_Q1c_max	Reactive power (C)_Fundamental	var
0763	PQ_Q1_max	Reactive power (Σ)_Fundamental	var
0781	PQ_Voltage (φ23)_max	Angle Vb-Vc	° (degree)
0787	PQ_Current (φ23)_max	Angle Ib-Ic	° (degree)
16013	PQ_THDS (Vab)_max	Voltage ab THDS	%
16015	PQ_THDS (Vbc)_max	Voltage bc THDS	%
16017	PQ_THDS (Vca)_max	Voltage ca THDS	%

2.2.7.25 Registers 0801 to 0846: Energy Counters (read only)

These registers are write-protected. A write attempt will be rejected with exception code 02 (ILLEGAL_DATA_ADDRESS).

Registers 0801 to 0802: Energy per Counter Pulse

Data type: Measured value

Table 2-30 Register 0801 to 0802: Energy per Counter Pulse

Register	Type of Information	Remark	Unit
0801	PulseQuantity	Conversion factor of counter pulses into energy values	Wh per pulse, varh per pulse or VAh per pulse

Registers 0803 to 0806: Counter Value Status

Data type: Counter (quality information)

Table 2-31 Registers 0803 to 0806: Counter Value Status

Register	Type of Information	Remark	Unit
0803/2 ⁰	Energy_Counters_Status_1	Status of counters WPa_imp	-
0803/2 ²	Energy_Counters_Status_2	Status of counters WPb_imp	-
0803/2 ⁴	Energy_Counters_Status_3	Status of counters WPC_imp	-
0803/2 ⁶	Energy_Counters_Status_4	Status of counters WP_imp	-
0803/2 ⁸	Energy_Counters_Status_5	Status of counters WPa_exp	-
0803/2 ¹⁰	Energy_Counters_Status_6	Status of counters WPb_exp	-
0803/2 ¹²	Energy_Counters_Status_7	Status of counters WPC_exp	-
0803/2 ¹⁴	Energy_Counters_Status_8	Status of counters WP_exp	-
0804/2 ⁰	Energy_Counters_Status_9	Status of counters WQa_ind	-
0804/2 ²	Energy_Counters_Status_10	Status of counters WQb_ind	-
0804/2 ⁴	Energy_Counters_Status_11	Status of counters WQc_ind	-
0804/2 ⁶	Energy_Counters_Status_12	Status of counters WQ_ind	-
0804/2 ⁸	Energy_Counters_Status_13	Status of counters WQa_cap	-
0804/2 ¹⁰	Energy_Counters_Status_14	Status of counters WQb_cap	-
0804/2 ¹²	Energy_Counters_Status_15	Status of counters WQc_cap	-

Table 2-31 Registers 0803 to 0806: Counter Value Status (cont.)

Register	Type of Information	Remark	Unit
0804/2 ¹⁴	Energy_Counters_Status_16	Status of counters WQ_cap	-
0805/2 ⁰	Energy_Counters_Status_17	Status of counters WSa	-
0805/2 ²	Energy_Counters_Status_18	Status of counters WSb	-
0805/2 ⁴	Energy_Counters_Status_19	Status of counters WSc	-
0805/2 ⁶	Energy_Counters_Status_20	Status of counters WS	-
0805/2 ⁸ to 0805/2 ¹⁵	Reserved	= 0	-
0806	Reserved	= 0	-

Registers 0807 to 0846: Counter Pulses

Data type: Counter

Table 2-32 Registers 0807 to 0846: Counter Pulses

Register	Type of Information	Remark	Unit
0807	WPa_imp	Active Energy, Import, Phase A	Pulse
0809	WPb_imp	Active Energy, Import, Phase B	Pulse
0811	WPc_imp	Active Energy, Import, Phase C	Pulse
0813	WP_imp	Active Energy, Import	Pulse
0815	WPa_exp	Active Energy, Export, Phase A	Pulse
0817	WPb_exp	Active Energy, Export, Phase B	Pulse
0819	WPc_exp	Active Energy, Export, Phase C	Pulse
0821	WP_exp	Active Energy, Export	Pulse
0823	WQa_ind	Reactive Energy, Inductive, Phase A	Pulse
0825	WQb_ind	Reactive Energy, Inductive, Phase B	Pulse
0827	WQc_ind	Reactive Energy, Inductive, Phase C	Pulse
0829	WQ_ind	Reactive Energy, Inductive	Pulse
0831	WQa_cap	Reactive Energy, Capacitive, Phase A	Pulse
0833	WQb_cap	Reactive Energy, Capacitive, Phase B	Pulse

Table 2-32 Registers 0807 to 0846: Counter Pulses (cont.)

Register	Type of Information	Remark	Unit
0835	WQc_cap	Reactive Energy, Capacitive, Phase C	Pulse
0837	WQ_cap	Reactive Energy, Capacitive	Pulse
0839	WSa	Apparent Energy, Phase A	Pulse
0841	WSb	Apparent Energy, Phase B	Pulse
0843	WSc	Apparent Energy, Phase C	Pulse
0845	WS	Apparent Energy	Pulse

2.2.7.26 Registers 0981 to 0988: Mains Signalling Voltage Evaluation (read only)

These registers are write-protected. A write attempt will be rejected with exception code 02 (ILLEGAL_DATA_ADDRESS).

Registers 0981 to 0984: C1/C of Mains Signalling Voltage Evaluation

Data type: Measured value

Table 2-33 Registers 0981 to 0984: C1/C of Mains Signalling Voltage Evaluation

Register	Type of Information	Remark	Unit
0981	MSCR_Freq1	The C1/C*100% ratio of mains signalling voltage evaluation on frequency 1	%
0983	MSCR_Freq2	The C1/C*100% ratio of mains signalling voltage evaluation on frequency 2	%

Registers 0985 to 0988: User Specified Frequency for Mains Signalling Voltage Evaluation

Data type: Measured value

Table 2-34 Registers 0985 to 0988: User Specified Frequency for Mains Signalling Voltage Evaluation

Register	Type of Information	Remark	Unit
0985	MS_Freq1	User-specified frequency 1 for mains signalling voltage evaluation	Hz
0987	MS_Freq2	User-specified frequency 2 for mains signalling voltage evaluation	Hz

2.2.7.27 Registers 1001 to 1377: Harmonics – Voltage Values (read only)

These registers are write-protected. A write attempt will be rejected with exception code 02 (ILLEGAL_DATA_ADDRESS).

Calculation period: 10/12 cycle (50Hz/60Hz)

Network types: harmonic ph-n is available if 4W is used; harmonic ph-ph is available if 3W is used.

Data type: Measured value

Table 2-35 Registers 1001 to 1377: Harmonics – Voltage Values

Register	Type of Information	Remark	Unit
1001	H_Va-1/H_Vab-1	1. Harmonic, voltage value, a-N, ab (fundamental)	V
1003	H_Va-2/H_Vab-2	2. Harmonic, voltage value, a-N, ab	V/%
1005	H_Va-3/H_Vab-3	3. Harmonic, voltage value, a-N, ab	V/%
1007	H_Va-4/H_Vab-4	4. Harmonic, voltage value, a-N, ab	V/%
1009	H_Va-5/H_Vab-5	5. Harmonic, voltage value, a-N, ab	V/%
1011	H_Va-6/H_Vab-6	6. Harmonic, voltage value, a-N, ab	V/%
1013	H_Va-7/H_Vab-7	7. Harmonic, voltage value, a-N, ab	V/%
1015	H_Va-8/H_Vab-8	8. Harmonic, voltage value, a-N, ab	V/%
1017	H_Va-9/H_Vab-9	9. Harmonic, voltage value, a-N, ab	V/%
1019	H_Va-10/H_Vab-10	10. Harmonic, voltage value, a-N, ab	V/%
1021	H_Va-11/H_Vab-11	11. Harmonic, voltage value, a-N, ab	V/%
1023	H_Va-12/H_Vab-12	12. Harmonic, voltage value, a-N, ab	V/%
1025	H_Va-13/H_Vab-13	13. Harmonic, voltage value, a-N, ab	V/%
1027	H_Va-14/H_Vab-14	14. Harmonic, voltage value, a-N, ab	V/%
1029	H_Va-15/H_Vab-15	15. Harmonic, voltage value, a-N, ab	V/%
1031	H_Va-16/H_Vab-16	16. Harmonic, voltage value, a-N, ab	V/%
1033	H_Va-17/H_Vab-17	17. Harmonic, voltage value, a-N, ab	V/%
1035	H_Va-18/H_Vab-18	18. Harmonic, voltage value, a-N, ab	V/%
1037	H_Va-19/H_Vab-19	19. Harmonic, voltage value, a-N, ab	V/%
1039	H_Va-20/H_Vab-20	20. Harmonic, voltage value, a-N, ab	V/%
1041	H_Va-21/H_Vab-21	21. Harmonic, voltage value, a-N, ab	V/%

Table 2-35 Registers 1001 to 1377: Harmonics – Voltage Values (cont.)

Register	Type of Information	Remark	Unit
1043	H_Va-22/H_Vab-22	22. Harmonic, voltage value, a-N, ab	V/%
1045	H_Va-23/H_Vab-23	23. Harmonic, voltage value, a-N, ab	V/%
1047	H_Va-24/H_Vab-24	24. Harmonic, voltage value, a-N, ab	V/%
1049	H_Va-25/H_Vab-25	25. Harmonic, voltage value, a-N, ab	V/%
1051	H_Va-26/H_Vab-26	26. Harmonic, voltage value, a-N, ab	V/%
1053	H_Va-27/H_Vab-27	27. Harmonic, voltage value, a-N, ab	V/%
1055	H_Va-28/H_Vab-28	28. Harmonic, voltage value, a-N, ab	V/%
1057	H_Va-29/H_Vab-29	29. Harmonic, voltage value, a-N, ab	V/%
1059	H_Va-30/H_Vab-30	30. Harmonic, voltage value, a-N, ab	V/%
1061	H_Va-31/H_Vab-31	31. Harmonic, voltage value, a-N, ab	V/%
1063	H_Va-32/H_Vab-32	32. Harmonic, voltage value, a-N, ab	V/%
1065	H_Va-33/H_Vab-33	33. Harmonic, voltage value, a-N, ab	V/%
1067	H_Va-34/H_Vab-34	34. Harmonic, voltage value, a-N, ab	V/%
1069	H_Va-35/H_Vab-35	35. Harmonic, voltage value, a-N, ab	V/%
1071	H_Va-36/H_Vab-36	36. Harmonic, voltage value, a-N, ab	V/%
1073	H_Va-37/H_Vab-37	37. Harmonic, voltage value, a-N, ab	V/%
1075	H_Va-38/H_Vab-38	38. Harmonic, voltage value, a-N, ab	V/%
1077	H_Va-39/H_Vab-39	39. Harmonic, voltage value, a-N, ab	V/%
1079	H_Va-40/H_Vab-40	40. Harmonic, voltage value, a-N, ab	V/%
1081	H_Va-41/H_Vab-41	41. Harmonic, voltage value, a-N, ab	V/%
1083	H_Va-42/H_Vab-42	42. Harmonic, voltage value, a-N, ab	V/%
1085	H_Va-43/H_Vab-43	43. Harmonic, voltage value, a-N, ab	V/%
1087	H_Va-44/H_Vab-44	44. Harmonic, voltage value, a-N, ab	V/%
1089	H_Va-45/H_Vab-45	45. Harmonic, voltage value, a-N, ab	V/%
1091	H_Va-46/H_Vab-46	46. Harmonic, voltage value, a-N, ab	V/%
1093	H_Va-47/H_Vab-47	47. Harmonic, voltage value, a-N, ab	V/%

Table 2-35 Registers 1001 to 1377: Harmonics – Voltage Values (cont.)

Register	Type of Information	Remark	Unit
1095	H_Va-48/H_Vab-48	48. Harmonic, voltage value, a-N, ab	V/%
1097	H_Va-49/H_Vab-49	49. Harmonic, voltage value, a-N, ab	V/%
1099	H_Va-50/H_Vab-50	50. Harmonic, voltage value, a-N, ab	V/%
1101	H_Va-51/H_Vab-51	51. Harmonic, voltage value, a-N, ab	V/%
1103	H_Va-52/H_Vab-52	52. Harmonic, voltage value, a-N, ab	V/%
1105	H_Va-53/H_Vab-53	53. Harmonic, voltage value, a-N, ab	V/%
1107	H_Va-54/H_Vab-54	54. Harmonic, voltage value, a-N, ab	V/%
1109	H_Va-55/H_Vab-55	55. Harmonic, voltage value, a-N, ab	V/%
1111	H_Va-56/H_Vab-56	56. Harmonic, voltage value, a-N, ab	V/%
1113	H_Va-57/H_Vab-57	57. Harmonic, voltage value, a-N, ab	V/%
1115	H_Va-58/H_Vab-58	58. Harmonic, voltage value, a-N, ab	V/%
1117	H_Va-59/H_Vab-59	59. Harmonic, voltage value, a-N, ab	V/%
1119	H_Va-60/H_Vab-60	60. Harmonic, voltage value, a-N, ab	V/%
1121	H_Va-61/H_Vab-61	61. Harmonic, voltage value, a-N, ab	V/%
1123	H_Va-62/H_Vab-62	62. Harmonic, voltage value, a-N, ab	V/%
1125	H_Va-63/H_Vab-63	63. Harmonic, voltage value, a-N, ab	V/%
1127	H_Vb-1/H_Vbc-1	1. Harmonic, voltage value, b-N, bc (Fundamental)	V
1129	H_Vb-2/H_Vbc-2	2. Harmonic, voltage value, b-N, bc	V/%
1131	H_Vb-3/H_Vbc-3	3. Harmonic, voltage value, b-N, bc	V/%
1133	H_Vb-4/H_Vbc-4	4. Harmonic, voltage value, b-N, bc	V/%
1135	H_Vb-5/H_Vbc-5	5. Harmonic, voltage value, b-N, bc	V/%
1137	H_Vb-6/H_Vbc-6	6. Harmonic, voltage value, b-N, bc	V/%
1139	H_Vb-7/H_Vbc-7	7. Harmonic, voltage value, b-N, bc	V/%
1141	H_Vb-8/H_Vbc-8	8. Harmonic, voltage value, b-N, bc	V/%
1143	H_Vb-9/H_Vbc-9	9. Harmonic, voltage value, b-N, bc	V/%
1145	H_Vb-10/H_Vbc-10	10. Harmonic, voltage value, b-N, bc	V/%

Table 2-35 Registers 1001 to 1377: Harmonics – Voltage Values (cont.)

Register	Type of Information	Remark	Unit
1147	H_Vb-11/H_Vbc-11	11. Harmonic, voltage value, b-N, bc	V/%
1149	H_Vb-12/H_Vbc-12	12. Harmonic, voltage value, b-N, bc	V/%
1151	H_Vb-13/H_Vbc-13	13. Harmonic, voltage value, b-N, bc	V/%
1153	H_Vb-14/H_Vbc-14	14. Harmonic, voltage value, b-N, bc	V/%
1155	H_Vb-15/H_Vbc-15	15. Harmonic, voltage value, b-N, bc	V/%
1157	H_Vb-16/H_Vbc-16	16. Harmonic, voltage value, b-N, bc	V/%
1159	H_Vb-17/H_Vbc-17	17. Harmonic, voltage value, b-N, bc	V/%
1161	H_Vb-18/H_Vbc-18	18. Harmonic, voltage value, b-N, bc	V/%
1163	H_Vb-19/H_Vbc-19	19. Harmonic, voltage value, b-N, bc	V/%
1165	H_Vb-20/H_Vbc-20	20. Harmonic, voltage value, b-N, bc	V/%
1167	H_Vb-21/H_Vbc-21	21. Harmonic, voltage value, b-N, bc	V/%
1169	H_Vb-22/H_Vbc-22	22. Harmonic, voltage value, b-N, bc	V/%
1171	H_Vb-23/H_Vbc-23	23. Harmonic, voltage value, b-N, bc	V/%
1173	H_Vb-24/H_Vbc-24	24. Harmonic, voltage value, b-N, bc	V/%
1175	H_Vb-25/H_Vbc-25	25. Harmonic, voltage value, b-N, bc	V/%
1177	H_Vb-26/H_Vbc-26	26. Harmonic, voltage value, b-N, bc	V/%
1179	H_Vb-27/H_Vbc-27	27. Harmonic, voltage value, b-N, bc	V/%
1181	H_Vb-28/H_Vbc-28	28. Harmonic, voltage value, b-N, bc	V/%
1183	H_Vb-29/H_Vbc-29	29. Harmonic, voltage value, b-N, bc	V/%
1185	H_Vb-30/H_Vbc-30	30. Harmonic, voltage value, b-N, bc	V/%
1187	H_Vb-31/H_Vbc-31	31. Harmonic, voltage value, b-N, bc	V/%
1189	H_Vb-32/H_Vbc-32	32. Harmonic, voltage value, b-N, bc	V/%
1191	H_Vb-33/H_Vbc-33	33. Harmonic, voltage value, b-N, bc	V/%
1193	H_Vb-34/H_Vbc-34	34. Harmonic, voltage value, b-N, bc	V/%
1195	H_Vb-35/H_Vbc-35	35. Harmonic, voltage value, b-N, bc	V/%
1197	H_Vb-36/H_Vbc-36	36. Harmonic, voltage value, b-N, bc	V/%

Table 2-35 Registers 1001 to 1377: Harmonics – Voltage Values (cont.)

Register	Type of Information	Remark	Unit
1199	H_Vb-37/H_Vbc-37	37. Harmonic, voltage value, b-N, bc	V/%
1201	H_Vb-38/H_Vbc-38	38. Harmonic, voltage value, b-N, bc	V/%
1203	H_Vb-39/H_Vbc-39	39. Harmonic, voltage value, b-N, bc	V/%
1205	H_Vb-40/H_Vbc-40	40. Harmonic, voltage value, b-N, bc	V/%
1207	H_Vb-41/H_Vbc-41	41. Harmonic, voltage value, b-N, bc	V/%
1209	H_Vb-42/H_Vbc-42	42. Harmonic, voltage value, b-N, bc	V/%
1211	H_Vb-43/H_Vbc-43	43. Harmonic, voltage value, b-N, bc	V/%
1213	H_Vb-44/H_Vbc-44	44. Harmonic, voltage value, b-N, bc	V/%
1215	H_Vb-45/H_Vbc-45	45. Harmonic, voltage value, b-N, bc	V/%
1217	H_Vb-46/H_Vbc-46	46. Harmonic, voltage value, b-N, bc	V/%
1219	H_Vb-47/H_Vbc-47	47. Harmonic, voltage value, b-N, bc	V/%
1221	H_Vb-48/H_Vbc-48	48. Harmonic, voltage value, b-N, bc	V/%
1223	H_Vb-49/H_Vbc-49	49. Harmonic, voltage value, b-N, bc	V/%
1225	H_Vb-50/H_Vbc-50	50. Harmonic, voltage value, b-N, bc	V/%
1227	H_Vb-51/H_Vbc-51	51. Harmonic, voltage value, b-N, bc	V/%
1229	H_Vb-52/H_Vbc-52	52. Harmonic, voltage value, b-N, bc	V/%
1231	H_Vb-53/H_Vbc-53	53. Harmonic, voltage value, b-N, bc	V/%
1233	H_Vb-54/H_Vbc-54	54. Harmonic, voltage value, b-N, bc	V/%
1235	H_Vb-55/H_Vbc-55	55. Harmonic, voltage value, b-N, bc	V/%
1237	H_Vb-56/H_Vbc-56	56. Harmonic, voltage value, b-N, bc	V/%
1239	H_Vb-57/H_Vbc-57	57. Harmonic, voltage value, b-N, bc	V/%
1241	H_Vb-58/H_Vbc-58	58. Harmonic, voltage value, b-N, bc	V/%
1243	H_Vb-59/H_Vbc-59	59. Harmonic, voltage value, b-N, bc	V/%
1245	H_Vb-60/H_Vbc-60	60. Harmonic, voltage value, b-N, bc	V/%
1247	H_Vb-61/H_Vbc-61	61. Harmonic, voltage value, b-N, bc	V/%
1249	H_Vb-62/H_Vbc-62	62. Harmonic, voltage value, b-N, bc	V/%

Table 2-35 Registers 1001 to 1377: Harmonics – Voltage Values (cont.)

Register	Type of Information	Remark	Unit
1251	H_Vb-63/H_Vbc-63	63. Harmonic, voltage value, b-N, bc	V/%
1253	H_Vc-1/H_Vca-1	1. Harmonic, voltage value, c-N, ca (Fundamental)	V
1255	H_Vc-2/H_Vca-2	2. Harmonic, voltage value, c-N, ca	V/%
1257	H_Vc-3/H_Vca-3	3. Harmonic, voltage value, c-N, ca	V/%
1259	H_Vc-4/H_Vca-4	4. Harmonic, voltage value, c-N, ca	V/%
1261	H_Vc-5/H_Vca-5	5. Harmonic, voltage value, c-N, ca	V/%
1263	H_Vc-6/H_Vca-6	6. Harmonic, voltage value, c-N, ca	V/%
1265	H_Vc-7/H_Vca-7	7. Harmonic, voltage value, c-N, ca	V/%
1267	H_Vc-8/H_Vca-8	8. Harmonic, voltage value, c-N, ca	V/%
1269	H_Vc-9/H_Vca-9	9. Harmonic, voltage value, c-N, ca	V/%
1271	H_Vc-10/H_Vca-10	10. Harmonic, voltage value, c-N, ca	V/%
1273	H_Vc-11/H_Vca-11	11. Harmonic, voltage value, c-N, ca	V/%
1275	H_Vc-12/H_Vca-12	12. Harmonic, voltage value, c-N, ca	V/%
1277	H_Vc-13/H_Vca-13	13. Harmonic, voltage value, c-N, ca	V/%
1279	H_Vc-14/H_Vca-14	14. Harmonic, voltage value, c-N, ca	V/%
1281	H_Vc-15/H_Vca-15	15. Harmonic, voltage value, c-N, ca	V/%
1283	H_Vc-16/H_Vca-16	16. Harmonic, voltage value, c-N, ca	V/%
1285	H_Vc-17/H_Vca-17	17. Harmonic, voltage value, c-N, ca	V/%
1287	H_Vc-18/H_Vca-18	18. Harmonic, voltage value, c-N, ca	V/%
1289	H_Vc-19/H_Vca-19	19. Harmonic, voltage value, c-N, ca	V/%
1291	H_Vc-20/H_Vca-20	20. Harmonic, voltage value, c-N, ca	V/%
1293	H_Vc-21/H_Vca-21	21. Harmonic, voltage value, c-N, ca	V/%
1295	H_Vc-22/H_Vca-22	22. Harmonic, voltage value, c-N, ca	V/%
1297	H_Vc-23/H_Vca-23	23. Harmonic, voltage value, c-N, ca	V/%
1299	H_Vc-24/H_Vca-24	24. Harmonic, voltage value, c-N, ca	V/%
1301	H_Vc-25/H_Vca-25	25. Harmonic, voltage value, c-N, ca	V/%

Table 2-35 Registers 1001 to 1377: Harmonics – Voltage Values (cont.)

Register	Type of Information	Remark	Unit
1303	H_Vc-26/H_Vca-26	26. Harmonic, voltage value, c-N, ca	V/%
1305	H_Vc-27/H_Vca-27	27. Harmonic, voltage value, c-N, ca	V/%
1307	H_Vc-28/H_Vca-28	28. Harmonic, voltage value, c-N, ca	V/%
1309	H_Vc-29/H_Vca-29	29. Harmonic, voltage value, c-N, ca	V/%
1311	H_Vc-30/H_Vca-30	30. Harmonic, voltage value, c-N, ca	V/%
1313	H_Vc-31/H_Vca-31	31. Harmonic, voltage value, c-N, ca	V/%
1315	H_Vc-32/H_Vca-32	32. Harmonic, voltage value, c-N, ca	V/%
1317	H_Vc-33/H_Vca-33	33. Harmonic, voltage value, c-N, ca	V/%
1319	H_Vc-34/H_Vca-34	34. Harmonic, voltage value, c-N, ca	V/%
1321	H_Vc-35/H_Vca-35	35. Harmonic, voltage value, c-N, ca	V/%
1323	H_Vc-36/H_Vca-36	36. Harmonic, voltage value, c-N, ca	V/%
1325	H_Vc-37/H_Vca-37	37. Harmonic, voltage value, c-N, ca	V/%
1327	H_Vc-38/H_Vca-38	38. Harmonic, voltage value, c-N, ca	V/%
1329	H_Vc-39/H_Vca-39	39. Harmonic, voltage value, c-N, ca	V/%
1331	H_Vc-40/H_Vca-40	40. Harmonic, voltage value, c-N, ca	V/%
1333	H_Vc-41/H_Vca-41	41. Harmonic, voltage value, c-N, ca	V/%
1335	H_Vc-42/H_Vca-42	42. Harmonic, voltage value, c-N, ca	V/%
1337	H_Vc-43/H_Vca-43	43. Harmonic, voltage value, c-N, ca	V/%
1339	H_Vc-44/H_Vca-44	44. Harmonic, voltage value, c-N, ca	V/%
1341	H_Vc-45/H_Vca-45	45. Harmonic, voltage value, c-N, ca	V/%
1343	H_Vc-46/H_Vca-46	46. Harmonic, voltage value, c-N, ca	V/%
1345	H_Vc-47/H_Vca-47	47. Harmonic, voltage value, c-N, ca	V/%
1347	H_Vc-48/H_Vca-48	48. Harmonic, voltage value, c-N, ca	V/%
1349	H_Vc-49/H_Vca-49	49. Harmonic, voltage value, c-N, ca	V/%
1351	H_Vc-50/H_Vca-50	50. Harmonic, voltage value, c-N, ca	V/%
1353	H_Vc-51/H_Vca-51	51. Harmonic, voltage value, c-N, ca	V/%

Table 2-35 Registers 1001 to 1377: Harmonics – Voltage Values (cont.)

Register	Type of Information	Remark	Unit
1355	H_Vc-52/H_Vca-52	52. Harmonic, voltage value, c-N, ca	V/%
1357	H_Vc-53/H_Vca-53	53. Harmonic, voltage value, c-N, ca	V/%
1359	H_Vc-54/H_Vca-54	54. Harmonic, voltage value, c-N, ca	V/%
1361	H_Vc-55/H_Vca-55	55. Harmonic, voltage value, c-N, ca	V/%
1363	H_Vc-56/H_Vca-56	56. Harmonic, voltage value, c-N, ca	V/%
1365	H_Vc-57/H_Vca-57	57. Harmonic, voltage value, c-N, ca	V/%
1367	H_Vc-58/H_Vca-58	58. Harmonic, voltage value, c-N, ca	V/%
1369	H_Vc-59/H_Vca-59	59. Harmonic, voltage value, c-N, ca	V/%
1371	H_Vc-60/H_Vca-60	60. Harmonic, voltage value, c-N, ca	V/%
1373	H_Vc-61/H_Vca-61	61. Harmonic, voltage value, c-N, ca	V/%
1375	H_Vc-62/H_Vca-62	62. Harmonic, voltage value, c-N, ca	V/%
1377	H_Vc-63/H_Vca-63	63. Harmonic, voltage value, c-N, ca	V/%

2.2.7.28 Registers 1379 to 1755: Harmonics – Current Values (read only)

These registers are write-protected. A write attempt will be rejected with exception code 02 (ILLEGAL_DATA_ADDRESS).

Calculation period: 10/12 cycle (50 Hz/60 Hz)

Data type: Measured value

Table 2-36 Registers 1379 to 1755: Harmonics – Current Values

Register	Type of Information	Remark	Unit
1379	H_la-1	1. Harmonic, current value, a (Fundamental)	A
1381	H_la-2	2. Harmonic, current value, a	A
1383	H_la-3	3. Harmonic, current value, a	A
1385	H_la-4	4. Harmonic, current value, a	A
1387	H_la-5	5. Harmonic, current value, a	A
1389	H_la-6	6. Harmonic, current value, a	A
1391	H_la-7	7. Harmonic, current value, a	A
1393	H_la-8	8. Harmonic, current value, a	A
1395	H_la-9	9. Harmonic, current value, a	A
1397	H_la-10	10. Harmonic, current value, a	A
1399	H_la-11	11. Harmonic, current value, a	A
1401	H_la-12	12. Harmonic, current value, a	A
1403	H_la-13	13. Harmonic, current value, a	A
1405	H_la-14	14. Harmonic, current value, a	A
1407	H_la-15	15. Harmonic, current value, a	A
1409	H_la-16	16. Harmonic, current value, a	A
1411	H_la-17	17. Harmonic, current value, a	A
1413	H_la-18	18. Harmonic, current value, a	A
1415	H_la-19	19. Harmonic, current value, a	A
1417	H_la-20	20. Harmonic, current value, a	A
1419	H_la-21	21. Harmonic, current value, a	A
1421	H_la-22	22. Harmonic, current value, a	A

Table 2-36 Registers 1379 to 1755: Harmonics – Current Values (cont.)

Register	Type of Information	Remark	Unit
1423	H_la-23	23. Harmonic, current value, a	A
1425	H_la-24	24. Harmonic, current value, a	A
1427	H_la-25	25. Harmonic, current value, a	A
1429	H_la-26	26. Harmonic, current value, a	A
1431	H_la-27	27. Harmonic, current value, a	A
1433	H_la-28	28. Harmonic, current value, a	A
1435	H_la-29	29. Harmonic, current value, a	A
1437	H_la-30	30. Harmonic, current value, a	A
1439	H_la-31	31. Harmonic, current value, a	A
1441	H_la-32	32. Harmonic, current value, a	A
1443	H_la-33	33. Harmonic, current value, a	A
1445	H_la-34	34. Harmonic, current value, a	A
1447	H_la-35	35. Harmonic, current value, a	A
1449	H_la-36	36. Harmonic, current value, a	A
1451	H_la-37	37. Harmonic, current value, a	A
1453	H_la-38	38. Harmonic, current value, a	A
1455	H_la-39	39. Harmonic, current value, a	A
1457	H_la-40	40. Harmonic, current value, a	A
1459	H_la-41	41. Harmonic, current value, a	A
1461	H_la-42	42. Harmonic, current value, a	A
1463	H_la-43	43. Harmonic, current value, a	A
1465	H_la-44	44. Harmonic, current value, a	A
1467	H_la-45	45. Harmonic, current value, a	A
1469	H_la-46	46. Harmonic, current value, a	A
1471	H_la-47	47. Harmonic, current value, a	A
1473	H_la-48	48. Harmonic, current value, a	A

Table 2-36 Registers 1379 to 1755: Harmonics – Current Values (cont.)

Register	Type of Information	Remark	Unit
1475	H_Ia-49	49. Harmonic, current value, a	A
1477	H_Ia-50	50. Harmonic, current value, a	A
1479	H_Ia-51	51. Harmonic, current value, a	A
1481	H_Ia-52	52. Harmonic, current value, a	A
1483	H_Ia-53	53. Harmonic, current value, a	A
1485	H_Ia-54	54. Harmonic, current value, a	A
1487	H_Ia-55	55. Harmonic, current value, a	A
1489	H_Ia-56	56. Harmonic, current value, a	A
1491	H_Ia-57	57. Harmonic, current value, a	A
1493	H_Ia-58	58. Harmonic, current value, a	A
1495	H_Ia-59	59. Harmonic, current value, a	A
1497	H_Ia-60	60. Harmonic, current value, a	A
1499	H_Ia-61	61. Harmonic, current value, a	A
1501	H_Ia-62	62. Harmonic, current value, a	A
1503	H_Ia-63	63. Harmonic, current value, a	A
1505	H_Ib-1	1. Harmonic, current value, b (Fundamental)	A
1507	H_Ib-2	2. Harmonic, current value, b	A
1509	H_Ib-3	3. Harmonic, current value, b	A
1511	H_Ib-4	4. Harmonic, current value, b	A
1513	H_Ib-5	5. Harmonic, current value, b	A
1515	H_Ib-6	6. Harmonic, current value, b	A
1517	H_Ib-7	7. Harmonic, current value, b	A
1519	H_Ib-8	8. Harmonic, current value, b	A
1521	H_Ib-9	9. Harmonic, current value, b	A
1523	H_Ib-10	10. Harmonic, current value, b	A
1525	H_Ib-11	11. Harmonic, current value, b	A

Table 2-36 Registers 1379 to 1755: Harmonics – Current Values (cont.)

Register	Type of Information	Remark	Unit
1527	H_lb-12	12. Harmonic, current value, b	A
1529	H_lb-13	13. Harmonic, current value, b	A
1531	H_lb-14	14. Harmonic, current value, b	A
1533	H_lb-15	15. Harmonic, current value, b	A
1535	H_lb-16	16. Harmonic, current value, b	A
1537	H_lb-17	17. Harmonic, current value, b	A
1539	H_lb-18	18. Harmonic, current value, b	A
1541	H_lb-19	19. Harmonic, current value, b	A
1543	H_lb-20	20. Harmonic, current value, b	A
1545	H_lb-21	21. Harmonic, current value, b	A
1547	H_lb-22	22. Harmonic, current value, b	A
1549	H_lb-23	23. Harmonic, current value, b	A
1551	H_lb-24	24. Harmonic, current value, b	A
1553	H_lb-25	25. Harmonic, current value, b	A
1555	H_lb-26	26. Harmonic, current value, b	A
1557	H_lb-27	27. Harmonic, current value, b	A
1559	H_lb-28	28. Harmonic, current value, b	A
1561	H_lb-29	29. Harmonic, current value, b	A
1563	H_lb-30	30. Harmonic, current value, b	A
1565	H_lb-31	31. Harmonic, current value, b	A
1567	H_lb-32	32. Harmonic, current value, b	A
1569	H_lb-33	33. Harmonic, current value, b	A
1571	H_lb-34	34. Harmonic, current value, b	A
1573	H_lb-35	35. Harmonic, current value, b	A
1575	H_lb-36	36. Harmonic, current value, b	A
1577	H_lb-37	37. Harmonic, current value, b	A

Table 2-36 Registers 1379 to 1755: Harmonics – Current Values (cont.)

Register	Type of Information	Remark	Unit
1579	H_Ib-38	38. Harmonic, current value, b	A
1581	H_Ib-39	39. Harmonic, current value, b	A
1583	H_Ib-40	40. Harmonic, current value, b	A
1585	H_Ib-41	41. Harmonic, current value, b	A
1587	H_Ib-42	42. Harmonic, current value, b	A
1589	H_Ib-43	43. Harmonic, current value, b	A
1591	H_Ib-44	44. Harmonic, current value, b	A
1593	H_Ib-45	45. Harmonic, current value, b	A
1595	H_Ib-46	46. Harmonic, current value, b	A
1597	H_Ib-47	47. Harmonic, current value, b	A
1599	H_Ib-48	48. Harmonic, current value, b	A
1601	H_Ib-49	49. Harmonic, current value, b	A
1603	H_Ib-50	50. Harmonic, current value, b	A
1605	H_Ib-51	51. Harmonic, current value, b	A
1607	H_Ib-52	52. Harmonic, current value, b	A
1609	H_Ib-53	53. Harmonic, current value, b	A
1611	H_Ib-54	54. Harmonic, current value, b	A
1613	H_Ib-55	55. Harmonic, current value, b	A
1615	H_Ib-56	56. Harmonic, current value, b	A
1617	H_Ib-57	57. Harmonic, current value, b	A
1619	H_Ib-58	58. Harmonic, current value, b	A
1621	H_Ib-59	59. Harmonic, current value, b	A
1623	H_Ib-60	60. Harmonic, current value, b	A
1625	H_Ib-61	61. Harmonic, current value, b	A
1627	H_Ib-62	62. Harmonic, current value, b	A
1629	H_Ib-63	63. Harmonic, current value, b	A

Table 2-36 Registers 1379 to 1755: Harmonics – Current Values (cont.)

Register	Type of Information	Remark	Unit
1631	H_lc-1	1. Harmonic, current value, c (Fundamental)	A
1633	H_lc-2	2. Harmonic, current value, c	A
1635	H_lc-3	3. Harmonic, current value, c	A
1637	H_lc-4	4. Harmonic, current value, c	A
1639	H_lc-5	5. Harmonic, current value, c	A
1641	H_lc-6	6. Harmonic, current value, c	A
1643	H_lc-7	7. Harmonic, current value, c	A
1645	H_lc-8	8. Harmonic, current value, c	A
1647	H_lc-9	9. Harmonic, current value, c	A
1649	H_lc-10	10. Harmonic, current value, c	A
1651	H_lc-11	11. Harmonic, current value, c	A
1653	H_lc-12	12. Harmonic, current value, c	A
1655	H_lc-13	13. Harmonic, current value, c	A
1657	H_lc-14	14. Harmonic, current value, c	A
1659	H_lc-15	15. Harmonic, current value, c	A
1661	H_lc-16	16. Harmonic, current value, c	A
1663	H_lc-17	17. Harmonic, current value, c	A
1665	H_lc-18	18. Harmonic, current value, c	A
1667	H_lc-19	19. Harmonic, current value, c	A
1669	H_lc-20	20. Harmonic, current value, c	A
1671	H_lc-21	21. Harmonic, current value, c	A
1673	H_lc-22	22. Harmonic, current value, c	A
1675	H_lc-23	23. Harmonic, current value, c	A
1677	H_lc-24	24. Harmonic, current value, c	A
1679	H_lc-25	25. Harmonic, current value, c	A
1681	H_lc-26	26. Harmonic, current value, c	A

Table 2-36 Registers 1379 to 1755: Harmonics – Current Values (cont.)

Register	Type of Information	Remark	Unit
1683	H_Ic-27	27. Harmonic, current value, c	A
1685	H_Ic-28	28. Harmonic, current value, c	A
1687	H_Ic-29	29. Harmonic, current value, c	A
1689	H_Ic-30	30. Harmonic, current value, c	A
1691	H_Ic-31	31. Harmonic, current value, c	A
1693	H_Ic-32	32. Harmonic, current value, c	A
1695	H_Ic-33	33. Harmonic, current value, c	A
1697	H_Ic-34	34. Harmonic, current value, c	A
1699	H_Ic-35	35. Harmonic, current value, c	A
1701	H_Ic-36	36. Harmonic, current value, c	A
1703	H_Ic-37	37. Harmonic, current value, c	A
1705	H_Ic-38	38. Harmonic, current value, c	A
1707	H_Ic-39	39. Harmonic, current value, c	A
1709	H_Ic-40	40. Harmonic, current value, c	A
1711	H_Ic-41	41. Harmonic, current value, c	A
1713	H_Ic-42	42. Harmonic, current value, c	A
1715	H_Ic-43	43. Harmonic, current value, c	A
1717	H_Ic-44	44. Harmonic, current value, c	A
1719	H_Ic-45	45. Harmonic, current value, c	A
1721	H_Ic-46	46. Harmonic, current value, c	A
1723	H_Ic-47	47. Harmonic, current value, c	A
1725	H_Ic-48	48. Harmonic, current value, c	A
1727	H_Ic-49	49. Harmonic, current value, c	A
1729	H_Ic-50	50. Harmonic, current value, c	A
1731	H_Ic-51	51. Harmonic, current value, c	A
1733	H_Ic-52	52. Harmonic, current value, c	A

Table 2-36 Registers 1379 to 1755: Harmonics – Current Values (cont.)

Register	Type of Information	Remark	Unit
1735	H_lc-53	53. Harmonic, current value, c	A
1737	H_lc-54	54. Harmonic, current value, c	A
1739	H_lc-55	55. Harmonic, current value, c	A
1741	H_lc-56	56. Harmonic, current value, c	A
1743	H_lc-57	57. Harmonic, current value, c	A
1745	H_lc-58	58. Harmonic, current value, c	A
1747	H_lc-59	59. Harmonic, current value, c	A
1749	H_lc-60	60. Harmonic, current value, c	A
1751	H_lc-61	61. Harmonic, current value, c	A
1753	H_lc-62	62. Harmonic, current value, c	A
1755	H_lc-63	63. Harmonic, current value, c	A

2.2.7.29 Registers 1801 to 2098: PQ Calculation for Harmonic (Average Values) – Voltage Values (read only)

These registers are write-protected. A write attempt will be rejected with exception code 02 (ILLEGAL_DATA_ADDRESS).

The data are calculated within the parameterized time (for example 30 s, 1 min etc.).

Network types: harmonic ph-n is available if 4W is used; harmonic ph-ph is available if 3W is used.

Data type: Measured value

Table 2-37 Registers 1801 to 2098: PQ Calculation for Harmonics (Average Values) – Voltage Values

Register	Type of Information	Remark	Unit
1801	H_Va/Vab-1_AVG	1. Harmonic (average value), voltage value, a-N, ab (Fundamental)	V
1803	H_Va/Vab-2_AVG	2. Harmonic (average value), voltage value, a-N, ab	V/%
1805	H_Va/Vab-3_AVG	3. Harmonic (average value), voltage value, a-N, ab	V/%
1807	H_Va/Vab-4_AVG	4. Harmonic (average value), voltage value, a-N, ab	V/%
1809	H_Va/Vab-5_AVG	5. Harmonic (average value), voltage value, a-N, ab	V/%
1811	H_Va/Vab-6_AVG	6. Harmonic (average value), voltage value, a-N, ab	V/%
1813	H_Va/Vab-7_AVG	7. Harmonic (average value), voltage value, a-N, ab	V/%
1815	H_Va/Vab-8_AVG	8. Harmonic (average value), voltage value, a-N, ab	V/%
1817	H_Va/Vab-9_AVG	9. Harmonic (average value), voltage value, a-N, ab	V/%
1819	H_Va/Vab-10_AVG	10. Harmonic (average value), voltage value, a-N, ab	V/%
1821	H_Va/Vab-11_AVG	11. Harmonic (average value), voltage value, a-N, ab	V/%
1823	H_Va/Vab-12_AVG	12. Harmonic (average value), voltage value, a-N, ab	V/%
1825	H_Va/Vab-13_AVG	13. Harmonic (average value), voltage value, a-N, ab	V/%
1827	H_Va/Vab-14_AVG	14. Harmonic (average value), voltage value, a-N, ab	V/%
1829	H_Va/Vab-15_AVG	15. Harmonic (average value), voltage value, a-N, ab	V/%
1831	H_Va/Vab-16_AVG	16. Harmonic (average value), voltage value, a-N, ab	V/%
1833	H_Va/Vab-17_AVG	17. Harmonic (average value), voltage value, a-N, ab	V/%
1835	H_Va/Vab-18_AVG	18. Harmonic (average value), voltage value, a-N, ab	V/%
1837	H_Va/Vab-19_AVG	19. Harmonic (average value), voltage value, a-N, ab	V/%
1839	H_Va/Vab-20_AVG	20. Harmonic (average value), voltage value, a-N, ab	V/%

Table 2-37 Registers 1801 to 2098: PQ Calculation for Harmonics (Average Values) – Voltage Values

Register	Type of Information	Remark	Unit
1841	H_Va/Vab-21_AVG	21. Harmonic (average value), voltage value, a-N, ab	V/%
1843	H_Va/Vab-22_AVG	22. Harmonic (average value), voltage value, a-N, ab	V/%
1845	H_Va/Vab-23_AVG	23. Harmonic (average value), voltage value, a-N, ab	V/%
1847	H_Va/Vab-24_AVG	24. Harmonic (average value), voltage value, a-N, ab	V/%
1849	H_Va/Vab-25_AVG	25. Harmonic (average value), voltage value, a-N, ab	V/%
1851	H_Va/Vab-26_AVG	26. Harmonic (average value), voltage value, a-N, ab	V/%
1853	H_Va/Vab-27_AVG	27. Harmonic (average value), voltage value, a-N, ab	V/%
1855	H_Va/Vab-28_AVG	28. Harmonic (average value), voltage value, a-N, ab	V/%
1857	H_Va/Vab-29_AVG	29. Harmonic (average value), voltage value, a-N, ab	V/%
1859	H_Va/Vab-30_AVG	30. Harmonic (average value), voltage value, a-N, ab	V/%
1861	H_Va/Vab-31_AVG	31. Harmonic (average value), voltage value, a-N, ab	V/%
1863	H_Va/Vab-32_AVG	32. Harmonic (average value), voltage value, a-N, ab	V/%
1865	H_Va/Vab-33_AVG	33. Harmonic (average value), voltage value, a-N, ab	V/%
1867	H_Va/Vab-34_AVG	34. Harmonic (average value), voltage value, a-N, ab	V/%
1869	H_Va/Vab-35_AVG	35. Harmonic (average value), voltage value, a-N, ab	V/%
1871	H_Va/Vab-36_AVG	36. Harmonic (average value), voltage value, a-N, ab	V/%
1873	H_Va/Vab-37_AVG	37. Harmonic (average value), voltage value, a-N, ab	V/%
1875	H_Va/Vab-38_AVG	38. Harmonic (average value), voltage value, a-N, ab	V/%
1877	H_Va/Vab-39_AVG	39. Harmonic (average value), voltage value, a-N, ab	V/%
1879	H_Va/Vab-40_AVG	40. Harmonic (average value), voltage value, a-N, ab	V/%
1881	H_Va/Vab-41_AVG	41. Harmonic (average value), voltage value, a-N, ab	V/%
1883	H_Va/Vab-42_AVG	42. Harmonic (average value), voltage value, a-N, ab	V/%
1885	H_Va/Vab-43_AVG	43. Harmonic (average value), voltage value, a-N, ab	V/%
1887	H_Va/Vab-44_AVG	44. Harmonic (average value), voltage value, a-N, ab	V/%
1889	H_Va/Vab-45_AVG	45. Harmonic (average value), voltage value, a-N, ab	V/%
1891	H_Va/Vab-46_AVG	46. Harmonic (average value), voltage value, a-N, ab	V/%

Table 2-37 Registers 1801 to 2098: PQ Calculation for Harmonics (Average Values) – Voltage Values

Register	Type of Information	Remark	Unit
1893	H_Va/Vab-47_AVG	47. Harmonic (average value), voltage value, a-N, ab	V/%
1895	H_Va/Vab-48_AVG	48. Harmonic (average value), voltage value, a-N, ab	V/%
1897	H_Va/Vab-49_AVG	49. Harmonic (average value), voltage value, a-N, ab	V/%
1901	H_Vb/Vbc-1_AVG	1. Harmonic (average value), voltage value, b-N, bc (Fundamental)	V
1903	H_Vb/Vbc-2_AVG	2. Harmonic (average value), voltage value, b-N, bc	V/%
1905	H_Vb/Vbc-3_AVG	3. Harmonic (average value), voltage value, b-N, bc	V/%
1907	H_Vb/Vbc-4_AVG	4. Harmonic (average value), voltage value, b-N, bc	V/%
1909	H_Vb/Vbc-5_AVG	5. Harmonic (average value), voltage value, b-N, bc	V/%
1911	H_Vb/Vbc-6_AVG	6. Harmonic (average value), voltage value, b-N, bc	V/%
1913	H_Vb/Vbc-7_AVG	7. Harmonic (average value), voltage value, b-N, bc	V/%
1915	H_Vb/Vbc-8_AVG	8. Harmonic (average value), voltage value, b-N, bc	V/%
1917	H_Vb/Vbc-9_AVG	9. Harmonic (average value), voltage value, b-N, bc	V/%
1919	H_Vb/Vbc-10_AVG	10. Harmonic (average value), voltage value, b-N, bc	V/%
1921	H_Vb/Vbc-11_AVG	11. Harmonic (average value), voltage value, b-N, bc	V/%
1923	H_Vb/Vbc-12_AVG	12. Harmonic (average value), voltage value, b-N, bc	V/%
1925	H_Vb/Vbc-13_AVG	13. Harmonic (average value), voltage value, b-N, bc	V/%
1927	H_Vb/Vbc-14_AVG	14. Harmonic (average value), voltage value, b-N, bc	V/%
1929	H_Vb/Vbc-15_AVG	15. Harmonic (average value), voltage value, b-N, bc	V/%
1931	H_Vb/Vbc-16_AVG	16. Harmonic (average value), voltage value, b-N, bc	V/%
1933	H_Vb/Vbc-17_AVG	17. Harmonic (average value), voltage value, b-N, bc	V/%
1935	H_Vb/Vbc-18_AVG	18. Harmonic (average value), voltage value, b-N, bc	V/%
1937	H_Vb/Vbc-19_AVG	19. Harmonic (average value), voltage value, b-N, bc	V/%
1939	H_Vb/Vbc-20_AVG	20. Harmonic (average value), voltage value, b-N, bc	V/%
1941	H_Vb/Vbc-21_AVG	21. Harmonic (average value), voltage value, b-N, bc	V/%
1943	H_Vb/Vbc-22_AVG	22. Harmonic (average value), voltage value, b-N, bc	V/%

Table 2-37 Registers 1801 to 2098: PQ Calculation for Harmonics (Average Values) – Voltage Values

Register	Type of Information	Remark	Unit
1945	H_Vb/Vbc-23_AVG	23. Harmonic (average value), voltage value, b-N, bc	V/%
1947	H_Vb/Vbc-24_AVG	24. Harmonic (average value), voltage value, b-N, bc	V/%
1949	H_Vb/Vbc-25_AVG	25. Harmonic (average value), voltage value, b-N, bc	V/%
1951	H_Vb/Vbc-26_AVG	26. Harmonic (average value), voltage value, b-N, bc	V/%
1953	H_Vb/Vbc-27_AVG	27. Harmonic (average value), voltage value, b-N, bc	V/%
1955	H_Vb/Vbc-28_AVG	28. Harmonic (average value), voltage value, b-N, bc	V/%
1957	H_Vb/Vbc-29_AVG	29. Harmonic (average value), voltage value, b-N, bc	V/%
1959	H_Vb/Vbc-30_AVG	30. Harmonic (average value), voltage value, b-N, bc	V/%
1961	H_Vb/Vbc-31_AVG	31. Harmonic (average value), voltage value, b-N, bc	V/%
1963	H_Vb/Vbc-32_AVG	32. Harmonic (average value), voltage value, b-N, bc	V/%
1965	H_Vb/Vbc-33_AVG	33. Harmonic (average value), voltage value, b-N, bc	V/%
1967	H_Vb/Vbc-34_AVG	34. Harmonic (average value), voltage value, b-N, bc	V/%
1969	H_Vb/Vbc-35_AVG	35. Harmonic (average value), voltage value, b-N, bc	V/%
1971	H_Vb/Vbc-36_AVG	36. Harmonic (average value), voltage value, b-N, bc	V/%
1973	H_Vb/Vbc-37_AVG	37. Harmonic (average value), voltage value, b-N, bc	V/%
1975	H_Vb/Vbc-38_AVG	38. Harmonic (average value), voltage value, b-N, bc	V/%
1977	H_Vb/Vbc-39_AVG	39. Harmonic (average value), voltage value, b-N, bc	V/%
1979	H_Vb/Vbc-40_AVG	40. Harmonic (average value), voltage value, b-N, bc	V/%
1981	H_Vb/Vbc-41_AVG	41. Harmonic (average value), voltage value, b-N, bc	V/%
1983	H_Vb/Vbc-42_AVG	42. Harmonic (average value), voltage value, b-N, bc	V/%
1985	H_Vb/Vbc-43_AVG	43. Harmonic (average value), voltage value, b-N, bc	V/%
1987	H_Vb/Vbc-44_AVG	44. Harmonic (average value), voltage value, b-N, bc	V/%
1989	H_Vb/Vbc-45_AVG	45. Harmonic (average value), voltage value, b-N, bc	V/%
1991	H_Vb/Vbc-46_AVG	46. Harmonic (average value), voltage value, b-N, bc	V/%
1993	H_Vb/Vbc-47_AVG	47. Harmonic (average value), voltage value, b-N, bc	V/%
1995	H_Vb/Vbc-48_AVG	48. Harmonic (average value), voltage value, b-N, bc	V/%

Table 2-37 Registers 1801 to 2098: PQ Calculation for Harmonics (Average Values) – Voltage Values

Register	Type of Information	Remark	Unit
1997	H_Vb/Vbc-49_AVG	49. Harmonic (average value), voltage value, b-N, bc	V/%
2001	H_Vc/Vca-1_AVG	1. Harmonic (average value), voltage value, c-N, ca (Fundamental)	V
2003	H_Vc/Vca-2_AVG	2. Harmonic (average value), voltage value, c-N, ca	V/%
2005	H_Vc/Vca-3_AVG	3. Harmonic (average value), voltage value, c-N, ca	V/%
2007	H_Vc/Vca-4_AVG	4. Harmonic (average value), voltage value, c-N, ca	V/%
2009	H_Vc/Vca-5_AVG	5. Harmonic (average value), voltage value, c-N, ca	V/%
2011	H_Vc/Vca-6_AVG	6. Harmonic (average value), voltage value, c-N, ca	V/%
2013	H_Vc/Vca-7_AVG	7. Harmonic (average value), voltage value, c-N, ca	V/%
2015	H_Vc/Vca-8_AVG	8. Harmonic (average value), voltage value, c-N, ca	V/%
2017	H_Vc/Vca-9_AVG	9. Harmonic (average value), voltage value, c-N, ca	V/%
2019	H_Vc/Vca-10_AVG	10. Harmonic (average value), voltage value, c-N, ca	V/%
2021	H_Vc/Vca-11_AVG	11. Harmonic (average value), voltage value, c-N, ca	V/%
2023	H_Vc/Vca-12_AVG	12. Harmonic (average value), voltage value, c-N, ca	V/%
2025	H_Vc/Vca-13_AVG	13. Harmonic (average value), voltage value, c-N, ca	V/%
2027	H_Vc/Vca-14_AVG	14. Harmonic (average value), voltage value, c-N, ca	V/%
2029	H_Vc/Vca-15_AVG	15. Harmonic (average value), voltage value, c-N, ca	V/%
2031	H_Vc/Vca-16_AVG	16. Harmonic (average value), voltage value, c-N, ca	V/%
2033	H_Vc/Vca-17_AVG	17. Harmonic (average value), voltage value, c-N, ca	V/%
2035	H_Vc/Vca-18_AVG	18. Harmonic (average value), voltage value, c-N, ca	V/%
2037	H_Vc/Vca-19_AVG	19. Harmonic (average value), voltage value, c-N, ca	V/%
2039	H_Vc/Vca-20_AVG	20. Harmonic (average value), voltage value, c-N, ca	V/%
2041	H_Vc/Vca-21_AVG	21. Harmonic (average value), voltage value, c-N, ca	V/%
2043	H_Vc/Vca-22_AVG	22. Harmonic (average value), voltage value, c-N, ca	V/%
2045	H_Vc/Vca-23_AVG	23. Harmonic (average value), voltage value, c-N, ca	V/%
2047	H_Vc/Vca-24_AVG	24. Harmonic (average value), voltage value, c-N, ca	V/%

Table 2-37 Registers 1801 to 2098: PQ Calculation for Harmonics (Average Values) – Voltage Values

Register	Type of Information	Remark	Unit
2049	H_Vc/Vca-25_AVG	25. Harmonic (average value), voltage value, c-N, ca	V/%
2051	H_Vc/Vca-26_AVG	26. Harmonic (average value), voltage value, c-N, ca	V/%
2053	H_Vc/Vca-27_AVG	27. Harmonic (average value), voltage value, c-N, ca	V/%
2055	H_Vc/Vca-28_AVG	28. Harmonic (average value), voltage value, c-N, ca	V/%
2057	H_Vc/Vca-29_AVG	29. Harmonic (average value), voltage value, c-N, ca	V/%
2059	H_Vc/Vca-30_AVG	30. Harmonic (average value), voltage value, c-N, ca	V/%
2061	H_Vc/Vca-31_AVG	31. Harmonic (average value), voltage value, c-N, ca	V/%
2063	H_Vc/Vca-32_AVG	32. Harmonic (average value), voltage value, c-N, ca	V/%
2065	H_Vc/Vca-33_AVG	33. Harmonic (average value), voltage value, c-N, ca	V/%
2067	H_Vc/Vca-34_AVG	34. Harmonic (average value), voltage value, c-N, ca	V/%
2069	H_Vc/Vca-35_AVG	35. Harmonic (average value), voltage value, c-N, ca	V/%
2071	H_Vc/Vca-36_AVG	36. Harmonic (average value), voltage value, c-N, ca	V/%
2073	H_Vc/Vca-37_AVG	37. Harmonic (average value), voltage value, c-N, ca	V/%
2075	H_Vc/Vca-38_AVG	38. Harmonic (average value), voltage value, c-N, ca	V/%
2077	H_Vc/Vca-39_AVG	39. Harmonic (average value), voltage value, c-N, ca	V/%
2079	H_Vc/Vca-40_AVG	40. Harmonic (average value), voltage value, c-N, ca	V/%
2081	H_Vc/Vca-41_AVG	41. Harmonic (average value), voltage value, c-N, ca	V/%
2083	H_Vc/Vca-42_AVG	42. Harmonic (average value), voltage value, c-N, ca	V/%
2085	H_Vc/Vca-43_AVG	43. Harmonic (average value), voltage value, c-N, ca	V/%
2087	H_Vc/Vca-44_AVG	44. Harmonic (average value), voltage value, c-N, ca	V/%
2089	H_Vc/Vca-45_AVG	45. Harmonic (average value), voltage value, c-N, ca	V/%
2091	H_Vc/Vca-46_AVG	46. Harmonic (average value), voltage value, c-N, ca	V/%
2093	H_Vc/Vca-47_AVG	47. Harmonic (average value), voltage value, c-N, ca	V/%
2095	H_Vc/Vca-48_AVG	48. Harmonic (average value), voltage value, c-N, ca	V/%
2097	H_Vc/Vca-49_AVG	49. Harmonic (average value), voltage value, c-N, ca	V/%

2.2.7.30 Registers 2201 to 2498: PQ Calculation for Maximum Harmonic – Voltage Values (read only)

These registers are write-protected. A write attempt will be rejected with exception code 02 (ILLEGAL_DATA_ADDRESS).

The data are calculated within the parameterized time (for example 30 s, 1 min etc.).

Data type: Measured value

Table 2-38 Registers 2201 to 2498: PQ Calculation for Harmonics (Maximum Values) – Voltage Values

Register	Type of Information	Remark	Unit
2201	H_Va/Vab-1_MAX	1. Harmonic (maximum value), voltage value, a-N, ab (Fundamental)	V
2203	H_Va/Vab-2_MAX	2. Harmonic (maximum value), voltage value, a-N, ab	V/%
2205	H_Va/Vab-3_MAX	3. Harmonic (maximum value), voltage value, a-N, ab	V/%
2207	H_Va/Vab-4_MAX	4. Harmonic (maximum value), voltage value, a-N, ab	V/%
2209	H_Va/Vab-5_MAX	5. Harmonic (maximum value), voltage value, a-N, ab	V/%
2211	H_Va/Vab-6_MAX	6. Harmonic (maximum value), voltage value, a-N, ab	V/%
2213	H_Va/Vab-7_MAX	7. Harmonic (maximum value), voltage value, a-N, ab	V/%
2215	H_Va/Vab-8_MAX	8. Harmonic (maximum value), voltage value, a-N, ab	V/%
2217	H_Va/Vab-9_MAX	9. Harmonic (maximum value), voltage value, a-N, ab	V/%
2219	H_Va/Vab-10_MAX	10. Harmonic (maximum value), voltage value, a-N, ab	V/%
2221	H_Va/Vab-11_MAX	11. Harmonic (maximum value), voltage value, a-N, ab	V/%
2223	H_Va/Vab-12_MAX	12. Harmonic (maximum value), voltage value, a-N, ab	V/%
2225	H_Va/Vab-13_MAX	13. Harmonic (maximum value), voltage value, a-N, ab	V/%
2227	H_Va/Vab-14_MAX	14. Harmonic (maximum value), voltage value, a-N, ab	V/%
2229	H_Va/Vab-15_MAX	15. Harmonic (maximum value), voltage value, a-N, ab	V/%
2231	H_Va/Vab-16_MAX	16. Harmonic (maximum value), voltage value, a-N, ab	V/%
2233	H_Va/Vab-17_MAX	17. Harmonic (maximum value), voltage value, a-N, ab	V/%
2235	H_Va/Vab-18_MAX	18. Harmonic (maximum value), voltage value, a-N, ab	V/%
2237	H_Va/Vab-19_MAX	19. Harmonic (maximum value), voltage value, a-N, ab	V/%
2239	H_Va/Vab-20_MAX	20. Harmonic (maximum value), voltage value, a-N, ab	V/%
2241	H_Va/Vab-21_MAX	21. Harmonic (maximum value), voltage value, a-N, ab	V/%

Table 2-38 Registers 2201 to 2498: PQ Calculation for Harmonics (Maximum Values) – Voltage Values

Register	Type of Information	Remark	Unit
2243	H_Va/Vab-22_MAX	22. Harmonic (maximum value), voltage value, a-N, ab	V/%
2245	H_Va/Vab-23_MAX	23. Harmonic (maximum value), voltage value, a-N, ab	V/%
2247	H_Va/Vab-24_MAX	24. Harmonic (maximum value), voltage value, a-N, ab	V/%
2249	H_Va/Vab-25_MAX	25. Harmonic (maximum value), voltage value, a-N, ab	V/%
2251	H_Va/Vab-26_MAX	26. Harmonic (maximum value), voltage value, a-N, ab	V/%
2253	H_Va/Vab-27_MAX	27. Harmonic (maximum value), voltage value, a-N, ab	V/%
2255	H_Va/Vab-28_MAX	28. Harmonic (maximum value), voltage value, a-N, ab	V/%
2257	H_Va/Vab-29_MAX	29. Harmonic (maximum value), voltage value, a-N, ab	V/%
2259	H_Va/Vab-30_MAX	30. Harmonic (maximum value), voltage value, a-N, ab	V/%
2261	H_Va/Vab-31_MAX	31. Harmonic (maximum value), voltage value, a-N, ab	V/%
2263	H_Va/Vab-32_MAX	32. Harmonic (maximum value), voltage value, a-N, ab	V/%
2265	H_Va/Vab-33_MAX	33. Harmonic (maximum value), voltage value, a-N, ab	V/%
2267	H_Va/Vab-34_MAX	34. Harmonic (maximum value), voltage value, a-N, ab	V/%
2269	H_Va/Vab-35_MAX	35. Harmonic (maximum value), voltage value, a-N, ab	V/%
2271	H_Va/Vab-36_MAX	36. Harmonic (maximum value), voltage value, a-N, ab	V/%
2273	H_Va/Vab-37_MAX	37. Harmonic (maximum value), voltage value, a-N, ab	V/%
2275	H_Va/Vab-38_MAX	38. Harmonic (maximum value), voltage value, a-N, ab	V/%
2277	H_Va/Vab-39_MAX	39. Harmonic (maximum value), voltage value, a-N, ab	V/%
2279	H_Va/Vab-40_MAX	40. Harmonic (maximum value), voltage value, a-N, ab	V/%
2281	H_Va/Vab-41_MAX	41. Harmonic (maximum value), voltage value, a-N, ab	V/%
2283	H_Va/Vab-42_MAX	42. Harmonic (maximum value), voltage value, a-N, ab	V/%
2285	H_Va/Vab-43_MAX	43. Harmonic (maximum value), voltage value, a-N, ab	V/%
2287	H_Va/Vab-44_MAX	44. Harmonic (maximum value), voltage value, a-N, ab	V/%
2289	H_Va/Vab-45_MAX	45. Harmonic (maximum value), voltage value, a-N, ab	V/%
2281	H_Va/Vab-46_MAX	46. Harmonic (maximum value), voltage value, a-N, ab	V/%
2293	H_Va/Vab-47_MAX	47. Harmonic (maximum value), voltage value, a-N, ab	V/%

Table 2-38 Registers 2201 to 2498: PQ Calculation for Harmonics (Maximum Values) – Voltage Values

Register	Type of Information	Remark	Unit
2295	H_Va/Vab-48_MAX	48. Harmonic (maximum value), voltage value, a-N, ab	V/%
2297	H_Va/Vab-49_MAX	49. Harmonic (maximum value), voltage value, a-N, ab	V/%
2301	H_Vb/Vbc-1_MAX	1. Harmonic (maximum value), voltage value, b-N, bc (Fundamental)	V
2303	H_Vb/Vbc-2_MAX	2. Harmonic (maximum value), voltage value, b-N, bc	V/%
2305	H_Vb/Vbc-3_MAX	3. Harmonic (maximum value), voltage value, b-N, bc	V/%
2307	H_Vb/Vbc-4_MAX	4. Harmonic (maximum value), voltage value, b-N, bc	V/%
2309	H_Vb/Vbc-5_MAX	5. Harmonic (maximum value), voltage value, b-N, bc	V/%
2311	H_Vb/Vbc-6_MAX	6. Harmonic (maximum value), voltage value, b-N, bc	V/%
2313	H_Vb/Vbc-7_MAX	7. Harmonic (maximum value), voltage value, b-N, bc	V/%
2315	H_Vb/Vbc-8_MAX	8. Harmonic (maximum value), voltage value, b-N, bc	V/%
2317	H_Vb/Vbc-9_MAX	9. Harmonic (maximum value), voltage value, b-N, bc	V/%
2323	H_Vb/Vbc-10_MAX	10. Harmonic (maximum value), voltage value, b-N, bc	V/%
2321	H_Vb/Vbc-11_MAX	11. Harmonic (maximum value), voltage value, b-N, bc	V/%
2323	H_Vb/Vbc-12_MAX	12. Harmonic (maximum value), voltage value, b-N, bc	V/%
2325	H_Vb/Vbc-13_MAX	13. Harmonic (maximum value), voltage value, b-N, bc	V/%
2327	H_Vb/Vbc-14_MAX	14. Harmonic (maximum value), voltage value, b-N, bc	V/%
2329	H_Vb/Vbc-15_MAX	15. Harmonic (maximum value), voltage value, b-N, bc	V/%
2331	H_Vb/Vbc-16_MAX	16. Harmonic (maximum value), voltage value, b-N, bc	V/%
2333	H_Vb/Vbc-17_MAX	17. Harmonic (maximum value), voltage value, b-N, bc	V/%
2335	H_Vb/Vbc-18_MAX	18. Harmonic (maximum value), voltage value, b-N, bc	V/%
2337	H_Vb/Vbc-19_MAX	19. Harmonic (maximum value), voltage value, b-N, bc	V/%
2339	H_Vb/Vbc-20_MAX	20. Harmonic (maximum value), voltage value, b-N, bc	V/%
2341	H_Vb/Vbc-21_MAX	21. Harmonic (maximum value), voltage value, b-N, bc	V/%
2343	H_Vb/Vbc-22_MAX	22. Harmonic (maximum value), voltage value, b-N, bc	V/%
2345	H_Vb/Vbc-23_MAX	23. Harmonic (maximum value), voltage value, b-N, bc	V/%

Table 2-38 Registers 2201 to 2498: PQ Calculation for Harmonics (Maximum Values) – Voltage Values

Register	Type of Information	Remark	Unit
2347	H_Vb/Vbc-24_MAX	24. Harmonic (maximum value), voltage value, b-N, bc	V/%
2349	H_Vb/Vbc-25_MAX	25. Harmonic (maximum value), voltage value, b-N, bc	V/%
2351	H_Vb/Vbc-26_MAX	26. Harmonic (maximum value), voltage value, b-N, bc	V/%
2353	H_Vb/Vbc-27_MAX	27. Harmonic (maximum value), voltage value, b-N, bc	V/%
2355	H_Vb/Vbc-28_MAX	28. Harmonic (maximum value), voltage value, b-N, bc	V/%
2357	H_Vb/Vbc-29_MAX	29. Harmonic (maximum value), voltage value, b-N, bc	V/%
2359	H_Vb/Vbc-30_MAX	30. Harmonic (maximum value), voltage value, b-N, bc	V/%
2361	H_Vb/Vbc-31_MAX	31. Harmonic (maximum value), voltage value, b-N, bc	V/%
2363	H_Vb/Vbc-32_MAX	32. Harmonic (maximum value), voltage value, b-N, bc	V/%
2365	H_Vb/Vbc-33_MAX	33. Harmonic (maximum value), voltage value, b-N, bc	V/%
2367	H_Vb/Vbc-34_MAX	34. Harmonic (maximum value), voltage value, b-N, bc	V/%
2369	H_Vb/Vbc-35_MAX	35. Harmonic (maximum value), voltage value, b-N, bc	V/%
2371	H_Vb/Vbc-36_MAX	36. Harmonic (maximum value), voltage value, b-N, bc	V/%
2373	H_Vb/Vbc-37_MAX	37. Harmonic (maximum value), voltage value, b-N, bc	V/%
2375	H_Vb/Vbc-38_MAX	38. Harmonic (maximum value), voltage value, b-N, bc	V/%
2377	H_Vb/Vbc-39_MAX	39. Harmonic (maximum value), voltage value, b-N, bc	V/%
2379	H_Vb/Vbc-40_MAX	40. Harmonic (maximum value), voltage value, b-N, bc	V/%
2381	H_Vb/Vbc-41_MAX	41. Harmonic (maximum value), voltage value, b-N, bc	V/%
2383	H_Vb/Vbc-42_MAX	42. Harmonic (maximum value), voltage value, b-N, bc	V/%
2385	H_Vb/Vbc-43_MAX	43. Harmonic (maximum value), voltage value, b-N, bc	V/%
2387	H_Vb/Vbc-44_MAX	44. Harmonic (maximum value), voltage value, b-N, bc	V/%
2389	H_Vb/Vbc-45_MAX	45. Harmonic (maximum value), voltage value, b-N, bc	V/%
2391	H_Vb/Vbc-46_MAX	46. Harmonic (maximum value), voltage value, b-N, bc	V/%
2393	H_Vb/Vbc-47_MAX	47. Harmonic (maximum value), voltage value, b-N, bc	V/%
2395	H_Vb/Vbc-48_MAX	48. Harmonic (maximum value), voltage value, b-N, bc	V/%
2397	H_Vb/Vbc-49_MAX	49. Harmonic (maximum value), voltage value, b-N, bc	V/%

Table 2-38 Registers 2201 to 2498: PQ Calculation for Harmonics (Maximum Values) – Voltage Values

Register	Type of Information	Remark	Unit
2401	H_Vc/Vca-1_MAX	1. Harmonic (maximum value), voltage value, c-N, ca (Fundamental)	V
2403	H_Vc/Vca-2_MAX	2. Harmonic (maximum value), voltage value, c-N, ca	V/%
2405	H_Vc/Vca-3_MAX	3. Harmonic (maximum value), voltage value, c-N, ca	V/%
2407	H_Vc/Vca-4_MAX	4. Harmonic (maximum value), voltage value, c-N, ca	V/%
2409	H_Vc/Vca-5_MAX	5. Harmonic (maximum value), voltage value, c-N, ca	V/%
2411	H_Vc/Vca-6_MAX	6. Harmonic (maximum value), voltage value, c-N, ca	V/%
2413	H_Vc/Vca-7_MAX	7. Harmonic (maximum value), voltage value, c-N, ca	V/%
2415	H_Vc/Vca-8_MAX	8. Harmonic (maximum value), voltage value, c-N, ca	V/%
2417	H_Vc/Vca-9_MAX	9. Harmonic (maximum value), voltage value, c-N, ca	V/%
2419	H_Vc/Vca-10_MAX	10. Harmonic (maximum value), voltage value, c-N, ca	V/%
2421	H_Vc/Vca-11_MAX	11. Harmonic (maximum value), voltage value, c-N, ca	V/%
2423	H_Vc/Vca-12_MAX	12. Harmonic (maximum value), voltage value, c-N, ca	V/%
2425	H_Vc/Vca-13_MAX	13. Harmonic (maximum value), voltage value, c-N, ca	V/%
2427	H_Vc/Vca-14_MAX	14. Harmonic (maximum value), voltage value, c-N, ca	V/%
2429	H_Vc/Vca-15_MAX	15. Harmonic (maximum value), voltage value, c-N, ca	V/%
2431	H_Vc/Vca-16_MAX	16. Harmonic (maximum value), voltage value, c-N, ca	V/%
2433	H_Vc/Vca-17_MAX	17. Harmonic (maximum value), voltage value, c-N, ca	V/%
2435	H_Vc/Vca-18_MAX	18. Harmonic (maximum value), voltage value, c-N, ca	V/%
2437	H_Vc/Vca-19_MAX	19. Harmonic (maximum value), voltage value, c-N, ca	V/%
2439	H_Vc/Vca-20_MAX	20. Harmonic (maximum value), voltage value, c-N, ca	V/%
2441	H_Vc/Vca-21_MAX	21. Harmonic (maximum value), voltage value, c-N, ca	V/%
2443	H_Vc/Vca-22_MAX	22. Harmonic (maximum value), voltage value, c-N, ca	V/%
2445	H_Vc/Vca-23_MAX	23. Harmonic (maximum value), voltage value, c-N, ca	V/%
2447	H_Vc/Vca-24_MAX	24. Harmonic (maximum value), voltage value, c-N, ca	V/%
2449	H_Vc/Vca-25_MAX	25. Harmonic (maximum value), voltage value, c-N, ca	V/%

Table 2-38 Registers 2201 to 2498: PQ Calculation for Harmonics (Maximum Values) – Voltage Values

Register	Type of Information	Remark	Unit
2451	H_Vc/Vca-26_MAX	26. Harmonic (maximum value), voltage value, c-N, ca	V/%
2453	H_Vc/Vca-27_MAX	27. Harmonic (maximum value), voltage value, c-N, ca	V/%
2455	H_Vc/Vca-28_MAX	28. Harmonic (maximum value), voltage value, c-N, ca	V/%
2457	H_Vc/Vca-29_MAX	29. Harmonic (maximum value), voltage value, c-N, ca	V/%
2459	H_Vc/Vca-30_MAX	30. Harmonic (maximum value), voltage value, c-N, ca	V/%
2461	H_Vc/Vca-31_MAX	31. Harmonic (maximum value), voltage value, c-N, ca	V/%
2463	H_Vc/Vca-32_MAX	32. Harmonic (maximum value), voltage value, c-N, ca	V/%
2465	H_Vc/Vca-33_MAX	33. Harmonic (maximum value), voltage value, c-N, ca	V/%
2467	H_Vc/Vca-34_MAX	34. Harmonic (maximum value), voltage value, c-N, ca	V/%
2469	H_Vc/Vca-35_MAX	35. Harmonic (maximum value), voltage value, c-N, ca	V/%
2471	H_Vc/Vca-36_MAX	36. Harmonic (maximum value), voltage value, c-N, ca	V/%
2473	H_Vc/Vca-37_MAX	37. Harmonic (maximum value), voltage value, c-N, ca	V/%
2475	H_Vc/Vca-38_MAX	38. Harmonic (maximum value), voltage value, c-N, ca	V/%
2477	H_Vc/Vca-39_MAX	39. Harmonic (maximum value), voltage value, c-N, ca	V/%
2479	H_Vc/Vca-40_MAX	40. Harmonic (maximum value), voltage value, c-N, ca	V/%
2481	H_Vc/Vca-41_MAX	41. Harmonic (maximum value), voltage value, c-N, ca	V/%
2483	H_Vc/Vca-42_MAX	42. Harmonic (maximum value), voltage value, c-N, ca	V/%
2485	H_Vc/Vca-43_MAX	43. Harmonic (maximum value), voltage value, c-N, ca	V/%
2487	H_Vc/Vca-44_MAX	44. Harmonic (maximum value), voltage value, c-N, ca	V/%
2489	H_Vc/Vca-45_MAX	45. Harmonic (maximum value), voltage value, c-N, ca	V/%
2491	H_Vc/Vca-46_MAX	46. Harmonic (maximum value), voltage value, c-N, ca	V/%
2493	H_Vc/Vca-47_MAX	47. Harmonic (maximum value), voltage value, c-N, ca	V/%
2495	H_Vc/Vca-48_MAX	48. Harmonic (maximum value), voltage value, c-N, ca	V/%
2497	H_Vc/Vca-49_MAX	49. Harmonic (maximum value), voltage value, c-N, ca	V/%

2.2.7.31 Registers 2601 to 2898: PQ Calculation for Average Harmonic – Current Values (read only)

These registers are write-protected. A write attempt will be rejected with exception code 02 (ILLEGAL_DATA_ADDRESS).

The data are calculated within the parameterized time (for example 30 s, 1 min etc.).

Data type: Measured value

Table 2-39 Registers 2601 to 2898: PQ Calculation for Harmonics (Average Values) – Current Values

Register	Type of Information	Remark	Unit
2601	H_la-1_AVG	1. Harmonic (average value), current value, a (Fundamental)	A
2603	H_la-2_AVG	2. Harmonic (average value), current value, a	A
2605	H_la-3_AVG	3. Harmonic (average value), current value, a	A
2607	H_la-4_AVG	4. Harmonic (average value), current value, a	A
2609	H_la-5_AVG	5. Harmonic (average value), current value, a	A
2611	H_la-6_AVG	6. Harmonic (average value), current value, a	A
2613	H_la-7_AVG	7. Harmonic (average value), current value, a	A
2615	H_la-8_AVG	8. Harmonic (average value), current value, a	A
2617	H_la-9_AVG	9. Harmonic (average value), current value, a	A
2619	H_la-10_AVG	10. Harmonic (average value), current value, a	A
2621	H_la-11_AVG	11. Harmonic (average value), current value, a	A
2623	H_la-12_AVG	12. Harmonic (average value), current value, a	A
2625	H_la-13_AVG	13. Harmonic (average value), current value, a	A
2627	H_la-14_AVG	14. Harmonic (average value), current value, a	A
2629	H_la-15_AVG	15. Harmonic (average value), current value, a	A
2631	H_la-16_AVG	16. Harmonic (average value), current value, a	A
2633	H_la-17_AVG	17. Harmonic (average value), current value, a	A
2635	H_la-18_AVG	18. Harmonic (average value), current value, a	A
2637	H_la-19_AVG	19. Harmonic (average value), current value, a	A
2639	H_la-20_AVG	20. Harmonic (average value), current value, a	A
2641	H_la-21_AVG	21. Harmonic (average value), current value, a	A

Table 2-39 Registers 2601 to 2898: PQ Calculation for Harmonics (Average Values) – Current Values

Register	Type of Information	Remark	Unit
2643	H_la-22_AVG	22. Harmonic (average value), current value, a	A
2645	H_la-23_AVG	23. Harmonic (average value), current value, a	A
2647	H_la-24_AVG	24. Harmonic (average value), current value, a	A
2649	H_la-25_AVG	25. Harmonic (average value), current value, a	A
2651	H_la-26_AVG	26. Harmonic (average value), current value, a	A
2653	H_la-27_AVG	27. Harmonic (average value), current value, a	A
2655	H_la-28_AVG	28. Harmonic (average value), current value, a	A
2657	H_la-29_AVG	29. Harmonic (average value), current value, a	A
2659	H_la-30_AVG	30. Harmonic (average value), current value, a	A
2661	H_la-31_AVG	31. Harmonic (average value), current value, a	A
2663	H_la-32_AVG	32. Harmonic (average value), current value, a	A
2665	H_la-33_AVG	33. Harmonic (average value), current value, a	A
2667	H_la-34_AVG	34. Harmonic (average value), current value, a	A
2669	H_la-35_AVG	35. Harmonic (average value), current value, a	A
2671	H_la-36_AVG	36. Harmonic (average value), current value, a	A
2673	H_la-37_AVG	37. Harmonic (average value), current value, a	A
2675	H_la-38_AVG	38. Harmonic (average value), current value, a	A
2677	H_la-39_AVG	39. Harmonic (average value), current value, a	A
2679	H_la-40_AVG	40. Harmonic (average value), current value, a	A
2681	H_la-41_AVG	41. Harmonic (average value), current value, a	A
2683	H_la-42_AVG	42. Harmonic (average value), current value, a	A
2685	H_la-43_AVG	43. Harmonic (average value), current value, a	A
2687	H_la-44_AVG	44. Harmonic (average value), current value, a	A
2689	H_la-45_AVG	45. Harmonic (average value), current value, a	A
2691	H_la-46_AVG	46. Harmonic (average value), current value, a	A
2693	H_la-47_AVG	47. Harmonic (average value), current value, a	A

Table 2-39 Registers 2601 to 2898: PQ Calculation for Harmonics (Average Values) – Current Values

Register	Type of Information	Remark	Unit
2695	H_Ia-48_AVG	48. Harmonic (average value), current value, a	A
2697	H_Ia-49_AVG	49. Harmonic (average value), current value, a	A
2701	H_Ib-1_AVG	1. Harmonic (average value), current value, b (Fundamental)	A
2703	H_Ib-2_AVG	2. Harmonic (average value), current value, b	A
2705	H_Ib-3_AVG	3. Harmonic (average value), current value, b	A
2707	H_Ib-4_AVG	4. Harmonic (average value), current value, b	A
2709	H_Ib-5_AVG	5. Harmonic (average value), current value, b	A
2711	H_Ib-6_AVG	6. Harmonic (average value), current value, b	A
2713	H_Ib-7_AVG	7. Harmonic (average value), current value, b	A
2715	H_Ib-8_AVG	8. Harmonic (average value), current value, b	A
2717	H_Ib-9_AVG	9. Harmonic (average value), current value, b	A
2719	H_Ib-10_AVG	10. Harmonic (average value), current value, b	A
2721	H_Ib-11_AVG	11. Harmonic (average value), current value, b	A
2723	H_Ib-12_AVG	12. Harmonic (average value), current value, b	A
2725	H_Ib-13_AVG	13. Harmonic (average value), current value, b	A
2727	H_Ib-14_AVG	14. Harmonic (average value), current value, b	A
2729	H_Ib-15_AVG	15. Harmonic (average value), current value, b	A
2731	H_Ib-16_AVG	16. Harmonic (average value), current value, b	A
2733	H_Ib-17_AVG	17. Harmonic (average value), current value, b	A
2735	H_Ib-18_AVG	18. Harmonic (average value), current value, b	A
2737	H_Ib-19_AVG	19. Harmonic (average value), current value, b	A
2739	H_Ib-20_AVG	20. Harmonic (average value), current value, b	A
2741	H_Ib-21_AVG	21. Harmonic (average value), current value, b	A
2743	H_Ib-22_AVG	22. Harmonic (average value), current value, b	A
2745	H_Ib-23_AVG	23. Harmonic (average value), current value, b	A

Table 2-39 Registers 2601 to 2898: PQ Calculation for Harmonics (Average Values) – Current Values

Register	Type of Information	Remark	Unit
2747	H_lb-24_AVG	24. Harmonic (average value), current value, b	A
2749	H_lb-25_AVG	25. Harmonic (average value), current value, b	A
2751	H_lb-26_AVG	26. Harmonic (average value), current value, b	A
2753	H_lb-27_AVG	27. Harmonic (average value), current value, b	A
2755	H_lb-28_AVG	28. Harmonic (average value), current value, b	A
2757	H_lb-29_AVG	29. Harmonic (average value), current value, b	A
2759	H_lb-30_AVG	30. Harmonic (average value), current value, b	A
2761	H_lb-31_AVG	31. Harmonic (average value), current value, b	A
2763	H_lb-32_AVG	32. Harmonic (average value), current value, b	A
2765	H_lb-33_AVG	33. Harmonic (average value), current value, b	A
2767	H_lb-34_AVG	34. Harmonic (average value), current value, b	A
2769	H_lb-35_AVG	35. Harmonic (average value), current value, b	A
2771	H_lb-36_AVG	36. Harmonic (average value), current value, b	A
2773	H_lb-37_AVG	37. Harmonic (average value), current value, b	A
2775	H_lb-38_AVG	38. Harmonic (average value), current value, b	A
2777	H_lb-39_AVG	39. Harmonic (average value), current value, b	A
2779	H_lb-40_AVG	40. Harmonic (average value), current value, b	A
2781	H_lb-41_AVG	41. Harmonic (average value), current value, b	A
2783	H_lb-42_AVG	42. Harmonic (average value), current value, b	A
2785	H_lb-43_AVG	43. Harmonic (average value), current value, b	A
2787	H_lb-44_AVG	44. Harmonic (average value), current value, b	A
2789	H_lb-45_AVG	45. Harmonic (average value), current value, b	A
2791	H_lb-46_AVG	46. Harmonic (average value), current value, b	A
2793	H_lb-47_AVG	47. Harmonic (average value), current value, b	A
2795	H_lb-48_AVG	48. Harmonic (average value), current value, b	A
2797	H_lb-49_AVG	49. Harmonic (average value), current value, b	A

Table 2-39 Registers 2601 to 2898: PQ Calculation for Harmonics (Average Values) – Current Values

Register	Type of Information	Remark	Unit
2801	H_Ic-1_AVG	1. Harmonic (average value), current value, c (Fundamental)	A
2803	H_Ic-2_AVG	2. Harmonic (average value), current value, c	A
2805	H_Ic-3_AVG	3. Harmonic (average value), current value, c	A
2807	H_Ic-4_AVG	4. Harmonic (average value), current value, c	A
2809	H_Ic-5_AVG	5. Harmonic (average value), current value, c	A
2811	H_Ic-6_AVG	6. Harmonic (average value), current value, c	A
2813	H_Ic-7_AVG	7. Harmonic (average value), current value, c	A
2815	H_Ic-8_AVG	8. Harmonic (average value), current value, c	A
2817	H_Ic-9_AVG	9. Harmonic (average value), current value, c	A
2819	H_Ic-10_AVG	10. Harmonic (average value), current value, c	A
2821	H_Ic-11_AVG	11. Harmonic (average value), current value, c	A
2823	H_Ic-12_AVG	12. Harmonic (average value), current value, c	A
2825	H_Ic-13_AVG	13. Harmonic (average value), current value, c	A
2827	H_Ic-14_AVG	14. Harmonic (average value), current value, c	A
2829	H_Ic-15_AVG	15. Harmonic (average value), current value, c	A
2831	H_Ic-16_AVG	16. Harmonic (average value), current value, c	A
2833	H_Ic-17_AVG	17. Harmonic (average value), current value, c	A
2835	H_Ic-18_AVG	18. Harmonic (average value), current value, c	A
2837	H_Ic-19_AVG	19. Harmonic (average value), current value, c	A
2839	H_Ic-20_AVG	20. Harmonic (average value), current value, c	A
2841	H_Ic-21_AVG	21. Harmonic (average value), current value, c	A
2843	H_Ic-22_AVG	22. Harmonic (average value), current value, c	A
2845	H_Ic-23_AVG	23. Harmonic (average value), current value, c	A
2847	H_Ic-24_AVG	24. Harmonic (average value), current value, c	A
2849	H_Ic-25_AVG	25. Harmonic (average value), current value, c	A

Table 2-39 Registers 2601 to 2898: PQ Calculation for Harmonics (Average Values) – Current Values

Register	Type of Information	Remark	Unit
2851	H_lc-26_AVG	26. Harmonic (average value), current value, c	A
2853	H_lc-27_AVG	27. Harmonic (average value), current value, c	A
2855	H_lc-28_AVG	28. Harmonic (average value), current value, c	A
2857	H_lc-29_AVG	29. Harmonic (average value), current value, c	A
2859	H_lc-30_AVG	30. Harmonic (average value), current value, c	A
2861	H_lc-31_AVG	31. Harmonic (average value), current value, c	A
2863	H_lc-32_AVG	32. Harmonic (average value), current value, c	A
2865	H_lc-33_AVG	33. Harmonic (average value), current value, c	A
2867	H_lc-34_AVG	34. Harmonic (average value), current value, c	A
2869	H_lc-35_AVG	35. Harmonic (average value), current value, c	A
2871	H_lc-36_AVG	36. Harmonic (average value), current value, c	A
2873	H_lc-37_AVG	37. Harmonic (average value), current value, c	A
2875	H_lc-38_AVG	38. Harmonic (average value), current value, c	A
2877	H_lc-39_AVG	39. Harmonic (average value), current value, c	A
2879	H_lc-40_AVG	40. Harmonic (average value), current value, c	A
2881	H_lc-41_AVG	41. Harmonic (average value), current value, c	A
2883	H_lc-42_AVG	42. Harmonic (average value), current value, c	A
2885	H_lc-43_AVG	43. Harmonic (average value), current value, c	A
2887	H_lc-44_AVG	44. Harmonic (average value), current value, c	A
2889	H_lc-45_AVG	45. Harmonic (average value), current value, c	A
2891	H_lc-46_AVG	46. Harmonic (average value), current value, c	A
2893	H_lc-47_AVG	47. Harmonic (average value), current value, c	A
2895	H_lc-48_AVG	48. Harmonic (average value), current value, c	A
2897	H_lc-49_AVG	49. Harmonic (average value), current value, c	A

2.2.7.32 Registers 2903 to 2980: Tarrif Counters (read only)

Registers 2903 to 2908: Tariff Counters Status

Data type: Counter (quality information)

Table 2-40 Register 2903 to 2908: Tariff Counters Status

Register	Type of Information	Remark	Unit
2903/2 ⁰	Tariff_Counters_Status_1	Status of counters WP_exp_tariff_1	-
2903/2 ²	Tariff_Counters_Status_2	Status of counters WP_imp_tariff_1	-
2903/2 ⁴	Tariff_Counters_Status_3	Status of counters WQ_ind_imp_tariff_1	-
2903/2 ⁶	Tariff_Counters_Status_4	Status of counters WQ_cap_exp_tariff_1	-
2903/2 ⁸	Tariff_Counters_Status_5	Status of counters WQ_ind_exp_tariff_1	-
2903/2 ¹⁰	Tariff_Counters_Status_6	Status of counters WQ_cap_imp_tariff_1	-
2903/2 ¹²	Tariff_Counters_Status_7	Status of counters WQ_ind_tariff_1	-
2903/2 ¹⁴	Tariff_Counters_Status_8	Status of counters WQ_cap_tariff_1	-
2904/2 ⁰	Tariff_Counters_Status_9	Status of counters WS_tariff_1	-
2904/2 ²	Tariff_Counters_Status_10	Status of counters WP_exp_tariff_2	-
2904/2 ⁴	Tariff_Counters_Status_11	Status of counters WP_imp_tariff_2	-
2904/2 ⁶	Tariff_Counters_Status_12	Status of counters WQ_ind_imp_tariff_2	-
2904/2 ⁸	Tariff_Counters_Status_13	Status of counters WQ_cap_exp_tariff_2	-
2904/2 ¹⁰	Tariff_Counters_Status_14	Status of counters WQ_ind_exp_tariff_2	-
2904/2 ¹²	Tariff_Counters_Status_15	Status of counters WQ_cap_imp_tariff_2	-
2904/2 ¹⁴	Tariff_Counters_Status_16	Status of counters WQ_ind_tariff_2	-
2905/2 ⁰	Tariff_Counters_Status_17	Status of counters WQ_cap_tariff_2	-
2905/2 ²	Tariff_Counters_Status_18	Status of counters WS_tariff_2	-
2905/2 ⁴	Tariff_Counters_Status_19	Status of counters WP_exp_tariff_3	-
2905/2 ⁶	Tariff_Counters_Status_20	Status of counters WP_imp_tariff_3	-
2905/2 ⁸	Tariff_Counters_Status_21	Status of counters WQ_ind_imp_tariff_3	-
2905/2 ¹⁰	Tariff_Counters_Status_22	Status of counters WQ_cap_exp_tariff_3	-
2905/2 ¹²	Tariff_Counters_Status_23	Status of counters WQ_ind_exp_tariff_3	-

Table 2-40 Register 2903 to 2908: Tariff Counters Status

Register	Type of Information	Remark	Unit
2905/2 ¹⁴	Tariff_Counters_Status_24	Status of counters WQ_cap_imp_tariff_3	-
2906/2 ⁰	Tariff_Counters_Status_25	Status of counters WQ_ind_tariff_3	-
2906/2 ²	Tariff_Counters_Status_26	Status of counters WQ_cap_tariff_3	-
2906/2 ⁴	Tariff_Counters_Status_27	Status of counters WS_tariff_3	-
2906/2 ⁶	Tariff_Counters_Status_28	Status of counters WP_exp_tariff_4	-
2906/2 ⁸	Tariff_Counters_Status_29	Status of counters WP_imp_tariff_4	-
2906/2 ¹⁰	Tariff_Counters_Status_30	Status of counters WQ_ind_imp_tariff_4	-
2906/2 ¹²	Tariff_Counters_Status_31	Status of counters WQ_cap_exp_tariff_4	-
2906/2 ¹⁴	Tariff_Counters_Status_32	Status of counters WQ_ind_exp_tariff_4	-
2907/2 ⁰	Tariff_Counters_Status_33	Status of counters WQ_cap_imp_tariff_4	-
2907/2 ²	Tariff_Counters_Status_34	Status of counters WQ_ind_tariff_4	-
2907/2 ⁴	Tariff_Counters_Status_35	Status of counters WQ_cap_tariff_4	-
2907/2 ⁶	Tariff_Counters_Status_36	Status of counters WS_tariff_4	-
2907/2 ⁸	Reserved	-	-
2907/2 ¹⁰	Reserved	-	-
2907/2 ¹²	Reserved	-	-
2907/2 ¹⁴	Reserved	-	-
2908	Reserved	-	-

Registers 2909 to 2980: Tariff Counters Pulses

Data type: Measured value

Table 2-41 Register 2909 to 2980: Tariff Counters Pulses

Register	Type of Information	Remark	Unit
2909	WP_exp_tariff_1	Active Energy, Export, Tariff 1	Pulse
2911	WP_imp_tariff_1	Active Energy, Import, Tariff 1	Pulse
2913	WQ_ind_imp_tariff_1	Reactive Energy, Inductive, Import, Tariff 1	Pulse
2915	WQ_cap_exp_tariff_1	Reactive Energy, Capacitive, Export, Tariff 1	Pulse

Table 2-41 Register 2909 to 2980: Tariff Counters Pulses

Register	Type of Information	Remark	Unit
2917	WQ_ind_exp_tariff_1	Reactive Energy, Inductive, Export, Tariff 1	Pulse
2919	WQ_cap_imp_tariff_1	Reactive Energy, Capacitive, Import, Tariff 1	Pulse
2921	WQ_ind_tariff_1	Reactive Energy, Inductive, Tariff 1	Pulse
2923	WQ_cap_tariff_1	Reactive Energy, Capacitive, Tariff 1	Pulse
2925	WS_tariff_1	Apparent Energy, Tariff 1	Pulse
2927	WP_exp_tariff_2	Active Energy, Export, Tariff 2	Pulse
2929	WP_imp_tariff_2	Active Energy, Import, Tariff 2	Pulse
2931	WQ_ind_imp_tariff_2	Reactive Energy, Inductive, Import, Tariff 2	Pulse
2933	WQ_cap_exp_tariff_2	Reactive Energy, Capacitive, Export, Tariff 2	Pulse
2935	WQ_ind_exp_tariff_2	Reactive Energy, Inductive, Export, Tariff 2	Pulse
2937	WQ_cap_imp_tariff_2	Reactive Energy, Capacitive, Import, Tariff 2	Pulse
2939	WQ_ind_tariff_2	Reactive Energy, Inductive, Tariff 2	Pulse
2941	WQ_cap_tariff_2	Reactive Energy, Capacitive, Tariff 2	Pulse
2943	WS_tariff_2	Apparent Energy, Tariff 2	Pulse
2945	WP_exp_tariff_3	Active Energy, Export, Tariff 3	Pulse
2947	WP_imp_tariff_3	Active Energy, Import, Tariff 3	Pulse
2949	WQ_ind_imp_tariff_3	Reactive Energy, Inductive, Import, Tariff 3	Pulse
2951	WQ_cap_exp_tariff_3	Reactive Energy, Capacitive, Export, Tariff 3	Pulse
2953	WQ_ind_exp_tariff_3	Reactive Energy, Inductive, Export, Tariff 3	Pulse
2955	WQ_cap_imp_tariff_3	Reactive Energy, Capacitive, Import, Tariff 3	Pulse
2957	WQ_ind_tariff_3	Reactive Energy, Inductive, Tariff 3	Pulse
2959	WQ_cap_tariff_3	Reactive Energy, Capacitive, Tariff 3	Pulse
2961	WS_tariff_3	Apparent Energy, Tariff 3	Pulse
2963	WP_exp_tariff_4	Active Energy, Export, Tariff 4	Pulse
2965	WP_imp_tariff_4	Active Energy, Import, Tariff 4	Pulse
2967	WQ_ind_imp_tariff_4	Reactive Energy, Inductive, Import, Tariff 4	Pulse

Table 2-41 Register 2909 to 2980: Tariff Counters Pulses

Register	Type of Information	Remark	Unit
2969	WQ_cap_exp_tariff_4	Reactive Energy, Capacitive, Export, Tariff 4	Pulse
2971	WQ_ind_exp_tariff_4	Reactive Energy, Inductive, Export, Tariff 4	Pulse
2973	WQ_cap_imp_tariff_4	Reactive Energy, Capacitive, Import, Tariff 4	Pulse
2975	WQ_ind_tariff_4	Reactive Energy, Inductive, Tariff 4	Pulse
2977	WQ_cap_tariff_4	Reactive Energy, Capacitive, Tariff 4	Pulse
2979	WS_tariff_4	Apparent Energy, Tariff 4	Pulse

2.2.7.33 Registers 3001 to 3298: PQ Calculation for Maximum Harmonic – Current Values (read only)

These registers are write-protected. A write attempt will be rejected with exception code 02 (ILLEGAL_DATA_ADDRESS).

The data are calculated within the parameterized time (for example 30 s, 1 min etc.).

Data type: Measured value

Table 2-42 Registers 3001 to 3298: PQ Calculation for Harmonics (Maximum Values) – Current Values

Register	Type of Information	Remark	Unit
3001	H_la-1_MAX	1. Harmonic (maximum value), current value, a (Fundamental)	A
3003	H_la-2_MAX	2. Harmonic (maximum value), current value, a	A
3005	H_la-3_MAX	3. Harmonic (maximum value), current value, a	A
3007	H_la-4_MAX	4. Harmonic (maximum value), current value, a	A
3009	H_la-5_MAX	5. Harmonic (maximum value), current value, a	A
3011	H_la-6_MAX	6. Harmonic (maximum value), current value, a	A
3013	H_la-7_MAX	7. Harmonic (maximum value), current value, a	A
3015	H_la-8_MAX	8. Harmonic (maximum value), current value, a	A
3017	H_la-9_MAX	9. Harmonic (maximum value), current value, a	A
3019	H_la-10_MAX	10. Harmonic (maximum value), current value, a	A
3021	H_la-11_MAX	11. Harmonic (maximum value), current value, a	A
3023	H_la-12_MAX	12. Harmonic (maximum value), current value, a	A
3025	H_la-13_MAX	13. Harmonic (maximum value), current value, a	A
3027	H_la-14_MAX	14. Harmonic (maximum value), current value, a	A
3029	H_la-15_MAX	15. Harmonic (maximum value), current value, a	A
3031	H_la-16_MAX	16. Harmonic (maximum value), current value, a	A
3033	H_la-17_MAX	17. Harmonic (maximum value), current value, a	A
3035	H_la-18_MAX	18. Harmonic (maximum value), current value, a	A
3037	H_la-19_MAX	19. Harmonic (maximum value), current value, a	A
3039	H_la-20_MAX	20. Harmonic (maximum value), current value, a	A
3041	H_la-21_MAX	21. Harmonic (maximum value), current value, a	A

Table 2-42 Registers 3001 to 3298: PQ Calculation for Harmonics (Maximum Values) – Current Values

Register	Type of Information	Remark	Unit
3043	H_la-22_MAX	22. Harmonic (maximum value), current value, a	A
3045	H_la-23_MAX	23. Harmonic (maximum value), current value, a	A
3047	H_la-24_MAX	24. Harmonic (maximum value), current value, a	A
3049	H_la-25_MAX	25. Harmonic (maximum value), current value, a	A
3051	H_la-26_MAX	26. Harmonic (maximum value), current value, a	A
3053	H_la-27_MAX	27. Harmonic (maximum value), current value, a	A
3055	H_la-28_MAX	28. Harmonic (maximum value), current value, a	A
3057	H_la-29_MAX	29. Harmonic (maximum value), current value, a	A
3059	H_la-30_MAX	30. Harmonic (maximum value), current value, a	A
3061	H_la-31_MAX	31. Harmonic (maximum value), current value, a	A
3063	H_la-32_MAX	32. Harmonic (maximum value), current value, a	A
3065	H_la-33_MAX	33. Harmonic (maximum value), current value, a	A
3067	H_la-34_MAX	34. Harmonic (maximum value), current value, a	A
3069	H_la-35_MAX	35. Harmonic (maximum value), current value, a	A
3071	H_la-36_MAX	36. Harmonic (maximum value), current value, a	A
3073	H_la-37_MAX	37. Harmonic (maximum value), current value, a	A
3075	H_la-38_MAX	38. Harmonic (maximum value), current value, a	A
3077	H_la-39_MAX	39. Harmonic (maximum value), current value, a	A
3079	H_la-40_MAX	40. Harmonic (maximum value), current value, a	A
3081	H_la-41_MAX	41. Harmonic (maximum value), current value, a	A
3083	H_la-42_MAX	42. Harmonic (maximum value), current value, a	A
3085	H_la-43_MAX	43. Harmonic (maximum value), current value, a	A
3087	H_la-44_MAX	44. Harmonic (maximum value), current value, a	A
3089	H_la-45_MAX	45. Harmonic (maximum value), current value, a	A
3091	H_la-46_MAX	46. Harmonic (maximum value), current value, a	A
3093	H_la-47_MAX	47. Harmonic (maximum value), current value, a	A

Table 2-42 Registers 3001 to 3298: PQ Calculation for Harmonics (Maximum Values) – Current Values

Register	Type of Information	Remark	Unit
3095	H_Ia-48_MAX	48. Harmonic (maximum value), current value, a	A
3097	H_Ia-49_MAX	49. Harmonic (maximum value), current value, a	A
3101	H_Ib-1_MAX	1. Harmonic (maximum value), current value, b (Fundamental)	A
3103	H_Ib-2_MAX	2. Harmonic (maximum value), current value, b	A
3105	H_Ib-3_MAX	3. Harmonic (maximum value), current value, b	A
3107	H_Ib-4_MAX	4. Harmonic (maximum value), current value, b	A
3109	H_Ib-5_MAX	5. Harmonic (maximum value), current value, b	A
3111	H_Ib-6_MAX	6. Harmonic (maximum value), current value, b	A
3113	H_Ib-7_MAX	7. Harmonic (maximum value), current value, b	A
3115	H_Ib-8_MAX	8. Harmonic (maximum value), current value, b	A
3117	H_Ib-9_MAX	9. Harmonic (maximum value), current value, b	A
3119	H_Ib-10_MAX	10. Harmonic (maximum value), current value, b	A
3121	H_Ib-11_MAX	11. Harmonic (maximum value), current value, b	A
3123	H_Ib-12_MAX	12. Harmonic (maximum value), current value, b	A
3125	H_Ib-13_MAX	13. Harmonic (maximum value), current value, b	A
3127	H_Ib-14_MAX	14. Harmonic (maximum value), current value, b	A
3129	H_Ib-15_MAX	15. Harmonic (maximum value), current value, b	A
3131	H_Ib-16_MAX	16. Harmonic (maximum value), current value, b	A
3133	H_Ib-17_MAX	17. Harmonic (maximum value), current value, b	A
3135	H_Ib-18_MAX	18. Harmonic (maximum value), current value, b	A
3137	H_Ib-19_MAX	19. Harmonic (maximum value), current value, b	A
3139	H_Ib-20_MAX	20. Harmonic (maximum value), current value, b	A
3141	H_Ib-21_MAX	21. Harmonic (maximum value), current value, b	A
3143	H_Ib-22_MAX	22. Harmonic (maximum value), current value, b	A
3145	H_Ib-23_MAX	23. Harmonic (maximum value), current value, b	A

Table 2-42 Registers 3001 to 3298: PQ Calculation for Harmonics (Maximum Values) – Current Values

Register	Type of Information	Remark	Unit
3147	H_lb-24_MAX	24. Harmonic (maximum value), current value, b	A
3149	H_lb-25_MAX	25. Harmonic (maximum value), current value, b	A
3151	H_lb-26_MAX	26. Harmonic (maximum value), current value, b	A
3153	H_lb-27_MAX	27. Harmonic (maximum value), current value, b	A
3155	H_lb-28_MAX	28. Harmonic (maximum value), current value, b	A
3157	H_lb-29_MAX	29. Harmonic (maximum value), current value, b	A
3159	H_lb-30_MAX	30. Harmonic (maximum value), current value, b	A
3161	H_lb-31_MAX	31. Harmonic (maximum value), current value, b	A
3163	H_lb-32_MAX	32. Harmonic (maximum value), current value, b	A
3165	H_lb-33_MAX	33. Harmonic (maximum value), current value, b	A
3167	H_lb-34_MAX	34. Harmonic (maximum value), current value, b	A
3169	H_lb-35_MAX	35. Harmonic (maximum value), current value, b	A
3171	H_lb-36_MAX	36. Harmonic (maximum value), current value, b	A
3173	H_lb-37_MAX	37. Harmonic (maximum value), current value, b	A
3175	H_lb-38_MAX	38. Harmonic (maximum value), current value, b	A
3177	H_lb-39_MAX	39. Harmonic (maximum value), current value, b	A
3179	H_lb-40_MAX	40. Harmonic (maximum value), current value, b	A
3181	H_lb-41_MAX	41. Harmonic (maximum value), current value, b	A
3183	H_lb-42_MAX	42. Harmonic (maximum value), current value, b	A
3185	H_lb-43_MAX	43. Harmonic (maximum value), current value, b	A
3187	H_lb-44_MAX	44. Harmonic (maximum value), current value, b	A
3189	H_lb-45_MAX	45. Harmonic (maximum value), current value, b	A
3191	H_lb-46_MAX	46. Harmonic (maximum value), current value, b	A
3193	H_lb-47_MAX	47. Harmonic (maximum value), current value, b	A
3195	H_lb-48_MAX	48. Harmonic (maximum value), current value, b	A
3197	H_lb-49_MAX	49. Harmonic (maximum value), current value, b	A

Table 2-42 Registers 3001 to 3298: PQ Calculation for Harmonics (Maximum Values) – Current Values

Register	Type of Information	Remark	Unit
3201	H_Ic-1_MAX	1. Harmonic (maximum value), current value, c (Fundamental)	A
3203	H_Ic-2_MAX	2. Harmonic (maximum value), current value, c	A
3205	H_Ic-3_MAX	3. Harmonic (maximum value), current value, c	A
3207	H_Ic-4_MAX	4. Harmonic (maximum value), current value, c	A
3209	H_Ic-5_MAX	5. Harmonic (maximum value), current value, c	A
3211	H_Ic-6_MAX	6. Harmonic (maximum value), current value, c	A
3213	H_Ic-7_MAX	7. Harmonic (maximum value), current value, c	A
3215	H_Ic-8_MAX	8. Harmonic (maximum value), current value, c	A
3217	H_Ic-9_MAX	9. Harmonic (maximum value), current value, c	A
3219	H_Ic-10_MAX	10. Harmonic (maximum value), current value, c	A
3221	H_Ic-11_MAX	11. Harmonic (maximum value), current value, c	A
3223	H_Ic-12_MAX	12. Harmonic (maximum value), current value, c	A
3225	H_Ic-13_MAX	13. Harmonic (maximum value), current value, c	A
3227	H_Ic-14_MAX	14. Harmonic (maximum value), current value, c	A
3229	H_Ic-15_MAX	15. Harmonic (maximum value), current value, c	A
3231	H_Ic-16_MAX	16. Harmonic (maximum value), current value, c	A
3233	H_Ic-17_MAX	17. Harmonic (maximum value), current value, c	A
3235	H_Ic-18_MAX	18. Harmonic (maximum value), current value, c	A
3237	H_Ic-19_MAX	19. Harmonic (maximum value), current value, c	A
3239	H_Ic-20_MAX	20. Harmonic (maximum value), current value, c	A
3241	H_Ic-21_MAX	21. Harmonic (maximum value), current value, c	A
3243	H_Ic-22_MAX	22. Harmonic (maximum value), current value, c	A
3245	H_Ic-23_MAX	23. Harmonic (maximum value), current value, c	A
3247	H_Ic-24_MAX	24. Harmonic (maximum value), current value, c	A
3249	H_Ic-25_MAX	25. Harmonic (maximum value), current value, c	A

Table 2-42 Registers 3001 to 3298: PQ Calculation for Harmonics (Maximum Values) – Current Values

Register	Type of Information	Remark	Unit
3251	H_lc-26_MAX	26. Harmonic (maximum value), current value, c	A
3253	H_lc-27_MAX	27. Harmonic (maximum value), current value, c	A
3255	H_lc-28_MAX	28. Harmonic (maximum value), current value, c	A
3257	H_lc-29_MAX	29. Harmonic (maximum value), current value, c	A
3259	H_lc-30_MAX	30. Harmonic (maximum value), current value, c	A
3261	H_lc-31_MAX	31. Harmonic (maximum value), current value, c	A
3263	H_lc-32_MAX	32. Harmonic (maximum value), current value, c	A
3265	H_lc-33_MAX	33. Harmonic (maximum value), current value, c	A
3267	H_lc-34_MAX	34. Harmonic (maximum value), current value, c	A
3269	H_lc-35_MAX	35. Harmonic (maximum value), current value, c	A
3271	H_lc-36_MAX	36. Harmonic (maximum value), current value, c	A
3273	H_lc-37_MAX	37. Harmonic (maximum value), current value, c	A
3275	H_lc-38_MAX	38. Harmonic (maximum value), current value, c	A
3277	H_lc-39_MAX	39. Harmonic (maximum value), current value, c	A
3279	H_lc-40_MAX	40. Harmonic (maximum value), current value, c	A
3281	H_lc-41_MAX	41. Harmonic (maximum value), current value, c	A
3283	H_lc-42_MAX	42. Harmonic (maximum value), current value, c	A
3285	H_lc-43_MAX	43. Harmonic (maximum value), current value, c	A
3287	H_lc-44_MAX	44. Harmonic (maximum value), current value, c	A
3289	H_lc-45_MAX	45. Harmonic (maximum value), current value, c	A
3291	H_lc-46_MAX	46. Harmonic (maximum value), current value, c	A
3293	H_lc-47_MAX	47. Harmonic (maximum value), current value, c	A
3295	H_lc-48_MAX	48. Harmonic (maximum value), current value, c	A
3297	H_lc-49_MAX	49. Harmonic (maximum value), current value, c	A

2.2.7.34 Registers 3301 to 3669: Tariff Values (read only)



NOTE

Registers 3301 to 3669 are not available in SICAM PQS.

Data type: Measured value

Table 2-43 Registers 3301 to 3669: Tariff Values (read only)

Register	Type of Information	Remark	Unit
3301	Milliseconds	see chapter 2.2.6.2	-
3302	Hours/minutes		-
3303	Month/day		-
3304	Time status/year		-
3405	WP_exp_tariff_value_1	Active Energy, Export, Tariff 1	Wh
3409	WP_imp_tariff_value_1	Active Energy, Import, Tariff 1	Wh
3413	WQ_ind_imp_tariff_value_1	Reactive Energy, Inductive, Import, Tariff 1	varh
3417	WQ_cap_exp_tariff_value_1	Reactive Energy, Capacitive, Export, Tariff 1	varh
3421	WQ_ind_exp_tariff_value_1	Reactive Energy, Inductive, Export, Tariff 1	varh
3425	WQ_cap_imp_tariff_value_1	Reactive Energy, Capacitive, Import, Tariff 1	varh
3429	WQ_ind_tariff_value_1	Reactive Energy, Inductive, Tariff 1	varh
3433	WQ_cap_tariff_value_1	Reactive Energy, Capacitive, Tariff 1	varh
3437	WQ_imp_tariff_value_1	Reactive Energy, Import, Tariff 1	varh
3441	WQ_exp_tariff_value_1	Reactive Energy, Export, Tariff 1	varh
3445	WS_tariff_value_1	Apparent Energy, Tariff 1	VAh
3449	WP_exp_tariff_value_2	Active Energy, Export, Tariff 2	Wh
3453	WP_imp_tariff_value_2	Active Energy, Import, Tariff 2	Wh
3457	WQ_ind_imp_tariff_value_2	Reactive Energy, Inductive, Import, Tariff 2	varh
3461	WQ_cap_exp_tariff_value_2	Reactive Energy, Capacitive, Export, Tariff 2	varh
3465	WQ_ind_exp_tariff_value_2	Reactive Energy, Inductive, Export, Tariff 2	varh
3469	WQ_cap_imp_tariff_value_2	Reactive Energy, Capacitive, Import, Tariff 2	varh

Table 2-43 Registers 3301 to 3669: Tariff Values (read only)

Register	Type of Information	Remark	Unit
3473	WQ_ind_tariff_value_2	Reactive Energy, Inductive, Tariff 2	varh
3477	WQ_cap_tariff_value_2	Reactive Energy, Capacitive, Tariff 2	varh
3481	WQ_imp_tariff_value_2	Reactive Energy, Import, Tariff 2	varh
3485	WQ_exp_tariff_value_2	Reactive Energy, Export, Tariff 2	varh
3489	WS_tariff_value_2	Apparent Energy, Tariff 2	VAh
3493	WP_exp_tariff_value_3	Active Energy, Export, Tariff 3	Wh
3497	WP_imp_tariff_value_3	Active Energy, Import, Tariff 3	Wh
3501	WQ_ind_imp_tariff_value_3	Reactive Energy, Inductive, Import, Tariff 3	varh
3505	WQ_cap_exp_tariff_value_3	Reactive Energy, Capacitive, Export, Tariff 3	varh
3509	WQ_ind_exp_tariff_value_3	Reactive Energy, Inductive, Export, Tariff 3	varh
3513	WQ_cap_imp_tariff_value_3	Reactive Energy, Capacitive, Import, Tariff 3	varh
3517	WQ_ind_tariff_value_3	Reactive Energy, Inductive, Tariff 3	varh
3521	WQ_cap_tariff_value_3	Reactive Energy, Capacitive, Tariff 3	varh
3525	WQ_imp_tariff_value_3	Reactive Energy, Import, Tariff 3	varh
3529	WQ_exp_tariff_value_3	Reactive Energy, Export, Tariff 3	varh
3533	WS_tariff_value_3	Apparent Energy, Tariff 3	VAh
3537	WP_exp_tariff_value_4	Active Energy, Export, Tariff 4	Wh
3541	WP_imp_tariff_value_4	Active Energy, Import, Tariff 4	Wh
3545	WQ_ind_imp_tariff_value_4	Reactive Energy, Inductive, Import, Tariff 4	varh
3549	WQ_cap_exp_tariff_value_4	Reactive Energy, Capacitive, Export, Tariff 4	varh
3553	WQ_ind_exp_tariff_value_4	Reactive Energy, Inductive, Export, Tariff 4	varh
3557	WQ_cap_imp_tariff_value_4	Reactive Energy, Capacitive, Import, Tariff 4	varh
3561	WQ_ind_tariff_value_4	Reactive Energy, Inductive, Tariff 4	varh
3565	WQ_cap_tariff_value_4	Reactive Energy, Capacitive, Tariff 4	varh
3569	WQ_imp_tariff_value_4	Reactive Energy, Import, Tariff 4	varh
3573	WQ_exp_tariff_value_4	Reactive Energy, Export, Tariff 4	varh

Table 2-43 Registers 3301 to 3669: Tariff Values (read only)

Register	Type of Information	Remark	Unit
3577	WS_tariff_value_4	Apparent Energy, Tariff 4	VAh
3581	WP_exp_tariff_value_5	Active Energy, Export, Tariff 5	Wh
3585	WP_imp_tariff_value_5	Active Energy, Import, Tariff 5	Wh
3589	WQ_ind_imp_tariff_value_5	Reactive Energy, Inductive, Import, Tariff 5	varh
3593	WQ_cap_exp_tariff_value_5	Reactive Energy, Capacitive, Export, Tariff 5	varh
3597	WQ_ind_exp_tariff_value_5	Reactive Energy, Inductive, Export, Tariff 5	varh
3601	WQ_cap_imp_tariff_value_5	Reactive Energy, Capacitive, Import, Tariff 5	varh
3605	WQ_ind_tariff_value_5	Reactive Energy, Inductive, Tariff 5	varh
3609	WQ_cap_tariff_value_5	Reactive Energy, Capacitive, Tariff 5	varh
3613	WQ_imp_tariff_value_5	Reactive Energy, Import, Tariff 5	varh
3617	WQ_exp_tariff_value_5	Reactive Energy, Export, Tariff 5	varh
3621	WS_tariff_value_5	Apparent Energy, Tariff 5	VAh
3625	WP_exp_tariff_value_6	Active Energy, Export, Tariff 6	Wh
3629	WP_imp_tariff_value_6	Active Energy, Import, Tariff 6	Wh
3633	WQ_ind_imp_tariff_value_6	Reactive Energy, Inductive, Import, Tariff 6	varh
3637	WQ_cap_exp_tariff_value_6	Reactive Energy, Capacitive, Export, Tariff 6	varh
3641	WQ_ind_exp_tariff_value_6	Reactive Energy, Inductive, Export, Tariff 6	varh
3645	WQ_cap_imp_tariff_value_6	Reactive Energy, Capacitive, Import, Tariff 6	varh
3649	WQ_ind_tariff_value_6	Reactive Energy, Inductive, Tariff 6	varh
3653	WQ_cap_tariff_value_6	Reactive Energy, Capacitive, Tariff 6	varh
3657	WQ_imp_tariff_value_6	Reactive Energy, Import, Tariff 6	varh
3661	WQ_exp_tariff_value_6	Reactive Energy, Export, Tariff 6	varh
3665	WS_tariff_value_6	Apparent Energy, Tariff 6	VAh

2.2.7.35 Registers 4001 to 4377: Phase Angle of Harmonics – Voltage Values (read only)

These registers are write-protected. A write attempt will be rejected with exception code 02 (ILLEGAL_DATA_ADDRESS).

Calculation period: 10/12 cycle (50 Hz/60 Hz)

Network types: Only 1P2W, 3P4W_bal, 3P4W_unb_PN is available.

Data type: Measured value

Table 2-44 Registers 4001 to 4377: Phase Angle of Harmonics – Voltage Values

Register	Type of Information	Remark	Unit
4001	HP_Va-1	1. Harmonic (phase angle), voltage value, a-N (fundamental)	° (degree)
4003	HP_Va-2	2. Harmonic (phase angle), voltage value, a-N	° (degree)
4005	HP_Va-3	3. Harmonic (phase angle), voltage value, a-N	° (degree)
4007	HP_Va-4	4. Harmonic (phase angle), voltage value, a-N	° (degree)
4009	HP_Va-5	5. Harmonic (phase angle), voltage value, a-N	° (degree)
4011	HP_Va-6	6. Harmonic (phase angle), voltage value, a-N	° (degree)
4013	HP_Va-7	7. Harmonic (phase angle), voltage value, a-N	° (degree)
4015	HP_Va-8	8. Harmonic (phase angle), voltage value, a-N	° (degree)
4017	HP_Va-9	9. Harmonic (phase angle), voltage value, a-N	° (degree)
4019	HP_Va-10	10. Harmonic (phase angle), voltage value, a-N	° (degree)
4021	HP_Va-11	11. Harmonic (phase angle), voltage value, a-N	° (degree)
4023	HP_Va-12	12. Harmonic (phase angle), voltage value, a-N	° (degree)
4025	HP_Va-13	13. Harmonic (phase angle), voltage value, a-N	° (degree)
4027	HP_Va-14	14. Harmonic (phase angle), voltage value, a-N	° (degree)
4029	HP_Va-15	15. Harmonic (phase angle), voltage value, a-N	° (degree)
4031	HP_Va-16	16. Harmonic (phase angle), voltage value, a-N	° (degree)
4033	HP_Va-17	17. Harmonic (phase angle), voltage value, a-N	° (degree)
4035	HP_Va-18	18. Harmonic (phase angle), voltage value, a-N	° (degree)
4037	HP_Va-19	19. Harmonic (phase angle), voltage value, a-N	° (degree)
4039	HP_Va-20	20. Harmonic (phase angle), voltage value, a-N	° (degree)

Table 2-44 Registers 4001 to 4377: Phase Angle of Harmonics – Voltage Values (cont.)

Register	Type of Information	Remark	Unit
4041	HP_Va-21	21. Harmonic (phase angle), voltage value, a-N	° (degree)
4043	HP_Va-22	22. Harmonic (phase angle), voltage value, a-N	° (degree)
4045	HP_Va-23	23. Harmonic (phase angle), voltage value, a-N	° (degree)
4047	HP_Va-24	24. Harmonic (phase angle), voltage value, a-N	° (degree)
4049	HP_Va-25	25. Harmonic (phase angle), voltage value, a-N	° (degree)
4051	HP_Va-26	26. Harmonic (phase angle), voltage value, a-N	° (degree)
4053	HP_Va-27	27. Harmonic (phase angle), voltage value, a-N	° (degree)
4055	HP_Va-28	28. Harmonic (phase angle), voltage value, a-N	° (degree)
4057	HP_Va-29	29. Harmonic (phase angle), voltage value, a-N	° (degree)
4059	HP_Va-30	30. Harmonic (phase angle), voltage value, a-N	° (degree)
4061	HP_Va-31	31. Harmonic (phase angle), voltage value, a-N	° (degree)
4063	HP_Va-32	32. Harmonic (phase angle), voltage value, a-N	° (degree)
4065	HP_Va-33	33. Harmonic (phase angle), voltage value, a-N	° (degree)
4067	HP_Va-34	34. Harmonic (phase angle), voltage value, a-N	° (degree)
4069	HP_Va-35	35. Harmonic (phase angle), voltage value, a-N	° (degree)
4071	HP_Va-36	36. Harmonic (phase angle), voltage value, a-N	° (degree)
4073	HP_Va-37	37. Harmonic (phase angle), voltage value, a-N	° (degree)
4075	HP_Va-38	38. Harmonic (phase angle), voltage value, a-N	° (degree)
4077	HP_Va-39	39. Harmonic (phase angle), voltage value, a-N	° (degree)
4079	HP_Va-40	40. Harmonic (phase angle), voltage value, a-N	° (degree)
4081	HP_Va-41	41. Harmonic (phase angle), voltage value, a-N	° (degree)
4083	HP_Va-42	42. Harmonic (phase angle), voltage value, a-N	° (degree)
4085	HP_Va-43	43. Harmonic (phase angle), voltage value, a-N	° (degree)
4087	HP_Va-44	44. Harmonic (phase angle), voltage value, a-N	° (degree)
4089	HP_Va-45	45. Harmonic (phase angle), voltage value, a-N	° (degree)
4091	HP_Va-46	46. Harmonic (phase angle), voltage value, a-N	° (degree)

Table 2-44 Registers 4001 to 4377: Phase Angle of Harmonics – Voltage Values (cont.)

Register	Type of Information	Remark	Unit
4093	HP_Va-47	47. Harmonic (phase angle), voltage value, a-N	° (degree)
4095	HP_Va-48	48. Harmonic (phase angle), voltage value, a-N	° (degree)
4097	HP_Va-49	49. Harmonic (phase angle), voltage value, a-N	° (degree)
4099	HP_Va-50	50. Harmonic (phase angle), voltage value, a-N	° (degree)
4101	HP_Va-51	51. Harmonic (phase angle), voltage value, a-N	° (degree)
4103	HP_Va-52	52. Harmonic (phase angle), voltage value, a-N	° (degree)
4105	HP_Va-53	53. Harmonic (phase angle), voltage value, a-N	° (degree)
4107	HP_Va-54	54. Harmonic (phase angle), voltage value, a-N	° (degree)
4109	HP_Va-55	55. Harmonic (phase angle), voltage value, a-N	° (degree)
4111	HP_Va-56	56. Harmonic (phase angle), voltage value, a-N	° (degree)
4113	HP_Va-57	57. Harmonic (phase angle), voltage value, a-N	° (degree)
4115	HP_Va-58	58. Harmonic (phase angle), voltage value, a-N	° (degree)
4117	HP_Va-59	59. Harmonic (phase angle), voltage value, a-N	° (degree)
4119	HP_Va-60	60. Harmonic (phase angle), voltage value, a-N	° (degree)
4121	HP_Va-61	61. Harmonic (phase angle), voltage value, a-N	° (degree)
4123	HP_Va-62	62. Harmonic (phase angle), voltage value, a-N	° (degree)
4125	HP_Va-63	63. Harmonic (phase angle), voltage value, a-N	° (degree)
4127	HP_Vb-1	1. Harmonic (phase angle), voltage value, b-N (Fundamental)	° (degree)
4129	HP_Vb-2	2. Harmonic (phase angle), voltage value, b-N	° (degree)
4131	HP_Vb-3	3. Harmonic (phase angle), voltage value, b-N	° (degree)
4133	HP_Vb-4	4. Harmonic (phase angle), voltage value, b-N	° (degree)
4135	HP_Vb-5	5. Harmonic (phase angle), voltage value, b-N	° (degree)
4137	HP_Vb-6	6. Harmonic (phase angle), voltage value, b-N	° (degree)
4139	HP_Vb-7	7. Harmonic (phase angle), voltage value, b-N	° (degree)
4141	HP_Vb-8	8. Harmonic (phase angle), voltage value, b-N	° (degree)
4143	HP_Vb-9	9. Harmonic (phase angle), voltage value, b-N	° (degree)

Table 2-44 Registers 4001 to 4377: Phase Angle of Harmonics – Voltage Values (cont.)

Register	Type of Information	Remark	Unit
4145	HP_Vb-10	10. Harmonic (phase angle), voltage value, b-N	° (degree)
4147	HP_Vb-11	11. Harmonic (phase angle), voltage value, b-N	° (degree)
4149	HP_Vb-12	12. Harmonic (phase angle), voltage value, b-N	° (degree)
4151	HP_Vb-13	13. Harmonic (phase angle), voltage value, b-N	° (degree)
4153	HP_Vb-14	14. Harmonic (phase angle), voltage value, b-N	° (degree)
4155	HP_Vb-15	15. Harmonic (phase angle), voltage value, b-N	° (degree)
4157	HP_Vb-16	16. Harmonic (phase angle), voltage value, b-N	° (degree)
4159	HP_Vb-17	17. Harmonic (phase angle), voltage value, b-N	° (degree)
4161	HP_Vb-18	18. Harmonic (phase angle), voltage value, b-N	° (degree)
4163	HP_Vb-19	19. Harmonic (phase angle), voltage value, b-N	° (degree)
4165	HP_Vb-20	20. Harmonic (phase angle), voltage value, b-N	° (degree)
4167	HP_Vb-21	21. Harmonic (phase angle), voltage value, b-N	° (degree)
4169	HP_Vb-22	22. Harmonic (phase angle), voltage value, b-N	° (degree)
4171	HP_Vb-23	23. Harmonic (phase angle), voltage value, b-N	° (degree)
4173	HP_Vb-24	24. Harmonic (phase angle), voltage value, b-N	° (degree)
4175	HP_Vb-25	25. Harmonic (phase angle), voltage value, b-N	° (degree)
4177	HP_Vb-26	26. Harmonic (phase angle), voltage value, b-N	° (degree)
4179	HP_Vb-27	27. Harmonic (phase angle), voltage value, b-N	° (degree)
4181	HP_Vb-28	28. Harmonic (phase angle), voltage value, b-N	° (degree)
4183	HP_Vb-29	29. Harmonic (phase angle), voltage value, b-N	° (degree)
4185	HP_Vb-30	30. Harmonic (phase angle), voltage value, b-N	° (degree)
4187	HP_Vb-31	31. Harmonic (phase angle), voltage value, b-N	° (degree)
4189	HP_Vb-32	32. Harmonic (phase angle), voltage value, b-N	° (degree)
4191	HP_Vb-33	33. Harmonic (phase angle), voltage value, b-N	° (degree)
4193	HP_Vb-34	34. Harmonic (phase angle), voltage value, b-N	° (degree)
4195	HP_Vb-35	35. Harmonic (phase angle), voltage value, b-N	° (degree)

Table 2-44 Registers 4001 to 4377: Phase Angle of Harmonics – Voltage Values (cont.)

Register	Type of Information	Remark	Unit
4197	HP_Vb-36	36. Harmonic (phase angle), voltage value, b-N	° (degree)
4199	HP_Vb-37	37. Harmonic (phase angle), voltage value, b-N	° (degree)
4201	HP_Vb-38	38. Harmonic (phase angle), voltage value, b-N	° (degree)
4203	HP_Vb-39	39. Harmonic (phase angle), voltage value, b-N	° (degree)
4205	HP_Vb-40	40. Harmonic (phase angle), voltage value, b-N	° (degree)
4207	HP_Vb-41	41. Harmonic (phase angle), voltage value, b-N	° (degree)
4209	HP_Vb-42	42. Harmonic (phase angle), voltage value, b-N	° (degree)
4211	HP_Vb-43	43. Harmonic (phase angle), voltage value, b-N	° (degree)
4213	HP_Vb-44	44. Harmonic (phase angle), voltage value, b-N	° (degree)
4215	HP_Vb-45	45. Harmonic (phase angle), voltage value, b-N	° (degree)
4217	HP_Vb-46	46. Harmonic (phase angle), voltage value, b-N	° (degree)
4219	HP_Vb-47	47. Harmonic (phase angle), voltage value, b-N	° (degree)
4221	HP_Vb-48	48. Harmonic (phase angle), voltage value, b-N	° (degree)
4223	HP_Vb-49	49. Harmonic (phase angle), voltage value, b-N	° (degree)
4225	HP_Vb-50	50. Harmonic (phase angle), voltage value, b-N	° (degree)
4227	HP_Vb-51	51. Harmonic (phase angle), voltage value, b-N	° (degree)
4229	HP_Vb-52	52. Harmonic (phase angle), voltage value, b-N	° (degree)
4231	HP_Vb-53	53. Harmonic (phase angle), voltage value, b-N	° (degree)
4233	HP_Vb-54	54. Harmonic (phase angle), voltage value, b-N	° (degree)
4235	HP_Vb-55	55. Harmonic (phase angle), voltage value, b-N	° (degree)
4237	HP_Vb-56	56. Harmonic (phase angle), voltage value, b-N	° (degree)
4239	HP_Vb-57	57. Harmonic (phase angle), voltage value, b-N	° (degree)
4241	HP_Vb-58	58. Harmonic (phase angle), voltage value, b-N	° (degree)
4243	HP_Vb-59	59. Harmonic (phase angle), voltage value, b-N	° (degree)
4245	HP_Vb-60	60. Harmonic (phase angle), voltage value, b-N	° (degree)
4247	HP_Vb-61	61. Harmonic (phase angle), voltage value, b-N	° (degree)

Table 2-44 Registers 4001 to 4377: Phase Angle of Harmonics – Voltage Values (cont.)

Register	Type of Information	Remark	Unit
4249	HP_Vb-62	62. Harmonic (phase angle), voltage value, b-N	° (degree)
4251	HP_Vb-63	63. Harmonic (phase angle), voltage value, b-N	° (degree)
4253	HP_Vc-1	1. Harmonic (phase angle), voltage value, c-N (Fundamental)	° (degree)
4255	HP_Vc-2	2. Harmonic (phase angle), voltage value, c-N	° (degree)
4257	HP_Vc-3	3. Harmonic (phase angle), voltage value, c-N	° (degree)
4259	HP_Vc-4	4. Harmonic (phase angle), voltage value, c-N	° (degree)
4261	HP_Vc-5	5. Harmonic (phase angle), voltage value, c-N	° (degree)
4263	HP_Vc-6	6. Harmonic (phase angle), voltage value, c-N	° (degree)
4265	HP_Vc-7	7. Harmonic (phase angle), voltage value, c-N	° (degree)
4267	HP_Vc-8	8. Harmonic (phase angle), voltage value, c-N	° (degree)
4269	HP_Vc-9	9. Harmonic (phase angle), voltage value, c-N	° (degree)
4271	HP_Vc-10	10. Harmonic (phase angle), voltage value, c-N	° (degree)
4273	HP_Vc-11	11. Harmonic (phase angle), voltage value, c-N	° (degree)
4275	HP_Vc-12	12. Harmonic (phase angle), voltage value, c-N	° (degree)
4277	HP_Vc-13	13. Harmonic (phase angle), voltage value, c-N	° (degree)
4279	HP_Vc-14	14. Harmonic (phase angle), voltage value, c-N	° (degree)
4281	HP_Vc-15	15. Harmonic (phase angle), voltage value, c-N	° (degree)
4283	HP_Vc-16	16. Harmonic (phase angle), voltage value, c-N	° (degree)
4285	HP_Vc-17	17. Harmonic (phase angle), voltage value, c-N	° (degree)
4287	HP_Vc-18	18. Harmonic (phase angle), voltage value, c-N	° (degree)
4289	HP_Vc-19	19. Harmonic (phase angle), voltage value, c-N	° (degree)
4291	HP_Vc-20	20. Harmonic (phase angle), voltage value, c-N	° (degree)
4293	HP_Vc-21	21. Harmonic (phase angle), voltage value, c-N	° (degree)
4295	HP_Vc-22	22. Harmonic (phase angle), voltage value, c-N	° (degree)
4297	HP_Vc-23	23. Harmonic (phase angle), voltage value, c-N	° (degree)
4299	HP_Vc-24	24. Harmonic (phase angle), voltage value, c-N	° (degree)

Table 2-44 Registers 4001 to 4377: Phase Angle of Harmonics – Voltage Values (cont.)

Register	Type of Information	Remark	Unit
4301	HP_Vc-25	25. Harmonic (phase angle), voltage value, c-N	° (degree)
4303	HP_Vc-26	26. Harmonic (phase angle), voltage value, c-N	° (degree)
4305	HP_Vc-27	27. Harmonic (phase angle), voltage value, c-N	° (degree)
4307	HP_Vc-28	28. Harmonic (phase angle), voltage value, c-N	° (degree)
4309	HP_Vc-29	29. Harmonic (phase angle), voltage value, c-N	° (degree)
4311	HP_Vc-30	30. Harmonic (phase angle), voltage value, c-N	° (degree)
4313	HP_Vc-31	31. Harmonic (phase angle), voltage value, c-N	° (degree)
4315	HP_Vc-32	32. Harmonic (phase angle), voltage value, c-N	° (degree)
4317	HP_Vc-33	33. Harmonic (phase angle), voltage value, c-N	° (degree)
4319	HP_Vc-34	34. Harmonic (phase angle), voltage value, c-N	° (degree)
4321	HP_Vc-35	35. Harmonic (phase angle), voltage value, c-N	° (degree)
4323	HP_Vc-36	36. Harmonic (phase angle), voltage value, c-N	° (degree)
4325	HP_Vc-37	37. Harmonic (phase angle), voltage value, c-N	° (degree)
4327	HP_Vc-38	38. Harmonic (phase angle), voltage value, c-N	° (degree)
4329	HP_Vc-39	39. Harmonic (phase angle), voltage value, c-N	° (degree)
4331	HP_Vc-40	40. Harmonic (phase angle), voltage value, c-N	° (degree)
4333	HP_Vc-41	41. Harmonic (phase angle), voltage value, c-N	° (degree)
4335	HP_Vc-42	42. Harmonic (phase angle), voltage value, c-N	° (degree)
4337	HP_Vc-43	43. Harmonic (phase angle), voltage value, c-N	° (degree)
4339	HP_Vc-44	44. Harmonic (phase angle), voltage value, c-N	° (degree)
4341	HP_Vc-45	45. Harmonic (phase angle), voltage value, c-N	° (degree)
4343	HP_Vc-46	46. Harmonic (phase angle), voltage value, c-N	° (degree)
4345	HP_Vc-47	47. Harmonic (phase angle), voltage value, c-N	° (degree)
4347	HP_Vc-48	48. Harmonic (phase angle), voltage value, c-N	° (degree)
4349	HP_Vc-49	49. Harmonic (phase angle), voltage value, c-N	° (degree)
4351	HP_Vc-50	50. Harmonic (phase angle), voltage value, c-N	° (degree)

Table 2-44 Registers 4001 to 4377: Phase Angle of Harmonics – Voltage Values (cont.)

Register	Type of Information	Remark	Unit
4353	HP_Vc-51	51. Harmonic (phase angle), voltage value, c-N	° (degree)
4355	HP_Vc-52	52. Harmonic (phase angle), voltage value, c-N	° (degree)
4357	HP_Vc-53	53. Harmonic (phase angle), voltage value, c-N	° (degree)
4359	HP_Vc-54	54. Harmonic (phase angle), voltage value, c-N	° (degree)
4361	HP_Vc-55	55. Harmonic (phase angle), voltage value, c-N	° (degree)
4363	HP_Vc-56	56. Harmonic (phase angle), voltage value, c-N	° (degree)
4365	HP_Vc-57	57. Harmonic (phase angle), voltage value, c-N	° (degree)
4367	HP_Vc-58	58. Harmonic (phase angle), voltage value, c-N	° (degree)
4369	HP_Vc-59	59. Harmonic (phase angle), voltage value, c-N	° (degree)
4371	HP_Vc-60	60. Harmonic (phase angle), voltage value, c-N	° (degree)
4373	HP_Vc-61	61. Harmonic (phase angle), voltage value, c-N	° (degree)
4375	HP_Vc-62	62. Harmonic (phase angle), voltage value, c-N	° (degree)
4377	HP_Vc-63	63. Harmonic (phase angle), voltage value, c-N	° (degree)

2.2.7.36 Registers 4379 to 4755: Phase Angle of Harmonics – Current Values (read only)

These registers are write-protected. A write attempt will be rejected with exception code 02 (ILLEGAL_DATA_ADDRESS).

Calculation period: 10/12 cycle (50 Hz/60 Hz)

Network types: Only 1P2W, 3P4W_bal, 3P4W_unb_PN is available.

Data type: Measured value

Table 2-45 Registers 4379 to 4756: Phase Angle of Harmonics – Current Values

Register	Type of Information	Remark	Unit
4379	HP_la-1	1. Harmonic (phase angle), current value, a (Fundamental)	° (degree)
4381	HP_la-2	2. Harmonic (phase angle), current value, a	° (degree)
4383	HP_la-3	3. Harmonic (phase angle), current value, a	° (degree)
4385	HP_la-4	4. Harmonic (phase angle), current value, a	° (degree)
4387	HP_la-5	5. Harmonic (phase angle), current value, a	° (degree)
4389	HP_la-6	6. Harmonic (phase angle), current value, a	° (degree)
4391	HP_la-7	7. Harmonic (phase angle), current value, a	° (degree)
4393	HP_la-8	8. Harmonic (phase angle), current value, a	° (degree)
4395	HP_la-9	9. Harmonic (phase angle), current value, a	° (degree)
4397	HP_la-10	10. Harmonic (phase angle), current value, a	° (degree)
4399	HP_la-11	11. Harmonic (phase angle), current value, a	° (degree)
4401	HP_la-12	12. Harmonic (phase angle), current value, a	° (degree)
4403	HP_la-13	13. Harmonic (phase angle), current value, a	° (degree)
4405	HP_la-14	14. Harmonic (phase angle), current value, a	° (degree)
4407	HP_la-15	15. Harmonic (phase angle), current value, a	° (degree)
4409	HP_la-16	16. Harmonic (phase angle), current value, a	° (degree)
4411	HP_la-17	17. Harmonic (phase angle), current value, a	° (degree)
4413	HP_la-18	18. Harmonic (phase angle), current value, a	° (degree)
4415	HP_la-19	19. Harmonic (phase angle), current value, a	° (degree)
4417	HP_la-20	20. Harmonic (phase angle), current value, a	° (degree)

Table 2-45 Registers 4379 to 4756: Phase Angle of Harmonics – Current Values (cont.)

Register	Type of Information	Remark	Unit
4419	HP_la-21	21. Harmonic (phase angle), current value, a	° (degree)
4421	HP_la-22	22. Harmonic (phase angle), current value, a	° (degree)
4423	HP_la-23	23. Harmonic (phase angle), current value, a	° (degree)
4425	HP_la-24	24. Harmonic (phase angle), current value, a	° (degree)
4427	HP_la-25	25. Harmonic (phase angle), current value, a	° (degree)
4429	HP_la-26	26. Harmonic (phase angle), current value, a	° (degree)
4431	HP_la-27	27. Harmonic (phase angle), current value, a	° (degree)
4433	HP_la-28	28. Harmonic (phase angle), current value, a	° (degree)
4435	HP_la-29	29. Harmonic (phase angle), current value, a	° (degree)
4437	HP_la-30	30. Harmonic (phase angle), current value, a	° (degree)
4439	HP_la-31	31. Harmonic (phase angle), current value, a	° (degree)
4441	HP_la-32	32. Harmonic (phase angle), current value, a	° (degree)
4443	HP_la-33	33. Harmonic (phase angle), current value, a	° (degree)
4445	HP_la-34	34. Harmonic (phase angle), current value, a	° (degree)
4447	HP_la-35	35. Harmonic (phase angle), current value, a	° (degree)
4449	HP_la-36	36. Harmonic (phase angle), current value, a	° (degree)
4451	HP_la-37	37. Harmonic (phase angle), current value, a	° (degree)
4453	HP_la-38	38. Harmonic (phase angle), current value, a	° (degree)
4455	HP_la-39	39. Harmonic (phase angle), current value, a	° (degree)
4457	HP_la-40	40. Harmonic (phase angle), current value, a	° (degree)
4459	HP_la-41	41. Harmonic (phase angle), current value, a	° (degree)
4461	HP_la-42	42. Harmonic (phase angle), current value, a	° (degree)
4463	HP_la-43	43. Harmonic (phase angle), current value, a	° (degree)
4465	HP_la-44	44. Harmonic (phase angle), current value, a	° (degree)
4467	HP_la-45	45. Harmonic (phase angle), current value, a	° (degree)
4469	HP_la-46	46. Harmonic (phase angle), current value, a	° (degree)

Table 2-45 Registers 4379 to 4756: Phase Angle of Harmonics – Current Values (cont.)

Register	Type of Information	Remark	Unit
4471	HP_la-47	47. Harmonic (phase angle), current value, a	° (degree)
4473	HP_la-48	48. Harmonic (phase angle), current value, a	° (degree)
4475	HP_la-49	49. Harmonic (phase angle), current value, a	° (degree)
4477	HP_la-50	50. Harmonic (phase angle), current value, a	° (degree)
4479	HP_la-51	51. Harmonic (phase angle), current value, a	° (degree)
4481	HP_la-52	52. Harmonic (phase angle), current value, a	° (degree)
4483	HP_la-53	53. Harmonic (phase angle), current value, a	° (degree)
4485	HP_la-54	54. Harmonic (phase angle), current value, a	° (degree)
4487	HP_la-55	55. Harmonic (phase angle), current value, a	° (degree)
4489	HP_la-56	56. Harmonic (phase angle), current value, a	° (degree)
4491	HP_la-57	57. Harmonic (phase angle), current value, a	° (degree)
4493	HP_la-58	58. Harmonic (phase angle), current value, a	° (degree)
4495	HP_la-59	59. Harmonic (phase angle), current value, a	° (degree)
4497	HP_la-60	60. Harmonic (phase angle), current value, a	° (degree)
4499	HP_la-61	61. Harmonic (phase angle), current value, a	° (degree)
4501	HP_la-62	62. Harmonic (phase angle), current value, a	° (degree)
4503	HP_la-63	63. Harmonic (phase angle), current value, a	° (degree)
4505	HP_lb-1	1. Harmonic (phase angle), current value, b (Fundamental)	° (degree)
4507	HP_lb-2	2. Harmonic (phase angle), current value, b	° (degree)
4509	HP_lb-3	3. Harmonic (phase angle), current value, b	° (degree)
4511	HP_lb-4	4. Harmonic (phase angle), current value, b	° (degree)
4513	HP_lb-5	5. Harmonic (phase angle), current value, b	° (degree)
4515	HP_lb-6	6. Harmonic (phase angle), current value, b	° (degree)
4517	HP_lb-7	7. Harmonic (phase angle), current value, b	° (degree)
4519	HP_lb-8	8. Harmonic (phase angle), current value, b	° (degree)
4521	HP_lb-9	9. Harmonic (phase angle), current value, b	° (degree)

Table 2-45 Registers 4379 to 4756: Phase Angle of Harmonics – Current Values (cont.)

Register	Type of Information	Remark	Unit
4523	HP_lb-10	10. Harmonic (phase angle), current value, b	° (degree)
4525	HP_lb-11	11. Harmonic (phase angle), current value, b	° (degree)
4527	HP_lb-12	12. Harmonic (phase angle), current value, b	° (degree)
4529	HP_lb-13	13. Harmonic (phase angle), current value, b	° (degree)
4531	HP_lb-14	14. Harmonic (phase angle), current value, b	° (degree)
4533	HP_lb-15	15. Harmonic (phase angle), current value, b	° (degree)
4535	HP_lb-16	16. Harmonic (phase angle), current value, b	° (degree)
4537	HP_lb-17	17. Harmonic (phase angle), current value, b	° (degree)
4539	HP_lb-18	18. Harmonic (phase angle), current value, b	° (degree)
4541	HP_lb-19	19. Harmonic (phase angle), current value, b	° (degree)
4543	HP_lb-20	20. Harmonic (phase angle), current value, b	° (degree)
4545	HP_lb-21	21. Harmonic (phase angle), current value, b	° (degree)
4547	HP_lb-22	22. Harmonic (phase angle), current value, b	° (degree)
4549	HP_lb-23	23. Harmonic (phase angle), current value, b	° (degree)
4551	HP_lb-24	24. Harmonic (phase angle), current value, b	° (degree)
4553	HP_lb-25	25. Harmonic (phase angle), current value, b	° (degree)
4555	HP_lb-26	26. Harmonic (phase angle), current value, b	° (degree)
4557	HP_lb-27	27. Harmonic (phase angle), current value, b	° (degree)
4559	HP_lb-28	28. Harmonic (phase angle), current value, b	° (degree)
4561	HP_lb-29	29. Harmonic (phase angle), current value, b	° (degree)
4563	HP_lb-30	30. Harmonic (phase angle), current value, b	° (degree)
4565	HP_lb-31	31. Harmonic (phase angle), current value, b	° (degree)
4567	HP_lb-32	32. Harmonic (phase angle), current value, b	° (degree)
4569	HP_lb-33	33. Harmonic (phase angle), current value, b	° (degree)
4571	HP_lb-34	34. Harmonic (phase angle), current value, b	° (degree)
4573	HP_lb-35	35. Harmonic (phase angle), current value, b	° (degree)

Table 2-45 Registers 4379 to 4756: Phase Angle of Harmonics – Current Values (cont.)

Register	Type of Information	Remark	Unit
4575	HP_lb-36	36. Harmonic (phase angle), current value, b	° (degree)
4577	HP_lb-37	37. Harmonic (phase angle), current value, b	° (degree)
4579	HP_lb-38	38. Harmonic (phase angle), current value, b	° (degree)
4581	HP_lb-39	39. Harmonic (phase angle), current value, b	° (degree)
4583	HP_lb-40	40. Harmonic (phase angle), current value, b	° (degree)
4585	HP_lb-41	41. Harmonic (phase angle), current value, b	° (degree)
4587	HP_lb-42	42. Harmonic (phase angle), current value, b	° (degree)
4589	HP_lb-43	43. Harmonic (phase angle), current value, b	° (degree)
4591	HP_lb-44	44. Harmonic (phase angle), current value, b	° (degree)
4593	HP_lb-45	45. Harmonic (phase angle), current value, b	° (degree)
4595	HP_lb-46	46. Harmonic (phase angle), current value, b	° (degree)
4597	HP_lb-47	47. Harmonic (phase angle), current value, b	° (degree)
4599	HP_lb-48	48. Harmonic (phase angle), current value, b	° (degree)
4601	HP_lb-49	49. Harmonic (phase angle), current value, b	° (degree)
4603	HP_lb-50	50. Harmonic (phase angle), current value, b	° (degree)
4605	HP_lb-51	51. Harmonic (phase angle), current value, b	° (degree)
4607	HP_lb-52	52. Harmonic (phase angle), current value, b	° (degree)
4609	HP_lb-53	53. Harmonic (phase angle), current value, b	° (degree)
4611	HP_lb-54	54. Harmonic (phase angle), current value, b	° (degree)
4613	HP_lb-55	55. Harmonic (phase angle), current value, b	° (degree)
4615	HP_lb-56	56. Harmonic (phase angle), current value, b	° (degree)
4617	HP_lb-57	57. Harmonic (phase angle), current value, b	° (degree)
4619	HP_lb-58	58. Harmonic (phase angle), current value, b	° (degree)
4621	HP_lb-59	59. Harmonic (phase angle), current value, b	° (degree)
4623	HP_lb-60	60. Harmonic (phase angle), current value, b	° (degree)
4625	HP_lb-61	61. Harmonic (phase angle), current value, b	° (degree)

Table 2-45 Registers 4379 to 4756: Phase Angle of Harmonics – Current Values (cont.)

Register	Type of Information	Remark	Unit
4627	HP_lb-62	62. Harmonic (phase angle), current value, b	° (degree)
4629	HP_lb-63	63. Harmonic (phase angle), current value, b	° (degree)
4631	HP_lc-1	1. Harmonic (phase angle), current value, c (Fundamental)	° (degree)
4633	HP_lc-2	2. Harmonic (phase angle), current value, c	° (degree)
4635	HP_lc-3	3. Harmonic (phase angle), current value, c	° (degree)
4637	HP_lc-4	4. Harmonic (phase angle), current value, c	° (degree)
4639	HP_lc-5	5. Harmonic (phase angle), current value, c	° (degree)
4641	HP_lc-6	6. Harmonic (phase angle), current value, c	° (degree)
4643	HP_lc-7	7. Harmonic (phase angle), current value, c	° (degree)
4645	HP_lc-8	8. Harmonic (phase angle), current value, c	° (degree)
4647	HP_lc-9	9. Harmonic (phase angle), current value, c	° (degree)
4649	HP_lc-10	10. Harmonic (phase angle), current value, c	° (degree)
4651	HP_lc-11	11. Harmonic (phase angle), current value, c	° (degree)
4653	HP_lc-12	12. Harmonic (phase angle), current value, c	° (degree)
4655	HP_lc-13	13. Harmonic (phase angle), current value, c	° (degree)
4657	HP_lc-14	14. Harmonic (phase angle), current value, c	° (degree)
4659	HP_lc-15	15. Harmonic (phase angle), current value, c	° (degree)
4661	HP_lc-16	16. Harmonic (phase angle), current value, c	° (degree)
4663	HP_lc-17	17. Harmonic (phase angle), current value, c	° (degree)
4665	HP_lc-18	18. Harmonic (phase angle), current value, c	° (degree)
4667	HP_lc-19	19. Harmonic (phase angle), current value, c	° (degree)
4669	HP_lc-20	20. Harmonic (phase angle), current value, c	° (degree)
4671	HP_lc-21	21. Harmonic (phase angle), current value, c	° (degree)
4673	HP_lc-22	22. Harmonic (phase angle), current value, c	° (degree)
4675	HP_lc-23	23. Harmonic (phase angle), current value, c	° (degree)
4677	HP_lc-24	24. Harmonic (phase angle), current value, c	° (degree)

Table 2-45 Registers 4379 to 4756: Phase Angle of Harmonics – Current Values (cont.)

Register	Type of Information	Remark	Unit
4679	HP_lc-25	25. Harmonic (phase angle), current value, c	° (degree)
4681	HP_lc-26	26. Harmonic (phase angle), current value, c	° (degree)
4683	HP_lc-27	27. Harmonic (phase angle), current value, c	° (degree)
4685	HP_lc-28	28. Harmonic (phase angle), current value, c	° (degree)
4687	HP_lc-29	29. Harmonic (phase angle), current value, c	° (degree)
4689	HP_lc-30	30. Harmonic (phase angle), current value, c	° (degree)
4691	HP_lc-31	31. Harmonic (phase angle), current value, c	° (degree)
4693	HP_lc-32	32. Harmonic (phase angle), current value, c	° (degree)
4695	HP_lc-33	33. Harmonic (phase angle), current value, c	° (degree)
4697	HP_lc-34	34. Harmonic (phase angle), current value, c	° (degree)
4699	HP_lc-35	35. Harmonic (phase angle), current value, c	° (degree)
4701	HP_lc-36	36. Harmonic (phase angle), current value, c	° (degree)
4703	HP_lc-37	37. Harmonic (phase angle), current value, c	° (degree)
4705	HP_lc-38	38. Harmonic (phase angle), current value, c	° (degree)
4707	HP_lc-39	39. Harmonic (phase angle), current value, c	° (degree)
4709	HP_lc-40	40. Harmonic (phase angle), current value, c	° (degree)
4711	HP_lc-41	41. Harmonic (phase angle), current value, c	° (degree)
4713	HP_lc-42	42. Harmonic (phase angle), current value, c	° (degree)
4715	HP_lc-43	43. Harmonic (phase angle), current value, c	° (degree)
4717	HP_lc-44	44. Harmonic (phase angle), current value, c	° (degree)
4719	HP_lc-45	45. Harmonic (phase angle), current value, c	° (degree)
4721	HP_lc-46	46. Harmonic (phase angle), current value, c	° (degree)
4723	HP_lc-47	47. Harmonic (phase angle), current value, c	° (degree)
4725	HP_lc-48	48. Harmonic (phase angle), current value, c	° (degree)
4727	HP_lc-49	49. Harmonic (phase angle), current value, c	° (degree)
4729	HP_lc-50	50. Harmonic (phase angle), current value, c	° (degree)

Table 2-45 Registers 4379 to 4756: Phase Angle of Harmonics – Current Values (cont.)

Register	Type of Information	Remark	Unit
4731	HP_Ic-51	51. Harmonic (phase angle), current value, c	° (degree)
4733	HP_Ic-52	52. Harmonic (phase angle), current value, c	° (degree)
4735	HP_Ic-53	53. Harmonic (phase angle), current value, c	° (degree)
4737	HP_Ic-54	54. Harmonic (phase angle), current value, c	° (degree)
4739	HP_Ic-55	55. Harmonic (phase angle), current value, c	° (degree)
4741	HP_Ic-56	56. Harmonic (phase angle), current value, c	° (degree)
4743	HP_Ic-57	57. Harmonic (phase angle), current value, c	° (degree)
4745	HP_Ic-58	58. Harmonic (phase angle), current value, c	° (degree)
4747	HP_Ic-59	59. Harmonic (phase angle), current value, c	° (degree)
4749	HP_Ic-60	60. Harmonic (phase angle), current value, c	° (degree)
4751	HP_Ic-61	61. Harmonic (phase angle), current value, c	° (degree)
4753	HP_Ic-62	62. Harmonic (phase angle), current value, c	° (degree)
4755	HP_Ic-63	63. Harmonic (phase angle), current value, c	° (degree)

2.2.7.37 Registers 5001 to 5099: Latest 10 Dips (read only)

These registers are write-protected. A write attempt will be rejected with exception code 02 (ILLEGAL_DATA_ADDRESS).

Data type: Measured value + Date/time

Table 2-46 Registers 5001 to 5099: Latest 10 Dips

Register	Type of Information	Unit	Remark
5001	Milliseconds	V	Start time of dip Data format see chapter 2.2.6.2
5002	Hours/minutes		
5003	Month/day		
5004	Time status/year		
5005 to 5006	Voltage dip 1	V	Minimum voltage value during dip 1
5007 to 5008	Voltage dip 1 time duration	s	Dip 1 time duration
5009	Influenced phase	-	Related phases bit 0: Va, bit 1: Vb, bit 2: Vc, bit 3: Vab, bit 4: Vbc, bit 5: Vca if any bit =1 means corresponding phase is influenced
5011	Milliseconds	V	Start time of dip Data format see chapter 2.2.6.2
5012	Hours/minutes		
5013	Month/day		
5014	Time status/year		
5015 to 5016	Voltage dip 2	V	Minimum voltage value during dip 2
5017 to 5018	Voltage dip 2 time duration	s	Dip 2 time duration
5019	Influenced phase	-	Related phases bit 0: Va, bit 1: Vb, bit 2: Vc, bit 3: Vab, bit 4: Vbc, bit 5: Vca if any bit =1 means corresponding phase is influenced
5021	Milliseconds	V	Start time of dip Data format see chapter 2.2.6.2
5022	Hours/minutes		
5023	Month/day		
5024	Time status/year		
5025 to 5026	Voltage dip 3	V	Minimum voltage value during dip 3

Table 2-46 Registers 5001 to 5099: Latest 10 Dips (cont.)

Register	Type of Information	Unit	Remark
5027 to 5028	Voltage dip 3 time duration	s	Dip 3 time duration
5029	Influenced phase	-	Related phases bit 0: Va, bit 1: Vb, bit 2: Vc, bit 3: Vab, bit 4: Vbc, bit 5: Vca if any bit =1 means corresponding phase is influenced
5031	Milliseconds	Start time of dip Data format see chapter 2.2.6.2	
5032	Hours/minutes		
5033	Month/day		
5034	Time status/year		
5035 to 5036	Voltage dip 4	V	Minimum voltage value during dip 4
5037 to 5038	Voltage dip 4 time duration	s	Dip 4 time duration
5039	Influenced phase	-	Related phases bit 0: Va, bit 1: Vb, bit 2: Vc, bit 3: Vab, bit 4: Vbc, bit 5: Vca if any bit =1 means corresponding phase is influenced
5041	Milliseconds	Start time of dip Data format see chapter 2.2.6.2	
5042	Hours/minutes		
5043	Month/day		
5044	Time status/year		
5045 to 5046	Voltage dip 5	V	Minimum voltage value during dip 5
5047 to 5048	Voltage dip 5 time duration	s	Dip 5 time duration
5049	Influenced phase	-	Related phases bit 0: Va, bit 1: Vb, bit 2: Vc, bit 3: Vab, bit 4: Vbc, bit 5: Vca if any bit =1 means corresponding phase is influenced
5051	Milliseconds	Start time of dip Data format see chapter 2.2.6.2	
5052	Hours/minutes		
5053	Month/day		
5054	Time status/year		

Table 2-46 Registers 5001 to 5099: Latest 10 Dips (cont.)

Register	Type of Information	Unit	Remark
5055 to 5056	Voltage dip 6	V	Minimum voltage value during dip 6
5057 to 5058	Voltage dip 6 time duration	s	Dip 6 time duration
5059	Influenced phase	-	Related phases bit 0: Va, bit 1: Vb, bit 2: Vc, bit 3: Vab, bit 4: Vbc, bit 5: Vca if any bit =1 means corresponding phase is influenced
5061	Milliseconds	Start time of dip Data format see chapter 2.2.6.2	
5062	Hours/minutes		
5063	Month/day		
5064	Time status/year		
5065 to 5066	Voltage dip 7	V	Minimum voltage value during dip 7
5067 to 5068	Voltage dip 7 time duration	s	Dip 7 time duration
5069	Influenced phase	-	Related phases bit 0: Va, bit 1: Vb, bit 2: Vc, bit 3: Vab, bit 4: Vbc, bit 5: Vca if any bit =1 means corresponding phase is influenced
5071	Milliseconds	Start time of dip Data format see chapter 2.2.6.2	
5072	Hours/minutes		
5073	Month/day		
5074	Time status/year		
5075 to 5076	Voltage dip 8	V	Minimum voltage value during dip 8
5077 to 5078	Voltage dip 8 time duration	s	Dip 8 time duration
5079	Influenced phase	-	Related phases bit 0: Va, bit 1: Vb, bit 2: Vc, bit 3: Vab, bit 4: Vbc, bit 5: Vca if any bit =1 means corresponding phase is influenced

Table 2-46 Registers 5001 to 5099: Latest 10 Dips (cont.)

Register	Type of Information	Unit	Remark
5081	Milliseconds	Start time of dip	Data format see chapter 2.2.6.2
5082	Hours/minutes		
5083	Month/day		
5084	Time status/year		
5085 to 5086	Voltage dip 9	V	Minimum voltage value during dip 9
5087 to 5088	Voltage dip 9 time duration	s	Dip 9 time duration
5089	Influenced phase	-	Related phases bit 0: Va, bit 1: Vb, bit 2: Vc, bit 3: Vab, bit 4: Vbc, bit 5: Vca if any bit =1 means corresponding phase is influenced
5091	Milliseconds	Start time of dip	Data format see chapter 2.2.6.2
5092	Hours/minutes		
5093	Month/day		
5094	Time status/year		
5095 to 5096	Voltage dip 10	V	Minimum voltage value during dip 10
5097 to 5098	Voltage dip 10 time duration	s	Dip 10 time duration
5099	Influenced phase	-	Related phases bit 0: Va, bit 1: Vb, bit 2: Vc, bit 3: Vab, bit 4: Vbc, bit 5: Vca if any bit =1 means corresponding phase is influenced

2.2.7.38 Registers 5201 to 5299: Latest 10 Swells (read only)

These registers are write-protected. A write attempt will be rejected with exception code 02 (ILLEGAL_DATA_ADDRESS).

Data types: Measured value and Date/time

Table 2-47 Registers 5201 to 5299: Latest 10 Swells

Register	Type of Information	Unit	Remark
5201	Milliseconds		Start time of swell Data format see chapter 2.2.6.2
5202	Hours/minutes		
5203	Month/day		
5204	Time status/year		
5205 to 5206	Voltage swell 1	V	Maximum voltage value during swell 1
5207 to 5208	Voltage swell 1 time duration	s	Swell 1 time duration
5209	Influenced phase	-	Related phases bit 0: Va, bit 1: Vb, bit 2: Vc, bit 3: Vab, bit 4: Vbc, bit 5: Vca if any bit =1 means corresponding phase is influenced
5211	Milliseconds		Start time of swell Data format see chapter 2.2.6.2
5212	Hours/minutes		
5213	Month/day		
5214	Time status/year		
5215 to 5216	Voltage swell 2	V	Maximum voltage value during swell 2
5217 to 5218	Voltage swell 2 time duration	s	Swell 2 time duration
5219	Influenced phase	-	Related phases bit 0: Va, bit 1: Vb, bit 2: Vc, bit 3: Vab, bit 4: Vbc, bit 5: Vca if any bit =1 means corresponding phase is influenced
5221	Milliseconds		Start time of swell Data format see chapter 2.2.6.2
5222	Hours/minutes		
5223	Month/day		
5224	Time status/year		
5225 to 5226	Voltage swell 3	V	Maximum voltage value during swell 3

Table 2-47 Registers 5201 to 5299: Latest 10 Swells (cont.)

Register	Type of Information	Unit	Remark
5227 to 5228	Voltage swell 3 time duration	s	Swell 3 time duration
5229	Influenced phase	-	Related phases bit 0: Va, bit 1: Vb, bit 2: Vc, bit 3: Vab, bit 4: Vbc, bit 5: Vca if any bit =1 means corresponding phase is influenced
5231	Milliseconds	Start time of swell Data format see chapter 2.2.6.2	
5232	Hours/minutes		
5233	Month/day		
5234	Time status/year		
5235 to 5236	Voltage swell 4	V	Maximum voltage value during swell 4
5237 to 5238	Voltage swell 4 time duration	s	Swell 4 time duration
5239	Influenced phase	-	Related phases bit 0: Va, bit 1: Vb, bit 2: Vc, bit 3: Vab, bit 4: Vbc, bit 5: Vca if any bit =1 means corresponding phase is influenced
5241	Milliseconds	Start time of swell Data format see chapter 2.2.6.2	
5242	Hours/minutes		
5243	Month/day		
5244	Time status/year		
5245 to 5246	Voltage swell 5	V	Maximum voltage value during swell 5
5247 to 5248	Voltage swell 5 time duration	s	Swell 5 time duration
5249	Influenced phase	-	Related phases bit 0: Va, bit 1: Vb, bit 2: Vc, bit 3: Vab, bit 4: Vbc, bit 5: Vca if any bit =1 means corresponding phase is influenced
5251	Milliseconds	Start time of swell Data format see chapter 2.2.6.2	
5252	Hours/minutes		
5253	Month/day		
5254	Time status/year		

Table 2-47 Registers 5201 to 5299: Latest 10 Swells (cont.)

Register	Type of Information	Unit	Remark
5255 to 5256	Voltage swell 6	V	Maximum voltage value during swell 6
5257 to 5258	Voltage swell 6 time duration	s	Swell 6 time duration
5259	Influenced phase	-	Related phases bit 0: Va, bit 1: Vb, bit 2: Vc, bit 3: Vab, bit 4: Vbc, bit 5: Vca if any bit =1 means corresponding phase is influenced
5261	Milliseconds	Start time of swell Data format see chapter 2.2.6.2	
5262	Hours/minutes		
5263	Month/day		
5264	Time status/year		
5265 to 5266	Voltage swell 7	V	Maximum voltage value during swell 7
5267 to 5268	Voltage swell 7 time duration	s	Swell 7 time duration
5269	Influenced phase	-	Related phases bit 0: Va, bit 1: Vb, bit 2: Vc, bit 3: Vab, bit 4: Vbc, bit 5: Vca if any bit =1 means corresponding phase is influenced
5271	Milliseconds	Start time of swell Data format see chapter 2.2.6.2	
5272	Hours/minutes		
5273	Month/day		
5274	Time status/year		
5275 to 5276	Voltage swell 8	V	Maximum voltage value during swell 8
5277 to 5278	Voltage swell 8 time duration	s	Swell 8 time duration
5279	Influenced phase	-	Related phases bit 0: Va, bit 1: Vb, bit 2: Vc, bit 3: Vab, bit 4: Vbc, bit 5: Vca if any bit =1 means corresponding phase is influenced

Table 2-47 Registers 5201 to 5299: Latest 10 Swells (cont.)

Register	Type of Information	Unit	Remark
5281	Milliseconds	Start time of swell	Data format see chapter 2.2.6.2
5282	Hours/minutes		
5283	Month/day		
5284	Time status/year		
5285 to 5286	Voltage swell 9	V	Maximum voltage value during swell 9
5287 to 5288	Voltage swell 9 time duration	s	Swell 9 time duration
5289	Influenced phase	-	Related phases bit 0: Va, bit 1: Vb, bit 2: Vc, bit 3: Vab, bit 4: Vbc, bit 5: Vca if any bit =1 means corresponding phase is influenced
5291	Milliseconds	Start time of swell	Data format see chapter 2.2.6.2
5292	Hours/minutes		
5293	Month/day		
5294	Time status/year		
5295 to 5296	Voltage swell 10	V	Maximum voltage value during swell 10
5297 to 5298	Voltage swell 10 time duration	s	Swell 10 time duration
5299	Influenced phase	-	Related phases bit 0: Va, bit 1: Vb, bit 2: Vc, bit 3: Vab, bit 4: Vbc, bit 5: Vca if any bit =1 means corresponding phase is influenced

2.2.7.39 Registers 5401 to 5499: Latest 10 Voltage Interrupts (read only)

These registers are write-protected. A write attempt will be rejected with exception code 02 (ILLEGAL_DATA_ADDRESS).

Data type: Measured value and Date/time

Table 2-48 Registers 5401 to 5499: Latest 10 Voltage Interrupts

Register	Type of Information	Unit	Remark
5401	Milliseconds		Start time of interrupt
5402	Hours/minutes		Data format see chapter 2.2.6.2
5403	Month/day		
5404	Time status/year		
5405 to 5406	Voltage interrupt 1	V	Minimum voltage value during interrupt 1
5407 to 5408	Voltage interrupt 1 time duration	s	Interrupt 1 time duration
5409	Influenced phase	-	Related phases bit 0: Va, bit 1: Vb, bit 2: Vc, bit 3: Vab, bit 4: Vbc, bit 5: Vca if any bit =1 means corresponding phase is influenced
5411	Milliseconds		Start time of interrupt
5412	Hours/minutes		Data format see chapter 2.2.6.2
5413	Month/day		
5414	Time status/year		
5415 to 5416	Voltage interrupt 2	V	Minimum voltage value during interrupt 2
5417 to 5418	Voltage interrupt 2 time duration	s	Interrupt 2 time duration
5419	Influenced phase	-	Related phases bit 0: Va, bit 1: Vb, bit 2: Vc, bit 3: Vab, bit 4: Vbc, bit 5: Vca if any bit =1 means corresponding phase is influenced
5421	Milliseconds		Start time of interrupt
5422	Hours/minutes		Data format see chapter 2.2.6.2
5423	Month/day		
5424	Time status/year		

Table 2-48 Registers 5401 to 5499: Latest 10 Voltage Interrupts (cont.)

Register	Type of Information	Unit	Remark
5425 to 5426	Voltage interrupt 3	V	Minimum voltage value during interrupt 3
5427 to 5428	Voltage interrupt 3 time duration	s	Interrupt 3 time duration
5429	Influenced phase	-	Related phases bit 0: Va, bit 1: Vb, bit 2: Vc, bit 3: Vab, bit 4: Vbc, bit 5: Vca if any bit =1 means corresponding phase is influenced
5431	Milliseconds	Start time of interrupt Data format see chapter 2.2.6.2	
5432	Hours/minutes		
5433	Month/day		
5434	Time status/year		
5435 to 5436	Voltage interrupt 4	V	Minimum voltage value during interrupt 4
5437 to 5438	Voltage interrupt 4 time duration	s	Interrupt 4 time duration
5439	Influenced phase	-	Related phases bit 0: Va, bit 1: Vb, bit 2: Vc, bit 3: Vab, bit 4: Vbc, bit 5: Vca if any bit =1 means corresponding phase is influenced
5441	Milliseconds	Start time of interrupt Data format see chapter 2.2.6.2	
5442	Hours/minutes		
5443	Month/day		
5444	Time status/year		
5445 to 5446	Voltage interrupt 5	V	Minimum voltage value during interrupt 5
5447 to 5448	Voltage interrupt 5 time duration	s	Interrupt 5 time duration
5449	Influenced phase	-	Related phases bit 0: Va, bit 1: Vb, bit 2: Vc, bit 3: Vab, bit 4: Vbc, bit 5: Vca if any bit =1 means corresponding phase is influenced

Table 2-48 Registers 5401 to 5499: Latest 10 Voltage Interrupts (cont.)

Register	Type of Information	Unit	Remark
5451	Milliseconds		Start time of interrupt Data format see chapter 2.2.6.2
5452	Hours/minutes		
5453	Month/day		
5454	Time status/year		
5455 to 5456	Voltage interrupt 6	V	Minimum voltage value during interrupt 6
5457 to 5458	Voltage interrupt 6 time duration	s	Interrupt 6 time duration
5459	Influenced phase	-	Related phases bit 0: Va, bit 1: Vb, bit 2: Vc, bit 3: Vab, bit 4: Vbc, bit 5: Vca if any bit =1 means corresponding phase is influenced
5461	Milliseconds		Start time of interrupt Data format see chapter 2.2.6.2
5462	Hours/minutes		
5463	Month/day		
5464	Time status/year		
5465 to 5466	Voltage interrupt 7	V	Minimum voltage value during interrupt 7
5467 to 5468	Voltage interrupt 7 time duration	s	Interrupt 7 time duration
5469	Influenced phase	-	Related phases bit 0: Va, bit 1: Vb, bit 2: Vc, bit 3: Vab, bit 4: Vbc, bit 5: Vca if any bit =1 means corresponding phase is influenced
5471	Milliseconds		Start time of interrupt Data format see chapter 2.2.6.2
5472	Hours/minutes		
5473	Month/day		
5474	Time status/year		
5475 to 5476	Voltage interrupt 8	V	Minimum voltage value during interrupt 8
5477 to 5478	Voltage interrupt 8 time duration	s	Interrupt 8 time duration

Table 2-48 Registers 5401 to 5499: Latest 10 Voltage Interrupts (cont.)

Register	Type of Information	Unit	Remark
5479	Influenced phase	-	Related phases bit 0: Va, bit 1: Vb, bit 2: Vc, bit 3: Vab, bit 4: Vbc, bit 5: Vca if any bit =1 means corresponding phase is influenced
5481	Milliseconds	Start time of interrupt Data format see chapter 2.2.6.2	
5482	Hours/minutes		
5483	Month/day		
5484	Time status/year		
5485 to 5486	Voltage interrupt 9	V	Minimum voltage value during interrupt 9
5487 to 5488	Voltage interrupt 9 time duration	s	Interrupt 9 time duration
5489	Influenced phase	-	Related phases bit 0: Va, bit 1: Vb, bit 2: Vc, bit 3: Vab, bit 4: Vbc, bit 5: Vca if any bit =1 means corresponding phase is influenced
5491	Milliseconds	Start time of interrupt Data format see chapter 2.2.6.2	
5492	Hours/minutes		
5493	Month/day		
5494	Time status/year		
5495 to 5496	Voltage interrupt 10	V	Minimum voltage value during interrupt 10
5497 to 5498	Voltage interrupt 10 time duration	s	Interrupt 10 time duration
5499	Influenced phase	-	Related phases bit 0: Va, bit 1: Vb, bit 2: Vc, bit 3: Vab, bit 4: Vbc, bit 5: Vca if any bit =1 means corresponding phase is influenced

2.2.7.40 Registers 5501 to 5691: Latest 10 RVC Events (read only)

These registers are write-protected. A write attempt will be rejected with exception code 02 (ILLEGAL_DATA_ADDRESS).

Data type: Measured value and Date/time

Table 2-49 Registers 5501 to 5691: Latest 10 RVC Events

Register	Type of Information	Unit	Remark
5501	Milliseconds	Start time of RVC Data format see chapter 2.2.6.2	
5502	Hours/minutes		
5503	Month/day		
5504	Time status/year		
5505 to 5506	$\Delta U_{\max}$ of RVC 1	V	$\Delta U_{\max}$ during RVC 1
5507 to 5508	ΔU_{ss} of RVC 1	V	ΔU_{ss} during RVC 1
5509 to 5510	RVC 1 time duration	s	RVC 1 time duration
5511	Influenced Phase	-	Related phases bit 0: Va, bit 1: Vb, bit 2: Vc, bit 3: Vab, bit 4: Vbc, bit 5: Vca if any bit =1 means corresponding phase is influenced
5521	Milliseconds	Start time of RVC Data format see chapter 2.2.6.2	
5522	Hours/minutes		
5523	Month/day		
5524	Time status/year		
5525 to 5526	$\Delta U_{\max}$ of RVC 2	V	$\Delta U_{\max}$ during RVC 2
5527 to 5528	ΔU_{ss} of RVC 2	V	ΔU_{ss} during RVC 2
5529 to 5530	RVC 2 time duration	s	RVC 2 time duration
5531	Influenced Phase	-	Related phases bit 0: Va, bit 1: Vb, bit 2: Vc, bit 3: Vab, bit 4: Vbc, bit 5: Vca if any bit =1 means corresponding phase is influenced

Table 2-49 Registers 5501 to 5691: Latest 10 RVC Events (cont.)

Register	Type of Information	Unit	Remark
5541	Milliseconds	Start time of RVC Data format see chapter 2.2.6.2	
5542	Hours/minutes		
5543	Month/day		
5544	Time status/year		
5545 to 5546	$\Delta U_{\max}$ of RVC 3	V	$\Delta U_{\max}$ during RVC 3
5547 to 5548	ΔU_{ss} of RVC 3	V	ΔU_{ss} during RVC 3
5549 to 5550	RVC 3 time duration	s	RVC 3 time duration
5551	Influenced Phase	-	Related phases bit 0: Va, bit 1: Vb, bit 2: Vc, bit 3: Vab, bit 4: Vbc, bit 5: Vca if any bit =1 means corresponding phase is influenced
5561	Milliseconds	Start time of RVC Data format see chapter 2.2.6.2	
5562	Hours/minutes		
5563	Month/day		
5564	Time status/year		
5565 to 5566	$\Delta U_{\max}$ of RVC 4	V	$\Delta U_{\max}$ during RVC 4
5567 to 5568	ΔU_{ss} of RVC 4	V	ΔU_{ss} during RVC 4
5569 to 5570	RVC 4 time duration	s	RVC 4 time duration
5571	Influenced Phase	-	Related phases bit 0: Va, bit 1: Vb, bit 2: Vc, bit 3: Vab, bit 4: Vbc, bit 5: Vca if any bit =1 means corresponding phase is influenced
5581	Milliseconds	Start time of RVC Data format see chapter 2.2.6.2	
5582	Hours/minutes		
5583	Month/day		
5584	Time status/year		
5585 to 5586	$\Delta U_{\max}$ of RVC 5	V	$\Delta U_{\max}$ during RVC 5
5587 to 5588	ΔU_{ss} of RVC 5	V	ΔU_{ss} during RVC 5

Table 2-49 Registers 5501 to 5691: Latest 10 RVC Events (cont.)

Register	Type of Information	Unit	Remark
5589 to 5590	RVC 5 time duration	s	RVC 5 time duration
5591	Influenced Phase	-	Related phases bit 0: Va, bit 1: Vb, bit 2: Vc, bit 3: Vab, bit 4: Vbc, bit 5: Vca if any bit =1 means corresponding phase is influenced
5601	Milliseconds	Start time of RVC Data format see chapter 2.2.6.2	
5602	Hours/minutes		
5603	Month/day		
5604	Time status/year		
5605 to 5606	$\Delta U_{\max}$ of RVC 6	V	$\Delta U_{\max}$ during RVC 6
5607 to 5608	ΔU_{ss} of RVC 6	V	ΔU_{ss} during RVC 6
5609 to 5610	RVC 6 time duration	s	RVC 6 time duration
5611	Influenced Phase	-	Related phases bit 0: Va, bit 1: Vb, bit 2: Vc, bit 3: Vab, bit 4: Vbc, bit 5: Vca if any bit =1 means corresponding phase is influenced
5621	Milliseconds	Start time of RVC Data format see chapter 2.2.6.2	
5622	Hours/minutes		
5623	Month/day		
5624	Time status/year		
5625 to 5626	$\Delta U_{\max}$ of RVC 7	V	$\Delta U_{\max}$ during RVC 7
5627 to 5628	ΔU_{ss} of RVC 7	V	ΔU_{ss} during RVC 7
5629 to 5630	RVC 7 time duration	s	RVC 7 time duration
5631	Influenced Phase	-	Related phases bit 0: Va, bit 1: Vb, bit 2: Vc, bit 3: Vab, bit 4: Vbc, bit 5: Vca if any bit =1 means corresponding phase is influenced

Table 2-49 Registers 5501 to 5691: Latest 10 RVC Events (cont.)

Register	Type of Information	Unit	Remark
5641	Milliseconds	Start time of RVC Data format see chapter 2.2.6.2	
5642	Hours/minutes		
5643	Month/day		
5644	Time status/year		
5645 to 5646	$\Delta U_{\max}$ of RVC 8	V	$\Delta U_{\max}$ during RVC 8
5647 to 5648	ΔU_{ss} of RVC 8	V	ΔU_{ss} during RVC 8
5649 to 5650	RVC 8 time duration	s	RVC 8 time duration
5651	Influenced Phase	-	Related phases bit 0: Va, bit 1: Vb, bit 2: Vc, bit 3: Vab, bit 4: Vbc, bit 5: Vca if any bit =1 means corresponding phase is influenced
5661	Milliseconds	Start time of RVC Data format see chapter 2.2.6.2	
5662	Hours/minutes		
5663	Month/day		
5664	Time status/year		
5665 to 5666	$\Delta U_{\max}$ of RVC 9	V	$\Delta U_{\max}$ during RVC 9
5667 to 5668	ΔU_{ss} of RVC 9	V	ΔU_{ss} during RVC 9
5669 to 5670	RVC 9 time duration	s	RVC 9 time duration
5671	Influenced Phase	-	Related phases bit 0: Va, bit 1: Vb, bit 2: Vc, bit 3: Vab, bit 4: Vbc, bit 5: Vca if any bit =1 means corresponding phase is influenced
5681	Milliseconds	Start time of RVC Data format see chapter 2.2.6.2	
5682	Hours/minutes		
5683	Month/day		
5684	Time status/year		
5685 to 5686	$\Delta U_{\max}$ of RVC 10	V	$\Delta U_{\max}$ during RVC 10

Table 2-49 Registers 5501 to 5691: Latest 10 RVC Events (cont.)

Register	Type of Information	Unit	Remark
5687 to 5688	ΔU_{ss} of RVC 10	V	ΔU_{ss} during RVC 10
5689 to 5690	RVC 10 time duration	s	RVC 10 time duration
5691	Influenced Phase	-	Related phases bit 0: Va, bit 1: Vb, bit 2: Vc, bit 3: Vab, bit 4: Vbc, bit 5: Vca if any bit =1 means corresponding phase is influenced

2.2.7.41 Registers 6001 to 6004: Number of PQ Voltage Events (read only)

These registers are write-protected. A write attempt will be rejected with exception code 02 (ILLEGAL_DATA_ADDRESS).

For more information on PQ events, see Chapter 4 of the Device Manual.

Table 2-50 Registers 6001 to 6004: Number of PQ Voltage Events

Register	Type of Information	Remark
6001 to 6002	PQ_Event_Number	Total number of PQ voltage events
6003 to 6004	PQ_Event_Number	Number of PQ voltage events since last polling

2.2.7.42 Registers 6087 to 6100: Load Profile – Management (read only)

These registers are write-protected. A write attempt will be rejected with exception code 02 (ILLEGAL_DATA_ADDRESS).

Data type: Unsigned, long

Table 2-51 Registers 6087 to 6100: Load Profile – Management

Register	Type of Information	Remark
6087 to 6090	Timestamp of last terminated period	UTC format
6091 to 6092	Momentary record ID (RecID)	Value of the momentary load profile identifier
6093 to 6094	Length of last terminated period	Unit: s
6095 to 6096	Time since begin of momentary period	Unit: s
6097 to 6098	Duration of subinterval	Unit: ms
6099 to 6100	Last period information	Meaning of the flags: see following table

Table 2-52 Last period information - Flags

Type of Flags	Flag	Remark
LOADPROFILE_FLAG_QUALITY_UNSECURE	0x00800000	Power values not exact because of overflow of at least one current or voltage value
LOADPROFILE_FLAG_QUALITY_AUXPOWER_FAIL	0x00400000	Power supply failure
LOADPROFILE_FLAG_QUALITY_SYNC	0x00200000	Time synchronization may not be accurate, for example, because the time has not been updated yet.
LOADPROFILE_FLAG_MISSUB	0x00100000	Flag "missing subinterval" for modbus communication
LOADPROFILE_FLAG_QUALITY_PERIOD_TO_SHORT	0x00010000	Resynch → period is shorter than parameterized
LOADPROFILE_TEMP_SYNCED	0x00000100	The flag is set if the period was synchronized internally; the external synchronization (binary inputs, communication) has not been received yet.
LOADPROFILE_FLAG_QN	0x00000080	Reactive Power = Qn
LOADPROFILE_FLAG_Q1	0x00000040	Reactive power = Q1
LOADPROFILE_FLAG_QTOT	0x00000020	Reactive power = Qtot
LOADPROFILE_FLAG_QMIXED	0x00000010	Reactive power was changed in subperiod

2.2.7.43 Registers 6101 to 6158: Load Profile – Measured Values (read only)

These registers are write-protected. A write attempt will be rejected with exception code 02 (ILLEGAL_DATA_ADDRESS).

Data type: Measured value

Table 2-53 Registers 6101 to 6158: Load Profile – Measured Values

Register	Type of Information	Remark
6101	Total power factor import (previous period)	-
6103	Total power factor export (previous period)	-
6105	Average active power import (previous period)	W
6107	Average active power export (previous period)	W
6109	Average reactive power import (previous period)	var
6111	Average reactive power export (previous period)	var
6113	Average apparent power (previous period)	VA
6115	Cumulated active power import (previous period)	W
6117	Cumulated active power export (previous period)	W
6119	Cumulated reactive power import (previous period)	var
6121	Cumulated reactive power export (previous period)	var
6123	Cumulated apparent power (previous period)	VA
6125	Maximum active power (previous period)	W
6127	Minimum active power (previous period)	W
6129	Maximum reactive power (previous period)	var
6131	Minimum reactive power (previous period)	var
6133	Maximum apparent power (previous period)	VA
6135	Minimum apparent power (previous period)	VA
6137	Cumulated active power import(current period)	W
6139	Cumulated active power export (current period)	W
6141	Cumulated reactive power import (current period)	var
6143	Cumulated reactive power export (current period)	var
6145	Cumulated apparent power (current period)	VA

Table 2-53 Registers 6101 to 6158: Load Profile – Measured Values (cont.)

Register	Type of Information	Remark
6147	Maximum active power (current period)	W
6149	Minimum active power (current period)	W
6151	Maximum reactive power (current period)	var
6153	Minimum reactive power (current period)	var
6155	Maximum apparent power (current period)	VA
6157	Minimum apparent power (current period)	VA

2.2.7.44 Registers 7001 to 7377: Prevailing Phase Angle of Harmonics – Voltage Values (read only)

These registers are write-protected. A write attempt will be rejected with exception code 02 (ILLEGAL_DATA_ADDRESS).

Reference rate: Aggregation time

Network types: Only 1P2W, 3P4W_bal, 3P4W_unb_PN is available.

Data type: Measured value

Table 2-54 Registers 7001 to 7377: Prevailing Phase Angle of Harmonics – Voltage Values

Register	Type of Information	Remark	Unit
7001	HPP_Va-1	1. Harmonic (prev. phase angle), voltage value, a-N (fundamental)	° (degree)
7003	HPP_Va-2	2. Harmonic (prev. phase angle), voltage value, a-N	° (degree)
7005	HPP_Va-3	3. Harmonic (prev. phase angle), voltage value, a-N	° (degree)
7007	HPP_Va-4	4. Harmonic (prev. phase angle), voltage value, a-N	° (degree)
7009	HPP_Va-5	5. Harmonic (prev. phase angle), voltage value, a-N	° (degree)
7011	HPP_Va-6	6. Harmonic (prev. phase angle), voltage value, a-N	° (degree)
7013	HPP_Va-7	7. Harmonic (prev. phase angle), voltage value, a-N	° (degree)
7015	HPP_Va-8	8. Harmonic (prev. phase angle), voltage value, a-N	° (degree)
7017	HPP_Va-9	9. Harmonic (prev. phase angle), voltage value, a-N	° (degree)
7019	HPP_Va-10	10. Harmonic (prev. phase angle), voltage value, a-N	° (degree)
7021	HPP_Va-11	11. Harmonic (prev. phase angle), voltage value, a-N	° (degree)
7023	HPP_Va-12	12. Harmonic (prev. phase angle), voltage value, a-N	° (degree)
7025	HPP_Va-13	13. Harmonic (prev. phase angle), voltage value, a-N	° (degree)
7027	HPP_Va-14	14. Harmonic (prev. phase angle), voltage value, a-N	° (degree)
7029	HPP_Va-15	15. Harmonic (prev. phase angle), voltage value, a-N	° (degree)
7031	HPP_Va-16	16. Harmonic (prev. phase angle), voltage value, a-N	° (degree)
7033	HPP_Va-17	17. Harmonic (prev. phase angle), voltage value, a-N	° (degree)
7035	HPP_Va-18	18. Harmonic (prev. phase angle), voltage value, a-N	° (degree)
7037	HPP_Va-19	19. Harmonic (prev. phase angle), voltage value, a-N	° (degree)
7039	HPP_Va-20	20. Harmonic (prev. phase angle), voltage value, a-N	° (degree)

Table 2-54 Registers 7001 to 7377: Prevailing Phase Angle of Harmonics – Voltage Values (cont.)

Register	Type of Information	Remark	Unit
7041	HPP_Va-21	21. Harmonic (prev. phase angle), voltage value, a-N	° (degree)
7043	HPP_Va-22	22. Harmonic (prev. phase angle), voltage value, a-N	° (degree)
7045	HPP_Va-23	23. Harmonic (prev. phase angle), voltage value, a-N	° (degree)
7047	HPP_Va-24	24. Harmonic (prev. phase angle), voltage value, a-N	° (degree)
7049	HPP_Va-25	25. Harmonic (prev. phase angle), voltage value, a-N	° (degree)
7051	HPP_Va-26	26. Harmonic (prev. phase angle), voltage value, a-N	° (degree)
7053	HPP_Va-27	27. Harmonic (prev. phase angle), voltage value, a-N	° (degree)
7055	HPP_Va-28	28. Harmonic (prev. phase angle), voltage value, a-N	° (degree)
7057	HPP_Va-29	29. Harmonic (prev. phase angle), voltage value, a-N	° (degree)
7059	HPP_Va-30	30. Harmonic (prev. phase angle), voltage value, a-N	° (degree)
7061	HPP_Va-31	31. Harmonic (prev. phase angle), voltage value, a-N	° (degree)
7063	HPP_Va-32	32. Harmonic (prev. phase angle), voltage value, a-N	° (degree)
7065	HPP_Va-33	33. Harmonic (prev. phase angle), voltage value, a-N	° (degree)
7067	HPP_Va-34	34. Harmonic (prev. phase angle), voltage value, a-N	° (degree)
7069	HPP_Va-35	35. Harmonic (prev. phase angle), voltage value, a-N	° (degree)
7071	HPP_Va-36	36. Harmonic (prev. phase angle), voltage value, a-N	° (degree)
7073	HPP_Va-37	37. Harmonic (prev. phase angle), voltage value, a-N	° (degree)
7075	HPP_Va-38	38. Harmonic (prev. phase angle), voltage value, a-N	° (degree)
7077	HPP_Va-39	39. Harmonic (prev. phase angle), voltage value, a-N	° (degree)
7079	HPP_Va-40	40. Harmonic (prev. phase angle), voltage value, a-N	° (degree)
7081	HPP_Va-41	41. Harmonic (prev. phase angle), voltage value, a-N	° (degree)
7083	HPP_Va-42	42. Harmonic (prev. phase angle), voltage value, a-N	° (degree)
7085	HPP_Va-43	43. Harmonic (prev. phase angle), voltage value, a-N	° (degree)
7087	HPP_Va-44	44. Harmonic (prev. phase angle), voltage value, a-N	° (degree)
7089	HPP_Va-45	45. Harmonic (prev. phase angle), voltage value, a-N	° (degree)
7091	HPP_Va-46	46. Harmonic (prev. phase angle), voltage value, a-N	° (degree)

Table 2-54 Registers 7001 to 7377: Prevailing Phase Angle of Harmonics – Voltage Values (cont.)

Register	Type of Information	Remark	Unit
7093	HPP_Va-47	47. Harmonic (prev. phase angle), voltage value, a-N	° (degree)
7095	HPP_Va-48	48. Harmonic (prev. phase angle), voltage value, a-N	° (degree)
7097	HPP_Va-49	49. Harmonic (prev. phase angle), voltage value, a-N	° (degree)
7099	HPP_Va-50	50. Harmonic (prev. phase angle), voltage value, a-N	° (degree)
7101	HPP_Va-51	51. Harmonic (prev. phase angle), voltage value, a-N	° (degree)
7103	HPP_Va-52	52. Harmonic (prev. phase angle), voltage value, a-N	° (degree)
7105	HPP_Va-53	53. Harmonic (prev. phase angle), voltage value, a-N	° (degree)
7107	HPP_Va-54	54. Harmonic (prev. phase angle), voltage value, a-N	° (degree)
7109	HPP_Va-55	55. Harmonic (prev. phase angle), voltage value, a-N	° (degree)
7111	HPP_Va-56	56. Harmonic (prev. phase angle), voltage value, a-N	° (degree)
7113	HPP_Va-57	57. Harmonic (prev. phase angle), voltage value, a-N	° (degree)
7115	HPP_Va-58	58. Harmonic (prev. phase angle), voltage value, a-N	° (degree)
7117	HPP_Va-59	59. Harmonic (prev. phase angle), voltage value, a-N	° (degree)
7119	HPP_Va-60	60. Harmonic (prev. phase angle), voltage value, a-N	° (degree)
7121	HPP_Va-61	61. Harmonic (prev. phase angle), voltage value, a-N	° (degree)
7123	HPP_Va-62	62. Harmonic (prev. phase angle), voltage value, a-N	° (degree)
7125	HPP_Va-63	63. Harmonic (prev. phase angle), voltage value, a-N	° (degree)
7127	HPP_Vb-1	1. Harmonic (prev. phase angle), voltage value, b-N (Fundamental)	° (degree)
7129	HPP_Vb-2	2. Harmonic (prev. phase angle), voltage value, b-N	° (degree)
7131	HPP_Vb-3	3. Harmonic (prev. phase angle), voltage value, b-N	° (degree)
7133	HPP_Vb-4	4. Harmonic (prev. phase angle), voltage value, b-N	° (degree)
7135	HPP_Vb-5	5. Harmonic (prev. phase angle), voltage value, b-N	° (degree)
7137	HPP_Vb-6	6. Harmonic (prev. phase angle), voltage value, b-N	° (degree)
7139	HPP_Vb-7	7. Harmonic (prev. phase angle), voltage value, b-N	° (degree)
7141	HPP_Vb-8	8. Harmonic (prev. phase angle), voltage value, b-N	° (degree)
7143	HPP_Vb-9	9. Harmonic (prev. phase angle), voltage value, b-N	° (degree)

Table 2-54 Registers 7001 to 7377: Prevailing Phase Angle of Harmonics – Voltage Values (cont.)

Register	Type of Information	Remark	Unit
7145	HPP_Vb-10	10. Harmonic (prev. phase angle), voltage value, b-N	° (degree)
7147	HPP_Vb-11	11. Harmonic (prev. phase angle), voltage value, b-N	° (degree)
7149	HPP_Vb-12	12. Harmonic (prev. phase angle), voltage value, b-N	° (degree)
7151	HPP_Vb-13	13. Harmonic (prev. phase angle), voltage value, b-N	° (degree)
7153	HPP_Vb-14	14. Harmonic (prev. phase angle), voltage value, b-N	° (degree)
7155	HPP_Vb-15	15. Harmonic (prev. phase angle), voltage value, b-N	° (degree)
7157	HPP_Vb-16	16. Harmonic (prev. phase angle), voltage value, b-N	° (degree)
7159	HPP_Vb-17	17. Harmonic (prev. phase angle), voltage value, b-N	° (degree)
7161	HPP_Vb-18	18. Harmonic (prev. phase angle), voltage value, b-N	° (degree)
7163	HPP_Vb-19	19. Harmonic (prev. phase angle), voltage value, b-N	° (degree)
7165	HPP_Vb-20	20. Harmonic (prev. phase angle), voltage value, b-N	° (degree)
7167	HPP_Vb-21	21. Harmonic (prev. phase angle), voltage value, b-N	° (degree)
7169	HPP_Vb-22	22. Harmonic (prev. phase angle), voltage value, b-N	° (degree)
7171	HPP_Vb-23	23. Harmonic (prev. phase angle), voltage value, b-N	° (degree)
7173	HPP_Vb-24	24. Harmonic (prev. phase angle), voltage value, b-N	° (degree)
7175	HPP_Vb-25	25. Harmonic (prev. phase angle), voltage value, b-N	° (degree)
7177	HPP_Vb-26	26. Harmonic (prev. phase angle), voltage value, b-N	° (degree)
7179	HPP_Vb-27	27. Harmonic (prev. phase angle), voltage value, b-N	° (degree)
7181	HPP_Vb-28	28. Harmonic (prev. phase angle), voltage value, b-N	° (degree)
7183	HPP_Vb-29	29. Harmonic (prev. phase angle), voltage value, b-N	° (degree)
7185	HPP_Vb-30	30. Harmonic (prev. phase angle), voltage value, b-N	° (degree)
7187	HPP_Vb-31	31. Harmonic (prev. phase angle), voltage value, b-N	° (degree)
7189	HPP_Vb-32	32. Harmonic (prev. phase angle), voltage value, b-N	° (degree)
7191	HPP_Vb-33	33. Harmonic (prev. phase angle), voltage value, b-N	° (degree)
7193	HPP_Vb-34	34. Harmonic (prev. phase angle), voltage value, b-N	° (degree)
7195	HPP_Vb-35	35. Harmonic (prev. phase angle), voltage value, b-N	° (degree)

Table 2-54 Registers 7001 to 7377: Prevailing Phase Angle of Harmonics – Voltage Values (cont.)

Register	Type of Information	Remark	Unit
7197	HPP_Vb-36	36. Harmonic (prev. phase angle), voltage value, b-N	° (degree)
7199	HPP_Vb-37	37. Harmonic (prev. phase angle), voltage value, b-N	° (degree)
7201	HPP_Vb-38	38. Harmonic (prev. phase angle), voltage value, b-N	° (degree)
7203	HPP_Vb-39	39. Harmonic (prev. phase angle), voltage value, b-N	° (degree)
7205	HPP_Vb-40	40. Harmonic (prev. phase angle), voltage value, b-N	° (degree)
7207	HPP_Vb-41	41. Harmonic (prev. phase angle), voltage value, b-N	° (degree)
7209	HPP_Vb-42	42. Harmonic (prev. phase angle), voltage value, b-N	° (degree)
7211	HPP_Vb-43	43. Harmonic (prev. phase angle), voltage value, b-N	° (degree)
7213	HPP_Vb-44	44. Harmonic (prev. phase angle), voltage value, b-N	° (degree)
7215	HPP_Vb-45	45. Harmonic (prev. phase angle), voltage value, b-N	° (degree)
7217	HPP_Vb-46	46. Harmonic (prev. phase angle), voltage value, b-N	° (degree)
7219	HPP_Vb-47	47. Harmonic (prev. phase angle), voltage value, b-N	° (degree)
7221	HPP_Vb-48	48. Harmonic (prev. phase angle), voltage value, b-N	° (degree)
7223	HPP_Vb-49	49. Harmonic (prev. phase angle), voltage value, b-N	° (degree)
7225	HPP_Vb-50	50. Harmonic (prev. phase angle), voltage value, b-N	° (degree)
7227	HPP_Vb-51	51. Harmonic (prev. phase angle), voltage value, b-N	° (degree)
7229	HPP_Vb-52	52. Harmonic (prev. phase angle), voltage value, b-N	° (degree)
7231	HPP_Vb-53	53. Harmonic (prev. phase angle), voltage value, b-N	° (degree)
7233	HPP_Vb-54	54. Harmonic (prev. phase angle), voltage value, b-N	° (degree)
7235	HPP_Vb-55	55. Harmonic (prev. phase angle), voltage value, b-N	° (degree)
7237	HPP_Vb-56	56. Harmonic (prev. phase angle), voltage value, b-N	° (degree)
7239	HPP_Vb-57	57. Harmonic (prev. phase angle), voltage value, b-N	° (degree)
7241	HPP_Vb-58	58. Harmonic (prev. phase angle), voltage value, b-N	° (degree)
7243	HPP_Vb-59	59. Harmonic (prev. phase angle), voltage value, b-N	° (degree)
7245	HPP_Vb-60	60. Harmonic (prev. phase angle), voltage value, b-N	° (degree)
7247	HPP_Vb-61	61. Harmonic (prev. phase angle), voltage value, b-N	° (degree)

Table 2-54 Registers 7001 to 7377: Prevailing Phase Angle of Harmonics – Voltage Values (cont.)

Register	Type of Information	Remark	Unit
7249	HPP_Vb-62	62. Harmonic (prev. phase angle), voltage value, b-N	° (degree)
7251	HPP_Vb-63	63. Harmonic (prev. phase angle), voltage value, b-N	° (degree)
7253	HPP_Vc-1	1. Harmonic (prev. phase angle), voltage value, c-N (Fundamental)	° (degree)
7255	HPP_Vc-2	2. Harmonic (prev. phase angle), voltage value, c-N	° (degree)
7257	HPP_Vc-3	3. Harmonic (prev. phase angle), voltage value, c-N	° (degree)
7259	HPP_Vc-4	4. Harmonic (prev. phase angle), voltage value, c-N	° (degree)
7261	HPP_Vc-5	5. Harmonic (prev. phase angle), voltage value, c-N	° (degree)
7263	HPP_Vc-6	6. Harmonic (prev. phase angle), voltage value, c-N	° (degree)
7265	HPP_Vc-7	7. Harmonic (prev. phase angle), voltage value, c-N	° (degree)
7267	HPP_Vc-8	8. Harmonic (prev. phase angle), voltage value, c-N	° (degree)
7269	HPP_Vc-9	9. Harmonic (prev. phase angle), voltage value, c-N	° (degree)
7271	HPP_Vc-10	10. Harmonic (prev. phase angle), voltage value, c-N	° (degree)
7273	HPP_Vc-11	11. Harmonic (prev. phase angle), voltage value, c-N	° (degree)
7275	HPP_Vc-12	12. Harmonic (prev. phase angle), voltage value, c-N	° (degree)
7277	HPP_Vc-13	13. Harmonic (prev. phase angle), voltage value, c-N	° (degree)
7279	HPP_Vc-14	14. Harmonic (prev. phase angle), voltage value, c-N	° (degree)
7281	HPP_Vc-15	15. Harmonic (prev. phase angle), voltage value, c-N	° (degree)
7283	HPP_Vc-16	16. Harmonic (prev. phase angle), voltage value, c-N	° (degree)
7285	HPP_Vc-17	17. Harmonic (prev. phase angle), voltage value, c-N	° (degree)
7287	HPP_Vc-18	18. Harmonic (prev. phase angle), voltage value, c-N	° (degree)
7289	HPP_Vc-19	19. Harmonic (prev. phase angle), voltage value, c-N	° (degree)
7291	HPP_Vc-20	20. Harmonic (prev. phase angle), voltage value, c-N	° (degree)
7293	HPP_Vc-21	21. Harmonic (prev. phase angle), voltage value, c-N	° (degree)
7295	HPP_Vc-22	22. Harmonic (prev. phase angle), voltage value, c-N	° (degree)
7297	HPP_Vc-23	23. Harmonic (prev. phase angle), voltage value, c-N	° (degree)
7299	HPP_Vc-24	24. Harmonic (prev. phase angle), voltage value, c-N	° (degree)

Table 2-54 Registers 7001 to 7377: Prevailing Phase Angle of Harmonics – Voltage Values (cont.)

Register	Type of Information	Remark	Unit
7301	HPP_Vc-25	25. Harmonic (prev. phase angle), voltage value, c-N	° (degree)
7303	HPP_Vc-26	26. Harmonic (prev. phase angle), voltage value, c-N	° (degree)
7305	HPP_Vc-27	27. Harmonic (prev. phase angle), voltage value, c-N	° (degree)
7307	HPP_Vc-28	28. Harmonic (prev. phase angle), voltage value, c-N	° (degree)
7309	HPP_Vc-29	29. Harmonic (prev. phase angle), voltage value, c-N	° (degree)
7311	HPP_Vc-30	30. Harmonic (prev. phase angle), voltage value, c-N	° (degree)
7313	HPP_Vc-31	31. Harmonic (prev. phase angle), voltage value, c-N	° (degree)
7315	HPP_Vc-32	32. Harmonic (prev. phase angle), voltage value, c-N	° (degree)
7317	HPP_Vc-33	33. Harmonic (prev. phase angle), voltage value, c-N	° (degree)
7319	HPP_Vc-34	34. Harmonic (prev. phase angle), voltage value, c-N	° (degree)
7321	HPP_Vc-35	35. Harmonic (prev. phase angle), voltage value, c-N	° (degree)
7323	HPP_Vc-36	36. Harmonic (prev. phase angle), voltage value, c-N	° (degree)
7325	HPP_Vc-37	37. Harmonic (prev. phase angle), voltage value, c-N	° (degree)
7327	HPP_Vc-38	38. Harmonic (prev. phase angle), voltage value, c-N	° (degree)
7329	HPP_Vc-39	39. Harmonic (prev. phase angle), voltage value, c-N	° (degree)
7331	HPP_Vc-40	40. Harmonic (prev. phase angle), voltage value, c-N	° (degree)
7333	HPP_Vc-41	41. Harmonic (prev. phase angle), voltage value, c-N	° (degree)
7335	HPP_Vc-42	42. Harmonic (prev. phase angle), voltage value, c-N	° (degree)
7337	HPP_Vc-43	43. Harmonic (prev. phase angle), voltage value, c-N	° (degree)
7339	HPP_Vc-44	44. Harmonic (prev. phase angle), voltage value, c-N	° (degree)
7341	HPP_Vc-45	45. Harmonic (prev. phase angle), voltage value, c-N	° (degree)
7343	HPP_Vc-46	46. Harmonic (prev. phase angle), voltage value, c-N	° (degree)
7345	HPP_Vc-47	47. Harmonic (prev. phase angle), voltage value, c-N	° (degree)
7347	HPP_Vc-48	48. Harmonic (prev. phase angle), voltage value, c-N	° (degree)
7349	HPP_Vc-49	49. Harmonic (prev. phase angle), voltage value, c-N	° (degree)
7351	HPP_Vc-50	50. Harmonic (prev. phase angle), voltage value, c-N	° (degree)

Table 2-54 Registers 7001 to 7377: Prevailing Phase Angle of Harmonics – Voltage Values (cont.)

Register	Type of Information	Remark	Unit
7353	HPP_Vc-51	51. Harmonic (prev. phase angle), voltage value, c-N	° (degree)
7355	HPP_Vc-52	52. Harmonic (prev. phase angle), voltage value, c-N	° (degree)
7357	HPP_Vc-53	53. Harmonic (prev. phase angle), voltage value, c-N	° (degree)
7359	HPP_Vc-54	54. Harmonic (prev. phase angle), voltage value, c-N	° (degree)
7361	HPP_Vc-55	55. Harmonic (prev. phase angle), voltage value, c-N	° (degree)
7363	HPP_Vc-56	56. Harmonic (prev. phase angle), voltage value, c-N	° (degree)
7365	HPP_Vc-57	57. Harmonic (prev. phase angle), voltage value, c-N	° (degree)
7367	HPP_Vc-58	58. Harmonic (prev. phase angle), voltage value, c-N	° (degree)
7369	HPP_Vc-59	59. Harmonic (prev. phase angle), voltage value, c-N	° (degree)
7371	HPP_Vc-60	60. Harmonic (prev. phase angle), voltage value, c-N	° (degree)
7373	HPP_Vc-61	61. Harmonic (prev. phase angle), voltage value, c-N	° (degree)
7375	HPP_Vc-62	62. Harmonic (prev. phase angle), voltage value, c-N	° (degree)
7377	HPP_Vc-63	63. Harmonic (prev. phase angle), voltage value, c-N	° (degree)

2.2.7.45 Registers 7379 to 7755: Prevailing Phase Angle of Harmonics – Current Values (read only)

These registers are write-protected. A write attempt will be rejected with exception code 02 (ILLEGAL_DATA_ADDRESS).

Reference rate: Aggregation time

Network types: Only 1P2W, 3P4W_bal, 3P4W_unb_PN is available.

Data type: Measured value

Table 2-55 Registers 7379 to 7756: Prevailing Phase Angle of Harmonics – Current Values

Register	Type of Information	Remark	Unit
7379	HPP_la-1	1. Harmonic (prev. phase angle), current value, a (Fundamental)	° (degree)
7381	HPP_la-2	2. Harmonic (prev. phase angle), current value, a	° (degree)
7383	HPP_la-3	3. Harmonic (prev. phase angle), current value, a	° (degree)
7385	HPP_la-4	4. Harmonic (prev. phase angle), current value, a	° (degree)
7387	HPP_la-5	5. Harmonic (prev. phase angle), current value, a	° (degree)
7389	HPP_la-6	6. Harmonic (prev. phase angle), current value, a	° (degree)
7391	HPP_la-7	7. Harmonic (prev. phase angle), current value, a	° (degree)
7393	HPP_la-8	8. Harmonic (prev. phase angle), current value, a	° (degree)
7395	HPP_la-9	9. Harmonic (prev. phase angle), current value, a	° (degree)
7397	HPP_la-10	10. Harmonic (prev. phase angle), current value, a	° (degree)
7399	HPP_la-11	11. Harmonic (prev. phase angle), current value, a	° (degree)
7401	HPP_la-12	12. Harmonic (prev. phase angle), current value, a	° (degree)
7403	HPP_la-13	13. Harmonic (prev. phase angle), current value, a	° (degree)
7405	HPP_la-14	14. Harmonic (prev. phase angle), current value, a	° (degree)
7407	HPP_la-15	15. Harmonic (prev. phase angle), current value, a	° (degree)
7409	HPP_la-16	16. Harmonic (prev. phase angle), current value, a	° (degree)
7411	HPP_la-17	17. Harmonic (prev. phase angle), current value, a	° (degree)
7413	HPP_la-18	18. Harmonic (prev. phase angle), current value, a	° (degree)
7415	HPP_la-19	19. Harmonic (prev. phase angle), current value, a	° (degree)
7417	HPP_la-20	20. Harmonic (prev. phase angle), current value, a	° (degree)

Table 2-55 Registers 7379 to 7756: Prevailing Phase Angle of Harmonics – Current Values (cont.)

Register	Type of Information	Remark	Unit
7419	HPP_Ia-21	21. Harmonic (prev. phase angle), current value, a	° (degree)
7421	HPP_Ia-22	22. Harmonic (prev. phase angle), current value, a	° (degree)
7423	HPP_Ia-23	23. Harmonic (prev. phase angle), current value, a	° (degree)
7425	HPP_Ia-24	24. Harmonic (prev. phase angle), current value, a	° (degree)
7427	HPP_Ia-25	25. Harmonic (prev. phase angle), current value, a	° (degree)
7429	HPP_Ia-26	26. Harmonic (prev. phase angle), current value, a	° (degree)
7431	HPP_Ia-27	27. Harmonic (prev. phase angle), current value, a	° (degree)
7433	HPP_Ia-28	28. Harmonic (prev. phase angle), current value, a	° (degree)
7435	HPP_Ia-29	29. Harmonic (prev. phase angle), current value, a	° (degree)
7437	HPP_Ia-30	30. Harmonic (prev. phase angle), current value, a	° (degree)
7439	HPP_Ia-31	31. Harmonic (prev. phase angle), current value, a	° (degree)
7441	HPP_Ia-32	32. Harmonic (prev. phase angle), current value, a	° (degree)
7443	HPP_Ia-33	33. Harmonic (prev. phase angle), current value, a	° (degree)
7445	HPP_Ia-34	34. Harmonic (prev. phase angle), current value, a	° (degree)
7447	HPP_Ia-35	35. Harmonic (prev. phase angle), current value, a	° (degree)
7449	HPP_Ia-36	36. Harmonic (prev. phase angle), current value, a	° (degree)
7451	HPP_Ia-37	37. Harmonic (prev. phase angle), current value, a	° (degree)
7453	HPP_Ia-38	38. Harmonic (prev. phase angle), current value, a	° (degree)
7455	HPP_Ia-39	39. Harmonic (prev. phase angle), current value, a	° (degree)
7457	HPP_Ia-40	40. Harmonic (prev. phase angle), current value, a	° (degree)
7459	HPP_Ia-41	41. Harmonic (prev. phase angle), current value, a	° (degree)
7461	HPP_Ia-42	42. Harmonic (prev. phase angle), current value, a	° (degree)
7463	HPP_Ia-43	43. Harmonic (prev. phase angle), current value, a	° (degree)
7465	HPP_Ia-44	44. Harmonic (prev. phase angle), current value, a	° (degree)
7467	HPP_Ia-45	45. Harmonic (prev. phase angle), current value, a	° (degree)
7469	HPP_Ia-46	46. Harmonic (prev. phase angle), current value, a	° (degree)

Table 2-55 Registers 7379 to 7756: Prevailing Phase Angle of Harmonics – Current Values (cont.)

Register	Type of Information	Remark	Unit
7471	HPP_la-47	47. Harmonic (prev. phase angle), current value, a	° (degree)
7473	HPP_la-48	48. Harmonic (prev. phase angle), current value, a	° (degree)
7475	HPP_la-49	49. Harmonic (prev. phase angle), current value, a	° (degree)
7477	HPP_la-50	50. Harmonic (prev. phase angle), current value, a	° (degree)
7479	HPP_la-51	51. Harmonic (prev. phase angle), current value, a	° (degree)
7481	HPP_la-52	52. Harmonic (prev. phase angle), current value, a	° (degree)
7483	HPP_la-53	53. Harmonic (prev. phase angle), current value, a	° (degree)
7485	HPP_la-54	54. Harmonic (prev. phase angle), current value, a	° (degree)
7487	HPP_la-55	55. Harmonic (prev. phase angle), current value, a	° (degree)
7489	HPP_la-56	56. Harmonic (prev. phase angle), current value, a	° (degree)
7491	HPP_la-57	57. Harmonic (prev. phase angle), current value, a	° (degree)
7493	HPP_la-58	58. Harmonic (prev. phase angle), current value, a	° (degree)
7495	HPP_la-59	59. Harmonic (prev. phase angle), current value, a	° (degree)
7497	HPP_la-60	60. Harmonic (prev. phase angle), current value, a	° (degree)
7499	HPP_la-61	61. Harmonic (prev. phase angle), current value, a	° (degree)
7501	HPP_la-62	62. Harmonic (prev. phase angle), current value, a	° (degree)
7503	HPP_la-63	63. Harmonic (prev. phase angle), current value, a	° (degree)
7505	HPP_lb-1	1. Harmonic (prev. phase angle), current value, b (Fundamental)	° (degree)
7507	HPP_lb-2	2. Harmonic (prev. phase angle), current value, b	° (degree)
7509	HPP_lb-3	3. Harmonic (prev. phase angle), current value, b	° (degree)
7511	HPP_lb-4	4. Harmonic (prev. phase angle), current value, b	° (degree)
7513	HPP_lb-5	5. Harmonic (prev. phase angle), current value, b	° (degree)
7515	HPP_lb-6	6. Harmonic (prev. phase angle), current value, b	° (degree)
7517	HPP_lb-7	7. Harmonic (prev. phase angle), current value, b	° (degree)
7519	HPP_lb-8	8. Harmonic (prev. phase angle), current value, b	° (degree)
7521	HPP_lb-9	9. Harmonic (prev. phase angle), current value, b	° (degree)

Table 2-55 Registers 7379 to 7756: Prevailing Phase Angle of Harmonics – Current Values (cont.)

Register	Type of Information	Remark	Unit
7523	HPP_Ib-10	10. Harmonic (prev. phase angle), current value, b	° (degree)
7525	HPP_Ib-11	11. Harmonic (prev. phase angle), current value, b	° (degree)
7527	HPP_Ib-12	12. Harmonic (prev. phase angle), current value, b	° (degree)
7529	HPP_Ib-13	13. Harmonic (prev. phase angle), current value, b	° (degree)
7531	HPP_Ib-14	14. Harmonic (prev. phase angle), current value, b	° (degree)
7533	HPP_Ib-15	15. Harmonic (prev. phase angle), current value, b	° (degree)
7535	HPP_Ib-16	16. Harmonic (prev. phase angle), current value, b	° (degree)
7537	HPP_Ib-17	17. Harmonic (prev. phase angle), current value, b	° (degree)
7539	HPP_Ib-18	18. Harmonic (prev. phase angle), current value, b	° (degree)
7541	HPP_Ib-19	19. Harmonic (prev. phase angle), current value, b	° (degree)
7543	HPP_Ib-20	20. Harmonic (prev. phase angle), current value, b	° (degree)
7545	HPP_Ib-21	21. Harmonic (prev. phase angle), current value, b	° (degree)
7547	HPP_Ib-22	22. Harmonic (prev. phase angle), current value, b	° (degree)
7549	HPP_Ib-23	23. Harmonic (prev. phase angle), current value, b	° (degree)
7551	HPP_Ib-24	24. Harmonic (prev. phase angle), current value, b	° (degree)
7553	HPP_Ib-25	25. Harmonic (prev. phase angle), current value, b	° (degree)
7555	HPP_Ib-26	26. Harmonic (prev. phase angle), current value, b	° (degree)
7557	HPP_Ib-27	27. Harmonic (prev. phase angle), current value, b	° (degree)
7559	HPP_Ib-28	28. Harmonic (prev. phase angle), current value, b	° (degree)
7561	HPP_Ib-29	29. Harmonic (prev. phase angle), current value, b	° (degree)
7563	HPP_Ib-30	30. Harmonic (prev. phase angle), current value, b	° (degree)
7565	HPP_Ib-31	31. Harmonic (prev. phase angle), current value, b	° (degree)
7567	HPP_Ib-32	32. Harmonic (prev. phase angle), current value, b	° (degree)
7569	HPP_Ib-33	33. Harmonic (prev. phase angle), current value, b	° (degree)
7571	HPP_Ib-34	34. Harmonic (prev. phase angle), current value, b	° (degree)
7573	HPP_Ib-35	35. Harmonic (prev. phase angle), current value, b	° (degree)

Table 2-55 Registers 7379 to 7756: Prevailing Phase Angle of Harmonics – Current Values (cont.)

Register	Type of Information	Remark	Unit
7575	HPP_lb-36	36. Harmonic (prev. phase angle), current value, b	° (degree)
7577	HPP_lb-37	37. Harmonic (prev. phase angle), current value, b	° (degree)
7579	HPP_lb-38	38. Harmonic (prev. phase angle), current value, b	° (degree)
7581	HPP_lb-39	39. Harmonic (prev. phase angle), current value, b	° (degree)
7583	HPP_lb-40	40. Harmonic (prev. phase angle), current value, b	° (degree)
7585	HPP_lb-41	41. Harmonic (prev. phase angle), current value, b	° (degree)
7587	HPP_lb-42	42. Harmonic (prev. phase angle), current value, b	° (degree)
7589	HPP_lb-43	43. Harmonic (prev. phase angle), current value, b	° (degree)
7591	HPP_lb-44	44. Harmonic (prev. phase angle), current value, b	° (degree)
7593	HPP_lb-45	45. Harmonic (prev. phase angle), current value, b	° (degree)
7595	HPP_lb-46	46. Harmonic (prev. phase angle), current value, b	° (degree)
7597	HPP_lb-47	47. Harmonic (prev. phase angle), current value, b	° (degree)
7599	HPP_lb-48	48. Harmonic (prev. phase angle), current value, b	° (degree)
7601	HPP_lb-49	49. Harmonic (prev. phase angle), current value, b	° (degree)
7603	HPP_lb-50	50. Harmonic (prev. phase angle), current value, b	° (degree)
7605	HPP_lb-51	51. Harmonic (prev. phase angle), current value, b	° (degree)
7607	HPP_lb-52	52. Harmonic (prev. phase angle), current value, b	° (degree)
7609	HPP_lb-53	53. Harmonic (prev. phase angle), current value, b	° (degree)
7611	HPP_lb-54	54. Harmonic (prev. phase angle), current value, b	° (degree)
7613	HPP_lb-55	55. Harmonic (prev. phase angle), current value, b	° (degree)
7615	HPP_lb-56	56. Harmonic (prev. phase angle), current value, b	° (degree)
7617	HPP_lb-57	57. Harmonic (prev. phase angle), current value, b	° (degree)
7619	HPP_lb-58	58. Harmonic (prev. phase angle), current value, b	° (degree)
7621	HPP_lb-59	59. Harmonic (prev. phase angle), current value, b	° (degree)
7623	HPP_lb-60	60. Harmonic (prev. phase angle), current value, b	° (degree)
7625	HPP_lb-61	61. Harmonic (prev. phase angle), current value, b	° (degree)

Table 2-55 Registers 7379 to 7756: Prevailing Phase Angle of Harmonics – Current Values (cont.)

Register	Type of Information	Remark	Unit
7627	HPP_Ib-62	62. Harmonic (prev. phase angle), current value, b	° (degree)
7629	HPP_Ib-63	63. Harmonic (prev. phase angle), current value, b	° (degree)
7631	HPP_Ic-1	1. Harmonic (prev. phase angle), current value, c (Fundamental)	° (degree)
7633	HPP_Ic-2	2. Harmonic (prev. phase angle), current value, c	° (degree)
7635	HPP_Ic-3	3. Harmonic (prev. phase angle), current value, c	° (degree)
7637	HPP_Ic-4	4. Harmonic (prev. phase angle), current value, c	° (degree)
7639	HPP_Ic-5	5. Harmonic (prev. phase angle), current value, c	° (degree)
7641	HPP_Ic-6	6. Harmonic (prev. phase angle), current value, c	° (degree)
7643	HPP_Ic-7	7. Harmonic (prev. phase angle), current value, c	° (degree)
7645	HPP_Ic-8	8. Harmonic (prev. phase angle), current value, c	° (degree)
7647	HPP_Ic-9	9. Harmonic (prev. phase angle), current value, c	° (degree)
7649	HPP_Ic-10	10. Harmonic (prev. phase angle), current value, c	° (degree)
7651	HPP_Ic-11	11. Harmonic (prev. phase angle), current value, c	° (degree)
7653	HPP_Ic-12	12. Harmonic (prev. phase angle), current value, c	° (degree)
7655	HPP_Ic-13	13. Harmonic (prev. phase angle), current value, c	° (degree)
7657	HPP_Ic-14	14. Harmonic (prev. phase angle), current value, c	° (degree)
7659	HPP_Ic-15	15. Harmonic (prev. phase angle), current value, c	° (degree)
7661	HPP_Ic-16	16. Harmonic (prev. phase angle), current value, c	° (degree)
7663	HPP_Ic-17	17. Harmonic (prev. phase angle), current value, c	° (degree)
7665	HPP_Ic-18	18. Harmonic (prev. phase angle), current value, c	° (degree)
7667	HPP_Ic-19	19. Harmonic (prev. phase angle), current value, c	° (degree)
7669	HPP_Ic-20	20. Harmonic (prev. phase angle), current value, c	° (degree)
7671	HPP_Ic-21	21. Harmonic (prev. phase angle), current value, c	° (degree)
7673	HPP_Ic-22	22. Harmonic (prev. phase angle), current value, c	° (degree)
7675	HPP_Ic-23	23. Harmonic (prev. phase angle), current value, c	° (degree)
7677	HPP_Ic-24	24. Harmonic (prev. phase angle), current value, c	° (degree)

Table 2-55 Registers 7379 to 7756: Prevailing Phase Angle of Harmonics – Current Values (cont.)

Register	Type of Information	Remark	Unit
7679	HPP_lc-25	25. Harmonic (prev. phase angle), current value, c	° (degree)
7681	HPP_lc-26	26. Harmonic (prev. phase angle), current value, c	° (degree)
7683	HPP_lc-27	27. Harmonic (prev. phase angle), current value, c	° (degree)
7685	HPP_lc-28	28. Harmonic (prev. phase angle), current value, c	° (degree)
7687	HPP_lc-29	29. Harmonic (prev. phase angle), current value, c	° (degree)
7689	HPP_lc-30	30. Harmonic (prev. phase angle), current value, c	° (degree)
7691	HPP_lc-31	31. Harmonic (prev. phase angle), current value, c	° (degree)
7693	HPP_lc-32	32. Harmonic (prev. phase angle), current value, c	° (degree)
7695	HPP_lc-33	33. Harmonic (prev. phase angle), current value, c	° (degree)
7697	HPP_lc-34	34. Harmonic (prev. phase angle), current value, c	° (degree)
7699	HPP_lc-35	35. Harmonic (prev. phase angle), current value, c	° (degree)
7701	HPP_lc-36	36. Harmonic (prev. phase angle), current value, c	° (degree)
7703	HPP_lc-37	37. Harmonic (prev. phase angle), current value, c	° (degree)
7705	HPP_lc-38	38. Harmonic (prev. phase angle), current value, c	° (degree)
7707	HPP_lc-39	39. Harmonic (prev. phase angle), current value, c	° (degree)
7709	HPP_lc-40	40. Harmonic (prev. phase angle), current value, c	° (degree)
7711	HPP_lc-41	41. Harmonic (prev. phase angle), current value, c	° (degree)
7713	HPP_lc-42	42. Harmonic (prev. phase angle), current value, c	° (degree)
7715	HPP_lc-43	43. Harmonic (prev. phase angle), current value, c	° (degree)
7717	HPP_lc-44	44. Harmonic (prev. phase angle), current value, c	° (degree)
7719	HPP_lc-45	45. Harmonic (prev. phase angle), current value, c	° (degree)
7721	HPP_lc-46	46. Harmonic (prev. phase angle), current value, c	° (degree)
7723	HPP_lc-47	47. Harmonic (prev. phase angle), current value, c	° (degree)
7725	HPP_lc-48	48. Harmonic (prev. phase angle), current value, c	° (degree)
7727	HPP_lc-49	49. Harmonic (prev. phase angle), current value, c	° (degree)
7729	HPP_lc-50	50. Harmonic (prev. phase angle), current value, c	° (degree)

Table 2-55 Registers 7379 to 7756: Prevailing Phase Angle of Harmonics – Current Values (cont.)

Register	Type of Information	Remark	Unit
7731	HPP_Ic-51	51. Harmonic (prev. phase angle), current value, c	° (degree)
7733	HPP_Ic-52	52. Harmonic (prev. phase angle), current value, c	° (degree)
7735	HPP_Ic-53	53. Harmonic (prev. phase angle), current value, c	° (degree)
7737	HPP_Ic-54	54. Harmonic (prev. phase angle), current value, c	° (degree)
7739	HPP_Ic-55	55. Harmonic (prev. phase angle), current value, c	° (degree)
7741	HPP_Ic-56	56. Harmonic (prev. phase angle), current value, c	° (degree)
7743	HPP_Ic-57	57. Harmonic (prev. phase angle), current value, c	° (degree)
7745	HPP_Ic-58	58. Harmonic (prev. phase angle), current value, c	° (degree)
7747	HPP_Ic-59	59. Harmonic (prev. phase angle), current value, c	° (degree)
7749	HPP_Ic-60	60. Harmonic (prev. phase angle), current value, c	° (degree)
7751	HPP_Ic-61	61. Harmonic (prev. phase angle), current value, c	° (degree)
7753	HPP_Ic-62	62. Harmonic (prev. phase angle), current value, c	° (degree)
7755	HPP_Ic-63	63. Harmonic (prev. phase angle), current value, c	° (degree)

2.2.7.46 Registers 8001 to 8240: Measured Values from Modbus Slave Devices (read only)

These registers are write-protected. A write attempt will be rejected with exception code 02 (ILLEGAL_DATA_ADDRESS).

Data type: Measured value

Table 2-56 001 to 8240: Measured Values from Modbus Slave Devices

Register	Type of Information	Remark
8001	MV 1 from device 1	Measured values 1 to 15 from Modbus slave device 1
8003	MV 2 from device 1	
8005	MV 3 from device 1	
8007	MV 4 from device 1	
8009	MV 5 from device 1	
8011	MV 6 from device 1	
8013	MV 7 from device 1	
8015	MV 8 from device 1	
8017	MV 9 from device 1	
8019	MV 10 from device 1	
8021	MV 11 from device 1	
8023	MV 12 from device 1	
8025	MV 13 from device 1	
8027	MV 14 from device 1	
8029	MV 15 from device 1	

Table 2-56 001 to 8240: Measured Values from Modbus Slave Devices (cont.)

Register	Type of Information	Remark
8031	MV 1 from device 2	Measured values 1 to 15 from Modbus slave device 2
8033	MV 2 from device 2	
8035	MV 3 from device 2	
8037	MV 4 from device 2	
8039	MV 5 from device 2	
8041	MV 6 from device 2	
8043	MV 7 from device 2	
8045	MV 8 from device 2	
8047	MV 9 from device 2	
8049	MV 10 from device 2	
8051	MV 11 from device 2	
8053	MV 12 from device 2	
8055	MV 13 from device 2	
8057	MV 14 from device 2	
8059	MV 15 from device 2	
8061	MV 1 from device 3	Measured values 1 to 15 from Modbus slave device 3
8063	MV 2 from device 3	
8065	MV 3 from device 3	
8067	MV 4 from device 3	
8069	MV 5 from device 3	
8071	MV 6 from device 3	
8073	MV 7 from device 3	
8075	MV 8 from device 3	
8077	MV 9 from device 3	
8079	MV 10 from device 3	
8081	MV 11 from device 3	
8083	MV 12 from device 3	
8085	MV 13 from device 3	
8087	MV 14 from device 3	
8089	MV 15 from device 3	

Table 2-56 001 to 8240: Measured Values from Modbus Slave Devices (cont.)

Register	Type of Information	Remark
8091	MV 1 from device 4	Measured values 1 to 15 from Modbus slave device 4
8093	MV 2 from device 4	
8095	MV 3 from device 4	
8097	MV 4 from device 4	
8099	MV 5 from device 4	
8101	MV 6 from device 4	
8103	MV 7 from device 4	
8105	MV 8 from device 4	
8107	MV 9 from device 4	
8109	MV 10 from device 4	
8111	MV 11 from device 4	
8113	MV 12 from device 4	
8115	MV 13 from device 4	
8117	MV 14 from device 4	
8119	MV 15 from device 4	
8121	MV 1 from device 5	Measured values 1 to 15 from Modbus slave device 5
8123	MV 2 from device 5	
8125	MV 3 from device 5	
8127	MV 4 from device 5	
8129	MV 5 from device 5	
8131	MV 6 from device 5	
8133	MV 7 from device 5	
8135	MV 8 from device 5	
8137	MV 9 from device 5	
8139	MV 10 from device 5	
8141	MV 11 from device 5	
8143	MV 12 from device 5	
8145	MV 13 from device 5	
8147	MV 14 from device 5	
8149	MV 15 from device 5	

Table 2-56 001 to 8240: Measured Values from Modbus Slave Devices (cont.)

Register	Type of Information	Remark
8151	MV 1 from device 6	Measured values 1 to 15 from Modbus slave device 6
8153	MV 2 from device 6	
8155	MV 3 from device 6	
8157	MV 4 from device 6	
8159	MV 5 from device 6	
8161	MV 6 from device 6	
8163	MV 7 from device 6	
8165	MV 8 from device 6	
8167	MV 9 from device 6	
8169	MV 10 from device 6	
8171	MV 11 from device 6	
8173	MV 12 from device 6	
8175	MV 13 from device 6	
8177	MV 14 from device 6	
8179	MV 15 from device 6	
8181	MV 1 from device 7	Measured values 1 to 15 from Modbus slave device 7
8183	MV 2 from device 7	
8185	MV 3 from device 7	
8187	MV 4 from device 7	
8189	MV 5 from device 7	
8191	MV 6 from device 7	
8193	MV 7 from device 7	
8195	MV 8 from device 7	
8197	MV 9 from device 7	
8199	MV 10 from device 7	
8201	MV 11 from device 7	
8203	MV 12 from device 7	
8205	MV 13 from device 7	
8207	MV 14 from device 7	
8209	MV 15 from device 7	

Table 2-56 001 to 8240: Measured Values from Modbus Slave Devices (cont.)

Register	Type of Information	Remark
8211	MV 1 from device 8	Measured values 1 to 15 from Modbus slave device 8
8213	MV 2 from device 8	
8215	MV 3 from device 8	
8217	MV 4 from device 8	
8219	MV 5 from device 8	
8221	MV 6 from device 8	
8223	MV 7 from device 8	
8225	MV 8 from device 8	
8227	MV 9 from device 8	
8229	MV 10 from device 8	
8231	MV 11 from device 8	
8233	MV 12 from device 8	
8235	MV 13 from device 8	
8237	MV 14 from device 8	
8239	MV 15 from device 8	

2.2.7.47 Registers 8401 to 8408: Indications from Modbus Slave Devices (read only)

These registers are write-protected. A write attempt will be rejected with exception code 02 (ILLEGAL_DATA_ADDRESS).

Data type: Indication

Tabelle 2-57 Registers 8401 to 8408: Indications from Modbus Slave Devices

Register	Type of Information	Remark
8401/2 ⁰	Ind. 1 from device 1	Indications 1 to 6 from Modbus slave device 1
8401/2 ²	Ind. 2 from device 1	
8401/2 ⁴	Ind. 3 from device 1	
8401/2 ⁶	Ind. 4 from device 1	
8401/2 ⁸	Ind. 5 from device 1	
8401/2 ¹⁰	Ind. 6 from device 1	
8401/2 ¹²	Reserved	= 0
8401/2 ¹⁴	Reserved	= 0
8402/2 ⁰	Ind. 1 from device 2	Indications 1 to 6 from Modbus slave device 2
8402/2 ²	Ind. 2 from device 2	
8402/2 ⁴	Ind. 3 from device 2	
8402/2 ⁶	Ind. 4 from device 2	
8402/2 ⁸	Ind. 5 from device 2	
8402/2 ¹⁰	Ind. 6 from device 2	
8402/2 ¹²	Reserved	= 0
8402/2 ¹⁴	Reserved	= 0
8403/2 ⁰	Ind. 1 from device 3	Indications 1 to 6 from Modbus slave device 3
8403/2 ²	Ind. 2 from device 3	
8403/2 ⁴	Ind. 3 from device 3	
8403/2 ⁶	Ind. 4 from device 3	
8403/2 ⁸	Ind. 5 from device 3	
8403/2 ¹⁰	Ind. 6 from device 3	
8403/2 ¹²	Reserved	= 0

Tabelle 2-57 Registers 8401 to 8408: Indications from Modbus Slave Devices (cont.)

Register	Type of Information	Remark
8403/2 ¹⁴	Reserved	= 0
8404/2 ⁰	Ind. 1 from device 4	Indications 1 to 6 from Modbus slave device 4
8404/2 ²	Ind. 2 from device 4	
8404/2 ⁴	Ind. 3 from device 4	
8404/2 ⁶	Ind. 4 from device 4	
8404/2 ⁸	Ind. 5 from device 4	
8404/2 ¹⁰	Ind. 6 from device 4	
8404/2 ¹²	Reserved	= 0
8404/2 ¹⁴	Reserved	= 0
8405/2 ⁰	Ind. 1 from device 5	Indications 1 to 6 from Modbus slave device 5
8405/2 ²	Ind. 2 from device 5	
8405/2 ⁴	Ind. 3 from device 5	
8405/2 ⁶	Ind. 4 from device 5	
8405/2 ⁸	Ind. 5 from device 5	
8405/2 ¹⁰	Ind. 6 from device 5	
8405/2 ¹²	Reserved	= 0
8405/2 ¹⁴	Reserved	= 0
8406/2 ⁰	Ind. 1 from device 6	Indications 1 to 6 from Modbus slave device 6
8406/2 ²	Ind. 2 from device 6	
8406/2 ⁴	Ind. 3 from device 6	
8406/2 ⁶	Ind. 4 from device 6	
8406/2 ⁸	Ind. 5 from device 6	
8406/2 ¹⁰	Ind. 6 from device 6	
8406/2 ¹²	Reserved	= 0
8406/2 ¹⁴	Reserved	= 0

Tabelle 2-57 Registers 8401 to 8408: Indications from Modbus Slave Devices (cont.)

Register	Type of Information	Remark
8407/2 ⁰	Ind. 1 from device 7	Indications 1 to 6 from Modbus slave device 7
8407/2 ²	Ind. 2 from device 7	
8407/2 ⁴	Ind. 3 from device 7	
8407/2 ⁶	Ind. 4 from device 7	
8407/2 ⁸	Ind. 5 from device 7	
8407/2 ¹⁰	Ind. 6 from device 7	
8407/2 ¹²	Reserved	= 0
8407/2 ¹⁴	Reserved	= 0
8408/2 ⁰	Ind. 1 from device 8	Indications 1 to 6 from Modbus slave device 8
8408/2 ²	Ind. 2 from device 8	
8408/2 ⁴	Ind. 3 from device 8	
8408/2 ⁶	Ind. 4 from device 8	
8408/2 ⁸	Ind. 5 from device 8	
8408/2 ¹⁰	Ind. 6 from device 8	
8408/2 ¹²	Reserved	= 0
8408/2 ¹⁴	Reserved	= 0

2.2.7.48 Registers 10001 to 10377: Prevailing Ratio of Harmonics – Voltage Values (read only)

These registers are write-protected. A write attempt will be rejected with exception code 02 (ILLEGAL_DATA_ADDRESS).

Reference rate: Aggregation time

Network types: Only 1P2W, 3P4W_bal, 3P4W_unb_PN is available.

Data type: Measured value

Table 2-58 Registers 10001 to 10377: Prevailing Ratio of Harmonics – Voltage Values

Register	Type of Information	Remark	Unit
10001	HPR_Va-1	1. Harmonic (prevailing ratio), voltage value, a-N (fundamental)	-
10003	HPR_Va-2	2. Harmonic (prevailing ratio), voltage value, a-N	-
10005	HPR_Va-3	3. Harmonic (prevailing ratio), voltage value, a-N	-
10007	HPR_Va-4	4. Harmonic (prevailing ratio), voltage value, a-N	-
10009	HPR_Va-5	5. Harmonic (prevailing ratio), voltage value, a-N	-
10011	HPR_Va-6	6. Harmonic (prevailing ratio), voltage value, a-N	-
10013	HPR_Va-7	7. Harmonic (prevailing ratio), voltage value, a-N	-
10015	HPR_Va-8	8. Harmonic (prevailing ratio), voltage value, a-N	-
10017	HPR_Va-9	9. Harmonic (prevailing ratio), voltage value, a-N,	-
10019	HPR_Va-10	10. Harmonic (prevailing ratio), voltage value, a-N	-
10021	HPR_Va-11	11. Harmonic (prevailing ratio), voltage value, a-N	-
10023	HPR_Va-12	12. Harmonic (prevailing ratio), voltage value, a-N	-
10025	HPR_Va-13	13. Harmonic (prevailing ratio), voltage value, a-N	-
10027	HPR_Va-14	14. Harmonic (prevailing ratio), voltage value, a-N	-
10029	HPR_Va-15	15. Harmonic (prevailing ratio), voltage value, a-N	-
10031	HPR_Va-16	16. Harmonic (prevailing ratio), voltage value, a-N	-
10033	HPR_Va-17	17. Harmonic (prevailing ratio), voltage value, a-N	-
10035	HPR_Va-18	18. Harmonic (prevailing ratio), voltage value, a-N	-
10037	HPR_Va-19	19. Harmonic (prevailing ratio), voltage value, a-N	-
10039	HPR_Va-20	20. Harmonic (prevailing ratio), voltage value, a-N	-

Table 2-58 Registers 10001 to 10377: Prevailing Ratio of Harmonics – Voltage Values (cont.)

Register	Type of Information	Remark	Unit
10041	HPR_Va-21	21. Harmonic (prevailing ratio), voltage value, a-N	-
10043	HPR_Va-22	22. Harmonic (prevailing ratio), voltage value, a-N	-
10045	HPR_Va-23	23. Harmonic (prevailing ratio), voltage value, a-N	-
10047	HPR_Va-24	24. Harmonic (prevailing ratio), voltage value, a-N	-
10049	HPR_Va-25	25. Harmonic (prevailing ratio), voltage value, a-N	-
10051	HPR_Va-26	26. Harmonic (prevailing ratio), voltage value, a-N	-
10053	HPR_Va-27	27. Harmonic (prevailing ratio), voltage value, a-N	-
10055	HPR_Va-28	28. Harmonic (prevailing ratio), voltage value, a-N	-
10057	HPR_Va-29	29. Harmonic (prevailing ratio), voltage value, a-N	-
10059	HPR_Va-30	30. Harmonic (prevailing ratio), voltage value, a-N	-
10061	HPR_Va-31	31. Harmonic (prevailing ratio), voltage value, a-N	-
10063	HPR_Va-32	32. Harmonic (prevailing ratio), voltage value, a-N	-
10065	HPR_Va-33	33. Harmonic (prevailing ratio), voltage value, a-N	-
10067	HPR_Va-34	34. Harmonic (prevailing ratio), voltage value, a-N	-
10069	HPR_Va-35	35. Harmonic (prevailing ratio), voltage value, a-N	-
10071	HPR_Va-36	36. Harmonic (prevailing ratio), voltage value, a-N	-
10073	HPR_Va-37	37. Harmonic (prevailing ratio), voltage value, a-N	-
10075	HPR_Va-38	38. Harmonic (prevailing ratio), voltage value, a-N	-
10077	HPR_Va-39	39. Harmonic (prevailing ratio), voltage value, a-N	-
10079	HPR_Va-40	40. Harmonic (prevailing ratio), voltage value, a-N	-
10081	HPR_Va-41	41. Harmonic (prevailing ratio), voltage value, a-N	-
10083	HPR_Va-42	42. Harmonic (prevailing ratio), voltage value, a-N	-
10085	HPR_Va-43	43. Harmonic (prevailing ratio), voltage value, a-N	-
10087	HPR_Va-44	44. Harmonic (prevailing ratio), voltage value, a-N	-
10089	HPR_Va-45	45. Harmonic (prevailing ratio), voltage value, a-N	-
10091	HPR_Va-46	46. Harmonic (prevailing ratio), voltage value, a-N	-

Table 2-58 Registers 10001 to 10377: Prevailing Ratio of Harmonics – Voltage Values (cont.)

Register	Type of Information	Remark	Unit
10093	HPR_Va-47	47. Harmonic (prevailing ratio), voltage value, a-N	-
10095	HPR_Va-48	48. Harmonic (prevailing ratio), voltage value, a-N	-
10097	HPR_Va-49	49. Harmonic (prevailing ratio), voltage value, a-N	-
10099	HPR_Va-50	50. Harmonic (prevailing ratio), voltage value, a-N	-
10101	HPR_Va-51	51. Harmonic (prevailing ratio), voltage value, a-N	-
10103	HPR_Va-52	52. Harmonic (prevailing ratio), voltage value, a-N	-
10105	HPR_Va-53	53. Harmonic (prevailing ratio), voltage value, a-N	-
10107	HPR_Va-54	54. Harmonic (prevailing ratio), voltage value, a-N	-
10109	HPR_Va-55	55. Harmonic (prevailing ratio), voltage value, a-N	-
10111	HPR_Va-56	56. Harmonic (prevailing ratio), voltage value, a-N	-
10113	HPR_Va-57	57. Harmonic (prevailing ratio), voltage value, a-N	-
10115	HPR_Va-58	58. Harmonic (prevailing ratio), voltage value, a-N	-
10117	HPR_Va-59	59. Harmonic (prevailing ratio), voltage value, a-N	-
10119	HPR_Va-60	60. Harmonic (prevailing ratio), voltage value, a-N	-
10121	HPR_Va-61	61. Harmonic (prevailing ratio), voltage value, a-N	-
10123	HPR_Va-62	62. Harmonic (prevailing ratio), voltage value, a-N	-
10125	HPR_Va-63	63. Harmonic (prevailing ratio), voltage value, a-N	-
10127	HPR_Vb-1	1. Harmonic (prevailing ratio), voltage value, b-N (Fundamental)	-
10129	HPR_Vb-2	2. Harmonic (prevailing ratio), voltage value, b-N	-
10131	HPR_Vb-3	3. Harmonic (prevailing ratio), voltage value, b-N	-
10133	HPR_Vb-4	4. Harmonic (prevailing ratio), voltage value, b-N	-
10135	HPR_Vb-5	5. Harmonic (prevailing ratio), voltage value, b-N	-
10137	HPR_Vb-6	6. Harmonic (prevailing ratio), voltage value, b-N	-
10139	HPR_Vb-7	7. Harmonic (prevailing ratio), voltage value, b-N	-
10141	HPR_Vb-8	8. Harmonic (prevailing ratio), voltage value, b-N	-
10143	HPR_Vb-9	9. Harmonic (prevailing ratio), voltage value, b-N	-

Table 2-58 Registers 10001 to 10377: Prevailing Ratio of Harmonics – Voltage Values (cont.)

Register	Type of Information	Remark	Unit
10145	HPR_Vb-10	10. Harmonic (prevailing ratio), voltage value, b-N	-
10147	HPR_Vb-11	11. Harmonic (prevailing ratio), voltage value, b-N	-
10149	HPR_Vb-12	12. Harmonic (prevailing ratio), voltage value, b-N	-
10151	HPR_Vb-13	13. Harmonic (prevailing ratio), voltage value, b-N	-
10153	HPR_Vb-14	14. Harmonic (prevailing ratio), voltage value, b-N	-
10155	HPR_Vb-15	15. Harmonic (prevailing ratio), voltage value, b-N	-
10157	HPR_Vb-16	16. Harmonic (prevailing ratio), voltage value, b-N	-
10159	HPR_Vb-17	17. Harmonic (prevailing ratio), voltage value, b-N	-
10161	HPR_Vb-18	18. Harmonic (prevailing ratio), voltage value, b-N	-
10163	HPR_Vb-19	19. Harmonic (prevailing ratio), voltage value, b-N	-
10165	HPR_Vb-20	20. Harmonic (prevailing ratio), voltage value, b-N	-
10167	HPR_Vb-21	21. Harmonic (prevailing ratio), voltage value, b-N	-
10169	HPR_Vb-22	22. Harmonic (prevailing ratio), voltage value, b-N	-
10171	HPR_Vb-23	23. Harmonic (prevailing ratio), voltage value, b-N	-
10173	HPR_Vb-24	24. Harmonic (prevailing ratio), voltage value, b-N	-
10175	HPR_Vb-25	25. Harmonic (prevailing ratio), voltage value, b-N	-
10177	HPR_Vb-26	26. Harmonic (prevailing ratio), voltage value, b-N	-
10179	HPR_Vb-27	27. Harmonic (prevailing ratio), voltage value, b-N	-
10181	HPR_Vb-28	28. Harmonic (prevailing ratio), voltage value, b-N	-
10183	HPR_Vb-29	29. Harmonic (prevailing ratio), voltage value, b-N	-
10185	HPR_Vb-30	30. Harmonic (prevailing ratio), voltage value, b-N	-
10187	HPR_Vb-31	31. Harmonic (prevailing ratio), voltage value, b-N	-
10189	HPR_Vb-32	32. Harmonic (prevailing ratio), voltage value, b-N	-
10191	HPR_Vb-33	33. Harmonic (prevailing ratio), voltage value, b-N	-
10193	HPR_Vb-34	34. Harmonic (prevailing ratio), voltage value, b-N	-
10195	HPR_Vb-35	35. Harmonic (prevailing ratio), voltage value, b-N	-

Table 2-58 Registers 10001 to 10377: Prevailing Ratio of Harmonics – Voltage Values (cont.)

Register	Type of Information	Remark	Unit
10197	HPR_Vb-36	36. Harmonic (prevailing ratio), voltage value, b-N	-
10199	HPR_Vb-37	37. Harmonic (prevailing ratio), voltage value, b-N	-
10201	HPR_Vb-38	38. Harmonic (prevailing ratio), voltage value, b-N	-
10203	HPR_Vb-39	39. Harmonic (prevailing ratio), voltage value, b-N	-
10205	HPR_Vb-40	40. Harmonic (prevailing ratio), voltage value, b-N	-
10207	HPR_Vb-41	41. Harmonic (prevailing ratio), voltage value, b-N	-
10209	HPR_Vb-42	42. Harmonic (prevailing ratio), voltage value, b-N	-
10211	HPR_Vb-43	43. Harmonic (prevailing ratio), voltage value, b-N	-
10213	HPR_Vb-44	44. Harmonic (prevailing ratio), voltage value, b-N	-
10215	HPR_Vb-45	45. Harmonic (prevailing ratio), voltage value, b-N	-
10217	HPR_Vb-46	46. Harmonic (prevailing ratio), voltage value, b-N	-
10219	HPR_Vb-47	47. Harmonic (prevailing ratio), voltage value, b-N	-
10221	HPR_Vb-48	48. Harmonic (prevailing ratio), voltage value, b-N	-
10223	HPR_Vb-49	49. Harmonic (prevailing ratio), voltage value, b-N	-
10225	HPR_Vb-50	50. Harmonic (prevailing ratio), voltage value, b-N	-
10227	HPR_Vb-51	51. Harmonic (prevailing ratio), voltage value, b-N	-
10229	HPR_Vb-52	52. Harmonic (prevailing ratio), voltage value, b-N	-
10231	HPR_Vb-53	53. Harmonic (prevailing ratio), voltage value, b-N	-
10233	HPR_Vb-54	54. Harmonic (prevailing ratio), voltage value, b-N	-
10235	HPR_Vb-55	55. Harmonic (prevailing ratio), voltage value, b-N	-
10237	HPR_Vb-56	56. Harmonic (prevailing ratio), voltage value, b-N	-
10239	HPR_Vb-57	57. Harmonic (prevailing ratio), voltage value, b-N	-
10241	HPR_Vb-58	58. Harmonic (prevailing ratio), voltage value, b-N	-
10243	HPR_Vb-59	59. Harmonic (prevailing ratio), voltage value, b-N	-
10245	HPR_Vb-60	60. Harmonic (prevailing ratio), voltage value, b-N	-
10247	HPR_Vb-61	61. Harmonic (prevailing ratio), voltage value, b-N	-

Table 2-58 Registers 10001 to 10377: Prevailing Ratio of Harmonics – Voltage Values (cont.)

Register	Type of Information	Remark	Unit
10249	HPR_Vb-62	62. Harmonic (prevailing ratio), voltage value, b-N	-
10251	HPR_Vb-63	63. Harmonic (prevailing ratio), voltage value, b-N	-
10253	HPR_Vc-1	1. Harmonic (prevailing ratio), voltage value, c-N (Fundamental)	-
10255	HPR_Vc-2	2. Harmonic (prevailing ratio), voltage value, c-N	-
10257	HPR_Vc-3	3. Harmonic (prevailing ratio), voltage value, c-N	-
10259	HPR_Vc-4	4. Harmonic (prevailing ratio), voltage value, c-N	-
10261	HPR_Vc-5	5. Harmonic (prevailing ratio), voltage value, c-N	-
10263	HPR_Vc-6	6. Harmonic (prevailing ratio), voltage value, c-N	-
10265	HPR_Vc-7	7. Harmonic (prevailing ratio), voltage value, c-N	-
10267	HPR_Vc-8	8. Harmonic (prevailing ratio), voltage value, c-N	-
10269	HPR_Vc-9	9. Harmonic (prevailing ratio), voltage value, c-N	-
10271	HPR_Vc-10	10. Harmonic (prevailing ratio), voltage value, c-N	-
10273	HPR_Vc-11	11. Harmonic (prevailing ratio), voltage value, c-N	-
10275	HPR_Vc-12	12. Harmonic (prevailing ratio), voltage value, c-N	-
10277	HPR_Vc-13	13. Harmonic (prevailing ratio), voltage value, c-N	-
10279	HPR_Vc-14	14. Harmonic (prevailing ratio), voltage value, c-N	-
10281	HPR_Vc-15	15. Harmonic (prevailing ratio), voltage value, c-N	-
10283	HPR_Vc-16	16. Harmonic (prevailing ratio), voltage value, c-N	-
10285	HPR_Vc-17	17. Harmonic (prevailing ratio), voltage value, c-N	-
10287	HPR_Vc-18	18. Harmonic (prevailing ratio), voltage value, c-N	-
10289	HPR_Vc-19	19. Harmonic (prevailing ratio), voltage value, c-N	-
10291	HPR_Vc-20	20. Harmonic (prevailing ratio), voltage value, c-N	-
10293	HPR_Vc-21	21. Harmonic (prevailing ratio), voltage value, c-N	-
10295	HPR_Vc-22	22. Harmonic (prevailing ratio), voltage value, c-N	-
10297	HPR_Vc-23	23. Harmonic (prevailing ratio), voltage value, c-N	-
10299	HPR_Vc-24	24. Harmonic (prevailing ratio), voltage value, c-N	-

Table 2-58 Registers 10001 to 10377: Prevailing Ratio of Harmonics – Voltage Values (cont.)

Register	Type of Information	Remark	Unit
10301	HPR_Vc-25	25. Harmonic (prevailing ratio), voltage value, c-N	-
10303	HPR_Vc-26	26. Harmonic (prevailing ratio), voltage value, c-N	-
10305	HPR_Vc-27	27. Harmonic (prevailing ratio), voltage value, c-N	-
10307	HPR_Vc-28	28. Harmonic (prevailing ratio), voltage value, c-N	-
10309	HPR_Vc-29	29. Harmonic (prevailing ratio), voltage value, c-N	-
10311	HPR_Vc-30	30. Harmonic (prevailing ratio), voltage value, c-N	-
10313	HPR_Vc-31	31. Harmonic (prevailing ratio), voltage value, c-N	-
10315	HPR_Vc-32	32. Harmonic (prevailing ratio), voltage value, c-N	-
10317	HPR_Vc-33	33. Harmonic (prevailing ratio), voltage value, c-N	-
10319	HPR_Vc-34	34. Harmonic (prevailing ratio), voltage value, c-N	-
10321	HPR_Vc-35	35. Harmonic (prevailing ratio), voltage value, c-N	-
10323	HPR_Vc-36	36. Harmonic (prevailing ratio), voltage value, c-N	-
10325	HPR_Vc-37	37. Harmonic (prevailing ratio), voltage value, c-N	-
10327	HPR_Vc-38	38. Harmonic (prevailing ratio), voltage value, c-N	-
10329	HPR_Vc-39	39. Harmonic (prevailing ratio), voltage value, c-N	-
10331	HPR_Vc-40	40. Harmonic (prevailing ratio), voltage value, c-N	-
10333	HPR_Vc-41	41. Harmonic (prevailing ratio), voltage value, c-N	-
10335	HPR_Vc-42	42. Harmonic (prevailing ratio), voltage value, c-N	-
10337	HPR_Vc-43	43. Harmonic (prevailing ratio), voltage value, c-N	-
10339	HPR_Vc-44	44. Harmonic (prevailing ratio), voltage value, c-N	-
10341	HPR_Vc-45	45. Harmonic (prevailing ratio), voltage value, c-N	-
10343	HPR_Vc-46	46. Harmonic (prevailing ratio), voltage value, c-N	-
10345	HPR_Vc-47	47. Harmonic (prevailing ratio), voltage value, c-N	-
10347	HPR_Vc-48	48. Harmonic (prevailing ratio), voltage value, c-N	-
10349	HPR_Vc-49	49. Harmonic (prevailing ratio), voltage value, c-N	-
10351	HPR_Vc-50	50. Harmonic (prevailing ratio), voltage value, c-N	-

Table 2-58 Registers 10001 to 10377: Prevailing Ratio of Harmonics – Voltage Values (cont.)

Register	Type of Information	Remark	Unit
10353	HPR_Vc-51	51. Harmonic (prevailing ratio), voltage value, c-N	-
10355	HPR_Vc-52	52. Harmonic (prevailing ratio), voltage value, c-N	-
10357	HPR_Vc-53	53. Harmonic (prevailing ratio), voltage value, c-N	-
10359	HPR_Vc-54	54. Harmonic (prevailing ratio), voltage value, c-N	-
10361	HPR_Vc-55	55. Harmonic (prevailing ratio), voltage value, c-N	-
10363	HPR_Vc-56	56. Harmonic (prevailing ratio), voltage value, c-N	-
10365	HPR_Vc-57	57. Harmonic (prevailing ratio), voltage value, c-N	-
10367	HPR_Vc-58	58. Harmonic (prevailing ratio), voltage value, c-N	-
10369	HPR_Vc-59	59. Harmonic (prevailing ratio), voltage value, c-N	-
10371	HPR_Vc-60	60. Harmonic (prevailing ratio), voltage value, c-N	-
10373	HPR_Vc-61	61. Harmonic (prevailing ratio), voltage value, c-N	-
10375	HPR_Vc-62	62. Harmonic (prevailing ratio), voltage value, c-N	-
10377	HPR_Vc-63	63. Harmonic (prevailing ratio), voltage value, c-N	-

2.2.7.49 Registers 10379 to 10755: Prevailing Ratio of Harmonics – Current Values (read only)

These registers are write-protected. A write attempt will be rejected with exception code 02 (ILLEGAL_DATA_ADDRESS).

Reference rate: Aggregation time

Network types: Only 1P2W, 3P4W_bal, 3P4W_unb_PN is available.

Data type: Measured value

Table 2-59 Registers 10379 to 10756: Prevailing Ratio of Harmonics – Current Values

Register	Type of Information	Remark	Unit
10379	HPR_Ia-1	1. Harmonic (prevailing ratio), current value, a (Fundamental)	-
10381	HPR_Ia-2	2. Harmonic (prevailing ratio), current value, a	-
10383	HPR_Ia-3	3. Harmonic (prevailing ratio), current value, a	-
10385	HPR_Ia-4	4. Harmonic (prevailing ratio), current value, a	-
10387	HPR_Ia-5	5. Harmonic (prevailing ratio), current value, a	-
10389	HPR_Ia-6	6. Harmonic (prevailing ratio), current value, a	-
10391	HPR_Ia-7	7. Harmonic (prevailing ratio), current value, a	-
10393	HPR_Ia-8	8. Harmonic (prevailing ratio), current value, a	-
10395	HPR_Ia-9	9. Harmonic (prevailing ratio), current value, a	-
10397	HPR_Ia-10	10. Harmonic (prevailing ratio), current value, a	-
10399	HPR_Ia-11	11. Harmonic (prevailing ratio), current value, a	-
10401	HPR_Ia-12	12. Harmonic (prevailing ratio), current value, a	-
10403	HPR_Ia-13	13. Harmonic (prevailing ratio), current value, a	-
10405	HPR_Ia-14	14. Harmonic (prevailing ratio), current value, a	-
10407	HPR_Ia-15	15. Harmonic (prevailing ratio), current value, a	-
10409	HPR_Ia-16	16. Harmonic (prevailing ratio), current value, a	-
10411	HPR_Ia-17	17. Harmonic (prevailing ratio), current value, a	-
10413	HPR_Ia-18	18. Harmonic (prevailing ratio), current value, a	-
10415	HPR_Ia-19	19. Harmonic (prevailing ratio), current value, a	-
10417	HPR_Ia-20	20. Harmonic (prevailing ratio), current value, a	-

Table 2-59 Registers 10379 to 10756: Prevailing Ratio of Harmonics – Current Values (cont.)

Register	Type of Information	Remark	Unit
10419	HPR_Ia-21	21. Harmonic (prevailing ratio), current value, a	-
10421	HPR_Ia-22	22. Harmonic (prevailing ratio), current value, a	-
10423	HPR_Ia-23	23. Harmonic (prevailing ratio), current value, a	-
10425	HPR_Ia-24	24. Harmonic (prevailing ratio), current value, a	-
10427	HPR_Ia-25	25. Harmonic (prevailing ratio), current value, a	-
10429	HPR_Ia-26	26. Harmonic (prevailing ratio), current value, a	-
10431	HPR_Ia-27	27. Harmonic (prevailing ratio), current value, a	-
10433	HPR_Ia-28	28. Harmonic (prevailing ratio), current value, a	-
10435	HPR_Ia-29	29. Harmonic (prevailing ratio), current value, a	-
10437	HPR_Ia-30	30. Harmonic (prevailing ratio), current value, a	-
10439	HPR_Ia-31	31. Harmonic (prevailing ratio), current value, a	-
10441	HPR_Ia-32	32. Harmonic (prevailing ratio), current value, a	-
10443	HPR_Ia-33	33. Harmonic (prevailing ratio), current value, a	-
10445	HPR_Ia-34	34. Harmonic (prevailing ratio), current value, a	-
10447	HPR_Ia-35	35. Harmonic (prevailing ratio), current value, a	-
10449	HPR_Ia-36	36. Harmonic (prevailing ratio), current value, a	-
10451	HPR_Ia-37	37. Harmonic (prevailing ratio), current value, a	-
10453	HPR_Ia-38	38. Harmonic (prevailing ratio), current value, a	-
10455	HPR_Ia-39	39. Harmonic (prevailing ratio), current value, a	-
10457	HPR_Ia-40	40. Harmonic (prevailing ratio), current value, a	-
10459	HPR_Ia-41	41. Harmonic (prevailing ratio), current value, a	-
10461	HPR_Ia-42	42. Harmonic (prevailing ratio), current value, a	-
10463	HPR_Ia-43	43. Harmonic (prevailing ratio), current value, a	-
10465	HPR_Ia-44	44. Harmonic (prevailing ratio), current value, a	-
10467	HPR_Ia-45	45. Harmonic (prevailing ratio), current value, a	-
10469	HPR_Ia-46	46. Harmonic (prevailing ratio), current value, a	-

Table 2-59 Registers 10379 to 10756: Prevailing Ratio of Harmonics – Current Values (cont.)

Register	Type of Information	Remark	Unit
10471	HPR_la-47	47. Harmonic (prevailing ratio), current value, a	-
10473	HPR_la-48	48. Harmonic (prevailing ratio), current value, a	-
10475	HPR_la-49	49. Harmonic (prevailing ratio), current value, a	-
10477	HPR_la-50	50. Harmonic (prevailing ratio), current value, a	-
10479	HPR_la-51	51. Harmonic (prevailing ratio), current value, a	-
10481	HPR_la-52	52. Harmonic (prevailing ratio), current value, a	-
10483	HPR_la-53	53. Harmonic (prevailing ratio), current value, a	-
10485	HPR_la-54	54. Harmonic (prevailing ratio), current value, a	-
10487	HPR_la-55	55. Harmonic (prevailing ratio), current value, a	-
10489	HPR_la-56	56. Harmonic (prevailing ratio), current value, a	-
10491	HPR_la-57	57. Harmonic (prevailing ratio), current value, a	-
10493	HPR_la-58	58. Harmonic (prevailing ratio), current value, a	-
10495	HPR_la-59	59. Harmonic (prevailing ratio), current value, a	-
10497	HPR_la-60	60. Harmonic (prevailing ratio), current value, a	-
10499	HPR_la-61	61. Harmonic (prevailing ratio), current value, a	-
10501	HPR_la-62	62. Harmonic (prevailing ratio), current value, a	-
10503	HPR_la-63	63. Harmonic (prevailing ratio), current value, a	-
10505	HPR_lb-1	1. Harmonic (prevailing ratio), current value, b (Fundamental)	-
10507	HPR_lb-2	2. Harmonic (prevailing ratio), current value, b	-
10509	HPR_lb-3	3. Harmonic (prevailing ratio), current value, b	-
10511	HPR_lb-4	4. Harmonic (prevailing ratio), current value, b	-
10513	HPR_lb-5	5. Harmonic (prevailing ratio), current value, b	-
10515	HPR_lb-6	6. Harmonic (prevailing ratio), current value, b	-
10517	HPR_lb-7	7. Harmonic (prevailing ratio), current value, b	-
10519	HPR_lb-8	8. Harmonic (prevailing ratio), current value, b	-
10521	HPR_lb-9	9. Harmonic (prevailing ratio), current value, b	-

Table 2-59 Registers 10379 to 10756: Prevailing Ratio of Harmonics – Current Values (cont.)

Register	Type of Information	Remark	Unit
10523	HPR_Ib-10	10. Harmonic (prevailing ratio), current value, b	-
10525	HPR_Ib-11	11. Harmonic (prevailing ratio), current value, b	-
10527	HPR_Ib-12	12. Harmonic (prevailing ratio), current value, b	-
10529	HPR_Ib-13	13. Harmonic (prevailing ratio), current value, b	-
10531	HPR_Ib-14	14. Harmonic (prevailing ratio), current value, b	-
10533	HPR_Ib-15	15. Harmonic (prevailing ratio), current value, b	-
10535	HPR_Ib-16	16. Harmonic (prevailing ratio), current value, b	-
10537	HPR_Ib-17	17. Harmonic (prevailing ratio), current value, b	-
10539	HPR_Ib-18	18. Harmonic (prevailing ratio), current value, b	-
10541	HPR_Ib-19	19. Harmonic (prevailing ratio), current value, b	-
10543	HPR_Ib-20	20. Harmonic (prevailing ratio), current value, b	-
10545	HPR_Ib-21	21. Harmonic (prevailing ratio), current value, b	-
10547	HPR_Ib-22	22. Harmonic (prevailing ratio), current value, b	-
10549	HPR_Ib-23	23. Harmonic (prevailing ratio), current value, b	-
10551	HPR_Ib-24	24. Harmonic (prevailing ratio), current value, b	-
10553	HPR_Ib-25	25. Harmonic (prevailing ratio), current value, b	-
10555	HPR_Ib-26	26. Harmonic (prevailing ratio), current value, b	-
10557	HPR_Ib-27	27. Harmonic (prevailing ratio), current value, b	-
10559	HPR_Ib-28	28. Harmonic (prevailing ratio), current value, b	-
10561	HPR_Ib-29	29. Harmonic (prevailing ratio), current value, b	-
10563	HPR_Ib-30	30. Harmonic (prevailing ratio), current value, b	-
10565	HPR_Ib-31	31. Harmonic (prevailing ratio), current value, b	-
10567	HPR_Ib-32	32. Harmonic (prevailing ratio), current value, b	-
10569	HPR_Ib-33	33. Harmonic (prevailing ratio), current value, b	-
10571	HPR_Ib-34	34. Harmonic (prevailing ratio), current value, b	-
10573	HPR_Ib-35	35. Harmonic (prevailing ratio), current value, b	-

Table 2-59 Registers 10379 to 10756: Prevailing Ratio of Harmonics – Current Values (cont.)

Register	Type of Information	Remark	Unit
10575	HPR_Ib-36	36. Harmonic (prevailing ratio), current value, b	-
10577	HPR_Ib-37	37. Harmonic (prevailing ratio), current value, b	-
10579	HPR_Ib-38	38. Harmonic (prevailing ratio), current value, b	-
10581	HPR_Ib-39	39. Harmonic (prevailing ratio), current value, b	-
10583	HPR_Ib-40	40. Harmonic (prevailing ratio), current value, b	-
10585	HPR_Ib-41	41. Harmonic (prevailing ratio), current value, b	-
10587	HPR_Ib-42	42. Harmonic (prevailing ratio), current value, b	-
10589	HPR_Ib-43	43. Harmonic (prevailing ratio), current value, b	-
10591	HPR_Ib-44	44. Harmonic (prevailing ratio), current value, b	-
10593	HPR_Ib-45	45. Harmonic (prevailing ratio), current value, b	-
10595	HPR_Ib-46	46. Harmonic (prevailing ratio), current value, b	-
10597	HPR_Ib-47	47. Harmonic (prevailing ratio), current value, b	-
10599	HPR_Ib-48	48. Harmonic (prevailing ratio), current value, b	-
10601	HPR_Ib-49	49. Harmonic (prevailing ratio), current value, b	-
10603	HPR_Ib-50	50. Harmonic (prevailing ratio), current value, b	-
10605	HPR_Ib-51	51. Harmonic (prevailing ratio), current value, b	-
10607	HPR_Ib-52	52. Harmonic (prevailing ratio), current value, b	-
10609	HPR_Ib-53	53. Harmonic (prevailing ratio), current value, b	-
10611	HPR_Ib-54	54. Harmonic (prevailing ratio), current value, b	-
10613	HPR_Ib-55	55. Harmonic (prevailing ratio), current value, b	-
10615	HPR_Ib-56	56. Harmonic (prevailing ratio), current value, b	-
10617	HPR_Ib-57	57. Harmonic (prevailing ratio), current value, b	-
10619	HPR_Ib-58	58. Harmonic (prevailing ratio), current value, b	-
10621	HPR_Ib-59	59. Harmonic (prevailing ratio), current value, b	-
10623	HPR_Ib-60	60. Harmonic (prevailing ratio), current value, b	-
10625	HPR_Ib-61	61. Harmonic (prevailing ratio), current value, b	-

Table 2-59 Registers 10379 to 10756: Prevailing Ratio of Harmonics – Current Values (cont.)

Register	Type of Information	Remark	Unit
10627	HPR_Ib-62	62. Harmonic (prevailing ratio), current value, b	-
10629	HPR_Ib-63	63. Harmonic (prevailing ratio), current value, b	-
10631	HPR_Ic-1	1. Harmonic (prevailing ratio), current value, c (Fundamental)	-
10633	HPR_Ic-2	2. Harmonic (prevailing ratio), current value, c	-
10635	HPR_Ic-3	3. Harmonic (prevailing ratio), current value, c	-
10637	HPR_Ic-4	4. Harmonic (prevailing ratio), current value, c	-
10639	HPR_Ic-5	5. Harmonic (prevailing ratio), current value, c	-
10641	HPR_Ic-6	6. Harmonic (prevailing ratio), current value, c	-
10643	HPR_Ic-7	7. Harmonic (prevailing ratio), current value, c	-
10645	HPR_Ic-8	8. Harmonic (prevailing ratio), current value, c	-
10647	HPR_Ic-9	9. Harmonic (prevailing ratio), current value, c	-
10649	HPR_Ic-10	10. Harmonic (prevailing ratio), current value, c	-
10651	HPR_Ic-11	11. Harmonic (prevailing ratio), current value, c	-
10653	HPR_Ic-12	12. Harmonic (prevailing ratio), current value, c	-
10655	HPR_Ic-13	13. Harmonic (prevailing ratio), current value, c	-
10657	HPR_Ic-14	14. Harmonic (prevailing ratio), current value, c	-
10659	HPR_Ic-15	15. Harmonic (prevailing ratio), current value, c	-
10661	HPR_Ic-16	16. Harmonic (prevailing ratio), current value, c	-
10663	HPR_Ic-17	17. Harmonic (prevailing ratio), current value, c	-
10665	HPR_Ic-18	18. Harmonic (prevailing ratio), current value, c	-
10667	HPR_Ic-19	19. Harmonic (prevailing ratio), current value, c	-
10669	HPR_Ic-20	20. Harmonic (prevailing ratio), current value, c	-
10671	HPR_Ic-21	21. Harmonic (prevailing ratio), current value, c	-
10673	HPR_Ic-22	22. Harmonic (prevailing ratio), current value, c	-
10675	HPR_Ic-23	23. Harmonic (prevailing ratio), current value, c	-
10677	HPR_Ic-24	24. Harmonic (prevailing ratio), current value, c	-

Table 2-59 Registers 10379 to 10756: Prevailing Ratio of Harmonics – Current Values (cont.)

Register	Type of Information	Remark	Unit
10679	HPR_Ic-25	25. Harmonic (prevailing ratio), current value, c	-
10681	HPR_Ic-26	26. Harmonic (prevailing ratio), current value, c	-
10683	HPR_Ic-27	27. Harmonic (prevailing ratio), current value, c	-
10685	HPR_Ic-28	28. Harmonic (prevailing ratio), current value, c	-
10687	HPR_Ic-29	29. Harmonic (prevailing ratio), current value, c	-
10689	HPR_Ic-30	30. Harmonic (prevailing ratio), current value, c	-
10691	HPR_Ic-31	31. Harmonic (prevailing ratio), current value, c	-
10693	HPR_Ic-32	32. Harmonic (prevailing ratio), current value, c	-
10695	HPR_Ic-33	33. Harmonic (prevailing ratio), current value, c	-
10697	HPR_Ic-34	34. Harmonic (prevailing ratio), current value, c	-
10699	HPR_Ic-35	35. Harmonic (prevailing ratio), current value, c	-
10701	HPR_Ic-36	36. Harmonic (prevailing ratio), current value, c	-
10703	HPR_Ic-37	37. Harmonic (prevailing ratio), current value, c	-
10705	HPR_Ic-38	38. Harmonic (prevailing ratio), current value, c	-
10707	HPR_Ic-39	39. Harmonic (prevailing ratio), current value, c	-
10709	HPR_Ic-40	40. Harmonic (prevailing ratio), current value, c	-
10711	HPR_Ic-41	41. Harmonic (prevailing ratio), current value, c	-
10713	HPR_Ic-42	42. Harmonic (prevailing ratio), current value, c	-
10715	HPR_Ic-43	43. Harmonic (prevailing ratio), current value, c	-
10717	HPR_Ic-44	44. Harmonic (prevailing ratio), current value, c	-
10719	HPR_Ic-45	45. Harmonic (prevailing ratio), current value, c	-
10721	HPR_Ic-46	46. Harmonic (prevailing ratio), current value, c	-
10723	HPR_Ic-47	47. Harmonic (prevailing ratio), current value, c	-
10725	HPR_Ic-48	48. Harmonic (prevailing ratio), current value, c	-
10727	HPR_Ic-49	49. Harmonic (prevailing ratio), current value, c	-
10729	HPR_Ic-50	50. Harmonic (prevailing ratio), current value, c	-

Table 2-59 Registers 10379 to 10756: Prevailing Ratio of Harmonics – Current Values (cont.)

Register	Type of Information	Remark	Unit
10731	HPR_Ic-51	51. Harmonic (prevailing ratio), current value, c	-
10733	HPR_Ic-52	52. Harmonic (prevailing ratio), current value, c	-
10735	HPR_Ic-53	53. Harmonic (prevailing ratio), current value, c	-
10737	HPR_Ic-54	54. Harmonic (prevailing ratio), current value, c	-
10739	HPR_Ic-55	55. Harmonic (prevailing ratio), current value, c	-
10741	HPR_Ic-56	56. Harmonic (prevailing ratio), current value, c	-
10743	HPR_Ic-57	57. Harmonic (prevailing ratio), current value, c	-
10745	HPR_Ic-58	58. Harmonic (prevailing ratio), current value, c	-
10747	HPR_Ic-59	59. Harmonic (prevailing ratio), current value, c	-
10749	HPR_Ic-60	60. Harmonic (prevailing ratio), current value, c	-
10751	HPR_Ic-61	61. Harmonic (prevailing ratio), current value, c	-
10753	HPR_Ic-62	62. Harmonic (prevailing ratio), current value, c	-
10755	HPR_Ic-63	63. Harmonic (prevailing ratio), current value, c	-

2.2.7.50 Registers 12001 to 12377: Phase Angle of Harmonic – Power (read only)

These registers are write-protected. A write attempt will be rejected with exception code 02 (ILLEGAL_DATA_ADDRESS).

Calculation period: 10/12 cycle (50 Hz/60 Hz)

Network types: Only 1P2W, 3P4W_bal, 3P4W_unb_PN is available.

Data type: Measured value

Table 2-60 Registers 12001 to 12377: Phase Angle of Harmonic Power

Register	Type of Information	Remark	Unit
12001	HP_φa-1	1. Harmonic (phase angle), power, a-N (Fundamental)	° (degree)
12003	HP_φa-2	2. Harmonic (phase angle), power, a-N	° (degree)
12005	HP_φa-3	3. Harmonic (phase angle), power, a-N	° (degree)
12007	HP_φa-4	4. Harmonic (phase angle), power, a-N	° (degree)
12009	HP_φa-5	5. Harmonic (phase angle), power, a-N	° (degree)
12011	HP_φa-6	6. Harmonic (phase angle), power, a-N	° (degree)
12013	HP_φa-7	7. Harmonic (phase angle), power, a-N	° (degree)
12015	HP_φa-8	8. Harmonic (phase angle), power, a-N	° (degree)
12017	HP_φa-9	9. Harmonic (phase angle), power, a-N	° (degree)
12019	HP_φa-10	10. Harmonic (phase angle), power, a-N	° (degree)
12021	HP_φa-11	11. Harmonic (phase angle), power, a-N	° (degree)
12023	HP_φa-12	12. Harmonic (phase angle), power, a-N	° (degree)
12025	HP_φa-13	13. Harmonic (phase angle), power, a-N	° (degree)
12027	HP_φa-14	14. Harmonic (phase angle), power, a-N	° (degree)
12029	HP_φa-15	15. Harmonic (phase angle), power, a-N	° (degree)
12031	HP_φa-16	16. Harmonic (phase angle), power, a-N	° (degree)
12033	HP_φa-17	17. Harmonic (phase angle), power, a-N	° (degree)
12035	HP_φa-18	18. Harmonic (phase angle), power, a-N	° (degree)
12037	HP_φa-19	19. Harmonic (phase angle), power, a-N	° (degree)
12039	HP_φa-20	20. Harmonic (phase angle), power, a-N	° (degree)
12041	HP_φa-21	21. Harmonic (phase angle), power, a-N	° (degree)

Table 2-60 Registers 12001 to 12377: Phase Angle of Harmonic Power (cont.)

Register	Type of Information	Remark	Unit
12043	HP_φa-22	22. Harmonic (phase angle), power, a-N	° (degree)
12045	HP_φa-23	23. Harmonic (phase angle), power, a-N	° (degree)
12047	HP_φa-24	24. Harmonic (phase angle), power, a-N	° (degree)
12049	HP_φa-25	25. Harmonic (phase angle), power, a-N	° (degree)
12051	HP_φa-26	26. Harmonic (phase angle), power, a-N	° (degree)
12053	HP_φa-27	27. Harmonic (phase angle), power, a-N	° (degree)
12055	HP_φa-28	28. Harmonic (phase angle), power, a-N	° (degree)
12057	HP_φa-29	29. Harmonic (phase angle), power, a-N	° (degree)
12059	HP_φa-30	30. Harmonic (phase angle), power, a-N	° (degree)
12061	HP_φa-31	31. Harmonic (phase angle), power, a-N	° (degree)
12063	HP_φa-32	32. Harmonic (phase angle), power, a-N	° (degree)
12065	HP_φa-33	33. Harmonic (phase angle), power, a-N	° (degree)
12067	HP_φa-34	34. Harmonic (phase angle), power, a-N	° (degree)
12069	HP_φa-35	35. Harmonic (phase angle), power, a-N	° (degree)
12071	HP_φa-36	36. Harmonic (phase angle), power, a-N	° (degree)
12073	HP_φa-37	37. Harmonic (phase angle), power, a-N	° (degree)
12075	HP_φa-38	38. Harmonic (phase angle), power, a-N	° (degree)
12077	HP_φa-39	39. Harmonic (phase angle), power, a-N	° (degree)
12079	HP_φa-40	40. Harmonic (phase angle), power, a-N	° (degree)
12081	HP_φa-41	41. Harmonic (phase angle), power, a-N	° (degree)
12083	HP_φa-42	42. Harmonic (phase angle), power, a-N	° (degree)
12085	HP_φa-43	43. Harmonic (phase angle), power, a-N	° (degree)
12087	HP_φa-44	44. Harmonic (phase angle), power, a-N	° (degree)
12089	HP_φa-45	45. Harmonic (phase angle), power, a-N	° (degree)
12091	HP_φa-46	46. Harmonic (phase angle), power, a-N	° (degree)
12093	HP_φa-47	47. Harmonic (phase angle), power, a-N	° (degree)

Table 2-60 Registers 12001 to 12377: Phase Angle of Harmonic Power (cont.)

Register	Type of Information	Remark	Unit
12095	HP_φa-48	48. Harmonic (phase angle), power, a-N	° (degree)
12097	HP_φa-49	49. Harmonic (phase angle), power, a-N	° (degree)
12099	HP_φa-50	50. Harmonic (phase angle), power, a-N	° (degree)
12101	HP_φa-51	51. Harmonic (phase angle), power, a-N	° (degree)
12103	HP_φa-52	52. Harmonic (phase angle), power, a-N	° (degree)
12105	HP_φa-53	53. Harmonic (phase angle), power, a-N	° (degree)
12107	HP_φa-54	54. Harmonic (phase angle), power, a-N	° (degree)
12109	HP_φa-55	55. Harmonic (phase angle), power, a-N	° (degree)
12111	HP_φa-56	56. Harmonic (phase angle), power, a-N	° (degree)
12113	HP_φa-57	57. Harmonic (phase angle), power, a-N	° (degree)
12115	HP_φa-58	58. Harmonic (phase angle), power, a-N	° (degree)
12117	HP_φa-59	59. Harmonic (phase angle), power, a-N	° (degree)
12119	HP_φa-60	60. Harmonic (phase angle), power, a-N	° (degree)
12121	HP_φa-61	61. Harmonic (phase angle), power, a-N	° (degree)
12123	HP_φa-62	62. Harmonic (phase angle), power, a-N	° (degree)
12125	HP_φa-63	63. Harmonic (phase angle), power, a-N	° (degree)
12127	HP_φb-1	1. Harmonic (phase angle), power, b-N (Fundamental)	° (degree)
12129	HP_φb-2	2. Harmonic (phase angle), power, b-N	° (degree)
12131	HP_φb-3	3. Harmonic (phase angle), power, b-N	° (degree)
12133	HP_φb-4	4. Harmonic (phase angle), power, b-N	° (degree)
12135	HP_φb-5	5. Harmonic (phase angle), power, b-N	° (degree)
12137	HP_φb-6	6. Harmonic (phase angle), power, b-N	° (degree)
12139	HP_φb-7	7. Harmonic (phase angle), power, b-N	° (degree)
12141	HP_φb-8	8. Harmonic (phase angle), power, b-N	° (degree)
12143	HP_φb-9	9. Harmonic (phase angle), power, b-N	° (degree)

Table 2-60 Registers 12001 to 12377: Phase Angle of Harmonic Power (cont.)

Register	Type of Information	Remark	Unit
12145	HP_φb-10	10. Harmonic (phase angle), power, b-N	° (degree)
12147	HP_φb-11	11. Harmonic (phase angle), power, b-N	° (degree)
12149	HP_φb-12	12. Harmonic (phase angle), power, b-N	° (degree)
12151	HP_φb-13	13. Harmonic (phase angle), power, b-N	° (degree)
12153	HP_φb-14	14. Harmonic (phase angle), power, b-N	° (degree)
12155	HP_φb-15	15. Harmonic (phase angle), power, b-N	° (degree)
12157	HP_φb-16	16. Harmonic (phase angle), power, b-N	° (degree)
12159	HP_φb-17	17. Harmonic (phase angle), power, b-N	° (degree)
12161	HP_φb-18	18. Harmonic (phase angle), power, b-N	° (degree)
12163	HP_φb-19	19. Harmonic (phase angle), power, b-N	° (degree)
12165	HP_φb-20	20. Harmonic (phase angle), power, b-N	° (degree)
12167	HP_φb-21	21. Harmonic (phase angle), power, b-N	° (degree)
12169	HP_φb-22	22. Harmonic (phase angle), power, b-N	° (degree)
12171	HP_φb-23	23. Harmonic (phase angle), power, b-N	° (degree)
12173	HP_φb-24	24. Harmonic (phase angle), power, b-N	° (degree)
12175	HP_φb-25	25. Harmonic (phase angle), power, b-N	° (degree)
12177	HP_φb-26	26. Harmonic (phase angle), power, b-N	° (degree)
12179	HP_φb-27	27. Harmonic (phase angle), power, b-N	° (degree)
12181	HP_φb-28	28. Harmonic (phase angle), power, b-N	° (degree)
12183	HP_φb-29	29. Harmonic (phase angle), power, b-N	° (degree)
12185	HP_φb-30	30. Harmonic (phase angle), power, b-N	° (degree)
12187	HP_φb-31	31. Harmonic (phase angle), power, b-N	° (degree)
12189	HP_φb-32	32. Harmonic (phase angle), power, b-N	° (degree)
12191	HP_φb-33	33. Harmonic (phase angle), power, b-N	° (degree)
12193	HP_φb-34	34. Harmonic (phase angle), power, b-N	° (degree)
12195	HP_φb-35	35. Harmonic (phase angle), power, b-N	° (degree)

Table 2-60 Registers 12001 to 12377: Phase Angle of Harmonic Power (cont.)

Register	Type of Information	Remark	Unit
12197	HP_φb-36	36. Harmonic (phase angle), power, b-N	° (degree)
12199	HP_φb-37	37. Harmonic (phase angle), power, b-N	° (degree)
12201	HP_φb-38	38. Harmonic (phase angle), power, b-N	° (degree)
12203	HP_φb-39	39. Harmonic (phase angle), power, b-N	° (degree)
12205	HP_φb-40	40. Harmonic (phase angle), power, b-N	° (degree)
12207	HP_φb-41	41. Harmonic (phase angle), power, b-N	° (degree)
12209	HP_φb-42	42. Harmonic (phase angle), power, b-N	° (degree)
12211	HP_φb-43	43. Harmonic (phase angle), power, b-N	° (degree)
12213	HP_φb-44	44. Harmonic (phase angle), power, b-N	° (degree)
12215	HP_φb-45	45. Harmonic (phase angle), power, b-N	° (degree)
12217	HP_φb-46	46. Harmonic (phase angle), power, b-N	° (degree)
12219	HP_φb-47	47. Harmonic (phase angle), power, b-N	° (degree)
12221	HP_φb-48	48. Harmonic (phase angle), power, b-N	° (degree)
12223	HP_φb-49	49. Harmonic (phase angle), power, b-N	° (degree)
12225	HP_φb-50	50. Harmonic (phase angle), power, b-N	° (degree)
12227	HP_φb-51	51. Harmonic (phase angle), power, b-N	° (degree)
12229	HP_φb-52	52. Harmonic (phase angle), power, b-N	° (degree)
12231	HP_φb-53	53. Harmonic (phase angle), power, b-N	° (degree)
12233	HP_φb-54	54. Harmonic (phase angle), power, b-N	° (degree)
12235	HP_φb-55	55. Harmonic (phase angle), power, b-N	° (degree)
12237	HP_φb-56	56. Harmonic (phase angle), power, b-N	° (degree)
12239	HP_φb-57	57. Harmonic (phase angle), power, b-N	° (degree)
12241	HP_φb-58	58. Harmonic (phase angle), power, b-N	° (degree)
12243	HP_φb-59	59. Harmonic (phase angle), power, b-N	° (degree)
12245	HP_φb-60	60. Harmonic (phase angle), power, b-N	° (degree)
12247	HP_φb-61	61. Harmonic (phase angle), power, b-N	° (degree)

Table 2-60 Registers 12001 to 12377: Phase Angle of Harmonic Power (cont.)

Register	Type of Information	Remark	Unit
12249	HP_φb-62	62. Harmonic (phase angle), power, b-N	° (degree)
12251	HP_φb-63	63. Harmonic (phase angle), power, b-N	° (degree)
12253	HP_φc-1	1. Harmonic (phase angle), power, c-N (Fundamental)	° (degree)
12255	HP_φc-2	2. Harmonic (phase angle), power, c-N	° (degree)
12257	HP_φc-3	3. Harmonic (phase angle), power, c-N	° (degree)
12259	HP_φc-4	4. Harmonic (phase angle), power, c-N	° (degree)
12261	HP_φc-5	5. Harmonic (phase angle), power, c-N	° (degree)
12263	HP_φc-6	6. Harmonic (phase angle), power, c-N	° (degree)
12265	HP_φc-7	7. Harmonic (phase angle), power, c-N	° (degree)
12267	HP_φc-8	8. Harmonic (phase angle), power, c-N	° (degree)
12269	HP_φc-9	9. Harmonic (phase angle), power, c-N	° (degree)
12271	HP_φc-10	10. Harmonic (phase angle), power, c-N	° (degree)
12273	HP_φc-11	11. Harmonic (phase angle), power, c-N	° (degree)
12275	HP_φc-12	12. Harmonic (phase angle), power, c-N	° (degree)
12277	HP_φc-13	13. Harmonic (phase angle), power, c-N	° (degree)
12279	HP_φc-14	14. Harmonic (phase angle), power, c-N	° (degree)
12281	HP_φc-15	15. Harmonic (phase angle), power, c-N	° (degree)
12283	HP_φc-16	16. Harmonic (phase angle), power, c-N	° (degree)
12285	HP_φc-17	17. Harmonic (phase angle), power, c-N	° (degree)
12287	HP_φc-18	18. Harmonic (phase angle), power, c-N	° (degree)
12289	HP_φc-19	19. Harmonic (phase angle), power, c-N	° (degree)
12291	HP_φc-20	20. Harmonic (phase angle), power, c-N	° (degree)
12293	HP_φc-21	21. Harmonic (phase angle), power, c-N	° (degree)
12295	HP_φc-22	22. Harmonic (phase angle), power, c-N	° (degree)
12297	HP_φc-23	23. Harmonic (phase angle), power, c-N	° (degree)

Table 2-60 Registers 12001 to 12377: Phase Angle of Harmonic Power (cont.)

Register	Type of Information	Remark	Unit
12299	HP_φc-24	24. Harmonic (phase angle), power, c-N	° (degree)
12301	HP_φc-25	25. Harmonic (phase angle), power, c-N	° (degree)
12303	HP_φc-26	26. Harmonic (phase angle), power, c-N	° (degree)
12305	HP_φc-27	27. Harmonic (phase angle), power, c-N	° (degree)
12307	HP_φc-28	28. Harmonic (phase angle), power, c-N	° (degree)
12309	HP_φc-29	29. Harmonic (phase angle), power, c-N	° (degree)
12311	HP_φc-30	30. Harmonic (phase angle), power, c-N	° (degree)
12313	HP_φc-31	31. Harmonic (phase angle), power, c-N	° (degree)
12315	HP_φc-32	32. Harmonic (phase angle), power, c-N	° (degree)
12317	HP_φc-33	33. Harmonic (phase angle), power, c-N	° (degree)
12319	HP_φc-34	34. Harmonic (phase angle), power, c-N	° (degree)
12321	HP_φc-35	35. Harmonic (phase angle), power, c-N	° (degree)
12323	HP_φc-36	36. Harmonic (phase angle), power, c-N	° (degree)
12325	HP_φc-37	37. Harmonic (phase angle), power, c-N	° (degree)
12327	HP_φc-38	38. Harmonic (phase angle), power, c-N	° (degree)
12329	HP_φc-39	39. Harmonic (phase angle), power, c-N	° (degree)
12331	HP_φc-40	40. Harmonic (phase angle), power, c-N	° (degree)
12333	HP_φc-41	41. Harmonic (phase angle), power, c-N	° (degree)
12335	HP_φc-42	42. Harmonic (phase angle), power, c-N	° (degree)
12337	HP_φc-43	43. Harmonic (phase angle), power, c-N	° (degree)
12339	HP_φc-44	44. Harmonic (phase angle), power, c-N	° (degree)
12341	HP_φc-45	45. Harmonic (phase angle), power, c-N	° (degree)
12343	HP_φc-46	46. Harmonic (phase angle), power, c-N	° (degree)
12345	HP_φc-47	47. Harmonic (phase angle), power, c-N	° (degree)
12347	HP_φc-48	48. Harmonic (phase angle), power, c-N	° (degree)
12349	HP_φc-49	49. Harmonic (phase angle), power, c-N	° (degree)

Table 2-60 Registers 12001 to 12377: Phase Angle of Harmonic Power (cont.)

Register	Type of Information	Remark	Unit
12351	HP_φc-50	50. Harmonic (phase angle), power, c-N	° (degree)
12353	HP_φc-51	51. Harmonic (phase angle), power, c-N	° (degree)
12355	HP_φc-52	52. Harmonic (phase angle), power, c-N	° (degree)
12357	HP_φc-53	53. Harmonic (phase angle), power, c-N	° (degree)
12359	HP_φc-54	54. Harmonic (phase angle), power, c-N	° (degree)
12361	HP_φc-55	55. Harmonic (phase angle), power, c-N	° (degree)
12363	HP_φc-56	56. Harmonic (phase angle), power, c-N	° (degree)
12365	HP_φc-57	57. Harmonic (phase angle), power, c-N	° (degree)
12367	HP_φc-58	58. Harmonic (phase angle), power, c-N	° (degree)
12369	HP_φc-59	59. Harmonic (phase angle), power, c-N	° (degree)
12371	HP_φc-60	60. Harmonic (phase angle), power, c-N	° (degree)
12373	HP_φc-61	61. Harmonic (phase angle), power, c-N	° (degree)
12375	HP_φc-62	62. Harmonic (phase angle), power, c-N	° (degree)
12377	HP_φc-63	63. Harmonic (phase angle), power, c-N	° (degree)

2.2.7.51 Registers 13001 to 13377: Harmonic, Power - Active Power Value (read only)

These registers are write-protected. A write attempt will be rejected with exception code 02 (ILLEGAL_DATA_ADDRESS).

Calculation period: 10/12 cycle (50 Hz/60 Hz)

Network types: Only 1P2W, 3P4W_bal, 3P4W_unb_PN is available.

Data type: Measured value

Table 2-61 Registers 13001 to 13377: Harmonic, Power - Active Power Value

Register	Type of Information	Remark	Unit
13001	HP_Pa-1	1. Harmonic (active power), a-N (Fundamental)	° (degree)
13003	HP_Pa-2	2. Harmonic (active power), a-N	° (degree)
13005	HP_Pa-3	3. Harmonic (active power), a-N	° (degree)
13007	HP_Pa-4	4. Harmonic (active power), a-N	° (degree)
13009	HP_Pa-5	5. Harmonic (active power), a-N	° (degree)
13011	HP_Pa-6	6. Harmonic (active power), a-N	° (degree)
13013	HP_Pa-7	7. Harmonic (active power), a-N	° (degree)
13015	HP_Pa-8	8. Harmonic (active power), a-N	° (degree)
13017	HP_Pa-9	9. Harmonic (active power), a-N	° (degree)
13019	HP_Pa-10	10. Harmonic (active power), a-N	° (degree)
13021	HP_Pa-11	11. Harmonic (active power), a-N	° (degree)
13023	HP_Pa-12	12. Harmonic (active power), a-N	° (degree)
13025	HP_Pa-13	13. Harmonic (active power), a-N	° (degree)
13027	HP_Pa-14	14. Harmonic (active power), a-N	° (degree)
13029	HP_Pa-15	15. Harmonic (active power), a-N	° (degree)
13031	HP_Pa-16	16. Harmonic (active power), a-N	° (degree)
13033	HP_Pa-17	17. Harmonic (active power), a-N	° (degree)
13035	HP_Pa-18	18. Harmonic (active power), a-N	° (degree)
13037	HP_Pa-19	19. Harmonic (active power), a-N	° (degree)
13039	HP_Pa-20	20. Harmonic (active power), a-N	° (degree)
13041	HP_Pa-21	21. Harmonic (active power), a-N	° (degree)

Table 2-61 Registers 13001 to 13377: Harmonic, Power - Active Power Value (cont.)

Register	Type of Information	Remark	Unit
13043	HP_Pa-22	22. Harmonic (active power), a-N	° (degree)
13045	HP_Pa-23	23. Harmonic (active power), a-N	° (degree)
13047	HP_Pa-24	24. Harmonic (active power), a-N	° (degree)
13049	HP_Pa-25	25. Harmonic (active power), a-N	° (degree)
13051	HP_Pa-26	26. Harmonic (active power), a-N	° (degree)
13053	HP_Pa-27	27. Harmonic (active power), a-N	° (degree)
13055	HP_Pa-28	28. Harmonic (active power), a-N	° (degree)
13057	HP_Pa-29	29. Harmonic (active power), a-N	° (degree)
13059	HP_Pa-30	30. Harmonic (active power), a-N	° (degree)
13061	HP_Pa-31	31. Harmonic (active power), a-N	° (degree)
13063	HP_Pa-32	32. Harmonic (active power), a-N	° (degree)
13065	HP_Pa-33	33. Harmonic (active power), a-N	° (degree)
13067	HP_Pa-34	34. Harmonic (active power), a-N	° (degree)
13069	HP_Pa-35	35. Harmonic (active power), a-N	° (degree)
13071	HP_Pa-36	36. Harmonic (active power), a-N	° (degree)
13073	HP_Pa-37	37. Harmonic (active power), a-N	° (degree)
13075	HP_Pa-38	38. Harmonic (active power), a-N	° (degree)
13077	HP_Pa-39	39. Harmonic (active power), a-N	° (degree)
13079	HP_Pa-40	40. Harmonic (active power), a-N	° (degree)
13081	HP_Pa-41	41. Harmonic (active power), a-N	° (degree)
13083	HP_Pa-42	42. Harmonic (active power), a-N	° (degree)
13085	HP_Pa-43	43. Harmonic (active power), a-N	° (degree)
13087	HP_Pa-44	44. Harmonic (active power), a-N	° (degree)
13089	HP_Pa-45	45. Harmonic (active power), a-N	° (degree)
13091	HP_Pa-46	46. Harmonic (active power), a-N	° (degree)
13093	HP_Pa-47	47. Harmonic (active power), a-N	° (degree)

Table 2-61 Registers 13001 to 13377: Harmonic, Power - Active Power Value (cont.)

Register	Type of Information	Remark	Unit
13095	HP_Pa-48	48. Harmonic (active power), a-N	° (degree)
13097	HP_Pa-49	49. Harmonic (active power), a-N	° (degree)
13099	HP_Pa-50	50. Harmonic (active power), a-N	° (degree)
13101	HP_Pa-51	51. Harmonic (active power), a-N	° (degree)
13103	HP_Pa-52	52. Harmonic (active power), a-N	° (degree)
13105	HP_Pa-53	53. Harmonic (active power), a-N	° (degree)
13107	HP_Pa-54	54. Harmonic (active power), a-N	° (degree)
13109	HP_Pa-55	55. Harmonic (active power), a-N	° (degree)
13111	HP_Pa-56	56. Harmonic (active power), a-N	° (degree)
13113	HP_Pa-57	57. Harmonic (active power), a-N	° (degree)
13115	HP_Pa-58	58. Harmonic (active power), a-N	° (degree)
13117	HP_Pa-59	59. Harmonic (active power), a-N	° (degree)
13119	HP_Pa-60	60. Harmonic (active power), a-N	° (degree)
13121	HP_Pa-61	61. Harmonic (active power), a-N	° (degree)
13123	HP_Pa-62	62. Harmonic (active power), a-N	° (degree)
13125	HP_Pa-63	63. Harmonic (active power), a-N	° (degree)
13127	HP_Pb-1	1. Harmonic (active power), b-N (Fundamental)	° (degree)
13129	HP_Pb-2	2. Harmonic (active power), b-N	° (degree)
13131	HP_Pb-3	3. Harmonic (active power), b-N	° (degree)
13133	HP_Pb-4	4. Harmonic (active power), b-N	° (degree)
13135	HP_Pb-5	5. Harmonic (active power), b-N	° (degree)
13137	HP_Pb-6	6. Harmonic (active power), b-N	° (degree)
13139	HP_Pb-7	7. Harmonic (active power), b-N	° (degree)
13141	HP_Pb-8	8. Harmonic (active power), b-N	° (degree)
13143	HP_Pb-9	9. Harmonic (active power), b-N	° (degree)
13145	HP_Pb-10	10. Harmonic (active power), b-N	° (degree)

Table 2-61 Registers 13001 to 13377: Harmonic, Power - Active Power Value (cont.)

Register	Type of Information	Remark	Unit
13147	HP_Pb-11	11. Harmonic (active power), b-N	° (degree)
13149	HP_Pb-12	12. Harmonic (active power), b-N	° (degree)
13151	HP_Pb-13	13. Harmonic (active power), b-N	° (degree)
13153	HP_Pb-14	14. Harmonic (active power), b-N	° (degree)
13155	HP_Pb-15	15. Harmonic (active power), b-N	° (degree)
13157	HP_Pb-16	16. Harmonic (active power), b-N	° (degree)
13159	HP_Pb-17	17. Harmonic (active power), b-N	° (degree)
13161	HP_Pb-18	18. Harmonic (active power), b-N	° (degree)
13163	HP_Pb-19	19. Harmonic (active power), b-N	° (degree)
13165	HP_Pb-20	20. Harmonic (active power), b-N	° (degree)
13167	HP_Pb-21	21. Harmonic (active power), b-N	° (degree)
13169	HP_Pb-22	22. Harmonic (active power), b-N	° (degree)
13171	HP_Pb-23	23. Harmonic (active power), b-N	° (degree)
13173	HP_Pb-24	24. Harmonic (active power), b-N	° (degree)
13175	HP_Pb-25	25. Harmonic (active power), b-N	° (degree)
13177	HP_Pb-26	26. Harmonic (active power), b-N	° (degree)
13179	HP_Pb-27	27. Harmonic (active power), b-N	° (degree)
13181	HP_Pb-28	28. Harmonic (active power), b-N	° (degree)
13183	HP_Pb-29	29. Harmonic (active power), b-N	° (degree)
13185	HP_Pb-30	30. Harmonic (active power), b-N	° (degree)
13187	HP_Pb-31	31. Harmonic (active power), b-N	° (degree)
13189	HP_Pb-32	32. Harmonic (active power), b-N	° (degree)
13191	HP_Pb-33	33. Harmonic (active power), b-N	° (degree)
13193	HP_Pb-34	34. Harmonic (active power), b-N	° (degree)
13195	HP_Pb-35	35. Harmonic (active power), b-N	° (degree)
13197	HP_Pb-36	36. Harmonic (active power), b-N	° (degree)

Table 2-61 Registers 13001 to 13377: Harmonic, Power - Active Power Value (cont.)

Register	Type of Information	Remark	Unit
13199	HP_Pb-37	37. Harmonic (active power), b-N	° (degree)
13201	HP_Pb-38	38. Harmonic (active power), b-N	° (degree)
13203	HP_Pb-39	39. Harmonic (active power), b-N	° (degree)
13205	HP_Pb-40	40. Harmonic (active power), b-N	° (degree)
13207	HP_Pb-41	41. Harmonic (active power), b-N	° (degree)
13209	HP_Pb-42	42. Harmonic (active power), b-N	° (degree)
13211	HP_Pb-43	43. Harmonic (active power), b-N	° (degree)
13213	HP_Pb-44	44. Harmonic (active power), b-N	° (degree)
13215	HP_Pb-45	45. Harmonic (active power), b-N	° (degree)
13217	HP_Pb-46	46. Harmonic (active power), b-N	° (degree)
13219	HP_Pb-47	47. Harmonic (active power), b-N	° (degree)
13221	HP_Pb-48	48. Harmonic (active power), b-N	° (degree)
13223	HP_Pb-49	49. Harmonic (active power), b-N	° (degree)
13225	HP_Pb-50	50. Harmonic (active power), b-N	° (degree)
13227	HP_Pb-51	51. Harmonic (active power), b-N	° (degree)
13229	HP_Pb-52	52. Harmonic (active power), b-N	° (degree)
13231	HP_Pb-53	53. Harmonic (active power), b-N	° (degree)
13233	HP_Pb-54	54. Harmonic (active power), b-N	° (degree)
13235	HP_Pb-55	55. Harmonic (active power), b-N	° (degree)
13237	HP_Pb-56	56. Harmonic (active power), b-N	° (degree)
13239	HP_Pb-57	57. Harmonic (active power), b-N	° (degree)
13241	HP_Pb-58	58. Harmonic (active power), b-N	° (degree)
13243	HP_Pb-59	59. Harmonic (active power), b-N	° (degree)
13245	HP_Pb-60	60. Harmonic (active power), b-N	° (degree)
13247	HP_Pb-61	61. Harmonic (active power), b-N	° (degree)
13249	HP_Pb-62	62. Harmonic (active power), b-N	° (degree)

Table 2-61 Registers 13001 to 13377: Harmonic, Power - Active Power Value (cont.)

Register	Type of Information	Remark	Unit
13251	HP_Pb-63	63. Harmonic (active power), b-N	° (degree)
13253	HP_Pc-1	1. Harmonic (active power), c-N (Fundamental)	° (degree)
13255	HP_Pc-2	2. Harmonic (active power), c-N	° (degree)
13257	HP_Pc-3	3. Harmonic (active power), c-N	° (degree)
13259	HP_Pc-4	4. Harmonic (active power), c-N	° (degree)
13261	HP_Pc-5	5. Harmonic (active power), c-N	° (degree)
13263	HP_Pc-6	6. Harmonic (active power), c-N	° (degree)
13265	HP_Pc-7	7. Harmonic (active power), c-N	° (degree)
13267	HP_Pc-8	8. Harmonic (active power), c-N	° (degree)
13269	HP_Pc-9	9. Harmonic (active power), c-N	° (degree)
13271	HP_Pc-10	10. Harmonic (active power), c-N	° (degree)
13273	HP_Pc-11	11. Harmonic (active power), c-N	° (degree)
13275	HP_Pc-12	12. Harmonic (active power), c-N	° (degree)
13277	HP_Pc-13	13. Harmonic (active power), c-N	° (degree)
13279	HP_Pc-14	14. Harmonic (active power), c-N	° (degree)
13281	HP_Pc-15	15. Harmonic (active power), c-N	° (degree)
13283	HP_Pc-16	16. Harmonic (active power), c-N	° (degree)
13285	HP_Pc-17	17. Harmonic (active power), c-N	° (degree)
13287	HP_Pc-18	18. Harmonic (active power), c-N	° (degree)
13289	HP_Pc-19	19. Harmonic (active power), c-N	° (degree)
13291	HP_Pc-20	20. Harmonic (active power), c-N	° (degree)
13293	HP_Pc-21	21. Harmonic (active power), c-N	° (degree)
13295	HP_Pc-22	22. Harmonic (active power), c-N	° (degree)
13297	HP_Pc-23	23. Harmonic (active power), c-N	° (degree)
13299	HP_Pc-24	24. Harmonic (active power), c-N	° (degree)
13301	HP_Pc-25	25. Harmonic (active power), c-N	° (degree)

Table 2-61 Registers 13001 to 13377: Harmonic, Power - Active Power Value (cont.)

Register	Type of Information	Remark	Unit
13303	HP_Pc-26	26. Harmonic (active power), c-N	° (degree)
13305	HP_Pc-27	27. Harmonic (active power), c-N	° (degree)
13307	HP_Pc-28	28. Harmonic (active power), c-N	° (degree)
13309	HP_Pc-29	29. Harmonic (active power), c-N	° (degree)
13311	HP_Pc-30	30. Harmonic (active power), c-N	° (degree)
13313	HP_Pc-31	31. Harmonic (active power), c-N	° (degree)
13315	HP_Pc-32	32. Harmonic (active power), c-N	° (degree)
13317	HP_Pc-33	33. Harmonic (active power), c-N	° (degree)
13319	HP_Pc-34	34. Harmonic (active power), c-N	° (degree)
13321	HP_Pc-35	35. Harmonic (active power), c-N	° (degree)
13323	HP_Pc-36	36. Harmonic (active power), c-N	° (degree)
13325	HP_Pc-37	37. Harmonic (active power), c-N	° (degree)
13327	HP_Pc-38	38. Harmonic (active power), c-N	° (degree)
13329	HP_Pc-39	39. Harmonic (active power), c-N	° (degree)
13331	HP_Pc-40	40. Harmonic (active power), c-N	° (degree)
13333	HP_Pc-41	41. Harmonic (active power), c-N	° (degree)
13335	HP_Pc-42	42. Harmonic (active power), c-N	° (degree)
13337	HP_Pc-43	43. Harmonic (active power), c-N	° (degree)
13339	HP_Pc-44	44. Harmonic (active power), c-N	° (degree)
13341	HP_Pc-45	45. Harmonic (active power), c-N	° (degree)
13343	HP_Pc-46	46. Harmonic (active power), c-N	° (degree)
13345	HP_Pc-47	47. Harmonic (active power), c-N	° (degree)
13347	HP_Pc-48	48. Harmonic (active power), c-N	° (degree)
13349	HP_Pc-49	49. Harmonic (active power), c-N	° (degree)
13351	HP_Pc-50	50. Harmonic (active power), c-N	° (degree)
13353	HP_Pc-51	51. Harmonic (active power), c-N	° (degree)

Table 2-61 Registers 13001 to 13377: Harmonic, Power - Active Power Value (cont.)

Register	Type of Information	Remark	Unit
13355	HP_Pc-52	52. Harmonic (active power), c-N	° (degree)
13357	HP_Pc-53	53. Harmonic (active power), c-N	° (degree)
13359	HP_Pc-54	54. Harmonic (active power), c-N	° (degree)
13361	HP_Pc-55	55. Harmonic (active power), c-N	° (degree)
13363	HP_Pc-56	56. Harmonic (active power), c-N	° (degree)
13365	HP_Pc-57	57. Harmonic (active power), c-N	° (degree)
13367	HP_Pc-58	58. Harmonic (active power), c-N	° (degree)
13369	HP_Pc-59	59. Harmonic (active power), c-N	° (degree)
13371	HP_Pc-60	60. Harmonic (active power), c-N	° (degree)
13373	HP_Pc-61	61. Harmonic (active power), c-N	° (degree)
13375	HP_Pc-62	62. Harmonic (active power), c-N	° (degree)
13377	HP_Pc-63	63. Harmonic (active power), c-N	° (degree)

2.2.7.52 Registers 14001 to 14377: Harmonic, Power - Reactive Power Value (read only)

These registers are write-protected. A write attempt will be rejected with exception code 02 (ILLEGAL_DATA_ADDRESS).

Calculation period: 10/12 cycle (50 Hz/60 Hz)

Network types: Only 1P2W, 3P4W_bal, 3P4W_unb_PN is available.

Data type: Measured value

Table 2-62 Registers 14001 to 14377: Harmonic, Power - Reactive Power Value

Register	Type of Information	Remark	Unit
14001	HP_Qa-1	1. Harmonic (reactive power), a-N (Fundamental)	° (degree)
14003	HP_Qa-2	2. Harmonic (reactive power), a-N	° (degree)
14005	HP_Qa-3	3. Harmonic (reactive power), a-N	° (degree)
14007	HP_Qa-4	4. Harmonic (reactive power), a-N	° (degree)
14009	HP_Qa-5	5. Harmonic (reactive power), a-N	° (degree)
14011	HP_Qa-6	6. Harmonic (reactive power), a-N	° (degree)
14013	HP_Qa-7	7. Harmonic (reactive power), a-N	° (degree)
14015	HP_Qa-8	8. Harmonic (reactive power), a-N	° (degree)
14017	HP_Qa-9	9. Harmonic (reactive power), a-N	° (degree)
14019	HP_Qa-10	10. Harmonic (reactive power), a-N	° (degree)
14021	HP_Qa-11	11. Harmonic (reactive power), a-N	° (degree)
14023	HP_Qa-12	12. Harmonic (reactive power), a-N	° (degree)
14025	HP_Qa-13	13. Harmonic (reactive power), a-N	° (degree)
14027	HP_Qa-14	14. Harmonic (reactive power), a-N	° (degree)
14029	HP_Qa-15	15. Harmonic (reactive power), a-N	° (degree)
14031	HP_Qa-16	16. Harmonic (reactive power), a-N	° (degree)
14033	HP_Qa-17	17. Harmonic (reactive power), a-N	° (degree)
14035	HP_Qa-18	18. Harmonic (reactive power), a-N	° (degree)
14037	HP_Qa-19	19. Harmonic (reactive power), a-N	° (degree)
14039	HP_Qa-20	20. Harmonic (reactive power), a-N	° (degree)

Table 2-62 Registers 14001 to 14377: Harmonic, Power - Reactive Power Value (cont.)

Register	Type of Information	Remark	Unit
14041	HP_Qa-21	21. Harmonic (reactive power), a-N	° (degree)
14043	HP_Qa-22	22. Harmonic (reactive power), a-N	° (degree)
14045	HP_Qa-23	23. Harmonic (reactive power), a-N	° (degree)
14047	HP_Qa-24	24. Harmonic (reactive power), a-N	° (degree)
14049	HP_Qa-25	25. Harmonic (reactive power), a-N	° (degree)
14051	HP_Qa-26	26. Harmonic (reactive power), a-N	° (degree)
14053	HP_Qa-27	27. Harmonic (reactive power), a-N	° (degree)
14055	HP_Qa-28	28. Harmonic (reactive power), a-N	° (degree)
14057	HP_Qa-29	29. Harmonic (reactive power), a-N	° (degree)
14059	HP_Qa-30	30. Harmonic (reactive power), a-N	° (degree)
14061	HP_Qa-31	31. Harmonic (reactive power), a-N	° (degree)
14063	HP_Qa-32	32. Harmonic (reactive power), a-N	° (degree)
14065	HP_Qa-33	33. Harmonic (reactive power), a-N	° (degree)
14067	HP_Qa-34	34. Harmonic (reactive power), a-N	° (degree)
14069	HP_Qa-35	35. Harmonic (reactive power), a-N	° (degree)
14071	HP_Qa-36	36. Harmonic (reactive power), a-N	° (degree)
14073	HP_Qa-37	37. Harmonic (reactive power), a-N	° (degree)
14075	HP_Qa-38	38. Harmonic (reactive power), a-N	° (degree)
14077	HP_Qa-39	39. Harmonic (reactive power), a-N	° (degree)
14079	HP_Qa-40	40. Harmonic (reactive power), a-N	° (degree)
14081	HP_Qa-41	41. Harmonic (reactive power), a-N	° (degree)
14083	HP_Qa-42	42. Harmonic (reactive power), a-N	° (degree)
14085	HP_Qa-43	43. Harmonic (reactive power), a-N	° (degree)
14087	HP_Qa-44	44. Harmonic (reactive power), a-N	° (degree)
14089	HP_Qa-45	45. Harmonic (reactive power), a-N	° (degree)
14091	HP_Qa-46	46. Harmonic (reactive power), a-N	° (degree)

Table 2-62 Registers 14001 to 14377: Harmonic, Power - Reactive Power Value (cont.)

Register	Type of Information	Remark	Unit
14093	HP_Qa-47	47. Harmonic (reactive power), a-N	° (degree)
14095	HP_Qa-48	48. Harmonic (reactive power), a-N	° (degree)
14097	HP_Qa-49	49. Harmonic (reactive power), a-N	° (degree)
14099	HP_Qa-50	50. Harmonic (reactive power), a-N	° (degree)
14101	HP_Qa-51	51. Harmonic (reactive power), a-N	° (degree)
14103	HP_Qa-52	52. Harmonic (reactive power), a-N	° (degree)
14105	HP_Qa-53	53. Harmonic (reactive power), a-N	° (degree)
14107	HP_Qa-54	54. Harmonic (reactive power), a-N	° (degree)
14109	HP_Qa-55	55. Harmonic (reactive power), a-N	° (degree)
14111	HP_Qa-56	56. Harmonic (reactive power), a-N	° (degree)
14113	HP_Qa-57	57. Harmonic (reactive power), a-N	° (degree)
14115	HP_Qa-58	58. Harmonic (reactive power), a-N	° (degree)
14117	HP_Qa-59	59. Harmonic (reactive power), a-N	° (degree)
14119	HP_Qa-60	60. Harmonic (reactive power), a-N	° (degree)
14121	HP_Qa-61	61. Harmonic (reactive power), a-N	° (degree)
14123	HP_Qa-62	62. Harmonic (reactive power), a-N	° (degree)
14125	HP_Qa-63	63. Harmonic (reactive power), a-N	° (degree)
14127	HP_Qb-1	1. Harmonic (reactive power), b-N (Fundamental)	° (degree)
14129	HP_Qb-2	2. Harmonic (reactive power), b-N	° (degree)
14131	HP_Qb-3	3. Harmonic (reactive power), b-N	° (degree)
14133	HP_Qb-4	4. Harmonic (reactive power), b-N	° (degree)
14135	HP_Qb-5	5. Harmonic (reactive power), b-N	° (degree)
14137	HP_Qb-6	6. Harmonic (reactive power), b-N	° (degree)
14139	HP_Qb-7	7. Harmonic (reactive power), b-N	° (degree)
14141	HP_Qb-8	8. Harmonic (reactive power), b-N	° (degree)

Table 2-62 Registers 14001 to 14377: Harmonic, Power - Reactive Power Value (cont.)

Register	Type of Information	Remark	Unit
14143	HP_Qb-9	9. Harmonic (reactive power), b-N	° (degree)
14145	HP_Qb-10	10. Harmonic (reactive power), b-N	° (degree)
14147	HP_Qb-11	11. Harmonic (reactive power), b-N	° (degree)
14149	HP_Qb-12	12. Harmonic (reactive power), b-N	° (degree)
14151	HP_Qb-13	13. Harmonic (reactive power), b-N	° (degree)
14153	HP_Qb-14	14. Harmonic (reactive power), b-N	° (degree)
14155	HP_Qb-15	15. Harmonic (reactive power), b-N	° (degree)
14157	HP_Qb-16	16. Harmonic (reactive power), b-N	° (degree)
14159	HP_Qb-17	17. Harmonic (reactive power), b-N	° (degree)
14161	HP_Qb-18	18. Harmonic (reactive power), b-N	° (degree)
14163	HP_Qb-19	19. Harmonic (reactive power), b-N	° (degree)
14165	HP_Qb-20	20. Harmonic (reactive power), b-N	° (degree)
14167	HP_Qb-21	21. Harmonic (reactive power), b-N	° (degree)
14169	HP_Qb-22	22. Harmonic (reactive power), b-N	° (degree)
14171	HP_Qb-23	23. Harmonic (reactive power), b-N	° (degree)
14173	HP_Qb-24	24. Harmonic (reactive power), b-N	° (degree)
14175	HP_Qb-25	25. Harmonic (reactive power), b-N	° (degree)
14177	HP_Qb-26	26. Harmonic (reactive power), b-N	° (degree)
14179	HP_Qb-27	27. Harmonic (reactive power), b-N	° (degree)
14181	HP_Qb-28	28. Harmonic (reactive power), b-N	° (degree)
14183	HP_Qb-29	29. Harmonic (reactive power), b-N	° (degree)
14185	HP_Qb-30	30. Harmonic (reactive power), b-N	° (degree)
14187	HP_Qb-31	31. Harmonic (reactive power), b-N	° (degree)
14189	HP_Qb-32	32. Harmonic (reactive power), b-N	° (degree)
14191	HP_Qb-33	33. Harmonic (reactive power), b-N	° (degree)
14193	HP_Qb-34	34. Harmonic (reactive power), b-N	° (degree)

Table 2-62 Registers 14001 to 14377: Harmonic, Power - Reactive Power Value (cont.)

Register	Type of Information	Remark	Unit
14195	HP_Qb-35	35. Harmonic (reactive power), b-N	° (degree)
14197	HP_Qb-36	36. Harmonic (reactive power), b-N	° (degree)
14199	HP_Qb-37	37. Harmonic (reactive power), b-N	° (degree)
14201	HP_Qb-38	38. Harmonic (reactive power), b-N	° (degree)
14203	HP_Qb-39	39. Harmonic (reactive power), b-N	° (degree)
14205	HP_Qb-40	40. Harmonic (reactive power), b-N	° (degree)
14207	HP_Qb-41	41. Harmonic (reactive power), b-N	° (degree)
14209	HP_Qb-42	42. Harmonic (reactive power), b-N	° (degree)
14211	HP_Qb-43	43. Harmonic (reactive power), b-N	° (degree)
14213	HP_Qb-44	44. Harmonic (reactive power), b-N	° (degree)
14215	HP_Qb-45	45. Harmonic (reactive power), b-N	° (degree)
14217	HP_Qb-46	46. Harmonic (reactive power), b-N	° (degree)
14219	HP_Qb-47	47. Harmonic (reactive power), b-N	° (degree)
14221	HP_Qb-48	48. Harmonic (reactive power), b-N	° (degree)
14223	HP_Qb-49	49. Harmonic (reactive power), b-N	° (degree)
14225	HP_Qb-50	50. Harmonic (reactive power), b-N	° (degree)
14227	HP_Qb-51	51. Harmonic (reactive power), b-N	° (degree)
14229	HP_Qb-52	52. Harmonic (reactive power), b-N	° (degree)
14231	HP_Qb-53	53. Harmonic (reactive power), b-N	° (degree)
14233	HP_Qb-54	54. Harmonic (reactive power), b-N	° (degree)
14235	HP_Qb-55	55. Harmonic (reactive power), b-N	° (degree)
14237	HP_Qb-56	56. Harmonic (reactive power), b-N	° (degree)
14239	HP_Qb-57	57. Harmonic (reactive power), b-N	° (degree)
14241	HP_Qb-58	58. Harmonic (reactive power), b-N	° (degree)
14243	HP_Qb-59	59. Harmonic (reactive power), b-N	° (degree)
14245	HP_Qb-60	60. Harmonic (reactive power), b-N	° (degree)

Table 2-62 Registers 14001 to 14377: Harmonic, Power - Reactive Power Value (cont.)

Register	Type of Information	Remark	Unit
14247	HP_Qb-61	61. Harmonic (reactive power), b-N	° (degree)
14249	HP_Qb-62	62. Harmonic (reactive power), b-N	° (degree)
14251	HP_Qb-63	63. Harmonic (reactive power), b-N	° (degree)
14253	HP_Qc-1	1. Harmonic (reactive power), c-N (Fundamental)	° (degree)
14255	HP_Qc-2	2. Harmonic (reactive power), c-N	° (degree)
14257	HP_Qc-3	3. Harmonic (reactive power), c-N	° (degree)
14259	HP_Qc-4	4. Harmonic (reactive power), c-N	° (degree)
14261	HP_Qc-5	5. Harmonic (reactive power), c-N	° (degree)
14263	HP_Qc-6	6. Harmonic (reactive power), c-N	° (degree)
14265	HP_Qc-7	7. Harmonic (reactive power), c-N	° (degree)
14267	HP_Qc-8	8. Harmonic (reactive power), c-N	° (degree)
14269	HP_Qc-9	9. Harmonic (reactive power), c-N	° (degree)
14271	HP_Qc-10	10. Harmonic (reactive power), c-N	° (degree)
14273	HP_Qc-11	11. Harmonic (reactive power), c-N	° (degree)
14275	HP_Qc-12	12. Harmonic (reactive power), c-N	° (degree)
14277	HP_Qc-13	13. Harmonic (reactive power), c-N	° (degree)
14279	HP_Qc-14	14. Harmonic (reactive power), c-N	° (degree)
14281	HP_Qc-15	15. Harmonic (reactive power), c-N	° (degree)
14283	HP_Qc-16	16. Harmonic (reactive power), c-N	° (degree)
14285	HP_Qc-17	17. Harmonic (reactive power), c-N	° (degree)
14287	HP_Qc-18	18. Harmonic (reactive power), c-N	° (degree)
14289	HP_Qc-19	19. Harmonic (reactive power), c-N	° (degree)
14291	HP_Qc-20	20. Harmonic (reactive power), c-N	° (degree)
14293	HP_Qc-21	21. Harmonic (reactive power), c-N	° (degree)
14295	HP_Qc-22	22. Harmonic (reactive power), c-N	° (degree)

Table 2-62 Registers 14001 to 14377: Harmonic, Power - Reactive Power Value (cont.)

Register	Type of Information	Remark	Unit
14297	HP_Qc-23	23. Harmonic (reactive power), c-N	° (degree)
14299	HP_Qc-24	24. Harmonic (reactive power), c-N	° (degree)
14301	HP_Qc-25	25. Harmonic (reactive power), c-N	° (degree)
14303	HP_Qc-26	26. Harmonic (reactive power), c-N	° (degree)
14305	HP_Qc-27	27. Harmonic (reactive power), c-N	° (degree)
14307	HP_Qc-28	28. Harmonic (reactive power), c-N	° (degree)
14309	HP_Qc-29	29. Harmonic (reactive power), c-N	° (degree)
14311	HP_Qc-30	30. Harmonic (reactive power), c-N	° (degree)
14313	HP_Qc-31	31. Harmonic (reactive power), c-N	° (degree)
14315	HP_Qc-32	32. Harmonic (reactive power), c-N	° (degree)
14317	HP_Qc-33	33. Harmonic (reactive power), c-N	° (degree)
14319	HP_Qc-34	34. Harmonic (reactive power), c-N	° (degree)
14321	HP_Qc-35	35. Harmonic (reactive power), c-N	° (degree)
14323	HP_Qc-36	36. Harmonic (reactive power), c-N	° (degree)
14325	HP_Qc-37	37. Harmonic (reactive power), c-N	° (degree)
14327	HP_Qc-38	38. Harmonic (reactive power), c-N	° (degree)
14329	HP_Qc-39	39. Harmonic (reactive power), c-N	° (degree)
14331	HP_Qc-40	40. Harmonic (reactive power), c-N	° (degree)
14333	HP_Qc-41	41. Harmonic (reactive power), c-N	° (degree)
14335	HP_Qc-42	42. Harmonic (reactive power), c-N	° (degree)
14337	HP_Qc-43	43. Harmonic (reactive power), c-N	° (degree)
14339	HP_Qc-44	44. Harmonic (reactive power), c-N	° (degree)
14341	HP_Qc-45	45. Harmonic (reactive power), c-N	° (degree)
14343	HP_Qc-46	46. Harmonic (reactive power), c-N	° (degree)
14345	HP_Qc-47	47. Harmonic (reactive power), c-N	° (degree)
14347	HP_Qc-48	48. Harmonic (reactive power), c-N	° (degree)

Table 2-62 Registers 14001 to 14377: Harmonic, Power - Reactive Power Value (cont.)

Register	Type of Information	Remark	Unit
14349	HP_Qc-49	49. Harmonic (reactive power), c-N	° (degree)
14351	HP_Qc-50	50. Harmonic (reactive power), c-N	° (degree)
14353	HP_Qc-51	51. Harmonic (reactive power), c-N	° (degree)
14355	HP_Qc-52	52. Harmonic (reactive power), c-N	° (degree)
14357	HP_Qc-53	53. Harmonic (reactive power), c-N	° (degree)
14359	HP_Qc-54	54. Harmonic (reactive power), c-N	° (degree)
14361	HP_Qc-55	55. Harmonic (reactive power), c-N	° (degree)
14363	HP_Qc-56	56. Harmonic (reactive power), c-N	° (degree)
14365	HP_Qc-57	57. Harmonic (reactive power), c-N	° (degree)
14367	HP_Qc-58	58. Harmonic (reactive power), c-N	° (degree)
14369	HP_Qc-59	59. Harmonic (reactive power), c-N	° (degree)
14371	HP_Qc-60	60. Harmonic (reactive power), c-N	° (degree)
14373	HP_Qc-61	61. Harmonic (reactive power), c-N	° (degree)
14375	HP_Qc-62	62. Harmonic (reactive power), c-N	° (degree)
14377	HP_Qc-63	63. Harmonic (reactive power), c-N	° (degree)

2.2.7.53 Registers 15001 to 15377: Harmonic Power - Apparent Power Value (read only)

These registers are write-protected. A write attempt will be rejected with exception code 02 (ILLEGAL_DATA_ADDRESS).

Calculation period: 10/12 cycle (50 Hz/60 Hz)

Network types: Only 1P2W, 3P4W_bal, 3P4W_unb_PN is available.

Data type: Measured value

Table 2-63 Registers 15001 to 15377: Harmonic Power - Apparent Power Value

Register	Type of Information	Remark	Unit
15001	HP_Sa-1	1. Harmonic (apparent power) , a-N (Fundamental)	° (degree)
15003	HP_Sa-2	2. Harmonic (apparent power) , a-N	° (degree)
15005	HP_Sa-3	3. Harmonic (apparent power) , a-N	° (degree)
15007	HP_Sa-4	4. Harmonic (apparent power) , a-N	° (degree)
15009	HP_Sa-5	5. Harmonic (apparent power) , a-N	° (degree)
15011	HP_Sa-6	6. Harmonic (apparent power) , a-N	° (degree)
15013	HP_Sa-7	7. Harmonic (apparent power) , a-N	° (degree)
15015	HP_Sa-8	8. Harmonic (apparent power) , a-N	° (degree)
15017	HP_Sa-9	9. Harmonic (apparent power) , a-N	° (degree)
15019	HP_Sa-10	10. Harmonic (apparent power) , a-N	° (degree)
15021	HP_Sa-11	11. Harmonic (apparent power) , a-N	° (degree)
15023	HP_Sa-12	12. Harmonic (apparent power) , a-N	° (degree)
15025	HP_Sa-13	13. Harmonic (apparent power) , a-N	° (degree)
15027	HP_Sa-14	14. Harmonic (apparent power) , a-N	° (degree)
15029	HP_Sa-15	15. Harmonic (apparent power) , a-N	° (degree)
15031	HP_Sa-16	16. Harmonic (apparent power) , a-N	° (degree)
15033	HP_Sa-17	17. Harmonic (apparent power) , a-N	° (degree)
15035	HP_Sa-18	18. Harmonic (apparent power) , a-N	° (degree)
15037	HP_Sa-19	19. Harmonic (apparent power) , a-N	° (degree)
15039	HP_Sa-20	20. Harmonic (apparent power) , a-N	° (degree)

Table 2-63 Registers 15001 to 15377: Harmonic Power - Apparent Power Value (cont.)

Register	Type of Information	Remark	Unit
15041	HP_Sa-21	21. Harmonic (apparent power) , a-N	° (degree)
15043	HP_Sa-22	22. Harmonic (apparent power) , a-N	° (degree)
15045	HP_Sa-23	23. Harmonic (apparent power) , a-N	° (degree)
15047	HP_Sa-24	24. Harmonic (apparent power) , a-N	° (degree)
15049	HP_Sa-25	25. Harmonic (apparent power) , a-N	° (degree)
15051	HP_Sa-26	26. Harmonic (apparent power) , a-N	° (degree)
15053	HP_Sa-27	27. Harmonic (apparent power) , a-N	° (degree)
15055	HP_Sa-28	28. Harmonic (apparent power) , a-N	° (degree)
15057	HP_Sa-29	29. Harmonic (apparent power) , a-N	° (degree)
15059	HP_Sa-30	30. Harmonic (apparent power) , a-N	° (degree)
15061	HP_Sa-31	31. Harmonic (apparent power) , a-N	° (degree)
15063	HP_Sa-32	32. Harmonic (apparent power) , a-N	° (degree)
15065	HP_Sa-33	33. Harmonic (apparent power) , a-N	° (degree)
15067	HP_Sa-34	34. Harmonic (apparent power) , a-N	° (degree)
15069	HP_Sa-35	35. Harmonic (apparent power) , a-N	° (degree)
15071	HP_Sa-36	36. Harmonic (apparent power) , a-N	° (degree)
15073	HP_Sa-37	37. Harmonic (apparent power) , a-N	° (degree)
15075	HP_Sa-38	38. Harmonic (apparent power) , a-N	° (degree)
15077	HP_Sa-39	39. Harmonic (apparent power) , a-N	° (degree)
15079	HP_Sa-40	40. Harmonic (apparent power) , a-N	° (degree)
15081	HP_Sa-41	41. Harmonic (apparent power) , a-N	° (degree)
15083	HP_Sa-42	42. Harmonic (apparent power) , a-N	° (degree)
15085	HP_Sa-43	43. Harmonic (apparent power) , a-N	° (degree)
15087	HP_Sa-44	44. Harmonic (apparent power) , a-N	° (degree)
15089	HP_Sa-45	45. Harmonic (apparent power) , a-N	° (degree)
15091	HP_Sa-46	46. Harmonic (apparent power) , a-N	° (degree)

Table 2-63 Registers 15001 to 15377: Harmonic Power - Apparent Power Value (cont.)

Register	Type of Information	Remark	Unit
15093	HP_Sa-47	47. Harmonic (apparent power) , a-N	° (degree)
15095	HP_Sa-48	48. Harmonic (apparent power) , a-N	° (degree)
15097	HP_Sa-49	49. Harmonic (apparent power) , a-N	° (degree)
15099	HP_Sa-50	50. Harmonic (apparent power) , a-N	° (degree)
15101	HP_Sa-51	51. Harmonic (apparent power) , a-N	° (degree)
15103	HP_Sa-52	52. Harmonic (apparent power) , a-N	° (degree)
15105	HP_Sa-53	53. Harmonic (apparent power) , a-N	° (degree)
15107	HP_Sa-54	54. Harmonic (apparent power) , a-N	° (degree)
15109	HP_Sa-55	55. Harmonic (apparent power) , a-N	° (degree)
15111	HP_Sa-56	56. Harmonic (apparent power) , a-N	° (degree)
15113	HP_Sa-57	57. Harmonic (apparent power) , a-N	° (degree)
15115	HP_Sa-58	58. Harmonic (apparent power) , a-N	° (degree)
15117	HP_Sa-59	59. Harmonic (apparent power) , a-N	° (degree)
15119	HP_Sa-60	60. Harmonic (apparent power) , a-N	° (degree)
15121	HP_Sa-61	61. Harmonic (apparent power) , a-N	° (degree)
15123	HP_Sa-62	62. Harmonic (apparent power) , a-N	° (degree)
15125	HP_Sa-63	63. Harmonic (apparent power) , a-N	° (degree)
15127	HP_Sb-1	1. Harmonic (apparent power) , b-N (Fundamental)	° (degree)
15129	HP_Sb-2	2. Harmonic (apparent power) , b-N	° (degree)
15131	HP_Sb-3	3. Harmonic (apparent power) , b-N	° (degree)
15133	HP_Sb-4	4. Harmonic (apparent power) , b-N	° (degree)
15135	HP_Sb-5	5. Harmonic (apparent power) , b-N	° (degree)
15137	HP_Sb-6	6. Harmonic (apparent power) , b-N	° (degree)
15139	HP_Sb-7	7. Harmonic (apparent power) , b-N	° (degree)
15141	HP_Sb-8	8. Harmonic (apparent power) , b-N	° (degree)

Table 2-63 Registers 15001 to 15377: Harmonic Power - Apparent Power Value (cont.)

Register	Type of Information	Remark	Unit
15143	HP_Sb-9	9. Harmonic (apparent power) , b-N	° (degree)
15145	HP_Sb-10	10. Harmonic (apparent power) , b-N	° (degree)
15147	HP_Sb-11	11. Harmonic (apparent power) , b-N	° (degree)
15149	HP_Sb-12	12. Harmonic (apparent power) , b-N	° (degree)
15151	HP_Sb-13	13. Harmonic (apparent power) , b-N	° (degree)
15153	HP_Sb-14	14. Harmonic (apparent power) , b-N	° (degree)
15155	HP_Sb-15	15. Harmonic (apparent power) , b-N	° (degree)
15157	HP_Sb-16	16. Harmonic (apparent power) , b-N	° (degree)
15159	HP_Sb-17	17. Harmonic (apparent power) , b-N	° (degree)
15161	HP_Sb-18	18. Harmonic (apparent power) , b-N	° (degree)
15163	HP_Sb-19	19. Harmonic (apparent power) , b-N	° (degree)
15165	HP_Sb-20	20. Harmonic (apparent power) , b-N	° (degree)
15167	HP_Sb-21	21. Harmonic (apparent power) , b-N	° (degree)
15169	HP_Sb-22	22. Harmonic (apparent power) , b-N	° (degree)
15171	HP_Sb-23	23. Harmonic (apparent power) , b-N	° (degree)
15173	HP_Sb-24	24. Harmonic (apparent power) , b-N	° (degree)
15175	HP_Sb-25	25. Harmonic (apparent power) , b-N	° (degree)
15177	HP_Sb-26	26. Harmonic (apparent power) , b-N	° (degree)
15179	HP_Sb-27	27. Harmonic (apparent power) , b-N	° (degree)
15181	HP_Sb-28	28. Harmonic (apparent power) , b-N	° (degree)
15183	HP_Sb-29	29. Harmonic (apparent power) , b-N	° (degree)
15185	HP_Sb-30	30. Harmonic (apparent power) , b-N	° (degree)
15187	HP_Sb-31	31. Harmonic (apparent power) , b-N	° (degree)
15189	HP_Sb-32	32. Harmonic (apparent power) , b-N	° (degree)
15191	HP_Sb-33	33. Harmonic (apparent power) , b-N	° (degree)
15193	HP_Sb-34	34. Harmonic (apparent power) , b-N	° (degree)

Table 2-63 Registers 15001 to 15377: Harmonic Power - Apparent Power Value (cont.)

Register	Type of Information	Remark	Unit
15195	HP_Sb-35	35. Harmonic (apparent power) , b-N	° (degree)
15197	HP_Sb-36	36. Harmonic (apparent power) , b-N	° (degree)
15199	HP_Sb-37	37. Harmonic (apparent power) , b-N	° (degree)
15201	HP_Sb-38	38. Harmonic (apparent power) , b-N	° (degree)
15203	HP_Sb-39	39. Harmonic (apparent power) , b-N	° (degree)
15205	HP_Sb-40	40. Harmonic (apparent power) , b-N	° (degree)
15207	HP_Sb-41	41. Harmonic (apparent power) , b-N	° (degree)
15209	HP_Sb-42	42. Harmonic (apparent power) , b-N	° (degree)
15211	HP_Sb-43	43. Harmonic (apparent power) , b-N	° (degree)
15213	HP_Sb-44	44. Harmonic (apparent power) , b-N	° (degree)
15215	HP_Sb-45	45. Harmonic (apparent power) , b-N	° (degree)
15217	HP_Sb-46	46. Harmonic (apparent power) , b-N	° (degree)
15219	HP_Sb-47	47. Harmonic (apparent power) , b-N	° (degree)
15221	HP_Sb-48	48. Harmonic (apparent power) , b-N	° (degree)
15223	HP_Sb-49	49. Harmonic (apparent power) , b-N	° (degree)
15225	HP_Sb-50	50. Harmonic (apparent power) , b-N	° (degree)
15227	HP_Sb-51	51. Harmonic (apparent power) , b-N	° (degree)
15229	HP_Sb-52	52. Harmonic (apparent power) , b-N	° (degree)
15231	HP_Sb-53	53. Harmonic (apparent power) , b-N	° (degree)
15233	HP_Sb-54	54. Harmonic (apparent power) , b-N	° (degree)
15235	HP_Sb-55	55. Harmonic (apparent power) , b-N	° (degree)
15237	HP_Sb-56	56. Harmonic (apparent power) , b-N	° (degree)
15239	HP_Sb-57	57. Harmonic (apparent power) , b-N	° (degree)
15241	HP_Sb-58	58. Harmonic (apparent power) , b-N	° (degree)
15243	HP_Sb-59	59. Harmonic (apparent power) , b-N	° (degree)
15245	HP_Sb-60	60. Harmonic (apparent power) , b-N	° (degree)

Table 2-63 Registers 15001 to 15377: Harmonic Power - Apparent Power Value (cont.)

Register	Type of Information	Remark	Unit
15247	HP_Sb-61	61. Harmonic (apparent power) , b-N	° (degree)
15249	HP_Sb-62	62. Harmonic (apparent power) , b-N	° (degree)
15251	HP_Sb-63	63. Harmonic (apparent power) , b-N	° (degree)
15253	HP_Sc-1	1. Harmonic (apparent power) , c-N (Fundamental)	° (degree)
15255	HP_Sc-2	2. Harmonic (apparent power) , c-N	° (degree)
15257	HP_Sc-3	3. Harmonic (apparent power) , c-N	° (degree)
15259	HP_Sc-4	4. Harmonic (apparent power) , c-N	° (degree)
15261	HP_Sc-5	5. Harmonic (apparent power) , c-N	° (degree)
15263	HP_Sc-6	6. Harmonic (apparent power) , c-N	° (degree)
15265	HP_Sc-7	7. Harmonic (apparent power) , c-N	° (degree)
15267	HP_Sc-8	8. Harmonic (apparent power) , c-N	° (degree)
15269	HP_Sc-9	9. Harmonic (apparent power) , c-N	° (degree)
15271	HP_Sc-10	10. Harmonic (apparent power) , c-N	° (degree)
15273	HP_Sc-11	11. Harmonic (apparent power) , c-N	° (degree)
15275	HP_Sc-12	12. Harmonic (apparent power) , c-N	° (degree)
15277	HP_Sc-13	13. Harmonic (apparent power) , c-N	° (degree)
15279	HP_Sc-14	14. Harmonic (apparent power) , c-N	° (degree)
15281	HP_Sc-15	15. Harmonic (apparent power) , c-N	° (degree)
15283	HP_Sc-16	16. Harmonic (apparent power) , c-N	° (degree)
15285	HP_Sc-17	17. Harmonic (apparent power) , c-N	° (degree)
15287	HP_Sc-18	18. Harmonic (apparent power) , c-N	° (degree)
15289	HP_Sc-19	19. Harmonic (apparent power) , c-N	° (degree)
15291	HP_Sc-20	20. Harmonic (apparent power) , c-N	° (degree)
15293	HP_Sc-21	21. Harmonic (apparent power) , c-N	° (degree)
15295	HP_Sc-22	22. Harmonic (apparent power) , c-N	° (degree)

Table 2-63 Registers 15001 to 15377: Harmonic Power - Apparent Power Value (cont.)

Register	Type of Information	Remark	Unit
15297	HP_Sc-23	23. Harmonic (apparent power) , c-N	° (degree)
15299	HP_Sc-24	24. Harmonic (apparent power) , c-N	° (degree)
15301	HP_Sc-25	25. Harmonic (apparent power) , c-N	° (degree)
15303	HP_Sc-26	26. Harmonic (apparent power) , c-N	° (degree)
15305	HP_Sc-27	27. Harmonic (apparent power) , c-N	° (degree)
15307	HP_Sc-28	28. Harmonic (apparent power) , c-N	° (degree)
15309	HP_Sc-29	29. Harmonic (apparent power) , c-N	° (degree)
15311	HP_Sc-30	30. Harmonic (apparent power) , c-N	° (degree)
15313	HP_Sc-31	31. Harmonic (apparent power) , c-N	° (degree)
15315	HP_Sc-32	32. Harmonic (apparent power) , c-N	° (degree)
15317	HP_Sc-33	33. Harmonic (apparent power) , c-N	° (degree)
15319	HP_Sc-34	34. Harmonic (apparent power) , c-N	° (degree)
15321	HP_Sc-35	35. Harmonic (apparent power) , c-N	° (degree)
15323	HP_Sc-36	36. Harmonic (apparent power) , c-N	° (degree)
15325	HP_Sc-37	37. Harmonic (apparent power) , c-N	° (degree)
15327	HP_Sc-38	38. Harmonic (apparent power) , c-N	° (degree)
15329	HP_Sc-39	39. Harmonic (apparent power) , c-N	° (degree)
15331	HP_Sc-40	40. Harmonic (apparent power) , c-N	° (degree)
15333	HP_Sc-41	41. Harmonic (apparent power) , c-N	° (degree)
15335	HP_Sc-42	42. Harmonic (apparent power) , c-N	° (degree)
15337	HP_Sc-43	43. Harmonic (apparent power) , c-N	° (degree)
15339	HP_Sc-44	44. Harmonic (apparent power) , c-N	° (degree)
15341	HP_Sc-45	45. Harmonic (apparent power) , c-N	° (degree)
15343	HP_Sc-46	46. Harmonic (apparent power) , c-N	° (degree)
15345	HP_Sc-47	47. Harmonic (apparent power) , c-N	° (degree)
15347	HP_Sc-48	48. Harmonic (apparent power) , c-N	° (degree)

Table 2-63 Registers 15001 to 15377: Harmonic Power - Apparent Power Value (cont.)

Register	Type of Information	Remark	Unit
15349	HP_Sc-49	49. Harmonic (apparent power) , c-N	° (degree)
15351	HP_Sc-50	50. Harmonic (apparent power) , c-N	° (degree)
15353	HP_Sc-51	51. Harmonic (apparent power) , c-N	° (degree)
15355	HP_Sc-52	52. Harmonic (apparent power) , c-N	° (degree)
15357	HP_Sc-53	53. Harmonic (apparent power) , c-N	° (degree)
15359	HP_Sc-54	54. Harmonic (apparent power) , c-N	° (degree)
15361	HP_Sc-55	55. Harmonic (apparent power) , c-N	° (degree)
15363	HP_Sc-56	56. Harmonic (apparent power) , c-N	° (degree)
15365	HP_Sc-57	57. Harmonic (apparent power) , c-N	° (degree)
15367	HP_Sc-58	58. Harmonic (apparent power) , c-N	° (degree)
15369	HP_Sc-59	59. Harmonic (apparent power) , c-N	° (degree)
15371	HP_Sc-60	60. Harmonic (apparent power) , c-N	° (degree)
15373	HP_Sc-61	61. Harmonic (apparent power) , c-N	° (degree)
15375	HP_Sc-62	62. Harmonic (apparent power) , c-N	° (degree)
15377	HP_Sc-63	63. Harmonic (apparent power) , c-N	° (degree)

2.2.8 Modbus Diagnosis

The diagnostics for Modbus TCP and Modbus RTU Slave allows analyzing the parameters and communication as well as resetting the diagnostics counters. For more information, see the SICAM Q100 device manual, chapter 8, Configuration of the Device.

2.2.8.1 Modbus TCP Diagnosis

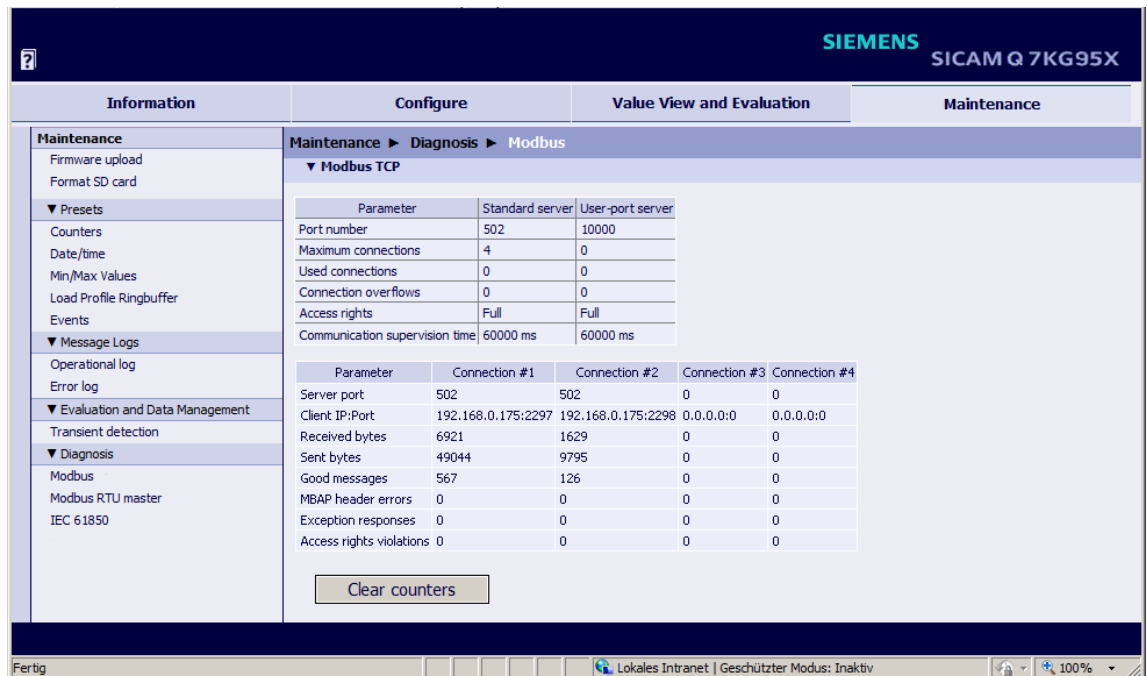


Figure 2-6 Modbus TCP Diagnosis

Parameter for Standard Server and User-port Server

- Port number: Standard port 502 and configured user port
- Maximum connections: For user port number 502: 4 connections via standard port 502
For other user port numbers: 2 connections via standard port 502 and 2 connections via the user port
- Used connections: Number of connections that are actually used
- Connection overflows: Counter of the attempts to establish more connections than allowed;
Number of allowed connection attempts:
For user port number 502: ≥ 5 connection attempts via standard port 502
For other user port numbers: ≥ 3 connection attempts via standard port 502 and/or ≥ 3 connection attempts via user port
- Access rights: Default setting: Full
- Communication supervision time: Default setting: 60 000 ms

Parameter of Connections

- Server port: Server port number of the current connection in the respective column; if **0** is displayed, the connection is inactive or down
- Client IP:Port: Last or current IP address and port number of the client
- Received bytes: Total number of bytes received by the TCP port
- Sent bytes: Total number of bytes sent to the TCP port
- Good messages: Total number of messages received that were detected as valid Modbus messages
- MBAP header errors: Error in the MBAP header: incorrect protocol ID or implausible length of data
- Exception responses: Counters of the transmitted exception response messages
- Access rights violations: Total number of write accesses received if the parameter **Access rights for port xxx** is set to **Read only** of the associated TCP port (for example 502) in the **Communication Ethernet** input/output window. For more information, see the device manual, chapter 8 - Ethernet Communication)

2.2.8.2 Modbus RTU Slave Diagnosis

▼ Modbus RTU					
Parameter		Serial interface		Serial server	
Device address	1	Received bytes	4043	Good messages	444
Baud rate	19200 bit/s	Sent bytes	32064	CRC errors	0
Parity	Even	Framing errors	11	Exception responses	0
Access rights	Full	Parity errors	27	Broadcast messages	0
Communication supervision time	60000 ms			Access rights violations	0

Clear counters

Figure 2-7 Modbus RTU Slave Diagnosis

Parameter

The following parameters are displayed with Modbus RTU Slave:

- Device address: Default setting: 1
- Baud rate: Default setting: 19 200 bit/s
- Parity: Default setting: Even
- Access rights: Default setting: Full
- Communication supervision time: Default setting: 60 000 ms

Serial Interface

- Received bytes: Total number of bytes received by the RS485 interface
- Sent bytes: Total number of bytes sent to the RS485 interface
- Framing errors: Number of detected frame errors (invalid stop bit, for example if the baud rate is wrong)
- Parity errors: Number of detected parity errors (wrong parity)

Serial Server

- Good messages: Total number of messages received that were detected as valid Modbus messages
- CRC errors: Total number of messages received in which CRC errors were detected
- Exception responses: Counters of the transmitted exception response messages
- Broadcast messages: Total number of the broadcast messages received with the server address 0
- Access rights violations: Total number of write accesses received if the parameter **Access rights** is set to **Read only** in the **Communication serial** input/output window (see Device Manual, chapter Operation - Serial Communication)

2.3 Modbus RTU Master

2.3.1 Functions and Properties for Modbus RTU Master

Schematic Overview of the Functioning of the Modbus RTU Master

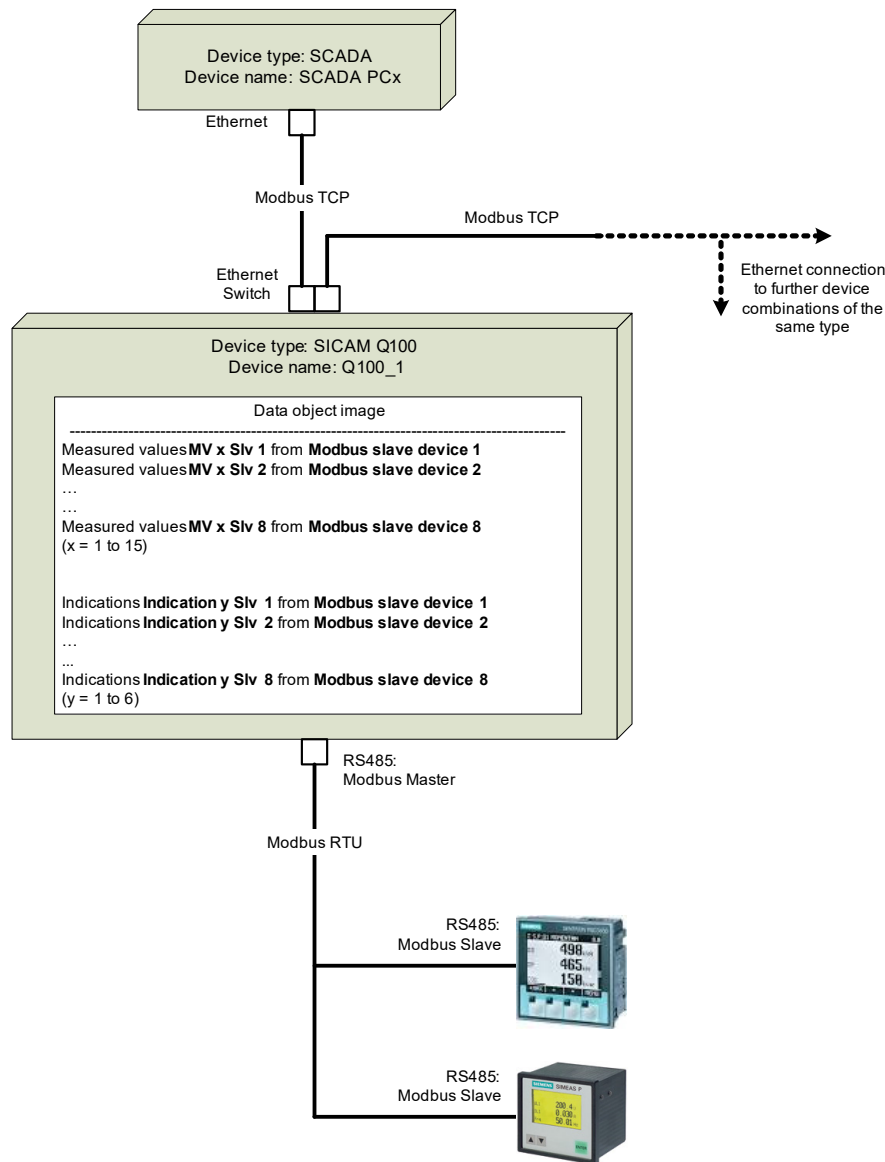


Figure 2-8 Functioning of the Modbus RTU Master

Supported Modbus Register Sets

- Coil status registers (0x references, read only)
- Input status registers (1x references, read only)
- Input registers (3x references, read only)
- Holding registers (4x references, read only)

Supported Modbus Functions

The Modbus RTU Master of SICAM Q100 supports the following Modbus functions:

Table 2-64 Supported Modbus RTU Master Functions

Function Number	Function Name	Description
01 (0x01H)	Read Coil Status	Reading one or several coil status registers of a Modbus slave
02 (0x02H)	Read Discrete Inputs (Read Input Status)	Reading one or several input status registers of a Modbus slave
03 (0x03H)	Read Holding Registers	Reading one or several holding registers of a Modbus slave
04 (0x04H)	Read Input Registers	Reading one or several input registers of a Modbus slave

Support of Modbus Slave Devices

The Modbus RTU master supports 8 Modbus slave devices each with:

- 15 readable measured values per Modbus slave device
- 6 readable indications from each Modbus slave device



NOTE

If more than the specified number of measured values and/or indications have to be read by a Modbus slave device, it is possible to assign the same address to multiple devices when configuring the devices connected to the Modbus master in SICAM Q100. The data of all devices with the same address are then queried by a Modbus slave device.

Properties of the Modbus RTU Master

- Master-Slave protocol
- The individual data bytes in the messages are transmitted asynchronously with 11 bits:
 - 1 start bit,
 - 8 data bits,
 - 1 parity bit and 1 stop bit or
 - No parity bit and 2 stop bits
- Single messages are separated by bus silent intervals of at least 3.5 character times and end with a CRC code for error detection.
- RS485 is used as interface.
- The Modbus RTU message has a maximum size of 256 bytes:
 - 1 byte server address
 - 253 bytes for data
 - 2 bytes for CRC

The following parameters can be set for the Modbus RTU Master bus protocol:

Table 2-65 Modbus RTU Master Settings

Parameter	Default Setting	Setting Range
Baud rate	19 200 bit/s	1200 bit/s, 2400 bit/s 4800 bit/s, 9600 bit/s 19 200 bit/s, 38 400 bit/s 57 600 bit/s, 115 200 bit/s
Parity	Even	None, 1 stop bit Even Odd None, 2 stop bit
Additional inter-character timeout	1 ms	0 ms to 100 ms
Maximum 0x/1x register gap	40	0 to 200
Maximum 3x/4x register gap	10	

**NOTE**

The parameterization of the serial communication via the RS485 interface, the Modbus slave devices, and the associated mapping are described in detail in the SICAM Q100 device manual, chapters 8.3.7.3 and 8.3.7.4.

2.3.2 Modbus RTU Master Diagnosis

The diagnosis for Modbus RTU master and Modbus gateway allows:

- checking the status of the serial communication with message and error counters and an overview of the configured serial interface parameters
- an overview of the request messages sent by the Modbus master including the request status for each message
- an overview of the last 5 messages sent via Modbus gateway (only available if the Modbus gateway function is enabled)

The message and error counters can be reset if necessary by clicking the **Clear counters** button.

The counters are cleared automatically when the device starts up and each time the request message list is regenerated after a change of the mapping parameterization.

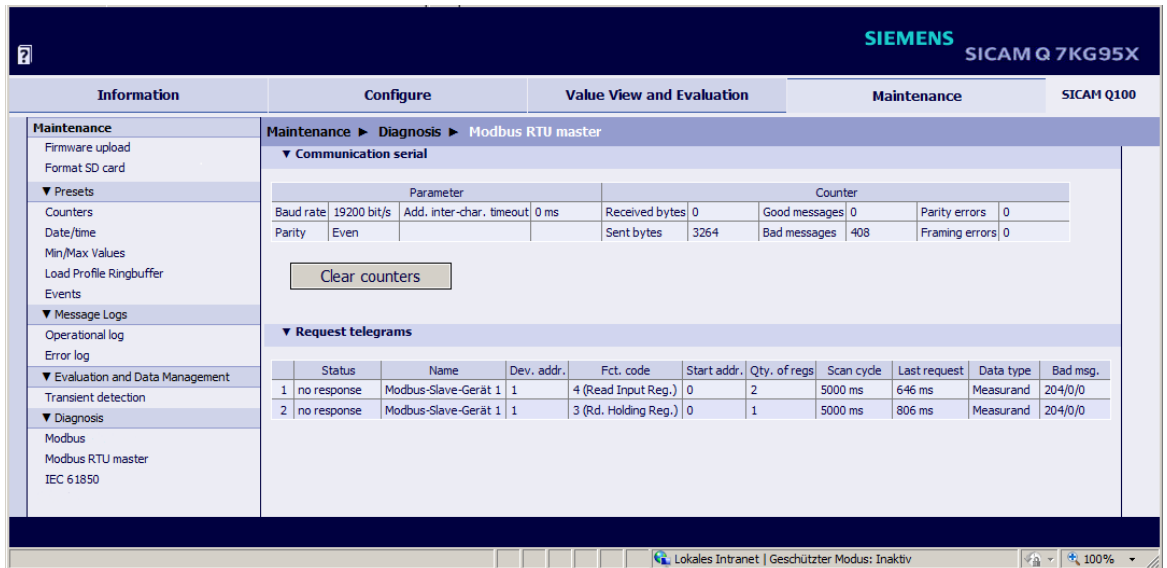


Figure 2-9 Diagnosis Modbus RTU Master

Parameter

- Baud rate: Default setting: 19 200 bit/s
- Parity: Default setting: Even
- Additional inter-character timeout: Default setting: 1 ms

Counter

- Received bytes: Total number of bytes received from the RS485 interface since the last device restart or the last clearing of the counter.
- Sent bytes: Total number of bytes sent to the RS485 interface since the last device restart or the last clearing of the counter.
- Good messages: Number of valid response messages of Modbus slave devices (syntax of the message is valid and the message was received within the response time-out).
- Bad messages: Total number of:
 - no responses (response time-out after sending a request)
 - error feedback indications
 - errors in message formats received
- Parity errors: Number of detected parity errors (wrong parity).

- Framing errors: Number of detected framing errors (invalid stop bit, for example, if the baud rate is wrong).

Request Telegrams

- Status: Status of the request messages
 - Good: correct response
 - Not requested: the request was not sent yet after changing the configuration
 - No response: the Modbus slave device does not respond (for example, communication failure)
 - Exception responses (n): exception responses essent with error code
 - CRC error: a CRC error was detected in the response
 - PDU error: implausible response (for example, the requested number of registers was not output)
- Name: Name of the Modbus slave device to which the request message belongs (as for the Modbus device configuration).
- Device address: Device address of the Modbus slave device to which the request message belongs (as for the Modbus device configuration).
- Function code: Modbus function code used in the request message (see Table 2-64).
- Start address: Start register address when reading data of this request message (based on the register numbers of the Modbus mapping configuration).
- Qty. of registers: Number of registers requested in this message; this value is calculated automatically based on the Modbus mapping configuration and the maximum register gap parameters in the serial interface configuration.
- Scan cycle: Scan cycle (send cycle) currently used for this request message; either the configured scan cycle is used for the data type or the configured "Scan cycle on error".
- Last request: This value indicates how many ms ago the request message was last sent. Note that this value is only intended as a notification that this message is sent and when it was last sent. It is a snapshot referring to the last update of the diagnostic page in the user interface. It cannot be used to determine the bus cycle time exactly.

This value can be greater than the configured scan cycle. This means that there is a longer delay in the bus cycle, for example, due to devices that are not responding.
- Data type: Data type requested with this request message (one or more data objects of this data type were requested; different data types are always requested with separate messages, because they have different scan cycles).
- Bad messages: Counter for errors of this request:
 - No responses
 - Exception responses
 - CRC errors

Notes for Commissioning

If a Modbus slave device is connected correctly, the serial parameters (baud rate and parity) are identical to the parameterization in the Modbus master of SICAM Q100, the device address was checked, and the errors "no responses" and/or "CRC errors" still occur (sporadically), proceed as follows:

- Try to increase the **Response timeouts**. Some devices may take longer to respond (in particular when reading a larger number of values with one message) or at low baud rates.
- Try to increase the **Additional inter-character timeout**. There may be larger message gaps during the transmission or a device needs a longer bus silent interval.

Check the correct design of the RS485 bus line, that is, the line topology with terminating resistors at both ends, fail-safe resistors if necessary at least at one end (see chapter 13.1.3 in the device manual). Stubs (that is, longer single feeders from the bus line to devices) must be avoided.

Last Modbus TCP/RTU Gateway Messages

Available only if the Modbus gateway function is activated.

- **Status:** Status of the request messages
 - Good: correct response
 - No response: the bus device does not respond (for example, communication failure)
 - Exception responses (n): exception response sent with error code
 - CRC error: a CRC error was detected in the response
- **Name:** Name of the Modbus slave device to which the request message was sent. The name is only available if the Modbus slave device was also parameterized in the Modbus RTU Master (active parameter set). Otherwise, "-" is entered.
- **Dev.addr.:** Device address of the Modbus slave device to which the request message belongs.
- **Fct.code:** Modbus function code used in the request message.
- **Start addr.:** Start register address when reading data of this request message.
- **Qty. of regs:** Number of registers requested in this message.
- **Last request:** This value indicates how many ms ago the data were requested. It is a snapshot referring to the last update of the diagnostic page in the user interface. It cannot be used to determine the sending time exactly.
- **Client IP:Port:** IP address and TCP port number of the Modbus TCP client that sent the request.

2.4 Modbus TCP to Modbus RTU Gateway

Schematic Overview of Modbus TCP to Modbus RTU Gateway

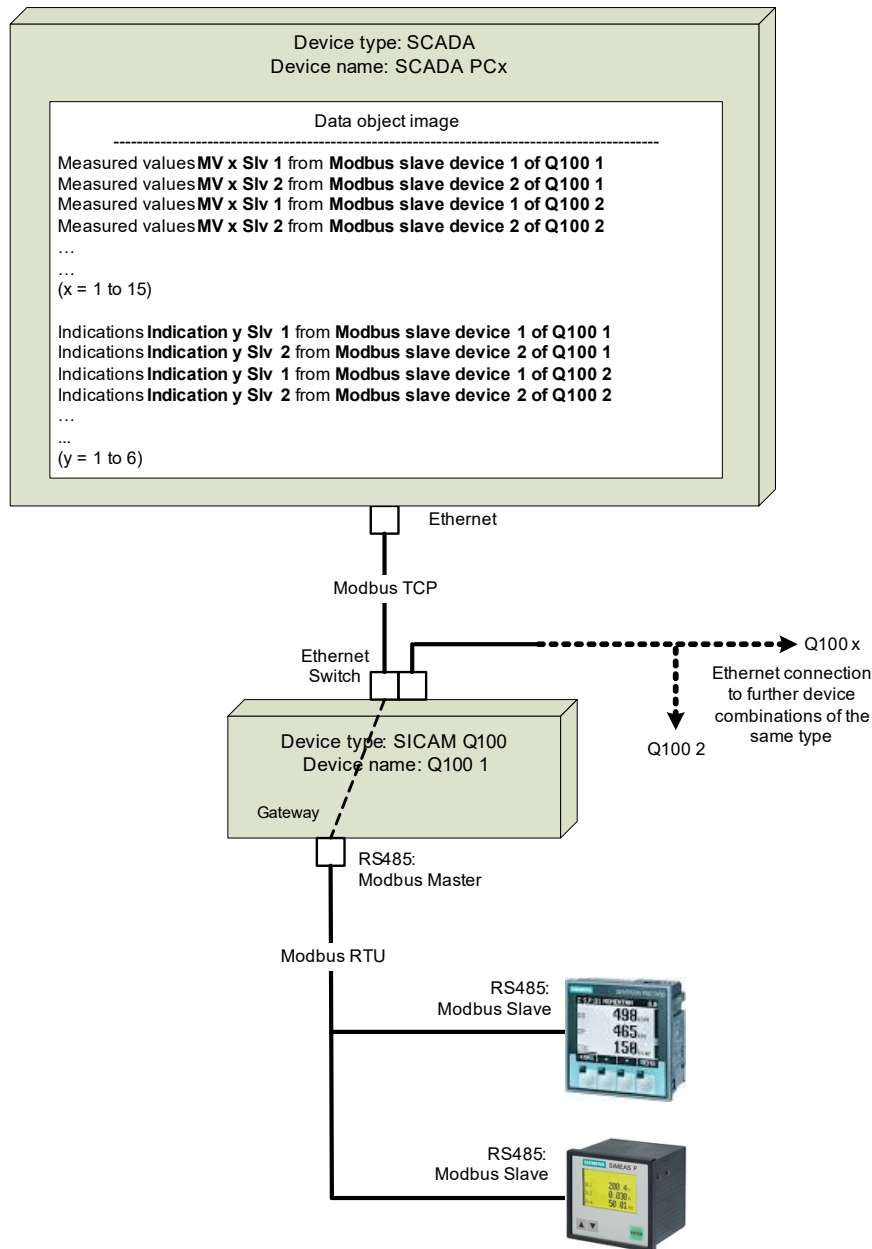


Figure 2-10 Functioning of Modbus TCP to Modbus RTU Gateway

Parameterization of the Modbus Gateway

You can find detailed information on parameterizing the Modbus gateway in the SICAM Q100 device manual, Communication chapter 8.

**NOTE**

The Modbus RTU master and the Modbus gateway function can be operated in parallel.

Diagnosing the Modbus Gateway

You can find detailed information on diagnosing the Modbus gateway in chapter 2.3.2.

**NOTE**

During a firmware update of the SICAM Q100, the Modbus gateway function is stopped.

Exception Responses from the Modbus Gateway

If a request from the Modbus gateway cannot be forwarded to the associated Modbus slave device or the Modbus slave device does not respond, the Modbus gateway sends Modbus exception codes in exception responses messages to the Modbus TCP client.

The messages contain the following codes:

- Exception code 10 GATEWAY_PATH_UNAVAILABLE
The gateway function was activated in the SICAM Q100 at the Ethernet interface settings, but Modbus RTU master was not selected as serial protocol.
- Exception code 11 GATEWAY_TARGET_DEVICE_FAILED_TO_RESPOND
No response from the Modbus slave device to which the request message was sent according to the unit ID (observing the parameterized response time-out and message repetitions).

2.5 Communication Protocol IEC 61850 Server

The IEC 61850 protocol is also used for communication via the Ethernet interface. The IEC 61850 specification with a detailed explanation of the protocol is given in “International Standard IEC 61850”. The device supports IEC 61850, Edition 2.

SICAM Q100 supports 6 input configurations (see Device Manual SICAM Q100):

- 1-phase system
- 3-wire network - balanced (1I)
- 3-wire network - unbalanced (3I)
- 3-wire network - unbalanced (2I)
- 4-wire network - balanced (1I)
- 4-wire network - unbalanced (3I)

All measurands are activated and transferred automatically.

2.5.1 Logical Node MMXN/MMXU: Measurement

1-Phase System

Table 2-66 1-Phase System

inst		1
desc		Measurand
InClass		MMXN
InName		IED_nameMEAS/MMXN1
clcMth		TRUE_RMS
Data Objects	Common Data Class	Measurand
Amp	MV	Ia
Vol	MV	Van
Watt	MV	Pa
VolAmpr	MV	Qa
VolAmp	MV	Sa
PwrFact	MV	PFa
Hz	MV	f

Table 2-67 Average Load Profile Values for Import (Previous Period)

inst	2	
desc	LP imp. avg	
InClass	MMXN	
InName	IED_nameMEAS/LPPrevPerMMXN2	
clcMth	AVG	
clcSrc	IED_nameMEAS/MMXN1	
Data Objects	Common Data Class	Measurand
Watt	MV	P
VolAmpr	MV	Q

Table 2-68 Average Load Profile Values for Export (Previous Period)

inst	3	
desc	LP exp. avg	
InClass	MMXN	
InName	IED_nameMEAS/LPPrevPerMMXN3	
clcMth	AVG	
clcSrc	IED_nameMEAS/MMXN1	
Data Objects	Common Data Class	Measurand
Watt	MV	P
VolAmpr	MV	Q

Table 2-69 Average Load Profile Apparent Power (Previous Period)

inst	4	
desc	LP avg	
InClass	MMXN	
InName	IED_nameMEAS/LPPrevPerMMXN4	

Table 2-69 Average Load Profile Apparent Power (Previous Period)

clcMth		AVG
clcSrc		IED_nameMEAS/MMXN1
Data Objects	Common Data Class	Measurand
VolAmp	MV	S

Table 2-70 Minimum Load Profile Values (Previous Period)

inst		5
desc		LP min
InClass		MMXN
InName		IED_nameMEAS/LPPrevPerMMXN5
clcMth		MIN
clcSrc		IED_nameMEAS/MMXN1
Data Objects	Common Data Class	Measurand
Watt	MV	P
VolAmpr	MV	Q
VolAmp	MV	S

Table 2-71 Maximum Load Profile Values (Previous Period)

inst		6
desc		LP max
InClass		MMXN
InName		IED_nameMEAS/LPPrevPerMMXN6
clcMth		MAX
clcSrc		IED_nameMEAS/MMXN1
Data Objects	Common Data Class	Measurand

Table 2-71 Maximum Load Profile Values (Previous Period)

Watt	MV	P
VolAmpr	MV	Q
VolAmp	MV	S

Table 2-72 Average Load Profile Values for Import (Current Period)

inst	7	
desc	LP imp. avg	
InClass	MMXN	
InName	IED_nameMEAS/LPCurPerMMXN7	
clcMth	AVG	
clcSrc	IED_nameMEAS/MMXN1	
Data Objects	Common Data Class	Measurand
Watt	MV	P
VolAmpr	MV	Q

Table 2-73 Average Load Profile Values for Export (Current Period)

inst	8	
desc	LP exp. avg	
InClass	MMXN	
InName	IED_nameMEAS/LPCurPerMMXN8	
clcMth	AVG	
clcSrc	IED_nameMEAS/MMXN1	
Data Objects	Common Data Class	Measurand
Watt	MV	P
VolAmpr	MV	Q

Table 2-74 Minimum Load Profile Values (Current Period)

inst	9	
desc	LP min	
InClass	MMXN	
InName	IED_nameMEAS/LPCurPerMMXN9	
clcMth	MIN	
clcSrc	IED_nameMEAS/MMXN1	
Data Objects	Common Data Class	Measurand
Watt	MV	P
VolAmpr	MV	Q

Table 2-75 Maximum Load Profile Values (Current Period)

inst	10	
desc	LP max	
InClass	MMXN	
InName	IED_nameMEAS/LPCurPerMMXN10	
clcMth	MAX	
clcSrc	IED_nameMEAS/MMXN1	
Data Objects	Common Data Class	Measurand
Watt	MV	P
VolAmpr	MV	Q

3-Wire Network - Balanced (1I)

Table 2-76 3-Wire Network - Balanced (1I)

inst		1
desc		Measurand
InClass		MMXU
InName		IED_nameMEAS/MMXU1
clcMth		TRUE_RMS
Data Objects	Common Data Class	Measurand
TotW	MV	P
TotVAr	MV	Q
TotVA	MV	S
TotPF	MV	PF
Hz	MV	f
PPV	DEL	Vab
		Vbc
		Vca
A	WYE	Ia

3-Wire Network - Unbalanced (3I)

Table 2-77 3-Wire Network - Unbalanced (3I)

inst		1
desc		Measurand
InClass		MMXU
InName		IED_nameMEAS/MMXU1
clcMth		TRUE_RMS
Data Objects	Common Data Class	Measurand
TotW	MV	P
TotVAr	MV	Q
TotVA	MV	S
TotPF	MV	PF
Hz	MV	f
PPV	DEL	Vab
		Vbc
		Vca
A	WYE	Ia
		Ib
		Ic
		In
		Iavg

3-Wire Network - Unbalanced (2I)

Table 2-78 3-Wire Network - Unbalanced (2I)

inst		1
desc		Measurand
InClass		MMXU
InName		IED_nameMEAS/MMXU1
clcMth		TRUE_RMS
Data Objects	Common Data Class	Measurand
TotW	MV	P
TotVAr	MV	Q
TotVA	MV	S
TotPF	MV	PF
Hz	MV	f
PPV	DEL	Vab
		Vbc
		Vca
A	WYE	Ia
		Ib
		Ic
		Iavg

4-Wire Network - Balanced (1I)

Table 2-79 4-Wire Network - Balanced (1I)

inst		1
desc		Measurand
InClass		MMXU
InName		IED_nameMEAS/MMXU1
clcMth		TRUE_RMS
Data Objects	Common Data Class	Measurand
TotW	MV	P
TotVAr	MV	Q
TotVA	MV	S
TotPF	MV	PF
Hz	MV	f
PhV	WYE	Van
		Vavg
A	WYE	Ia

4-Wire Network - Unbalanced (3I)

Table 2-80 4-Wire Network - Unbalanced (3I)

inst		1
desc		Measurand
InClass		MMXU
InName		IED_nameMEAS/MMXU1
clcMth		TRUE_RMS
Data Objects	Common Data Class	Measurand
TotW	MV	P
TotVAr	MV	Q
TotVA	MV	S
TotPF	MV	PF
Hz	MV	f
PPV	DEL	Vab
		Vbc
		Vca
PhV	WYE	Van
		Vbn
		Vcn
		Vn
		Vavg
A	WYE	Ia
		Ib
		Ic
		In
		Iavg

Table 2-80 4-Wire Network - Unbalanced (3I) (cont.)

W	WYE	Pa
		Pb
		Pc
VAr	WYE	Qa
		Qb
		Qc
VA	WYE	Sa
		Sb
		Sc
PF	WYE	PFa
		PFb
		PFc

3-Wire and 4-Wire Network

Table 2-81 Average Load Profile Values for Import (Previous Period)

inst		2
desc		LP imp. avg
InClass		MMXU
InName		IED_nameMEAS/LPPrevPerMMXU2
clcMth		AVG
clcSrc		IED_nameMEAS/MMXU1
Data Objects	Common Data Class	Measurand
TotW	MV	P
TotVar	MV	Q

Table 2-82 Average Load Profile Values for Export (Previous Period)

inst		3
desc		LP exp. avg
InClass		MMXU
InName		IED_nameMEAS/LPPrevPerMMXU3
clcMth		AVG
clcSrc		IED_nameMEAS/MMXU1
Data Objects	Common Data Class	Measurand
TotW	MV	P
TotVar	MV	Q

Table 2-83 Average Load Profile Apparent Power (Previous Period)

inst	4	
desc	LP avg	
InClass	MMXU	
InName	IED_nameMEAS/LPPrevPerMMXU4	
clcMth	AVG	
clcSrc	IED_nameMEAS/MMXU1	
Data Objects	Common Data Class	Measurand
TotVA	MV	S

Table 2-84 Minimum Load Profile Values (Previous Period)

inst	5	
desc	LP min	
InClass	MMXU	
InName	IED_nameMEAS/LPPrevPerMMXU5	
clcMth	MIN	
clcSrc	IED_nameMEAS/MMXU1	
Data Objects	Common Data Class	Measurand
TotW	MV	P
TotVar	MV	Q
TotVA	MV	S

Table 2-85 Maximum Load Profile Values (Previous Period)

inst	6	
desc	LP max	
InClass	MMXU	
InName	IED_nameMEAS/LPPrevPerMMXU6	

Table 2-85 Maximum Load Profile Values (Previous Period)

clcMth		MAX
clcSrc		IED_nameMEAS/MMXU1
Data Objects	Common Data Class	Measurand
TotW	MV	P
TotVar	MV	Q
TotVA	MV	S

Table 2-86 Average Load Profile Values for Import (Current Period)

inst		7
desc		LP imp. avg
InClass		MMXU
InName		IED_nameMEAS/LPCurPerMMXU7
clcMth		AVG
clcSrc		IED_nameMEAS/MMXU1
Data Objects	Common Data Class	Measurand
TotW	MV	P
TotVar	MV	Q

Table 2-87 Average Load Profile Values for Export (Current Period)

inst		8
desc		LP exp. avg
InClass		MMXU
InName		IED_nameMEAS/LPCurPerMMXU8
clcMth		AVG
clcSrc		IED_nameMEAS/MMXU1

Table 2-87 Average Load Profile Values for Export (Current Period)

Data Objects	Common Data Class	Measurand
TotW	MV	P
TotVar	MV	Q

Table 2-88 Minimum Load Profile Values (Current Period)

inst	9	
desc	LP min	
InClass	MMXU	
InName	IED_nameMEAS/LPCurPerMMXU9	
clcMth	MIN	
clcSrc	IED_nameMEAS/MMXU1	
Data Objects	Common Data Class	Measurand
TotW	MV	P
TotVar	MV	Q

Table 2-89 Maximum Load Profile Values (Current Period)

inst	10	
desc	LP max	
InClass	MMXU	
InName	IED_nameMEAS/LPCurPerMMXU10	
clcMth	MAX	
clcSrc	IED_nameMEAS/MMXU1	
Data Objects	Common Data Class	Measurand
TotW	MV	P
TotVar	MV	Q

2.5.2 Logical Node MMTN/MMTR: Metering

1-Phase System

Table 2-90 1-Phase System

inst		1
desc		Meter. 1-ph
InClass		MMTN
InName		IED_nameMEAS/MMTN
Data Objects	Common Data Class	Counter
SupWh	BCR	WPa_exp
SupVARh	BCR	WQa_ind
DmdWh	BCR	WPa_imp
DmdVARh	BCR	WQa_cap

Table 2-91 Metering 1-Phase System Energy Time of Use Tariff 1

inst		1
desc		TOU tariff 1
InClass		MMTN
InName		IED_nameMEAS/ TOUTariff1MMTN1
Data Objects	Common Data Class	Counter
TotVAh	BCR	WS_tariff_1
SupWh	BCR	WP_exp_tariff_1
SupVARh	BCR	WQ_ind_tariff_1
DmdWh	BCR	WP_imp_tariff_1
DmdVARh	BCR	WQ_cap_tariff_1

Table 2-92 Metering 1-Phase System Energy Time of Use Tariff 2

inst		1
desc		TOU tariff 2
InClass		MMTN
InName		IED_nameMEAS/ TOUTariff2MMTN1
Data Objects	Common Data Class	Counter
TotVAh	BCR	WS_tariff_2
SupWh	BCR	WP_exp_tariff_2
SupVArh	BCR	WQ_ind_tariff_2
DmdWh	BCR	WP_imp_tariff_2
DmdVArh	BCR	WQ_cap_tariff_2

Table 2-93 Metering 1-Phase System Energy Time of Use Tariff 3

inst		1
desc		TOU tariff 3
InClass		MMTN
InName		IED_nameMEAS/ TOUTariff3MMTN1
Data Objects	Common Data Class	Counter
TotVAh	BCR	WS_tariff_3
SupWh	BCR	WP_exp_tariff_3
SupVArh	BCR	WQ_ind_tariff_3
DmdWh	BCR	WP_imp_tariff_3
DmdVArh	BCR	WQ_cap_tariff_3

Table 2-94 Metering 1-Phase System Energy Time of Use Tariff 4

inst		1
desc		TOU tariff 4
InClass		MMTN
InName		IED_nameMEAS/ TOUTariff4MMTN1
Data Objects	Common Data Class	Counter
TotVAh	BCR	WS_tariff_4
SupWh	BCR	WP_exp_tariff_4
SupVArh	BCR	WQ_ind_tariff_4
DmdWh	BCR	WP_imp_tariff_4
DmdVArh	BCR	WQ_cap_tariff_4

3-Wire and 4-Wire Network

Table 2-95 3-Wire and 4-Wire Network

inst		1
desc		Meter. 3W/Meter. 4W
InClass		MMTR
InName		IED_nameMEAS/MMTR
Data Objects	Common Data Class	Counter
TotVAh	BCR	WS
SupWh	BCR	WP_exp
SupVArh	BCR	WQ_ind
DmdWh	BCR	WP_imp
DmdVArh	BCR	WQ_cap

Table 2-96 Metering 3-Wire and 4-Wire Network Energy Time of Use Tariff 1

inst		1
desc		TOU tariff 1
InClass		MMTR
InName		IED_nameMEAS/ TOUTariff1MMTR1
Data Objects	Common Data Class	Counter
TotVAh	BCR	WS_tariff_1
SupWh	BCR	WP_exp_tariff_1
SupVArh	BCR	WQ_ind_tariff_1
DmdWh	BCR	WP_imp_tariff_1
DmdVArh	BCR	WQ_cap_tariff_1

Table 2-97 Metering 3-Wire and 4-Wire Network Energy Time of Use Tariff 2

inst		1
desc		TOU tariff 2
InClass		MMTR
InName		IED_nameMEAS/ TOUTariff2MMTR1
Data Objects	Common Data Class	Counter
TotVAh	BCR	WS_tariff_2
SupWh	BCR	WP_exp_tariff_2
SupVArh	BCR	WQ_ind_tariff_2
DmdWh	BCR	WP_imp_tariff_2
DmdVArh	BCR	WQ_cap_tariff_2

Table 2-98 Metering 3-Wire and 4-Wire Network Energy Time of Use Tariff 3

inst		1
desc		TOU tariff 3
InClass		MMTR
InName		IED_nameMEAS/ TOUTariff3MMTR1
Data Objects	Common Data Class	Counter
TotVAh	BCR	WS_tariff_3
SupWh	BCR	WP_exp_tariff_3
SupVArh	BCR	WQ_ind_tariff_3
DmdWh	BCR	WP_imp_tariff_3
DmdVArh	BCR	WQ_cap_tariff_3

Table 2-99 Metering 3-Wire and 4-Wire Network Energy Time of Use Tariff 4

inst		1
desc		TOU tariff 4
InClass		MMTR
InName		IED_nameMEAS/ TOUTariff4MMTR1
Data Objects	Common Data Class	Counter
TotVAh	BCR	WS_tariff_4
SupWh	BCR	WP_exp_tariff_4
SupVArh	BCR	WQ_ind_tariff_4
DmdWh	BCR	WP_imp_tariff_4
DmdVArh	BCR	WQ_cap_tariff_4

2.5.3 Logical Node GGIO: General I/O Processes

Table 2-100 Limit Violations/Group Indications

inst		1
desc		Limits
InClass		GGIO
InName		IED_nameMEAS/GGIO1
Data Objects	Common Data Class	
Status information		
Alm1~16	SPS	Limit violations 1 to 16
Alm17~20	SPS	Group indications 1 to 4

Table 2-101 Indications

inst		2
desc		Indications
InClass		GGIO
InName		IED_nameMEAS/GGIO2
Data Objects	Common Data Class	
Status information		
Ind1	SPC	Remote indication 1
Ind2	SPC	Remote indication 2
Alm1	SPS	Reset Energy
Alm2	SPS	Parameter load
Alm3	SPS	Time synchronization error
Alm4	SPS	Rotation
Alm5	SPS	SD card error

Table 2-102 Modbus Subdevice Objects

inst		3
desc		Modbus subd.
InClass		GGIO
InName		IED_nameMEAS/GGIO3
Data Objects	Common Data Class	
Status Information		
AnIn1~15	SPS	Measured values from Modbus slave device 1
AnIn16~30	SPS	Measured values from Modbus slave device 2
AnIn31~45	SPS	Measured values from Modbus slave device 3
AnIn46~60	SPS	Measured values from Modbus slave device 4
AnIn61~75	SPS	Measured values from Modbus slave device 5
AnIn76~90	SPS	Measured values from Modbus slave device 6
AnIn91~105	SPS	Measured values from Modbus slave device 7
AnIn106~120	SPS	Measured values from Modbus slave device 8
Ind1~6	SPS	Indications from Modbus slave device 1
Ind7~12	SPS	Indications from Modbus slave device 2
Ind13~18	SPS	Indications from Modbus slave device 3
Ind19~24	SPS	Indications from Modbus slave device 4
Ind25~30	SPS	Indications from Modbus slave device 5
Ind31~36	SPS	Indications from Modbus slave device 6
Ind37~42	SPS	Indications from Modbus slave device 7
Ind43~48	SPS	Indications from Modbus slave device 8

Table 2-103 SICAM IO Subdevice 1 Binary Inputs and Binary Outputs

inst		4
desc		SICAM IO subd. 1
InClass		GGIO
InName		IED_nameMEAS/GGIO4
Data Objects	Common Data Class	
Status Information		
Ind1~6	SPS	Binary inputs 1 to 6
Ind7~12	SPS	Binary outputs 1 to 6
Ind13	SPS	Subdevice 1 OK

Table 2-104 SICAM IO Subdevice 2 Binary Inputs and Binary Outputs

inst		5
desc		SICAM IO subd. 2
InClass		GGIO
InName		IED_nameMEAS/GGIO5
Data Objects	Common Data Class	
Status Information		
Ind1~6	SPS	Binary inputs 1 to 6
Ind7~12	SPS	Binary outputs 1 to 6
Ind13	SPS	Subdevice 2 OK

Table 2-105 Controllable Remote Indications 3 to 14

inst		6
desc		Rem. ind. 3 - 14
InClass		GGIO
InName		IED_nameMEAS/ProxyGGIO6
Data Objects	Common Data Class	
Status Information		
SPCSO1~12	SPC	Remote indications 3 to 14

Table 2-106 Binary Inputs

inst		7
desc		Binary in.
InClass		GGIO
InName		IED_nameMEAS/BinInGGIO7
Data Objects	Common Data Class	Status information
Ind1~2	SPS	Binary input 1 to 2

Table 2-107 Binary Outputs

inst		7
desc		Binary out.
InClass		GGIO
InName		IED_nameMEAS/BinOutGGIO7
Data Objects	Common Data Class	Status information
Ind1~2	SPS	Binary output 1 to 2

2.5.4 Logical Node ZBAT: Battery

Table 2-108 Battery

inst		1
desc		Battery status
InClass		ZBAT
InName		IED_nameMEAS/ZBAT1
Data Objects	Common Data Class	
Status information		
Vol	MV	Battery voltage (not available, invalid)
BatLo	SPS	Battery low (undervoltage or battery is missing)

2.5.5 Logical Node QVVR: Voltage Variation

Table 2-109 Voltage Variation

inst		1
desc		Volt. var.
InClass		QVVR
InName		IED_nameMEAS/QVVR1
Data Objects	Common Data Class	
Status information		
VarStr	SPS	Start of event: Voltage variation
DipStr	SPS	Start: Voltage dip
SwlStr	SPS	Start: Voltage swell
IntrStr	SPS	Start: Voltage interruption
VVa ¹⁾	MV	Highest or lowest voltage magnitude of the last completed event
VVaTm ¹⁾	MV	Voltage variation duration of the last completed event
AffPhs ¹⁾	ENS	Affected phase(s) of the last completed event

¹⁾ acc. to Tissue 952

2.5.6 Logical Node QFVR: Frequency Variation

Table 2-110 Frequency Variation

inst		1
desc		Freq. var.
InClass		QFVR
InName		IED_nameMEAS/QFVR1
Data Objects	Common Data Class	
Status information		
VarStr	SPS	Start of event: Frequency variation
UnHzStr	SPS	Start: Underfrequency
OvHzStr	SPS	Start: Overfrequency

2.5.7 Logical Node QVUB: 3-Wire Network and 4-Wire Network Unbalanced (3I)

Table 2-111 3-Wire Network and 4-Wire Network Unbalanced (3I)

inst		1
desc		Volt. unbal.
InClass		QVUB
InName		IED_nameMEAS/QVUB1
Data Objects	Common Data Class	
Status information		
VarStr	SPS	Start of event: Voltage unbalance variation

2.5.8 Logical Node RDRE: Disturbance Recorder Function

Table 2-112 Disturbance Recorder Function

inst		1
desc		Fault rec.
InClass		RDRE
InName		IED_nameMEAS/RDRE1
Data Objects	Common Data Class	
Status information		
RcdMade	SPS	Recording made
FltNum	INS	Fault number

2.5.9 Logical Node MHAN: Harmonics for 1-Phase

Table 2-113 Harmonics for 1-Phase

inst		1
desc		Harmonics
InClass		MHAN
InName		IED_nameMEAS/MHAN1
Data Objects	Common Data Class	
Status information		
Hz	MV	Basic frequency
HaAmp	HMV	Sequence of harmonics current
HaVol	HMV	Sequence of harmonics voltages
ThdsAmp	MV	Current THDS for 1-phase
ThdsVol	MV	Voltage THDS for 1-phase
TddAmp	MV	Current total demand distortion for 1-phase

2.5.10 Logical Node MHA1: Harmonics - 3-Phase/3-Wire

Table 2-114 Harmonics - 3-Phase/3-Wire

inst		1
desc		Harmonics
InClass		MHA1
InName		IED_nameMEAS/MHA11
Data Objects	Common Data Class	
Status information		
Hz	MV	Basic frequency
HA	HWYE	Sequence of harmonics current
HPPV	HDEL	Sequence of harmonics phase to phase voltages
ThdsA	WYE	Current THDS
ThdsPPV	DEL	Voltage THDS for phase to phase only available in 3p3w (balance, unbalance 2I, unbalance 3I)
TddA	WYE	Current total demand distortion

2.5.11 Logical Node MHA1: Harmonics - 3-Phase/4-Wire

Table 2-115 Harmonics - 3-Phase/4-Wire

inst		1
desc		Harmonics
InClass		MHA1
InName		IED_nameMEAS/MHA11
Data Objects	Common Data Class	
Status information		
Hz	MV	Basic frequency
HA	HWYE	Sequence of harmonics current
HPhV	HWYE	Sequence of harmonics phase to ground voltages
ThdsA	WYE	Current THDS
ThdsPhV	WYE	Voltage THDS for phase to ground (only available in 1p2w (1-phase), and 3p4w (3-phase, 4-wire balance and unbalanced))
TddA	WYE	Current total demand distortion

2.5.12 Logical Node MFLK: Flicker 3-Phase/3-Wire

Table 2-116 Flicker

inst		1
desc		Flicker
InClass		MFLK
InName		IED_nameMEAS/MFLK
Data Objects	Common Data Class	
Status information		
PPPst	DEL	Short-term flicker severity of last complete interval for phase to phase measurements
PPPlt	DEL	Long-term flicker severity of last complete interval for phase to phase measurements

2.5.13 Logical Node MFLK: Flicker 3-Phase/4-Wire and 1-Phase system

Table 2-117 Flicker

inst		1
desc		Flicker
InClass		MFLK
InName		IED_nameMEAS/MFLK
Data Objects	Common Data Class	
Status information		
PhPst	WYE	Short-term flicker severity of last complete interval for phase to ground measurements
PhPlt	WYE	Long-term flicker severity of last complete interval for phase to ground measurements

2.5.14 PICS, PIXIT and TICS



NOTE

PICS, PIXIT, and TICS are available online at <http://www.powerquality.de> in a separate document with the order number E50417-G4010-C522-A1.

2.5.15 Diagnosis IEC 61850

The diagnostics for IEC 61850 allows the analysis of parameters and communication. For more information, see the SICAM Q100 device manual.

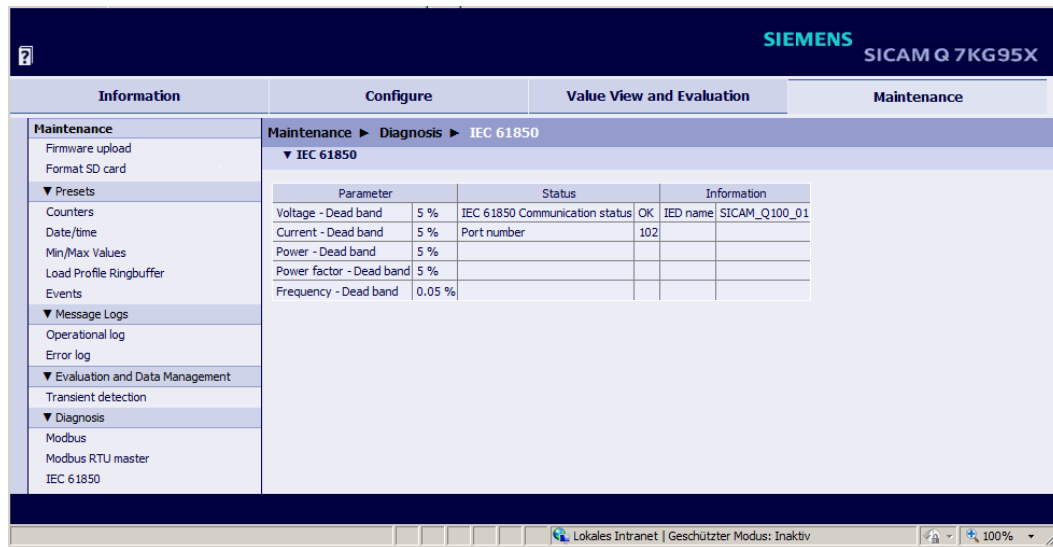


Figure 2-11 Diagnosis IEC 61850

Parameters

With IEC 61850, the following parameters are displayed:

- Voltage - Dead band: Default: 5 %
- Current - Dead band: Default: 5 %
- Power - Dead band: Default: 5 %
- Power factor - Dead band: Default: 5 %
- Frequency - Dead band: Default: 0.05 %

Status

With IEC 61850, the following statuses are displayed:

- IEC 61850 Communication status: Status of communication: OK or Fail
- Port number: Set port number, for example 102

Information

- IED Name: Default: SICAM_Q100_01
- IEC 61850 Edition: 2

2.6 Application Examples for Communication with Subdevices



NOTE

Also see the parameter setting of the SICAM subdevices described in the device manual in the chapter 8.3.7.5.

2.6.1 Communication of the SICAM Q100 with the SICAM I/O Unit (subdevice) via Modbus UDP and via External Ethernet Switch with the Control System

When using a Y-cable and the internal Ethernet switch of the device, you can connect the SICAM Q100 with the SICAM I/O Unit 7XV5673. The second terminal of the Y-cable allows you to connect this device combination to the control system using an external Ethernet switch. The following diagram shows a device wiring example and the possible transmission protocols.

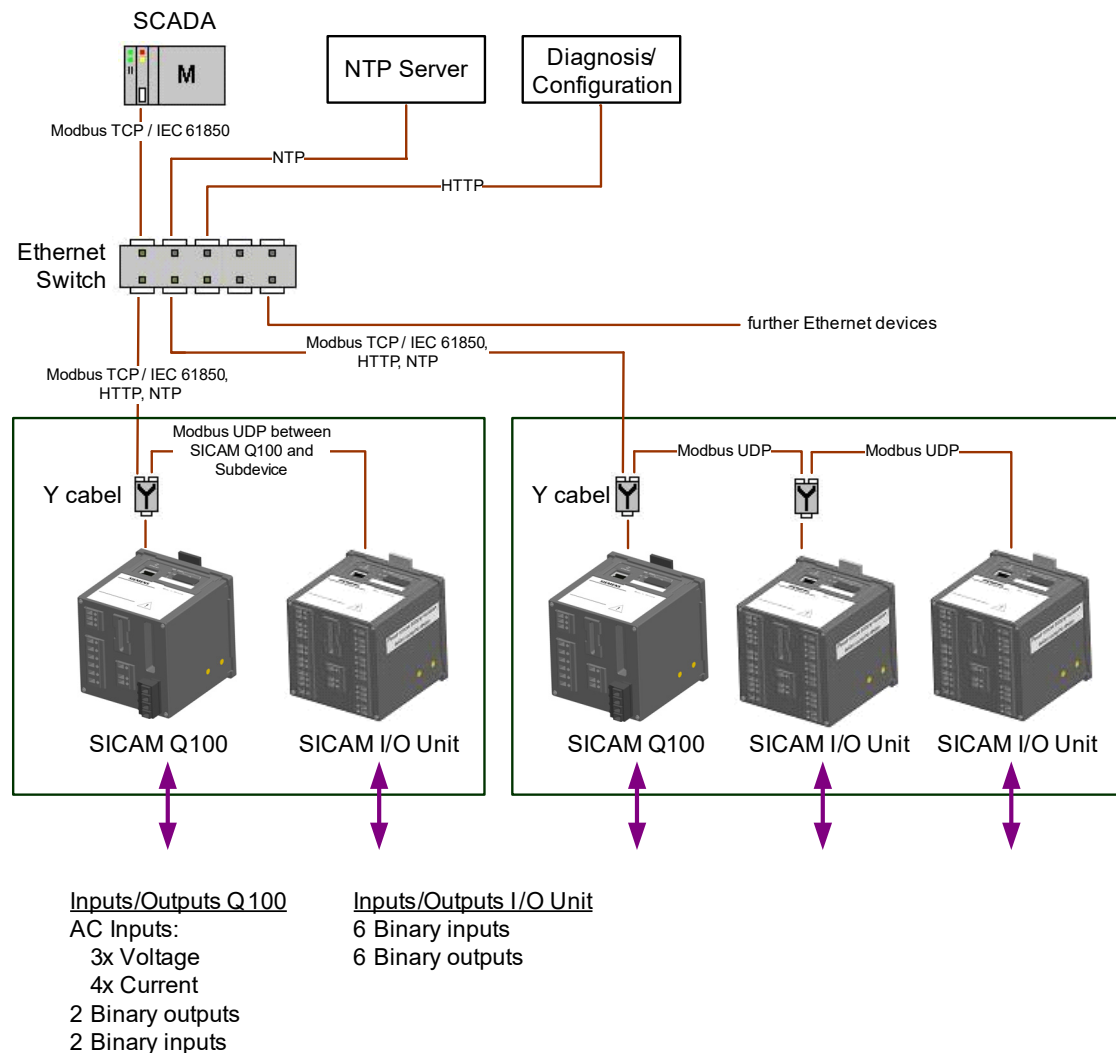


Figure 2-12 Connecting the SICAM Q100 with the SICAM I/O Unit via Y-cable and with the Control System via External Ethernet Switch

2.6.2 Communication of the SICAM Q100 Devices with the SICAM I/O Units (subdevices) via External Ethernet Switches and Modbus UDP

When using external Ethernet switches, you can connect the devices SICAM Q100 and SICAM I/O Unit 7XV5673 with each other. Furthermore, control system devices can be connected to the external Ethernet switches. The following diagram shows a device wiring example and the possible transmission protocols.

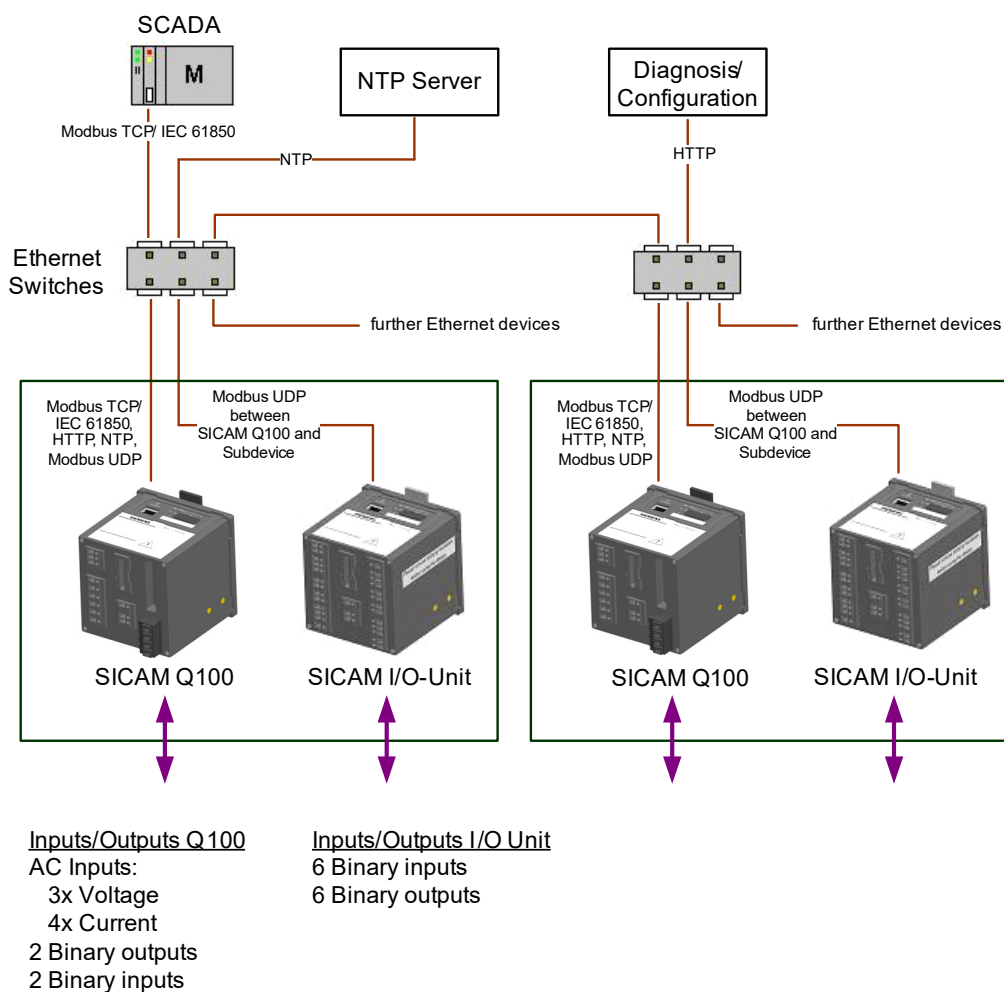


Figure 2-13 Connecting the SICAM Q100 with the SICAM I/O Unit and the Control System via External Ethernet Switch



NOTE

During a firmware update of the SICAM Q100, the communication between SICAM Q100 and the SICAM sub-devices is stopped.

3 Connection with SICAM PQS

(Version V8.03 SICAM PAS PQS and Higher)

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3.1 General

The data acquired by SICAM Q100 are stored in the internal memory of the device. The data of the measured value recorder, for example mean values, and of the trend recorder are available in the PGDIF data format. The data of the fault recorder are saved in the COMTRADE data format. This data can be transferred to SICAM PQS using the IEC 61850 Ed.2 protocol.

The SICAM PQS software, version V8.03 and higher, allows importing the data into the SICAM PQS archive. Once the data has been transferred into the SICAM PQS archive, it can be used for further evaluations such as reporting, export, etc.

SICAM PQ Analyzer or SIGRA allow displaying the data in graphical or numerical form and analyzing them. For example, evaluations of the records and reports can be performed according to the EN 50160 standard or other grid codes.

The following diagram shows the sequence of the parameterization and the analysis:

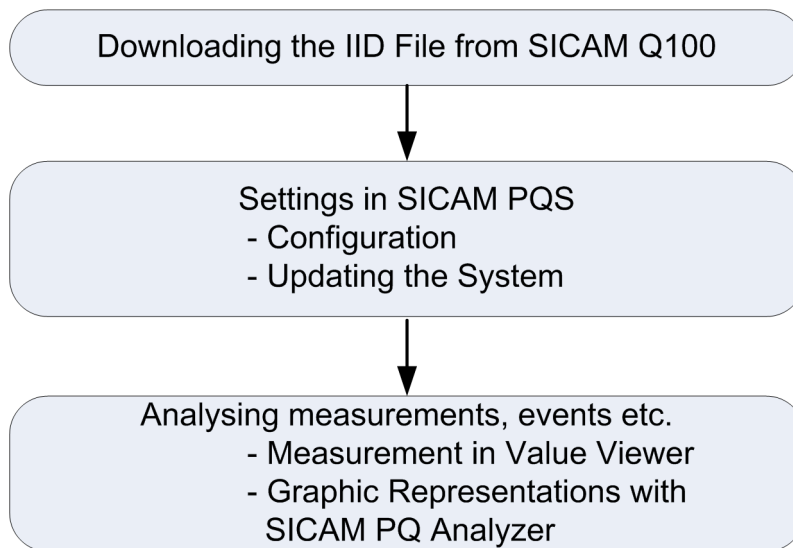


Figure 3-1 Workflow

3.2 Licensing SICAM PQS

After installing SICAM PQS, execute the **Feature Enabler** application:

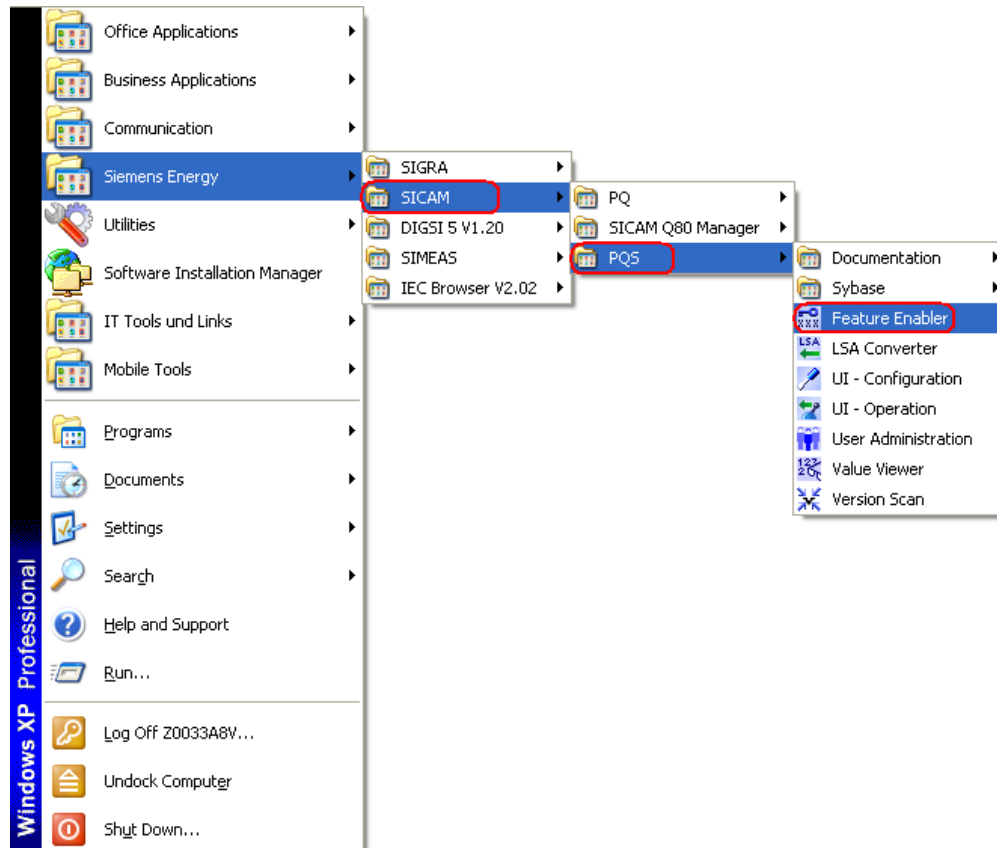


Figure 3-2 Start Feature Enabler

- ✧ Enter all license keys for your application and click **Install**.

Licenses

On the configuration computer:

- Configuration Large/Medium: depending on the number of equipment

On the runtime computer:

- Runtime Large/Medium/Small: depending on the number of equipment
- IEC 61850 Client or IEC 61850 Client Monitor

When required:

- PQS Scheduled Reporting
- PQS Grid Code Evaluation
- PQS Fault Locator
- PQS Notification
- PQS Automatic COMTRADE Export
- PQS Automatic PQDIF Export
- PQS Automatic REPORT Export

3.3 Downloading the IID File from SICAM Q100

Before configuring SICAM PQS, download the IID file of SICAM Q100 to a folder on your local PC. Proceed as follows:

- ✧ In SICAM Q100 open the **Configure** tab → **Communication Ethernet** (see Device Manual, Chapter 8).
- ✧ Click **Download IID file**.

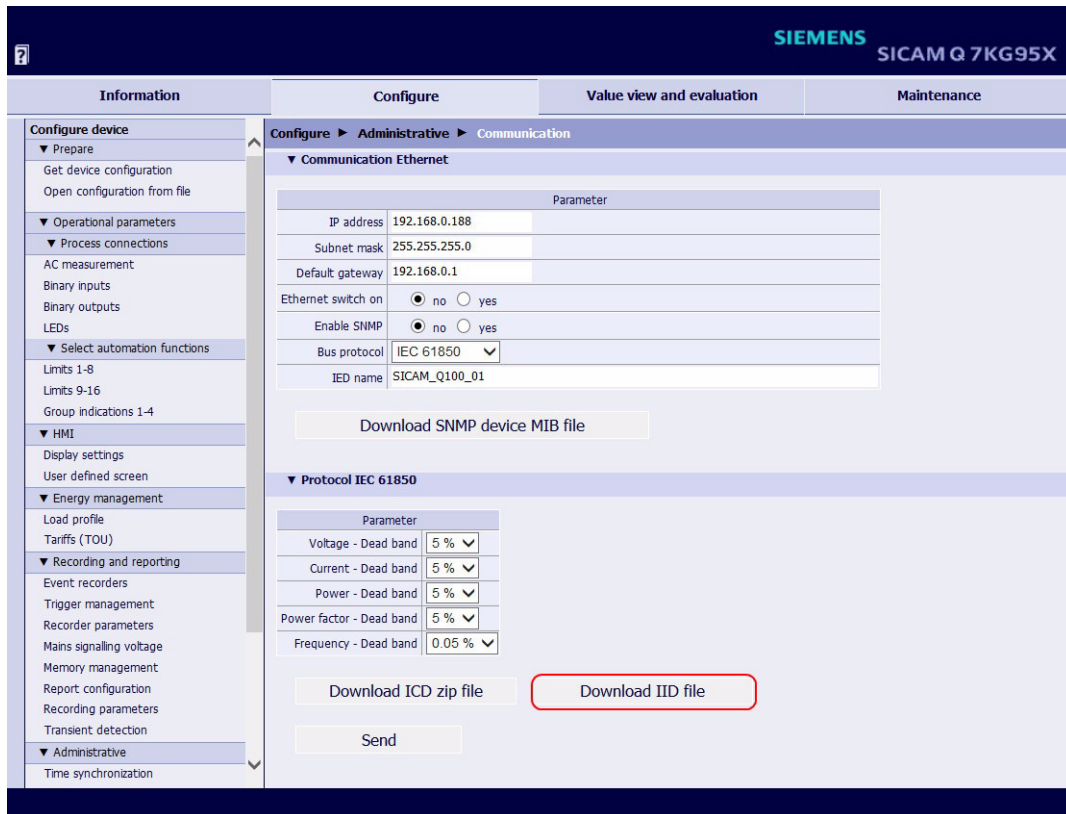


Figure 3-3 Configuration Tab, Communication Ethernet

- ✧ Save the IID file in a folder.

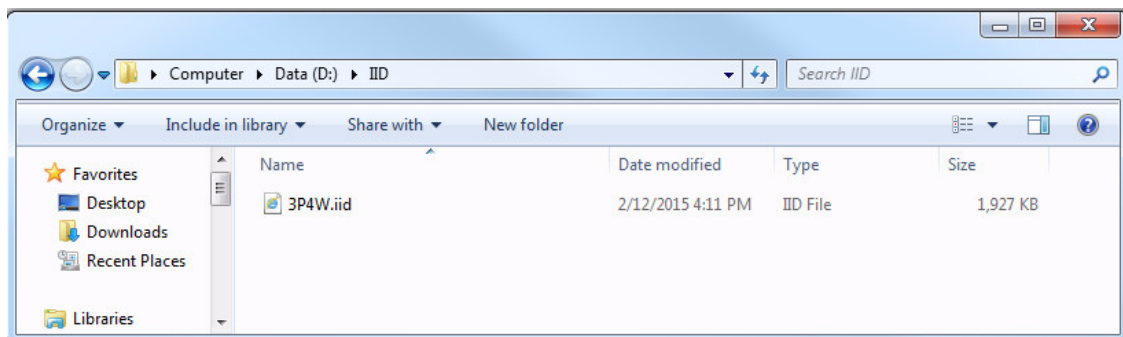


Figure 3-4 Saved IID File

3.4 Settings in SICAM PQS

3.4.1 Configuration

✧ In SICAM PQS start the **UI - Configuration**.

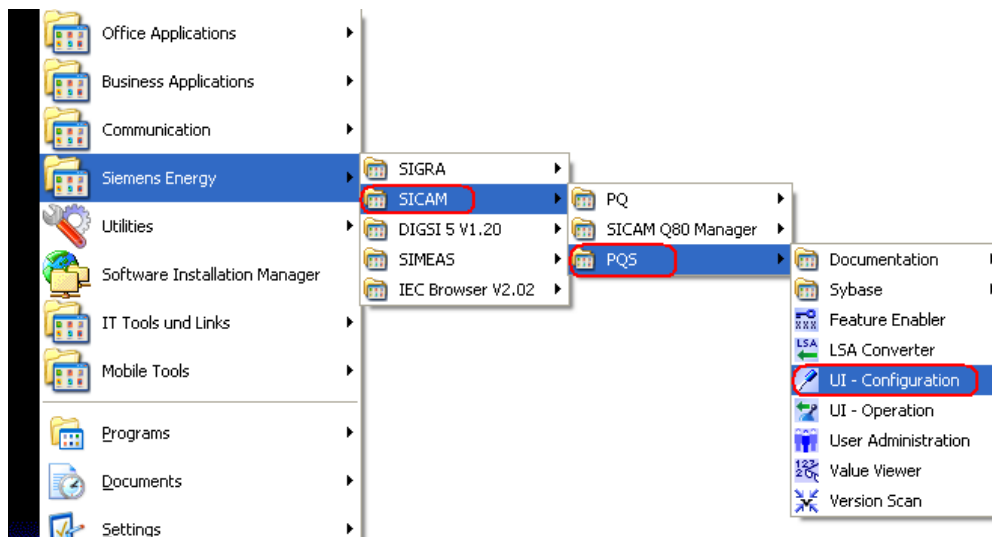


Figure 3-5 Start UI - Configuration

✧ Select the **Configuration** tab.

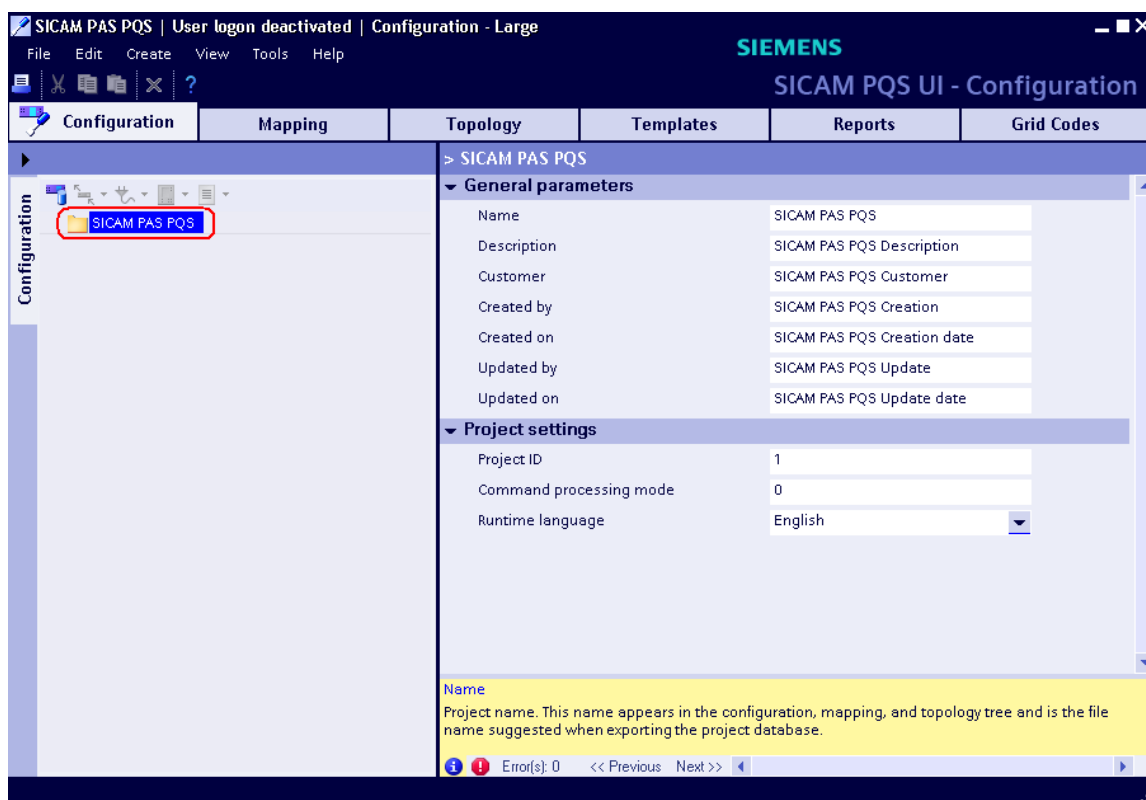


Figure 3-6 Configuration Tab

3.4 Settings in SICAM PQS

- ✧ Select the project and add its system from the context menu.

Your own PC will be automatically inserted as the first system and as the full server.

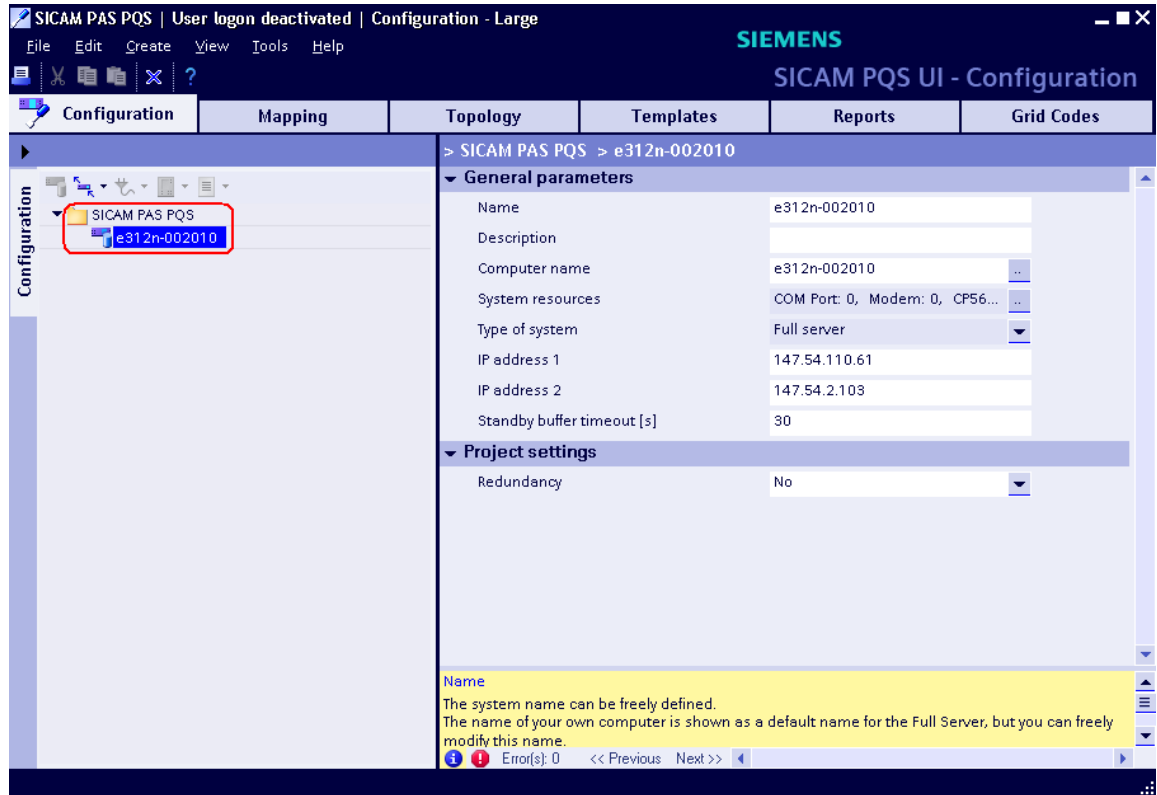


Figure 3-7 Inserting the System

- ✧ In the navigation window right-click **SICAM PAS PQS** → **Computer name** (in the example e312n-002010) → **Application** → **Archive**.

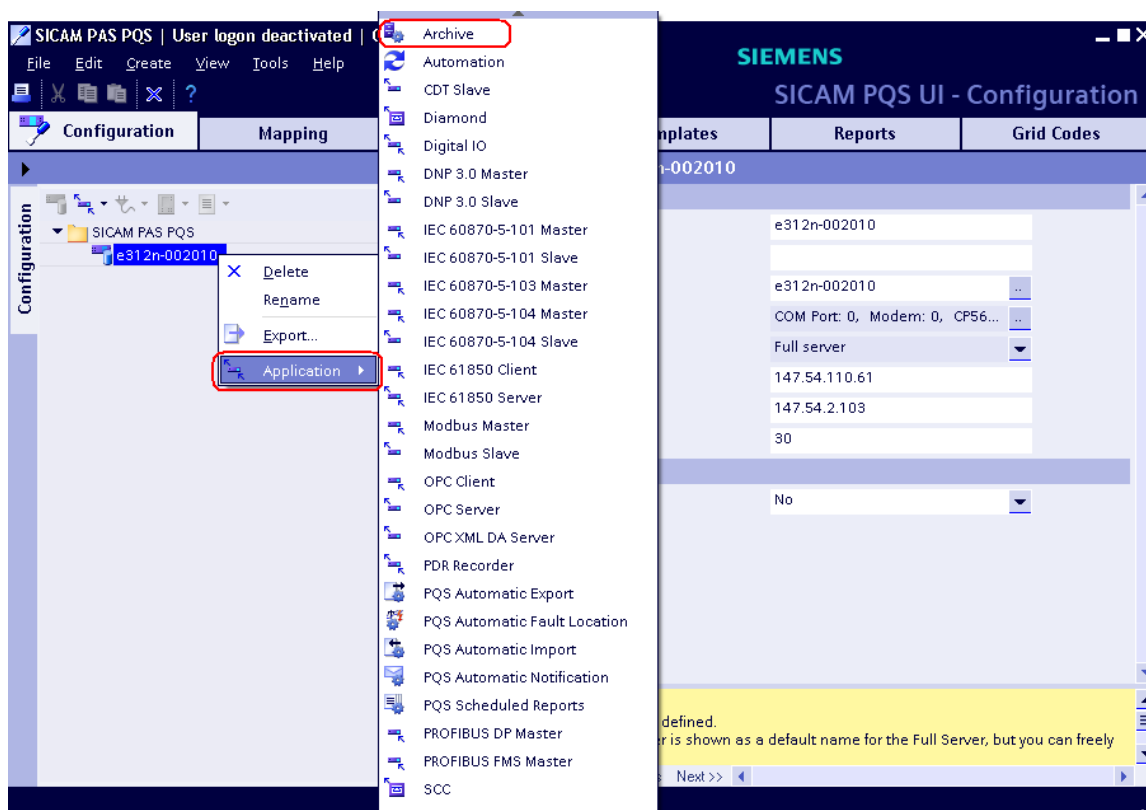


Figure 3-8 Selecting the Archive

- ✧ Create a path for the archive.

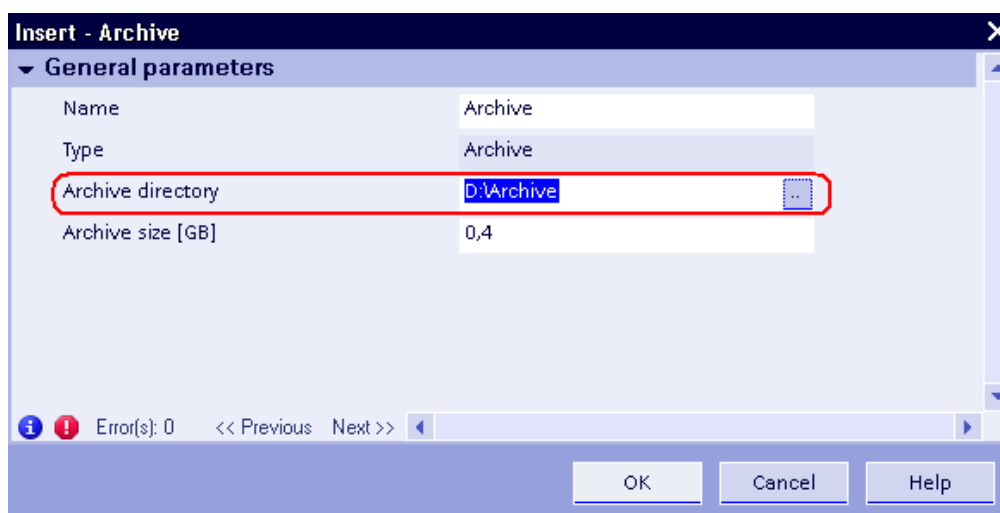


Figure 3-9 Creating the Archive Folder

- ✧ Click **OK**.

**NOTE**

The **archive** is needed to store measurements recorded by SICAM Q100 which enables SICAM PQ Analyzer to present them.

- ✧ In the navigation window right-click **SICAM PAS PQS** → **Computer name** (in the example: e312n-002010) → **Application** → **IEC 61850 Client**.

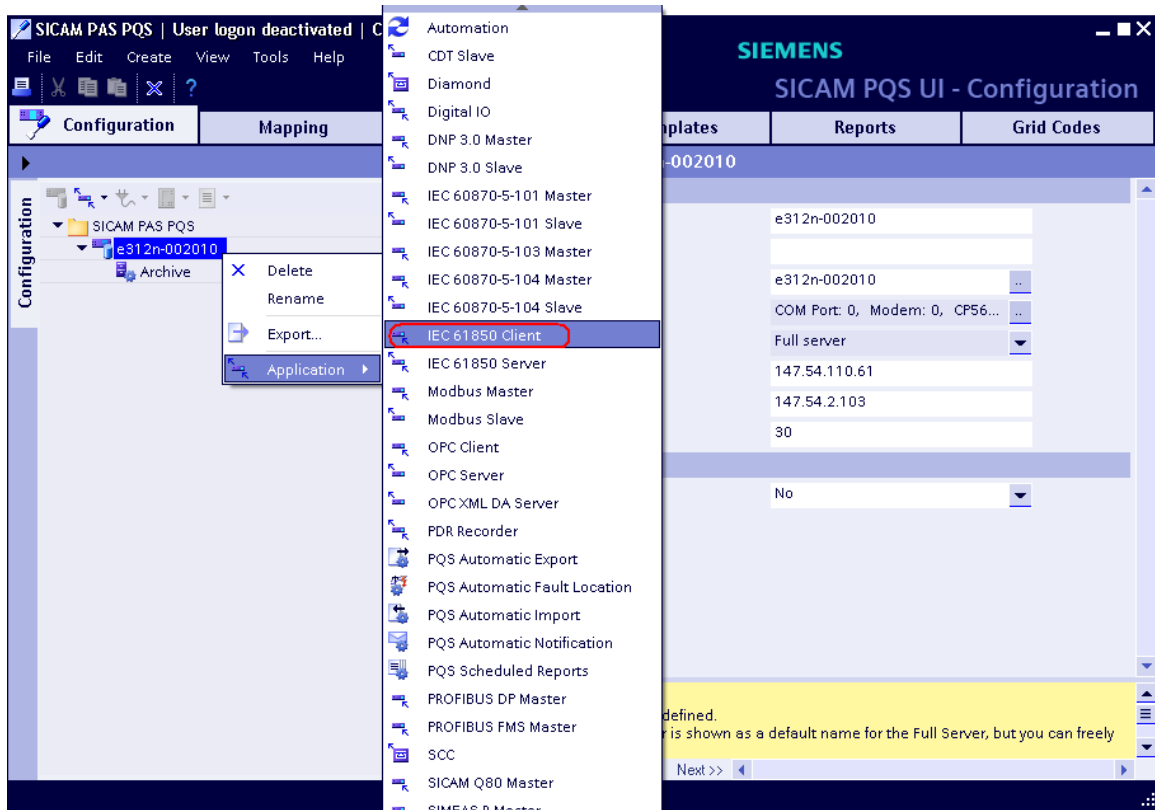


Figure 3-10 Selection of the IEC 61850 Client

- ✧ If necessary, change the name of the IEC 61850 client in the **General Parameters** window.

- ✧ In the navigation window right-click **SICAM PAS PQS** → **Computer name** (in the example: e312n-002010) → **IEC 61850 Client** → **Interface**.

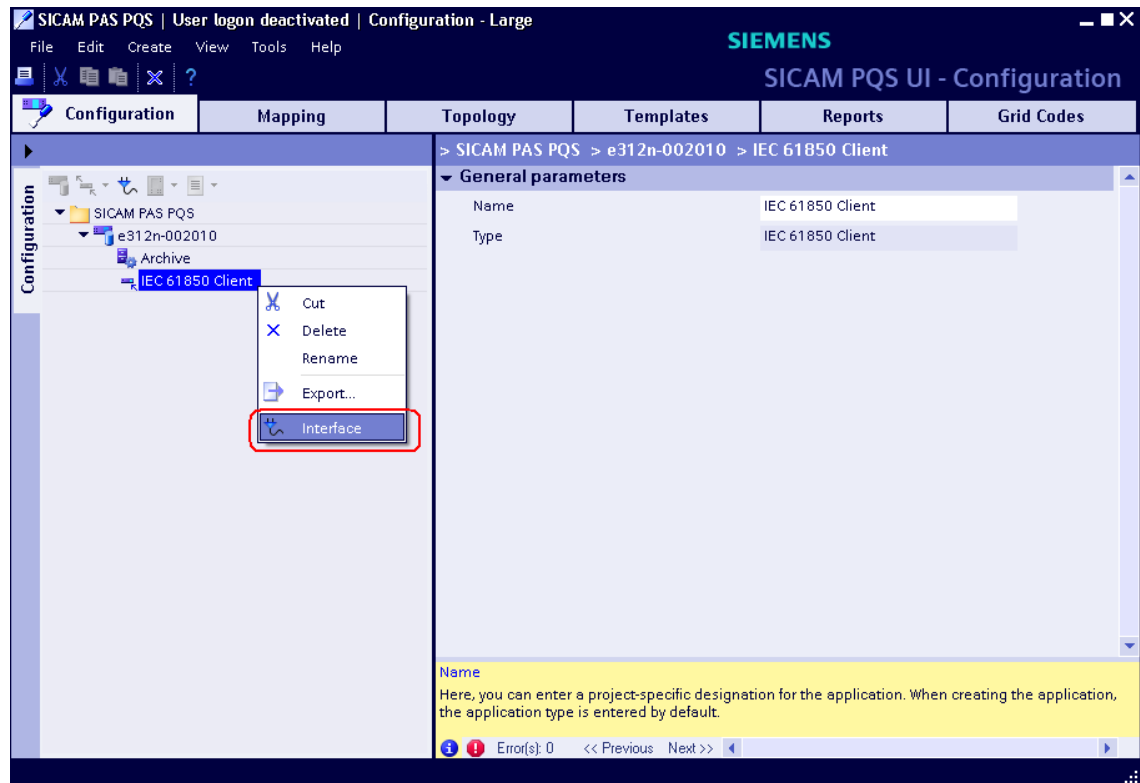


Figure 3-11 Selecting the Interface

3.4 Settings in SICAM PQS

✧ In the **Interface** window enter a **Name**.

The screenshot shows the SICAM PQS UI - Configuration window. The left sidebar displays a tree view with the following structure:

- SICAM PAS PQS
 - e312n-002010
 - Archive
 - IEC 61850 Client
 - Interface (selected)

The main window displays the configuration for the selected 'Interface'. The breadcrumb path is: > SICAM PAS PQS > e312n-002010 > IEC 61850 Client > Interface. The configuration is organized into several sections:

- General parameters**
 - Name: 3P4W (highlighted with a red box)
 - Description:
 - Redundancy: No
 - Dependency: Independent
- Transmission parameters**
 - IP address: 0.0.0.0
 - Subnet mask: 0.0.0.0
- Fault record transmission**
 - Support of the legacy RECPRO archive: No
 - Fault record directory: C:\Documents and Settings\All...
 - Activation on device start: Unknown
 - Polling cycle [min]: 2
- Expert parameters**
 - Manufacturer and firmware version: SIEMENS:3.01.06;
 - Invert DP intermediate state: No
 - Command actual/setpoint comparison: Yes
 - Chatter blocking held: No

At the bottom, there is a yellow box with the text: "Name
Under Name, you can enter a unique name for the interface. The name entered here is taken over as the source in the topology."

The status bar at the bottom shows "Error(s): 0" and navigation buttons: "<< Previous Next >>".

Figure 3-12 Interface Parameters

- ✧ In the navigation window right-click **SICAM PAS PQS** → **Computer name** (in the example: e312n-002010) → **IEC 61850 Client** → **Interface** (in the example: interface designation **3P4W**) → **Import...**

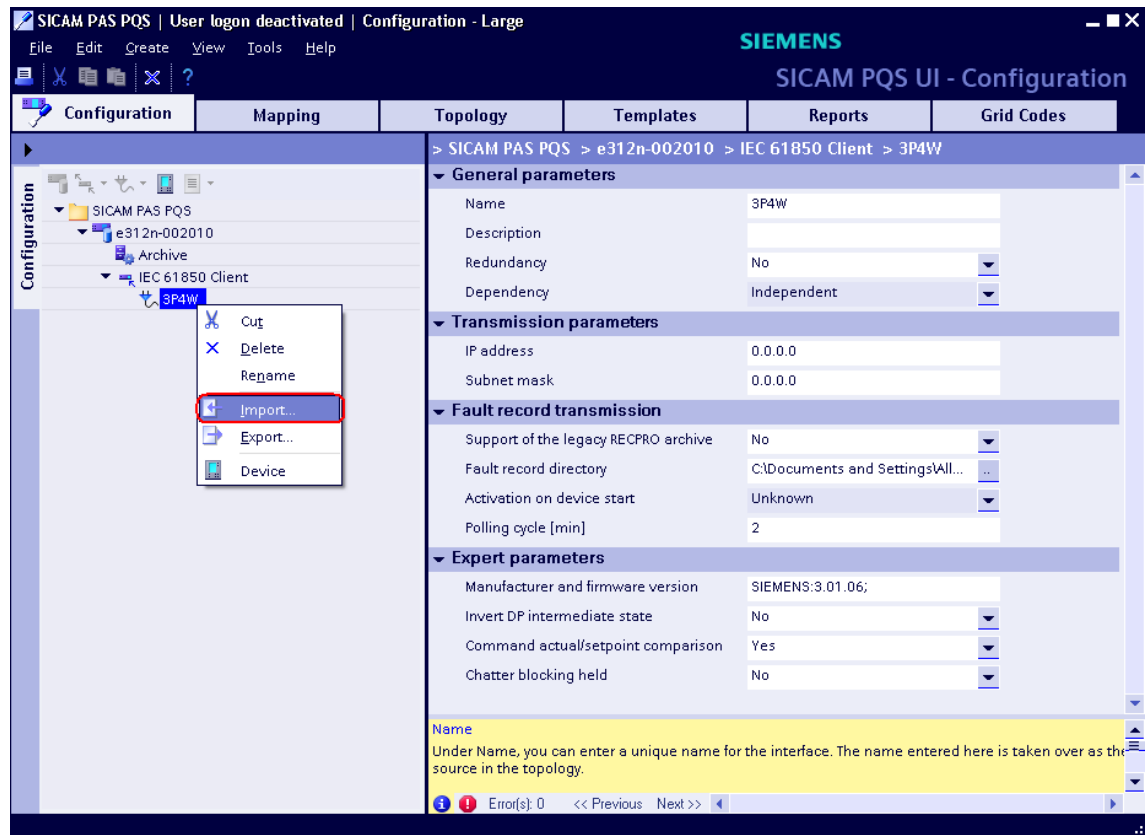


Figure 3-13 Import

3.4 Settings in SICAM PQS

- ✧ In the folder select the file previously downloaded from device (in the example and then click **Open**.

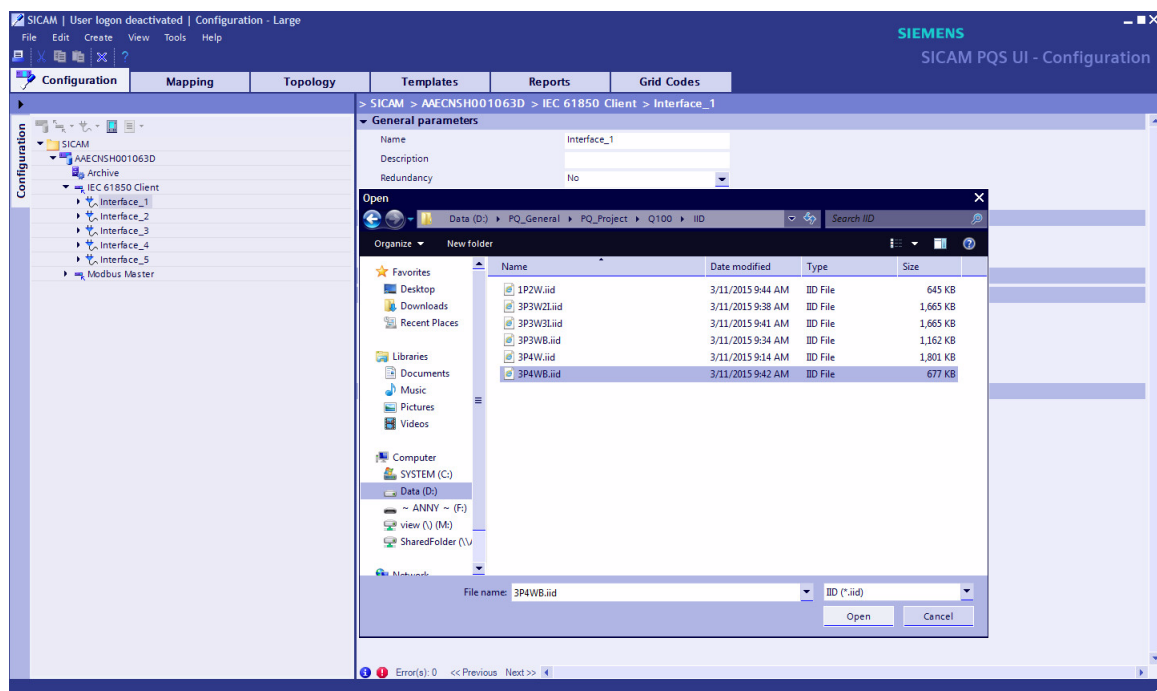


Figure 3-14 Importing the IID File

- ✧ Select the desired element in the next window (in the example: SICAMQ_00001) by checking the **Select** column.

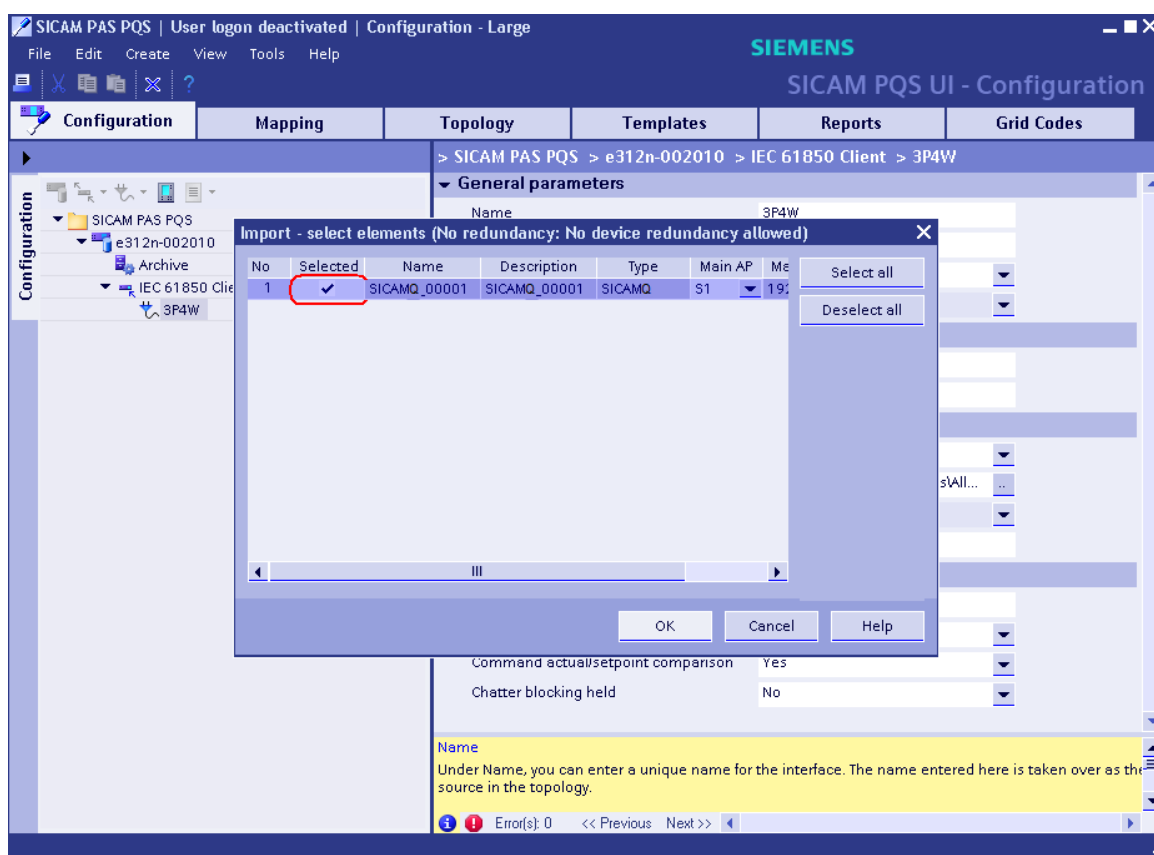


Figure 3-15 Selecting an Element

- ✧ Click **OK**.

3.4 Settings in SICAM PQS

- ✧ If you wish a fault record transmission (COMTRADE files), select **Yes** in the list box under **Fault record transmission** → **Activation on device start**.
- ✧ To transfer PQDIF data of the measured value recorder or trend recorder, select **Yes** in the list box under **PQDIF data transmission** → **Transfer PQDIF data**. The **Name** is taken by the parameter setting of the SICAM Q100 automatically.

SICAM PAS PQS | User login deactivated | Configuration - Large

File Edit Create View Tools Help

SICAM PAS PQS UI - Configuration

Configuration Mapping Topology Templates Reports Grid Codes

> SICAM PAS PQS > e312n-002010 > IEC 61850 Client > 3P4W > 3P4W

General parameters

Name	3P4W
Device group	SICAM_Q100
Description	
Device template	SICAMQ_00001
Buffer time [ms]	50
SCD device name	SICAMQ_00001

Communication parameters

IP address	192.168.0.55
Port	102
IP gateway of the device network	192.168.0.1
IP subnet mask	255.255.255.0
Drop buffered	No
Connection test [ms]	5000

Fault record transmission

Activation on device start	Yes
Transfer SIPROTEC fault records	No

PQDIF data transmission

Transfer PQDIF data	Yes
---------------------	-----

Expert parameters

OSI network address	01
OSI transport selector	0001

Description

Description allows you to enter further information about the device (e.g. to keep a change history).

Error(s): 0 << Previous Next >>

Figure 3-16 Entries

**NOTE**

The fault records can be displayed in PQ Analyzer. Additionally, fault records can be forwarded via **PQS Automatic Export** and **PQS Notification** and displayed by SICAM Diamond.

✧ You execute the assignment of measuring channels for the SICAM Q100 as following:

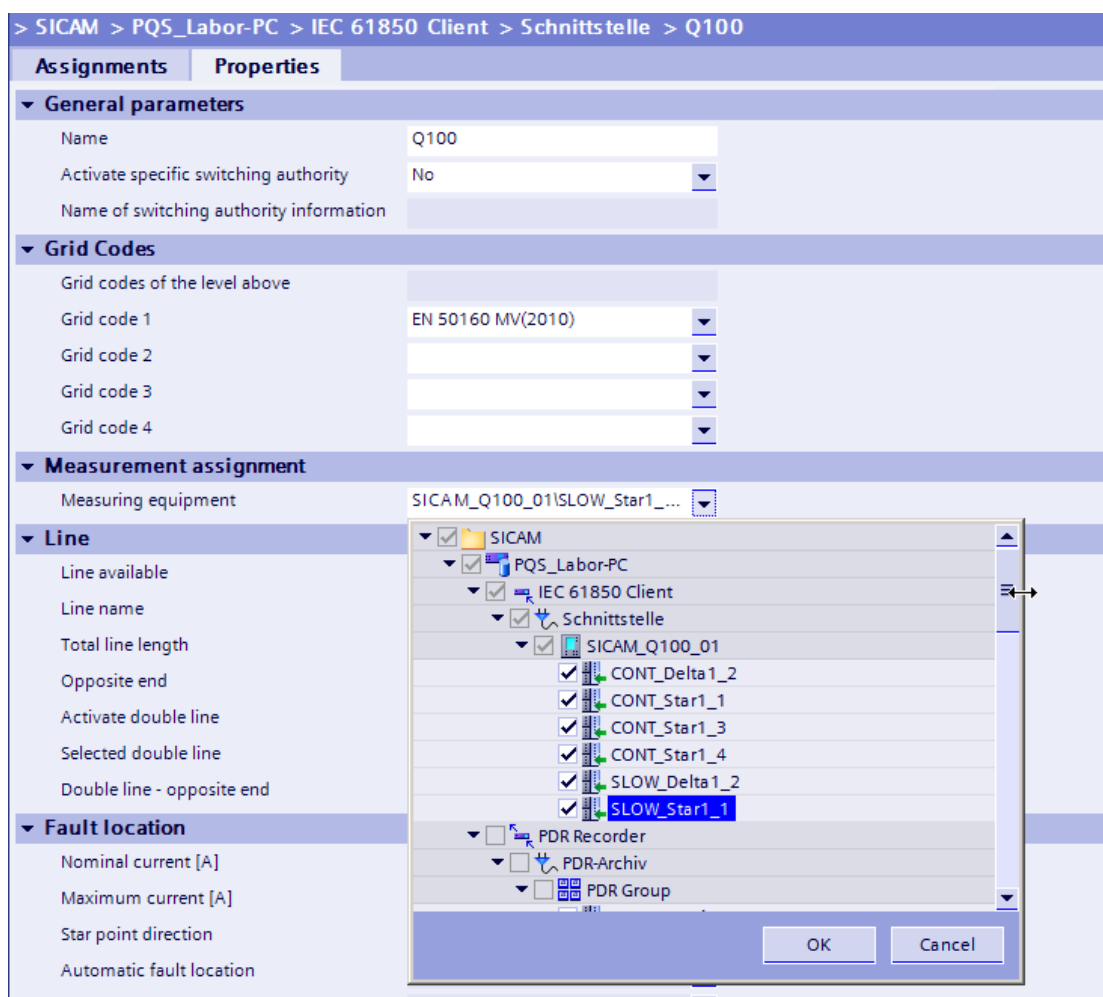


Figure 3-17 Measurement Assignment

✧ Select SLOW_ for Slow Scan Recorder and CONT_ for Continuous Recorder.

3.4.2 Updating the System

- Start the **UI - Operation** updating interface in SICAM PQS.

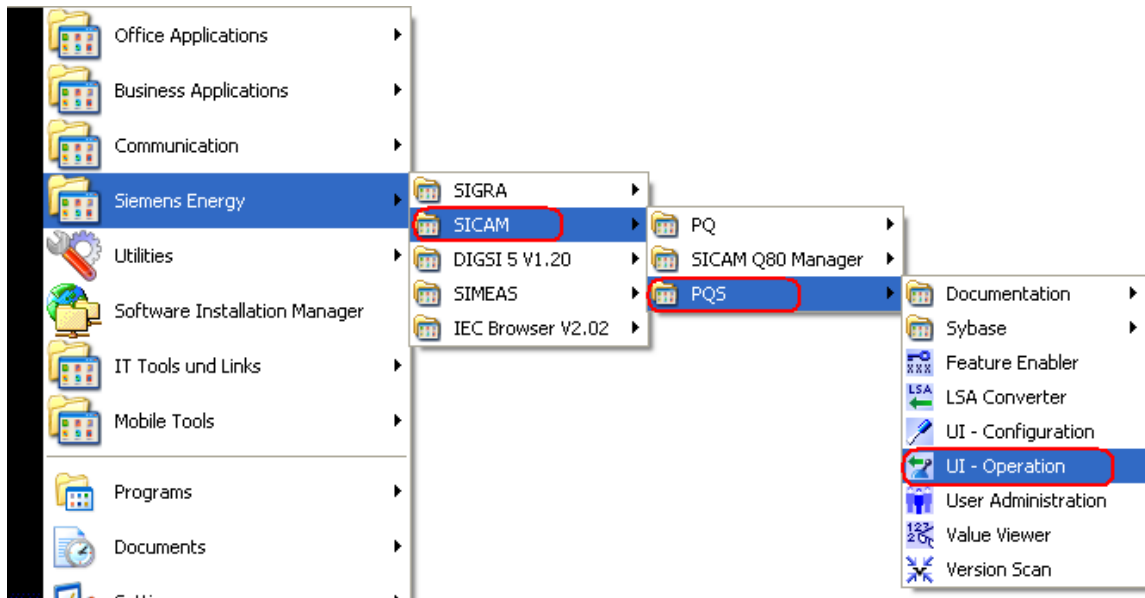


Figure 3-18 Start UI - Operation

- Click **Update system**.

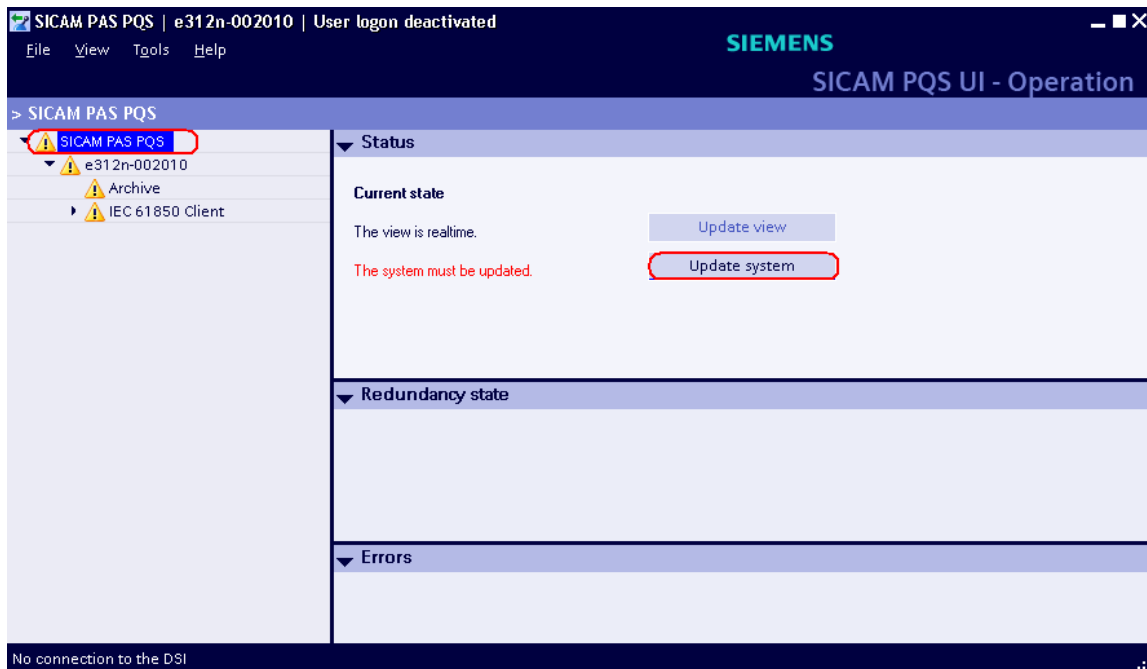


Figure 3-19 Updating the System



NOTE

After the update has been completed successfully, the entries in the navigation window are displayed with a blue icon.

✧ In the navigation window right-click your **Computer name** and subsequently **Start all**.

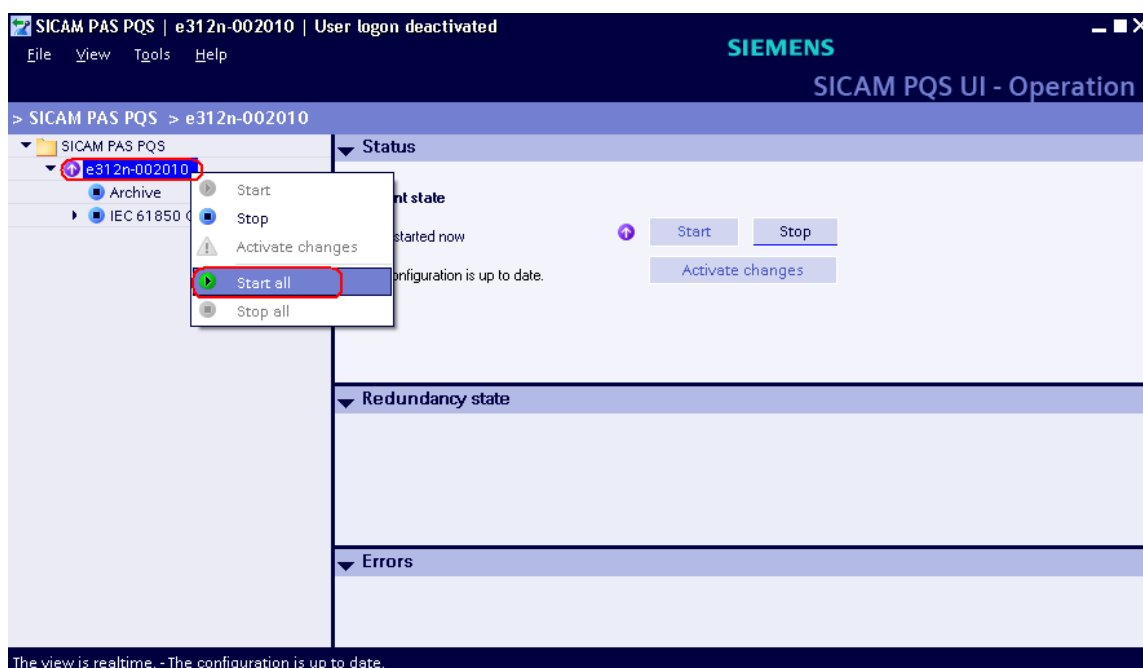


Figure 3-20 Starting the System

The current system status is displayed in the following window.

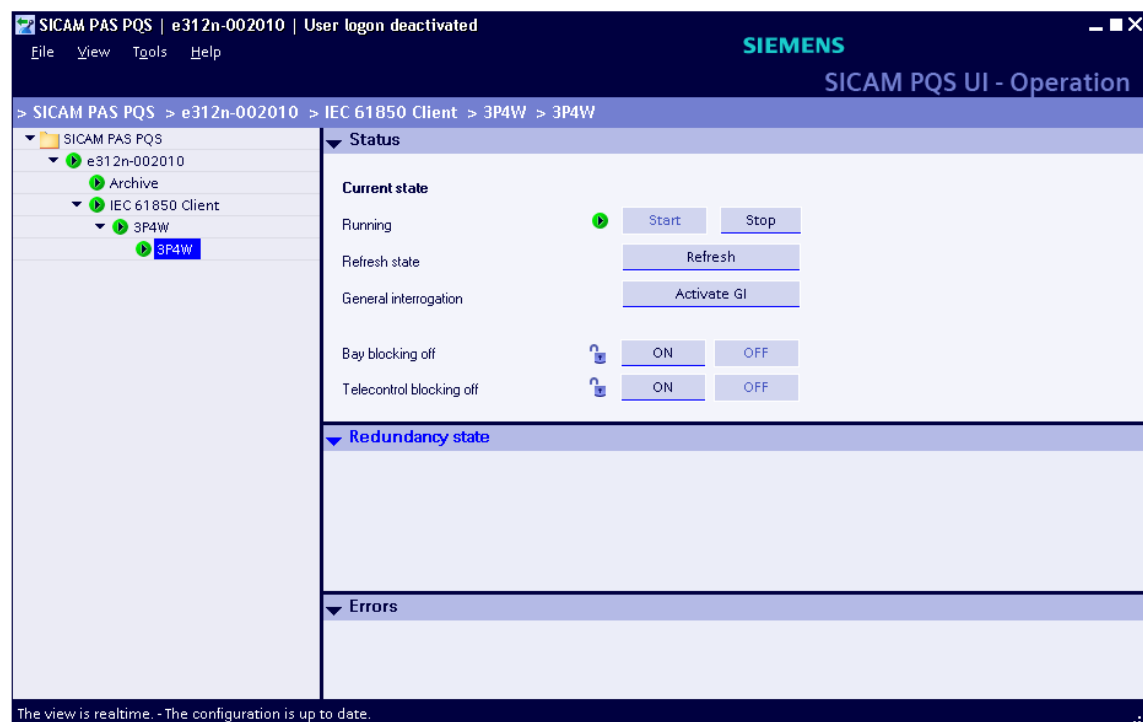


Figure 3-21 Current System Status

3.5 Viewing Measured Values in Value Viewer

- ❖ Start the **Value Viewer** in **SICAM PQS**.

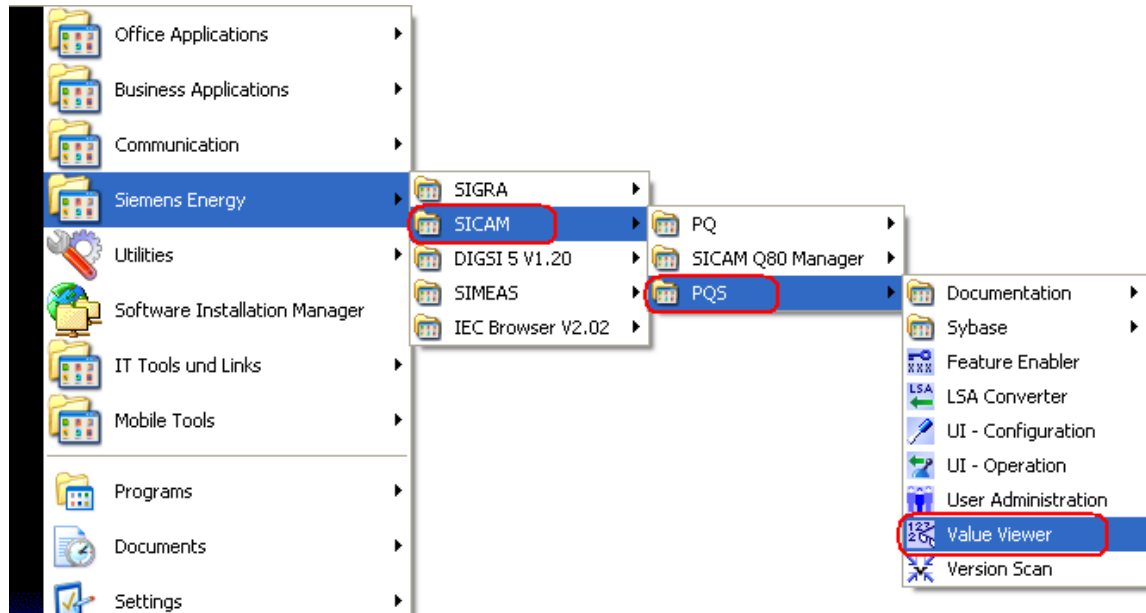


Figure 3-22 Selecting Value Viewer

After starting the **Value Viewer**, the up-to-date measured values are displayed in a table.

SICAM PAS PQS | User login deactivated

SIEMENS

SICAM PQS - Value Viewer

TimeSta...	TimeSta...	TimeSta...	ValuePath	ValueName	Value	Initiator...	CauseOf...	Validit...
(none)	(none)	(none)	(none)	(none)	(none)	(none)	(none)	(none)
18.12.2...	Valid	Low	SICAM ...	PowerQuality/Limit Violations.Limit violation 9	1	Irrelevan...	General...	NotVa
18.12.2...	Valid, Pr...		SICAM ...	PowerQuality/Messurement Energy.Apparent Energ...	3168862	Irrelevan...	Spontan...	Valid
18.12.2...	Valid, Pr...		SICAM ...	PowerQuality/Messurement Energy.Wp Input.actual	3167402	Irrelevan...	Spontan...	Valid
18.12.2...	Valid	Low	SICAM ...	PowerQuality/Messurement Energy.Wp output.actual	175	Irrelevan...	General...	Valid
18.12.2...	Valid	Low	SICAM ...	PowerQuality/Messurement Energy.Wq Input.actual	15	Irrelevan...	General...	Valid
18.12.2...	Valid, Pr...		SICAM ...	PowerQuality/Messurement Energy.Wq output.actual	7149	Irrelevan...	Spontan...	Valid
18.12.2...	Valid, Pr...		SICAM ...	PowerQuality/Messurement cos.phsA	1	Irrelevan...	Spontan...	Valid
18.12.2...	Valid, Pr...		SICAM ...	PowerQuality/Messurement cos.phsB	1	Irrelevan...	Spontan...	Valid
18.12.2...	Valid, Pr...		SICAM ...	PowerQuality/Messurement cos.phsC	1	Irrelevan...	Spontan...	Valid
18.12.2...	Valid, Pr...		SICAM ...	PowerQuality/Messurement cossum	3	Irrelevan...	Spontan...	Valid
18.12.2...	Valid, Pr...		SICAM ...	PowerQuality/Messurement f	50	Irrelevan...	Spontan...	Valid
18.12.2...	Valid, Pr...		SICAM ...	PowerQuality/Messurement I.net	0,999	Irrelevan...	Spontan...	Valid
18.12.2...	Valid	Low	SICAM ...	PowerQuality/Messurement I.neut	0,008	Irrelevan...	General...	Valid
18.12.2...	Valid, Pr...		SICAM ...	PowerQuality/Messurement I.phsA	0,999	Irrelevan...	Spontan...	Valid
18.12.2...	Valid, Pr...		SICAM ...	PowerQuality/Messurement I.phsB	0,999	Irrelevan...	Spontan...	Valid
18.12.2...	Valid, Pr...		SICAM ...	PowerQuality/Messurement I.phsC	0,999	Irrelevan...	Spontan...	Valid
18.12.2...	Valid, Pr...		SICAM ...	PowerQuality/Messurement P.phsA	49,932	Irrelevan...	Spontan...	Valid
18.12.2...	Valid, Pr...		SICAM ...	PowerQuality/Messurement P.phsB	49,975	Irrelevan...	Spontan...	Valid
18.12.2...	Valid, Pr...		SICAM ...	PowerQuality/Messurement P.phsC	49,936	Irrelevan...	Spontan...	Valid
18.12.2...	Valid, Pr...		SICAM ...	PowerQuality/Messurement Psum	149,843	Irrelevan...	Spontan...	Valid
18.12.2...	Valid	Low	SICAM ...	PowerQuality/Messurement Q.phsA	0,037	Irrelevan...	General...	Valid
18.12.2...	Valid	Low	SICAM ...	PowerQuality/Messurement Q.phsB	0	Irrelevan...	General...	Valid
18.12.2...	Valid	Low	SICAM ...	PowerQuality/Messurement Q.phsC	0,059	Irrelevan...	General...	Valid
18.12.2...	Valid	Low	SICAM ...	PowerQuality/Messurement Qsum	0,077	Irrelevan...	General...	Valid
18.12.2...	Valid, Pr...		SICAM ...	PowerQuality/Messurement S.phsA	49,932	Irrelevan...	Spontan...	Valid
18.12.2...	Valid, Pr...		SICAM ...	PowerQuality/Messurement S.phsB	49,975	Irrelevan...	Spontan...	Valid
18.12.2...	Valid, Pr...		SICAM ...	PowerQuality/Messurement S.phsC	49,936	Irrelevan...	Spontan...	Valid
18.12.2...	Valid, Pr...		SICAM ...	PowerQuality/Messurement Ssum	149,843	Irrelevan...	Spontan...	Valid
18.12.2...	Valid, Pr...		SICAM ...	PowerQuality/Messurement U.phsAB	86,589	Irrelevan...	Spontan...	Valid
18.12.2...	Valid, Pr...		SICAM ...	PowerQuality/Messurement U.phsBC	86,45	Irrelevan...	Spontan...	Valid
18.12.2...	Valid, Pr...		SICAM ...	PowerQuality/Messurement U.phsCA	86,688	Irrelevan...	Spontan...	Valid
18.12.2...	Valid, Pr...		SICAM ...	PowerQuality/Messurement UE.net	49,985	Irrelevan...	Spontan...	Valid
18.12.2...	Valid	Low	SICAM ...	PowerQuality/Messurement UE.neut	0,1	Irrelevan...	General...	Valid
18.12.2...	Valid, Pr...		SICAM ...	PowerQuality/Messurement UE.phsA	49,977	Irrelevan...	Spontan...	Valid
18.12.2...	Valid, Pr...		SICAM ...	PowerQuality/Messurement UE.phsB	50,003	Irrelevan...	Spontan...	Valid
18.12.2...	Valid, Pr...		SICAM ...	PowerQuality/Messurement UE.phsC	49,974	Irrelevan...	Spontan...	Valid

DSI Connection Status: OK

Properties

Value: 1

Value (Hex): 0x1

Validity: Not

TimeStamp: 18.

Source: Tele

NormalSource: Tele

NormalRange: Nor

BlockState: Unt

TimeStampStatus: Vali

TimeStampQua...: Low

ValueId: 69%

ValueName: Pov

TypeId: Sca

DisCovSequence: 3

CauseOfTrans...: Ger

InitiatorCategory: Irre

TypeOfValue: Sin

TypeOfIdentific...: Ide

IdentificationN...: 0

TypeOfSupple...: Sup

Supplementary...: 0

AdditionalCause: Adc

Errors: 0 << Previous

Substitute: ☒

Select: ☐

Break: ☐

Control: ☐

Transmit

Figure 3-23 Measured Values Display in Value Viewer

3.6 Graphic Display in PQ Analyzer

To display records graphically, you require the PQ Analyzer in **SICAM PQ**.



NOTE

You receive detailed information about the PQ Analyzer in the manual of the PQ Analyzer.

- Start the **PQ Analyzer** in **SICAM PQ** as follows:

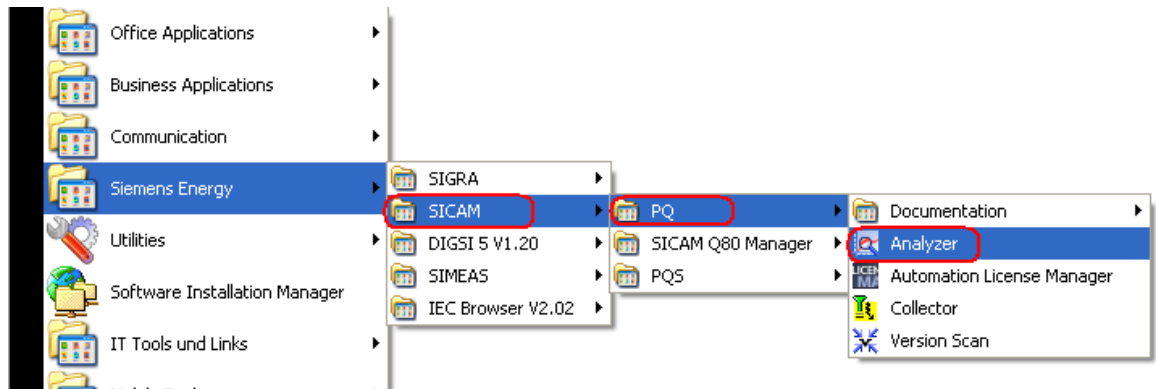


Figure 3-24 Starting PQ Analyzer

Example of Displaying Fault Records

The PQ Analyzer window opens with a list of the COMTRADE data.

- Select the fault record you want to display graphically and click **open**.

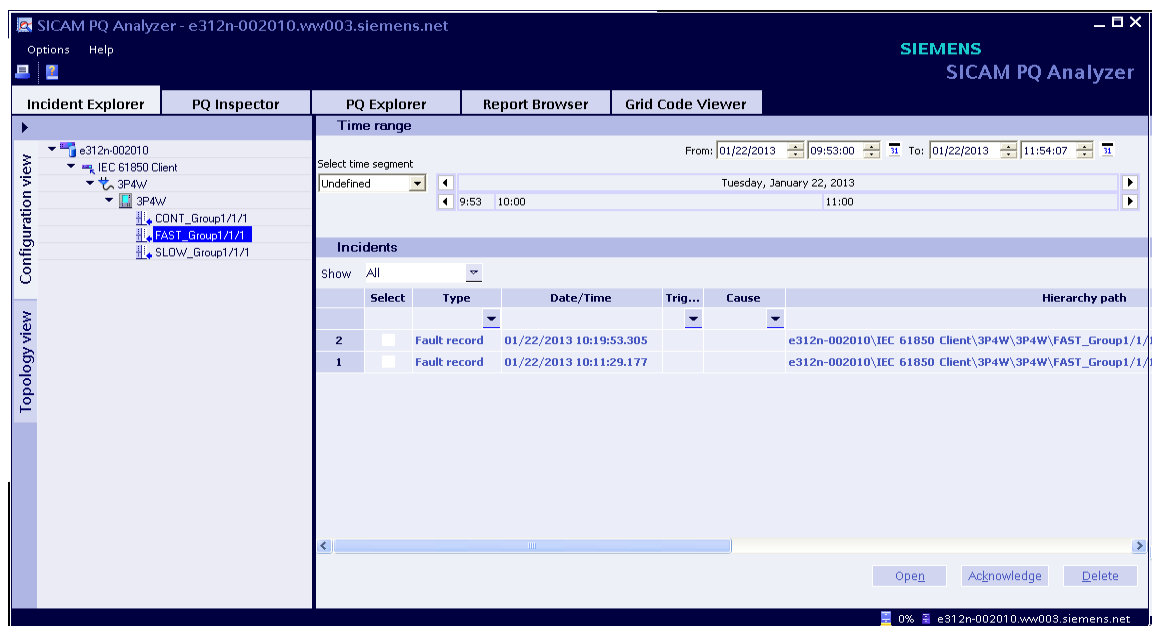


Figure 3-25 Window of the PQ Analyzer

- Click **Open**.

The selected fault record is displayed.

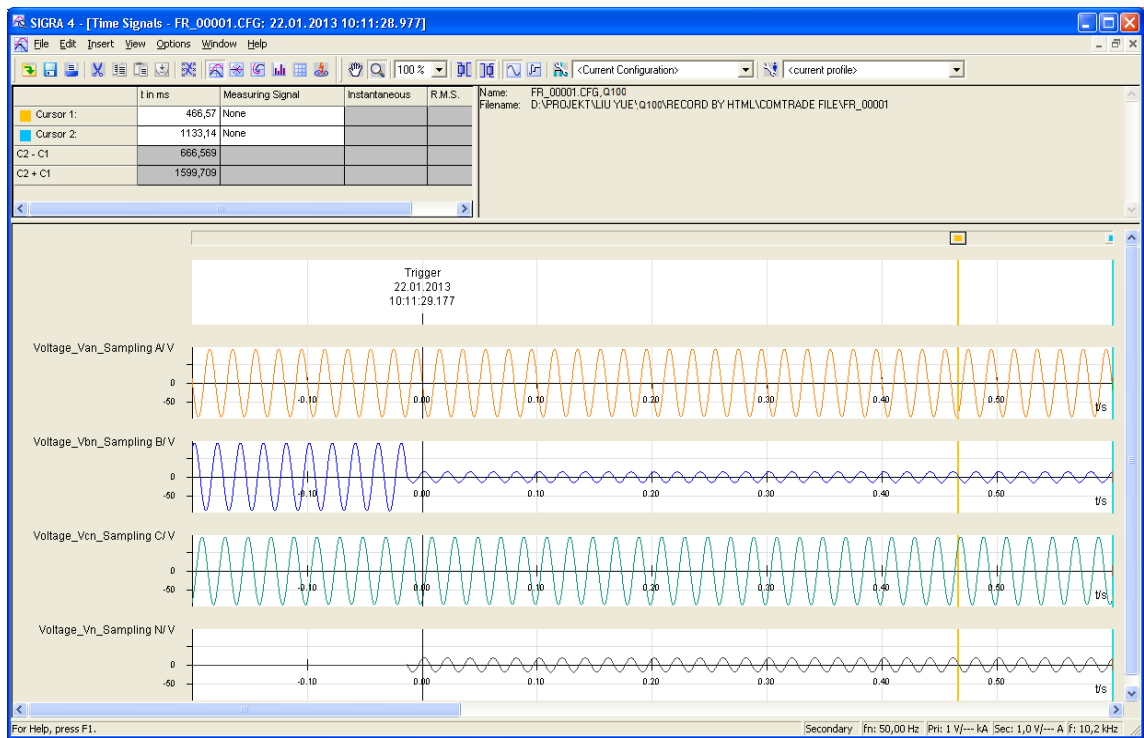


Figure 3-26 Display of a Fault Record

Glossary

A

AC	A lternating C urrent
ARP	A ddress R esolution P rotocol: Network protocol
ASDU	A pplication S ervice D ata U nit

B

Big-Endian format	The most significant byte is stored first, that is at the memory location with the lowest address.
Broadcast message	Message in the network where data packets are transmitted to all devices on the network from one point

C

CDC	C ommon D ata C lass (IEC 61850)
CRC error	C yclic R edundancy C heck: The cyclic redundancy check is a method of determining a test value for data (for example for data transmission in computer networks) with the purpose to detect errors during the transmission or duplication of data.
COMTRADE	C OMmon format for T RAnsient D ata E xchange

D

DC	D irect C urrent
DHCP	D ynamic H ost C onfiguration P rotocol enables the network configuration to be assigned to the devices by a DHCP server
DST	D aylight S aving T ime

E

Ethernet	Cable-based data network technology for local data networks
----------	---

F

FW	F irm w are: Program code for execution in a microcontroller
----	--

G

Gateway	Enables networks based on different protocols to communicate with each other
---------	--

H		
Holding register		Area for representing data in Modbus communication
I		
ICD file		IED Capability Description : Contains the standardized description of the device configuration
IEC		International Electrotechnical Commission , standardization body; Communication standard for substations and protection equipment
IEC 61850		Type of protocol to the data transmission via Ethernet
IED		Intelligent Electronic Device
+Inf		Stands for <i>Infinity</i> and denotes a counter overflow. Extremely large number or infinitely positive number
IP		Internet Protocol
IP address		Addresses in computer networks based on the Internet protocol
K		
KeepAlive		KeepAlive on TCP level is a feature intended to verify the availability and functioning of the communication partner (client) and to maintain a TCP network link if the network is inactive. The server sends KeepAlive messages (TCP packets without data) to the client in regular intervals (KeepAlive time) while the network is inactive, and the client responds to these messages. If the client does not respond to a KeepAlive message, the server assumes that the link is down or the client is inactive and closes the TCP link.
L		
LED		Light-Emitting Diode
Limit violation		A value exceeding or falling under a parameterized limiting value.
LSB		Least Significant Bit
M		
MAC-Address		Media Access Control address: Hardware address that clearly identifies the device on the network.
MBAP		Modbus Application Protocol
MBAP Header		Header of a Modbus TCP message consisting of these 4 parts: Transaction identifier (2 bytes), protocol identifier (2 bytes), length (2 bytes), unit identifier (1 byte).
Modbus		The Modbus protocol is a communication protocol based on a client-server architecture.
Modbus RTU		Modbus Remote Terminal Unit : Modbus protocol type for transmitting data over serial networks (for example RS485)
Modbus TCP		Modbus Transmission Control Protocol : Modbus protocol type for transmitting data as TCP/IP packets; TCP port 502 is reserved for Modbus TCP.

MSB	M ost S ignificant B it
MSV	M ains S ignalling V oltage
N	
NaN	N ot a N umber means "invalid": Result of an invalid computing operation
NTP	N etwork T ime P rotocol: Standard for synchronizing clocks in computer systems using packet-based communication networks
R	
RJ45	Ethernet plug connector
RS485	Interface standard for digital, wire-based, differential, serial data transmission
RTC	R ea - T ime C lock
RTU	See Modbus R emote T erminal U nit
S	
Server	Sends data upon request by the client
SNMP	S imple N etwork M anagement P rotocol: Serves for monitoring and controlling network elements of a central station
SNTP	S imple N etwork T ime P rotocol: Simplified version of the NTP
SW	S oftware: Program executed on a computer
STP	S hielded t wisted- p air is the cable for 100Base-T (Ethernet)
Subnet mask	Bit mask in the network protocol that defines how many IP addresses the computer network encompasses. Together with the IP address of a device, the subnet mask defines which IP addresses the device searches in its own network and which IP addresses it tries to reach via routers in other networks.
T	
TCP/IP	T ransmission C ontrol P rotocol/ I nternet P rotocol: Family of network protocols

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