



ezPAC™

Substation Automation Unit  
SA310/SA320/SA330

Modbus Communications Protocol  
GOST 13109-97 extensions

---

Reference Guide

Every effort has been made to ensure that the material herein is complete and accurate. However, the manufacturer is not responsible for any mistakes in printing or faulty instructions contained in this book. Notification of any errors or misprints will be received with appreciation.

For further information regarding a particular installation, operation or maintenance of equipment, contact the manufacturer or your local representative or distributor.

This document is applicable to devices with firmware versions:

SA310N/SA320N/SA300N:

20.7.XX - Basic Fault + GOST 13109

20.17.XX - Basic Fault + GOST 13109 + IEC 61850

#### REVISION HISTORY

A1	July 2009	Release. Applicable to F/W versions 10.7.XX and 10.17.XX.
A2	Dec 2009	Added IEC 61850 GOOSE publisher and subscriber setup.
A3	Jan 2011	Added direct control ports blocking setup. Added IEC 61850 GOOSE subscriber update status register. Added TCP notification client. Added communication counters.
A4	Feb 2013	Applicable to F/W versions 20.7.07 and 20.17.07 or later: Added IEC 61850 IED properties setup registers. Added bay controller configuration, monitoring and control registers. Applicable to F/W versions 20.7.10 and 20.17.10 or later: Added AI 1/2 cycle, 1 sec, demand and Min/Max log registers. Added incremental/decremental delta and relative delta triggers.

Modbus is a trademark of Schneider Electric.

# Table of Contents

<b>1 GENERAL .....</b>	<b>10</b>
<b>2 MODBUS PROTOCOL IMPLEMENTATION.....</b>	<b>11</b>
2.1 Transmission Modes .....	11
2.2 Address Field .....	11
2.3 Function Field.....	11
2.4 Exception Responses .....	11
2.5 Modbus Register Addresses .....	11
2.6 Data Formats .....	12
2.6.1 16-bit Scaled Integer Format .....	12
2.6.2 32-bit Long Integer Format .....	13
2.6.3 32-bit Modulo-10000 Format .....	14
2.7 User Assignable Registers.....	14
2.8 Password Protection .....	15
2.9 Data Recording and File Transfers .....	15
2.9.1 Log File Organization.....	15
2.9.2 File Transfers.....	17
2.10 TCP Notification Client.....	19
<b>3 MODBUS REGISTER MAP .....</b>	<b>21</b>
3.1 Modbus Setup Registers.....	21
Modbus Assignable Registers.....	21
Assignable Registers Map .....	21
Modbus Conversion Scales .....	21
3.2 16-bit Scaled Analog Values - Basic Register Set .....	22
3.3 16-bit Scaled Analog Values .....	24
1/2-Cycle Values.....	24
1-Cycle Phase Values.....	24
1-Cycle Low Phase Values .....	25
1/2-Cycle Analog Inputs.....	25
1-Cycle High Phase Values .....	26
1-Second Analog Inputs.....	26
1-Cycle Total Values.....	26
1-Cycle Auxiliary Values .....	26
Fundamental Phasor Values.....	27
1-Second Phase Values.....	27
1-Second Low Phase Values .....	28
1-Second High Phase Values .....	28
1-Second Total Values.....	29
1-Second Auxiliary Values .....	29
Present Harmonic Demands .....	29
Present Demands .....	29
Symmetrical Components .....	30
V1 Harmonics .....	30
V2 Harmonics .....	31
V3 Harmonics .....	31
I1 Harmonics.....	31
I2 Harmonics.....	31
I3 Harmonics.....	31
V1 Harmonic Voltages (odd numbers) .....	31
V2 Harmonic Voltages (odd numbers) .....	31
V3 Harmonic Voltages (odd numbers) .....	31
I1 Harmonic Currents (odd numbers).....	32
I2 Harmonic Currents (odd numbers).....	32
I3 Harmonic Currents (odd numbers).....	32

Total Harmonic kW (odd numbers) .....	32
Total Harmonic kvar (odd numbers).....	32
Total Harmonic Power Factor (odd numbers) .....	32
V4 Harmonics .....	32
Flicker .....	32
I4 Harmonics.....	33
Minimum 1-Cycle Phase Values .....	33
Minimum 1-Cycle Total Values .....	34
Minimum 1-Cycle Auxiliary Values.....	34
Minimum Analog Inputs.....	34
Programmable Min/Max Minimum Values.....	34
V4 Harmonic Voltages (odd numbers) .....	34
I4 Harmonic Currents (odd numbers).....	34
Maximum 1-Cycle Phase Values .....	35
Maximum 1-Cycle Total Values .....	35
Maximum 1-Cycle Auxiliary Values .....	36
Maximum Analog Inputs.....	36
Maximum Demands .....	36
Programmable Min/Max Maximum Values.....	36
Maximum Harmonic Demands.....	37
Maximum Analog Input Demands .....	37
Present Analog Input Demands .....	37
1-Cycle Analog Inputs .....	37
Raw Analog Inputs .....	37
Scaled Analog Outputs .....	38
Billing Summary Accumulated Demands .....	38
Billing Summary Block Demands .....	38
Billing Summary Sliding Window Demands .....	38
Billing Summary Maximum Demands .....	38
Billing TOU Maximum Demand Register #1.....	38
Billing TOU Maximum Demand Register #4.....	38
Billing TOU Maximum Demand Register #2.....	38
Billing TOU Maximum Demand Register #5.....	39
Billing TOU Maximum Demand Register #3.....	39
Billing TOU Maximum Demand Register #6.....	39
Billing TOU Maximum Demand Register #7.....	39
Billing TOU Maximum Demand Register #8.....	39
Billing TOU Maximum Demand Register #9.....	39
Billing TOU Maximum Demand Register #10.....	39
Billing TOU Maximum Demand Register #11.....	39
Billing TOU Maximum Demand Register #12.....	40
Billing TOU Maximum Demand Register #13.....	40
Billing TOU Maximum Demand Register #14.....	40
Billing TOU Maximum Demand Register #15.....	40
Billing TOU Maximum Demand Register #16.....	40
0.2-Second RMS and Auxiliary Values .....	40
3-Second RMS and Auxiliary Values .....	41
1-Minute RMS and Auxiliary Values.....	41
10-Minute RMS and Auxiliary Values.....	42
2-Hour RMS and Auxiliary Values.....	43
0.2-Second Harmonics.....	43
3-Second Harmonics.....	44
10-Minute Harmonics .....	45
2-Hour Harmonics.....	46
<b>3.4 32-bit Binary and Analog Values .....</b>	<b>48</b>
Setpoint Status.....	48
Special Inputs .....	48
Event Flags .....	48
Internal Pulsed Events .....	48
External Triggers (UDP).....	48
Periodic Timers .....	48
Digital Inputs .....	49
Pulse Inputs .....	49

Relay Outputs .....	49
Static Event Flags .....	49
Counters .....	50
Time/Date .....	50
1/2-Cycle Values .....	50
1-Cycle Phase Values .....	51
1-Cycle Low Phase Values .....	51
1/2-Cycle Analog Inputs .....	52
1-Cycle High Phase Values .....	52
1-Second Analog Inputs .....	52
1-Cycle Total Values .....	52
1-Cycle Auxiliary Values .....	53
Fundamental Phasor Values .....	53
1-Second Phase Values .....	53
1-Second Low Phase Values .....	54
1-Second High Phase Values .....	54
1-Second Total Values .....	55
1-Second Auxiliary Values .....	55
Present Harmonic Demands .....	55
Present Demands .....	56
Total Energies .....	57
Billing Summary Registers .....	57
Symmetrical Components .....	57
V1 Harmonics .....	57
V2 Harmonics .....	57
V3 Harmonics .....	57
I1 Harmonics .....	58
I2 Harmonics .....	58
I3 Harmonics .....	58
V1 Harmonic Voltages (odd numbers) .....	58
V2 Harmonic Voltages (odd numbers) .....	58
V3 Harmonic Voltages (odd numbers) .....	58
I1 Harmonic Currents (odd numbers) .....	58
I2 Harmonic Currents (odd numbers) .....	58
I3 Harmonic Currents (odd numbers) .....	59
Total Harmonic kW (odd numbers) .....	59
Total Harmonic kvar (odd numbers) .....	59
Total Harmonic Power Factor (odd numbers) .....	59
V4 Harmonics .....	59
Flicker .....	59
I4 Harmonics .....	59
Minimum 1-Cycle Phase Values .....	59
Minimum 1-Cycle Total Values .....	60
Minimum 1-Cycle Auxiliary Values .....	60
Minimum Analog Inputs .....	61
Programmable Min/Max Minimum Values .....	61
V4 Harmonic Voltages (odd numbers) .....	61
I4 Harmonic Currents (odd numbers) .....	61
Maximum 1-Cycle Phase Values .....	61
Maximum 1-Cycle Total Values .....	62
Maximum 1-Cycle Auxiliary Values .....	62
Maximum Analog Inputs .....	63
Maximum Demands .....	63
Programmable Min/Max Maximum Values .....	63
Maximum Harmonic Demands .....	63
Maximum Analog Input Demands .....	64
Present Analog Input Demands .....	64
1-Cycle Analog Inputs .....	64
Raw Analog Inputs .....	64
TOU Parameters .....	64
Scaled Analog Outputs .....	64
Billing TOU Register #1 .....	64
Billing TOU Register #2 .....	65

Billing TOU Register #3.....	65
Billing TOU Register #4.....	65
Billing TOU Register #5.....	65
Billing TOU Register #6.....	65
Billing TOU Register #7.....	65
Billing TOU Register #8.....	65
Billing TOU Register #9.....	65
Billing TOU Register #10.....	66
Billing TOU Register #11.....	66
Billing TOU Register #12.....	66
Billing TOU Register #13.....	66
Billing TOU Register #14.....	66
Billing TOU Register #15.....	66
Billing TOU Register #16.....	66
Billing Summary Accumulated Demands .....	66
Billing Summary Block Demands .....	67
Billing Summary Sliding Window Demands .....	67
Billing Summary Maximum Demands .....	67
Billing TOU Maximum Demand Register #1.....	67
Billing TOU Maximum Demand Register #4.....	67
Billing TOU Maximum Demand Register #2.....	67
Billing TOU Maximum Demand Register #5.....	67
Billing TOU Maximum Demand Register #3.....	67
Billing TOU Maximum Demand Register #6.....	68
Billing TOU Maximum Demand Register #7.....	68
Billing TOU Maximum Demand Register #8.....	68
Billing TOU Maximum Demand Register #9.....	68
Billing TOU Maximum Demand Register #10.....	68
Billing TOU Maximum Demand Register #11.....	68
Billing TOU Maximum Demand Register #12.....	68
Billing TOU Maximum Demand Register #13.....	68
Billing TOU Maximum Demand Register #14.....	69
Billing TOU Maximum Demand Register #15.....	69
Billing TOU Maximum Demand Register #16.....	69
0.2-Second RMS and Auxiliary Values .....	69
3-Second RMS and Auxiliary Values .....	70
1-Minute RMS and Auxiliary Values.....	70
10-Minute RMS and Auxiliary Values.....	71
2-Hour RMS and Auxiliary Values.....	72
0.2-Second Harmonics.....	72
3-Second Harmonics.....	73
10-Minute Harmonics .....	74
2-Hour Harmonics .....	75
Present GOST 13109 PQ Values .....	75
External Integer Measured Values.....	76
External Float Measured Values.....	76
External Indication .....	76
Switch Position Indication .....	77
Switch Operation-Open Indication .....	77
Switch Operation-Close Indication .....	77
Switch Operation Counters (resettable).....	77
Generic TOU Energy Registers .....	77
Generic TOU Maximum Demand Registers.....	78
Generic Data.....	78
<b>3.5 Minimum/Maximum Log Registers.....</b>	<b>81</b>
Minimum Phase Values .....	81
Minimum Total Values.....	82
Minimum Analog Inputs.....	83
Minimum Auxiliary Values.....	83
Programmable Min/Max Minimum Values.....	83
Maximum Analog Inputs.....	83
Maximum Phase Values .....	84
Maximum Total Values.....	85

Maximum Analog Input Demands .....	86
Maximum Auxiliary Values .....	86
Billing Summary Maximum Demands .....	86
Maximum Demands .....	87
Programmable Min/Max Maximum Values.....	88
Maximum Harmonic Demands .....	88
Billing TOU Maximum Demand Register #1.....	88
Billing TOU Maximum Demand Register #4.....	89
Billing TOU Maximum Demand Register #2.....	89
Billing TOU Maximum Demand Register #5.....	89
Billing TOU Maximum Demand Register #3.....	89
Billing TOU Maximum Demand Register #6.....	89
Billing TOU Maximum Demand Register #7.....	90
Billing TOU Maximum Demand Register #8.....	90
Billing TOU Maximum Demand Register #9.....	90
Billing TOU Maximum Demand Register #10.....	90
Billing TOU Maximum Demand Register #11.....	90
Billing TOU Maximum Demand Register #12.....	91
Billing TOU Maximum Demand Register #13.....	91
Billing TOU Maximum Demand Register #14.....	91
Billing TOU Maximum Demand Register #15.....	91
Billing TOU Maximum Demand Register #16.....	91
<b>3.6 Device Control and Status Registers .....</b>	<b>93</b>
Event Flags Registers (bit map).....	93
Remote Relay Control Registers (bit map).....	93
Reset/Clear Registers .....	94
Device Mode Control Registers .....	94
UDP Cross-trigger Register .....	94
Memory Status Registers.....	94
Log Notification Registers (bit map) .....	94
Setpoint Status Registers (bit map) .....	94
Setpoint Alarm Latch Registers (bit map).....	94
Device Diagnostics Register (bit map) .....	95
GOOSE Subscriber Status Register (bit map) .....	95
Port Identification .....	95
Current Network Settings .....	95
Device Authorization Register .....	95
Communication Counters.....	95
Switch Remote Control Registers .....	95
Switch Status Registers .....	96
Factory Diagnostic Registers .....	97
<b>3.7 Device Setup Registers.....</b>	<b>98</b>
Device Identification.....	98
Factory Device Settings .....	98
Basic Setup.....	98
Demands Setup .....	99
Device Options Setup .....	99
Time/Date Setup .....	100
Clock Setup and Status.....	100
Communication Ports Setup .....	101
Network Setup .....	101
Password Setup.....	101
IEC 61850 License Setup .....	102
Expert Power Service Setup .....	102
Internet Service Provider (ISP) account.....	102
SNTP Client Setup.....	102
TCP Notification Client Setup.....	102
GOOSE Subscriber Setup .....	102
GOOSE Publisher Setup.....	103
IEC 61850 IED Setup.....	103
IEC 61850 Dataset Setup .....	104
IEC 61850 RCB Setup .....	104
IEC 61850 Report Deadbands .....	105

DNP Options Setup.....	105
DNP Events Setup .....	105
DNP Class 0 Point Assignment.....	106
Direct Control Ports Setup .....	106
GOST 13109 PQ Recorder Triggers Setup.....	106
Advanced GOST 13109 Setup.....	107
GOST 13109 Harmonic Voltage Limits .....	108
SOE Log Labels.....	108
Fault Log Triggers Setup.....	108
Fault Log Recording Setup .....	109
File Setup.....	109
Waveform Recorder Setup.....	110
Data Log Setup .....	111
Programmable Min/Max Log Setup.....	111
TOU Daily Profile Setup .....	112
TOU Calendar Years Setup .....	112
TOU Calendar Setup .....	113
Billing/TOU Registers Setup .....	116
Billing/TOU Registers Source Setup .....	116
Control Setpoints Setup (SP1-SP32) .....	116
Control Setpoints Setup (SP1-SP64).....	117
Switching Device Setup .....	118
Periodic Timers Setup.....	120
Energy Pulse Source Setup.....	120
Counters Setup .....	120
Counter Source Setup.....	121
Digital Inputs Setup DI1-DI64.....	121
Digital Inputs Setup DI65-DI128.....	121
Relay Outputs Setup .....	121
Analog Inputs Setup.....	122
Analog Outputs Setup .....	122
<b>3.8 Expansion I/O Slots Configuration .....</b>	<b>123</b>
Expansion I/O Slots Configuration Info .....	123
Expansion I/O Modules Type Info.....	123
<b>3.9 File Transfer Blocks .....</b>	<b>125</b>
File Transfer Control Blocks.....	125
File Info Response Block (Variation 0 – File info) .....	126
File Info Response Block (Variation 1 – Current record info) .....	127
File Info Response Block (Variation 2 – Data log record structure).....	127
Event Log Response Block.....	128
Data Log Response Block.....	128
Waveform Log Response Block.....	129
Sequence of Events (SOE) Log Response Block .....	129
Power Quality (PQ) Log Response Block .....	130
Fault Log Response Block .....	131
File Response Block Alias.....	132
Power Quality (PQ) Log Response Block Alias.....	132
<b>3.10 GOST 13109 Compliance Statistics Data Log .....</b>	<b>134</b>
<b>3.11 GOST 13109 Harmonic Statistics Data Log.....</b>	<b>140</b>
<b>3.12 Billing/TOU Daily and Monthly Profile Data Logs.....</b>	<b>143</b>
<b>4 DATA SCALES AND UNITS .....</b>	<b>145</b>
Data Scales.....	145
Data Units .....	145
<b>5 DATA FORMATS .....</b>	<b>146</b>
Timestamp .....	146
File ID.....	146
File Attributes .....	146
File Status Word (bitmap) .....	146
File Record Status Word (bitmap).....	146



Billing/TOU Profile Log Channel ID .....	146
Waveform Log Channel ID .....	146
Billing/TOU Profile Log Channel Mask (bitmap) .....	147
Waveform Log Channel Mask (bitmap) .....	147
TOU Tariff Change Time .....	147
Billing/TOU Register Source ID .....	147
Setpoint Trigger Parameters ID .....	148
Setpoint Relational Operator .....	148
Setpoint Action ID .....	148
Energy Pulse Source ID .....	148
Counter Source ID .....	149
Relay Output Pulse Source ID .....	149
AO Parameters ID (see Section 3.4 for data scales) .....	149
Event Source/Point ID .....	150
Event Effect ID .....	150
Data/Function Point ID .....	151
Event Type ID .....	152
Device Diagnostics (bitmap) .....	152
DNP Object Types .....	153
DNP Class 0 Objects .....	153
Wiring Mode .....	154
IEC 61850 Measured Value Indices .....	154

# 1 General

This document specifies a subset of the Modbus communications protocol used to transfer data between a master computer station and the SA300. The document provides the complete information necessary to develop third-party communications software capable of communication with the SA300. Refer to the SA300 Installation Manual and SA300 Operation Manual for more information on communication connections and configuring communication parameters in your device.

## 2 Modbus Protocol Implementation

For detailed information on the Modbus protocol, message framing and error checking, refer to the Modbus Protocol Reference Guide. It can be downloaded from the Modbus-IDA Website at <http://www.modbus.org/>. The following paragraphs outline some issues concerning the implementation of the Modbus protocol in the SA300.

### 2.1 Transmission Modes

The SA300 can be set up to communicate on a serial Modbus network using either RTU, or ASCII serial transmission mode, and via the Internet using Modbus/TCP mode. Refer to the SA300 Operation Manual for information on selecting the transmission mode in your device.

### 2.2 Address Field

The address field contains a user assigned address of the instrument (1-247) on a Modbus network. Broadcast mode using address 0 is not supported.

When communicating via the Internet, the address field is not checked and is returned in the response message header.

### 2.3 Function Field

The Modbus functions implemented in the SA300 are shown in Table 2-1. Function 04 can be used in the same context as function 03.

**Table 2-1 Modbus Function Codes**

Code (decimal)	Meaning in Modbus	Action
03	Read holding registers	Read multiple registers
04	Read input registers	Read multiple registers
06	Preset single register	Write single register
16	Preset multiple registers	Write multiple registers
22	Mask write	Set or clear individual bits
08 <sup>1</sup>	Loop-back test	Communications test

<sup>1</sup> The SA300 supports only diagnostic code 0 - return query data.

### 2.4 Exception Responses

The instrument sends an exception response when an error is detected in the received message. To indicate that the response is notification of an error, the high order bit of the function code is set to 1.

Implemented exception response codes:

- 01** - Illegal function
- 02** - Illegal data address
- 03** - Illegal data value
- 04** - Device failure

When the character framing, parity, or redundancy check detects a communication error, processing of the master's request stops. The instrument will not act on or respond to the message.

### 2.5 Modbus Register Addresses

The SA300 Modbus registers are numbered in the range of 0 to 65535. From the Modbus applications, the SA300 Modbus registers can be accessed by simulating

holding registers of the Modicon 584, 884 or 984 Programmable Controller, using a 5-digit "4XXXX" or 6-digit "4XXXXX" addressing scheme. To map the SA300 register address to the range of the Modbus holding registers, add a value of 40001 to the SA300 register address. When a register address exceeds 9999, use a 6-digit addressing scheme by adding 400001 to the SA300 register address.

## 2.6 Data Formats

The SA300 uses three data formats to pass data between a master application and the instrument: 16-bit short integer, 32-bit long integer and 32-bit modulo-10000 formats. Binary values and counters are always transmitted in 32-bit registers, while analog values can be read both in 32-bit and in 16-bit scaled registers.

Analog registers 256 through 308 and 4320 through 10751 contain scaled 16-bit values.

### 2.6.1 16-bit Scaled Integer Format

16-bit scaled data is transmitted in a single 16-bit Modbus register as unsigned (UINT16) integer (whole) numbers using the linear conversion to accommodate large-scale and fractional numbers to a 16-bit register format. The linear conversion uses two scales to read the raw data from the device and convert it into engineering units: the device original engineering scale and the Modbus conversion scale.

When transmitting measured data, the device scales it into the range of Modbus Low and High conversion scales. To reconstruct data in the original engineering units, perform the reverse conversion according to the following formula:

$$\text{Engineering\_Units} = \frac{\text{Raw\_Data} \times (\text{ENG\_HI} - \text{ENG\_LO})}{\text{RAW\_HI} - \text{RAW\_LO}} + \text{ENG\_LO}$$

where:

ENG_LO and ENG_HI	-	reading low and high scales in engineering units
RAW_LO and RAW_HI	-	raw data low and high scales (by default, 0 and 9999)
Raw_Data	-	raw input data in the range of RAW_LO to RAW_HI
Engineering_Units	-	true value in engineering units

The default Modbus conversion scales are 0 for the low scale and 9999 for the high scale. This means that the scaled analog data is always transmitted in the range of 0 to 9999. The Modbus conversion scales can be changed through communications via registers 240 and 241.

The engineering scales are separately indicated for each scaled 16-bit register. For data scales and measurement units that depend on the device input scales (such as volts, amps and powers), refer to Chapter 4 "Data Scales and Units".

#### Conversion Examples

##### 1. Voltage readings

a) Assume device settings (direct wiring): PT ratio = 1.

Voltage engineering scales (see Chapter 4):

$$\begin{aligned} \text{HI\_ENG} &= V_{\text{max}} = 828.0 \times \text{PT ratio} = 828.0 \times 1 = 828.0\text{V} \\ \text{LO\_ENG} &= 0\text{V} \end{aligned}$$

If the raw data reading is 1449 then the voltage reading in engineering units will be as follows:

$$\text{Volts reading} = 1449 \times (828.0 - 0) / (9999 - 0) + 0 = 120.0\text{V}$$

b) Assume device settings (wiring via PT): PT ratio = 14,400V : 120V = 120.

Voltage engineering scales (see Chapter 4):

$$\begin{aligned} \text{HI\_ENG} &= V_{\text{max}} = 828.0 \times \text{PT ratio} = 828 \times 120 = 99,360\text{V} \\ \text{LO\_ENG} &= 0\text{V} \end{aligned}$$

If the raw data reading is 1449 then the voltage reading in engineering units will be as follows:

$$\text{Volts reading} = 1449 \times (99360 - 0)/(9999 - 0) + 0 = 14,399V$$

## 2. Current readings

Assume device settings: CT primary current = 200A; current input overload = 400% (20A).

Current engineering scales (see Chapter 4):

$$\begin{aligned} \text{HI\_ENG} &= I_{\text{max}} = \text{CT primary current} \times 4 = 200.00 \times 4 = 800.00A \\ \text{LO\_ENG} &= 0A \end{aligned}$$

If the raw data reading is 250 then the current reading in engineering units will be as follows:

$$\text{Amps reading} = 250 \times (800.00 - 0)/(9999 - 0) + 0 = 20.00A$$

## 3. Power readings

a) Assume device settings (direct wiring): PT = 1; CT primary current = 200A; current input overload = 400% (20A).

Active Power engineering scales (rounded to whole kW, see Chapter 4):

$$\begin{aligned} \text{HI\_ENG} &= P_{\text{max}} = V_{\text{max}} \times I_{\text{max}} \times 2 = (828.0 \times 1) \times (200.00 \times 4) \times 2 = 1,324,800 \text{ W} = 1325 \text{ kW} \\ \text{LO\_ENG} &= -P_{\text{max}} = -1325 \text{ kW} \end{aligned}$$

If the raw data reading is 5500 then the power reading in engineering units will be as follows:

$$\text{Watts reading} = 5500 \times (1325 - (-1325))/(9999 - 0) + (-1325) = 132.6 \text{ kW}$$

If the raw data reading is 500 then the power reading in engineering units will be as follows:

$$\text{Watts reading} = 500 \times (1325 - (-1325))/(9999 - 0) + (-1325) = -1192.5 \text{ kW}$$

b) Assume device settings (wiring via PT): PT = 120; CT primary current = 200A; current input overload = 400% (20A).

Active Power engineering scales (rounded to whole kW, see Chapter 4):

$$\begin{aligned} \text{HI\_ENG} &= P_{\text{max}} = V_{\text{max}} \times I_{\text{max}} \times 2 = (828 \times 120) \times (200.00 \times 4) \times 2/1000 = 158976 \text{ kW} \\ \text{LO\_ENG} &= -P_{\text{max}} = -158976 \text{ kW} \end{aligned}$$

If the raw data reading is 5500 then the power reading in engineering units will be as follows:

$$\text{Watts reading} = 5500 \times (158976 - (-158976))/(9999 - 0) + (-158976) = 15915 \text{ kW}$$

If the raw data reading is 500 then the power reading in engineering units will be as follows:

$$\text{Watts reading} = 500 \times (158976 - (-158976))/(9999 - 0) + (-158976) = -143077 \text{ kW}$$

## 4. Power Factor readings

Power factor engineering scales (see Chapter 4):

$$\begin{aligned} \text{HI\_ENG} &= 1.000. \\ \text{LO\_ENG} &= -1.000. \end{aligned}$$

If the raw data reading is 8900 then the power factor in engineering units will be as follows:

$$\text{Power factor reading} = 8900 \times (1.000 - (-1.000))/(9999 - 0) + (-1.000) = 0.78$$

## 2.6.2 32-bit Long Integer Format

32-bit long integer data is transmitted in two adjacent 16-bit Modbus registers as unsigned (UINT32) or signed (INT32) whole numbers. The first register contains the low-order word (lower 16 bits) and the second register contains the high order word (higher 16 bits). The low-order word always starts at an even Modbus address. The value range for unsigned data is 0 to 4,294,967,295; for signed data the range is -2,147,483,648 to 2,147,483,647.

If your Modbus driver does not support a 32-bit long integer format, you can read the two 16-bit registers separately, and then convert them into a 32-bit value as follows (using C notation):

$$\text{32-bit value} = (\text{signed short})\text{high\_order\_register} \times 65536L + (\text{unsigned short})\text{low\_order\_register}$$

## Examples

### 1. Unsigned 32-bit Values

If you read unsigned Voltage V1 of 69,000V from registers 13952-13953, then the register readings will be as follows:

$$\begin{aligned}(13952) &= 3464 \\ (13953) &= 1\end{aligned}$$

The 32-bit value is  $(1 \times 65536 + 3464) = 69000V$ .

### 2. Signed 32-bit Values

If you read signed kW of -789kW from registers 14336-14337, then the register readings will be:

$$\begin{aligned}(14336) &= 64747 \text{ (unsigned)} \\ (14337) &= 65535 \text{ (unsigned) or } -1 \text{ (signed value)}.\end{aligned}$$

To take the high order register as a signed value, compare it with 32767. If the value is less or equal to 32767, use it as is. If it is greater than 32767, then this is a negative number in a two's complement code (like in our example) - just subtract it from 65536 to get the original negative value.

The 32-bit reading is  $(-1 \times 65536 + 64747) = -789kW$ .

Fractional 32-bit data is transmitted using decimal scaling to pass fractional numbers in integer format. Fractional numbers are pre-multiplied by 10 to the power N, where N is the number of digits in the fractional part. For example, the frequency reading of 50.01 Hz is transmitted as 5001, having been pre-multiplied by 100.

Whenever a data register contains a fractional number, the register measurement unit is given with a multiplier  $\times 0.1$ ,  $\times 0.01$  or  $\times 0.001$ , showing the weight of the least significant decimal digit. To get an actual fractional number with specified precision, multiply the register value by the given multiplier. To write a fractional number into the register, divide the number by the given multiplier.

### 2.6.3 32-bit Modulo-10000 Format

Energy counters 287-294 and 301-302 are read in two contiguous 16-bit registers in a modulo-10000 format. The first (low order) register contains the value mod 10000, and the second (high order) register contains the value/10000. To get the true energy reading, the high order register value should be multiplied by 10,000 and added to the low order register.

## 2.7 User Assignable Registers

The SA300 provides 120 user assignable registers in the address range of 0 to 119. You can re-map any register available in the device to any assignable register so that Modbus registers that reside at different locations may be simply accessed using a single request by re-mapping them to adjacent addresses.

The actual addresses of the assignable registers, which are accessed via addresses 0 through 119, are specified in the register map (registers 120 through 239), where register 120 contains the actual address of the register accessed via register 0, register 121 contains the actual address of the register accessed via register 1, and so on. The assignable registers and the map registers themselves may not be re-mapped.

Initially these registers are reserved and none of them points to an actual register address. To build your own register map, write to map registers 120 to 239 the actual addresses you want to read from or write to via the assignable area (registers 0 to 119). 32-bit long registers should always be aligned at even addresses. For example, to read registers 4672 (1-second V1 voltage, scaled short integer) and 14720-14721 (kWh Import, long integer) via registers 0-2, do the following:

- write 14720 to register 120
- write 14721 to register 121
- write 4672 to register 122

Reading from registers 0-2 will return the kWh reading in registers 0 (low 16 bits) and 1 (high 16 bits), and the voltage reading in register 2.

## 2.8 Password Protection

The SA300 has a password protection option allowing you to protect your setups, cumulative registers and logs from being changed or cleared through communications. You can disable or enable password protection through communications, the RDM or via the Terminal. For details, refer to your instrument Operation Manual.

A user password must be written into the device authorization register (44378-44379) before another write request is issued. If the correct password is not supplied while password protection is enabled, the device will respond to all write requests with the exception code 01 (illegal operation). It is recommended to clear the password register after you have completed your changes in order to activate password protection.

## 2.9 Data Recording and File Transfers

### 2.9.1 Log File Organization

Historical files are stored to the non-volatile memory with battery backup. Memory is allocated for each file statically when you set up your files and will not change unless you re-organize the files. The SA300 automatically performs de-fragmentation of the memory each time you re-organize your files. This prevents possible leakage of memory caused by fragmentation.

Data records in a file are arranged in the order of their recording. Each record has a unique 16-bit sequence number that is incremented modulo 65536 with each new record. The sequence number can be used to point to a particular record in the file, or to check the sequence of records when uploading files from the device.

Each file has a write position pointer that indicates the place where the next record will be recorded, and a read position pointer that indicates the place from where the current record will be read. Both pointers show sequence numbers of the records they point to rather than record offsets in the file.

After acknowledging a record you have read, the read pointer automatically advances to the next record in the file. When the read pointer gets to the record to which the file write pointer points, the end-of-file (EOF) flag is set. It is automatically cleared when a new record is added to the file, or when you explicitly move the read pointer to any record within a file.

If a file has a wrap-around attribute (circular file), the most recent records can overwrite the oldest records. When this happens at the current read position, the read pointer automatically advances forward in order to point to the oldest record in the file.

The SA300 keeps a separate read pointer for each communication port so that access to the same file through a different port will not affect current active sessions for other ports.

### **Multi-section Files**

Log files can have one or more (up to 32) sections for multi-channel recording. An ordinal file consists of a single section. Some files, such as TOU profile log files and waveform log files, are arranged as multi-section files.

A multi-section file is subdivided into multiple sections of the same structure, one section per recording channel. The number of sections in each file is defined at the time you set up your files and may not change unless you re-organize the file. Sections within a multi-section file can be addressed by a section number, or by a section channel ID.

A multi-section file has a single write position pointer for all sections and stores data in all sections simultaneously. This means that records with the same sequence number in all sections are associated with the same event. A multi-section file has also a single read position pointer for all sections.

## Data Log Files

Conventional data log files can store up to 16 measured parameters per a record. Any data measured by the device can be stored in the log file. The number of parameters that each record will hold and the list of parameters you want to be recorded in the file can be selected through the Data log setup registers for a particular file.

Recording data to data log files can be triggered through the setpoints, either on a time basis, or upon any event detected by the setpoints.

## TOU Profile Log Files

Data log files #15 and #16 can be configured for monthly and daily profile logs of the energy usage and maximum demand registers. A profile log file is organized as a multi-section file that has a separate section for each energy and maximum demand register. See Section 3.12 for more information on the file record structure. A file record stores all tariff data for each configured Billing/TOU register.

The number of sections is taken automatically from the Billing/TOU Registers setup. In order to correctly allocate memory space, configure your TOU registers before you set up TOU profile files.

Since each Billing/TOU energy register has a shadow maximum demand register, the number of sections in the file will be twice the number of the allocated Billing/TOU registers.

## Power Quality Statistics Log Files

Data log files #9 and #10 are configured to store the power quality statistics data on a daily basis. They are organized as multi-section files. See Sections 3.10-3.11 for more information on the file record structure. You can review the list of parameters recorded to the files through the file info request/response blocks using info requests with variation 2 (see Section 3.9).

## Waveform Log Files

Waveform log files are organized as multi-section files that store data for each recording channel in a separate section. A waveform log file can record up to 12 channels simultaneously: eight AC channels (four voltages and four currents), a VDC channel, and 3x16 digital inputs DI1:16, DI17:32, DI33:48 that are recorded as three 16-bit analog channels.

The number of sections, or channels, that a file can store, is defined in the file setup. The waveform log setup allows selecting channels that a file will record. All selected channels are recorded in successive file sections.

A waveform file has a single read pointer for all sections, so that data from all channels of a single record can be read together without repositioning the file pointer. When you point to a particular file record, data from all sections related to the same event are all available for a read. Moreover, the SA300 takes all channel data for the currently accessed record to a separate buffer, so that even when the record is overwritten at the time of reading, you are still prevented from receiving partially updated data. You can also read a file in a common sequential manner section-by-section.

A single waveform record for a channel can contain up to 512 points of the sampled input signal. The VDC and DI channels are sampled at different rates than AC channels and may contain fewer points than the corresponding AC records. Refer to the sampling rate field in the channel records to correctly set up the time scale for the VDC and DI waveforms. If the record contains less than 512 points, the value of unused points is unpredictable.

If a waveform log is configured to record more samples per event than a single record can hold, the waveform recorder will store as many records per event as required to record the entire event. All waveform records related to the event are merged in a series and have the same series number, so that they can all be plotted together. Each record within a series has a unique serial number that allows tracking the sequence of records in the series. A single waveform series can hold up to 347,136 points (10,848 cycles at a rate of 32 samples per cycle) of a sampled AC signal.



## 2.9.2 File Transfers

File transfer protocol provides both data transfer and information services. File transfer is performed through two blocks of registers: a 32-word master request block and a 1792-word read-only file response block. After a master application has written the request into the file request block, the requested data is available for a read through the file response block registers. File transfer functions allow changing the file or section position in order to point to the desired record.

The information service uses separate 8-word file info request and 200-word file info response blocks. The extended file information is available including current file pointers' positions, file contents, the number of records in the file, allocated file size, time of file creation, time of the last file update and reset, and more.

### Common File Transfer

Log files can be read either in a sequence record-by-record, or in a random order. Each Read-File request fills the file response block with the data of the record pointed to by the file (or section) read pointer. If you want to begin reading a file from a particular record, which sequence number is known, you can change the pointer position by issuing the Set-File-Position request with the desired sequence number. If you want to read a file from the beginning, send the Reset-File-Position request that moves the pointer to the oldest file record. If you do not change the file position, then you will continue reading the file from the record following the one you have read the last time you accessed the file.

You need not explicitly move the file position to the following record if you want to continue reading a file in sequence after you have uploaded the current record. Instead, issue an acknowledgment request that automatically advances the file pointer to the next record, and then read the record data through the file response block.

The file response block can contain more than one record. The number of records available in the block and the file record size in words are always reported in the block heading. There are no special rules on how to read records from the file transfer block. You can read a single record or all records together, or begin reading from the last record and end with the first record. However, you should remember: 1) after an acknowledgment, the file position moves to the record following the last one you have accessed in the file transfer block; and 2) data in the file transfer block does not change until you either issue an acknowledgment, or explicitly change the file position by the Set-File-Position or Reset-File-Position requests.

The file transfer is completed after you have read the last record of the file. Before storing a file record to your database, always check bit 9 in the record status word, which contains the end-of-file (EOF) flag. This bit set to 1 indicates that the file read pointer does not point to any record within the file, and you should not store any record that has this bit set. The EOF flag is set only after you have acknowledged the last record of the file, so that testing for end-of-file requires one extra read. If you wish to stop the transfer just after storing the last file record, acknowledge the record and check bit 0 in the record status word. Bit 0 is set to 1 only once when you read the last record of the file.

The following gives a summary of steps you should do to read an ordinal log file:

1. If you want to begin reading a file from a particular record or from the first record, use either the Set-File-Position request with the desired record sequence number, or the Reset-File-Position request. Preset a section number and channel ID to zero.
2. Write the Read-File request with a section number and channel ID set to zero.
3. Read the record data from the file response block.
4. Write an acknowledgment for the file. You need not fill all the request fields: only the file function is required. The file pointer will be moved to the next file record.

Repeat steps 3-4 until all the file records are read.

### Reading Multi-section Data Log Files

In a multi-section data log file, all user requests including an acknowledgment, the Read-File, Set-File-Position and Reset-File-Position requests, relate to a particular file

section rather than to the file itself. The only request that affects the entire file is the Erase-File that clears all the file sections together.

A file section can be requested either by a section number, or by a section channel ID. If you use a channel ID, preset the section number field to 0xFFFF. If a section number is specified, the channel ID field will not be checked. The device returns both fields in the response block heading, so you can always identify what channel data is being read from the present file section. If you want to know which channels are recorded to the file sections, check the file channel mask in the file info block. This is a bitmap that contains one in a bit position if a channel with an ID equal to the bit number is recorded to the file, and contains zero if it is not.

The following gives a summary of steps for reading a multi-section data log file:

1. If you wish to begin reading a file section from a particular record or from the first record, use either the Set-File-Position request with the desired record sequence number, or the Reset-File-Position request. Specify either a section number, or the channel ID for the section from where you want to read data. If you use a channel ID, preset the section number field to 0xFFFF.
2. Write the Read-File request with the section number and channel ID as shown in the previous step.
3. Read the record data from the file response block.
4. Write an acknowledgment for the file. The file section pointer will be moved to the next record.

Repeat steps 3-4 until all the section records are read.

### **Reading Multi-section Waveform Files**

Waveform files can be read as conventional multi-section files in the order described above. Another way is to take advantage of the fact that waveform files have a single read pointer for all file sections, so you can read records of all the channels related to the same event at once without repositioning the file pointer. The following gives a summary of steps for reading waveform files:

1. If you want to begin reading a file from a particular record or from the first record, use either the Set-File-Position request with the desired record sequence number, or the Reset-File-Position request. Preset the section field to zero.
2. Write the Read-File request. Address your request to the first file section (its number is always zero), or to the first file channel (if you know channel's ID). If you use a channel ID, preset the section number field to 0xFFFF.
3. Read the channel's data from the file response block. Store the received record's sequence number.
4. Write the Read-File request for the next file section or channel using the stored record sequence number. The file response block will be refilled with the data for the requested channel that is related to the record with the same sequence number.
5. Repeat steps 3, 4 until all the channel records with the current sequence number are read.
6. Write an acknowledgment. The file pointer will be moved to the next record.

Repeat steps 2-6 until all the file records are read.

### **Reading Real-time Waveforms**

Real-time waveforms are accessed through the same transfer blocks just like the waveform log files by addressing file 128. Writing the Read-File request for file 128 provides a simultaneous capture of 6 real-time waveform records – three voltage and three current waveforms – into a communication buffer that can be read through the common file response block. The following gives a summary of steps for reading real-time waveforms:

1. Write the Read-File request for file 128. Address you request to the first file section (its number is always zero), or to the first file channel (if you know channel's ID). If you use a channel ID, preset the section number field to 0xFFFF.
2. Read the channel's data from the file response block.
3. Write the Read-File request for the next file section or channel. The file response block will be refilled with the data for the requested channel.
4. Repeat steps 3, 4 until all the channel records are read.
5. Write an acknowledgment to release the buffer.

## 2.10 TCP Notification Client

The TCP notification client can establish connections with a remote Modbus/TCP server and send notification messages either on events, or periodically on a time basis.

Notification messages are sent via a block of 24 Modbus registers using write function 16. The following table shows the message exchange structure.

Modbus Register Offset	Description	Type	Comment
+0-1	Device serial number	UINT32	
+2-4	Device MAC address	CHAR6	
+5	Device address	UINT16	1 for Ethernet
+6-7	Device IP address	UINT32	Network byte order
+8	Event type	UINT16	See F22 in Section 5
+9	Event sequence number	UINT16	
+10-11	Start event timestamp, seconds	UINT32	Local time since Jan 1, 1970
+12-13	Start event timestamp, seconds fraction, in microseconds	UINT32	
+14-15	End event timestamp, seconds	UINT32	Local time since Jan 1, 1970
+16-17	End event timestamp, seconds fraction, in microseconds	UINT32	
+18	Not used	UINT16	Written as 0
+19	Critical trigger ID	UINT16	See Table below
+20-21	Critical trigger value	UINT32	See Table below
+22-23	Reserved	UINT32	Written as 0

The reported trigger type and value depend on the event source and are described in the following table.

Event Source	Trigger Type	Trigger Value
Setpoint events	Critical setpoint trigger caused setpoint operation or release (see F12 in Section 5)	Trigger entering or return value
PQ events	PQ event trigger. For polyphase events, the worst phase is reported (see Generic Data in Section 3.4)	Maximum fault magnitude on the reported phase
Fault events	Current phase with highest recorded fault current (see Generic Data in Section 3.4)	Maximum fault current magnitude on the reported phase

After receiving a write acknowledgement from a server, a TCP connection is still open for 10 seconds to give the server an opportunity to access meter registers through an open socket. It may help you access the meter from outside your local network when the server is located on another network. The notification client will respond to all server requests as if it were a regular incoming connection.

In case a client connection is not used for following data transfers, it is recommended for the server to close the connection immediately after sending a write acknowledgement; otherwise there will be a 10-second delay before the next notification may be sent.

If there is no activity on the connection socket, it will be closed in 10 seconds. In the event a connection attempt was unsuccessful, the notification client retries two more times before announcing a connection failure.

The server's IP address, port number and starting Modbus register address are programmable in the meter. To configure and enable the notification client in your meter via PAS, select Communication Setup in the Meter Setup menu, and click on the TCP Notification Client Setup tab.

Client connections are triggered via programmable setpoints. To send event notifications to a server, configure a setpoint to respond to desired triggers or to periodic time events and add the "Send notification" action to the end of the setpoint actions list.

Setpoint operation events triggered by regular analog and digital triggers are reported twice - when the event starts and when it ends, except of the pulsed events and time triggers that will be reported once. In the start notification message, the event end timestamp is zeroed, and the critical trigger value indicates its entering value, while the second notification message gives both the event start and end time and shows the trigger return value.

In case of triggering notifications with events generated by the PQ and Fault recorders, like the PQ EVENT, FAULT EVENT, EXTERNAL TRIGGER or FAULT DETECTED triggers, the recorded power quality or/and corresponding fault events are reported instead of setpoint-triggered notifications. Notification messages contain the fault event start and end time, a critical phase and the maximum fault magnitude on the reported phase. If regular triggers are added to the setpoint triggers list, then the setpoint operation events will also be reported.

## 3 Modbus Register Map

### 3.1 Modbus Setup Registers

Address	Point ID	Description	Options/Range	Units	Type	R/W	Notes
<b>Modbus Assignable Registers</b>							
<b>0-119</b>							
+0		Register 0 contents	0-65535		UINT16	R/W	
+1		Register 1 contents	0-65535		UINT16	R/W	
		...					
+119		Register 119 contents	0-65535		UINT16	R/W	
<b>Assignable Registers Map</b>							
<b>120-239</b>							
+0		Register 0 address	0-65535		UINT16	R/W	
+1		Register 1 address	0-65535		UINT16	R/W	
+119		Register 119 address	0-65535		UINT16	R/W	
<b>Modbus Conversion Scales</b>							
240		Low raw scale	0-65535 (default 0)		UINT16	R/W	
241		High raw scale	1023-65535 (default 9999)		UINT16	R/W	
242		Voltage scale, secondary volts	60-828 (default 828V)	1V	UINT16	R/W	
243		Current scale, secondary amps	10-200 (default CT secondary current x Current Overload)	×0.1A	UINT16	R/W	

### 3.2 16-bit Scaled Analog Values - Basic Register Set

Address	Point ID	Description	Low and High Scales <sup>2</sup>	Units <sup>2</sup>	Type	R/W	Notes
256-308		<b>1-Second Values</b>					
+0	0x1100	V1/V12 voltage	0-Vmax	U1	UINT16	R	1
+1	0x1101	V2/V23 voltage	0-Vmax	U1	UINT16	R	1
+2	0x1102	V3/V31 voltage	0-Vmax	U1	UINT16	R	1
+3	0x1103	I1 current	0-Imax	U2	UINT16	R	
+4	0x1104	I2 current	0-Imax	U2	UINT16	R	
+5	0x1105	I3 current	0-Imax	U2	UINT16	R	
+6	0x1106	kW L1	-Pmax-Pmax	U3	INT16	R	
+7	0x1107	kW L2	-Pmax-Pmax	U3	INT16	R	
+8	0x1108	kW L3	-Pmax-Pmax	U3	INT16	R	
+9	0x1109	kvar L1	-Pmax-Pmax	U3	INT16	R	
+10	0x110A	kvar L2	-Pmax-Pmax	U3	INT16	R	
+11	0x110B	kvar L3	-Pmax-Pmax	U3	INT16	R	
+12	0x110C	kVA L1	-Pmax-Pmax	U3	UINT16	R	
+13	0x110D	kVA L2	-Pmax-Pmax	U3	UINT16	R	
+14	0x110E	kVA L3	-Pmax-Pmax	U3	UINT16	R	
+15	0x110F	Power factor L1	-1.000-1.000	0.001	INT16	R	
+16	0x1110	Power factor L2	-1.000-1.000	0.001	INT16	R	
+17	0x1111	Power factor L3	-1.000-1.000	0.001	INT16	R	
+18	0x1403	Total PF	-1.000-1.000	0.001	INT16	R	
+19	0x1400	Total kW	-Pmax-Pmax	U3	INT16	R	
+20	0x1401	Total kvar	-Pmax-Pmax	U3	INT16	R	
+21	0x1402	Total kVA	-Pmax-Pmax	U3	UINT16	R	
+22	0x1501	In current	0-Imax	U2	UINT16	R	
+23	0x1502	Frequency	45.00-65.00	0.01Hz	UINT16	R	
+24	0x3709	Maximum kW import sliding window demand	-Pmax-Pmax	U3	UINT16	R	
+25	0x160F	kW import accumulated demand	-Pmax-Pmax	U3	UINT16	R	
+26	0x370B	Maximum kVA sliding window demand	-Pmax-Pmax	U3	UINT16	R	
+27	0x1611	kVA accumulated demand	-Pmax-Pmax	U3	UINT16	R	
+28	0x3703	I1 Maximum ampere demand	-Pmax-Pmax	U2	UINT16	R	
+29	0x3704	I2 Maximum ampere demand	-Pmax-Pmax	U2	UINT16	R	
+30	0x3705	I3 Maximum ampere demand	-Pmax-Pmax	U2	UINT16	R	
+31		kWh import (low)	0-9999	×0.1 kWh	UINT16	R	6
+32		kWh import (high)	0-9999	×1 MWh	UINT16	R	6
+33		kWh export (low)	0-9999	×0.1 kWh	UINT16	R	6
+34		kWh export (high)	0-9999	×1 MWh	UINT16	R	6
+35		+kvarh net (low)	0-9999	×0.1 kvarh	UINT16	R	4, 6
+36		+kvarh net (high)	0-9999	×1 Mvarh	UINT16	R	4, 6
+37		-kvarh net (low)	0-9999	×0.1 kvarh	UINT16	R	5, 6

Address	Point ID	Description	Low and High Scales <sup>2</sup>	Units <sup>2</sup>	Type	R/W	Notes
+38		-kvarh net (high)	0-9999	×1 Mvarh	UINT16	R	5, 6
+39	0x1112	V1/V12 voltage THD	0-999.9	0.1%	UINT16	R	3
+40	0x1113	V2/V23 voltage THD	0-999.9	0.1%	UINT16	R	3
+41	0x1114	V3/V31 voltage THD	0-999.9	0.1%	UINT16	R	3
+42	0x1115	I1 current THD	0-999.9	0.1%	UINT16	R	3
+43	0x1116	I2 current THD	0-999.9	0.1%	UINT16	R	3
+44	0x1117	I3 current THD	0-999.9	0.1%	UINT16	R	3
+45		kVAh (low)	0-9999	×0.1 kVAh	UINT16	R	6
+46		kVAh (high)	0-9999	×1 MVAh	UINT16	R	6
+47	0x1609	Present kW import sliding window demand	-Pmax-Pmax	U3	UINT16	R	
+48	0x160B	Present kVA sliding window demand	-Pmax-Pmax	U3	UINT16	R	
+49	0x1615	PF (import) at Max. kVA sliding window demand	0-1.000	0.001	UINT16	R	
+50	0x111B	I1 current TDD	0-100.0	0.1%	UINT16	R	3
+51	0x111C	I2 current TDD	0-100.0	0.1%	UINT16	R	3
+52	0x111D	I3 current TDD	0-100.0	0.1%	UINT16	R	3

**NOTES:**

- 1 When the 4LN3, 3LN3 or 3BLN3 wiring mode is selected, the voltages will be line-to-neutral; for any other wiring mode, they will be line-to-line voltages.
- 2 All analog registers except of harmonics are 1-second average values. For volts, amps and power scales and units, refer to Section 4 "Data Scales and Units". For analog data scaling formulas and examples, see Section 2.6.1, "16-bit Scaled Integer Format".
- 3 On a 3-s interval.
- 4 Positive readings of kvarh net.
- 5 Negative readings of kvarh net.
- 6 If you use these energy registers instead of 32-bit registers, limit the energy roll value to 8 digits (see Advanced Device Setup) to avoid early overflow.

### 3.3 16-bit Scaled Analog Values

Address	Point ID	Description	Low and High Scales <sup>3</sup>	Units <sup>3</sup>	Type	R/W	Notes
4320-4344		<b>1/2-Cycle Values</b>					
+0	0x0B80	V1 voltage	0-Vmax	U1	UINT16	R	1
+1	0x0B81	V2 voltage	0-Vmax	U1	UINT16	R	1
+2	0x0B82	V3 voltage	0-Vmax	U1	UINT16	R	1
+3	0x0B83	V4 voltage	0-V4max	U4	UINT16	R	
+4	0x0B84	V12 voltage	0-Vmax	U1	UINT16	R	
+5	0x0B85	V23 voltage	0-Vmax	U1	UINT16	R	
+5	0x0B86	V31 voltage	0-Vmax	U1	UINT16	R	
+7	0x0B87	I1 current	0-Imax	U2	UINT16	R	
+8	0x0B88	I2 current	0-Imax	U2	UINT16	R	
+9	0x0B89	I3 current	0-Imax	U2	UINT16	R	
+10	0x0B8A	I4 current	0-I4max	U2	UINT16	R	
+11	0x0B8B	In current	0-Imax	U2	UINT16	R	
+12	0x0B8C	I1x current	0-Ixmax	U2	UINT16	R	
+13	0x0B8D	I2x current	0-Ixmax	U2	UINT16	R	
+14	0x0B8E	I3x current	0-Ixmax	U2	UINT16	R	
+15	0x0B8F	I4x current	0-I4xmax	U2	UINT16	R	
+16	0x0B90	Inx current	0-Ixmax	U2	UINT16	R	
+17	0x0B91	Zero-sequence voltage	0-Vmax	U1	UINT16	R	
+18	0x0B92	Zero-sequence current	0-Imax	U2	UINT16	R	
+19	0x0B93	Ix Zero-sequence current	0-Ixmax	U2	UINT16	R	
+20	0x0B94	Voltage unbalance	0-300.0	0.1%	UINT16	R	
+21	0x0B95	Current unbalance	0-300.0	0.1%	UINT16	R	
+22	0x0B96	Ix current unbalance	0-300.0	0.1%	UINT16	R	
+23	0x0B97	DC voltage	0-9999.00	0.01V	UINT16	R	
+24	0x0B98	Frequency (1-cycle)	0-100.00	0.01Hz	UINT16	R	
4352-4387		<b>1-Cycle Phase Values</b>					
+0	0x0C00	V1 voltage	0-Vmax	U1	UINT16	R	1
+1	0x0C01	V2 voltage	0-Vmax	U1	UINT16	R	1
+2	0x0C02	V3 voltage	0-Vmax	U1	UINT16	R	1
+3	0x0C03	I1 current	0-Imax	U2	UINT16	R	
+4	0x0C04	I2 current	0-Imax	U2	UINT16	R	
+5	0x0C05	I3 current	0-Imax	U2	UINT16	R	
+6	0x0C06	kW L1	-Pmax-Pmax	U3	INT16	R	
+7	0x0C07	kW L2	-Pmax-Pmax	U3	INT16	R	
+8	0x0C08	kW L3	-Pmax-Pmax	U3	INT16	R	
+9	0x0C09	kvar L1	-Pmax-Pmax	U3	INT16	R	
+10	0x0C0A	kvar L2	-Pmax-Pmax	U3	INT16	R	
+11	0x0C0B	kvar L3	-Pmax-Pmax	U3	INT16	R	



Address	Point ID	Description	Low and High Scales <sup>3</sup>	Units <sup>3</sup>	Type	R/W	Notes
+12	0x0C0C	kVA L1	0-Pmax	U3	UINT16	R	
+13	0x0C0D	kVA L2	0-Pmax	U3	UINT16	R	
+14	0x0C0E	kVA L3	0-Pmax	U3	UINT16	R	
+15	0x0C0F	Power factor L1	-1.000-1.000	0.001	INT16	R	
+16	0x0C10	Power factor L2	-1.000-1.000	0.001	INT16	R	
+17	0x0C11	Power factor L3	-1.000-1.000	0.001	INT16	R	
+18	0x0C12	V1 voltage THD	0-999.9	0.1%	UINT16	R	2, 4
+19	0x0C13	V2 voltage THD	0-999.9	0.1%	UINT16	R	2, 4
+20	0x0C14	V3 voltage THD	0-999.9	0.1%	UINT16	R	2, 4
+21	0x0C15	I1 current THD	0-999.9	0.1%	UINT16	R	4
+22	0x0C16	I2 current THD	0-999.9	0.1%	UINT16	R	4
+23	0x0C17	I3 current THD	0-999.9	0.1%	UINT16	R	4
+24	0x0C18	I1 K-Factor	1.0-999.9	0.1	UINT16	R	4
+25	0x0C19	I2 K-Factor	1.0-999.9	0.1	UINT16	R	4
+26	0x0C1A	I3 K-Factor	1.0-999.9	0.1	UINT16	R	4
+27	0x0C1B	I1 current TDD	0-100.0	0.1%	UINT16	R	4
+28	0x0C1C	I2 current TDD	0-100.0	0.1%	UINT16	R	4
+29	0x0C1D	I3 current TDD	0-100.0	0.1%	UINT16	R	4
+30	0x0C1E	V12 voltage	0-Vmax	U1	UINT16	R	
+31	0x0C1F	V23 voltage	0-Vmax	U1	UINT16	R	
+32	0x0C20	V31 voltage	0-Vmax	U1	UINT16	R	
+33	0x0C21	I1x current	0-Ixmax	U2	UINT16	R	
+34	0x0C22	I2x current	0-Ixmax	U2	UINT16	R	
+35	0x0C23	I3x current	0-Ixmax	U2	UINT16	R	
4416-4429		<b>1-Cycle Low Phase Values</b>					
+0	0x0D00	Low L-N voltage	0-Vmax	U1	UINT16	R	
+1	0x0D01	Low current	0-Imax	U2	UINT16	R	
+2	0x0D02	Low kW	-Pmax-Pmax	U3	INT16	R	
+3	0x0D03	Low kvar	-Pmax-Pmax	U3	INT16	R	
+4	0x0D04	Low kVA	0-Pmax	U3	UINT16	R	
+5	0x0D05	Low PF Lag	0-1.000	0.001	UINT16	R	
+5	0x0D06	Low PF Lead	0-1.000	0.001	UINT16	R	
+7	0x0D07	Low voltage THD	0-999.9	0.1%	UINT16	R	2, 4
+8	0x0D08	Low current THD	0-999.9	0.1%	UINT16	R	4
+9	0x0D09	Low K-Factor	1.0-999.9	0.1	UINT16	R	4
+10	0x0D0A	Low current TDD	0-100.0	0.1%	UINT16	R	4
+11	0x0D0B	Low L-L voltage	0-Vmax	U1	UINT16	R	
+12	0x0D0C	Not used	0		UINT16	R	
+13	0x0D0D	Not used	0		UINT16	R	
4448-4463		<b>1/2-Cycle Analog Inputs</b>					
+0	0x0D80	Analog input AI1	AI1min-AI1max		UINT16	R	
+1	0x0D81	Analog input AI2	AI2min-AI2max		UINT16	R	
		...					

Address	Point ID	Description	Low and High Scales <sup>3</sup>	Units <sup>3</sup>	Type	R/W	Notes
+15	0x0D8F	Analog input AI16	AI16min-AI16max		UINT16	R	
4480-4493		<b>1-Cycle High Phase Values</b>					
+0	0x0E00	High L-N voltage	0-Vmax	U1	UINT16	R	
+1	0x0E01	High current	0-Imax	U2	UINT16	R	
+2	0x0E02	High kW	-Pmax-Pmax	U3	INT16	R	
+3	0x0E03	High kvar	-Pmax-Pmax	U3	INT16	R	
+4	0x0E04	High kVA	0-Pmax	U3	UINT16	R	
+5	0x0E05	High PF Lag	0-1.000	0.001	UINT16	R	
+5	0x0E06	High PF Lead	0-1.000	0.001	UINT16	R	
+7	0x0E07	High voltage THD	0-999.9	0.1%	UINT16	R	2, 4
+8	0x0E08	High current THD	0-999.9	0.1%	UINT16	R	4
+9	0x0E09	High K-Factor	1.0-999.9	0.1	UINT16	R	4
+10	0x0E0A	High current TDD	0-100.0	0.1%	UINT16	R	4
+11	0x0E0B	High L-L voltage	0-Vmax	U1	UINT16	R	
+12	0x0E0C	Not used	0		UINT16	R	
+13	0x0E0D	Not used	0		UINT16	R	
4512-4527		<b>1-Second Analog Inputs</b>					
+0	0x0E80	Analog input AI1	AI1min-AI1max		UINT16	R	
+1	0x0E81	Analog input AI2	AI2min-AI2max		UINT16	R	
		...					
+15	0x0E8F	Analog input AI16	AI16min-AI16max		UINT16	R	
4544-4557		<b>1-Cycle Total Values</b>					
+0	0x0F00	Total kW	-Pmax-Pmax	U3	INT16	R	
+1	0x0F01	Total kvar	-Pmax-Pmax	U3	INT16	R	
+2	0x0F02	Total kVA	0-Pmax	U3	UINT16	R	
+3	0x0F03	Total PF	-1.000-1.000	0.001	INT16	R	
+4	0x0F04	Total PF lag	0-1.000	0.001	UINT16	R	
+5	0x0F05	Total PF lead	0-1.000	0.001	UINT16		
+5	0x0F06	Total kW import	0-Pmax	U3	UINT16		
+7	0x0F07	Total kW export	0-Pmax	U3	UINT16	R	
+8	0x0F08	Total kvar import	0-Pmax	U3	UINT16	R	
+9	0x0F09	Total kvar export	0-Pmax	U3	UINT16	R	
+10	0x0F0A	3-phase average L-N voltage	0-Vmax	U1	UINT16	R	
+11	0x0F0B	3-phase average L-L voltage	0-Vmax	U1	UINT16	R	
+12	0x0F0C	3-phase average current	0-Imax	U2	UINT16	R	
+13	0x0F0D	3-phase average current, extended inputs I1x-I3x	0-Ixmax	U2	UINT16	R	
4608-4556		<b>1-Cycle Auxiliary Values</b>					
+0	0x1000	I4 current	0-I4max	U2	UINT16	R	
+1	0x1001	In current	0-Imax	U2	UINT16	R	
+2	0x1002	Frequency	0-100.00	0.01Hz	UINT16	R	
+3	0x1003	Voltage unbalance	0-300.0	0.1%	UINT16	R	
+4	0x1004	Current unbalance	0-300.0	0.1%	UINT16	R	
+5	0x1005	DC voltage	0-9999.00	0.01V	UINT16	R	

Address	Point ID	Description	Low and High Scales <sup>3</sup>	Units <sup>3</sup>	Type	R/W	Notes
+5	0x1006	V4 voltage	0-V4max	U4	UINT16	R	
+7	0x1007	I4x current	0-I4xmax	U2	UINT16	R	
4640-4655		<b>Fundamental Phasor Values</b>					
+0	0x1080	V1 voltage magnitude	0-Vmax	U1	UINT16	R	2
+1	0x1081	V2 voltage magnitude	0-Vmax	U1	UINT16	R	2
+2	0x1082	V3 voltage magnitude	0-Vmax	U1	UINT16	R	2
+3	0x1083	V4 voltage magnitude	0-V4max	U1	UINT16	R	
+4	0x1084	I1 current magnitude	0-Imax	U2	UINT16	R	
+5	0x1085	I2 current magnitude	0-Imax	U2	UINT16	R	
+5	0x1086	I3 current magnitude	0-Imax	U2	UINT16	R	
+7	0x1087	I4 current magnitude	0-Imax	U2	UINT16	R	
+8	0x1088	V1 voltage angle	-180.0-180.0	0.1°	INT16	R	2
+9	0x1089	V2 voltage angle	-180.0-180.0	0.1°	INT16	R	2
+10	0x108A	V3 voltage angle	-180.0-180.0	0.1°	INT16	R	2
+11	0x108B	V4 voltage angle	-180.0-180.0	0.1°	INT16	R	
+12	0x108C	I1 current angle	-180.0-180.0	0.1°	INT16	R	
+13	0x108D	I2 current angle	-180.0-180.0	0.1°	INT16	R	
+14	0x108E	I3 current angle	-180.0-180.0	0.1°	INT16	R	
+15	0x108F	I4 current angle	-180.0-180.0	0.1°	INT16	R	
4672-4707		<b>1-Second Phase Values</b>					
+0	0x1100	V1 voltage	0-Vmax	U1	UINT16	R	1
+1	0x1101	V2 voltage	0-Vmax	U1	UINT16	R	1
+2	0x1102	V3 voltage	0-Vmax	U1	UINT16	R	1
+3	0x1103	I1 current	0-Imax	U2	UINT16	R	
+4	0x1104	I2 current	0-Imax	U2	UINT16	R	
+5	0x1105	I3 current	0-Imax	U2	UINT16	R	
+6	0x1106	kW L1	-Pmax-Pmax	U3	INT16	R	
+7	0x1107	kW L2	-Pmax-Pmax	U3	INT16	R	
+8	0x1108	kW L3	-Pmax-Pmax	U3	INT16	R	
+9	0x1109	kvar L1	-Pmax-Pmax	U3	INT16	R	
+10	0x110A	kvar L2	-Pmax-Pmax	U3	INT16	R	
+11	0x110B	kvar L3	-Pmax-Pmax	U3	INT16	R	
+12	0x110C	kVA L1	0-Pmax	U3	UINT16	R	
+13	0x110D	kVA L2	0-Pmax	U3	UINT16	R	
+14	0x110E	kVA L3	0-Pmax	U3	UINT16	R	
+15	0x110F	Power factor L1	-1.000-1.000	0.001	INT16	R	
+16	0x1110	Power factor L2	-1.000-1.000	0.001	INT16	R	
+17	0x1111	Power factor L3	-1.000-1.000	0.001	INT16	R	
+18	0x1112	V1 voltage THD	0-999.9	0.1%	UINT16	R	2, 5
+19	0x1113	V2 voltage THD	0-999.9	0.1%	UINT16	R	2, 5
+20	0x1114	V3 voltage THD	0-999.9	0.1%	UINT16	R	2, 5
+21	0x1115	I1 current THD	0-999.9	0.1%	UINT16	R	5
+22	0x1116	I2 current THD	0-999.9	0.1%	UINT16	R	5

Address	Point ID	Description	Low and High Scales <sup>3</sup>	Units <sup>3</sup>	Type	R/W	Notes
+23	0x1117	I3 current THD	0-999.9	0.1%	UINT16	R	5
+24	0x1118	I1 K-Factor	1.0-999.9	0.1	UINT16	R	5
+25	0x1119	I2 K-Factor	1.0-999.9	0.1	UINT16	R	5
+26	0x111A	I3 K-Factor	1.0-999.9	0.1	UINT16	R	5
+27	0x111B	I1 current TDD	0-100.0	0.1%	UINT16	R	5
+28	0x111C	I2 current TDD	0-100.0	0.1%	UINT16	R	5
+29	0x111D	I3 current TDD	0-100.0	0.1%	UINT16	R	5
+30	0x111E	V12 voltage	0-Vmax	U1	UINT16	R	
+31	0x111F	V23 voltage	0-Vmax	U1	UINT16	R	
+32	0x1120	V31 voltage	0-Vmax	U1	UINT16	R	
+33	0x1121	I1x current	0-Ixmax	U2	UINT16	R	
+34	0x1122	I2x current	0-Ixmax	U2	UINT16	R	
+35	0x1123	I3x current	0-Ixmax	U2	UINT16	R	
4736-4749		<b>1-Second Low Phase Values</b>					
+0	0x1200	Low L-N voltage	0-Vmax	U1	UINT16	R	
+1	0x1201	Low current	0-Imax	U2	UINT16	R	
+2	0x1202	Low kW	-Pmax-Pmax	U3	INT16	R	
+3	0x1203	Low kvar	-Pmax-Pmax	U3	INT16	R	
+4	0x1204	Low kVA	0-Pmax	U3	UINT16	R	
+5	0x1205	Low PF Lag	0-1.000	0.001	UINT16	R	
+5	0x1206	Low PF Lead	0-1.000	0.001	UINT16	R	
+7	0x1207	Low voltage THD	0-999.9	0.1%	UINT16	R	2, 5
+8	0x1208	Low current THD	0-999.9	0.1%	UINT16	R	5
+9	0x1209	Low K-Factor	1.0-999.9	0.1	UINT16	R	5
+10	0x120A	Low current TDD	0-100.0	0.1%	UINT16	R	5
+11	0x120B	Low L-L voltage	0-Vmax	U1	UINT16	R	
+12	0x120C	Not used	0		UINT16	R	
+13	0x120D	Not used	0		UINT16	R	
4800-4813		<b>1-Second High Phase Values</b>					
+0	0x1300	High L-N voltage	0-Vmax	U1	UINT16	R	
+1	0x1301	High current	0-Imax	U2	UINT16	R	
+2	0x1302	High kW	-Pmax-Pmax	U3	INT16	R	
+3	0x1303	High kvar	-Pmax-Pmax	U3	INT16	R	
+4	0x1304	High kVA	0-Pmax	U3	UINT16	R	
+5	0x1305	High PF Lag	0-1.000	0.001	UINT16	R	
+5	0x1306	High PF Lead	0-1.000	0.001	UINT16	R	
+7	0x1307	High voltage THD	0-999.9	0.1%	UINT16	R	2, 5
+8	0x1308	High current THD	0-999.9	0.1%	UINT16	R	5
+9	0x1309	High K-Factor	1.0-999.9	0.1	UINT16	R	5
+10	0x130A	High current TDD	0-100.0	0.1%	UINT16	R	5
+11	0x130B	High L-L voltage	0-Vmax	U1	UINT16	R	
+12	0x130C	Not used	0		UINT16	R	
+13	0x130D	Not used	0		UINT16	R	

Address	Point ID	Description	Low and High Scales <sup>3</sup>	Units <sup>3</sup>	Type	R/W	Notes
4864-4877		<b>1-Second Total Values</b>					
+0	0x1400	Total kW	-Pmax-Pmax	U3	UINT16	R	
+1	0x1401	Total kvar	-Pmax-Pmax	U3	UINT16	R	
+2	0x1402	Total kVA	0-Pmax	U3	UINT16	R	
+3	0x1403	Total PF	-1.000-1.000	0.001	UINT16	R	
+4	0x1404	Total PF lag	0-1.000	0.001	UINT16	R	
+5	0x1405	Total PF lead	0-1.000	0.001	UINT16		
+5	0x1406	Total kW import	0-Pmax	U3	UINT16		
+7	0x1407	Total kW export	0-Pmax	U3	UINT16	R	
+8	0x1408	Total kvar import	0-Pmax	U3	UINT16	R	
+9	0x1409	Total kvar export	0-Pmax	U3	UINT16	R	
+10	0x140A	3-phase average L-N voltage	0-Vmax	U1	UINT16	R	
+11	0x140B	3-phase average L-L voltage	0-Vmax	U1	UINT16	R	
+12	0x140C	3-phase average current	0-Imax	U2	UINT16	R	
+13	0x140D	3-phase average current, extended inputs I1x-I3x	0-Ixmax	U2	UINT16	R	
4928-4935		<b>1-Second Auxiliary Values</b>					
+0	0x1500	I4 current	0-I4max	U2	UINT16	R	
+1	0x1501	In current	0-Imax	U2	UINT16	R	
+2	0x1502	Frequency	0-100.00	0.01Hz	UINT16	R	
+3	0x1503	Voltage unbalance	0-300.0	0.1%	UINT16	R	
+4	0x1504	Current unbalance	0-300.0	0.1%	UINT16	R	
+5	0x1505	DC voltage	0-9999.00	0.01V	UINT16	R	
+5	0x1506	V4 voltage	0-V4max	U4	UINT16	R	
+7	0x1507	I4x current	0-I4xmax	U2	UINT16	R	
4960-4971		<b>Present Harmonic Demands</b>					
+0	0x1580	V1 THD demand	0-999.9	0.1%	UINT16	R	2
+1	0x1581	V2 THD demand	0-999.9	0.1%	UINT16	R	2
+2	0x1582	V3 THD demand	0-999.9	0.1%	UINT16	R	2
+3	0x1583	V4 THD demand	0-999.9	0.1%	UINT16	R	
+4	0x1584	I1 THD demand	0-999.9	0.1%	UINT16	R	
+5	0x1585	I2 THD demand	0-999.9	0.1%	UINT16	R	
+5	0x1586	I3 THD demand	0-999.9	0.1%	UINT16	R	
+7	0x1587	I4 THD demand	0-999.9	0.1%	UINT16	R	
+8	0x1588	I1 TDD demand	0-100.0	0.1%	UINT16	R	
+9	0x1589	I2 TDD demand	0-100.0	0.1%	UINT16	R	
+10	0x158A	I3 TDD demand	0-100.0	0.1%	UINT16	R	
+11	0x158B	I4 TDD demand	0-100.0	0.1%	UINT16	R	
4992-5026		<b>Present Demands</b>					
+0	0x1600	V1 Volt demand	0-Vmax	U1	UINT16	R	2
+1	0x1601	V2 Volt demand	0-Vmax	U1	UINT16	R	2
+2	0x1602	V3 Volt demand	0-Vmax	U1	UINT16	R	2
+3	0x1603	I1 Ampere demand	0-Imax	U2	UINT16	R	
+4	0x1604	I2 Ampere demand	0-Imax	U2	UINT16	R	

Address	Point ID	Description	Low and High Scales <sup>3</sup>	Units <sup>3</sup>	Type	R/W	Notes
+5	0x1605	I3 Ampere demand	0-Imax	U2	UINT16	R	
+6	0x1606	kW import block demand	0-Pmax	U3	UINT16	R	
+7	0x1607	kvar import block demand	0-Pmax	U3	UINT16	R	
+8	0x1608	kVA block demand	0-Pmax	U3	UINT16	R	
+9	0x1609	kW import sliding window demand	0-Pmax	U3	UINT16	R	
+10	0x160A	kvar import sliding window demand	0-Pmax	U3	UINT16	R	
+11	0x160B	kVA sliding window demand	0-Pmax	U3	UINT16	R	
+12	0x160C	Not used	0		UINT16	R	
+13	0x160D	Not used	0		UINT16	R	
+14	0x160E	Not used	0		UINT16	R	
+15	0x160F	kW import accumulated demand	0-Pmax	U3	UINT16	R	
+16	0x1610	kvar import accumulated demand	0-Pmax	U3	UINT16	R	
+17	0x1611	kVA accumulated demand	0-Pmax	U3	UINT16	R	
+18	0x1612	kW import predicted sliding window demand	0-Pmax	U3	UINT16	R	
+19	0x1613	kvar import predicted sliding window demand	0-Pmax	U3	UINT16	R	
+20	0x1614	kVA predicted sliding window demand	0-Pmax	U3	UINT16	R	
+21	0x1615	PF (import) at Max. kVA sliding window demand	0-1.000	0.001	UINT16	R	
+22	0x1616	kW export block demand	0-Pmax	U3	UINT16	R	
+23	0x1617	kvar export block demand	0-Pmax	U3	UINT16	R	
+24	0x1618	kW export sliding window demand	0-Pmax	U3	UINT16	R	
+25	0x1619	kvar export sliding window demand	0-Pmax	U3	UINT16	R	
+26	0x161A	kW export accumulated demand	0-Pmax	U3	UINT16	R	
+27	0x161B	kvar export accumulated demand	0-Pmax	U3	UINT16	R	
+28	0x161C	kW export predicted sliding window demand	0-Pmax	U3	UINT16	R	
+29	0x161D	kvar export predicted sliding window demand	0-Pmax	U3	UINT16	R	
+30	0x161E	Not used	0		UINT16	R	
+31	0x161F	Not used	0		UINT16	R	
+32	0x1620	V4 volt demand	0-Vmax	U4	UINT16	R	
+33	0x1621	I4 ampere demand	0-Imax	U2	UINT16	R	
+34	0x1622	In ampere demand	0-Imax	U2	UINT16	R	
5152-5161		<b>Symmetrical Components</b>					
+0	0x1880	Positive-sequence voltage	0-Vmax	U1	UINT16	R	
+1	0x1881	Negative-sequence voltage	0-Vmax	U1	UINT16	R	
+2	0x1882	Zero-sequence voltage	0-Vmax	U1	UINT16	R	
+3	0x1883	Negative-sequence voltage unbalance	0-300.0	0.1%	UINT16	R	
+4	0x1884	Zero-sequence voltage unbalance	0-300.0	0.1%	UINT16	R	
+5	0x1885	Positive-sequence current	0-Imax	U2	UINT16	R	
+6	0x1886	Negative-sequence current	0-Imax	U2	UINT16	R	
+7	0x1887	Zero-sequence current	0-Imax	U2	UINT16	R	
+8	0x1888	Negative-sequence current unbalance	0-300.0	0.1%	UINT16	R	
+9	0x1889	Zero-sequence current unbalance	0-300.0	0.1%	UINT16	R	
5184-5246		<b>V1 Harmonics</b>					2
+0	0x1900	H01 Harmonic distortion	0-100.00	0.01%	UINT16	R	

Address	Point ID	Description	Low and High Scales <sup>3</sup>	Units <sup>3</sup>	Type	R/W	Notes
+1	0x1901	H02 Harmonic distortion	0-100.00	0.01%	UINT16	R	
		...					
+62	0x193E	H63 Harmonic distortion	0-100.00	0.01%	UINT16	R	
5248-5310		<b>V2 Harmonics</b>					2
+0	0x1A00	H01 Harmonic distortion	0-100.00	0.01%	UINT16	R	
+1	0x1A01	H02 Harmonic distortion	0-100.00	0.01%	UINT16	R	
		...					
+62	0x1A3E	H63 Harmonic distortion	0-100.00	0.01%	UINT16	R	
5312-5374		<b>V3 Harmonics</b>					2
+0	0x1B00	H01 Harmonic distortion	0-100.00	0.01%	UINT16	R	
+1	0x1B01	H02 Harmonic distortion	0-100.00	0.01%	UINT16	R	
		...					
+62	0x1B3E	H63 Harmonic distortion	0-100.00	0.01%	UINT16	R	
5376-5438		<b>I1 Harmonics</b>					
+0	0x1C00	H01 Harmonic distortion	0-100.00	0.01%	UINT16	R	
+1	0x1C01	H02 Harmonic distortion	0-100.00	0.01%	UINT16	R	
		...					
+62	0x1C3E	H63 Harmonic distortion	0-100.00	0.01%	UINT16	R	
5440-5502		<b>I2 Harmonics</b>					
+0	0x1D00	H01 Harmonic distortion	0-100.00	0.01%	UINT16	R	
+1	0x1D01	H02 Harmonic distortion	0-100.00	0.01%	UINT16	R	
		...					
+62	0x1D3E	H63 Harmonic distortion	0-100.00	0.01%	UINT16	R	
5504-5566		<b>I3 Harmonics</b>					
+0	0x1E00	H01 Harmonic distortion	0-100.00	0.01%	UINT16	R	
+1	0x1E01	H02 Harmonic distortion	0-100.00	0.01%	UINT16	R	
		...					
+62	0x1E3E	H63 Harmonic distortion	0-100.00	0.01%	UINT16	R	
5568-5599		<b>V1 Harmonic Voltages (odd numbers)</b>					2
+0	0x1F00	H01 Harmonic voltage	0-Vmax	U1	UINT16	R	
+1	0x1F01	H03 Harmonic voltage	0-Vmax	U1	UINT16	R	
		...					
+31	0x1F3E	H63 Harmonic voltage	0-Vmax	U1	UINT16	R	
5632-5663		<b>V2 Harmonic Voltages (odd numbers)</b>					2
+0	0x2000	H01 Harmonic voltage	0-Vmax	U1	UINT16	R	
+1	0x2001	H03 Harmonic voltage	0-Vmax	U1	UINT16	R	
		...					
+31	0x203E	H63 Harmonic voltage	0-Vmax	U1	UINT16	R	
5696-5727		<b>V3 Harmonic Voltages (odd numbers)</b>					2
+0	0x2100	H01 Harmonic voltage	0-Vmax	U1	UINT16	R	

Address	Point ID	Description	Low and High Scales <sup>3</sup>	Units <sup>3</sup>	Type	R/W	Notes
+1	0x2101	H03 Harmonic voltage	0-Vmax	U1	UINT16	R	
		...					
+31	0x213E	H63 Harmonic voltage	0-Vmax	U1	UINT16	R	
5760-5791		<b>I1 Harmonic Currents (odd numbers)</b>					
+0	0x2200	H01 Harmonic current	0-Imax	U2	UINT16	R	
+1	0x2201	H03 Harmonic current	0-Imax	U2	UINT16	R	
		...					
+31	0x223E	H63 Harmonic current	0-Imax	U2	UINT16	R	
5824-5855		<b>I2 Harmonic Currents (odd numbers)</b>					
+0	0x2300	H01 Harmonic current	0-Imax	U2	UINT16	R	
+1	0x2301	H03 Harmonic current	0-Imax	U2	UINT16	R	
		...					
+31	0x233E	H63 Harmonic current	0-Imax	U2	UINT16	R	
5888-5919		<b>I3 Harmonic Currents (odd numbers)</b>					
+0	0x2400	H01 Harmonic current	0-Imax	U2	UINT16	R	
+1	0x2401	H03 Harmonic current	0-Imax	U2	UINT16	R	
		...					
+31	0x243E	H63 Harmonic current	0-Imax	U2	UINT16	R	
5952-5983		<b>Total Harmonic kW (odd numbers)</b>					
+0	0x2500	H01 Harmonic kW	-Pmax -Pmax	U3	INT16	R	
+1	0x2501	H03 Harmonic kW	-Pmax -Pmax	U3	INT16	R	
		...					
+31	0x253E	H63 Harmonic kW	-Pmax -Pmax	U3	INT16	R	
6016-6047		<b>Total Harmonic kvar (odd numbers)</b>					
+0	0x2600	H01 Harmonic kvar	-Pmax -Pmax	U3	INT16	R	
+1	0x2601	H03 Harmonic kvar	-Pmax -Pmax	U3	INT16	R	
		...					
+31	0x263E	H63 Harmonic kvar	-Pmax -Pmax	U3	INT16	R	
6080-6111		<b>Total Harmonic Power Factor (odd numbers)</b>					
+0	0x2700	H01 Harmonic PF	-1.000-1.000	0.001	INT16	R	
+1	0x2701	H03 Harmonic PF	-1.000-1.000	0.001	INT16	R	
		...					
+31	0x273E	H63 Harmonic PF	-1.000-1.000	0.001	INT16	R	
6144-6206		<b>V4 Harmonics</b>					
+0	0x2800	H01 Harmonic distortion	0-100.00	0.01%	UINT16	R	
+1	0x2801	H02 Harmonic distortion	0-100.00	0.01%	UINT16	R	
		...					
+62	0x283E	H63 Harmonic distortion	0-100.00	0.01%	UINT16	R	
6240-6245		<b>Flicker</b>					
+0	0x2980	V1 Pst	0-100.00	0.01	UINT16	R	2
+1	0x2981	V2 Pst	0-100.00	0.01	UINT16	R	2



Address	Point ID	Description	Low and High Scales <sup>3</sup>	Units <sup>3</sup>	Type	R/W	Notes
+2	0x2982	V3 Pst	0-100.00	0.01	UINT16	R	2
+3	0x2983	V1 Plt	0-100.00	0.01	UINT16	R	2
+4	0x2984	V2 Plt	0-100.00	0.01	UINT16	R	2
+5	0x2985	V3 Plt	0-100.00	0.01	UINT16	R	2
6336-6398		<b>I4 Harmonics</b>					
+0	0x2B00	H01 Harmonic distortion	0-100.00	0.01%	UINT16	R	
+1	0x2B01	H02 Harmonic distortion	0-100.00	0.01%	UINT16	R	
		...					
+62	0x2B3E	H63 Harmonic distortion	0-100.00	0.01%	UINT16	R	
6400-6435		<b>Minimum 1-Cycle Phase Values</b>					
+0	0x2C00	V1 voltage	0-Vmax	U1	UINT16	R	1
+1	0x2C01	V2 voltage	0-Vmax	U1	UINT16	R	1
+2	0x2C02	V3 voltage	0-Vmax	U1	UINT16	R	1
+3	0x2C03	I1 current	0-Imax	U2	UINT16	R	
+4	0x2C04	I2 current	0-Imax	U2	UINT16	R	
+5	0x2C05	I3 current	0-Imax	U2	UINT16	R	
+6	0x2C06	kW L1	-Pmax-Pmax	U3	INT16	R	
+7	0x2C07	kW L2	-Pmax-Pmax	U3	INT16	R	
+8	0x2C08	kW L3	-Pmax-Pmax	U3	INT16	R	
+9	0x2C09	kvar L1	-Pmax-Pmax	U3	INT16	R	
+10	0x2C0A	kvar L2	-Pmax-Pmax	U3	INT16	R	
+11	0x2C0B	kvar L3	-Pmax-Pmax	U3	INT16	R	
+12	0x2C0C	kVA L1	0-Pmax	U3	UINT16	R	
+13	0x2C0D	kVA L2	0-Pmax	U3	UINT16	R	
+14	0x2C0E	kVA L3	0-Pmax	U3	UINT16	R	
+15	0x2C0F	Power factor L1	0-1.000	0.001	UINT16	R	Absolute value
+16	0x2C10	Power factor L2	0-1.000	0.001	UINT16	R	Absolute value
+17	0x2C11	Power factor L3	0-1.000	0.001	UINT16	R	Absolute value
+18	0x2C12	V1 voltage THD	0-9999	0.1%	UINT16	R	2, 4
+19	0x2C13	V2 voltage THD	0-9999	0.1%	UINT16	R	2, 4
+20	0x2C14	V3 voltage THD	0-999.9	0.1%	UINT16	R	2, 4
+21	0x2C15	I1 current THD	0-999.9	0.1%	UINT16	R	4
+22	0x2C16	I2 current THD	0-999.9	0.1%	UINT16	R	4
+23	0x2C17	I3 current THD	0-999.9	0.1%	UINT16	R	4
+24	0x2C18	I1 K-Factor	1.0-999.9	0.1	UINT16	R	4
+25	0x2C19	I2 K-Factor	1.0-999.9	0.1	UINT16	R	4
+26	0x2C1A	I3 K-Factor	1.0-999.9	0.1	UINT16	R	4
+27	0x2C1B	I1 current TDD	0-100.0	0.1%	UINT16	R	4
+28	0x2C1C	I2 current TDD	0-100.0	0.1%	UINT16	R	4
+29	0x2C1D	I3 current TDD	0-100.0	0.1%	UINT16	R	4
+30	0x2C1E	V12 voltage	0-Vmax	U1	UINT16	R	
+31	0x2C1F	V23 voltage	0-Vmax	U1	UINT16	R	
+32	0x2C20	V31 voltage	0-Vmax	U1	UINT16	R	

Address	Point ID	Description	Low and High Scales <sup>3</sup>	Units <sup>3</sup>	Type	R/W	Notes
+33	0x2C21	I1x current	0-Ixmax	U2	UINT16	R	
+34	0x2C22	I2x current	0-Ixmax	U2	UINT16	R	
+35	0x2C23	I3x current	0-Ixmax	U2	UINT16	R	
6464-6469		<b>Minimum 1-Cycle Total Values</b>					
+0	0x2D00	Total kW	-Pmax-Pmax	U3	INT16	R	
+1	0x2D01	Total kvar	-Pmax-Pmax	U3	INT16	R	
+2	0x2D02	Total kVA	0-Pmax	U3	UINT16	R	
+3	0x2D03	Total PF	0-1.000	0.001	UINT16	R	Absolute value
+4	0x2D04	Total PF lag	0-1.000	0.001	UINT16	R	
+5	0x2D05	Total PF lead	0-1.000	0.001	UINT16	R	
6528-6538		<b>Minimum 1-Cycle Auxiliary Values</b>					
+0	0x2E00	I4 current	0-I4max	U2	UINT16	R	
+1	0x2E01	In current	0-Imax	U2	UINT16	R	
+2	0x2E02	Frequency	0-100.00	0.01Hz	UINT16	R	
+3	0x2E03	Voltage unbalance	0-300.0	0.1%	UINT16	R	
+4	0x2E04	Current unbalance	0-300.0	0.1%	UINT16	R	
+5	0x2E05	DC voltage	0-9999.00	0.01V	UINT16	R	
+6	0x2E06	V4 voltage	0-V4max	U4	UINT16	R	
+7	0x2E07	I4x current	0-I4xmax	U2	UINT16	R	
+8	0x2E08	V4 THD	0-999.9	0.1%	UINT16	R	4
+9	0x2E09	I4x THD	0-999.9	0.1%	UINT16	R	4
+10	0x2E0A	I4x TDD	0-100.0	0.1%	UINT16	R	4
6560-6575		<b>Minimum Analog Inputs</b>					
+0	0x2E80	Analog input A11	A11min-A11max		UINT16	R	
+1	0x2E81	Analog input A12	A12min-A12max		UINT16	R	
		...					
+15	0x2E8F	Analog input A116	A116min-A116max		UINT16	R	
6656-6671		<b>Programmable Min/Max Minimum Values</b>					
+0	0x3000	Min/Max Register #1			UINT16	R	
+1	0x3001	Min/Max Register #2			UINT16	R	
		...					
+15	0x300F	Min/Max Register #16			UINT16	R	
6720-6751		<b>V4 Harmonic Voltages (odd numbers)</b>					
+0	0x3100	H01 Harmonic voltage	0-Vmax	U1	UINT16	R	
+1	0x3101	H03 Harmonic voltage	0-Vmax	U1	UINT16	R	
		...					
+31	0x313E	H63 Harmonic voltage	0-Vmax	U1	UINT16	R	
6784-6815		<b>I4 Harmonic Currents (odd numbers)</b>					
+0	0x3200	H01 Harmonic current	0-Imax	U2	UINT16	R	
+1	0x3201	H03 Harmonic current	0-Imax	U2	UINT16	R	
		...					
+31	0x323E	H63 Harmonic current	0-Imax	U2	UINT16	R	

Address	Point ID	Description	Low and High Scales <sup>3</sup>	Units <sup>3</sup>	Type	R/W	Notes
6912-6947		<b>Maximum 1-Cycle Phase Values</b>					
+0	0x3400	V1 voltage	0-Vmax	U1	UINT16	R	1
+1	0x3401	V2 voltage	0-Vmax	U1	UINT16	R	1
+2	0x3402	V3 voltage	0-Vmax	U1	UINT16	R	1
+3	0x3403	I1 current	0-Imax	U2	UINT16	R	
+4	0x3404	I2 current	0-Imax	U2	UINT16	R	
+5	0x3405	I3 current	0-Imax	U2	UINT16	R	
+6	0x3406	kW L1	-Pmax-Pmax	U3	INT16	R	
+7	0x3407	kW L2	-Pmax-Pmax	U3	INT16	R	
+8	0x3408	kW L3	-Pmax-Pmax	U3	INT16	R	
+9	0x3409	kvar L1	-Pmax-Pmax	U3	INT16	R	
+10	0x340A	kvar L2	-Pmax-Pmax	U3	INT16	R	
+11	0x340B	kvar L3	-Pmax-Pmax	U3	INT16	R	
+12	0x340C	kVA L1	0-Pmax	U3	UINT16	R	
+13	0x340D	kVA L2	0-Pmax	U3	UINT16	R	
+14	0x340E	kVA L3	0-Pmax	U3	UINT16	R	
+15	0x340F	Power factor L1	0-1.000	0.001	UINT16	R	Absolute value
+16	0x3410	Power factor L2	0-1.000	0.001	UINT16	R	Absolute value
+17	0x3411	Power factor L3	0-1.000	0.001	UINT16	R	Absolute value
+18	0x3412	V1 voltage THD	0-999.9	0.1%	UINT16	R	2, 4
+19	0x3413	V2 voltage THD	0-999.9	0.1%	UINT16	R	2, 4
+20	0x3414	V3 voltage THD	0-999.9	0.1%	UINT16	R	2, 4
+21	0x3415	I1 current THD	0-999.9	0.1%	UINT16	R	4
+22	0x3416	I2 current THD	0-999.9	0.1%	UINT16	R	4
+23	0x3417	I3 current THD	0-999.9	0.1%	UINT16	R	4
+24	0x3418	I1 K-Factor	1.0-999.9	0.1	UINT16	R	4
+25	0x3419	I2 K-Factor	1.0-999.9	0.1	UINT16	R	4
+26	0x341A	I3 K-Factor	1.0-999.9	0.1	UINT16	R	4
+27	0x341B	I1 current TDD	0-100.0	0.1%	UINT16	R	4
+28	0x341C	I2 current TDD	0-100.0	0.1%	UINT16	R	4
+29	0x341D	I3 current TDD	0-100.0	0.1%	UINT16	R	4
+30	0x341E	V12 voltage	0-Vmax	U1	UINT16	R	
+31	0x341F	V23 voltage	0-Vmax	U1	UINT16	R	
+32	0x3420	V31 voltage	0-Vmax	U1	UINT16	R	
+33	0x3421	I1x current	0-Ixmax	U2	UINT16	R	
+34	0x3422	I2x current	0-Ixmax	U2	UINT16	R	
+35	0x3423	I3x current	0-Ixmax	U2	UINT16	R	
6976-6981		<b>Maximum 1-Cycle Total Values</b>					
+0	0x3500	Total kW	-Pmax-Pmax	U3	INT16	R	
+1	0x3501	Total kvar	-Pmax-Pmax	U3	INT16	R	
+2	0x3502	Total kVA	0-Pmax	U3	UINT16	R	
+3	0x3503	Total PF	0-1.000	0.001	UINT16	R	Absolute value
+4	0x3504	Total PF lag	0-1.000	0.001	UINT16	R	

Address	Point ID	Description	Low and High Scales <sup>3</sup>	Units <sup>3</sup>	Type	R/W	Notes
+5	0x3505	Total PF lead	0-1.000	0.001	UINT16	R	
7040-7050		<b>Maximum 1-Cycle Auxiliary Values</b>					
+0	0x3600	I4 current	0-I4max	U2	UINT16	R	
+1	0x3601	In current	0-Imax	U2	UINT16	R	
+2	0x3602	Frequency	0-100.00	0.01Hz	UINT16	R	
+3	0x3603	Voltage unbalance	0-300.0	0.1%	UINT16	R	
+4	0x3604	Current unbalance	0-300.0	0.1%	UINT16	R	
+5	0x3605	DC voltage	0-9999.00	0.01V	UINT16	R	
+6	0x3606	V4 voltage	0-V4max	U4	UINT16	R	
+7	0x3607	I4x current	0-I4xmax	U2	UINT16	R	
+8	0x3608	V4 THD	0-999.9	0.1%	UINT16	R	4
+9	0x3609	I4x THD	0-999.9	0.1%	UINT16	R	4
+10	0x360A	I4x TDD	0-100.0	0.1%	UINT16	R	4
7072-7087		<b>Maximum Analog Inputs</b>					
+0	0x3680	Analog input AI1	AI1min-AI1max		UINT16	R	
+1	0x3681	Analog input AI2	AI2min-AI2max		UINT16	R	
		...					
+15	0x368F	Analog input AI16	AI16min-AI16max		UINT16	R	
7104-71025		<b>Maximum Demands</b>					
+0	0x3700	V1 Maximum volt demand	0-Vmax	U1	UINT16	R	2
+1	0x3701	V2 Maximum volt demand	0-Vmax	U1	UINT16	R	2
+2	0x3702	V3 Maximum volt demand	0-Vmax	U1	UINT16	R	2
+3	0x3703	I1 Maximum ampere demand	0-Imax	U2	UINT16	R	
+4	0x3704	I2 Maximum ampere demand	0-Imax	U2	UINT16	R	
+5	0x3705	I3 Maximum ampere demand	0-Imax	U2	UINT16	R	
+6	0x3706	Not used	0		UINT16	R	
+7	0x3707	Not used	0		UINT16	R	
+8	0x3708	Not used	0		UINT16	R	
+9	0x3709	Maximum kW import sliding window demand	0-Pmax	U3	UINT16	R	
+10	0x370A	Maximum kvar import sliding window demand	0-Pmax	U3	UINT16	R	
+11	0x370B	Maximum kVA sliding window demand	0-Pmax	U3	UINT16	R	
+12	0x370C	Not used	0		UINT16	R	
+13	0x370D	Not used	0		UINT16	R	
+14	0x370E	Not used	0		UINT16	R	
+15	0x370F	Maximum kW export sliding window demand	0-Pmax	U3	UINT16	R	
+16	0x3710	Maximum kvar export sliding window demand	0-Pmax	U3	UINT16	R	
+17	0x3711	Not used	0		UINT16	R	
+18	0x3712	Not used	0		UINT16	R	
+19	0x3713	V4 Maximum volt demand	0-Vmax	U4	UINT16	R	
+20	0x3714	I4 Maximum ampere demand	0-I4max	U2	UINT16	R	
+21	0x3715	In Maximum ampere demand	0-Imax	U2	UINT16	R	
7168-7183		<b>Programmable Min/Max Maximum Values</b>					
+0	0x3800	Min/Max Register #1			UINT16	R	

Address	Point ID	Description	Low and High Scales <sup>3</sup>	Units <sup>3</sup>	Type	R/W	Notes
+1	0x3801	Min/Max Register #2			UINT16	R	
		...					
+15	0x380F	Min/Max Register #16			UINT16	R	
7200-7211		<b>Maximum Harmonic Demands</b>					
+0	0x3880	V1 THD demand	0-999.9	0.1%	UINT16	R	2
+1	0x3881	V2 THD demand	0-999.9	0.1%	UINT16	R	2
+2	0x3882	V3 THD demand	0-999.9	0.1%	UINT16	R	2
+3	0x3883	V4 THD demand	0-999.9	0.1%	UINT16	R	
+4	0x3884	I1 THD demand	0-999.9	0.1%	UINT16	R	
+5	0x3885	I2 THD demand	0-999.9	0.1%	UINT16	R	
+6	0x3886	I3 THD demand	0-999.9	0.1%	UINT16	R	
+7	0x3887	I4 THD demand	0-999.9	0.1%	UINT16	R	
+8	0x3888	I1 TDD demand	0-100.0	0.1%	UINT16	R	
+9	0x3889	I2 TDD demand	0-100.0	0.1%	UINT16	R	
+10	0x388A	I3 TDD demand	0-100.0	0.1%	UINT16	R	
+11	0x388B	I4 TDD demand	0-100.0	0.1%	UINT16	R	
7232-7263		<b>Maximum Analog Input Demands</b>					
+0	0x3900	Analog input A11+	A11min-A11max		UINT16	R	Positive AI readings demand
+1	0x3901	Analog input A12+	A12min-A12max		UINT16	R	
		...					
+15	0x390F	Analog input A116+	A116min-A116max		UINT16	R	
+16	0x3910	Analog input A11-	A11min-A11max		UINT16	R	Negative AI readings demand
+17	0x3911	Analog input A12-	A12min-A12max		UINT16	R	
		...					
+31	0x391F	Analog input A116-	A116min-A116max		UINT16	R	
7296-7327		<b>Present Analog Input Demands</b>					
+0	0x3A00	Analog input A11+	A11min-A11max		UINT16	R	Positive AI readings demand
+1	0x3A01	Analog input A12+	A12min-A12max		UINT16	R	
		...					
+15	0x3A0F	Analog input A116+	A116min-A116max		UINT16	R	
+16	0x3A10	Analog input A11-	A11min-A11max		UINT16	R	Negative AI readings demand
+17	0x3A11	Analog input A12-	A12min-A12max		UINT16	R	
		...					
+31	0x3A1F	Analog input A116-	A116min-A116max		UINT16	R	
7360-7375		<b>1-Cycle Analog Inputs</b>					
+0	0x3B00	Analog input A11	A11min-A11max		UINT16	R	
+1	0x3B01	Analog input A12	A12min-A12max		UINT16	R	
		...					
+15	0x3B0F	Analog input A116	A116min-A116max		UINT16	R	
7392-7407		<b>Raw Analog Inputs</b>					
+0	0x3B80	Analog input A11	0-4095		UINT16	R	
+1	0x3B81	Analog input A12	0-4095		UINT16	R	
		...					

Address	Point ID	Description	Low and High Scales <sup>3</sup>	Units <sup>3</sup>	Type	R/W	Notes
+15	0x3B8F	Analog input AI16	0-4095		UINT16	R	
7456-7471		<b>Scaled Analog Outputs</b>					
+0	0x3C80	Analog input AO1	0-4095		UINT16	R/W	
+1	0x3C81	Analog input AO2	0-4095		UINT16	R/W	
		...					
+15	0x3C8F	Analog input AO16	0-4095		UINT16	R/W	
8000-8015		<b>Billing Summary Accumulated Demands</b>					
+0	0x4500	Summary register #1	0-Pmax	U3	UINT16	R	
+1	0x4501	Summary register #2	0-Pmax	U3	UINT16	R	
		...					
+15	0x4503	Summary register #16	0-Pmax	U3	UINT16	R	
8032-8047		<b>Billing Summary Block Demands</b>					
+0	0x4580	Summary register #1	0-Pmax	U3	UINT16	R	
+1	0x4581	Summary register #2	0-Pmax	U3	UINT16	R	
		...					
+15	0x4583	Summary register #16	0-Pmax	U3	UINT16	R	
8064-8079		<b>Billing Summary Sliding Window Demands</b>					
+0	0x4600	Summary register #1	0-Pmax	U3	UINT16	R	
+1	0x4601	Summary register #2	0-Pmax	U3	UINT16	R	
		...					
+15	0x4603	Summary register #16	0-Pmax	U3	UINT16	R	
8160-8175		<b>Billing Summary Maximum Demands</b>					
+0	0x4780	Summary register #1	0-Pmax	U3	UINT16	R	
+1	0x4781	Summary register #2	0-Pmax	U3	UINT16	R	
		...					
+15	0x4783	Summary register #16	0-Pmax	U3	UINT16	R	
8192-8207		<b>Billing TOU Maximum Demand Register #1</b>					
+0	0x4800	Tariff #1 register	0-Pmax	U3	UINT16	R	
+1	0x4801	Tariff #2 register	0-Pmax	U3	UINT16	R	
		...				R	
+15	0x480F	Tariff #16 register	0-Pmax	U3	UINT16	R	
8224-8239		<b>Billing TOU Maximum Demand Register #4</b>					
+0	0x4880	Tariff #1 register	0-Pmax	U3	UINT16	R	
+1	0x4881	Tariff #2 register	0-Pmax	U3	UINT16	R	
		...				R	
+15	0x488F	Tariff #16 register	0-Pmax	U3	UINT16	R	
8256-8271		<b>Billing TOU Maximum Demand Register #2</b>					
+0	0x4900	Tariff #1 register	0-Pmax	U3	UINT16	R	
+1	0x4901	Tariff #2 register	0-Pmax	U3	UINT16	R	
		...				R	
+15	0x490F	Tariff #16 register	0-Pmax	U3	UINT16	R	

Address	Point ID	Description	Low and High Scales <sup>3</sup>	Units <sup>3</sup>	Type	R/W	Notes
8288-8303		<b>Billing TOU Maximum Demand Register #5</b>					
+0	0x4980	Tariff #1 register	0-Pmax	U3	UINT16	R	
+1	0x4981	Tariff #2 register	0-Pmax	U3	UINT16	R	
		...				R	
+15	0x498F	Tariff #16 register	0-Pmax	U3	UINT16	R	
8320-8335		<b>Billing TOU Maximum Demand Register #3</b>					
+0	0x4A00	Tariff #1 register	0-Pmax	U3	UINT16	R	
+1	0x4A01	Tariff #2 register	0-Pmax	U3	UINT16	R	
		...				R	
+15	0x4A0F	Tariff #16 register	0-Pmax	U3	UINT16	R	
8352-8367		<b>Billing TOU Maximum Demand Register #6</b>					
+0	0x4A80	Tariff #1 register	0-Pmax	U3	UINT16	R	
+1	0x4A81	Tariff #2 register	0-Pmax	U3	UINT16	R	
		...				R	
+15	0x4A8F	Tariff #16 register	0-Pmax	U3	UINT16	R	
8896-8911		<b>Billing TOU Maximum Demand Register #7</b>					
+0	0x5300	Tariff #1 register	0-Pmax	U3	UINT16	R	
+1	0x5301	Tariff #2 register	0-Pmax	U3	UINT16	R	
		...				R	
+15	0x530F	Tariff #16 register	0-Pmax	U3	UINT16	R	
8928-8943		<b>Billing TOU Maximum Demand Register #8</b>					
+0	0x5380	Tariff #1 register	0-Pmax	U3	UINT16	R	
+1	0x5381	Tariff #2 register	0-Pmax	U3	UINT16	R	
		...				R	
+15	0x538F	Tariff #16 register	0-Pmax	U3	UINT16	R	
8960-8975		<b>Billing TOU Maximum Demand Register #9</b>					
+0	0x5400	Tariff #1 register	0-Pmax	U3	UINT16	R	
+1	0x5401	Tariff #2 register	0-Pmax	U3	UINT16	R	
		...				R	
+15	0x540F	Tariff #16 register	0-Pmax	U3	UINT16	R	
8992-9007		<b>Billing TOU Maximum Demand Register #10</b>					
+0	0x5480	Tariff #1 register	0-Pmax	U3	UINT16	R	
+1	0x5481	Tariff #2 register	0-Pmax	U3	UINT16	R	
		...				R	
+15	0x548F	Tariff #16 register	0-Pmax	U3	UINT16	R	
9024-9039		<b>Billing TOU Maximum Demand Register #11</b>					
+0	0x5500	Tariff #1 register	0-Pmax	U3	UINT16	R	
+1	0x5501	Tariff #2 register	0-Pmax	U3	UINT16	R	
		...				R	
+15	0x550F	Tariff #16 register	0-Pmax	U3	UINT16	R	

Address	Point ID	Description	Low and High Scales <sup>3</sup>	Units <sup>3</sup>	Type	R/W	Notes
9056-9071		<b>Billing TOU Maximum Demand Register #12</b>					
+0	0x5580	Tariff #1 register	0-Pmax	U3	UINT16	R	
+1	0x5581	Tariff #2 register	0-Pmax	U3	UINT16	R	
		...				R	
+15	0x558F	Tariff #16 register	0-Pmax	U3	UINT16	R	
9088-9103		<b>Billing TOU Maximum Demand Register #13</b>					
+0	0x5600	Tariff #1 register	0-Pmax	U3	UINT16	R	
+1	0x5601	Tariff #2 register	0-Pmax	U3	UINT16	R	
		...				R	
+15	0x560F	Tariff #16 register	0-Pmax	U3	UINT16	R	
9120-9135		<b>Billing TOU Maximum Demand Register #14</b>					
+0	0x5680	Tariff #1 register	0-Pmax	U3	UINT16	R	
+1	0x5681	Tariff #2 register	0-Pmax	U3	UINT16	R	
		...				R	
+15	0x568F	Tariff #16 register	0-Pmax	U3	UINT16	R	
9152-9167		<b>Billing TOU Maximum Demand Register #15</b>					
+0	0x5700	Tariff #1 register	0-Pmax	U3	UINT16	R	
+1	0x5701	Tariff #2 register	0-Pmax	U3	UINT16	R	
		...				R	
+15	0x570F	Tariff #16 register	0-Pmax	U3	UINT16	R	
9184-9199		<b>Billing TOU Maximum Demand Register #16</b>					
+0	0x5780	Tariff #1 register	0-Pmax	U3	UINT16	R	
+1	0x5781	Tariff #2 register	0-Pmax	U3	UINT16	R	
		...				R	
+15	0x578F	Tariff #16 register	0-Pmax	U3	UINT16	R	
10496-10522		<b>0.2-Second RMS and Auxiliary Values</b>					
+0	0x6C00	V1 voltage	0-Vmax	U1	UINT16	R	1
+1	0x6C01	V2 voltage	0-Vmax	U1	UINT16	R	1
+2	0x6C02	V3 voltage	0-Vmax	U1	UINT16	R	1
+3	0x6C03	V4 voltage	0-V4max	U4	UINT16	R	
+4	0x6C04	V12 voltage	0-Vmax	U1	UINT16	R	
+5	0x6C05	V23 voltage	0-Vmax	U1	UINT16	R	
+6	0x6C06	V31 voltage	0-Vmax	U1	UINT16	R	
+7	0x6C07	I1 current	0-Imax	U2	UINT16	R	
+8	0x6C08	I2 current	0-Imax	U2	UINT16	R	
+9	0x6C09	I3 current	0-Imax	U2	UINT16	R	
+10	0x6C0A	I4 current	0-I4max	U2	UINT16	R	
+11	0x6C0B	In current	0-Imax	U2	UINT16	R	
+12	0x6C0C	I1x current	0-Ixmax	U2	UINT16	R	
+13	0x6C0D	I2x current	0-Ixmax	U2	UINT16	R	
+14	0x6C0E	I3x current	0-Ixmax	U2	UINT16	R	



Address	Point ID	Description	Low and High Scales <sup>3</sup>	Units <sup>3</sup>	Type	R/W	Notes
+15	0x6C0F	I4x current	0-I4xmax	U2	UINT16	R	
+16	0x6C10	Inx current	0-Ixmax	U2	UINT16	R	
+17	0x6C11	Zero-sequence voltage	0-Vmax	U1	UINT16	R	
+18	0x6C12	Zero-sequence current	0-Imax	U2	UINT16	R	
+19	0x6C13	Ix Zero-sequence current	0-Ixmax	U2	UINT16	R	
+20	0x6C14	Voltage unbalance	0-300.0	0.1%	UINT16	R	
+21	0x6C15	Current unbalance	0-300.0	0.1%	UINT16	R	
+22	0x6C16	Ix current unbalance	0-300.0	0.1%	UINT16	R	
+23	0x6C17	DC voltage	0-9999.00	0.01V	UINT16	R	
+24	0x6C18	Frequency	0-100.00	0.01Hz	UINT16	R	
+25	0x6C19	Positive-sequence voltage	0-Vmax	U1	UINT16	R	
+26	0x6C1A	Zero-sequence voltage unbalance	0-300.0	0.1%	UINT16	R	
10528-10554		<b>3-Second RMS and Auxiliary Values</b>					
+0	0x6C80	V1 voltage	0-Vmax	U1	UINT16	R	1
+1	0x6C81	V2 voltage	0-Vmax	U1	UINT16	R	1
+2	0x6C82	V3 voltage	0-Vmax	U1	UINT16	R	1
+3	0x6C83	V4 voltage	0-V4max	U4	UINT16	R	
+4	0x6C84	V12 voltage	0-Vmax	U1	UINT16	R	
+5	0x6C85	V23 voltage	0-Vmax	U1	UINT16	R	
+6	0x6C86	V31 voltage	0-Vmax	U1	UINT16	R	
+7	0x6C87	I1 current	0-Imax	U2	UINT16	R	
+8	0x6C88	I2 current	0-Imax	U2	UINT16	R	
+9	0x6C89	I3 current	0-Imax	U2	UINT16	R	
+10	0x6C8A	I4 current	0-I4max	U2	UINT16	R	
+11	0x6C8B	In current	0-Imax	U2	UINT16	R	
+12	0x6C8C	I1x current	0-Ixmax	U2	UINT16	R	
+13	0x6C8D	I2x current	0-Ixmax	U2	UINT16	R	
+14	0x6C8E	I3x current	0-Ixmax	U2	UINT16	R	
+15	0x6C8F	I4x current	0-I4xmax	U2	UINT16	R	
+16	0x6C90	Inx current	0-Ixmax	U2	UINT16	R	
+17	0x6C91	Zero-sequence voltage	0-Vmax	U1	UINT16	R	
+18	0x6C92	Zero-sequence current	0-Imax	U2	UINT16	R	
+19	0x6C93	Ix Zero-sequence current	0-Ixmax	U2	UINT16	R	
+20	0x6C94	Voltage unbalance	0-300.0	0.1%	UINT16	R	
+21	0x6C95	Current unbalance	0-300.0	0.1%	UINT16	R	
+22	0x6C96	Ix current unbalance	0-300.0	0.1%	UINT16	R	
+23	0x6C97	DC voltage	0-9999.00	0.01V	UINT16	R	
+24	0x6C98	Frequency	0-100.00	0.01Hz	UINT16	R	20-sec value
+25	0x6C99	Positive-sequence voltage	0-Vmax	U1	UINT16	R	
+26	0x6C9A	Zero-sequence voltage unbalance	0-300.0	0.1%	UINT16	R	
11136-11162		<b>1-Minute RMS and Auxiliary Values</b>					
+0	0x7600	V1 voltage	0-Vmax	U1	UINT16	R	1
+1	0x7601	V2 voltage	0-Vmax	U1	UINT16	R	1

Address	Point ID	Description	Low and High Scales <sup>3</sup>	Units <sup>3</sup>	Type	R/W	Notes
+2	0x7602	V3 voltage	0-Vmax	U1	UINT16	R	1
+3	0x7603	V4 voltage	0-V4max	U4	UINT16	R	
+4	0x7604	V12 voltage	0-Vmax	U1	UINT16	R	
+5	0x7605	V23 voltage	0-Vmax	U1	UINT16	R	
+6	0x7606	V31 voltage	0-Vmax	U1	UINT16	R	
+7	0x7607	I1 current	0-Imax	U2	UINT16	R	
+8	0x7608	I2 current	0-Imax	U2	UINT16	R	
+9	0x7609	I3 current	0-Imax	U2	UINT16	R	
+10	0x760A	I4 current	0-I4max	U2	UINT16	R	
+11	0x760B	In current	0-Imax	U2	UINT16	R	
+12	0x760C	I1x current	0-Ixmax	U2	UINT16	R	
+13	0x760D	I2x current	0-Ixmax	U2	UINT16	R	
+14	0x760E	I3x current	0-Ixmax	U2	UINT16	R	
+15	0x760F	I4x current	0-I4xmax	U2	UINT16	R	
+16	0x7610	Inx current	0-Ixmax	U2	UINT16	R	
+17	0x7611	Zero-sequence voltage	0-Vmax	U1	UINT16	R	
+18	0x7612	Zero-sequence current	0-Imax	U2	UINT16	R	
+19	0x7613	Ix Zero-sequence current	0-Ixmax	U2	UINT16	R	
+20	0x7614	Voltage unbalance	0-300.0	0.1%	UINT16	R	
+21	0x7615	Current unbalance	0-300.0	0.1%	UINT16	R	
+22	0x7616	Ix current unbalance	0-300.0	0.1%	UINT16	R	
+23	0x7617	DC voltage	0-9999.00	0.01V	UINT16	R	
+24	0x7618	Frequency	0-100.00	0.01Hz	UINT16	R	
+25	0x7619	Positive-sequence voltage	0-Vmax	U1	UINT16	R	
+26	0x761A	Zero-sequence voltage unbalance	0-300.0	0.1%	UINT16	R	
10560-10586		<b>10-Minute RMS and Auxiliary Values</b>					
+0	0x6D00	V1 voltage	0-Vmax	U1	UINT16	R	1
+1	0x6D01	V2 voltage	0-Vmax	U1	UINT16	R	1
+2	0x6D02	V3 voltage	0-Vmax	U1	UINT16	R	1
+3	0x6D03	V4 voltage	0-V4max	U4	UINT16	R	
+4	0x6D04	V12 voltage	0-Vmax	U1	UINT16	R	
+5	0x6D05	V23 voltage	0-Vmax	U1	UINT16	R	
+6	0x6D06	V31 voltage	0-Vmax	U1	UINT16	R	
+7	0x6D07	I1 current	0-Imax	U2	UINT16	R	
+8	0x6D08	I2 current	0-Imax	U2	UINT16	R	
+9	0x6D09	I3 current	0-Imax	U2	UINT16	R	
+10	0x6D0A	I4 current	0-I4max	U2	UINT16	R	
+11	0x6D0B	In current	0-Imax	U2	UINT16	R	
+12	0x6D0C	I1x current	0-Ixmax	U2	UINT16	R	
+13	0x6D0D	I2x current	0-Ixmax	U2	UINT16	R	
+14	0x6D0E	I3x current	0-Ixmax	U2	UINT16	R	
+15	0x6D0F	I4x current	0-I4xmax	U2	UINT16	R	
+16	0x6D10	Inx current	0-Ixmax	U2	UINT16	R	

Address	Point ID	Description	Low and High Scales <sup>3</sup>	Units <sup>3</sup>	Type	R/W	Notes
+17	0x6D11	Zero-sequence voltage	0-Vmax	U1	UINT16	R	
+18	0x6D12	Zero-sequence current	0-Imax	U2	UINT16	R	
+19	0x6D13	Ix Zero-sequence current	0-Ixmax	U2	UINT16	R	
+20	0x6D14	Voltage unbalance	0-300.0	0.1%	UINT16	R	
+21	0x6D15	Current unbalance	0-300.0	0.1%	UINT16	R	
+22	0x6D16	Ix current unbalance	0-300.0	0.1%	UINT16	R	
+23	0x6D17	DC voltage	0-9999.00	0.01V	UINT16	R	
+24	0x6D18	Frequency	0-100.00	0.01Hz	UINT16	R	
+25	0x6D19	Positive-sequence voltage	0-Vmax	U1	UINT16	R	
+26	0x6D1A	Zero-sequence voltage unbalance	0-300.0	0.1%	UINT16	R	
10592-10618		<b>2-Hour RMS and Auxiliary Values</b>					
+0	0x6D80	V1 voltage	0-Vmax	U1	UINT16	R	1
+1	0x6D81	V2 voltage	0-Vmax	U1	UINT16	R	1
+2	0x6D82	V3 voltage	0-Vmax	U1	UINT16	R	1
+3	0x6D83	V4 voltage	0-V4max	U4	UINT16	R	
+4	0x6D84	V12 voltage	0-Vmax	U1	UINT16	R	
+5	0x6D85	V23 voltage	0-Vmax	U1	UINT16	R	
+6	0x6D86	V31 voltage	0-Vmax	U1	UINT16	R	
+7	0x6D87	I1 current	0-Imax	U2	UINT16	R	
+8	0x6D88	I2 current	0-Imax	U2	UINT16	R	
+9	0x6D89	I3 current	0-Imax	U2	UINT16	R	
+10	0x6D8A	I4 current	0-I4max	U2	UINT16	R	
+11	0x6D8B	In current	0-Imax	U2	UINT16	R	
+12	0x6D8C	I1x current	0-Ixmax	U2	UINT16	R	
+13	0x6D8D	I2x current	0-Ixmax	U2	UINT16	R	
+14	0x6D8E	I3x current	0-Ixmax	U2	UINT16	R	
+15	0x6D8F	I4x current	0-I4xmax	U2	UINT16	R	
+16	0x6D90	Inx current	0-Ixmax	U2	UINT16	R	
+17	0x6D91	Zero-sequence voltage	0-Vmax	U1	UINT16	R	
+18	0x6D92	Zero-sequence current	0-Imax	U2	UINT16	R	
+19	0x6D93	Ix Zero-sequence current	0-Ixmax	U2	UINT16	R	
+20	0x6D94	Voltage unbalance	0-300.0	0.1%	UINT16	R	
+21	0x6D95	Current unbalance	0-300.0	0.1%	UINT16	R	
+22	0x6D96	Ix current unbalance	0-300.0	0.1%	UINT16	R	
+23	0x6D97	DC voltage	0-9999.00	0.01V	UINT16	R	
+24	0x6D98	Frequency	0-100.00	0.01Hz	UINT16	R	
+25	0x6D99	Positive-sequence voltage	0-Vmax	U1	UINT16	R	
+26	0x6D9A	Zero-sequence voltage unbalance	0-300.0	0.1%	UINT16	R	
10624-10655		<b>0.2-Second Harmonics</b>					
+0	0x6E00	V1 THD	0-999.9	0.1%	UINT16	R	2
+1	0x6E01	V2 THD	0-999.9	0.1%	UINT16	R	2
+2	0x6E02	V3 THD	0-999.9	0.1%	UINT16	R	2
+3	0x6E03	V4 THD	0-999.9	0.1%	UINT16	R	

Address	Point ID	Description	Low and High Scales <sup>3</sup>	Units <sup>3</sup>	Type	R/W	Notes
+4	0x6E04	I1 THD	0-999.9	0.1%	UINT16	R	
+5	0x6E05	I2 THD	0-999.9	0.1%	UINT16	R	
+6	0x6E06	I3 THD	0-999.9	0.1%	UINT16	R	
+7	0x6E07	I4 THD	0		UINT16	R	
+8	0x6E08	Not used	0		UINT16	R	
+9	0x6E09	Not used	0		UINT16	R	
+10	0x6E0A	Not used	0		UINT16	R	
+11	0x6E0B	Not used	0		UINT16	R	
+12	0x6E0C	Not used	0		UINT16	R	
+13	0x6E0D	Not used	0		UINT16	R	
+14	0x6E0E	Not used	0		UINT16	R	
+15	0x6E0F	Not used	0		UINT16	R	
+16	0x6E10	I1 TDD	0-100.0	0.1%	UINT16	R	
+17	0x6E11	I2 TDD	0-100.0	0.1%	UINT16	R	
+18	0x6E12	I3 TDD	0-100.0	0.1%	UINT16	R	
+19	0x6E13	I4 TDD	0-100.0	0.1%	UINT16	R	
+20	0x6E14	I1 K-Factor	1.0-999.9	0.1	UINT16	R	
+21	0x6E15	I2 K-Factor	1.0-999.9	0.1	UINT16	R	
+22	0x6E16	I3 K-Factor	1.0-999.9	0.1	UINT16	R	
+23	0x6E17	I4 K-Factor	1.0-999.9	0.1	UINT16	R	
+24	0x6E18	V1 Crest Factor	0-100.00	0.01	UINT16	R	<sup>2</sup>
+25	0x6E19	V2 Crest Factor	0-100.00	0.01	UINT16	R	<sup>2</sup>
+26	0x6E1A	V3 Crest Factor	0-100.00	0.01	UINT16	R	<sup>2</sup>
+27	0x6E1B	V4 Crest Factor	0-100.00	0.01	UINT16	R	
+28	0x6E1C	I1 Crest Factor	0-100.00	0.01	UINT16	R	
+29	0x6E1D	I2 Crest Factor	0-100.00	0.01	UINT16	R	
+30	0x6E1E	I3 Crest Factor	0-100.00	0.01	UINT16	R	
+31	0x6E1F	I4 Crest Factor	0-100.00	0.01	UINT16	R	
10656-10687		<b>3-Second Harmonics</b>					
+0	0x6E80	V1 THD	0-999.9	0.1%	UINT16	R	<sup>2</sup>
+1	0x6E81	V2 THD	0-999.9	0.1%	UINT16	R	<sup>2</sup>
+2	0x6E82	V3 THD	0-999.9	0.1%	UINT16	R	<sup>2</sup>
+3	0x6E83	V4 THD	0-999.9	0.1%	UINT16	R	
+4	0x6E84	I1 THD	0-999.9	0.1%	UINT16	R	
+5	0x6E85	I2 THD	0-999.9	0.1%	UINT16	R	
+6	0x6E86	I3 THD	0-999.9	0.1%	UINT16	R	
+7	0x6E87	I4 THD	0-999.9	0.1%	UINT16	R	
+8	0x6E88	Not used	0		UINT16	R	
+9	0x6E89	Not used	0		UINT16	R	
+10	0x6E8A	Not used	0		UINT16	R	
+11	0x6E8B	Not used	0		UINT16	R	
+12	0x6E8C	Not used	0		UINT16	R	
+13	0x6E8D	Not used	0		UINT16	R	

Address	Point ID	Description	Low and High Scales <sup>3</sup>	Units <sup>3</sup>	Type	R/W	Notes
+14	0x6E8E	Not used	0		UINT16	R	
+15	0x6E8F	Not used	0		UINT16	R	
+16	0x6E90	I1 TDD	0		UINT16	R	
+17	0x6E91	I2 TDD	0-100.0	0.1%	UINT16	R	
+18	0x6E92	I3 TDD	0-100.0	0.1%	UINT16	R	
+19	0x6E93	I4 TDD	0-100.0	0.1%	UINT16	R	
+20	0x6E94	I1 K-Factor	1.0-999.9	0.1	UINT16	R	
+21	0x6E95	I2 K-Factor	1.0-999.9	0.1	UINT16	R	
+22	0x6E96	I3 K-Factor	1.0-999.9	0.1	UINT16	R	
+23	0x6E97	I4 K-Factor	1.0-999.9	0.1	UINT16	R	
+24	0x6E98	V1 Crest Factor	0-100.00	0.01	UINT16	R	<sup>2</sup>
+25	0x6E99	V2 Crest Factor	0-100.00	0.01	UINT16	R	<sup>2</sup>
+26	0x6E9A	V3 Crest Factor	0-100.00	0.01	UINT16	R	<sup>2</sup>
+27	0x6E9B	V4 Crest Factor	0-100.00	0.01	UINT16	R	
+28	0x6E9C	I1 Crest Factor	0-100.00	0.01	UINT16	R	
+29	0x6E9D	I2 Crest Factor	0-100.00	0.01	UINT16	R	
+30	0x6E9E	I3 Crest Factor	0-100.00	0.01	UINT16	R	
+31	0x6E9F	I4 Crest Factor	0-100.00	0.01	UINT16	R	
10688-10719		<b>10-Minute Harmonics</b>					
+0	0x6F00	V1 THD	0-999.9	0.1%	UINT16	R	<sup>2</sup>
+1	0x6F01	V2 THD	0-999.9	0.1%	UINT16	R	<sup>2</sup>
+2	0x6F02	V3 THD	0-999.9	0.1%	UINT16	R	<sup>2</sup>
+3	0x6F03	V4 THD	0-999.9	0.1%	UINT16	R	
+4	0x6F04	I1 THD	0-999.9	0.1%	UINT16	R	
+5	0x6F05	I2 THD	0-999.9	0.1%	UINT16	R	
+6	0x6F06	I3 THD	0-999.9	0.1%	UINT16	R	
+7	0x6F07	I4 THD	0-999.9	0.1%	UINT16	R	
+8	0x6F08	Not used	0		UINT16	R	
+9	0x6F09	Not used	0		UINT16	R	
+10	0x6F0A	Not used	0		UINT16	R	
+11	0x6F0B	Not used	0		UINT16	R	
+12	0x6F0C	Not used	0		UINT16	R	
+13	0x6F0D	Not used	0		UINT16	R	
+14	0x6F0E	Not used	0		UINT16	R	
+15	0x6F0F	Not used	0		UINT16	R	
+16	0x6F10	I1 TDD	0		UINT16	R	
+17	0x6F11	I2 TDD	0-100.0	0.1%	UINT16	R	
+18	0x6F12	I3 TDD	0-100.0	0.1%	UINT16	R	
+19	0x6F13	I4 TDD	0-100.0	0.1%	UINT16	R	
+20	0x6F14	I1 K-Factor	1.0-999.9	0.1	UINT16	R	
+21	0x6F15	I2 K-Factor	1.0-999.9	0.1	UINT16	R	
+22	0x6F16	I3 K-Factor	1.0-999.9	0.1	UINT16	R	
+23	0x6F17	I4 K-Factor	1.0-999.9	0.1	UINT16	R	

Address	Point ID	Description	Low and High Scales <sup>3</sup>	Units <sup>3</sup>	Type	R/W	Notes
+24	0x6F18	V1 Crest Factor	0-100.00	0.01	UINT16	R	2
+25	0x6F19	V2 Crest Factor	0-100.00	0.01	UINT16	R	2
+26	0x6F1A	V3 Crest Factor	0-100.00	0.01	UINT16	R	2
+27	0x6F1B	V4 Crest Factor	0-100.00	0.01	UINT16	R	
+28	0x6F1C	I1 Crest Factor	0-100.00	0.01	UINT16	R	
+29	0x6F1D	I2 Crest Factor	0-100.00	0.01	UINT16	R	
+30	0x6F1E	I3 Crest Factor	0-100.00	0.01	UINT16	R	
+31	0x6F1F	I4 Crest Factor	0-100.00	0.01	UINT16	R	
10720-10751		<b>2-Hour Harmonics</b>					
+0	0x6F80	V1 THD	0-999.9	0.1%	UINT16	R	2
+1	0x6F81	V2 THD	0-999.9	0.1%	UINT16	R	2
+2	0x6F82	V3 THD	0-999.9	0.1%	UINT16	R	2
+3	0x6F83	V4 THD	0-999.9	0.1%	UINT16	R	
+4	0x6F84	I1 THD	0-999.9	0.1%	UINT16	R	
+5	0x6F85	I2 THD	0-999.9	0.1%	UINT16	R	
+6	0x6F86	I3 THD	0-999.9	0.1%	UINT16	R	
+7	0x6F87	I4 THD	0-999.9	0.1%	UINT16	R	
+8	0x6F88	Not used	0		UINT16	R	
+9	0x6F89	Not used	0		UINT16	R	
+10	0x6F8A	Not used	0		UINT16	R	
+11	0x6F8B	Not used	0		UINT16	R	
+12	0x6F8C	Not used	0		UINT16	R	
+13	0x6F8D	Not used	0		UINT16	R	
+14	0x6F8E	Not used	0		UINT16	R	
+15	0x6F8F	Not used	0		UINT16	R	
+16	0x6F90	I1 TDD	0		UINT16	R	
+17	0x6F91	I2 TDD	0-100.0	0.1%	UINT16	R	
+18	0x6F92	I3 TDD	0-100.0	0.1%	UINT16	R	
+19	0x6F93	I4 TDD	0-100.0	0.1%	UINT16	R	
+20	0x6F94	I1 K-Factor	1.0-999.9	0.1	UINT16	R	
+21	0x6F95	I2 K-Factor	1.0-999.9	0.1	UINT16	R	
+22	0x6F96	I3 K-Factor	1.0-999.9	0.1	UINT16	R	
+23	0x6F97	I4 K-Factor	1.0-999.9	0.1	UINT16	R	
+24	0x6F98	V1 Crest Factor	0-100.00	0.01	UINT16	R	2
+25	0x6F99	V2 Crest Factor	0-100.00	0.01	UINT16	R	2
+26	0x6F9A	V3 Crest Factor	0-100.00	0.01	UINT16	R	2
+27	0x6F9B	V4 Crest Factor	0-100.00	0.01	UINT16	R	
+28	0x6F9C	I1 Crest Factor	0-100.00	0.01	UINT16	R	
+29	0x6F9D	I2 Crest Factor	0-100.00	0.01	UINT16	R	
+30	0x6F9E	I3 Crest Factor	0-100.00	0.01	UINT16	R	
+31	0x6F9F	I4 Crest Factor	0-100.00	0.01	UINT16	R	

**NOTES:**

- <sup>1</sup> When the 4LN3, 4LL3, 3LN3, 3LL3, 3BLN3 or 3BLL3 wiring mode is selected, the voltages will be line-to-neutral; for any other wiring mode, they will be line-to-line.
- <sup>2</sup> When the 4LN3, 3LN3 or 3BLN3 wiring mode is selected, the voltages will be line-to-neutral; for any other wiring mode, they will be line-to-line voltages.
- <sup>3</sup> For volts, amps, power and frequency scales and units, refer to Section 4 "Data Scales and Units".
- <sup>4</sup> On a 16-cycle interval.
- <sup>5</sup> On a 3-s interval.

### 3.4 32-bit Binary and Analog Values

Address	Point ID	Description	Options/Range <sup>3</sup>	Units <sup>3</sup>	Type	R/W	Notes
11776-11777	0x0000	<b>None</b>	0		UINT32	R	
		<b>Setpoint Status</b>	0x00000000 - 0xFFFFFFFF				
11840-11841		Setpoints 1-32 (alias)	0x00000000 - 0xFFFFFFFF		UINT32	R	
27648-27649		Setpoints 1-32	0x00000000 - 0xFFFFFFFF		UINT32	R	
27712-27713		Setpoints 33-64	0x00000000 - 0xFFFFFFFF		UINT32	R	
	0x0080	Setpoint #1	0/1			TRG	
	0x0081	Setpoint #2	0/1			TRG	
		...					
	0x00BF	Setpoint #64	0/1			TRG	
11904-11907		<b>Special Inputs</b>					
	+0,1 0x0100	Voltage disturbance	0-100	%	UINT32	R	
	+2,3 0x0101	Phase rotation order	0 = error, 1 = positive (ABC), 2 = negative (CBA)		UINT32	R	
		<b>Event Flags</b>					
12160-12161		Event flags 1-32	0x00000000 - 0xFFFFFFFF		UINT32	R	
12224-12225		Event flags 33-64	0x00000000 - 0xFFFFFFFF		UINT32	R	
	0x0300	Event flag #1	0/1			TRG	
	0x0301	Event flag #2	0/1			TRG	
		...					
	0x033F	Event flag #64	0/1			TRG	
		<b>Internal Pulsed Events</b>					
	0x0400	kWh Import pulse	0/1			TRG	
	0x0401	kWh Export pulse	0/1			TRG	
	0x0402	kWh Total pulse	0/1			TRG	
	0x0403	kvarh Import pulse	0/1			TRG	
	0x0404	kvarh Export pulse	0/1			TRG	
	0x0405	kvarh Total pulse	0/1			TRG	
	0x0406	kVAh pulse	0/1			TRG	
	0x0407	Start of power demand interval pulse	0/1			TRG	
	0x0408	Start of tariff interval pulse	0/1			TRG	
		<b>External Triggers (UDP)</b>					
	0x0480	External trigger #1	0/1			TRG	
	0x0481	External trigger #2	0/1			TRG	
		...					
	0x048F	External trigger #16	0/1			TRG	
		<b>Periodic Timers</b>					
	0x0500	Timer #1	0/1			TRG	
	0x0501	Timer #2	0/1			TRG	
		...					



Address	Point ID	Description	Options/Range <sup>3</sup>	Units <sup>3</sup>	Type	R/W	Notes
	0x050F	Timer #16	0/1			TRG	
		<b>Digital Inputs</b>					6
12544-12545		Digital inputs DI1–DI32	0x00000000 - 0xFFFFFFFF		UINT32	R	
12608-12609		Digital inputs DI33–DI64	0x00000000 - 0xFFFFFFFF		UINT32	R	
12672-12673		Digital inputs DI65–DI96	0x00000000 - 0xFFFFFFFF		UINT32	R	
12736-12737		Digital inputs DI97–DI128	0x00000000 - 0xFFFFFFFF		UINT32	R	
	0x0600	Digital input DI1	0/1			TRG	
	0x0601	Digital input DI2	0/1			TRG	
		...					
	0x067F	Digital input DI128	0/1			TRG	
		<b>Pulse Inputs</b>					7
	0x0700	Digital input DI1	0/1			TRG	
	0x0701	Digital input DI2	0/1			TRG	
		...					
	0x077F	Digital input DI128	0/1			TRG	
		<b>Relay Outputs</b>					
12800-12801		Relay outputs RO1–RO32	0x00000000 - 0xFFFFFFFF		UINT32	R	
12864-12865		Relay outputs RO1–RO64	0x00000000 - 0xFFFFFFFF		UINT32	R	
	0x0800	Relay output RO1	0/1			TRG	
	0x0801	Relay output RO2	0/1			TRG	
		...					
	0x083F	Relay output RO64	0/1			TRG	
		<b>Static Event Flags</b>					
12928-12929		Static event flags: Bit 0: Phase order error Bit 1: Positive phase order Bit 2: Negative phase order Bit 3: PQ event Bit 4: General fault event Bit 5: Fault detected Bit 6: External fault trigger Bit 7: Device fault (non-critical error) Bit 8: No voltage Bit 9: Remote control	0x00000000 - 0xFFFFFFFF		UINT32	R	
	0x0900	Phase order error	0/1			TRG	
	0x0901	Positive phase order	0/1			TRG	
	0x0902	Negative phase order	0/1			TRG	
	0x0903	PQ event	0/1			TRG	
	0x0904	General fault event	0/1			TRG	
	0x0905	Fault detected	0/1			TRG	
	0x0906	External fault trigger	0/1			TRG	
	0x0907	Device fault (non-critical error)	0/1			TRG	
	0x0908	No voltage	0/1			TRG	

Address	Point ID	Description	Options/Range <sup>3</sup>	Units <sup>3</sup>	Type	R/W	Notes
	0x0909	Remote control	0/1			TRG	
13056-13119		<b>Counters</b>					
+0,1	0x0A00	Counter #1	0 - 999,999,999		UINT32	R/W	
+2,3	0x0A01	Counter #2	0 - 999,999,999		UINT32	R/W	
		...					
+62,63	0x0A1F	Counter #32	0 - 999,999,999		UINT32	R/W	
		<b>Time/Date</b>					
	0x0B00	Packed date	YYMMDD		UINT32	TRG	
	0x0B01	Packed time	hhmmss		UINT32	TRG	
	0x0B02	Day of week	1-7, 1 = Sun, 7 = Sat		UINT32	TRG	
	0x0B03	Year	0-99		UINT32	TRG	
	0x0B04	Month	1-12		UINT32	TRG	
	0x0B05	Day of month	1-31		UINT32	TRG	
	0x0B06	Hours	0-23		UINT32	TRG	
	0x0B07	Minutes	0-59		UINT32	TRG	
	0x0B08	Seconds	0-59		UINT32	TRG	
13248-13297		<b>1/2-Cycle Values</b>					
+0,1	0x0B80	V1 voltage	0-Vmax	U1	UINT32	R	<sup>1</sup>
+2,3	0x0B81	V2 voltage	0-Vmax	U1	UINT32	R	<sup>1</sup>
+4,5	0x0B82	V3 voltage	0-Vmax	U1	UINT32	R	<sup>1</sup>
+6,7	0x0B83	V4 voltage	0-V4max	U4	UINT32	R	
+8,9	0x0B84	V12 voltage	0-Vmax	U1	UINT32	R	
+10,11	0x0B85	V23 voltage	0-Vmax	U1	UINT32	R	
+12,13	0x0B86	V31 voltage	0-Vmax	U1	UINT32	R	
+14,15	0x0B87	I1 current	0-Imax	U2	UINT32	R	
+16,17	0x0B88	I2 current	0-Imax	U2	UINT32	R	
+18,19	0x0B89	I3 current	0-Imax	U2	UINT32	R	
+20,21	0x0B8A	I4 current	0-I4max	U2	UINT32	R	
+22,23	0x0B8B	In current	0-Imax	U2	UINT32	R	
+24,25	0x0B8C	I1x current	0-Ixmax	U2	UINT32	R	
+26,27	0x0B8D	I2x current	0-Ixmax	U2	UINT32	R	
+28,29	0x0B8E	I3x current	0-Ixmax	U2	UINT32	R	
+30,31	0x0B8F	I4x current	0-I4xmax	U2	UINT32	R	
+32,33	0x0B90	Irx current	0-Ixmax	U2	UINT32	R	
+34,35	0x0B91	Zero-sequence voltage	0-Vmax	U1	UINT32	R	
+36,37	0x0B92	Zero-sequence current	0-Imax	U2	UINT32	R	
+38,39	0x0B93	Ix Zero-sequence current	0-Ixmax	U2	UINT32	R	
+40,41	0x0B94	Voltage unbalance	0-3000	×0.1%	UINT32	R	
+42,43	0x0B95	Current unbalance	0-3000	×0.1%	UINT32	R	
+44,45	0x0B96	Ix current unbalance	0-3000	×0.1%	UINT32	R	
+46,47	0x0B97	DC voltage	0-999900	×0.01V	UINT32	R	
+48,49	0x0B98	Frequency (1-cycle)	0-10000	×0.01Hz	UINT32	R	

Address	Point ID	Description	Options/Range <sup>3</sup>	Units <sup>3</sup>	Type	R/W	Notes
13312-13383		<b>1-Cycle Phase Values</b>					
+0,1	0x0C00	V1 voltage	0-Vmax	U1	UINT32	R	1
+2,3	0x0C01	V2 voltage	0-Vmax	U1	UINT32	R	1
+4,5	0x0C02	V3 voltage	0-Vmax	U1	UINT32	R	1
+6,7	0x0C03	I1 current	0-Imax	U2	UINT32	R	
+8,9	0x0C04	I2 current	0-Imax	U2	UINT32	R	
+10,11	0x0C05	I3 current	0-Imax	U2	UINT32	R	
+12,13	0x0C06	kW L1	-Pmax-Pmax	U3	INT32	R	
+14,15	0x0C07	kW L2	-Pmax-Pmax	U3	INT32	R	
+16,17	0x0C08	kW L3	-Pmax-Pmax	U3	INT32	R	
+18,19	0x0C09	kvar L1	-Pmax-Pmax	U3	INT32	R	
+20,21	0x0C0A	kvar L2	-Pmax-Pmax	U3	INT32	R	
+22,23	0x0C0B	kvar L3	-Pmax-Pmax	U3	INT32	R	
+24,25	0x0C0C	kVA L1	0-Pmax	U3	UINT32	R	
+26,27	0x0C0D	kVA L2	0-Pmax	U3	UINT32	R	
+28,29	0x0C0E	kVA L3	0-Pmax	U3	UINT32	R	
+30,31	0x0C0F	Power factor L1	-1000-1000	×0.001	INT32	R	
+32,33	0x0C10	Power factor L2	-1000-1000	×0.001	INT32	R	
+34,35	0x0C11	Power factor L3	-1000-1000	×0.001	INT32	R	
+36,37	0x0C12	V1 voltage THD	0-9999	×0.1%	UINT32	R	2, 4
+38,39	0x0C13	V2 voltage THD	0-9999	×0.1%	UINT32	R	2, 4
+40,41	0x0C14	V3 voltage THD	0-9999	×0.1%	UINT32	R	2, 4
+42,43	0x0C15	I1 current THD	0-9999	×0.1%	UINT32	R	4
+44,45	0x0C16	I2 current THD	0-9999	×0.1%	UINT32	R	4
+46,47	0x0C17	I3 current THD	0-9999	×0.1%	UINT32	R	4
+48,49	0x0C18	I1 K-Factor	10-9999	×0.1	UINT32	R	4
+50,51	0x0C19	I2 K-Factor	10-9999	×0.1	UINT32	R	4
+52,53	0x0C1A	I3 K-Factor	10-9999	×0.1	UINT32	R	4
+54,55	0x0C1B	I1 current TDD	0-1000	×0.1%	UINT32	R	4
+56,57	0x0C1C	I2 current TDD	0-1000	×0.1%	UINT32	R	4
+58,59	0x0C1D	I3 current TDD	0-1000	×0.1%	UINT32	R	4
+60,61	0x0C1E	V12 voltage	0-Vmax	U1	UINT32	R	
+62,63	0x0C1F	V23 voltage	0-Vmax	U1	UINT32	R	
+64,65	0x0C20	V31 voltage	0-Vmax	U1	UINT32	R	
+66,67	0x0C21	I1x current	0-Ixmax	U2	UINT32	R	
+68,69	0x0C22	I2x current	0-Ixmax	U2	UINT32	R	
+70,71	0x0C23	I3x current	0-Ixmax	U2	UINT32	R	
13440-13467		<b>1-Cycle Low Phase Values</b>					
+0,1	0x0D00	Low L-N voltage	0-Vmax	U1	UINT32	R	
+2,3	0x0D01	Low current	0-Imax	U2	UINT32	R	
+4,5	0x0D02	Low kW	-Pmax-Pmax	U3	INT32	R	
+6,7	0x0D03	Low kvar	-Pmax-Pmax	U3	INT32	R	
+8,9	0x0D04	Low kVA	0-Pmax	U3	UINT32	R	

Address	Point ID	Description	Options/Range <sup>3</sup>	Units <sup>3</sup>	Type	R/W	Notes
+10,11	0x0D05	Low PF Lag	0-1000	×0.001	UINT32	R	
+12,13	0x0D06	Low PF Lead	0-1000	×0.001	UINT32	R	
+14,15	0x0D07	Low voltage THD	0-9999	×0.1%	UINT32	R	2, 4
+16,17	0x0D08	Low current THD	0-9999	×0.1%	UINT32	R	4
+18,19	0x0D09	Low K-Factor	10-9999	×0.1	UINT32	R	4
+20,21	0x0D0A	Low current TDD	0-1000	×0.1%	UINT32	R	4
+22,23	0x0D0B	Low L-L voltage	0-Vmax	U1	UINT32	R	
+24,25	0x0D0C	Not used	0		UINT32	R	
+26,27	0x0D0D	Not used	0		UINT32	R	
13504-13535		<b>1/2-Cycle Analog Inputs</b>					
+0,1	0x0D80	Analog input AI1	AI1min-AI1max		INT32	R	
+2,3	0x0D81	Analog input AI2	AI2min-AI2max		INT32	R	
		...					
+30,31	0x0D8F	Analog input AI16	AI16min-AI16max		INT32	R	
13568-13595		<b>1-Cycle High Phase Values</b>					
+0,1	0x0E00	High L-N voltage	0-Vmax	U1	UINT32	R	
+2,3	0x0E01	High current	0-Imax	U2	UINT32	R	
+4,5	0x0E02	High kW	-Pmax-Pmax	U3	INT32	R	
+6,7	0x0E03	High kvar	-Pmax-Pmax	U3	INT32	R	
+8,9	0x0E04	High kVA	0-Pmax	U3	UINT32	R	
+10,11	0x0E05	High PF Lag	0-1000	×0.001	UINT32	R	
+12,13	0x0E06	High PF Lead	0-1000	×0.001	UINT32	R	
+14,15	0x0E07	High voltage THD	0-9999	×0.1%	UINT32	R	2, 4
+16,17	0x0E08	High current THD	0-9999	×0.1%	UINT32	R	4
+18,19	0x0E09	High K-Factor	10-9999	×0.1	UINT32	R	4
+20,21	0x0E0A	High current TDD	0-1000	×0.1%	UINT32	R	4
+22,23	0x0E0B	High L-L voltage	0-Vmax	U1	UINT32	R	
+24,25	0x0E0C	Not used	0		UINT32	R	
+26,27	0x0E0D	Not used	0		UINT32	R	
13632-13663		<b>1-Second Analog Inputs</b>					
+0,1	0x0E80	Analog input AI1	AI1min-AI1max		INT32	R	
+2,3	0x0E81	Analog input AI2	AI2min-AI2max		INT32	R	
		...					
+30,31	0x0E8F	Analog input AI16	AI16min-AI16max		INT32	R	
13696-13723		<b>1-Cycle Total Values</b>					
+0,1	0x0F00	Total kW	-Pmax-Pmax	U3	INT32	R	
+2,3	0x0F01	Total kvar	-Pmax-Pmax	U3	INT32	R	
+4,5	0x0F02	Total kVA	0-Pmax	U3	UINT32	R	
+6,7	0x0F03	Total PF	-1000-1000	×0.001	INT32	R	
+8,9	0x0F04	Total PF lag	0-1000	×0.001	UINT32	R	
+10,11	0x0F05	Total PF lead	0-1000	×0.001	UINT32		
+12,13	0x0F06	Total kW import	0-Pmax	U3	UINT32		
+14,15	0x0F07	Total kW export	0-Pmax	U3	UINT32	R	

Address	Point ID	Description	Options/Range <sup>3</sup>	Units <sup>3</sup>	Type	R/W	Notes
+16,17	0x0F08	Total kvar import	0-Pmax	U3	UINT32	R	
+18,19	0x0F09	Total kvar export	0-Pmax	U3	UINT32	R	
+20,21	0x0F0A	3-phase average L-N voltage	0-Vmax	U1	UINT32	R	
+22,23	0x0F0B	3-phase average L-L voltage	0-Vmax	U1	UINT32	R	
+24,25	0x0F0C	3-phase average current	0-Imax	U2	UINT32	R	
+26,27	0x0F0D	3-phase average current, extended inputs I1x-I3x	0-Ixmax	U2	UINT32	R	
13824-13839		<b>1-Cycle Auxiliary Values</b>					
+0,1	0x1000	I4 current	0-Imax	U2	UINT32	R	
+2,3	0x1001	In current	0-Imax	U2	UINT32	R	
+4,5	0x1002	Frequency	0-10000	×0.01Hz	UINT32	R	
+6,7	0x1003	Voltage unbalance	0-3000	×0.1%	UINT32	R	
+8,9	0x1004	Current unbalance	0-3000	×0.1%	UINT32	R	
+10,11	0x1005	DC voltage	0-999900	×0.01V	UINT32	R	
+12,13	0x1006	V4 voltage	0-V4max	U4	UINT32	R	
+14,15	0x1007	I4x current	0-Ixmax	U2	UINT32	R	
13888-13919		<b>Fundamental Phasor Values</b>					
+0, 1	0x1080	V1 voltage magnitude	0-Vmax	U1	UINT32	R	2
+2, 3	0x1081	V2 voltage magnitude	0-Vmax	U1	UINT32	R	2
+4, 5	0x1082	V3 voltage magnitude	0-Vmax	U1	UINT32	R	2
+6, 7	0x1083	V4 voltage magnitude	0-V4max	U1	UINT32	R	
+8, 9	0x1084	I1 current magnitude	0-Imax	U2	UINT32	R	
+10, 11	0x1085	I2 current magnitude	0-Imax	U2	UINT32	R	
+12, 13	0x1086	I3 current magnitude	0-Imax	U2	UINT32	R	
+14, 15	0x1087	I4 current magnitude	0-Imax	U2	UINT32	R	
+16, 17	0x1088	V1 voltage angle	-1800-1800	×0.1°	INT32	R	2
+18, 19	0x1089	V2 voltage angle	-1800-1800	×0.1°	INT32	R	2
+20, 21	0x108A	V3 voltage angle	-1800-1800	×0.1°	INT32	R	2
+22, 23	0x108B	V4 voltage angle	-1800-1800	×0.1°	INT32	R	
+24, 25	0x108C	I1 current angle	-1800-1800	×0.1°	INT32	R	
+26, 27	0x108D	I2 current angle	-1800-1800	×0.1°	INT32	R	
+28, 29	0x108E	I3 current angle	-1800-1800	×0.1°	INT32	R	
+30, 31	0x108F	I4 current angle	-1800-1800	×0.1°	INT32	R	
13952-14023		<b>1-Second Phase Values</b>					
+0, 1	0x1100	V1 voltage	0-Vmax	U1	UINT32	R	1
+2, 3	0x1101	V2 voltage	0-Vmax	U1	UINT32	R	1
+4, 5	0x1102	V3 voltage	0-Vmax	U1	UINT32	R	1
+6, 7	0x1103	I1 current	0-Imax	U2	UINT32	R	
+8, 9	0x1104	I2 current	0-Imax	U2	UINT32	R	
+10, 11	0x1105	I3 current	0-Imax	U2	UINT32	R	
+12, 13	0x1106	kW L1	-Pmax-Pmax	U3	INT32	R	
+14, 15	0x1107	kW L2	-Pmax-Pmax	U3	INT32	R	
+16, 17	0x1108	kW L3	-Pmax-Pmax	U3	INT32	R	
+18, 19	0x1109	kvar L1	-Pmax-Pmax	U3	INT32	R	

Address	Point ID	Description	Options/Range <sup>3</sup>	Units <sup>3</sup>	Type	R/W	Notes
+20, 21	0x110A	kvar L2	-Pmax-Pmax	U3	INT32	R	
+22, 23	0x110B	kvar L3	-Pmax-Pmax	U3	INT32	R	
+24, 25	0x110C	kVA L1	0-Pmax	U3	UINT32	R	
+26, 27	0x110D	kVA L2	0-Pmax	U3	UINT32	R	
+28, 29	0x110E	kVA L3	0-Pmax	U3	UINT32	R	
+30, 31	0x110F	Power factor L1	-1000-1000	×0.001	INT32	R	
+32, 33	0x1110	Power factor L2	-1000-1000	×0.001	INT32	R	
+34, 35	0x1111	Power factor L3	-1000-1000	×0.001	INT32	R	
+36, 37	0x1112	V1 voltage THD	0-9999	×0.1%	UINT32	R	2, 5
+38, 39	0x1113	V2 voltage THD	0-9999	×0.1%	UINT32	R	2, 5
+40, 41	0x1114	V3 voltage THD	0-9999	×0.1%	UINT32	R	2, 5
+42, 43	0x1115	I1 current THD	0-9999	×0.1%	UINT32	R	5
+44, 45	0x1116	I2 current THD	0-9999	×0.1%	UINT32	R	5
+46, 47	0x1117	I3 current THD	0-9999	×0.1%	UINT32	R	5
+48, 49	0x1118	I1 K-Factor	10-9999	×0.1	UINT32	R	5
+50, 51	0x1119	I2 K-Factor	10-9999	×0.1	UINT32	R	5
+52, 53	0x111A	I3 K-Factor	10-9999	×0.1	UINT32	R	5
+54, 55	0x111B	I1 current TDD	0-1000	×0.1%	UINT32	R	5
+56, 57	0x111C	I2 current TDD	0-1000	×0.1%	UINT32	R	5
+58, 59	0x111D	I3 current TDD	0-1000	×0.1%	UINT32	R	5
+60, 61	0x111E	V12 voltage	0-Vmax	U1	UINT32	R	
+62, 63	0x111F	V23 voltage	0-Vmax	U1	UINT32	R	
+64, 65	0x1120	V31 voltage	0-Vmax	U1	UINT32	R	
+66, 67	0x1121	I1x current	0-Ixmax	U2	UINT32	R	
+68, 69	0x1122	I2x current	0-Ixmax	U2	UINT32	R	
+70, 71	0x1123	I3x current	0-Ixmax	U2	UINT32	R	
14080-14107		<b>1-Second Low Phase Values</b>					
+0, 1	0x1200	Low L-N voltage	0-Vmax	U1	UINT32	R	
+2, 3	0x1201	Low current	0-Imax	U2	UINT32	R	
+4, 5	0x1202	Low kW	-Pmax-Pmax	U3	INT32	R	
+6, 7	0x1203	Low kvar	-Pmax-Pmax	U3	INT32	R	
+8, 9	0x1204	Low kVA	0-Pmax	U3	UINT32	R	
+10, 11	0x1205	Low PF Lag	0-1000	×0.001	UINT32	R	
+12, 13	0x1206	Low PF Lead	0-1000	×0.001	UINT32	R	
+14, 15	0x1207	Low voltage THD	0-9999	×0.1%	UINT32	R	2, 5
+16, 17	0x1208	Low current THD	0-9999	×0.1%	UINT32	R	5
+18, 19	0x1209	Low K-Factor	10-9999	×0.1	UINT32	R	5
+20, 21	0x120A	Low current TDD	0-1000	×0.1%	UINT32	R	5
+22, 23	0x120B	Low L-L voltage	0-Vmax	U1	UINT32	R	
+24, 25	0x120C	Not used	0		UINT32	R	
+26, 27	0x120D	Not used	0		UINT32	R	
14208-14235		<b>1-Second High Phase Values</b>					
+0, 1	0x1300	High L-N voltage	0-Vmax	U1	UINT32	R	

Address	Point ID	Description	Options/Range <sup>3</sup>	Units <sup>3</sup>	Type	R/W	Notes
+2, 3	0x1301	High current	0-Imax	U2	UINT32	R	
+4, 5	0x1302	High kW	-Pmax-Pmax	U3	INT32	R	
+6, 7	0x1303	High kvar	-Pmax-Pmax	U3	INT32	R	
+8, 9	0x1304	High kVA	0-Pmax	U3	UINT32	R	
+10, 11	0x1305	High PF Lag	0-1000	×0.001	UINT32	R	
+12, 13	0x1306	High PF Lead	0-1000	×0.001	UINT32	R	
+14, 15	0x1307	High voltage THD	0-9999	×0.1%	UINT32	R	2, 5
+16, 17	0x1308	High current THD	0-9999	×0.1%	UINT32	R	5
+18, 19	0x1309	High K-Factor	10-9999	×0.1	UINT32	R	5
+20, 21	0x130A	High current TDD	0-1000	×0.1%	UINT32	R	5
+22, 23	0x130B	High L-L voltage	0-Vmax	U1	UINT32	R	
+24, 25	0x130C	Not used	0		UINT32	R	
+26, 27	0x130D	Not used	0		UINT32	R	
14336-14363		<b>1-Second Total Values</b>					
+0, 1	0x1400	Total kW	-Pmax-Pmax	U3	INT32	R	
+2, 3	0x1401	Total kvar	-Pmax-Pmax	U3	INT32	R	
+4, 5	0x1402	Total kVA	0-Pmax	U3	UINT32	R	
+6, 7	0x1403	Total PF	-1000-1000	×0.001	INT32	R	
+8, 9	0x1404	Total PF lag	0-1000	×0.001	UINT32	R	
+10, 11	0x1405	Total PF lead	0-1000	×0.001	UINT32		
+12, 13	0x1406	Total kW import	0-Pmax	U3	UINT32		
+14, 15	0x1407	Total kW export	0-Pmax	U3	UINT32	R	
+16, 17	0x1408	Total kvar import	0-Pmax	U3	UINT32	R	
+18, 19	0x1409	Total kvar export	0-Pmax	U3	UINT32	R	
+20, 21	0x140A	3-phase average L-N voltage	0-Vmax	U1	UINT32	R	
+22, 23	0x140B	3-phase average L-L voltage	0-Vmax	U1	UINT32	R	
+24, 25	0x140C	3-phase average current	0-Imax	U2	UINT32	R	
+26, 27	0x140D	3-phase average current, extended inputs I1x-I3x	0-Ixmax	U2	UINT32	R	
14464-14479		<b>1-Second Auxiliary Values</b>					
+0, 1	0x1500	I4 current	0-Imax	U2	UINT32	R	
+2, 3	0x1501	In current	0-Imax	U2	UINT32	R	
+4, 5	0x1502	Frequency	0-10000	×0.01Hz	UINT32	R	
+6, 7	0x1503	Voltage unbalance	0-3000	×0.1%	UINT32	R	
+8, 9	0x1504	Current unbalance	0-3000	×0.1%	UINT32	R	
+10, 11	0x1505	DC voltage	0-999900	×0.01V	UINT32	R	
+12, 13	0x1506	V4 voltage	0-V4max	U4	UINT32	R	
+14, 15	0x1507	I4x current	0-Ixmax	U2	UINT32	R	
14528-14551		<b>Present Harmonic Demands</b>					
+0, 1	0x1580	V1 THD demand	0-9999	×0.1%	UINT32	R	2
+2, 3	0x1581	V2 THD demand	0-9999	×0.1%	UINT32	R	2
+4, 5	0x1582	V3 THD demand	0-9999	×0.1%	UINT32	R	2
+6, 7	0x1583	V4 THD demand	0-9999	×0.1%	UINT32	R	
+8, 9	0x1584	I1 THD demand	0-9999	×0.1%	UINT32	R	

Address	Point ID	Description	Options/Range <sup>3</sup>	Units <sup>3</sup>	Type	R/W	Notes
+10, 11	0x1585	I2 THD demand	0-9999	×0.1%	UINT32	R	
+12, 13	0x1586	I3 THD demand	0-9999	×0.1%	UINT32	R	
+14, 15	0x1587	I4 THD demand	0-9999	×0.1%	UINT32	R	
+16, 17	0x1588	I1 TDD demand	0-1000	×0.1%	UINT32	R	
+18, 19	0x1589	I2 TDD demand	0-1000	×0.1%	UINT32	R	
+20, 21	0x158A	I3 TDD demand	0-1000	×0.1%	UINT32	R	
+22, 23	0x158B	I4 TDD demand	0-1000	×0.1%	UINT32	R	
14592-14661		<b>Present Demands</b>					
+0, 1	0x1600	V1 volt demand	0-Vmax	U1	UINT32	R	2
+2, 3	0x1601	V2 volt demand	0-Vmax	U1	UINT32	R	2
+4, 5	0x1602	V3 volt demand	0-Vmax	U1	UINT32	R	2
+6, 7	0x1603	I1 ampere demand	0-Imax	U2	UINT32	R	
+8, 9	0x1604	I2 ampere demand	0-Imax	U2	UINT32	R	
+10, 11	0x1605	I3 ampere demand	0-Imax	U2	UINT32	R	
+12, 13	0x1606	kW import block demand	0-Pmax	U3	UINT32	R	
+14, 15	0x1607	kvar import block demand	0-Pmax	U3	UINT32	R	
+16, 17	0x1608	kVA block demand	0-Pmax	U3	UINT32	R	
+18, 19	0x1609	kW import sliding window demand	0-Pmax	U3	UINT32	R	
+20, 21	0x160A	kvar import sliding window demand	0-Pmax	U3	UINT32	R	
+22, 23	0x160B	kVA sliding window demand	0-Pmax	U3	UINT32	R	
+24, 25	0x160C	Not used	0		UINT32	R	
+26, 27	0x160D	Not used	0		UINT32	R	
+28, 29	0x160E	Not used	0		UINT32	R	
+30, 31	0x160F	kW import accumulated demand	0-Pmax	U3	UINT32	R	
+32, 33	0x1610	kvar import accumulated demand	0-Pmax	U3	UINT32	R	
+34, 35	0x1611	kVA accumulated demand	0-Pmax	U3	UINT32	R	
+36, 37	0x1612	kW import predicted sliding window demand	0-Pmax	U3	UINT32	R	
+38, 39	0x1613	kvar import predicted sliding window demand	0-Pmax	U3	UINT32	R	
+40, 41	0x1614	kVA predicted sliding window demand	0-Pmax	U3	UINT32	R	
+42, 43	0x1615	PF (import) at Max. kVA sliding window demand	0-1000	×0.001	UINT32	R	
+44, 45	0x1616	kW export block demand	0-Pmax	U3	UINT32	R	
+46, 47	0x1617	kvar export block demand	0-Pmax	U3	UINT32	R	
+48, 49	0x1618	kW export sliding window demand	0-Pmax	U3	UINT32	R	
+50, 51	0x1619	kvar export sliding window demand	0-Pmax	U3	UINT32	R	
+52, 53	0x161A	kW export accumulated demand	0-Pmax	U3	UINT32	R	
+54, 55	0x161B	kvar export accumulated demand	0-Pmax	U3	UINT32	R	
+56, 57	0x161C	kW export predicted sliding window demand	0-Pmax	U3	UINT32	R	
+58, 59	0x161D	kvar export predicted sliding window demand	0-Pmax	U3	UINT32	R	
+60, 61	0x161E	Not used	0		UINT32	R	
+62, 63	0x161F	Not used	0		UINT32	R	
+64, 65	0x1620	V4 volt demand	0-Vmax	U4	UINT32	R	
+66, 67	0x1621	I4 ampere demand	0-Imax	U2	UINT32	R	
+68, 69	0x1622	In ampere demand	0-Imax	U2	UINT32	R	



Address	Point ID	Description	Options/Range <sup>3</sup>	Units <sup>3</sup>	Type	R/W	Notes
14720-14741		<b>Total Energies</b>					
+0, 1	0x1700	kWh import	0-999,999,999	1 kWh	UINT32	R	
+2, 3	0x1701	kWh export	0-999,999,999	1 kWh	UINT32	R	
+4, 5	0x1702	kWh net	-999,999,999-999,999,999	1 kWh	INT32	R	
+6, 7	0x1703	kWh total	0-999,999,999	1 kWh	UINT32	R	
+8, 9	0x1704	kvarh import	0-999,999,999	1 kvarh	UINT32	R	
+10, 11	0x1705	kvarh export	0-999,999,999	1 kvarh	UINT32	R	
+12, 13	0x1706	kvarh net	-999,999,999-999,999,999	1 kvarh	INT32	R	
+14, 15	0x1707	kvarh total	0-999,999,999	1 kvarh	UINT32	R	
+16, 17	0x1708	kVAh total	0-999,999,999	1 kVAh	UINT32	R	
+18, 19	0x1709	Vh total	0-999,999,999	1 Vh	UINT32	R	
+20, 21	0x170A	Ah total	0-999,999,999	1 Ah	UINT32	R	
14784-14815		<b>Billing Summary Registers</b>					
+0, 1	0x1780	Summary energy register #1	0-999,999,999	1 kWh	UINT32	R	
+2, 3	0x1781	Summary energy register #2	0-999,999,999	1 kWh	UINT32	R	
		...					
+30, 31	0x178F	Summary energy register #16	0-999,999,999	1 kWh	UINT32	R	
14912-14931		<b>Symmetrical Components</b>					
+0, 1	0x1880	Positive-sequence voltage	0-Vmax	U1	UINT32	R	
+2, 3	0x1881	Negative-sequence voltage	0-Vmax	U1	UINT32	R	
+4, 5	0x1882	Zero-sequence voltage	0-Vmax	U1	UINT32	R	
+6, 7	0x1883	Negative-sequence voltage unbalance	0-3000	×0.1%	UINT32	R	
+8, 9	0x1884	Zero-sequence voltage unbalance	0-3000	×0.1%	UINT32	R	
+10, 11	0x1885	Positive-sequence current	0-Imax	U2	UINT32	R	
+12, 13	0x1886	Negative-sequence current	0-Imax	U2	UINT32	R	
+14, 15	0x1887	Zero-sequence current	0-Imax	U2	UINT32	R	
+16, 17	0x1888	Negative-sequence current unbalance	0-3000	×0.1%	UINT32	R	
+18, 19	0x1889	Zero-sequence current unbalance	0-3000	×0.1%	UINT32	R	
14976-15101		<b>V1 Harmonics</b>					2
+0, 1	0x1900	H01 Harmonic distortion	0-10000	×0.01%	UINT32	R	
+2, 3	0x1901	H02 Harmonic distortion	0-10000	×0.01%	UINT32	R	
		...					
+124, 125	0x193E	H63 Harmonic distortion	0-10000	×0.01%	UINT32	R	
15104-15229		<b>V2 Harmonics</b>					2
+0, 1	0x1A00	H01 Harmonic distortion	0-10000	×0.01%	UINT32	R	
+2, 3	0x1A01	H02 Harmonic distortion	0-10000	×0.01%	UINT32	R	
		...					
+124, 125	0x1A3E	H63 Harmonic distortion	0-10000	×0.01%	UINT32	R	
15232-15357		<b>V3 Harmonics</b>					2
+0, 1	0x1B00	H01 Harmonic distortion	0-10000	×0.01%	UINT32	R	
+2, 3	0x1B01	H02 Harmonic distortion	0-10000	×0.01%	UINT32	R	
		...					

Address	Point ID	Description	Options/Range <sup>3</sup>	Units <sup>3</sup>	Type	R/W	Notes
+124, 125	0x1B3E	H63 Harmonic distortion	0-10000	×0.01%	UINT32	R	
15360-15485		<b>I1 Harmonics</b>					
+0, 1	0x1C00	H01 Harmonic distortion	0-10000	×0.01%	UINT32	R	
+2, 3	0x1C01	H02 Harmonic distortion	0-10000	×0.01%	UINT32	R	
		...					
+124, 125	0x1C3E	H63 Harmonic distortion	0-10000	×0.01%	UINT32	R	
15488-15613		<b>I2 Harmonics</b>					
+0, 1	0x1D00	H01 Harmonic distortion	0-10000	×0.01%	UINT32	R	
+2, 3	0x1D01	H02 Harmonic distortion	0-10000	×0.01%	UINT32	R	
		...					
+124, 125	0x1D3E	H63 Harmonic distortion	0-10000	×0.01%	UINT32	R	
15616-15741		<b>I3 Harmonics</b>					
+0, 1	0x1E00	H01 Harmonic distortion	0-10000	×0.01%	UINT32	R	
+2, 3	0x1E01	H02 Harmonic distortion	0-10000	×0.01%	UINT32	R	
		...					
+124, 125	0x1E3E	H63 Harmonic distortion	0-10000	×0.01%	UINT32	R	
15744-15807		<b>V1 Harmonic Voltages (odd numbers)</b>					2
+0, 1	0x1F00	H01 Harmonic voltage	0-Vmax	U1	UINT32	R	
+2, 3	0x1F01	H03 Harmonic voltage	0-Vmax	U1	UINT32	R	
		...					
+62, 63	0x1F3E	H63 Harmonic voltage	0-Vmax	U1	UINT32	R	
15872-15935		<b>V2 Harmonic Voltages (odd numbers)</b>					2
+0, 1	0x2000	H01 Harmonic voltage	0-Vmax	U1	UINT32	R	
+2, 3	0x2001	H03 Harmonic voltage	0-Vmax	U1	UINT32	R	
		...					
+62, 63	0x203E	H63 Harmonic voltage	0-Vmax	U1	UINT32	R	
16000-16063		<b>V3 Harmonic Voltages (odd numbers)</b>					2
+0, 1	0x2100	H01 Harmonic voltage	0-Vmax	U1	UINT32	R	
+2, 3	0x2101	H03 Harmonic voltage	0-Vmax	U1	UINT32	R	
		...					
+62, 63	0x213E	H63 Harmonic voltage	0-Vmax	U1	UINT32	R	
16128-16191		<b>I1 Harmonic Currents (odd numbers)</b>					
+0, 1	0x2200	H01 Harmonic current	0-Imax	U2	UINT32	R	
+2, 3	0x2201	H03 Harmonic current	0-Imax	U2	UINT32	R	
		...					
+62, 63	0x223E	H63 Harmonic current	0-Imax	U2	UINT32	R	
16256-16319		<b>I2 Harmonic Currents (odd numbers)</b>					
+0, 1	0x2300	H01 Harmonic current	0-Imax	U2	UINT32	R	
+2, 3	0x2301	H03 Harmonic current	0-Imax	U2	UINT32	R	
		...					

Address	Point ID	Description	Options/Range <sup>3</sup>	Units <sup>3</sup>	Type	R/W	Notes
+62, 63	0x233E	H63 Harmonic current	0-Imax	U2	UINT32	R	
16384-16447		<b>I3 Harmonic Currents (odd numbers)</b>					
+0, 1	0x2400	H01 Harmonic current	0-Imax	U2	UINT32	R	
+2, 3	0x2401	H03 Harmonic current	0-Imax	U2	UINT32	R	
		...					
+62, 63	0x243E	H63 Harmonic current	0-Imax	U2	UINT32	R	
16512-16575		<b>Total Harmonic kW (odd numbers)</b>					
+0, 1	0x2500	H01 Harmonic kW	-Pmax -Pmax	U3	INT32	R	
+2, 3	0x2501	H03 Harmonic kW	-Pmax -Pmax	U3	INT32	R	
		...					
+62, 63	0x253E	H63 Harmonic kW	-Pmax -Pmax	U3	INT32	R	
16640-16703		<b>Total Harmonic kvar (odd numbers)</b>					
+0, 1	0x2600	H01 Harmonic kvar	-Pmax -Pmax	U3	INT32	R	
+2, 3	0x2601	H03 Harmonic kvar	-Pmax -Pmax	U3	INT32	R	
		...					
+62, 63	0x263E	H63 Harmonic kvar	-Pmax -Pmax	U3	INT32	R	
16768-16831		<b>Total Harmonic Power Factor (odd numbers)</b>					
+0, 1	0x2700	H01 Harmonic PF	-1000-1000	×0.001	INT32	R	
+2, 3	0x2701	H03 Harmonic PF	-1000-1000	×0.001	INT32	R	
		...					
+62, 63	0x273E	H63 Harmonic PF	-1000-1000	×0.001	INT32	R	
16896-17021		<b>V4 Harmonics</b>					
+0, 1	0x2800	H01 Harmonic distortion	0-10000	0.01%	UINT32	R	
+2, 3	0x2801	H02 Harmonic distortion	0-10000	0.01%	UINT32	R	
		...					
+124, 125	0x283E	H63 Harmonic distortion	0-10000	0.01%	UINT32	R	
17088-17099		<b>Flicker</b>					
+0,1	0x2980	V1 Pst	0-10000	×0.01	UINT32	R	
+2,3	0x2981	V2 Pst	0-10000	×0.01	UINT32	R	
+4,5	0x2982	V3 Pst	0-10000	×0.01	UINT32	R	
+6,7	0x2983	V1 Plt	0-10000	×0.01	UINT32	R	
+8,9	0x2984	V2 Plt	0-10000	×0.01	UINT32	R	
+10,11	0x2985	V3 Plt	0-10000	×0.01	UINT32	R	
17280-17405		<b>I4 Harmonics</b>					
+0, 1	0x2B00	H01 Harmonic distortion	0-10000	0.01%	UINT32	R	
+2, 3	0x2B01	H02 Harmonic distortion	0-10000	0.01%	UINT32	R	
		...					
+124, 125	0x2B3E	H63 Harmonic distortion	0-10000	0.01%	UINT32	R	
17408-17479		<b>Minimum 1-Cycle Phase Values</b>					
+0, 1	0x2C00	V1 voltage	0-Vmax	U1	UINT32	R	<sup>1</sup>
+2, 3	0x2C01	V2 voltage	0-Vmax	U1	UINT32	R	<sup>1</sup>

Address	Point ID	Description	Options/Range <sup>3</sup>	Units <sup>3</sup>	Type	R/W	Notes
+4, 5	0x2C02	V3 voltage	0-Vmax	U1	UINT32	R	1
+6, 7	0x2C03	I1 current	0-Imax	U2	UINT32	R	
+8, 9	0x2C04	I2 current	0-Imax	U2	UINT32	R	
+10, 11	0x2C05	I3 current	0-Imax	U2	UINT32	R	
+12, 13	0x2C06	kW L1	-Pmax-Pmax	U3	INT32	R	
+14, 15	0x2C07	kW L2	-Pmax-Pmax	U3	INT32	R	
+16, 17	0x2C08	kW L3	-Pmax-Pmax	U3	INT32	R	
+18, 19	0x2C09	kvar L1	-Pmax-Pmax	U3	INT32	R	
+20, 21	0x2C0A	kvar L2	-Pmax-Pmax	U3	INT32	R	
+22, 23	0x2C0B	kvar L3	-Pmax-Pmax	U3	INT32	R	
+24, 25	0x2C0C	kVA L1	0-Pmax	U3	UINT32	R	
+26, 27	0x2C0D	kVA L2	0-Pmax	U3	UINT32	R	
+28, 29	0x2C0E	kVA L3	0-Pmax	U3	UINT32	R	
+30, 31	0x2C0F	Power factor L1	0-1000	×0.001	UINT32	R	Absolute value
+32, 33	0x2C10	Power factor L2	0-1000	×0.001	UINT32	R	Absolute value
+34, 35	0x2C11	Power factor L3	0-1000	×0.001	UINT32	R	Absolute value
+36, 37	0x2C12	V1 voltage THD	0-9999	×0.1%	UINT32	R	2, 4
+38, 39	0x2C13	V2 voltage THD	0-9999	×0.1%	UINT32	R	2, 4
+40, 41	0x2C14	V3 voltage THD	0-9999	×0.1%	UINT32	R	2, 4
+42, 43	0x2C15	I1 current THD	0-9999	×0.1%	UINT32	R	4
+44, 45	0x2C16	I2 current THD	0-9999	×0.1%	UINT32	R	4
+46, 47	0x2C17	I3 current THD	0-9999	×0.1%	UINT32	R	4
+48, 49	0x2C18	I1 K-Factor	10-9999	×0.1	UINT32	R	4
+50, 51	0x2C19	I2 K-Factor	10-9999	×0.1	UINT32	R	4
+52, 53	0x2C1A	I3 K-Factor	10-9999	×0.1	UINT32	R	4
+54, 55	0x2C1B	I1 current TDD	0-1000	×0.1%	UINT32	R	4
+56, 57	0x2C1C	I2 current TDD	0-1000	×0.1%	UINT32	R	4
+58, 59	0x2C1D	I3 current TDD	0-1000	×0.1%	UINT32	R	4
+60, 61	0x2C1E	V12 voltage	0-Vmax	U1	UINT32	R	
+62, 63	0x2C1F	V23 voltage	0-Vmax	U1	UINT32	R	
+64, 65	0x2C20	V31 voltage	0-Vmax	U1	UINT32	R	
+66, 67	0x2C21	I1x current	0-Ixmax	U2	UINT32	R	
+68, 69	0x2C22	I2x current	0-Ixmax	U2	UINT32	R	
+70, 71	0x2C23	I3x current	0-Ixmax	U2	UINT32	R	
17536-17547		<b>Minimum 1-Cycle Total Values</b>					
+0, 1	0x2D00	Total kW	-Pmax-Pmax	U3	INT32	R	
+2, 3	0x2D01	Total kvar	-Pmax-Pmax	U3	INT32	R	
+4, 5	0x2D02	Total kVA	0-Pmax	U3	UINT32	R	
+6, 7	0x2D03	Total PF	0-1000	×0.001	UINT32	R	Absolute value
+8, 9	0x2D04	Total PF lag	0-1000	×0.001	UINT32	R	
+10, 11	0x2D05	Total PF lead	0-1000	×0.001	UINT32	R	
17664-17685		<b>Minimum 1-Cycle Auxiliary Values</b>					
+0, 1	0x2E00	I4 current	0-Imax	U2	UINT32	R	

Address	Point ID	Description	Options/Range <sup>3</sup>	Units <sup>3</sup>	Type	R/W	Notes
+2, 3	0x2E01	In current	0-Imax	U2	UINT32	R	
+4, 5	0x2E02	Frequency	0-10000	×0.01Hz	UINT32	R	
+6, 7	0x2E03	Voltage unbalance	0-3000	×0.1%	UINT32	R	
+8, 9	0x2E04	Current unbalance	0-3000	×0.1%	UINT32	R	
+10, 11	0x2E05	DC voltage	0-999900	×0.01V	UINT32	R	
+12, 13	0x2E06	V4 voltage	0-V4max	U4	UINT32	R	
+14, 15	0x2E07	I4x current	0-Ixmax	U2	UINT32	R	
+16, 17	0x2E08	V4 THD	0-9999	×0.1%	UINT32	R	4
+18, 19	0x2E09	I4x THD	0-9999	×0.1%	UINT32	R	4
+20, 21	0x2E0A	I4x TDD	0-1000	×0.1%	UINT32	R	4
17728-17759		<b>Minimum Analog Inputs</b>					
+0,1	0x2E80	Analog input AI1	AI1min-AI1max		INT32	R	
+2,3	0x2E81	Analog input AI2	AI2min-AI2max		INT32	R	
		...					
+30,31	0x2E8F	Analog input AI16	AI16min-AI16max		INT32	R	
17920-17951		<b>Programmable Min/Max Minimum Values</b>					
+0, 1	0x3000	Min/Max Register #1			UINT32	R	
+2, 3	0x3001	Min/Max Register #2			UINT32	R	
		...					
+30, 31	0x300F	Min/Max Register #16			UINT32	R	
18048-18111		<b>V4 Harmonic Voltages (odd numbers)</b>					
+0, 1	0x3100	H01 Harmonic voltage	0-Vmax	U1	UINT32	R	
+2, 3	0x3101	H03 Harmonic voltage	0-Vmax	U1	UINT32	R	
		...					
+62, 63	0x313E	H63 Harmonic voltage	0-Vmax	U1	UINT32	R	
18176-18239		<b>I4 Harmonic Currents (odd numbers)</b>					
+0, 1	0x3200	H01 Harmonic current	0-Imax	U2	UINT32	R	
+2, 3	0x3201	H03 Harmonic current	0-Imax	U2	UINT32	R	
		...					
+62, 63	0x323E	H63 Harmonic current	0-Imax	U2	UINT32	R	
18432-18503		<b>Maximum 1-Cycle Phase Values</b>					
+0, 1	0x3400	V1 voltage	0-Vmax	U1	UINT32	R	1
+2, 3	0x3401	V2 voltage	0-Vmax	U1	UINT32	R	1
+4, 5	0x3402	V3 voltage	0-Vmax	U1	UINT32	R	1
+6, 7	0x3403	I1 current	0-Imax	U2	UINT32	R	
+8, 9	0x3404	I2 current	0-Imax	U2	UINT32	R	
+10, 11	0x3405	I3 current	0-Imax	U2	UINT32	R	
+12, 13	0x3406	kW L1	-Pmax-Pmax	U3	INT32	R	
+14, 15	0x3407	kW L2	-Pmax-Pmax	U3	INT32	R	
+16, 17	0x3408	kW L3	-Pmax-Pmax	U3	INT32	R	
+18, 19	0x3409	kvar L1	-Pmax-Pmax	U3	INT32	R	
+20, 21	0x340A	kvar L2	-Pmax-Pmax	U3	INT32	R	

Address	Point ID	Description	Options/Range <sup>3</sup>	Units <sup>3</sup>	Type	R/W	Notes
+22, 23	0x340B	kvar L3	-Pmax-Pmax	U3	INT32	R	
+24, 25	0x340C	kVA L1	0-Pmax	U3	UINT32	R	
+26, 27	0x340D	kVA L2	0-Pmax	U3	UINT32	R	
+28, 29	0x340E	kVA L3	0-Pmax	U3	UINT32	R	
+30, 31	0x340F	Power factor L1	0-1000	×0.001	UINT32	R	Absolute value
+32, 33	0x3410	Power factor L2	0-1000	×0.001	UINT32	R	Absolute value
+34, 35	0x3411	Power factor L3	0-1000	×0.001	UINT32	R	Absolute value
+36, 37	0x3412	V1 voltage THD	0-9999	×0.1%	UINT32	R	2, 4
+38, 39	0x3413	V2 voltage THD	0-9999	×0.1%	UINT32	R	2, 4
+40, 41	0x3414	V3 voltage THD	0-9999	×0.1%	UINT32	R	2, 4
+42, 43	0x3415	I1 current THD	0-9999	×0.1%	UINT32	R	4
+44, 45	0x3416	I2 current THD	0-9999	×0.1%	UINT32	R	4
+46, 47	0x3417	I3 current THD	0-9999	×0.1%	UINT32	R	4
+48, 49	0x3418	I1 K-Factor	10-9999	×0.1	UINT32	R	4
+50, 51	0x3419	I2 K-Factor	10-9999	×0.1	UINT32	R	4
+52, 53	0x341A	I3 K-Factor	10-9999	×0.1	UINT32	R	4
+54, 55	0x341B	I1 current TDD	0-1000	×0.1%	UINT32	R	4
+56, 57	0x341C	I2 current TDD	0-1000	×0.1%	UINT32	R	4
+58, 59	0x341D	I3 current TDD	0-1000	×0.1%	UINT32	R	4
+60, 61	0x341E	V12 voltage	0-Vmax	U1	UINT32	R	
+62, 63	0x341F	V23 voltage	0-Vmax	U1	UINT32	R	
+64, 65	0x3420	V31 voltage	0-Vmax	U1	UINT32	R	
+66, 67	0x3421	I1x current	0-Ixmax	U2	UINT32	R	
+68, 69	0x3422	I2x current	0-Ixmax	U2	UINT32	R	
+70, 71	0x3423	I3x current	0-Ixmax	U2	UINT32	R	
18560-18571		<b>Maximum 1-Cycle Total Values</b>					
+0, 1	0x3500	Total kW	-Pmax-Pmax	U3	INT32	R	
+2, 3	0x3501	Total kvar	-Pmax-Pmax	U3	INT32	R	
+4, 5	0x3502	Total kVA	0-Pmax	U3	UINT32	R	
+6, 7	0x3503	Total PF	0-1000	×0.001	UINT32	R	Absolute value
+8, 9	0x3504	Total PF lag	0-1000	×0.001	UINT32	R	
+10, 11	0x3505	Total PF lead	0-1000	×0.001	UINT32	R	
18668-18689		<b>Maximum 1-Cycle Auxiliary Values</b>					
+0, 1	0x3600	I4 current	0-Imax	U2	UINT32	R	
+2, 3	0x3601	In current	0-Imax	U2	UINT32	R	
+4, 5	0x3602	Frequency	0-10000	×0.01Hz	UINT32	R	
+6, 7	0x3603	Voltage unbalance	0-3000	×0.1%	UINT32	R	
+8, 9	0x3604	Current unbalance	0-3000	×0.1%	UINT32	R	
+10, 11	0x3605	DC voltage	0-999900	×0.01V	UINT32	R	
+12, 13	0x3606	V4 voltage	0-V4max	U4	UINT32	R	
+14, 15	0x3607	I4x current	0-Ixmax	U2	UINT32	R	
+16, 17	0x3608	V4 THD	0-9999	×0.1%	UINT32	R	4
+18, 19	0x3609	I4x THD	0-9999	×0.1%	UINT32	R	4

Address	Point ID	Description	Options/Range <sup>3</sup>	Units <sup>3</sup>	Type	R/W	Notes
+20, 21	0x360A	I4x TDD	0-1000	×0.1%	UINT32	R	4
18732-18795		<b>Maximum Analog Inputs</b>					
+0,1	0x3680	Analog input AI1	AI1min-AI1max		INT32	R	
+2,3	0x3681	Analog input AI2	AI2min-AI2max		INT32	R	
		...					
+30,31	0x368F	Analog input AI16	AI16min-AI16max		INT32	R	
18816-18859		<b>Maximum Demands</b>					
+0, 1	0x3700	V1 Maximum volt demand	0-Vmax	U1	UINT32	R	2
+2, 3	0x3701	V2 Maximum volt demand	0-Vmax	U1	UINT32	R	2
+4, 5	0x3702	V3 Maximum volt demand	0-Vmax	U1	UINT32	R	2
+6, 7	0x3703	I1 Maximum ampere demand	0-Imax	U2	UINT32	R	
+8, 9	0x3704	I2 Maximum ampere demand	0-Imax	U2	UINT32	R	
+10, 11	0x3705	I3 Maximum ampere demand	0-Imax	U2	UINT32	R	
+12, 13	0x3706	Not used	0		UINT32	R	
+14, 15	0x3707	Not used	0		UINT32	R	
+16, 17	0x3708	Not used	0		UINT32	R	
+18, 19	0x3709	Maximum kW import sliding window demand	0-Pmax	U3	UINT32	R	
+20, 21	0x370A	Maximum kvar import sliding window demand	0-Pmax	U3	UINT32	R	
+22, 23	0x370B	Maximum kVA sliding window demand	0-Pmax	U3	UINT32	R	
+24, 25	0x3737	Not used	0		UINT32	R	
+26, 27	0x370D	Not used	0		UINT32	R	
+28, 29	0x370E	Not used	0		UINT32	R	
+30, 31	0x370F	Maximum kW export sliding window demand	0-Pmax	U3	UINT32	R	
+32, 33	0x3710	Maximum kvar export sliding window demand	0-Pmax	U3	UINT32	R	
+34, 35	0x3737	Not used	0		UINT32	R	
+36, 37	0x3712	Not used	0		UINT32	R	
+38, 39	0x3713	V4 Maximum volt demand	0-Vmax	U4	UINT32	R	
+40, 41	0x3714	I4 Maximum ampere demand	0-I4max	U2	UINT32	R	
+42, 43	0x3715	In Maximum ampere demand	0-Imax	U2	UINT32	R	
18944-18975		<b>Programmable Min/Max Maximum Values</b>					
+0, 1	0x3800	Min/Max Register #1			UINT32	R	
+2, 3	0x3801	Min/Max Register #2			UINT32	R	
		...					
+30, 31	0x380F	Min/Max Register #16			UINT32	R	
19008-19031		<b>Maximum Harmonic Demands</b>					
+0, 1	0x3880	V1 THD demand	0-9999	×0.1%	UINT32	R	2
+2, 3	0x3881	V2 THD demand	0-9999	×0.1%	UINT32	R	2
+4, 5	0x3882	V3 THD demand	0-9999	×0.1%	UINT32	R	2
+6, 7	0x3883	V4 THD demand	0-9999	×0.1%	UINT32	R	
+8, 9	0x3884	I1 THD demand	0-9999	×0.1%	UINT32	R	
+10, 11	0x3885	I2 THD demand	0-9999	×0.1%	UINT32	R	
+12, 13	0x3886	I3 THD demand	0-9999	×0.1%	UINT32	R	
+14, 15	0x3887	I4 THD demand	0-9999	×0.1%	UINT32	R	

Address	Point ID	Description	Options/Range <sup>3</sup>	Units <sup>3</sup>	Type	R/W	Notes
+16, 17	0x3888	I1 TDD demand	0-1000	×0.1%	UINT32	R	
+18, 19	0x3889	I2 TDD demand	0-1000	×0.1%	UINT32	R	
+20, 21	0x388A	I3 TDD demand	0-1000	×0.1%	UINT32	R	
+22, 23	0x388B	I4 TDD demand	0-1000	×0.1%	UINT32	R	
19072-19135		<b>Maximum Analog Input Demands</b>					
+0,1	0x3900	Analog input AI1+	AI1min-AI1max		UINT32	R	Positive AI readings demand
+2,3	0x3901	Analog input AI2+	AI2min-AI2max		UINT32	R	
		...					
+30,31	0x390F	Analog input AI16+	AI16min-AI16max		UINT32	R	
+32,33	0x3910	Analog input AI1-	AI1min-AI1max		UINT32	R	Negative AI readings demand
+34,35	0x3911	Analog input AI2-	AI2min-AI2max		UINT32	R	
		...					
+62,63	0x391F	Analog input AI16-	AI16min-AI16max		UINT32	R	
19200-19263		<b>Present Analog Input Demands</b>					
+0,1	0x3A00	Analog input AI1+	AI1min-AI1max		UINT32	R	Positive AI readings demand
+2,3	0x3A01	Analog input AI2+	AI2min-AI2max		UINT32	R	
		...					
+30,31	0x3A0F	Analog input AI16+	AI16min-AI16max		UINT32	R	
+32,33	0x3A10	Analog input AI1-	AI1min-AI1max		UINT32	R	Negative AI readings demand
+34,35	0x3A11	Analog input AI2-	AI2min-AI2max		UINT32	R	
		...					
+62,63	0x3A1F	Analog input AI16-	AI16min-AI16max		UINT32	R	
19328-19359		<b>1-Cycle Analog Inputs</b>					
+0, 1	0x3B00	Analog input AI1	AI1min-AI1max		INT32	R	
+2, 3	0x3B01	Analog input AI2	AI2min-AI2max		INT32	R	
		...					
+30, 31	0x3B0F	Analog input AI16	AI16min-AI16max		INT32	R	
19392-19423		<b>Raw Analog Inputs</b>					
+0, 1	0x3B80	Analog input AI1	0-4095		UINT32	R	
+2, 3	0x3B81	Analog input AI2	0-4095		UINT32	R	
		...					
+30, 31	0x3B8F	Analog input AI16	0-4095		UINT32	R	
19456-19459		<b>TOU Parameters</b>					
+0, 1	0x3C00	Active tariff	0-15 = Tariff 1-16		UINT32	R	
+2, 3	0x3C01	Active profile	0-15 = Profile 1-16		UINT32	R	
19520-19551		<b>Scaled Analog Outputs</b>					
+0, 1	0x3C80	Analog input AO1	0-4095		UINT32	R/W	
+2, 3	0x3C81	Analog input AO2	0-4095		UINT32	R/W	
		...					
+30, 31	0x3C8F	Analog input AO16	0-4095		UINT32	R/W	
19584-19615		<b>Billing TOU Register #1</b>					
+0, 1	0x3D00	Tariff #1 register	-999,999,999-999,999,999	1 kWh	UINT32	R	
+2, 3	0x3D01	Tariff #2 register	-999,999,999-999,999,999	1 kWh	UINT32	R	



Address	Point ID	Description	Options/Range <sup>3</sup>	Units <sup>3</sup>	Type	R/W	Notes
		...				R	
+30, 31	0x3D0F	Tariff #16 register	-999,999,999-999,999,999	1 kWh	UINT32	R	
19712-19743		<b>Billing TOU Register #2</b>					
+0, 1	0x3E00	Tariff #1 register	-999,999,999-999,999,999	1 kWh	UINT32	R	
+2, 3	0x3E01	Tariff #2 register	-999,999,999-999,999,999	1 kWh	UINT32	R	
		...				R	
+30, 31	0x3E0F	Tariff #16 register	-999,999,999-999,999,999	1 kWh	UINT32	R	
19840-19871		<b>Billing TOU Register #3</b>					
+0, 1	0x3F00	Tariff #1 register	-999,999,999-999,999,999	1 kWh	UINT32	R	
+2, 3	0x3F01	Tariff #2 register	-999,999,999-999,999,999	1 kWh	UINT32	R	
		...				R	
+30, 31	0x3F0F	Tariff #16 register	-999,999,999-999,999,999	1 kWh	UINT32	R	
19968-19999		<b>Billing TOU Register #4</b>					
+0, 1	0x4000	Tariff #1 register	-999,999,999-999,999,999	1 kWh	UINT32	R	
+2, 3	0x4001	Tariff #2 register	-999,999,999-999,999,999	1 kWh	UINT32	R	
		...				R	
+30, 31	0x400F	Tariff #16 register	-999,999,999-999,999,999	1 kWh	UINT32	R	
20096-20127		<b>Billing TOU Register #5</b>					
+0, 1	0x4100	Tariff #1 register	-999,999,999-999,999,999	1 kWh	UINT32	R	
+2, 3	0x4101	Tariff #2 register	-999,999,999-999,999,999	1 kWh	UINT32	R	
		...				R	
+30, 31	0x410F	Tariff #16 register	-999,999,999-999,999,999	1 kWh	UINT32	R	
20224-20255		<b>Billing TOU Register #6</b>					
+0, 1	0x4200	Tariff #1 register	-999,999,999-999,999,999	1 kWh	UINT32	R	
+2, 3	0x4201	Tariff #2 register	-999,999,999-999,999,999	1 kWh	UINT32	R	
		...				R	
+30, 31	0x420F	Tariff #16 register	-999,999,999-999,999,999	1 kWh	UINT32	R	
20352-20383		<b>Billing TOU Register #7</b>					
+0, 1	0x4300	Tariff #1 register	-999,999,999-999,999,999	1 kWh	UINT32	R	
+2, 3	0x4301	Tariff #2 register	-999,999,999-999,999,999	1 kWh	UINT32	R	
		...				R	
+30, 31	0x430F	Tariff #16 register	-999,999,999-999,999,999	1 kWh	UINT32	R	
20480-20511		<b>Billing TOU Register #8</b>					
+0, 1	0x4400	Tariff #1 register	-999,999,999-999,999,999	1 kWh	UINT32	R	
+2, 3	0x4401	Tariff #2 register	-999,999,999-999,999,999	1 kWh	UINT32	R	
		...				R	
+30, 31	0x440F	Tariff #16 register	-999,999,999-999,999,999	1 kWh	UINT32	R	
21376-21407		<b>Billing TOU Register #9</b>					
+0, 1	0x4B00	Tariff #1 register	-999,999,999-999,999,999	1 kWh	UINT32	R	
+2, 3	0x4B01	Tariff #2 register	-999,999,999-999,999,999	1 kWh	UINT32	R	
		...				R	

Address	Point ID	Description	Options/Range <sup>3</sup>	Units <sup>3</sup>	Type	R/W	Notes
+30, 31	0x4B0F	Tariff #16 register	-999,999,999-999,999,999	1 kWh	UINT32	R	
21504-21535		<b>Billing TOU Register #10</b>					
+0, 1	0x4C00	Tariff #1 register	-999,999,999-999,999,999	1 kWh	UINT32	R	
+2, 3	0x4C01	Tariff #2 register	-999,999,999-999,999,999	1 kWh	UINT32	R	
		...				R	
+30, 31	0x4C0F	Tariff #16 register	-999,999,999-999,999,999	1 kWh	UINT32	R	
21632-21663		<b>Billing TOU Register #11</b>					
+0, 1	0x4D00	Tariff #1 register	-999,999,999-999,999,999	1 kWh	UINT32	R	
+2, 3	0x4D01	Tariff #2 register	-999,999,999-999,999,999	1 kWh	UINT32	R	
		...				R	
+30, 31	0x4D0F	Tariff #16 register	-999,999,999-999,999,999	1 kWh	UINT32	R	
21760-21791		<b>Billing TOU Register #12</b>					
+0, 1	0x4E00	Tariff #1 register	-999,999,999-999,999,999	1 kWh	UINT32	R	
+2, 3	0x4E01	Tariff #2 register	-999,999,999-999,999,999	1 kWh	UINT32	R	
		...				R	
+30, 31	0x4E0F	Tariff #16 register	-999,999,999-999,999,999	1 kWh	UINT32	R	
21888-21919		<b>Billing TOU Register #13</b>					
+0, 1	0x4F00	Tariff #1 register	-999,999,999-999,999,999	1 kWh	UINT32	R	
+2, 3	0x4F01	Tariff #2 register	-999,999,999-999,999,999	1 kWh	UINT32	R	
		...				R	
+30, 31	0x4F0F	Tariff #16 register	-999,999,999-999,999,999	1 kWh	UINT32	R	
22016-22047		<b>Billing TOU Register #14</b>					
+0, 1	0x5000	Tariff #1 register	-999,999,999-999,999,999	1 kWh	UINT32	R	
+2, 3	0x5001	Tariff #2 register	-999,999,999-999,999,999	1 kWh	UINT32	R	
		...				R	
+30, 31	0x500F	Tariff #16 register	-999,999,999-999,999,999	1 kWh	UINT32	R	
22144-22175		<b>Billing TOU Register #15</b>					
+0, 1	0x5100	Tariff #1 register	-999,999,999-999,999,999	1 kWh	UINT32	R	
+2, 3	0x5101	Tariff #2 register	-999,999,999-999,999,999	1 kWh	UINT32	R	
		...				R	
+30, 31	0x510F	Tariff #16 register	-999,999,999-999,999,999	1 kWh	UINT32	R	
22272-22303		<b>Billing TOU Register #16</b>					
+0, 1	0x5200	Tariff #1 register	-999,999,999-999,999,999	1 kWh	UINT32	R	
+2, 3	0x5201	Tariff #2 register	-999,999,999-999,999,999	1 kWh	UINT32	R	
		...				R	
+30, 31	0x520F	Tariff #16 register	-999,999,999-999,999,999	1 kWh	UINT32	R	
20608-20639		<b>Billing Summary Accumulated Demands</b>					
+0, 1	0x4500	Summary register #1	0-Pmax	U3	UINT32	R	
+2, 3	0x4501	Summary register #2	0-Pmax	U3	UINT32	R	
		...					

Address	Point ID	Description	Options/Range <sup>3</sup>	Units <sup>3</sup>	Type	R/W	Notes
+30, 31	0x4503	Summary register #16	0-Pmax	U3	UINT32	R	
20672-20703		<b>Billing Summary Block Demands</b>					
+0, 1	0x4580	Summary register #1	0-Pmax	U3	UINT32	R	
+2, 3	0x4581	Summary register #2	0-Pmax	U3	UINT32	R	
		...					
+30, 31	0x4583	Summary register #16	0-Pmax	U3	UINT32	R	
20736-20767		<b>Billing Summary Sliding Window Demands</b>					
+0, 1	0x4600	Summary register #1	0-Pmax	U3	UINT32	R	
+2, 3	0x4601	Summary register #2	0-Pmax	U3	UINT32	R	
		...					
+30, 31	0x4603	Summary register #16	0-Pmax	U3	UINT32	R	
20928-20959		<b>Billing Summary Maximum Demands</b>					
+0, 1	0x4780	Summary register #1	0-Pmax	U3	UINT32	R	
+2, 3	0x4781	Summary register #2	0-Pmax	U3	UINT32	R	
		...					
+30, 31	0x4783	Summary register #16	0-Pmax	U3	UINT32	R	
20992-21023		<b>Billing TOU Maximum Demand Register #1</b>					
+0, 1	0x4800	Tariff #1 register	0-Pmax	U3	UINT32	R	
+2, 3	0x4801	Tariff #2 register	0-Pmax	U3	UINT32	R	
		...				R	
+30, 31	0x480F	Tariff #16 register	0-Pmax	U3	UINT32	R	
21056-21087		<b>Billing TOU Maximum Demand Register #4</b>					
+0, 1	0x4880	Tariff #1 register	0-Pmax	U3	UINT32	R	
+2, 3	0x4881	Tariff #2 register	0-Pmax	U3	UINT32	R	
		...				R	
+30, 31	0x488F	Tariff #16 register	0-Pmax	U3	UINT32	R	
21120-21151		<b>Billing TOU Maximum Demand Register #2</b>					
+0, 1	0x4900	Tariff #1 register	0-Pmax	U3	UINT32	R	
+2, 3	0x4901	Tariff #2 register	0-Pmax	U3	UINT32	R	
		...				R	
+30, 31	0x490F	Tariff #16 register	0-Pmax	U3	UINT32	R	
21184-21215		<b>Billing TOU Maximum Demand Register #5</b>					
+0, 1	0x4980	Tariff #1 register	0-Pmax	U3	UINT32	R	
+2, 3	0x4981	Tariff #2 register	0-Pmax	U3	UINT32	R	
		...				R	
+30, 31	0x498F	Tariff #16 register	0-Pmax	U3	UINT32	R	
21248-21279		<b>Billing TOU Maximum Demand Register #3</b>					
+0, 1	0x4A00	Tariff #1 register	0-Pmax	U3	UINT32	R	
+2, 3	0x4A01	Tariff #2 register	0-Pmax	U3	UINT32	R	
		...				R	

Address	Point ID	Description	Options/Range <sup>3</sup>	Units <sup>3</sup>	Type	R/W	Notes
+30, 31	0x4A0F	Tariff #16 register	0-Pmax	U3	UINT32	R	
21312-21343		<b>Billing TOU Maximum Demand Register #6</b>					
+0, 1	0x4A80	Tariff #1 register	0-Pmax	U3	UINT32	R	
+2, 3	0x4A81	Tariff #2 register	0-Pmax	U3	UINT32	R	
		...				R	
+30, 31	0x4A8F	Tariff #16 register	0-Pmax	U3	UINT32	R	
22400-22431		<b>Billing TOU Maximum Demand Register #7</b>					
+0, 1	0x5300	Tariff #1 register	0-Pmax	U3	UINT32	R	
+2, 3	0x5301	Tariff #2 register	0-Pmax	U3	UINT32	R	
		...				R	
+30, 31	0x530F	Tariff #16 register	0-Pmax	U3	UINT32	R	
22464-22495		<b>Billing TOU Maximum Demand Register #8</b>					
+0, 1	0x5380	Tariff #1 register	0-Pmax	U3	UINT32	R	
+2, 3	0x5381	Tariff #2 register	0-Pmax	U3	UINT32	R	
		...				R	
+30, 31	0x538F	Tariff #16 register	0-Pmax	U3	UINT32	R	
22528-22559		<b>Billing TOU Maximum Demand Register #9</b>					
+0, 1	0x5400	Tariff #1 register	0-Pmax	U3	UINT32	R	
+2, 3	0x5401	Tariff #2 register	0-Pmax	U3	UINT32	R	
		...				R	
+30, 31	0x540F	Tariff #16 register	0-Pmax	U3	UINT32	R	
22592-22623		<b>Billing TOU Maximum Demand Register #10</b>					
+0, 1	0x5480	Tariff #1 register	0-Pmax	U3	UINT32	R	
+2, 3	0x5481	Tariff #2 register	0-Pmax	U3	UINT32	R	
		...				R	
+30, 31	0x548F	Tariff #16 register	0-Pmax	U3	UINT32	R	
22656-22687		<b>Billing TOU Maximum Demand Register #11</b>					
+0, 1	0x5500	Tariff #1 register	0-Pmax	U3	UINT32	R	
+2, 3	0x5501	Tariff #2 register	0-Pmax	U3	UINT32	R	
		...				R	
+30, 31	0x550F	Tariff #16 register	0-Pmax	U3	UINT32	R	
22720-22751		<b>Billing TOU Maximum Demand Register #12</b>					
+0, 1	0x5580	Tariff #1 register	0-Pmax	U3	UINT32	R	
+2, 3	0x5581	Tariff #2 register	0-Pmax	U3	UINT32	R	
		...				R	
+30, 31	0x558F	Tariff #16 register	0-Pmax	U3	UINT32	R	
22784-22815		<b>Billing TOU Maximum Demand Register #13</b>					
+0, 1	0x5600	Tariff #1 register	0-Pmax	U3	UINT32	R	
+2, 3	0x5601	Tariff #2 register	0-Pmax	U3	UINT32	R	
		...				R	

Address	Point ID	Description	Options/Range <sup>3</sup>	Units <sup>3</sup>	Type	R/W	Notes
+30, 31	0x560F	Tariff #16 register	0-Pmax	U3	UINT32	R	
22848-22879		<b>Billing TOU Maximum Demand Register #14</b>					
+0, 1	0x5680	Tariff #1 register	0-Pmax	U3	UINT32	R	
+2, 3	0x5681	Tariff #2 register	0-Pmax	U3	UINT32	R	
		...				R	
+30, 31	0x568F	Tariff #16 register	0-Pmax	U3	UINT32	R	
22912-22943		<b>Billing TOU Maximum Demand Register #15</b>					
+0, 1	0x5700	Tariff #1 register	0-Pmax	U3	UINT32	R	
+2, 3	0x5701	Tariff #2 register	0-Pmax	U3	UINT32	R	
		...				R	
+30, 31	0x570F	Tariff #16 register	0-Pmax	U3	UINT32	R	
22976-23007		<b>Billing TOU Maximum Demand Register #16</b>					
+0, 1	0x5780	Tariff #1 register	0-Pmax	U3	UINT32	R	
+2, 3	0x5781	Tariff #2 register	0-Pmax	U3	UINT32	R	
		...				R	
+30, 31	0x578F	Tariff #16 register	0-Pmax	U3	UINT32	R	
25600-25653		<b>0.2-Second RMS and Auxiliary Values</b>					
+0, 1	0x6C00	V1 voltage	0-Vmax	U1	UINT32	R	1
+2, 3	0x6C01	V2 voltage	0-Vmax	U1	UINT32	R	1
+4, 5	0x6C02	V3 voltage	0-Vmax	U1	UINT32	R	1
+6, 7	0x6C03	V4 voltage	0-V4max	U4	UINT32	R	
+8, 9	0x6C04	V12 voltage	0-Vmax	U1	UINT32	R	
+10, 11	0x6C05	V23 voltage	0-Vmax	U1	UINT32	R	
+12, 13	0x6C06	V31 voltage	0-Vmax	U1	UINT32	R	
+14, 15	0x6C07	I1 current	0-Imax	U2	UINT32	R	
+16, 17	0x6C08	I2 current	0-Imax	U2	UINT32	R	
+18, 19	0x6C09	I3 current	0-Imax	U2	UINT32	R	
+20, 21	0x6C0A	I4 current	0-I4max	U2	UINT32	R	
+22, 23	0x6C0B	In current	0-Imax	U2	UINT32	R	
+24, 25	0x6C0C	I1x current	0-Ixmax	U2	UINT32	R	
+26, 27	0x6C0D	I2x current	0-Ixmax	U2	UINT32	R	
+28, 29	0x6C0E	I3x current	0-Ixmax	U2	UINT32	R	
+30, 31	0x6C0F	I4x current	0-I4xmax	U2	UINT32	R	
+32, 33	0x6C10	Inx current	0-Ixmax	U2	UINT32	R	
+34, 35	0x6C11	Zero-sequence voltage	0-Vmax	U1	UINT32	R	
+36, 37	0x6C12	Zero-sequence current	0-Imax	U2	UINT32	R	
+38, 39	0x6C13	Ix Zero-sequence current	0-Ixmax	U2	UINT32	R	
+40, 41	0x6C14	Voltage unbalance	0-3000	×0.1%	UINT32	R	
+42, 43	0x6C15	Current unbalance	0-3000	×0.1%	UINT32	R	
+44, 45	0x6C16	Ix current unbalance	0-3000	×0.1%	UINT32	R	
+46, 47	0x6C17	DC voltage	0-999900	×0.01V	UINT32	R	
+48, 49	0x6C18	Frequency	0-10000	×0.01Hz	UINT32	R	

Address	Point ID	Description	Options/Range <sup>3</sup>	Units <sup>3</sup>	Type	R/W	Notes
+50, 51	0x6C19	Positive-sequence voltage	0-Vmax	U1	UINT32	R	
+52, 53	0x6C1A	Zero-sequence voltage unbalance	0-300.0	×0.1%	UINT32	R	
25664-25717		<b>3-Second RMS and Auxiliary Values</b>					
+0, 1	0x6C80	V1 voltage	0-Vmax	U1	UINT32	R	1
+2, 3	0x6C81	V2 voltage	0-Vmax	U1	UINT32	R	1
+4, 5	0x6C82	V3 voltage	0-Vmax	U1	UINT32	R	1
+6, 7	0x6C83	V4 voltage	0-V4max	U4	UINT32	R	
+8, 9	0x6C84	V12 voltage	0-Vmax	U1	UINT32	R	
+10, 11	0x6C85	V23 voltage	0-Vmax	U1	UINT32	R	
+12, 13	0x6C86	V31 voltage	0-Vmax	U1	UINT32	R	
+14, 15	0x6C87	I1 current	0-Imax	U2	UINT32	R	
+16, 17	0x6C88	I2 current	0-Imax	U2	UINT32	R	
+18, 19	0x6C89	I3 current	0-Imax	U2	UINT32	R	
+20, 21	0x6C8A	I4 current	0-I4max	U2	UINT32	R	
+22, 23	0x6C8B	In current	0-Imax	U2	UINT32	R	
+24, 25	0x6C8C	I1x current	0-Ixmax	U2	UINT32	R	
+26, 27	0x6C8D	I2x current	0-Ixmax	U2	UINT32	R	
+28, 29	0x6C8E	I3x current	0-Ixmax	U2	UINT32	R	
+30, 31	0x6C8F	I4x current	0-I4xmax	U2	UINT32	R	
+32, 33	0x6C90	Inx current	0-Ixmax	U2	UINT32	R	
+34, 35	0x6C91	Zero-sequence voltage	0-Vmax	U1	UINT32	R	
+36, 37	0x6C92	Zero-sequence current	0-Imax	U2	UINT32	R	
+38, 39	0x6C93	Ix Zero-sequence current	0-Ixmax	U2	UINT32	R	
+40, 41	0x6C94	Voltage unbalance	0-3000	×0.1%	UINT32	R	
+42, 43	0x6C95	Current unbalance	0-3000	×0.1%	UINT32	R	
+44, 45	0x6C96	Ix current unbalance	0-3000	×0.1%	UINT32	R	
+46, 47	0x6C97	DC voltage	0-999900	×0.01V	UINT32	R	
+48, 49	0x6C98	Frequency	0-10000	×0.01Hz	UINT32	R	20-sec value
+50, 51	0x6C99	Positive-sequence voltage	0-Vmax	U1	UINT32	R	
+52, 53	0x6C9A	Zero-sequence voltage unbalance	0-300.0	×0.1%	UINT32	R	
26880-26993		<b>1-Minute RMS and Auxiliary Values</b>					
+0, 1	0x7600	V1 voltage	0-Vmax	U1	UINT32	R	1
+2, 3	0x7601	V2 voltage	0-Vmax	U1	UINT32	R	1
+4, 5	0x7602	V3 voltage	0-Vmax	U1	UINT32	R	1
+6, 7	0x7603	V4 voltage	0-V4max	U4	UINT32	R	
+8, 9	0x7604	V12 voltage	0-Vmax	U1	UINT32	R	
+10, 11	0x7605	V23 voltage	0-Vmax	U1	UINT32	R	
+12, 13	0x7606	V31 voltage	0-Vmax	U1	UINT32	R	
+14, 15	0x7607	I1 current	0-Imax	U2	UINT32	R	
+16, 17	0x7608	I2 current	0-Imax	U2	UINT32	R	
+18, 19	0x7609	I3 current	0-Imax	U2	UINT32	R	
+20, 21	0x760A	I4 current	0-I4max	U2	UINT32	R	
+22, 23	0x760B	In current	0-Imax	U2	UINT32	R	

Address	Point ID	Description	Options/Range <sup>3</sup>	Units <sup>3</sup>	Type	R/W	Notes
+24, 25	0x760C	I1x current	0-Ixmax	U2	UINT32	R	
+26, 27	0x760D	I2x current	0-Ixmax	U2	UINT32	R	
+28, 29	0x760E	I3x current	0-Ixmax	U2	UINT32	R	
+30, 31	0x760F	I4x current	0-I4xmax	U2	UINT32	R	
+32, 33	0x7610	Inx current	0-Ixmax	U2	UINT32	R	
+34, 35	0x7611	Zero-sequence voltage	0-Vmax	U1	UINT32	R	
+36, 37	0x7612	Zero-sequence current	0-Imax	U2	UINT32	R	
+38, 39	0x7613	Ix Zero-sequence current	0-Ixmax	U2	UINT32	R	
+40, 41	0x7614	Voltage unbalance	0-3000	×0.1%	UINT32	R	
+42, 43	0x7615	Current unbalance	0-3000	×0.1%	UINT32	R	
+44, 45	0x7616	Ix current unbalance	0-3000	×0.1%	UINT32	R	
+46, 47	0x7617	DC voltage	0-999900	×0.01V	UINT32	R	
+48, 49	0x7618	Frequency	0-10000	×0.01Hz	UINT32	R	
+50, 51	0x7619	Positive-sequence voltage	0-Vmax	U1	UINT32	R	
+52, 53	0x761A	Zero-sequence voltage unbalance	0-300.0	×0.1%	UINT32	R	
25728-25781		<b>10-Minute RMS and Auxiliary Values</b>					
+0, 1	0x6D00	V1 voltage	0-Vmax	U1	UINT32	R	1
+2, 3	0x6D01	V2 voltage	0-Vmax	U1	UINT32	R	1
+4, 5	0x6D02	V3 voltage	0-Vmax	U1	UINT32	R	1
+6, 7	0x6D03	V4 voltage	0-V4max	U4	UINT32	R	
+8, 9	0x6D04	V12 voltage	0-Vmax	U1	UINT32	R	
+10, 11	0x6D05	V23 voltage	0-Vmax	U1	UINT32	R	
+12, 13	0x6D06	V31 voltage	0-Vmax	U1	UINT32	R	
+14, 15	0x6D07	I1 current	0-Imax	U2	UINT32	R	
+16, 17	0x6D08	I2 current	0-Imax	U2	UINT32	R	
+18, 19	0x6D09	I3 current	0-Imax	U2	UINT32	R	
+20, 21	0x6D0A	I4 current	0-I4max	U2	UINT32	R	
+22, 23	0x6D0B	In current	0-Imax	U2	UINT32	R	
+24, 25	0x6D0C	I1x current	0-Ixmax	U2	UINT32	R	
+26, 27	0x6D0D	I2x current	0-Ixmax	U2	UINT32	R	
+28, 29	0x6D0E	I3x current	0-Ixmax	U2	UINT32	R	
+30, 31	0x6D0F	I4x current	0-I4xmax	U2	UINT32	R	
+32, 33	0x6D10	Inx current	0-Ixmax	U2	UINT32	R	
+34, 35	0x6D11	Zero-sequence voltage	0-Vmax	U1	UINT32	R	
+36, 37	0x6D12	Zero-sequence current	0-Imax	U2	UINT32	R	
+38, 39	0x6D13	Ix Zero-sequence current	0-Ixmax	U2	UINT32	R	
+40, 41	0x6D14	Voltage unbalance	0-3000	×0.1%	UINT32	R	
+42, 43	0x6D15	Current unbalance	0-3000	×0.1%	UINT32	R	
+44, 45	0x6D16	Ix current unbalance	0-3000	×0.1%	UINT32	R	
+46, 47	0x6D17	DC voltage	0-999900	×0.01V	UINT32	R	
+48, 49	0x6D18	Frequency	0-10000	×0.01Hz	UINT32	R	
+50, 51	0x6D19	Positive-sequence voltage	0-Vmax	U1	UINT32	R	
+52, 53	0x6D1A	Zero-sequence voltage unbalance	0-300.0	×0.1%	UINT32	R	

Address	Point ID	Description	Options/Range <sup>3</sup>	Units <sup>3</sup>	Type	R/W	Notes
25792-25845		<b>2-Hour RMS and Auxiliary Values</b>					
+0, 1	0x6D80	V1 voltage	0-Vmax	U1	UINT32	R	1
+2, 3	0x6D81	V2 voltage	0-Vmax	U1	UINT32	R	1
+4, 5	0x6D82	V3 voltage	0-Vmax	U1	UINT32	R	1
+6, 7	0x6D83	V4 voltage	0-V4max	U4	UINT32	R	
+8, 9	0x6D84	V12 voltage	0-Vmax	U1	UINT32	R	
+10, 11	0x6D85	V23 voltage	0-Vmax	U1	UINT32	R	
+12, 13	0x6D86	V31 voltage	0-Vmax	U1	UINT32	R	
+14, 15	0x6D87	I1 current	0-Imax	U2	UINT32	R	
+16, 17	0x6D88	I2 current	0-Imax	U2	UINT32	R	
+18, 19	0x6D89	I3 current	0-Imax	U2	UINT32	R	
+20, 21	0x6D8A	I4 current	0-I4max	U2	UINT32	R	
+22, 23	0x6D8B	In current	0-Imax	U2	UINT32	R	
+24, 25	0x6D8C	I1x current	0-Ixmax	U2	UINT32	R	
+26, 27	0x6D8D	I2x current	0-Ixmax	U2	UINT32	R	
+28, 29	0x6D8E	I3x current	0-Ixmax	U2	UINT32	R	
+30, 31	0x6D8F	I4x current	0-I4xmax	U2	UINT32	R	
+32, 33	0x6D90	Inx current	0-Ixmax	U2	UINT32	R	
+34, 35	0x6D91	Zero-sequence voltage	0-Vmax	U1	UINT32	R	
+36, 37	0x6D92	Zero-sequence current	0-Imax	U2	UINT32	R	
+38, 39	0x6D93	Ix Zero-sequence current	0-Ixmax	U2	UINT32	R	
+40, 41	0x6D94	Voltage unbalance	0-3000	×0.1%	UINT32	R	
+42, 43	0x6D95	Current unbalance	0-3000	×0.1%	UINT32	R	
+44, 45	0x6D96	Ix current unbalance	0-3000	×0.1%	UINT32	R	
+46, 47	0x6D97	DC voltage	0-999900	×0.01V	UINT32	R	
+48, 49	0x6D98	Frequency	0-10000	×0.01Hz	UINT32	R	
+50, 51	0x6D99	Positive-sequence voltage	0-Vmax	U1	UINT32	R	
+52, 53	0x6D9A	Zero-sequence voltage unbalance	0-300.0	×0.1%	UINT32	R	
25856-25905		<b>0.2-Second Harmonics</b>					
+0, 1	0x6E00	V1 THD	0-9999	×0.1%	UINT32	R	2
+2, 3	0x6E01	V2 THD	0-9999	×0.1%	UINT32	R	2
+4, 5	0x6E02	V3 THD	0-9999	×0.1%	UINT32	R	2
+6, 7	0x6E03	V4 THD	0-9999	×0.1%	UINT32	R	
+8, 9	0x6E04	I1 THD	0-9999	×0.1%	UINT32	R	
+10, 11	0x6E05	I2 THD	0-9999	×0.1%	UINT32	R	
+12, 13	0x6E06	I3 THD	0-9999	×0.1%	UINT32	R	
+14, 15	0x6E07	I4 THD	0		UINT32	R	
+16, 17	0x6E08	Not used	0		UINT32	R	
+18, 19	0x6E09	Not used	0		UINT32	R	
+20, 21	0x6E0A	Not used	0		UINT32	R	
+22, 23	0x6E0B	Not used	0		UINT32	R	
+24, 25	0x6E0C	Not used	0		UINT32	R	
+26, 27	0x6E0D	Not used	0		UINT32	R	



Address	Point ID	Description	Options/Range <sup>3</sup>	Units <sup>3</sup>	Type	R/W	Notes
+28, 29	0x6E0E	Not used	0		UINT32	R	
+30, 31	0x6E0F	Not used	0		UINT32	R	
+32, 33	0x6E10	I1 TDD	0-1000	×0.1%	UINT32	R	
+34, 35	0x6E11	I2 TDD	0-1000	×0.1%	UINT32	R	
+36, 37	0x6E12	I3 TDD	0-1000	×0.1%	UINT32	R	
+38, 39	0x6E13	I4 TDD	0-1000	×0.1%	UINT32	R	
+40, 41	0x6E14	I1 K-Factor	10-9999	×0.1	UINT32	R	
+42, 43	0x6E15	I2 K-Factor	10-9999	×0.1	UINT32	R	
+44, 45	0x6E16	I3 K-Factor	10-9999	×0.1	UINT32	R	
+46, 47	0x6E17	I4 K-Factor	10-9999	×0.1	UINT32	R	
+48, 49	0x6E18	V1 Crest Factor	0-10000	×0.01	UINT32	R	2
+50, 51	0x6E19	V2 Crest Factor	0-10000	×0.01	UINT32	R	2
+52, 53	0x6E1A	V3 Crest Factor	0-10000	×0.01	UINT32	R	2
+54, 55	0x6E1B	V4 Crest Factor	0-10000	×0.01	UINT32	R	
+56, 57	0x6E1C	I1 Crest Factor	0-10000	×0.01	UINT32	R	
+58, 59	0x6E1D	I2 Crest Factor	0-10000	×0.01	UINT32	R	
+60, 61	0x6E1E	I3 Crest Factor	0-10000	×0.01	UINT32	R	
+62, 63	0x6E1F	I4 Crest Factor	0-10000	×0.01	UINT32	R	
25920-25969		<b>3-Second Harmonics</b>					
+0, 1	0x6E80	V1 THD	0-9999	×0.1%	UINT32	R	2
+2, 3	0x6E81	V2 THD	0-9999	×0.1%	UINT32	R	2
+4, 5	0x6E82	V3 THD	0-9999	×0.1%	UINT32	R	2
+6, 7	0x6E83	V4 THD	0-9999	×0.1%	UINT32	R	
+8, 9	0x6E84	I1 THD	0-9999	×0.1%	UINT32	R	
+10, 11	0x6E85	I2 THD	0-9999	×0.1%	UINT32	R	
+12, 13	0x6E86	I3 THD	0-9999	×0.1%	UINT32	R	
+14, 15	0x6E87	I4 THD	0-9999	×0.1%	UINT32	R	
+16, 17	0x6E88	Not used	0		UINT32	R	
+18, 19	0x6E89	Not used	0		UINT32	R	
+20, 21	0x6E8A	Not used	0		UINT32	R	
+22, 23	0x6E8B	Not used	0		UINT32	R	
+24, 25	0x6E6E	Not used	0		UINT32	R	
+26, 27	0x6E8D	Not used	0		UINT32	R	
+28, 29	0x6E8E	Not used	0		UINT32	R	
+30, 31	0x6E8F	Not used	0		UINT32	R	
+32, 33	0x6E90	I1 TDD	0-1000	×0.1%	UINT32	R	
+34, 35	0x6E91	I2 TDD	0-1000	×0.1%	UINT32	R	
+36, 37	0x6E92	I3 TDD	0-1000	×0.1%	UINT32	R	
+38, 39	0x6E93	I4 TDD	0-1000	×0.1%	UINT32	R	
+40, 41	0x6E94	I1 K-Factor	10-9999	×0.1	UINT32	R	
+42, 43	0x6E95	I2 K-Factor	10-9999	×0.1	UINT32	R	
+44, 45	0x6E96	I3 K-Factor	10-9999	×0.1	UINT32	R	

Address	Point ID	Description	Options/Range <sup>3</sup>	Units <sup>3</sup>	Type	R/W	Notes
+46, 47	0x6E97	I4 K-Factor	10-9999	×0.1	UINT32	R	
+48, 49	0x6E98	V1 Crest Factor	0-10000	×0.01	UINT32	R	2
+50, 51	0x6E99	V2 Crest Factor	0-10000	×0.01	UINT32	R	2
+52, 53	0x6E9A	V3 Crest Factor	0-10000	×0.01	UINT32	R	2
+54, 55	0x6E9B	V4 Crest Factor	0-10000	×0.01	UINT32	R	
+56, 57	0x6E9C	I1 Crest Factor	0-10000	×0.01	UINT32	R	
+58, 59	0x6E9D	I2 Crest Factor	0-10000	×0.01	UINT32	R	
+60, 61	0x6E9E	I3 Crest Factor	0-10000	×0.01	UINT32	R	
+62, 63	0x6E9F	I4 Crest Factor	0-10000	×0.01	UINT32	R	
25984-26033		<b>10-Minute Harmonics</b>					
+0, 1	0x6F00	V1 THD	0-9999	×0.1%	UINT32	R	2
+2, 3	0x6F01	V2 THD	0-9999	×0.1%	UINT32	R	2
+4, 5	0x6F02	V3 THD	0-9999	×0.1%	UINT32	R	2
+6, 7	0x6F03	V4 THD	0-9999	×0.1%	UINT32	R	
+8, 9	0x6F04	I1 THD	0-9999	×0.1%	UINT32	R	
+10, 11	0x6F05	I2 THD	0-9999	×0.1%	UINT32	R	
+12, 13	0x6F06	I3 THD	0-9999	×0.1%	UINT32	R	
+14, 15	0x6F07	I4 THD	0-9999	×0.1%	UINT32	R	
+16, 17	0x6F08	Not used	0		UINT32	R	
+18, 19	0x6F09	Not used	0		UINT32	R	
+20, 21	0x6F0A	Not used	0		UINT32	R	
+22, 23	0x6F0B	Not used	0		UINT32	R	
+24, 25	0x6F0C	Not used	0		UINT32	R	
+26, 27	0x6F0D	Not used	0		UINT32	R	
+28, 29	0x6F0E	Not used	0		UINT32	R	
+30, 31	0x6F0F	Not used	0		UINT32	R	
+32, 33	0x6F10	I1 TDD	0-1000	×0.1%	UINT32	R	
+34, 35	0x6F11	I2 TDD	0-1000	×0.1%	UINT32	R	
+36, 37	0x6F12	I3 TDD	0-1000	×0.1%	UINT32	R	
+38, 39	0x6F13	I4 TDD	0-1000	×0.1%	UINT32	R	
+40, 41	0x6F14	I1 K-Factor	10-9999	×0.1	UINT32	R	
+42, 43	0x6F15	I2 K-Factor	10-9999	×0.1	UINT32	R	
+44, 45	0x6F16	I3 K-Factor	10-9999	×0.1	UINT32	R	
+46, 47	0x6F17	I4 K-Factor	10-9999	×0.1	UINT32	R	
+48, 49	0x6F18	V1 Crest Factor	0-10000	×0.01	UINT32	R	2
+50, 51	0x6F19	V2 Crest Factor	0-10000	×0.01	UINT32	R	2
+52, 53	0x6F1A	V3 Crest Factor	0-10000	×0.01	UINT32	R	2
+54, 55	0x6F1B	V4 Crest Factor	0-10000	×0.01	UINT32	R	
+56, 57	0x6F1C	I1 Crest Factor	0-10000	×0.01	UINT32	R	
+58, 59	0x6F1D	I2 Crest Factor	0-10000	×0.01	UINT32	R	
+60, 61	0x6F1E	I3 Crest Factor	0-10000	×0.01	UINT32	R	
+62, 63	0x6F1F	I4 Crest Factor	0-10000	×0.01	UINT32	R	

Address	Point ID	Description	Options/Range <sup>3</sup>	Units <sup>3</sup>	Type	R/W	Notes
26046-26097		<b>2-Hour Harmonics</b>					
+0, 1	0x6F80	V1 THD	0-9999	×0.1%	UINT32	R	2
+2, 3	0x6F81	V2 THD	0-9999	×0.1%	UINT32	R	2
+4, 5	0x6F82	V3 THD	0-9999	×0.1%	UINT32	R	2
+6, 7	0x6F83	V4 THD	0-9999	×0.1%	UINT32	R	
+8, 9	0x6F84	I1 THD	0-9999	×0.1%	UINT32	R	
+10, 11	0x6F85	I2 THD	0-9999	×0.1%	UINT32	R	
+12, 13	0x6F86	I3 THD	0-9999	×0.1%	UINT32	R	
+14, 15	0x6F87	I4 THD	0-9999	×0.1%	UINT32	R	
+16, 17	0x6F88	Not used	0		UINT32	R	
+18, 19	0x6F89	Not used	0		UINT32	R	
+20, 21	0x6F8A	Not used	0		UINT32	R	
+22, 23	0x6F8B	Not used	0		UINT32	R	
+24, 25	0x6F8C	Not used	0		UINT32	R	
+26, 27	0x6F8D	Not used	0		UINT32	R	
+28, 29	0x6F8E	Not used	0		UINT32	R	
+30, 31	0x6F8F	Not used	0		UINT32	R	
+32, 33	0x6F90	I1 TDD	0-1000	×0.1%	UINT32	R	
+34, 35	0x6F91	I2 TDD	0-1000	×0.1%	UINT32	R	
+36, 37	0x6F92	I3 TDD	0-1000	×0.1%	UINT32	R	
+38, 39	0x6F93	I4 TDD	0-1000	×0.1%	UINT32	R	
+40, 41	0x6F94	I1 K-Factor	10-9999	×0.1	UINT32	R	
+42, 43	0x6F95	I2 K-Factor	10-9999	×0.1	UINT32	R	
+44, 45	0x6F96	I3 K-Factor	10-9999	×0.1	UINT32	R	
+46, 47	0x6F97	I4 K-Factor	10-9999	×0.1	UINT32	R	
+48, 49	0x6F98	V1 Crest Factor	0-10000	×0.01	UINT32	R	2
+50, 51	0x6F99	V2 Crest Factor	0-10000	×0.01	UINT32	R	2
+52, 53	0x6F9A	V3 Crest Factor	0-10000	×0.01	UINT32	R	2
+54, 55	0x6F9B	V4 Crest Factor	0-10000	×0.01	UINT32	R	
+56, 57	0x6F9C	I1 Crest Factor	0-10000	×0.01	UINT32	R	
+58, 59	0x6F9D	I2 Crest Factor	0-10000	×0.01	UINT32	R	
+60, 61	0x6F9E	I3 Crest Factor	0-10000	×0.01	UINT32	R	
+62, 63	0x6F9F	I4 Crest Factor	0-10000	×0.01	UINT32	R	
27136-27179		<b>Present GOST 13109 PQ Values</b>					
+0,1	0x7800	Voltage variation ( $\delta U_y$ ) on phase A/AB, +/--%Un		0.01%	INT32	R	Last 1-min measurement
+2,3	0x7801	Voltage variation ( $\delta U_y$ ) on phase B/BC, +/--%Un		0.01%	INT32	R	"
+4,5	0x7802	Voltage variation ( $\delta U_y$ ) on phase C/CA, +/--%Un		0.01%	INT32	R	"
+6,7	0x7803	Positive sequence voltage variation ( $\delta U_y$ ), +/--%Un		0.01%	INT32	R	"
+8,9	0x7804	Voltage change ( $\delta U_t$ ) on phase A/AB, %Un		0.01%	UINT32	R	Last 10-min measurement
+10,11	0x7805	Repetition rate of voltage changes ( $F\delta U_t$ ) A/AB, 1/min		1/min × 0.01	UINT32	R	"
+12,13	0x7806	Voltage change ( $\delta U_t$ ) on phase B/BC, %Un		0.01%	UINT32	R	"
+14,15	0x7807	Repetition rate of voltage changes ( $F\delta U_t$ ) B/BC, 1/min		1/min × 0.01	UINT32	R	"

Address	Point ID	Description	Options/Range <sup>3</sup>	Units <sup>3</sup>	Type	R/W	Notes
+16,17	0x7808	Voltage change ( $\delta U_t$ ) on phase C/CA, %Un		0.01%	UINT32	R	"
+18,19	0x7809	Repetition rate of voltage changes ( $F\delta U_t$ ) C/CA, 1/min		1/min $\times$ 0.01	UINT32	R	"
+20,21	0x780A	Voltage Pst on phase A/AB		0.01	UINT32	R	Last 10-min measurement
+22,23	0x780B	Voltage Pst on phase B/BC		0.01	UINT32	R	"
+24,25	0x780C	Voltage Pst on phase C/CA		0.01	UINT32	R	"
+26,27	0x780D	Voltage Plt on phase A/AB		0.01	UINT32	R	Last 2-hour measurement
+28,29	0x780E	Voltage Plt on phase B/BC		0.01	UINT32	R	"
+30,31	0x780F	Voltage Plt on phase C/CA		0.01	UINT32	R	"
+32,33	0x7810	Voltage THD (KU) on phase A/AB, %		0.1%	UINT32	R	Last 3-s measurement
+34,35	0x7811	Voltage THD (KU) on phase B/BC, %		0.1%	UINT32	R	"
+36,37	0x7812	Voltage THD (KU) on phase C/CA, %		0.1%	UINT32	R	"
+38,39	0x7813	Negative-sequence voltage unbalance (K2u), %		0.1%	UINT32	R	"
+40,41	0x7814	Zero-sequence voltage unbalance (K0u), %		0.1%	UINT32	R	"
+42,43	0x7815	Frequency variation ( $\Delta f$ ), +/-Hz		0.01 Hz	INT32	R	Last 20-s measurement
28160-28223		<b>External Integer Measured Values</b>					
+0,1	0x8000	ExtiVal1			INT32	R	
+2,3	0x8001	ExtiVal2			INT32	R	
	...	...			INT32	R	
+62,63	0x801F	ExtiVal32			INT32	R	
28288-28321		<b>External Float Measured Values</b>					
+0,1	0x8100	ExtfVal1			FLOAT32	R	
+2,3	0x8101	ExtfVal2			FLOAT32	R	
	...	...			FLOAT32	R	
+62,63	0x801F	ExtfVal32			FLOAT32	R	
		<b>External Indication</b>					
28416-28417		ExtInd1:32 Bit 0: ExtInd1 ... Bit 32: ExtInd32	0x00000000-0xFFFFFFFF Bit Value: 0=OFF, 1=ON		UINT32	R	Bitmap
28480-28481		ExtInd33:64 Bit 0: ExtInd33 ... Bit 32: ExtInd64	0x00000000-0xFFFFFFFF Bit Value: 0=OFF, 1=ON		UINT32	R	Bitmap
28544-28545		ExtInd65:96 Bit 0: ExtInd65 ... Bit 32: ExtInd96	0x00000000-0xFFFFFFFF Bit Value: 0=OFF, 1=ON		UINT32	R	Bitmap
28608-28609		ExtInd97:128 Bit 0: ExtInd97 ... Bit 32: ExtInd128	0x00000000-0xFFFFFFFF Bit Value: 0=OFF, 1=ON		UINT32	R	Bitmap
	0x8200	ExtInd1	0/1		UINT32	TRG	
	0x8201	ExtInd2	0/1		UINT32	TRG	

Address	Point ID	Description	Options/Range <sup>3</sup>	Units <sup>3</sup>	Type	R/W	Notes
	...	...					
	0x827F	ExtInd128	0/1		UINT32	TRG	
		<b>Switch Position Indication</b>					
29440-29471	0x8A00	Switch position (Pos)	00=intermediate-state, 01=OFF, 10=ON, 11=bad-state		UINT32	R	
+0,1	0x8A00	XCBR1_Pos	00/01/10/11			TRG	
+2,3	0x8A01	XCBR2_Pos	00/01/10/11			TRG	
+4,5	0x8A02	XSWI1_Pos	00/01/10/11			TRG	
	...	...					
+30,31	0x8A0F	XSWI14_Pos	00/01/10/11			TRG	
		<b>Switch Operation-Open Indication</b>					
29568-29569	0x8B00	Operation Open activation status (OpOpn): Bit 0: XCBR1_OpOpn Bit 1: XCBR2_OpOpn Bit 2: XSWI1_OpOpn ... Bit 15: XSWI14_OpOpn	0x00000000 - 0x0000FFFF Bit value: 0=not active, 1=activated		UINT32	R	Bitmap
	0x8B00	XCBR1_OpOpn	0/1			TRG	
	0x8B01	XCBR2_OpOpn	0/1			TRG	
	0x8B02	XSWI1_OpOpn	0/1			TRG	
	...	...					
	0x8B0F	XSWI14_OpOpn	0/1			TRG	
		<b>Switch Operation-Close Indication</b>					
29632-29633	0x8B80	Operation Close activation status (OpCls): Bit 0: XCBR1_OpCls Bit 1: XCBR2_OpCls Bit 2: XSWI1_OpCls ... Bit 15: XSWI14_OpCls	0x00000000 - 0x0000FFFF Bit value: 0=not active, 1=activated		UINT32	R	Bitmap
	0x8B80	XCBR1_OpCls	0/1			TRG	
	0x8B81	XCBR2_OpCls	0/1			TRG	
	0x8B82	XSWI1_OpCls	0/1			TRG	
	...	...				TRG	
	0x8B8F	XSWI14_OpCls	0/1				
29696-29727		<b>Switch Operation Counters (resettable)</b>					
+0,1	0x8C00	XCBR1_OpCnt	0-9999		UINT32	R/W	
+2,3	0x8C01	XCBR2_OpCnt	0-9999		UINT32	R/W	
+4,5	0x8C02	XSWI1_OpCnt	0-9999		UINT32	R/W	
	...	...					
+30,31	0x8C0F	XSWI14_OpCnt	0-9999		UINT32	R/W	
		<b>Generic TOU Energy Registers</b>					Point references
	0x7000	Tariff #1 register	-999,999,999-999,999,999	1 kWh	UINT32		
	0x7001	Tariff #2 register	-999,999,999-999,999,999	1 kWh	UINT32		

Address	Point ID	Description	Options/Range <sup>3</sup>	Units <sup>3</sup>	Type	R/W	Notes
		...					
	0x700F	Tariff #16 register	-999,999,999-999,999,999	1 kWh	UINT32		
		<b>Generic TOU Maximum Demand Registers</b>					Point references
	0x7100	Tariff #1 register	0-Pmax	U3	UINT32		
	0x7101	Tariff #2 register	0-Pmax	U3	UINT32		
		...					
	0x710F	Tariff #16 register	0-Pmax	U3	UINT32		
		<b>Generic Data</b>					Point references
	0x7400	V1 voltage	0-Vmax	U1	UINT32		1
	0x7401	V2 voltage	0-Vmax	U1	UINT32		1
	0x7402	V3 voltage	0-Vmax	U1	UINT32		1
	0x7403	V4 voltage	0-V4max	U4	UINT32		
	0x7404	V12 voltage	0-Vmax	U1	UINT32		
	0x7405	V23 voltage	0-Vmax	U1	UINT32		
	0x7406	V31 voltage	0-Vmax	U1	UINT32		
	0x7407	I1 current	0-Imax	U2	UINT32		
	0x7408	I2 current	0-Imax	U2	UINT32		
	0x7409	I3 current	0-Imax	U2	UINT32		
	0x740A	I4 current	0-I4max	U2	UINT32		
	0x740B	In current	0-Imax	U2	UINT32		
	0x740C	I1x current	0-Ixmax	U2	UINT32		
	0x740D	I2x current	0-Ixmax	U2	UINT32		
	0x740E	I3x current	0-Ixmax	U2	UINT32		
	0x740F	I4x current	0-I4xmax	U2	UINT32		
	0x7410	Inx current	0-Ixmax	U2	UINT32		
	0x7411	Zero-sequence voltage	0-Vmax	U1	UINT32		
	0x7412	Zero-sequence current	0-Imax	U2	UINT32		
	0x7413	Ix Zero-sequence current	0-Ixmax	U2	UINT32		
	0x7414	Voltage unbalance	0-3000	×0.1%	UINT32		
	0x7415	Current unbalance	0-3000	×0.1%	UINT32		
	0x7416	Ix current unbalance	0-3000	×0.1%	UINT32		
	0x7417	DC voltage	0-999900	×0.01V	UINT32		
	0x7418	Frequency	0-10000	×0.01Hz	UINT32		
	0x7419	V1 THD	0-9999	×0.1%	UINT32		2
	0x741A	V2 THD	0-9999	×0.1%	UINT32		2
	0x741B	V3 THD	0-9999	×0.1%	UINT32		2
	0x741C	V4 THD	0-9999	×0.1%	UINT32		
	0x741D	I1 THD	0-9999	×0.1%	UINT32		
	0x741E	I2 THD	0-9999	×0.1%	UINT32		
	0x741F	I3 THD	0-9999	×0.1%	UINT32		
	0x7420	I4 THD	0-9999	×0.1%	UINT32		
	0x7421	Not used	0		UINT32		

Address	Point ID	Description	Options/Range <sup>3</sup>	Units <sup>3</sup>	Type	R/W	Notes
	0x7422	Not used	0		UINT32		
	0x7423	Not used	0		UINT32		
	0x7425	Not used	0		UINT32		
	0x7426	Not used	0		UINT32		
	0x7427	Not used	0		UINT32		
	0x7428	Not used	0		UINT32		
	0x7429	I1 TDD	0-1000	×0.1%	UINT32		
	0x742A	I2 TDD	0-1000	×0.1%	UINT32		
	0x742B	I3 TDD	0-1000	×0.1%	UINT32		
	0x742C	I4 TDD	0-1000	×0.1%	UINT32		
	0x742D	I1 K-Factor	10-9999	×0.1	UINT32		
	0x742E	I2 K-Factor	10-9999	×0.1	UINT32		
	0x742F	I3 K-Factor	10-9999	×0.1	UINT32		
	0x7430	I4 K-Factor	10-9999	×0.1	UINT32		
	0x7431	V1 Crest Factor	0-10000	×0.01	UINT32		2
	0x7432	V2 Crest Factor	0-10000	×0.01	UINT32		2
	0x7433	V3 Crest Factor	0-10000	×0.01	UINT32		2
	0x7434	V4 Crest Factor	0-10000	×0.01	UINT32		
	0x7435	I1 Crest Factor	0-10000	×0.01	UINT32		
	0x7436	I2 Crest Factor	0-10000	×0.01	UINT32		
	0x7437	I3 Crest Factor	0-10000	×0.01	UINT32		
	0x7438	I4 Crest Factor	0-10000	×0.01	UINT32		
	0x750A	Positive-sequence voltage	0-Vmax	U1	UINT32		2
	0x750B	Negative-sequence voltage	0-Vmax	U1	UINT32		2
	0x750C	Zero-sequence voltage	0-Vmax	U1	UINT32		2
	0x750D	Negative-sequence voltage unbalance	0-3000	×0.1%	UINT32		2
	0x750E	Zero-sequence voltage unbalance	0-3000	×0.1%	UINT32		2
	0x1900	V1 H01 Harmonic voltage, %Un	0-10000	×0.01%	UINT32		2
	0x1901	V1 H02 Harmonic voltage, %Un	0-10000	×0.01%	UINT32		2
		...					
	0x1931	V1 H50 Harmonic voltage, %Un	0-10000	×0.01%	UINT32		2
	0x1A00	V2 H01 Harmonic voltage, %Un	0-10000	×0.01%	UINT32		2
	0x1A01	V2 H02 Harmonic voltage, %Un	0-10000	×0.01%	UINT32		2
		...					
	0x1A31	V2 H50 Harmonic voltage, %Un	0-10000	×0.01%	UINT32		2
	0x1B00	V3 H01 Harmonic voltage, %Un	0-10000	×0.01%	UINT32		2
	0x1B01	V3 H02 Harmonic voltage, %Un	0-10000	×0.01%	UINT32		2
		...					
	0x1B31	V3 H50 Harmonic voltage, %Un	0-10000	×0.01%	UINT32		2
	0x2980	V1 Pst	0-10000	×0.01	UINT32		2
	0x2981	V2 Pst	0-10000	×0.01	UINT32		2
	0x2982	V3 Pst	0-10000	×0.01	UINT32		2

Address	Point ID	Description	Options/Range <sup>3</sup>	Units <sup>3</sup>	Type	R/W	Notes
	0x2983	V1 PIt	0-10000	×0.01	UINT32		2
	0x2984	V2 PIt	0-10000	×0.01	UINT32		2
	0x2985	V3 PIt	0-10000	×0.01	UINT32		2
	0xC481	Voltage change on phase A/AB, %Un		0.01%	UINT32		
	0xC486	Voltage change on phase B/BC, %Un		0.01%	UINT32		
	0xC48B	Voltage change on phase C/CA, %Un		0.01%	UINT32		

**NOTES:**

- <sup>1</sup> When the 4LN3, 4LL3, 3LN3, 3LL3, 3BLN3 or 3BLL3 wiring mode is selected, the voltages will be line-to-neutral; for any other wiring mode, they will be line-to-line.
- <sup>2</sup> When the 4LN3, 3LN3 or 3BLN3 wiring mode is selected, the voltages will be line-to-neutral; for any other wiring mode, they will be line-to-line voltages.
- <sup>3</sup> For volts, amps, power and frequency scales and units, refer to Section 4 "Data Scales and Units".
- <sup>4</sup> On a 16-cycle interval.
- <sup>5</sup> On a 3-s interval.
- <sup>6</sup> Digital input registers return the state of the level-sensitive digital inputs in a 32-bit packed format beginning from the nearest lower point number divisible by 32. For example, registers 12544-12545 and 12548-12549 report the same 32-bit value that contains the state of digital inputs DI1:DI32. Bits that reference non-existent points will contain zeros.
- <sup>7</sup> Pulse input registers contain the transition status of the edge sensitive digital inputs. A bit value is set to '1' if a pulse edge (either rising, falling, or any of them depending on the input polarity setting) has been detected on the input. Pulse inputs cannot be directly read but can be tested through the setpoints and/or linked to the pulse counters and Billing/TOU registers.



### 3.5 Minimum/Maximum Log Registers

Address	Point ID	Description	Options/Range/Format <sup>3</sup>	Units <sup>3</sup>	Type	R/W	Notes
35840-35983		<b>Minimum Phase Values</b>					
+0, 1 +2, 3	0x2C00	Min. V1 voltage Timestamp	0-Vmax F1	U1 sec	UINT32 UINT32	R R	1
+4, 5 +6, 7	0x2C01	Min. V2 voltage Timestamp	0-Vmax F1	U1 sec	UINT32 UINT32	R R	1
+8, 9 +10, 11	0x2C02	Min. V3 voltage Timestamp	0-Vmax F1	U1 sec	UINT32 UINT32	R R	1
+12, 13 +14, 15	0x2C03	Min. I1 current Timestamp	0-Imax F1	U2 sec	UINT32 UINT32	R R	
+16, 17 +18, 19	0x2C04	Min. I2 current Timestamp	0-Imax	U2 sec	UINT32 UINT32	R R	
+20, 21 +22, 23	0x2C05	Min. I3 current Timestamp	0-Imax	U2 sec	UINT32 UINT32	R R	
+24, 25 +26, 27	0x2C06	Min. kW L1 Timestamp	-Pmax-Pmax	U3 sec	INT32 INT32	R R	
+28, 29 +30, 31	0x2C07	Min. kW L2 Timestamp	-Pmax-Pmax	U3 sec	INT32 INT32	R R	
+32, 33 +34, 35	0x2C08	Min. kW L3 Timestamp	-Pmax-Pmax	U3 sec	INT32 INT32	R R	
+36, 37 +38, 39	0x2C09	Min. kvar L1 Timestamp	-Pmax-Pmax	U3 sec	INT32 INT32	R R	
+40, 41 +42, 43	0x2C0A	Min. kvar L2 Timestamp	-Pmax-Pmax	U3 sec	INT32 INT32	R R	
+44, 45 +46, 47	0x2C0B	Min. kvar L3 Timestamp	-Pmax-Pmax	U3 sec	INT32 INT32	R R	
+48, 49 +50, 51	0x2C0C	Min. kVA L1 Timestamp	0-Pmax	U3 sec	UINT32 UINT32	R R	
+52, 53 +54, 55	0x2C0D	Min. kVA L2 Timestamp	0-Pmax	U3 sec	UINT32 UINT32	R R	
+56, 57 +58, 59	0x2C0E	Min. kVA L3 Timestamp	0-Pmax	U3 sec	UINT32 UINT32	R R	
+60, 61 +62, 63	0x2C0F	Min. Power factor L1 Timestamp	0-1000	×0.001 sec	UINT32 UINT32	R R	Absolute value
+64, 65 +66, 67	0x2C10	Min. Power factor L2 Timestamp	0-1000	×0.001 sec	UINT32 UINT32	R R	Absolute value
+68, 69 +70, 71	0x2C11	Min. Power factor L3 Timestamp	0-1000	×0.001 sec	UINT32 UINT32	R R	Absolute value
+72, 73 +74, 75	0x2C12	Min. V1 voltage THD Timestamp	0-9999	×0.1% sec	UINT32 UINT32	R R	2, 4
+76, 77	0x2C13	Min. V2 voltage THD	0-9999	×0.1%	UINT32	R	2, 4

Address	Point ID	Description	Options/Range/Format <sup>3</sup>	Units <sup>3</sup>	Type	R/W	Notes
+78, 79		Timestamp		sec	UINT32	R	
+80, 81	0x2C14	Min. V3 voltage THD	0-9999	×0.1%	UINT32	R	2, 4
+82, 83		Timestamp		sec	UINT32	R	
+84, 85	0x2C15	Min. I1 current THD	0-9999	×0.1%	UINT32	R	4
+86, 87		Timestamp		sec	UINT32	R	
+88, 89	0x2C16	Min. I2 current THD	0-9999	×0.1%	UINT32	R	4
+90, 91		Timestamp		sec	UINT32	R	
+92, 93	0x2C17	Min. I3 current THD	0-9999	×0.1%	UINT32	R	4
+94, 95		Timestamp		sec	UINT32	R	
+96, 97	0x2C18	Min. I1 K-Factor	10-9999	×0.1	UINT32	R	4
+98, 99		Timestamp		sec	UINT32	R	
+100, 101	0x2C19	Min. I2 K-Factor	10-9999	×0.1	UINT32	R	4
+102, 103		Timestamp		sec	UINT32	R	
+104, 105	0x2C1A	Min. I3 K-Factor	10-9999	×0.1	UINT32	R	4
+106, 107		Timestamp		sec	UINT32	R	
+108, 109	0x2C1B	Min. I1 current TDD	0-1000	×0.1%	UINT32	R	4
+110, 111		Timestamp		sec	UINT32	R	
+112, 113	0x2C1C	Min. I2 current TDD	0-1000	×0.1%	UINT32	R	4
+114, 115		Timestamp		sec	UINT32	R	
+116, 117	0x2C1D	Min. I3 current TDD	0-1000	×0.1%	UINT32	R	4
+118, 119		Timestamp		sec	UINT32	R	
+120, 121	0x2C1E	Min. V12 voltage	0-Vmax	U1	UINT32	R	
+122, 123		Timestamp		sec	UINT32	R	
+124, 125	0x2C1F	Min. V23 voltage	0-Vmax	U1	UINT32	R	
+126, 127		Timestamp		sec	UINT32	R	
+128, 129	0x2C20	Min. V31 voltage	0-Vmax	U1	UINT32	R	
+130, 131		Timestamp		sec	UINT32	R	
+132, 133	0x2C21	Min. I1x current	0-Ixmax	U2	UINT32	R	
+134, 135		Timestamp		sec	UINT32	R	
+136, 137	0x2C22	Min. I2x current	0-Ixmax	U2	UINT32	R	
+138, 139		Timestamp		sec	UINT32	R	
+140, 141	0x2C23	Min. I3x current	0-Ixmax	U2	UINT32	R	
+142, 143		Timestamp		sec	UINT32	R	
36096-36119		<b>Minimum Total Values</b>					
+0, 1	0x2D00	Min. Total kW	-Pmax-Pmax	U3	INT32	R	
+2, 3		Timestamp		sec	UINT32	R	
+4, 5	0x2D01	Min. Total kvar	-Pmax-Pmax	U3	INT32	R	
+6, 7		Timestamp		sec	UINT32	R	
+8, 9	0x2D02	Min. Total kVA	0-Pmax	U3	UINT32	R	
+10, 11		Timestamp		sec	UINT32	R	
+12, 13	0x2D03	Min. Total PF	-1000-1000	×0.001	INT32	R	
+14, 15		Timestamp		sec	UINT32	R	
+16, 17	0x2D04	Min. Total PF lag	0-1000	×0.001	UINT32	R	
+18, 19		Timestamp		sec	UINT32	R	

Address	Point ID	Description	Options/Range/Format <sup>3</sup>	Units <sup>3</sup>	Type	R/W	Notes
+20, 21 +22, 23	0x2D05	Min. Total PF lead Timestamp	0-1000	×0.001 sec	UINT32 UINT32	R R	
36224-36287		<b>Minimum Analog Inputs</b>					
+0, 1 +2, 3	0x2E80	Min. analog input AI1 Timestamp	AI1min-AI1max		INT32 UINT32	R R	
+4, 5 +6, 7	0x2E81	Min. analog input AI2 Timestamp	AI2min-AI2max		INT32 UINT32	R R	
		...					
+60, 61 +62, 63	0x2E8F	Min. analog input AI16 Timestamp	AI16min-AI16max		INT32 UINT32	R R	
36352-36395		<b>Minimum Auxiliary Values</b>					
+0, 1 +2, 3	0x2E00	Min. I4 current Timestamp	0-I <sub>max</sub>	U2 sec	UINT32 UINT32	R R	
+4, 5 +6, 7	0x2E01	Min. In current Timestamp	0-I <sub>max</sub>	U2 sec	UINT32 UINT32	R R	
+8, 9 +10, 11	0x2E02	Min. Frequency Timestamp	0-10000	×0.01Hz sec	UINT32 UINT32	R R	
+12, 13 +14, 15	0x2E03	Min. Voltage unbalance Timestamp	0-3000	×0.1% sec	UINT32 UINT32	R R	
+16, 17 +18, 19	0x2E04	Min. Current unbalance Timestamp	0-3000	×0.1% sec	UINT32 UINT32	R R	
+20, 21 +22, 23	0x2E05	Min. DC voltage Timestamp	0-999900	×0.01V sec	UINT32 UINT32	R R	
+24, 25 +26, 27	0x2E06	Min. V4 voltage Timestamp	0-V4 <sub>max</sub>	U4 sec	UINT32 UINT32	R R	
+28, 29 +30, 31	0x2E07	Min. I4x current Timestamp	0-I <sub>xmax</sub>	U2 sec	UINT32 UINT32	R R	
+32, 33 +34, 35	0x2E08	Min. V4 THD Timestamp	0-9999	×0.1% sec	UINT32 UINT32	R R	<sup>4</sup>
+36, 37 +38, 39	0x2E09	Min. I4x THD Timestamp	0-9999	×0.1% sec	UINT32 UINT32	R R	<sup>4</sup>
+40, 41 +42, 43	0x2E0A	Min. I4x TDD Timestamp	0-1000	×0.1% sec	UINT32 UINT32	R R	<sup>4</sup>
36608-36671		<b>Programmable Min/Max Minimum Values</b>					
+0, 1 +2, 3	0x3000	Min. Min/Max Register #1 Timestamp			UINT32 UINT32	R R	
+4, 5 +6, 7	0x3001	Min. Min/Max Register #2 Timestamp			UINT32 UINT32	R R	
		...					
+60, 61 +62, 63	0x300F	Min. Min/Max Register #16 Timestamp			UINT32 UINT32	R R	
36736-36799		<b>Maximum Analog Inputs</b>					
+0, 1 +2, 3	0x3680	Max. analog input AI1 Timestamp	AI1min-AI1max		INT32 UINT32	R R	

Address	Point ID	Description	Options/Range/Format <sup>3</sup>	Units <sup>3</sup>	Type	R/W	Notes
+4, 5 +6, 7	0x3681	Max. analog input AI2 Timestamp	AI2min-AI2max		INT32 UINT32	R R	
		...					
+60, 61 +62, 63	0x368F	Max. analog input AI16 Timestamp	AI16min-AI16max		INT32 UINT32	R R	
36864-37007		<b>Maximum Phase Values</b>					
+0, 1 +2, 3	0x3400	Max. V1 voltage Timestamp	0-Vmax	U1 sec	UINT32 UINT32	R R	1
+4, 5 +6, 7	0x3401	Max. V2 voltage Timestamp	0-Vmax	U1 sec	UINT32 UINT32	R R	1
+8, 9 +10, 11	0x3402	Max. V3 voltage Timestamp	0-Vmax	U1 sec	UINT32 UINT32	R R	1
+12, 13 +14, 15	0x3403	Max. I1 current Timestamp	0-Imax	U2 sec	UINT32 UINT32	R R	
+16, 17 +18, 19	0x3404	Max. I2 current Timestamp	0-Imax	U2 sec	UINT32 UINT32	R R	
+20, 21 +22, 23	0x3405	Max. I3 current Timestamp	0-Imax	U2 sec	UINT32 UINT32	R R	
+24, 25 +26, 27	0x3406	Max. kW L1 Timestamp	-Pmax-Pmax	U3 sec	INT32 INT32	R R	
+28, 29 +30, 31	0x3407	Max. kW L2 Timestamp	-Pmax-Pmax	U3 sec	INT32 INT32	R R	
+32, 33 +34, 35	0x3408	Max. kW L3 Timestamp	-Pmax-Pmax	U3 sec	INT32 INT32	R R	
+36, 37 +38, 39	0x3409	Max. kvar L1 Timestamp	-Pmax-Pmax	U3 sec	INT32 INT32	R R	
+40, 41 +42, 43	0x340A	Max. kvar L2 Timestamp	-Pmax-Pmax	U3 sec	INT32 INT32	R R	
+44, 45 +46, 47	0x340B	Max. kvar L3 Timestamp	-Pmax-Pmax	U3 sec	INT32 INT32	R R	
+48, 49 +50, 51	0x340C	Max. kVA L1 Timestamp	0-Pmax	U3 sec	UINT32 UINT32	R R	
+52, 53 +54, 55	0x340D	Max. kVA L2 Timestamp	0-Pmax	U3 sec	UINT32 UINT32	R R	
+56, 57 +58, 59	0x340E	Max. kVA L3 Timestamp	0-Pmax	U3 sec	UINT32 UINT32	R R	
+60, 61 +62, 63	0x340F	Max. Power factor L1 Timestamp	0-1000	×0.001 sec	UINT32 UINT32	R R	Absolute value
+64, 65 +66, 67	0x3410	Max. Power factor L2 Timestamp	0-1000	×0.001 sec	UINT32 UINT32	R R	Absolute value
+68, 69 +70, 71	0x3411	Max. Power factor L3 Timestamp	0-1000	×0.001 sec	UINT32 UINT32	R R	Absolute value
+72, 73 +74, 75	0x3412	Max. V1 voltage THD Timestamp	0-9999	×0.1% sec	UINT32 UINT32	R R	2, 4

Address	Point ID	Description	Options/Range/Format <sup>3</sup>	Units <sup>3</sup>	Type	R/W	Notes
+76, 77 +78, 79	0x3413	Max. V2 voltage THD Timestamp	0-9999	×0.1% sec	UINT32 UINT32	R R	2, 4
+80, 81 +82, 83	0x3414	Max. V3 voltage THD Timestamp	0-9999	×0.1% sec	UINT32 UINT32	R R	2, 4
+84, 85 +86, 87	0x3415	Max. I1 current THD Timestamp	0-9999	×0.1% sec	UINT32 UINT32	R R	4
+88, 89 +90, 91	0x3416	Max. I2 current THD Timestamp	0-9999	×0.1% sec	UINT32 UINT32	R R	4
+92, 93 +94, 95	0x3417	Max. I3 current THD Timestamp	0-9999	×0.1% sec	UINT32 UINT32	R R	4
+96, 97 +98, 99	0x3418	Max. I1 K-Factor Timestamp	10-9999	×0.1 sec	UINT32 UINT32	R R	4
+100, 101 +102, 103	0x3419	Max. I2 K-Factor Timestamp	10-9999	×0.1 sec	UINT32 UINT32	R R	4
+104, 105 +106, 107	0x341A	Max. I3 K-Factor Timestamp	10-9999	×0.1 sec	UINT32 UINT32	R R	4
+108, 109 +110, 111	0x341B	Max. I1 current TDD Timestamp	0-1000	×0.1% sec	UINT32 UINT32	R R	4
+112, 113 +114, 115	0x341C	Max. I2 current TDD Timestamp	0-1000	×0.1% sec	UINT32 UINT32	R R	4
+116, 117 +118, 119	0x341D	Max. I3 current TDD Timestamp	0-1000	×0.1% sec	UINT32 UINT32	R R	4
+120, 121 +122, 123	0x341E	Max. V12 voltage Timestamp	0-Vmax	U1 sec	UINT32 UINT32	R R	
+124, 125 +126, 127	0x341F	Max. V23 voltage Timestamp	0-Vmax	U1 sec	UINT32 UINT32	R R	
+128, 129 +130, 131	0x3420	Max. V31 voltage Timestamp	0-Vmax	U1 sec	UINT32 UINT32	R R	
+132, 133 +134, 135	0x3421	Max. I1x current Timestamp	0-Ixmax	U2 sec	UINT32 UINT32	R R	
+136, 137 +138, 139	0x3422	Max. I2x current Timestamp	0-Ixmax	U2 sec	UINT32 UINT32	R R	
+140, 141 +142, 143	0x3423	Max. I3x current Timestamp	0-Ixmax	U2 sec	UINT32 UINT32	R R	
37120-37143		<b>Maximum Total Values</b>					
+0, 1 +2, 3	0x3500	Max. Total kW Timestamp	-Pmax-Pmax	U3 sec	INT32 UINT32	R R	
+4, 5 +6, 7	0x3501	Max. Total kvar Timestamp	-Pmax-Pmax	U3 sec	INT32 UINT32	R R	
+8, 9 +10, 11	0x3502	Max. Total kVA Timestamp	0-Pmax	U3 sec	UINT32 UINT32	R R	
+12, 13 +14, 15	0x3503	Max. Total PF Timestamp	-1000-1000	×0.001 sec	INT32 UINT32	R R	
+16, 17	0x3504	Max. Total PF lag	0-1000	×0.001	UINT32	R	

Address	Point ID	Description	Options/Range/Format <sup>3</sup>	Units <sup>3</sup>	Type	R/W	Notes
+18, 19		Timestamp		sec	UINT32	R	
+20, 21 +22, 23	0x3505	Max. Total PF lead Timestamp	0-1000	×0.001 sec	UINT32 UINT32	R R	
37248-37375		<b>Maximum Analog Input Demands</b>					
+0, 1 +2, 3	0x3900	Max. analog input demand AI1+ Timestamp	AI1min-AI1max		UINT32 UINT32	R R	Positive AI readings demand
+4, 5 +6, 7	0x3901	Max. analog input demand AI2+ Timestamp	AI2min-AI2max		UINT32 UINT32	R R	
		...					
+60, 61 +62, 63	0x390F	Max. analog input demand AI16+ Timestamp	AI16min-AI16max		UINT32 UINT32	R R	
+64, 65 +66, 67	0x3910	Max. analog input demand AI1- Timestamp	AI1min-AI1max		UINT32 UINT32	R R	Negative AI readings demand
+68, 69 +70, 71	0x3911	Max. analog input demand AI2- Timestamp	AI2min-AI2max		UINT32 UINT32	R R	
		...					
+124, 125 +126, 127	0x391F	Max. analog input demand AI16- Timestamp	AI16min-AI16max		UINT32 UINT32	R R	
37376-37419		<b>Maximum Auxiliary Values</b>					
+0, 1 +2, 3	0x3600	Max. I4 current Timestamp	0-I <sub>max</sub>	U2 sec	UINT32 UINT32	R R	
+4, 5 +6, 7	0x3601	Max. In current Timestamp	0-I <sub>max</sub>	U2 sec	UINT32 UINT32	R R	
+8, 9 +10, 11	0x3602	Max. Frequency Timestamp	0-10000	×0.01Hz sec	UINT32 UINT32	R R	
+12, 13 +14, 15	0x3603	Max. Voltage unbalance Timestamp	0-3000	×0.1% sec	UINT32 UINT32	R R	
+16, 17 +18, 19	0x3604	Max. Current unbalance Timestamp	0-3000	×0.1% sec	UINT32 UINT32	R R	
+20, 21 +22, 23	0x3605	Max. DC voltage Timestamp	0-999900	×0.01V sec	UINT32 UINT32	R R	
+24, 25 +26, 27	0x3606	Max. V4 voltage Timestamp	0-V4max	U4 sec	UINT32 UINT32	R R	
+28, 29 +30, 31	0x3607	Max. I4x current Timestamp	0-I <sub>xmax</sub>	U2 sec	UINT32 UINT32	R R	
+32, 33 +34, 35	0x3608	Max. V4 THD Timestamp	0-9999	×0.1% sec	UINT32 UINT32	R R	<sup>4</sup>
+36, 37 +38, 39	0x3609	Max. I4x THD Timestamp	0-9999	×0.1% sec	UINT32 UINT32	R R	<sup>4</sup>
+40, 41 +42, 43	0x360A	Max. I4x TDD Timestamp	0-1000	×0.1% sec	UINT32 UINT32	R R	<sup>4</sup>
37504-37567		<b>Billing Summary Maximum Demands</b>					
+0, 1 +2, 3	0x4780	Summary register #1 Maximum Demand Timestamp	0-P <sub>max</sub>	U3	UINT32	R	

Address	Point ID	Description	Options/Range/Format <sup>3</sup>	Units <sup>3</sup>	Type	R/W	Notes
+4, 5 +6, 7	0x4781	Summary register #2 Maximum Demand Timestamp	0-Pmax	U3	UINT32	R	
		...					
+60, 61 +62, 63	0x4783	Summary register #16 Maximum Demand Timestamp	0-Pmax	U3	UINT32	R	
37632-37719		<b>Maximum Demands</b>					
+0, 1 +2, 3	0x3700	V1 Maximum volt demand Timestamp	0-Vmax	U1 sec	UINT32 UINT32	R R	2
+4, 5 +6, 7	0x3701	V2 Maximum volt demand Timestamp	0-Vmax	U1 sec	UINT32 UINT32	R R	2
+8, 9 +10, 11	0x3702	V3 Maximum volt demand Timestamp	0-Vmax	U1 sec	UINT32 UINT32	R R	2
+12, 13 +14, 15	0x3703	I1 Maximum ampere demand Timestamp	0-Imax	U2 sec	UINT32 UINT32	R R	
+16, 17 +18, 19	0x3704	I2 Maximum ampere demand Timestamp	0-Imax	U2 sec	UINT32 UINT32	R R	
+20, 21 +22, 23	0x3705	I3 Maximum ampere demand Timestamp	0-Imax	U2 sec	UINT32 UINT32	R R	
+24, 25 +26, 27	0x3706	Not used Timestamp	0		UINT32 UINT32	R R	
+28, 29 +30, 31	0x3707	Not used Timestamp	0		UINT32 UINT32	R R	
+32, 33 +34, 35	0x3708	Not used Timestamp	0		UINT32 UINT32	R R	
+36, 37 +38, 39	0x3709	Maximum kW import sliding window demand Timestamp	0-Pmax	U3 sec	UINT32 UINT32	R R	
+40, 41 +42, 43	0x370A	Maximum kvar import sliding window demand Timestamp	0-Pmax	U3 sec	UINT32 UINT32	R R	
+44, 45 +46, 47	0x370B	Maximum kVA sliding window demand Timestamp	0-Pmax	U3 sec	UINT32 UINT32	R R	
+48, 49 +50, 51	0x3737	Not used Timestamp	0		UINT32 UINT32	R R	
+52, 53 +54, 55	0x370D	Not used Timestamp	0		UINT32 UINT32	R R	
+56, 57 +58, 59	0x370E	Not used Timestamp	0		UINT32 UINT32	R R	
+60, 61 +62, 63	0x370F	Maximum kW export sliding window demand Timestamp	0-Pmax	U3 sec	UINT32 UINT32	R R	
+64, 65 +66, 67	0x3710	Maximum kvar export sliding window demand Timestamp	0-Pmax	U3 sec	UINT32 UINT32	R R	
+68, 69 +70, 71	0x3737	Not used Timestamp	0		UINT32 UINT32	R R	
+72, 73 +74, 75	0x3712	Not used Timestamp	0		UINT32 UINT32	R R	

Address	Point ID	Description	Options/Range/Format <sup>3</sup>	Units <sup>3</sup>	Type	R/W	Notes
+76, 77 +78, 79	0x3713	V4 Maximum volt demand Timestamp	0-Vmax	U4 sec	UINT32 UINT32	R R	
+80, 81 +82, 83	0x3714	I4 Maximum ampere demand Timestamp	0-I4max	U2 sec	UINT32 UINT32	R R	
+84, 85 +86, 87	0x3715	In Maximum ampere demand Timestamp	0-Imax	U2 sec	UINT32 UINT32	R R	
37888-37951		<b>Programmable Min/Max Maximum Values</b>					
+0, 1 +2, 3	0x3800	Max. Min/Max Register #1 Timestamp			UINT32 UINT32	R R	
+4, 5 +6, 7	0x3801	Max. Min/Max Register #2 Timestamp			UINT32 UINT32	R R	
		...					
+60, 61 +62, 63	0x380F	Max. Min/Max Register #16 Timestamp			UINT32 UINT32	R R	
38016-38063		<b>Maximum Harmonic Demands</b>					
+0, 1 +2, 3	0x3880	V1 THD demand Timestamp	0-9999	×0.1% sec	UINT32 UINT32	R R	<sup>2</sup>
+4, 5 +6, 7	0x3881	V2 THD demand Timestamp	0-9999	×0.1% sec	UINT32 UINT32	R R	<sup>2</sup>
+8, 9 +10, 11	0x3882	V3 THD demand Timestamp	0-9999	×0.1% sec	UINT32 UINT32	R R	<sup>2</sup>
+12, 13 +14, 15	0x3883	V4 THD demand Timestamp	0-9999	×0.1% sec	UINT32 UINT32	R R	
+16, 17 +18, 19	0x3884	I1 THD demand Timestamp	0-9999	×0.1% sec	UINT32 UINT32	R R	
+20, 21 +22, 23	0x3885	I2 THD demand Timestamp	0-9999	×0.1% sec	UINT32 UINT32	R R	
+24, 25 +26, 27	0x3886	I3 THD demand Timestamp	0-9999	×0.1% sec	UINT32 UINT32	R R	
+28, 29 +30, 31	0x3887	I4 THD demand Timestamp	0-9999	×0.1% sec	UINT32 UINT32	R R	
+32, 33 +34, 35	0x3888	I1 TDD demand Timestamp	0-1000	×0.1% sec	UINT32 UINT32	R R	
+36, 37 +38, 39	0x3889	I2 TDD demand Timestamp	0-1000	×0.1% sec	UINT32 UINT32	R R	
+40, 41 +42, 43	0x388A	I3 TDD demand Timestamp	0-1000	×0.1% sec	UINT32 UINT32	R R	
+44, 45 +46, 47	0x388B	I4 TDD demand Timestamp	0-1000	×0.1% sec	UINT32 UINT32	R R	
38144-38207		<b>Billing TOU Maximum Demand Register #1</b>					
+0, 1 +2, 3	0x4800	Tariff #1 register Timestamp	0-Pmax	U3 sec	UINT32 UINT32	R R	
+4, 5 +6, 7	0x4801	Tariff #2 register	0-Pmax	U3 sec	UINT32 UINT32	R R	



Address	Point ID	Description	Options/Range/Format <sup>3</sup>	Units <sup>3</sup>	Type	R/W	Notes
		Timestamp					
		...				R	
+60, 61 +62, 63	0x480F	Tariff #16 register Timestamp	0-Pmax	U3 sec	UINT32 UINT32	R R	
38272-38335		<b>Billing TOU Maximum Demand Register #4</b>					
+0, 1 +2, 3	0x4880	Tariff #1 register Timestamp	0-Pmax	U3 sec	UINT32 UINT32	R R	
+4, 5 +6, 7	0x4881	Tariff #2 register Timestamp	0-Pmax	U3 sec	UINT32 UINT32	R R	
		...				R	
+60, 61 +62, 63	0x488F	Tariff #16 register Timestamp	0-Pmax	U3 sec	UINT32 UINT32	R R	
38400-38463		<b>Billing TOU Maximum Demand Register #2</b>					
+0, 1 +2, 3	0x4900	Tariff #1 register Timestamp	0-Pmax	U3 sec	UINT32 UINT32	R R	
+4, 5 +6, 7	0x4901	Tariff #2 register Timestamp	0-Pmax	U3 sec	UINT32 UINT32	R R	
		...				R	
+60, 61 +62, 63	0x490F	Tariff #16 register Timestamp	0-Pmax	U3 sec	UINT32 UINT32	R R	
38528-38591		<b>Billing TOU Maximum Demand Register #5</b>					
+0, 1 +2, 3	0x4980	Tariff #1 register Timestamp	0-Pmax	U3 sec	UINT32 UINT32	R R	
+4, 5 +6, 7	0x4981	Tariff #2 register Timestamp	0-Pmax	U3 sec	UINT32 UINT32	R R	
		...				R	
+60, 61 +62, 63	0x498F	Tariff #16 register Timestamp	0-Pmax	U3 sec	UINT32 UINT32	R R	
38656-38719		<b>Billing TOU Maximum Demand Register #3</b>					
+0, 1 +2, 3	0x4A00	Tariff #1 register Timestamp	0-Pmax	U3 sec	UINT32 UINT32	R R	
+4, 5 +6, 7	0x4A01	Tariff #2 register Timestamp	0-Pmax	U3 sec	UINT32 UINT32	R R	
		...				R	
+60, 61 +62, 63	0x4A0F	Tariff #16 register Timestamp	0-Pmax	U3 sec	UINT32 UINT32	R R	
38784-38847		<b>Billing TOU Maximum Demand Register #6</b>					
+0, 1 +2, 3	0x4A80	Tariff #1 register Timestamp	0-Pmax	U3 sec	UINT32 UINT32	R R	
+4, 5 +6, 7	0x4A81	Tariff #2 register Timestamp	0-Pmax	U3 sec	UINT32 UINT32	R R	
		...				R	

Address	Point ID	Description	Options/Range/Format <sup>3</sup>	Units <sup>3</sup>	Type	R/W	Notes
+60, 61 +62, 63	0x4A8F	Tariff #16 register Timestamp	0-Pmax	U3 sec	UINT32 UINT32	R R	
38912-38975		<b>Billing TOU Maximum Demand Register #7</b>					
+0, 1 +2, 3	0x5300	Tariff #1 register Timestamp	0-Pmax	U3 sec	UINT32 UINT32	R R	
+4, 5 +6, 7	0x5301	Tariff #2 register Timestamp	0-Pmax	U3 sec	UINT32 UINT32	R R	
		...				R	
+60, 61 +62, 63	0x530F	Tariff #16 register Timestamp	0-Pmax	U3 sec	UINT32 UINT32	R R	
39040-39103		<b>Billing TOU Maximum Demand Register #8</b>					
+0, 1 +2, 3	0x5380	Tariff #1 register Timestamp	0-Pmax	U3 sec	UINT32 UINT32	R R	
+4, 5 +6, 7	0x5381	Tariff #2 register Timestamp	0-Pmax	U3 sec	UINT32 UINT32	R R	
		...				R	
+60, 61 +62, 63	0x538F	Tariff #16 register Timestamp	0-Pmax	U3 sec	UINT32 UINT32	R R	
39168-39231		<b>Billing TOU Maximum Demand Register #9</b>					
+0, 1 +2, 3	0x5400	Tariff #1 register Timestamp	0-Pmax	U3 sec	UINT32 UINT32	R R	
+4, 5 +6, 7	0x5401	Tariff #2 register Timestamp	0-Pmax	U3 sec	UINT32 UINT32	R R	
		...				R	
+60, 61 +62, 63	0x540F	Tariff #16 register Timestamp	0-Pmax	U3 sec	UINT32 UINT32	R R	
39296-39359		<b>Billing TOU Maximum Demand Register #10</b>					
+0, 1 +2, 3	0x5480	Tariff #1 register Timestamp	0-Pmax	U3 sec	UINT32 UINT32	R R	
+4, 5 +6, 7	0x5481	Tariff #2 register Timestamp	0-Pmax	U3 sec	UINT32 UINT32	R R	
		...				R	
+60, 61 +62, 63	0x548F	Tariff #16 register Timestamp	0-Pmax	U3 sec	UINT32 UINT32	R R	
39424-39487		<b>Billing TOU Maximum Demand Register #11</b>					
+0, 1 +2, 3	0x5500	Tariff #1 register Timestamp	0-Pmax	U3 sec	UINT32 UINT32	R R	
+4, 5 +6, 7	0x5501	Tariff #2 register Timestamp	0-Pmax	U3 sec	UINT32 UINT32	R R	
		...				R	
+60, 61 +62, 63	0x550F	Tariff #16 register Timestamp	0-Pmax	U3 sec	UINT32 UINT32	R R	

Address	Point ID	Description	Options/Range/Format <sup>3</sup>	Units <sup>3</sup>	Type	R/W	Notes
39552-39615		<b>Billing TOU Maximum Demand Register #12</b>					
+0, 1 +2, 3	0x5580	Tariff #1 register Timestamp	0-Pmax	U3 sec	UINT32 UINT32	R R	
+4, 5 +6, 7	0x5581	Tariff #2 register Timestamp	0-Pmax	U3 sec	UINT32 UINT32	R R	
		...				R	
+60, 61 +62, 63	0x558F	Tariff #16 register Timestamp	0-Pmax	U3 sec	UINT32 UINT32	R R	
39680-39743		<b>Billing TOU Maximum Demand Register #13</b>					
+0, 1 +2, 3	0x5600	Tariff #1 register Timestamp	0-Pmax	U3 sec	UINT32 UINT32	R R	
+4, 5 +6, 7	0x5601	Tariff #2 register Timestamp	0-Pmax	U3 sec	UINT32 UINT32	R R	
		...				R	
+60, 61 +62, 63	0x560F	Tariff #16 register Timestamp	0-Pmax	U3 sec	UINT32 UINT32	R R	
39808-39871		<b>Billing TOU Maximum Demand Register #14</b>					
+0, 1 +2, 3	0x5680	Tariff #1 register Timestamp	0-Pmax	U3 sec	UINT32 UINT32	R R	
+4, 5 +6, 7	0x5681	Tariff #2 register Timestamp	0-Pmax	U3 sec	UINT32 UINT32	R R	
		...				R	
+60, 61 +62, 63	0x568F	Tariff #16 register Timestamp	0-Pmax	U3 sec	UINT32 UINT32	R R	
39936-39999		<b>Billing TOU Maximum Demand Register #15</b>					
+0, 1 +2, 3	0x5700	Tariff #1 register Timestamp	0-Pmax	U3 sec	UINT32 UINT32	R R	
+4, 5 +6, 7	0x5701	Tariff #2 register Timestamp	0-Pmax	U3 sec	UINT32 UINT32	R R	
		...				R	
+60, 61 +62, 63	0x570F	Tariff #16 register Timestamp	0-Pmax	U3 sec	UINT32 UINT32	R R	
40064-40127		<b>Billing TOU Maximum Demand Register #16</b>					
+0, 1 +2, 3	0x5780	Tariff #1 register Timestamp	0-Pmax	U3 sec	UINT32 UINT32	R R	
+4, 5 +6, 7	0x5781	Tariff #2 register Timestamp	0-Pmax	U3 sec	UINT32 UINT32	R R	
		...				R	
+60, 61 +62, 63	0x578F	Tariff #16 register Timestamp	0-Pmax	U3 sec	UINT32 UINT32	R R	

**NOTES:**

- <sup>1</sup> When the 4LN3, 4LL3, 3LN3, 3LL3, 3BLN3 or 3BLL3 wiring mode is selected, the voltages will be line-to-neutral; for any other wiring mode, they will be line-to-line.
- <sup>2</sup> When the 4LN3, 3LN3 or 3BLN3 wiring mode is selected, the voltages will be line-to-neutral; for any other wiring mode, they will be line-to-line voltages.
- <sup>3</sup> For volts, amps, power and frequency scales and units, refer to Section 4 "Data Scales and Units".
- <sup>4</sup> On a 16-cycle interval.

### 3.6 Device Control and Status Registers

Address	Point ID	Description	Options/Range	Units	Type	R/W	Notes
<b>Event Flags Registers (bit map)</b>							
44032-44033		Event flags 1-32 set register (0 = no effect, 1 = set)	0x00000000 - 0xFFFFFFFF		UINT32	W	Read as 0
44034-44035		Event flags 1-32 clear register (0=clear,1 = no effect)	0x00000000 - 0xFFFFFFFF		UINT32	W	Read as 0
44036-44037		Event flags 1-32 status (0 = cleared, 1 = set)	0x00000000 - 0xFFFFFFFF		UINT32	R	
44238-44241		Event flags 1-64 set register (0 = no effect, 1 = set)	0x00000000 - 0xFFFFFFFF 0x00000000 - 0xFFFFFFFF		UINT64	W	Read as 0
44242-44245		Reserved			UINT32		Read as 0
44246-44249		Event flags 1-64 clear register (0=clear, 1 = no effect)	0x00000000 - 0xFFFFFFFF 0x00000000 - 0xFFFFFFFF		UINT64	W	Read as 0
44250-44253		Reserved			UINT32		Read as 0
44254-44257		Event flags 1-64 status (0 = cleared, 1 = set)	0x00000000 - 0xFFFFFFFF 0x00000000 - 0xFFFFFFFF		UINT64	R	
44258-44261		Reserved			UINT32		Read as 0
<b>Remote Relay Control Registers (bit map)</b>							
44038-44045		Reserved			UINT32		
44046-44049		Force relay operate register: 0 = no effect, 1 = operate	0x00000000 - 0xFFFFFFFF 0x00000000 - 0xFFFFFFFF		UINT64	W	Read as 0
44050-44053		Force relay release register: 0 = no effect, 1 = release	0x00000000 - 0xFFFFFFFF 0x00000000 - 0xFFFFFFFF		UINT64	W	Read as 0
44054-44057		Locally latched relays status: 0 = unlatched, 1 = locally latched	0x00000000 - 0xFFFFFFFF 0x00000000 - 0xFFFFFFFF		UINT64	R	
44058-44061		Remote latched relays status: 0 = unlatched, 1 = remote latched	0x00000000 - 0xFFFFFFFF 0x00000000 - 0xFFFFFFFF		UINT64	R	
44062-44065		Direct relay control disable status: 0 = direct control enabled, 1 = direct control disabled	0x00000000 - 0xFFFFFFFF 0x00000000 - 0xFFFFFFFF		UINT64	R	Direct relay control is disabled if a relay is under local automation control
44066-44069		Relay status: 0 = open, 1 = closed	0x00000000 - 0xFFFFFFFF 0x00000000 - 0xFFFFFFFF		UINT64	R	
44070-44073		Latch relays mode: 0 = unlatched mode, 1 = latched mode	0x00000000 - 0xFFFFFFFF 0x00000000 - 0xFFFFFFFF		UINT64	R	
44074-44077		Pulse relays mode: 0 = not pulse mode, 1 = pulse mode	0x00000000 - 0xFFFFFFFF 0x00000000 - 0xFFFFFFFF		UINT32	R	
44078-44081		KYZ relays mode: 0 = not KYZ mode, 1 = KYZ mode	0x00000000 - 0xFFFFFFFF 0x00000000 - 0xFFFFFFFF		UINT64	R	
44082-44085		Relay polarity mode: 0 = normal mode, 1 = inverting mode	0x00000000 - 0xFFFFFFFF 0x00000000 - 0xFFFFFFFF		UINT64	R	
44086-44089		Relay blocking mode: 0 = normal mode, 1 = blocked mode	0x00000000 - 0xFFFFFFFF 0x00000000 - 0xFFFFFFFF		UINT64	R	
44090-44093		Blocked relay status: 0 = relay unblocked, 1 = relay blocked	0x00000000 - 0xFFFFFFFF 0x00000000 - 0xFFFFFFFF		UINT64	R	Relay control commands are ignored if a relay is blocked

Address	Point ID	Description	Options/Range	Units	Type	R/W	Notes
44094-44101		Reserved			UINT64		
<b>Reset/Clear Registers</b>							
44102		Clear energies	0		UINT16	W	
44103		Clear maximum demands	0 = clear all maximum demands 1 = clear power demands 2 = clear volt and ampere demands 3 = clear volt demands 4 = clear ampere demands 5 = clear harmonic demands		UINT16	W	
44104		Clear Billing/TOU energy registers	0		UINT16	W	
44105		Clear Billing/TOU maximum demands	0		UINT16	W	
44106		Clear counters	0 = clear all counters, 1-32 = clear counter #1-#32		UINT16	W	
44107		Clear Min/Max log	0		UINT16	W	
44108		Clear operation/event counters	0 = clear GOST 13109 statistics 6 = clear communication counters 7 = clear switch operation counters		UINT16	W	
44109-44133		Reserved			UINT16		
<b>Device Mode Control Registers</b>							
44134		Energy test mode	0 = disabled, 1 = enabled		UINT16		
44135		Controller/setpoints operation	0 = disabled, 1 = enabled		UINT16		
44136		PQ recorder	0 = disabled, 1 = enabled		UINT16		
44137		Fault recorder	0 = disabled, 1 = enabled		UINT16		
44138-44165		Reserved			UINT16		
<b>UDP Cross-trigger Register</b>							
44166		External trigger index	0-15		UINT16	W	
44167		Reserved			UINT16		
44168-44237		<b>Reserved</b>			UINT16		
<b>Memory Status Registers</b>							
44262-44263		Memory size, bytes			UINT32	R	
44264-44265		Free memory, bytes			UINT32	R	
44266-44277		Reserved			UINT32	R	
<b>Log Notification Registers (bit map)</b>							
44278-44279		Files 0-31 (0 = no new logs, 1 = new record logged)	0x00000000 - 0xFFFFFFFF		UINT32	R	
44280-44293		Reserved			UINT32	R	
<b>Setpoint Status Registers (bit map)</b>							
44294-44297		Setpoints 1-64 status (0 = released, 1 = operated)	0x00000000 - 0xFFFFFFFF 0x00000000 - 0xFFFFFFFF		UINT64	R	
44298-44309		Reserved			UINT32	R	
<b>Setpoint Alarm Latch Registers (bit map)</b>							
44310-44313		Setpoints 1-64 alarm status. When read: 0 = no setpoint operations logged, 1 = setpoint has been operated at least once since the last alarm bit reset. When written: 0 = clear setpoint	0x00000000 - 0xFFFFFFFF 0x00000000 - 0xFFFFFFFF		UINT64	R/W	

Address	Point ID	Description	Options/Range	Units	Type	R/W	Notes
44314-44323		alarm bit, 1 = no effect. Reserved					
<b>Device Diagnostics Register (bit map)</b>							
44326-44327		Device self-diagnostics flags. When read: 0 = no faults logged, 1 = a fault bit has been set at least once since the last reset. When written: 0 = clear a fault bit, 1 = no effect.	F23		UINT32	R/W	
44328-44339		Reserved					
<b>GOOSE Subscriber Status Register (bit map)</b>							
44340-44341		Bits 0-19 = subscriber #1-#20 status: 0 = subscriber does not receive updates or the data set differs from the subscriber setup; 1 = subscriber receives updates.	0x00000000 - 0x000FFFFF		UINT32	R	Bitmap
<b>Port Identification</b>							
44342		Active port number	0-2 = serial port COM1-COM3, 3 = IR Port, 4 = Modem port, 5 = USB/Modbus port, 6-10 = Ethernet/TCP port		UINT16	R	
44343-44345		Reserved					
<b>Current Network Settings</b>							
44346-44377							
+0, 1		Active device IP Address			UINT32	R	Network byte order
+2, 3		Active network subnet mask			UINT32	R	Network byte order
+4, 5		Active network default gateway			UINT32	R	Network byte order
44352-44377		Reserved					
<b>Device Authorization Register</b>							
44378-44379		When write: 8-digit password. When read: 0 = access permitted, -1 = authorization required.	0 - 99999999 (write) 0/-1 (read)		INT32	R/W	
44380-44385		Reserved					
<b>Communication Counters</b>							
44410		Successful eXpertPower client connections	0-65534		UINT16	R	
44411		Failed eXpertPower client connections	0-65534		UINT16	R	
44412		Successful TCP notification client connections	0-65534		UINT16	R	
44413		Failed TCP notification client connections	0-65534		UINT16	R	
44414-44441		Reserved			UINT16	R	65535 = N/A
<b>Switch Remote Control Registers</b>							
44458-44459		ON/Close command register: Bit 0: XCBR1 Bit 1: XCBR2 Bit 2: XSWI1 ... Bit 15: XSWI14	0x00000000 - 0x0000FFFF Bit value: 0=no effect, 1=ON		UINT32	W	Read as 0
44460-44461		OFF/Open command register: Bit 0: XCBR1	0x00000000 - 0x0000FFFF: Bit value: 0=no effect, 1=OFF		UINT32	W	Read as 0

Address	Point ID	Description	Options/Range	Units	Type	R/W	Notes
		Bit 1: XCBR2 Bit 2: XSWI1 ... Bit 15: XSWI14					
44462-44463		Position substitution enable command register (subEna): Bit 0: XCBR1 Bit 1: XCBR2 Bit 2: XSWI1 ... Bit 15: XSWI14	0x00000000 - 0x0000FFFF Bit value: 0=no effect, 1=enable		UINT32	W	Read as 0
44464-44465		Position substitution disable command register (~subEna): Bit 0: XCBR1 Bit 1: XCBR2 Bit 2: XSWI1 ... Bit 15: XSWI14	0x00000000 - 0x0000FFFF Bit value: 0=no effect, 1=disable		UINT32	W	Read as 0
44466-44481		Position substitution value registers (subVal)	00=intermediate-state, 01=OFF, 10=ON, 11=bad-state				
+0		XCBR1 position substitution value			UINT16	R/W	
+1		XCBR2 position substitution value			UINT16	R/W	
+2		XSWI1 position substitution value			UINT16	R/W	
...		...					
+15		XSWI14 position substitution value			UINT16	R/W	
+16-47		Reserved					
<b>Switch Status Registers</b>							
44514-44515		Operation Open activation indication (alias): Bit 0: XCBR1_OpOpn Bit 1: XCBR2_OpOpn Bit 2: XSWI1_OpOpn ... Bit 15: XSWI14_OpOpn	0x00000000 - 0x0000FFFF Bit value: 0=not active, 1=activated		UINT32	R	
44516-44517		Operation Close activation indication (alias): Bit 0: XCBR1_OpCl s Bit 1: XCBR2_OpCl Bit 2: XSWI1_OpCl ... Bit 15: XSWI14_OpCl	0x00000000 - 0x0000FFFF Bit value: 0=not active, 1=activated		UINT32	R	
44518-44519		Enable Opening status (EnaOpn): Bit 0: XCBR1 Bit 1: XCBR2 Bit 2: XSWI1 ... Bit 15: XSWI14	0x00000000 - 0x0000FFFF Bit value: 0=disabled/blocked, 1=enabled/unblocked		UINT32	R	



Address	Point ID	Description	Options/Range	Units	Type	R/W	Notes
44520-44521		Enable Closing status (EnaCls): Bit 0: XCBR1 Bit 1: XCBR2 Bit 2: XSWI1 ... Bit 15: XSWI14	0x00000000 - 0x0000FFFF Bit value: 0=disabled/blocked, 1=enabled/unblocked		UINT32	R	
44522-44523		Position substitution enable status (subEna): Bit 0: XCBR1 Bit 1: XCBR2 Bit 2: XSWI1 ... Bit 15: XSWI14	0x00000000 - 0x0000FFFF Bit value: 0=actual position, 1=substituted position		UINT32	R	
44524-44525		Fault disconnect alarm status (AlmFlt): Bit 0: XCBR1 Bit 1: XCBR2 Bit 2: XSWI1 ... Bit 15: XSWI14	0x00000000 - 0x0000FFFF Bit value: 0=no alarm, 1=alarm		UINT32	R	
44526-44541		Command termination status	0=Success, 1=Not-supported, 2=Blocked-by-switching-hierarchy, 4=Invalid-position, 5=Position-reached, 8=Blocked-by-Mode, 9=Blocked-by-process, 10=Blocked-by-interlocking, 12=Command-already-in-execution, 13=Blocked-by-health, 16=Time-limit-over		UINT16	R	
+0		XCBR1 command termination status			UINT16	R	
+1		XCBR2 command termination status			UINT16	R	
+2		XSWI1 command termination status			UINT16	R	
...		...					
+15		XSWI14 command termination status			UINT16	R	
<b>Factory Diagnostic Registers</b>							
45952-46079		Factory diagnostic registers			UINT32	R	

### 3.7 Device Setup Registers

Address	Point ID	Description	Options/Range	Units	Type	R/W	Notes
<b>Device Identification</b>							
46080-46111							
+0,1		Device serial number	1-999999		UINT32	R	
+2,3		Device model ID	310, 320, 330		UINT32	R	
+4-11		Device model name	"SA310", "SA320", "SA330"		CHAR16	R	Null-terminated string
+12-13		Device options (bitmap)			UINT32	R	
+14-19		Reserved			UINT16	R	
+20		Device firmware version number			UINT16	R	
+21		Device firmware build number			UINT16	R	
+22		DSP firmware version number			UINT16	R	
+23		DSP firmware build number			UINT16	R	
+24		Boot loader version number			UINT16	R	
+25		Boot loader build number			UINT16	R	
+26-31		Reserved			UINT16	R	
<b>Factory Device Settings</b>							
46112-46207							
+0		V1-V3 input range	690	V	UINT16	R	
+1		V1-V3 input overload	120	%	UINT16	R	
+2		V4 input range	690	V	UINT16	R	
+3		V4 input overload	120	%	UINT16	R	
+4		I1-I3 input range	1, 5	A	UINT16	R	
+5		I1-I3 input overload	400 (ANSI), 200 (IEC)	%	UINT16	R	
+6		I4 input range	1, 5	A	UINT16	R	
+7		I4 input overload	400 (ANSI), 200 (IEC)	%	UINT16	R	
+8		I1x-I3x input range	1, 5	A	UINT16	R	
+9		I1x-I3x input overload	3000	%	UINT16	R	
+10		I4x input range	1, 5	A	UINT16	R	
+11		I4x input overload	3000	%	UINT16	R	
+12		VDC input range	300	V	UINT16	R	
+13		VDC input overload	100	%	UINT16	R	
+14-63		Reserved			UINT16	R	
+64		Ethernet MAC address 0-1	0x0500		UINT16	R	
+65		Ethernet MAC address 2-3	0x00F0		UINT16	R	
+66		Ethernet MAC address 4-5	0x0000-0xFFFF		UINT16	R	
+67-95		Reserved			UINT16	R	
<b>Basic Setup</b>							
46208-46271							
+0		Wiring mode	F26		UINT16	R/W	
+1		PT ratio (primary to secondary ratio)	10-65000	×0.1	UINT16	R/W	
+2		PT secondary (line-to-line)	50-700	V	UINT16	R/W	

Address	Point ID	Description	Options/Range	Units	Type	R/W	Notes
+3		V4 PT ratio (primary to secondary ratio)	10-65000	×0.1	UINT16	R/W	
+4		V4 PT secondary voltage	10-690	V	UINT16	R/W	
+5		CT primary current	1-10000	A	UINT16	R/W	
+6		CT secondary current	1, 5	A	UINT16	R/W	
+7		I4 CT primary current	1-10000	A	UINT16	R/W	
+8		I4 CT secondary current	1, 5	A	UINT16	R/W	
+9		Ix CT primary current	1-10000	A	UINT16	R/W	
+10		Ix CT secondary current	1, 5	A	UINT16	R/W	
+11		I4x CT primary current	1-10000	A	UINT16	R/W	
+12		I4x CT secondary current	1-10000	A	UINT16	R/W	
+13		PT secondary (line-to-line), alternative register	500 to 7000, 65535 = N/A	×0.1V	UINT16	R/W	
+14-15		Reserved			UINT16	R/W	
+16		VDC nominal voltage	10-300	V	UINT16	R/W	
+17		Nominal line frequency	50, 60	Hz	UINT16	R/W	
+18		Phase order	0 = ABC, 1 = CBA		UINT16	R/W	
+19-23		Reserved			UINT16	R/W	
+24		I maximum demand load current	0-10000	A	UINT16	R/W	
+25		I4 maximum demand load current	0-10000	A	UINT16	R/W	
+26		Ix maximum demand load current	0-10000	A	UINT16	R/W	
+27		I4x maximum demand load current	0-10000	A	UINT16	R/W	
+28-31		Reserved			UINT16	R/W	
<b>Demands Setup</b>							
46240-46255							
+0		Power demand period (block interval)	1, 2, 3, 5, 10, 15, 30, 60	min	UINT16	R/W	
+1		Number of demand periods in a sliding window	1-15		UINT16	R/W	
+2		Demand synchronization source input	0 = device clock, 1-96 = DI1-DI96		UINT16	R/W	A DI input is considered a pulse or KYZ input. The pulse edge restarts the power demand accumulation interval.
+3-7		Reserved			UINT16	R/W	
+8		Volt demand period	0-9000	sec	UINT16	R/W	
+9		Ampere demand period	0-9000	sec	UINT16	R/W	
+10		Harmonic demand period	0-9000	sec	UINT16	R/W	
+11-15		Reserved			UINT16	R/W	
<b>Device Options Setup</b>							
46256-46399							
+0		Power calculation mode	0 = using reactive power: $S = f(P,Q)$ , 1 = using non-active power: $Q = f(S,P)$		UINT16	R/W	
+1		Energy roll value	0 = $1 \times 10^4$ , 1 = $1 \times 10^5$ , 2 = $1 \times 10^6$ , 3 = $1 \times 10^7$ , 4 = $1 \times 10^8$ , 5 = $1 \times 10^9$		UINT16	R/W	
+2-7		Reserved			UINT16	R/W	

Address	Point ID	Description	Options/Range	Units	Type	R/W	Notes
+8		"kWh"/"kvarh" LED pulse rate, Wh/varh per pulse (in secondary units)	1 - 10000	×0.01Wh	UINT16	R/W	
+9		"VDC MEASURE LOW" LED alarm threshold, %	10 - 1000	×0.1%	UINT16	R/W	
+12-143		Reserved			UINT16	R/W	
<b>Time/Date Setup</b>							
46400-46415							
+0		Local time offset, min	0-+/-720		INT16	R/W	Offset in minutes from UTC (Universal Coordinated or Greenwich Mean time)
+1		Daylight savings time (DST) option	0 = DST disabled (standard time only), 1 = DST enabled		UINT16	R/W	
+2		DST start month	1-12		UINT16	R/W	
+3		DST start week of the month	1-4 = 1st, 2nd, 3rd and 4th week, 5=the last week of the month		UINT16	R/W	
+4		DST start weekday	1-7 (1=Sun, 7=Sat)		UINT16	R/W	
+5		DST end month	1-12		UINT16	R/W	
+6		DST end week of the month	1-4 = 1st, 2nd, 3 <sup>rd</sup> and 4th week, 5=last week of the month		UINT16	R/W	
+7		DST end weekday	1-7 (1=Sun, 7=Sat)		UINT16	R/W	
+8		Clock synchronization source	0 = GPS IRIG-B master clock, 0x0001-0x0080 = DI1-DI128 1PPM, 0x1001-0x1080 = DI1-DI128 1PPS, 0xFFFFE = SNTP, 0xFFFF = none		UINT16	R/W	A DI input is considered a pulse or KYZ input. The pulse edge aligns the clock at the nearest whole minute.
+9-15		Reserved			UINT16	R/W	
<b>Clock Setup and Status</b>							
46416-46447							
+0,1		Local time, in seconds, since Jan 1, 1970	F1	sec	UINT32	R/W	
+2,3		Fractional seconds, μsec		μsec	UINT32	R/W	
+4		Fractional seconds, milliseconds	0-999		UINT16	R/W	
+5		Seconds	0-59		UINT16	R/W	
+6		Minutes	0-59		UINT16	R/W	
+7		Hour	0-23		UINT16	R/W	
+8		Day of month	1-31		UINT16	R/W	
+9		Month	1-12		UINT16	R/W	
+10		Year (calendar year minus 2000)	0-99		UINT16	R/W	
+11		Weekday	1-7 (1=Sun, 7=Sat)		UINT16	R	
+12		Daylight savings time status	0 = standard time, 1 = daylight savings time is active		UINT16	R	
+13		IRIG-B status	0, 1 = no signal, 2 = time unlocked, 3 = time locked		UINT16	R	
+14-31		Reserved			UINT16		

Address	Point ID	Description	Options/Range	Units	Type	R/W	Notes
<b>Communication Ports Setup</b>							
46448-46575							
+0		Communication protocol	0 = Modbus RTU, 1 = Modbus ASCII, 2 = DNP3.0		UINT16	R/W	
+1		Interface	0 = RS-232, 1 = RS-422, 2 = RS-485, 3 = Infrared, 4 = Modem		UINT16	R/W	
+2		Device address	1-247		UINT16	R/W	
+3		Baud rate	1 = 300 bps, 2 = 600 bps, 3 = 1200 bps, 4 = 2400 bps, 5 = 4800 bps, 6 = 9600 bps, 7 = 19200 bps, 8 = 38400 bps, 9 = 57600 bps, 10 = 115200 bps		UINT16	R/W	
+4		Data format	0 = 7 bits/even parity, 1 = 8 bits/no parity, 2 = 8 bits/even parity		UINT16	R/W	
+5		CTS mode	0 = not used, 1 = wait for CTS before sending data		UINT16	R/W	N/A for COM2-COM5 (read as 65535)
+6		RTS mode	0 = not used, 1 = RTS is asserted during the transmission		UINT16	R/W	N/A for COM2-COM5 (read as 65535)
+7		Minimum delay before sending data	0-1000 (default = 5)	ms	UINT16	R/W	
+8		Inter-character time-out	0-1000 (default = 4-character time)	ms	UINT16	R/W	
+9-15		Reserved					
46448-46463		<b>COM1 Setup</b>					
46464-46479		<b>COM2 Setup</b>					
46480-46495		<b>COM3 Setup</b>					
46496-46511		<b>COM4 Setup</b>					
46512-46527		<b>COM5 Setup</b>					
46528-46575		Reserved					
<b>Network Setup</b>							
46576-46703							
+0,1		Device IP Address	0x01000000-0xFFFFFFFF		UINT32	R/W	Network byte order
+2,3		Network subnet mask	0x00000001-0xFFFFFFFF		UINT32	R/W	Network byte order
+4,5		Network default gateway	0x00000000-0xFFFFFFFF		UINT32	R/W	Network byte order
+6,7		Use DHCP	0 = NO, 1 = YES		UINT32	R/W	
+8,9		TCP service port	502 = Modbus/TCP, 20000 = DNP3.0/TCP		UINT32	R/W	Only for firmware versions older than 10.2.16
+10-127		Reserved				R/W	
<b>Password Setup</b>							
46704-46707							
+0,1		Communications password (8 digits)	0 - 99999999		UINT32	R/W	Read as 0
+2		Password protection enabled	0 = disabled, 1 = enabled		UINT16	R/W	
+3		Reserved			UINT16	R/W	

Address	Point ID	Description	Options/Range	Units	Type	R/W	Notes
46708-46761		Reserved					
<b>IEC 61850 License Setup</b>							
46762-46767							
+0,1		License code, first word			UINT32	R/W	
+2,3		License code, second word			UINT32	R/W	
+4,5		Current license type	0=no valid license 1-31=temporary license, remaining time in days -1=permanent license -3=temporary license has expired		UINT32	R	
<b>Expert Power Service Setup</b>							
46768-46783							
+0,1		Expert Power server IP Address	0x01000000-0xFFFFFFFF		UINT32	R/W	Default = 207.232.60.18
+2,3		Expert Power server TCP service port	0-65535		UINT32	R/W	Default = 5001
+4,5		Expert Power client enabled	0=client disabled, 1=client enabled		UINT32	R/W	
+6,7		Time to next session	1-99999	min	UINT32	R/W	
+8,9		Time to next session	1-99999	min	UINT32	R	Same as previous
+10-15		Reserved					
<b>Internet Service Provider (ISP) account</b>							
46784-46879							
+0-15		ISP telephone number			CHAR32	R/W	
+16-31		Login name			CHAR32	R/W	
+32-47		Login password			CHAR32	R/W	
+48-95		Reserved					
<b>SNTP Client Setup</b>							
46880-46895							
+0,1		SNTP client enabled	0=disabled, 1=enabled		UINT32	R/W	
+2,3		Polling interval	60-86400	s	UINT32	R/W	Default = 600 s
+4-7		Reserved	0		UINT32	R/W	
+8,9		Primary SNTP server IP address	0x01000000-0xFFFFFFFF		UINT32	R/W	Default = 192.36.143.151
+10,11		Secondary SNTP server IP address	0x01000000-0xFFFFFFFF		UINT32	R/W	Default = 130.149.17.21
+12-15		Reserved					
<b>TCP Notification Client Setup</b>							
46896-46991							
+0,1		Client enabled	0=disabled, 1=enabled		UINT32	R/W	
+2,3		Server address	0x01000000-0xFFFFFFFF		UINT32	R/W	
+4,5		Server port	0-65535		UINT32	R/W	
+6,7		Message exchange address	0-65535		UINT32	R/W	
+8-15		Reserved					
<b>GOOSE Subscriber Setup</b>							
48726-48833							
+0		Subscription number	0-19		UINT16	R/W	Write subscription number first

Address	Point ID	Description	Options/Range	Units	Type	R/W	Notes
							before reading following registers
+1		Activate	Write: 1=activate		UINT16	R/W	Write 1 to store and activate setup
+2		Subscription enabled	0=disabled, 1=enabled		UINT16	R/W	Default = 0
+3-35		Data set reference			CHAR66	R/W	
+36,37		Configuration revision	1-0xFFFFFFFF		UINT32	R/W	Default = 1
+38-40		Destination MAC address (multicast)	01:0C:CD:01:00:00 to 01:0C:CD:01:01:FF		CHAR6	R/W	Default = 01:0C:CD:01:01:01-13
+41		Application ID	0-0xFFFF		UINT16	R/W	Default = 3001
+42-43		Not used	0		UINT16	R/W	
		<b>Data Set Entry #1</b>					
+44		Bits 0:7=member type, bits 8:15=GOOSE element number			UINT16	R/W	
+45		Basic member type			UINT16	R/W	
+46		Input variable ID			UINT16	R/W	
+47		Not used			UINT16	R/W	
+48-51		<b>Data Set Entry #2</b>					
...		...					
+104-107		<b>Data Set Entry #16</b>					
+108-171		Reserved			UINT16	R/W	
48898-49045		Reserved					
<b>GOOSE Publisher Setup</b>							
49046-49145							
+0		Publisher number	0		UINT16	R/W	Write number first before reading following registers
+1		Activate	Write: 1=activate		UINT16	R/W	Write 1 to store and activate setup
+2-34		Goose control block reference	"CTRL/LLN0\$GO\$GoCBPub1"		CHAR66	R	
+35		Publisher enabled	0 = disabled, 1 = enabled		UINT16	R/W	
+36-51		GOOSE application identifier	"Pub1"		CHAR34	R	
+53-85		Data set reference	"CTRL/LLN0\$DSetGOOSE1"		CHAR66	R	
+86-87		Configuration revision	1		UINT32	R/W	Default = 1
+88		Needs commissioning	0 = no, 1 = yes		UINT16	R	Default = 0
+89-91		Destination MAC address (multicast)	01:0C:CD:01:00:00 to 01:0C:CD:01:01:FF		CHAR6	R/W	Default = 01:0C:CD:01:01:FF
+92		Destination VLAN priority	4		UINT16	R	Default = 4
+93		Destination VLAN ID	0		UINT16	R	Default = 0
+94		Destination application ID	0-0xFFFF		UINT16	R/W	Default = 3001
+95		Maximum retransmission interval	500-60000	ms	UINT16	R/W	Default = 5000
+96-99		Not used					
<b>IEC 61850 IED Setup</b>							
49146-49209							
+0-11		IED name			CHAR24	R/W	
+12-19		Subnet name			CHAR16	R/W	
+20		Connection idle timeout	1-10 min		UINT16	R/W	

Address	Point ID	Description	Options/Range	Units	Type	R/W	Notes
+21		Voltage units	0=V, 1=kV		UINT16	R/W	
+22		Current units	0=A, 1=kA		UINT16	R/W	
+23		Power units	0=kW, 1=MW		UINT16	R/W	
+24		Maximum instances/clients per RCB	0=non-indexed, 1, 2, 4		UINT16	R/W	
+25-30		Location			CHAR32	R/W	
+31-63		Not used	0		UINT16	R/W	
<b>IEC 61850 Dataset Setup</b>							
49210-49278							
+0		Read: current dataset number Write: number of dataset members	1-16/1-64		UINT16	R/W	Write a dataset number before reading dataset registers
+1		Activate	Write: 1=activate		UINT16	R/W	Write 1 to store and activate setup
+2-34		Dataset reference			CHAR66	R/W	
+35		Dataset member number	0-63		UINT16	R/W	Write a dataset member number before reading following registers
+36-68		Dataset member reference			CHAR66	R/W	
<b>IEC 61850 RCB Setup</b>							
49280-49351							
		<b>Command registers</b>					Write 1-2 registers for a command
+0		Read command (moves the list pointer to the first item in a list)	0xF0F0=read RCBs list, 0xE0E0=read dataset references list		UINT16	W	Write a command before reading setup registers
+1		Activate	1=activate		UINT16	W	Write to store and activate setup
		<b>RCB registers (read/write)</b>			UINT16	R/W	Write more than 2 registers to change setup
+0		RCB type: 1=BRCB, 2=URCB			UINT16	R/W	
+1		Not used			UINT16	R/W	
+2-18		RptID			CHAR34	R/W	
+19		RptEna			UINT16	R/W	
+20-52		Dataset reference			CHAR66	R/W	
+53		Not used			UINT16	R/W	
+54,55		ConfRev			UINT32	R/W	
+56,57		OptFlds			UINT32	R/W	
+58,59		BuTm			UINT32	R/W	
+60		SqNum			UINT16	R/W	
+61		TrgOps			UINT16	R/W	
+62,63		IntgPd			UINT32	R/W	
+64		Resv			UINT16	R/W	
+65-71		RCB name (logical_device/rcb_name)	CTRL/rcb_name MET1/rcb_name		CHAR14	R/W	Reading register 71 advances to the next RCB in the list
		<b>Dataset references list (read)</b>					
+19		Dataset number			UINT16	R	
+20-52		Dataset reference			CHAR66	R	Reading register 52 advances to the next dataset in the list



Address	Point ID	Description	Options/Range	Units	Type	R/W	Notes
<b>IEC 61850 Report Deadbands</b>							
49396-49444							See F27 for measured value indices
+0		Measured value 1 deadband	1-50000	×0.001%	UINT16	R/W	
...		...	1-50000	×0.001%	UINT16	R/W	
+48		Measured value 49 deadband	1-50000	×0.001%	UINT16	R/W	
49445-49459		Reserved					Read as 65535
<b>DNP Options Setup</b>							
51158-51183							
+0		Default Binary Input Static object variation	F24 (default 0)		UINT16	R/W	
+1		Binary Input Change object variation	F24 (default 1)		UINT16	R/W	
+2		Default Binary Counter object variation	F24 (default 3)		UINT16	R/W	
+3		Frozen Binary Counter object variation	F24 (default 4)		UINT16	R/W	
+4		Reserved			UINT16	R/W	
+5		Binary Counter Change Event object variation	F24 (default 2)		UINT16	R/W	
+6		Default Analog Input object variation	F24 (default 3)		UINT16	R/W	
+7		Reserved			UINT16	R/W	
+8		Reserved			UINT16	R/W	
+9		Analog Input Change Event object variation	F24 (default 2)		UINT16	R/W	
+10		Re-mapping static point indices for event objects	0=disabled (default), 1=enabled		UINT16	R/W	
+11		16-bit BC scaling	0=×1 (default), 1=×10, 2=×100, 3=×1000		UINT16	R/W	
+12		16-bit AI scaling	0=disabled, 1=enabled		UINT16	R/W	
+13		Number of Analog Input change event points	0 to 43 (default 43)		UINT16	R/W	
+14		Number of Binary Input change event points	0 to 32 (default 21)		UINT16	R/W	
+15		Number of Binary Counter change event points	0 to 16 (default 0)		UINT16	R/W	
+16		Select/Operate Timeout	2 to 30 seconds (default 10 sec)		UINT16	R/W	
+17		Multi Fragment Interval	50 to 500 ms (default 50 ms)		UINT16	R/W	
+18-21		Reserved	Read as 65535		UINT16	R/W	
+22,23		Time Sync Period	1 to 86400 seconds (default 86400 sec), 0=disable time requests		UINT32	R/W	
+24		Voltage scale, secondary volts	60 to 828V (default 828V)		UINT16	R/W	
+25		Current scale, secondary amps	10 to 200 (default CT secondary × CT overload)	×0.1A	UINT16	R/W	
51184-51189		Reserved					
<b>DNP Events Setup</b>							
51190-51445							
+0,1		Threshold/Deadband	See Section 3.5 for point value limits.		UINT32	R/W	A hysteresis for the point return threshold is 0.05Hz for frequency and 2% of the operating threshold for other points
+2		DNP point number	DNP point number available for the selected object		UINT16	R/W	

Address	Point ID	Description	Options/Range	Units	Type	R/W	Notes
	+3	Event scan control field (bitmap)	Bits 0-1 - DNP Object: 0=none, 1=AI, 2=BI, 3=BC Bit 2 – Object change event scan: 0= disabled, 1=enabled Bits 5-6 - DNP event poll class: 0=Class 1, 1=Class 2, 2=Class 3 Bit 7 – unused Bits 8-9 – Threshold/Deadband relation: 0=Delta, 1=more than (over threshold), 2=less than (under threshold)		UINT16	R/W	If Event log is enabled, the source of a DNP event will be recorded to the device Event log file as a general Setpoint #17.
51190-51193		<b>DNP Event #1</b>					
51194-51197		<b>DNP Event #2</b>					
		...					
51442-51445		<b>DNP Event #64</b>					
51446-51701		Reserved					
<b>DNP Class 0 Point Assignment</b>							
51702-51797							
	+0	DNP object and variation	F25		UINT16	R/W	
	+1	Start point number	Start point number for the selected object		UINT16	R/W	
	+2	Number of the points in a range	0-128		UINT16	R/W	
51702-51704		<b>DNP Class 0 Points Range 1</b>					
51705-51707		<b>DNP Class 0 Points Range 2</b>					
		...					
51795-51797		<b>DNP Class 0 Points Range 32</b>					
<b>Direct Control Ports Setup</b>							
51798-51861							
	+0	Port	0=not used, 1=COM1, 2=COM2, 3=COM3, 4=COM4, 5=COM5, 6=USB, 7=Ethernet		UINT16	R/W	
	+1	Direct control via a port	0=Enabled, 1=Disabled, 2=Blocked		UINT16	R/W	
	+2-3	Client IP address			UINT32	R/W	
51798-51801		<b>Table entry 1</b>					
51802-51805		<b>Table entry 2</b>					
		...					
51858-51861		<b>Table entry 16</b>					
<b>GOST 13109 PQ Recorder Triggers Setup</b>							
50134-50453							
	+0	High normally permissible limit, %	0-2000	×0.01%	UINT16	R/W	
	+1	Hysteresis, % of threshold	0-500	×0.1%	UINT16	R/W	
	+2	Log options, bitmap	Bit 0 – waveform log on event start:		UINT16	R/W	

Address	Point ID	Description	Options/Range	Units	Type	R/W	Notes
			0 = disabled, 1 = enabled; Bit 1 – waveform log on event end: 0 = disabled, 1 = enabled; Bit 2 – PQ log on normally permissible limit: 0 = enabled, 1 = disabled. Bit 3 – PQ log on maximum permissible limit: 0 = enabled, 1 = disabled.				
+3		Waveform log number	0-1 = log #1-#2		UINT16	R/W	
+4-11		Not used	0		UINT16	R/W	
+12		High maximum permissible limit, %	0-2000	×0.01%	UINT16	R/W	
+13		Low normally permissible limit, %	0-2000	×0.01%	UINT16	R/W	
+14		Low maximum permissible limit, %	0-2000	×0.01%	UINT16	R/W	
+15		Not used	0		UINT16	R/W	
50134-50149		<b>Voltage variation, peak load, +/-dU, %Un</b>					
50150-50165		<b>Voltage variation, light load, +/-dU, %Un</b>					
50166-50181		<b>Voltage change, +/-dU, %Un</b>					
50182-50197		<b>Short-term flicker, Pst</b>					
50198-50213		<b>Long-term flicker, Plt</b>					
50214-50229		<b>Voltage THD, %</b>					
50230-50245		<b>Voltage harmonic components, %</b>					
50246-50261		<b>Negative-sequence voltage unbalance, %</b>					
50262-50277		<b>Zero-sequence voltage unbalance, %</b>					
50278-50293		<b>Frequency variation, +/-dF, %Fn</b>					
50294-50309		<b>Voltage dip, %Un</b>					
50310-50325		<b>Impulsive voltage, %Un peak</b>					
50326-50341		<b>Temporary overvoltage, %Un</b>					
50342-50453		Reserved					
<b>Advanced GOST 13109 Setup</b>							
50838-50879							
		<b>GOST 13109 Compliance Statistics</b>					
+0		Evaluation	0=disabled, 1=enabled		UINT16	R/W	
+1		Evaluation period	0=daily		UINT16	R/W	
+2-3		Not used	0		UINT16	R/W	
		<b>GOST 13109 Harmonic Statistics</b>					
+4		Evaluation	0=disabled, 1=enabled		UINT16	R/W	
+5		Evaluation period	0=daily		UINT16	R/W	
+6-8		Not used	0		UINT16	R/W	
		<b>Voltage Change</b>					
+9		GOST 13109 limit curve	0=curve 1, 1= curve 2		UINT16	R/W	
		<b>Flicker</b>					
+10		Pst period	1-10	min	UINT16	R/W	

Address	Point ID	Description	Options/Range	Units	Type	R/W	Notes
+11-13		Not used	0		UINT16	R/W	
		<b>Harmonic Voltage</b>					
+14		IEC 61000-4-7 harmonics grouping	0=disabled, 1=enabled		UINT16	R/W	
+15-35		Not used	0		UINT16	R/W	
		<b>Peak Load Time Intervals</b>					
+36		Start weekday	0=disabled, 1-7 – Sunday-Saturday		UINT16	R/W	
+37		End weekday	0=disabled, 1-7 – Sunday-Saturday		UINT16	R/W	
+38		Interval 1 start time	0-1439	min	UINT16	R/W	
+39		Interval 1 end time	0-1439	min	UINT16	R/W	
+40		Interval 2 start time	0-1439	min	UINT16	R/W	
+41		Interval 2 end time	0-1439	min	UINT16	R/W	
50880-50901		Reserved	0		UINT16	R/W	
<b>GOST 13109 Harmonic Voltage Limits</b>							
50902-50965							
+0		H02 limit	1-10000	x0.01%	UINT16	R/W	
+1		H03 limit	1-10000	x0.01%	UINT16	R/W	
+2		H04 limit	1-10000	x0.01%	UINT16	R/W	
		...					
+38		H40 limit	1-10000	x0.01%	UINT16	R/W	
+39-63		Reserved					
<b>SOE Log Labels</b>							
51894-52043							
+0		Event type	0=Setpoints, 2=Faults, 3=DI, 4=RO		UINT16	R/W	Write the event type and point number before reading following registers
+1		Point number	0-47		UINT16	R/W	
+2-17		Point ID			CHAR32	R/W	
+18-33		Status ON label			CHAR32	R/W	
+34-81		Status ON description			CHAR96	R/W	
+82		Status ON color	0-15		UINT16	R/W	
+83		Reserved	0		UINT16	R/W	
+84-99		Status OFF label			CHAR32	R/W	
+100-147		Status OFF description			CHAR96	R/W	
+148		Status OFF color	0-15		UINT16	R/W	
+149		Reserved	0		UINT16	R/W	
52044-52149		Reserved					
<b>Fault Log Triggers Setup</b>							
52150-52277							
+0		Trigger 1: Threshold, %	0 - 2000	x 0.1%	UINT16	R/W	
+1		Trigger 1: Hysteresis, % of threshold	0 - 500	x 0.1%	UINT16	R/W	
+2		Trigger 1: Trigger enabled	0 = disabled, 1 = enabled		UINT16	R/W	
+3		Trigger 2: Threshold, %	0 - 2000	x 0.1%	UINT16	R/W	
+4		Trigger 2: Hysteresis, % of threshold	0 - 500	x 0.1%	UINT16	R/W	

Address	Point ID	Description	Options/Range	Units	Type	R/W	Notes
+5		Trigger 2: Trigger enabled	0 = disabled, 1 = enabled		UINT16	R/W	
+6-7		Reserved			UINT16	R/W	
52150-52157		<b>External trigger</b>					Enabled by default
52158-52165		<b>Zero-sequence current</b>					
52166-52173		<b>Zero-sequence voltage</b>					
52174-52181		<b>Current unbalance</b>					
52182-52189		<b>Voltage unbalance</b>					
52190-52197		<b>Overcurrent and Undervoltage</b>					
52198-52205		<b>Undervoltage</b>					
52206-52213		<b>I4 (neutral) current</b>					
52214-52277		Reserved			UINT16	R/W	
<b>Fault Log Recording Setup</b>							
52278-52341							
+0		Log options, bitmap	Bit 0 – waveform log on event start: 0 = disabled, 1 = enabled; Bit 1 – waveform log on event end: 0 = disabled, 1 = enabled; Bit 2 – recording to PQ log: 0 = enabled, 1 = disabled.		UINT16	R/W	
+1		Waveform log number	0 - 7 = log #1 - #8		UINT16	R/W	
+2		Data/RMS plot option	0 = disabled, 1 = enabled		UINT16	R/W	
+3		Data log number (factory preset)	12 = log #13		UINT16	R/W	
+4		1/2-cycle RMS plot, cycles before event	0 - 20	cycle	UINT16	R/W	
+5		1/2-cycle RMS plot, cycles after event	0 - 20	cycle	UINT16	R/W	
+6		1/2-cycle RMS plot duration, cycles	0 - 10000	cycle	UINT16	R/W	
+7-63		Reserved	0		UINT16	R/W	
<b>File Setup</b>							
52598-53877							
+0		File type	0		UINT16	R/W	
+1		File attributes (bitmap)	F3		UINT16	R/W	
+2		Number of records in the file	0-65535 (0 = delete file)		UINT16	R/W	
+3		Number of sections/channels in the file	0-32		UINT16	R/W	0 = non-partitioned file
+4		Number of parameters per section record	1-16 for conventional data files, 40 for GOST 13109 Statistics log, 80 for GOST 13109 Harmonics log		UINT16	R/W	
+5		Not used	0		UINT16	R/W	
+6		Section record size, bytes (for info only)			UINT16	R	
+7		File record size, bytes (for info only)			UINT16	R	
+8,9		Allocated file size, bytes (for info only)			UINT32	R	
52598-52607		<b>Event Log Setup</b>					
52608-52617		<b>Data Log #1 Setup</b>					
52618-52627		<b>Data Log #2 Setup</b>					
52628-52637		<b>Data Log #3 Setup</b>					

Address	Point ID	Description	Options/Range	Units	Type	R/W	Notes
52638-52647		Data Log #4 Setup					
52648-52657		Data Log #5 Setup					
52658-52667		Data Log #6 Setup					
52668-52677		Data Log #7 Setup					
52678-52687		Data Log #8 Setup					
52688-52697		Data Log #9 Setup					GOST 13109 compliance statistics
52698-52707		Data Log #10 Setup					GOST 13109 harmonic statistics
52708-52717		Data Log #11 Setup					
52718-52727		Data Log #12 Setup					
52728-52737		Data Log #13 Setup					
52738-52747		Data Log #14 Setup					
52748-52757		Data Log #15 Setup					
52758-52767		Data Log #16 Setup					
52768-52777		Waveform Log #1 Setup					
52778-52787		Waveform Log #2 Setup					
52788-52797		Waveform Log #3 Setup					
52798-52807		Waveform Log #4 Setup					
52808-52817		Waveform Log #5 Setup					
52818-52827		Waveform Log #6 Setup					
52828-52837		Waveform Log #7 Setup					
52838-52847		Waveform Log #8 Setup					
52848-52857		SOE Log Setup					
52858-52867		GOST 13109 PQ Log Setup					
52868-52877		Fault Log Setup					
52878-53877		Reserved					
<b>Waveform Recorder Setup</b>							
53878-53949							
+0		Sampling rate, samples per cycle	32, 64, 128		UINT16	R/W	
+1		Number of cycles per series	16-10848 (32 samples/cycle), 8-5424 (64 samples/cycle), 4-2712 (128 samples/cycle)		UINT16	R/W	
+3		Not used	0		UINT16	R/W	
+4		Number of cycles before trigger	1-20		UINT16	R/W	
+4,5		File channel mask (channels 1-32), bitmap	F9		UINT32	R/W	
+6,7		File channel mask (channels 33-64), bitmap	F9		UINT32	R/W	
53878-53885		Waveform Log #1 Setup					
53886-53893		Waveform Log #2 Setup					
53894-53901		Waveform Log #3 Setup					
53902-53909		Waveform Log #4 Setup					
53910-53917		Waveform Log #5 Setup					
53918-53925		Waveform Log #6 Setup					
53926-53933		Waveform Log #7 Setup					
53934-53941		Waveform Log #8 Setup					

Address	Point ID	Description	Options/Range	Units	Type	R/W	Notes
53942-53949		Reserved					
<b>Data Log Setup</b>							
54006-55541							
+0		Data log parameter #1 ID	0x0000-0xFFFF		UINT16	R/W	
+1		Data log parameter #2 ID	0x0000-0xFFFF		UINT16	R/W	
+2		Data log parameter #3 ID	0x0000-0xFFFF		UINT16	R/W	
+3		Data log parameter #4 ID	0x0000-0xFFFF		UINT16	R/W	
+4		Data log parameter #5 ID	0x0000-0xFFFF		UINT16	R/W	
+5		Data log parameter #6 ID	0x0000-0xFFFF		UINT16	R/W	
+6		Data log parameter #7 ID	0x0000-0xFFFF		UINT16	R/W	
+7		Data log parameter #8 ID	0x0000-0xFFFF		UINT16	R/W	
+8		Data log parameter #9 ID	0x0000-0xFFFF		UINT16	R/W	
+9		Data log parameter #10 ID	0x0000-0xFFFF		UINT16	R/W	
+10		Data log parameter #11 ID	0x0000-0xFFFF		UINT16	R/W	
+11		Data log parameter #12 ID	0x0000-0xFFFF		UINT16	R/W	
+12		Data log parameter #13 ID	0x0000-0xFFFF		UINT16	R/W	
+13		Data log parameter #14 ID	0x0000-0xFFFF		UINT16	R/W	
+14		Data log parameter #15 ID	0x0000-0xFFFF		UINT16	R/W	
+15		Data log parameter #16 ID	0x0000-0xFFFF		UINT16	R/W	
+16-31		Reserved			UINT16	R/W	
54006-54037		<b>Data log #1 Setup</b>					
54038-54069		<b>Data log #2 Setup</b>					
54070-54101		<b>Data log #3 Setup</b>					
54102-54133		<b>Data log #4 Setup</b>					
54134-54165		<b>Data log #5 Setup</b>					
54166-54197		<b>Data log #6 Setup</b>					
54198-54229		<b>Data log #7 Setup</b>					
54230-54261		<b>Data log #8 Setup</b>					
54262-54293		<b>Data log #9 Setup</b>					Auto-configured. Read as NONE.
54294-54325		<b>Data log #10 Setup</b>					Auto-configured. Read as NONE.
54326-54357		<b>Data log #11 Setup</b>					
54358-54389		<b>Data log #12 Setup</b>					
54390-54421		<b>Data log #13 Setup</b>					
54422-54453		<b>Data log #14 Setup</b>					
54454-54485		<b>Data log #15 Setup</b>					
54486-54517		<b>Data log #16 Setup</b>					
54518-55541		Reserved			UINT16	R/W	
<b>Programmable Min/Max Log Setup</b>							
55542-55573							
55542		Min/Max log parameter #1 ID	0x0000-0xFFFF		UINT16	R/W	
55543		Min/Max log parameter #2 ID	0x0000-0xFFFF		UINT16	R/W	
55544		Min/Max log parameter #3 ID	0x0000-0xFFFF		UINT16	R/W	
55545		Min/Max log parameter #4 ID	0x0000-0xFFFF		UINT16	R/W	

Address	Point ID	Description	Options/Range	Units	Type	R/W	Notes
55546		Min/Max log parameter #5 ID	0x0000-0xFFFF		UINT16	R/W	
55547		Min/Max log parameter #6 ID	0x0000-0xFFFF		UINT16	R/W	
55548		Min/Max log parameter #7 ID	0x0000-0xFFFF		UINT16	R/W	
55549		Min/Max log parameter #8 ID	0x0000-0xFFFF		UINT16	R/W	
55550		Min/Max log parameter #9 ID	0x0000-0xFFFF		UINT16	R/W	
55551		Min/Max log parameter #10 ID	0x0000-0xFFFF		UINT16	R/W	
55552		Min/Max log parameter #11 ID	0x0000-0xFFFF		UINT16	R/W	
55553		Min/Max log parameter #12 ID	0x0000-0xFFFF		UINT16	R/W	
55554		Min/Max log parameter #13 ID	0x0000-0xFFFF		UINT16	R/W	
55555		Min/Max log parameter #14 ID	0x0000-0xFFFF		UINT16	R/W	
55556		Min/Max log parameter #15 ID	0x0000-0xFFFF		UINT16	R/W	
55557		Min/Max log parameter #16 ID	0x0000-0xFFFF		UINT16	R/W	
55558-55573		Reserved			UINT16	R/W	
<b>TOU Daily Profile Setup</b>							
55574-55701							
+0		1 <sup>st</sup> tariff change	F10		UINT16	R/W	
+1		2 <sup>nd</sup> tariff change	F10		UINT16	R/W	
+2		3 <sup>rd</sup> tariff change	F10		UINT16	R/W	
+3		4 <sup>th</sup> tariff change	F10		UINT16	R/W	
+4		5 <sup>th</sup> tariff change	F10		UINT16	R/W	
+5		6 <sup>th</sup> tariff change	F10		UINT16	R/W	
+6		7 <sup>th</sup> tariff change	F10		UINT16	R/W	
+7		8 <sup>th</sup> tariff change	F10		UINT16	R/W	
55574-55581		<b>TOU daily profile #1</b>					
55582-55589		<b>TOU daily profile #2</b>					
55590-55597		<b>TOU daily profile #3</b>					
55598-55605		<b>TOU daily profile #4</b>					
55606-55613		<b>TOU daily profile #5</b>					
55614-55621		<b>TOU daily profile #6</b>					
55622-55629		<b>TOU daily profile #7</b>					
55630-55637		<b>TOU daily profile #8</b>					
55638-55645		<b>TOU daily profile #9</b>					
55646-55653		<b>TOU daily profile #10</b>					
55654-55661		<b>TOU daily profile #11</b>					
55662-55669		<b>TOU daily profile #12</b>					
55670-55677		<b>TOU daily profile #13</b>					
55678-55685		<b>TOU daily profile #14</b>					
55686-55693		<b>TOU daily profile #15</b>					
55694-55701		<b>TOU daily profile #16</b>					
<b>TOU Calendar Years Setup</b>							
55702-55711							
55702		Calendar #1 year	0-99		UINT16	R/W	
55703		Calendar #2 year	0-99		UINT16	R/W	



Address	Point ID	Description	Options/Range	Units	Type	R/W	Notes
55704		Calendar #3 year	0-99		UINT16	R/W	
55705		Calendar #4 year	0-99		UINT16	R/W	
55706		Calendar #5 year	0-99		UINT16	R/W	
55707		Calendar #6 year	0-99		UINT16	R/W	
55708		Calendar #7 year	0-99		UINT16	R/W	
55709		Calendar #8 year	0-99		UINT16	R/W	
55710		Calendar #9 year	0-99		UINT16	R/W	
55711		Calendar #10 year	0-99		UINT16	R/W	
<b>TOU Calendar Setup</b>							
55712-56671							
+0-7		<b>January</b>				R/W	
+0		1-4 January day profiles			UINT16	R/W	
+1		5-7 January day profiles			UINT16	R/W	
+2		8-12 January day profiles			UINT16	R/W	
+3		13-16 January day profiles			UINT16	R/W	
+4		17-20 January day profiles			UINT16	R/W	
+5		21-24 January day profiles			UINT16	R/W	
+6		25-28 January day profiles			UINT16	R/W	
+7		29-31 January day profiles			UINT16	R/W	
+8-15		<b>February</b>			UINT16	R/W	
+0		1-4 February day profiles			UINT16	R/W	
+1		5-7 February day profiles			UINT16	R/W	
+2		8-12 February day profiles			UINT16	R/W	
+3		13-16 February day profiles			UINT16	R/W	
+4		17-20 February day profiles			UINT16	R/W	
+5		21-24 February day profiles			UINT16	R/W	
+6		25-28 February day profiles			UINT16	R/W	
+7		29 February day profile			UINT16	R/W	
+16-23		<b>March</b>					
+0		1-4 March day profiles			UINT16	R/W	
+1		5-7 March day profiles			UINT16	R/W	
+2		8-12 March day profiles			UINT16	R/W	
+3		13-16 March day profiles			UINT16	R/W	
+4		17-20 March day profiles			UINT16	R/W	
+5		21-24 March day profiles			UINT16	R/W	
+6		25-28 March day profiles			UINT16	R/W	
+7		29-31 March day profile			UINT16	R/W	
+24-31		<b>April</b>			UINT16	R/W	
+0		1-4 April day profiles			UINT16	R/W	
+1		5-7 April day profiles			UINT16	R/W	
+2		8-12 April day profiles			UINT16	R/W	
+3		13-16 April day profiles			UINT16	R/W	
+4		17-20 April day profiles			UINT16	R/W	

Address	Point ID	Description	Options/Range	Units	Type	R/W	Notes
+5		21-24 April day profiles			UINT16	R/W	
+6		25-28 April day profiles			UINT16	R/W	
+7		29-30 April day profile			UINT16	R/W	
+32-39		<b>May</b>			UINT16	R/W	
+0		1-4 May day profiles			UINT16	R/W	
+1		5-7 May day profiles			UINT16	R/W	
+2		8-12 May day profiles			UINT16	R/W	
+3		13-16 May day profiles			UINT16	R/W	
+4		17-20 May day profiles			UINT16	R/W	
+5		21-24 May day profiles			UINT16	R/W	
+6		25-28 May day profiles			UINT16	R/W	
+7		29-31 May day profile			UINT16	R/W	
+40-23		<b>June</b>			UINT16	R/W	
+0		1-4 June day profiles			UINT16	R/W	
+1		5-7 June day profiles			UINT16	R/W	
+2		8-12 June day profiles			UINT16	R/W	
+3		13-16 June day profiles			UINT16	R/W	
+4		17-20 June day profiles			UINT16	R/W	
+5		21-24 June day profiles			UINT16	R/W	
+6		25-28 June day profiles			UINT16	R/W	
+7		29-30 June day profile			UINT16	R/W	
+48-55		<b>July</b>			UINT16	R/W	
+0		1-4 July day profiles			UINT16	R/W	
+1		5-7 July day profiles			UINT16	R/W	
+2		8-12 July day profiles			UINT16	R/W	
+3		13-16 July day profiles			UINT16	R/W	
+4		17-20 July day profiles			UINT16	R/W	
+5		21-24 July day profiles			UINT16	R/W	
+6		25-28 July day profiles			UINT16	R/W	
+7		29-31 July day profile			UINT16	R/W	
+56-63		<b>August</b>			UINT16	R/W	
+0		1-4 August day profiles			UINT16	R/W	
+1		5-7 August day profiles			UINT16	R/W	
+2		8-12 August day profiles			UINT16	R/W	
+3		13-16 August day profiles			UINT16	R/W	
+4		17-20 August day profiles			UINT16	R/W	
+5		21-24 August day profiles			UINT16	R/W	
+6		25-28 August day profiles			UINT16	R/W	
+7		29-31 August day profile			UINT16	R/W	
+64-71		<b>September</b>			UINT16	R/W	
+0		1-4 September day profiles			UINT16	R/W	
+1		5-7 September day profiles			UINT16	R/W	
+2		8-12 September day profiles			UINT16	R/W	

Address	Point ID	Description	Options/Range	Units	Type	R/W	Notes
+3		13-16 September day profiles			UINT16	R/W	
+4		17-20 September day profiles			UINT16	R/W	
+5		21-24 September day profiles			UINT16	R/W	
+6		25-28 September day profiles			UINT16	R/W	
+7		29-30 September day profile			UINT16	R/W	
+72-79		<b>October</b>			UINT16	R/W	
+0		1-4 October day profiles			UINT16	R/W	
+1		5-7 October day profiles			UINT16	R/W	
+2		8-12 October day profiles			UINT16	R/W	
+3		13-16 October day profiles			UINT16	R/W	
+4		17-20 October day profiles			UINT16	R/W	
+5		21-24 October day profiles			UINT16	R/W	
+6		25-28 October day profiles			UINT16	R/W	
+7		29-31 October day profile			UINT16	R/W	
+80-87		<b>November</b>			UINT16	R/W	
+0		1-4 November day profiles			UINT16	R/W	
+1		5-7 November day profiles			UINT16	R/W	
+2		8-12 November day profiles			UINT16	R/W	
+3		13-16 November day profiles			UINT16	R/W	
+4		17-20 November day profiles			UINT16	R/W	
+5		21-24 November day profiles			UINT16	R/W	
+6		25-28 November day profiles			UINT16	R/W	
+7		29-30 November day profile			UINT16	R/W	
+88-95		<b>December</b>			UINT16	R/W	
+0		1-4 December day profiles			UINT16	R/W	
+1		5-7 December day profiles			UINT16	R/W	
+2		8-12 December day profiles			UINT16	R/W	
+3		13-16 December day profiles			UINT16	R/W	
+4		17-20 December day profiles			UINT16	R/W	
+5		21-24 December day profiles			UINT16	R/W	
+6		25-28 December day profiles			UINT16	R/W	
+7		29-31 December day profile			UINT16	R/W	
55712-55807		<b>TOU Calendar #1 Setup</b>					
55808-55903		<b>TOU Calendar #2 Setup</b>					
55904-55999		<b>TOU Calendar #3 Setup</b>					
56000-56095		<b>TOU Calendar #4 Setup</b>					
56096-56191		<b>TOU Calendar #5 Setup</b>					
56192-56287		<b>TOU Calendar #6 Setup</b>					
56288-56383		<b>TOU Calendar #7 Setup</b>					
56384-56479		<b>TOU Calendar #8 Setup</b>					
56480-56575		<b>TOU Calendar #9 Setup</b>					
56576-56671		<b>TOU Calendar #10 Setup</b>					

Address	Point ID	Description	Options/Range	Units	Type	R/W	Notes
<b>Billing/TOU Registers Setup</b>							
56672-56927							
+0,1		Roll over value	1-1,000,000,000		UINT32	R/W	
+2		TOU register enabled	0 = disabled, 1 = enabled		UINT16	R/W	
+3		Setpoint gate	0 = disabled, 1-32 = setpoint No		UINT16	R/W	
56672-56675		<b>Register #1 Setup</b>					
56676-56679		<b>Register #2 Setup</b>					
56680-56683		<b>Register #3 Setup</b>					
		...					
56796-56799		<b>Register #32 Setup</b>					
56800-56927		Reserved					
<b>Billing/TOU Registers Source Setup</b>							
56928-57183							
+0		Energy source ID	F11		UINT16	R/W	
+1		Target billing register number	0-31		UINT16	R/W	
+2,3		Multiplier	+/-1-10000		INT32	R/W	
56928-56931		<b>Energy Source #1</b>					
56932-56935		<b>Energy Source #2</b>					
56936-56939		<b>Energy Source #3</b>					
		...					
57180-57183		<b>Energy Source #64</b>					
<b>Control Setpoints Setup (SP1-SP32)</b>							
57184-59103		<b>Setpoints 1-32</b>					
+0		Condition #1: Trigger parameter ID	F12		UINT16	R/W	
+1		Condition #2: Trigger parameter ID	F12		UINT16	R/W	
+2		Condition #3: Trigger parameter ID	F12		UINT16	R/W	
+3		Condition #4: Trigger parameter ID	F12		UINT16	R/W	
+4		Condition #1: Logical operator	0 = OR, 1 = AND		UINT16	R/W	
+5		Condition #2: Logical operator	0 = OR, 1 = AND		UINT16	R/W	
+6		Condition #3: Logical operator	0 = OR, 1 = AND		UINT16	R/W	
+7		Condition #4: Logical operator	0 = OR, 1 = AND		UINT16	R/W	
+8		Condition #1: Relational operator	F13		UINT16	R/W	
+9		Condition #2: Relational operator	F13		UINT16	R/W	
+10		Condition #3: Relational operator	F13		UINT16	R/W	
+11		Condition #4: Relational operator	F13		UINT16	R/W	
+12,13		Condition #1: Operate limit			INT32	R/W	
+14,15		Condition #2: Operate limit			INT32	R/W	
+16,17		Condition #3: Operate limit			INT32	R/W	
+18,19		Condition #4: Operate limit			INT32	R/W	
+20,21		Condition #1: Release limit			INT32	R/W	
+22,23		Condition #2: Release limit			INT32	R/W	
+24,25		Condition #3: Release limit			INT32	R/W	
+26,27		Condition #4: Release limit			INT32	R/W	

Address	Point ID	Description	Options/Range	Units	Type	R/W	Notes
+28		Action #1: Action ID	F14		UINT16	R/W	
+29		Action #2: Action ID	F14		UINT16	R/W	
+30		Action #3: Action ID	F14		UINT16	R/W	
+31		Action #4: Action ID	F14		UINT16	R/W	
+32,33		Action #1: Parameter value			INT32	R/W	
+34,35		Action #2: Parameter value			INT32	R/W	
+36,37		Action #3: Parameter value			INT32	R/W	
+38,39		Action #4: Parameter value			INT32	R/W	
+40,41		Operate delay	0-10000000	0.001 s	UINT32	R/W	
+42,43		Release delay	0-10000000	0.001 s	UINT32	R/W	
+44-59		Not used			UINT16	R/W	
57184-57243		<b>Setpoint #1</b>					
57244-57303		<b>Setpoint #2</b>					
		...					
59044-59103		<b>Setpoint #32</b>					
<b>Control Setpoints Setup (SP1-SP64)</b>							
59104-59177		<b>Setpoints 1-64</b>					
+0		Setpoint number	0-63		UINT16	R/W	Write a setpoint number first before reading following registers
+1		Variation	8		UINT16	R/W	
+2		Condition #1: Trigger parameter ID	F12		UINT16	R/W	
+3		Condition #2: Trigger parameter ID	F12		UINT16	R/W	
+4		Condition #3: Trigger parameter ID	F12		UINT16	R/W	
+5		Condition #4: Trigger parameter ID	F12		UINT16	R/W	
+6		Condition #5: Trigger parameter ID	F12		UINT16	R/W	
+7		Condition #6: Trigger parameter ID	F12		UINT16	R/W	
+8		Condition #7: Trigger parameter ID	F12		UINT16	R/W	
+9		Condition #8: Trigger parameter ID	F12		UINT16	R/W	
+10		Condition #1: Logical operator	0 = OR, 1 = AND		UINT16	R/W	
+11		Condition #2: Logical operator	0 = OR, 1 = AND		UINT16	R/W	
+12		Condition #3: Logical operator	0 = OR, 1 = AND		UINT16	R/W	
+13		Condition #4: Logical operator	0 = OR, 1 = AND		UINT16	R/W	
+14		Condition #5: Logical operator	0 = OR, 1 = AND		UINT16	R/W	
+15		Condition #6: Logical operator	0 = OR, 1 = AND		UINT16	R/W	
+16		Condition #7: Logical operator	0 = OR, 1 = AND		UINT16	R/W	
+17		Condition #8: Logical operator	0 = OR, 1 = AND		UINT16	R/W	
+18		Condition #1: Relational operator	F13		UINT16	R/W	
+19		Condition #2: Relational operator	F13		UINT16	R/W	
+20		Condition #3: Relational operator	F13		UINT16	R/W	
+21		Condition #4: Relational operator	F13		UINT16	R/W	
+22		Condition #5: Relational operator	F13		UINT16	R/W	
+23		Condition #6: Relational operator	F13		UINT16	R/W	
+24		Condition #7: Relational operator	F13		UINT16	R/W	

Address	Point ID	Description	Options/Range	Units	Type	R/W	Notes
+25		Condition #8: Relational operator	F13		UINT16	R/W	
+26,27		Condition #1: Operate limit			INT32	R/W	
+28,29		Condition #2: Operate limit			INT32	R/W	
+30,31		Condition #3: Operate limit			INT32	R/W	
+32,33		Condition #4: Operate limit			INT32	R/W	
+34,35		Condition #5: Operate limit			INT32	R/W	
+36,37		Condition #6: Operate limit			INT32	R/W	
+38,39		Condition #7: Operate limit			INT32	R/W	
+40,41		Condition #8: Operate limit			INT32	R/W	
+42,43		Condition #1: Release limit			INT32	R/W	
+44,45		Condition #2: Release limit			INT32	R/W	
+46,47		Condition #3: Release limit			INT32	R/W	
+48,49		Condition #4: Release limit			INT32	R/W	
+50,51		Condition #5: Release limit			INT32	R/W	
+52,53		Condition #6: Release limit			INT32	R/W	
+54,55		Condition #7: Release limit			INT32	R/W	
+56,57		Condition #8: Release limit			INT32	R/W	
+58		Action #1: Action ID	F14		UINT16	R/W	
+59		Action #2: Action ID	F14		UINT16	R/W	
+60		Action #3: Action ID	F14		UINT16	R/W	
+61		Action #4: Action ID	F14		UINT16	R/W	
+62,63		Action #1: Parameter value			INT32	R/W	
+64,65		Action #2: Parameter value			INT32	R/W	
+66,67		Action #3: Parameter value			INT32	R/W	
+68,69		Action #4: Parameter value			INT32	R/W	
+70,71		Operate delay	0-10000000	0.001 s	UINT32	R/W	
+72,73		Release delay	0-10000000	0.001 s	UINT32	R/W	
59178-59253		Reserved	0		INT16	R/W	
<b>Switching Device Setup</b>							
59255		Switch number	0-15		UINT16	R/W	Write a switch number before accessing following registers
59256-59315		Switch setup data					
		<b>General</b>			UINT16	R/W	
+0		Switch designation	0-1=XCBR1-XCBR2, 2-15=XSWI1-XSWI14		UINT16	R/W	Same as switch number
+1-3		IEC 61850 name prefix	1-5 ASCII characters		CHAR6	R/W	Null-terminated ASCII string
+4		Switch type	1=load break switch, 2=disconnecter, 3=earthing switch, 4=high speed earthing switch, 5=breaker (fixed for XCBR1-XCBR2)		UINT16	R/W	
+5		Switch enabled	0=disabled, 1=enabled		UINT16	R/W	
		<b>Position Indication</b>					

Address	Point ID	Description	Options/Range	Units	Type	R/W	Notes
+6		Phase A N.O. contact input	0=none, 0x0080-0x00BF=SP1-SP64, 0x0300-0x033F=FLAG1-FLAG64, 0x0600-0x067F=DI1-DI128, 0x8200-0x827F=ExtInd1-ExtInd128		UINT16	R/W	
+7		Phase A N.C. contact input	0=none, 0x0080-0x00BF=SP1-SP64, 0x0300-0x033F=FLAG1-FLAG64, 0x0600-0x067F=DI1-DI128, 0x8200-0x827F=ExtInd1-ExtInd128		UINT16	R/W	
+8		Phase B N.O. contact input	0=none, 0x0080-0x00BF=SP1-SP64, 0x0300-0x033F=FLAG1-FLAG64, 0x0600-0x067F=DI1-DI128, 0x8200-0x827F=ExtInd1-ExtInd128		UINT16	R/W	
+9		Phase B N.C. contact input	0=none, 0x0080-0x00BF=SP1-SP64, 0x0300-0x033F=FLAG1-FLAG64, 0x0600-0x067F=DI1-DI128, 0x8200-0x827F=ExtInd1-ExtInd128		UINT16	R/W	
+10		Phase C N.O. contact input	0=none, 0x0080-0x00BF=SP1-SP64, 0x0300-0x033F=FLAG1-FLAG64, 0x0600-0x067F=DI1-DI128, 0x8200-0x827F=ExtInd1-ExtInd128		UINT16	R/W	
+11		Phase C N.C. contact input	0=none, 0x0080-0x00BF=SP1-SP64, 0x0300-0x033F=FLAG1-FLAG64, 0x0600-0x067F=DI1-DI128, 0x8200-0x827F=ExtInd1-ExtInd128		UINT16	R/W	
		<b>Control</b>					
+12		Close control output	0=none, 0x0800-0x083F=RO1-RO64		UINT16	R/W	
+13		Open control output	0=none, 0x0800-0x083F=RO1-RO64		UINT16	R/W	
+14		Open-2 control output	0=none, 0x0800-0x083F=RO1-RO64		UINT16	R/W	
+15		Select-Close control output	0=none, 0x0800-0x083F=RO1-RO64		UINT16	R/W	
+16		Select-Open control output	0=none, 0x0800-0x083F=RO1-RO64		UINT16	R/W	
+17		Select-Open-2 control output	0=none, 0x0800-0x083F=RO1-RO64		UINT16	R/W	
+18		Close duration control logic equation	0=none, 0x0080-0x00BF=SP1-SP64		UINT16	R/W	
+19		Open duration control logic equation	0=none, 0x0080-0x00BF=SP1-SP64		UINT16	R/W	

Address	Point ID	Description	Options/Range	Units	Type	R/W	Notes
+20,21		Close command duration	100-60000 ms		UINT32	R/W	
+22,23		Open command duration	100-60000 ms		UINT32	R/W	
+24,25		Close start moving timeout	0-60000 ms, 0=not controlled		UINT32	R/W	
+26,27		Open start moving timeout	0-60000 ms, 0=not controlled		UINT32	R/W	
+28,29		Close command termination timeout	1-120000 ms		UINT32	R/W	
+30,31		Open command termination timeout	1-120000 ms		UINT32	R/W	
		<b>Interlocking</b>					
+32		Enable close logic equation	0=none, 0x0080-0x00BF=SP1-SP64, 0xFFFF=TRUE		UINT16	R/W	
+33		Enable open logic equation	0=none, 0x0080-0x00BF=SP1-SP64, 0xFFFF=TRUE		UINT16	R/W	
+34		Interlocking bypass logic equation	0=none, 0x0080-0x00BF=SP1-SP64		UINT16	R/W	
+35		Interlocking bypass timeout	0-600 s		UINT16	R/W	
+36-59		Reserved			UINT16	R/W	
<b>Periodic Timers Setup</b>							
61024-61087							
+0,1		Time interval (positive in seconds, negative in cycles)	-100000000 -100000000	0.001 s/c	UINT32	R/W	
61024-61025		<b>Timer #1 Setup</b>		0.001 s/c	UINT32	R/W	
61026-61027		<b>Timer #2 Setup</b>		0.001 s/c	UINT32	R/W	
		...					
61040-61041		<b>Timer #9 Setup</b>		0.001s/c	UINT32	R/W	
61042-61043		<b>Timer #10 Setup</b> (factory preset)	-500 (half-cycle)	0.001cyc	UINT32	R	
61044-61045		<b>Timer #11 Setup</b> (factory preset)	-1000 (one cycle)	0.001cyc	UINT32	R	
61046-61047		<b>Timer #12 Setup</b> (factory preset)	200 (200 ms = 10/12 cycles)	0.001 s	UINT32	R	
61048-61049		<b>Timer #13 Setup</b> (factory preset)	3000 (3 sec = 150/180 cycles)	0.001 s	UINT32	R	
61050-61051		<b>Timer #14 Setup</b> (factory preset)	10000 (10 sec)	0.001 s	UINT32	R	
61052-61053		<b>Timer #15 Setup</b> (factory preset)	600000 (10 min)	0.001 s	UINT32	R	
61054-61055		<b>Timer #16 Setup</b> (factory preset)	7200000 (2 hours)	0.001 s	UINT32	R	
61056-61087		Reserved					
<b>Energy Pulse Source Setup</b>							
61088-61215							
+0		Energy pulse source ID	F15		UINT16	R/W	
+1		Not used	0		UINT16	R/W	
+2,3		Units per pulse	1-10000		UINT32	R/W	
61088-61091		<b>Pulse Source #1</b>					
61092-61095		<b>Pulse Source #2</b>					
		...					
61212-61215		<b>Pulse Source #32</b>					
<b>Counters Setup</b>							
61216-61471							
+0,1		Roll over value	1-1,000,000,000		UINT32	R/W	
+2,3		Reset value	0 - +/-999,999,999		INT32	R/W	
61216-61219		<b>Counter #1 Setup</b>					



Address	Point ID	Description	Options/Range	Units	Type	R/W	Notes
61220-61223		<b>Counter #2 Setup</b>					
		...					
61340-61343		<b>Counter #32 Setup</b>					
61344-61471		Reserved					
<b>Counter Source Setup</b>							
61472-61727							
+0		Pulse source ID	F16		UINT16	R/W	
+1		Target counter number	0-31		UINT16	R/W	
+2,3		Multiplier	+/-1-10000		INT32	R/W	
61472-61475		<b>Counter Source #1</b>					
61476-61479		<b>Counter Source #2</b>					
		...					
61724-61727		<b>Counter Source #64</b>					
<b>Digital Inputs Setup DI1-DI64</b>							
61728-61983							
+0		Pulse mode	0 = pulse, 1 = KYZ		UINT16	R/W	
+1		Polarity	Bit 0 – pulse polarity: 0=normal, 1=inverting Bit 1 – input polarity: 0=normal, 1=inverting		UINT16	R/W	
+2		De-bounce time, ms	1-1000		UINT16	R/W	Note 3
+3		Flags	Bit 0 – SOE Log: 0 = disabled, 1 = enabled; Bit 1 – Fault Log: 0 = disabled, 1 = enabled;		UINT16	R/W	
61728-61731		<b>DI1 Setup</b>					
61732-61735		<b>DI2 Setup</b>					
		...					
61980-61983		<b>DI64 Setup</b>					
<b>Digital Inputs Setup DI65-DI128</b>							
62752-63007							
62752-62575		<b>DI65 Setup</b>					
62756-62759		<b>DI66 Setup</b>					
		...					
63003-63007		<b>DI128 Setup</b>					
<b>Relay Outputs Setup</b>							
61984-62367							
+0		Operation Mode	0 = unlatched, 1 = latched, 2 = pulse, 3 = KYZ		UINT16	R/W	
+1		Flags	Bit 0 – polarity: 0 = normal, 1 = inverting Bit 2 – blocking: 0 = unblocked relay, 1= blocked relay		UINT16	R/W	A blocked relay can only be unblocked by the “unblock relay” setpoint command

Address	Point ID	Description	Options/Range	Units	Type	R/W	Notes
+2		Pulse width, ms	1-3000		UINT16	R/W	
+3		Pulse source ID	F17		UINT16	R/W	
+4		Retentive mode	0 = disabled, 1 = enabled		UINT16	R/W	
+5		SOE log on output change enabled	0 = disabled, 1 = enabled		UINT16	R/W	
61984-61989		<b>RO1 Setup</b>					
61990-61995		<b>RO2 Setup</b>					
		...					
62362-62367		<b>RO64 Setup</b>					
<b>Analog Inputs Setup</b>							
62368-62559							
+0		Input parameter ID	0 = input not assigned		UINT16	R/W	
+1		Not used	0		UINT16	R/W	
+2,3		Zero scale value (0/4 mA, 0V)			INT32	R/W	
+4,5		Full scale value (1/20/50 mA, 10V)			INT32	R/W	
62368-62373		<b>AI1 Setup</b>					
62374-62379		<b>AI2 Setup</b>					
		...					
62458-62463		<b>AI16 Setup</b>					
62464-62559		Reserved					
<b>Analog Outputs Setup</b>							
62560-62751							
+0		Output parameter ID	F18		UINT16	R/W	
+1		Not used	0		UINT16	R/W	
+2,3		Zero scale value (0/4 mA)			INT32	R/W	
+4,5		Full scale value (20/1 mA)			INT32	R/W	
62560-62565		<b>AO1 Setup</b>					
62566-62571		<b>AO2 Setup</b>					
		...					
62650-62655		<b>AO16 Setup</b>					
62656-62751		Reserved					

### 3.8 Expansion I/O Slots Configuration

Address	Point ID	Description	Options/Range	Units	Type	R/W	Notes
<b>Expansion I/O Slots Configuration Info</b>							
63008-63055		<b>Expansion I/O Slots Configuration Info</b>					
+0		I/O module type	Bitmap		UINT16	R	Note 2
+1		Number of I/Os on the slot	0-32		UINT16	R	
+2		First I/O number on the slot	0-79		UINT16	R	Note 1
+3		Last I/O number on the slot	0-95		UINT16	R	Note 1
63008-63011		<b>I/O Slot #1 Configuration</b>					
63012-63015		<b>I/O Slot #2 Configuration</b>					
63016-63019		<b>I/O Slot #3 Configuration</b>					
63020-63023		<b>I/O Slot #4 Configuration</b>					
63024-63027		<b>I/O Slot #5 Configuration</b>					
63028-63055		Reserved					
<b>Expansion I/O Modules Type Info</b>							
63056-63119		<b>Expansion I/O Modules Type Info</b>					
+0		Number of I/O modules of this type	0-5		UINT16	R	
+1		Total number of I/O's of this type	0-96		UINT16	R	
+2		Not used			UINT16	R	
+3		Not used	0		UINT16	R	
63056-63059		<b>DI Module Type Info</b>					
63060-63063		<b>RO Module Type Info</b>					
63064-63067		<b>AI Module Type Info</b>					
63068-63071		<b>AO Module Type Info</b>					
63072-63075		<b>XM Module Type Info</b>					
63076-63119		Reserved					

**NOTES:**

1. I/O numbers of expansion I/O modules are automatically assigned in the order of connection. The connection order is counted for each I/O module type separately. If the I/O module position is changed but its order in the chain of the modules of the same type is preserved, then all I/Os on the module will retain their I/O numbers. On the dual AI/AO module, both AI and AO will have same logical I/O range.

2. The type of a module in the corresponding slot position, number of I/Os on the module and their I/O numbers can be read through the I/O Slots Configuration Info registers. I/O module type register contains bit-mapped information on the module type and its options in bits D7:D0 as shown in the Table below.

### I/O Module Type

Module	Option	D7	D6	D5	D4	D3	D2	D1	D0
DI (16DI)	DRY	0	0	0	0	0	0	0	0
DI (16DI)	WET 24V	0	0	0	0	0	0	0	1
DI (16DI)	WET 48V	0	0	0	0	0	0	1	0
DI (16DI)	WET 125V	0	0	0	0	0	0	1	1
DI (32DI)	DRY	0	0	0	1	0	0	0	0
DI (32DI)	WET 24V	0	0	0	1	0	0	0	1
DI (32DI)	WET 48V	0	0	0	1	0	0	1	0
DI (32DI)	WET 125V	0	0	0	1	0	0	1	1
DI (32DI)	WET 250V	0	0	0	1	0	1	0	0
RO (8RO)		0	0	1	0	0	0	0	0
RO (16RO)		1	0	1	0	0	0	0	0
RO (8RO)		1	0	1	1	0	0	0	0
AI (4AI/4AO)	±1 mA	0	1	0	0	×	×	0	0
AI (4AI/4AO)	0-20 mA	0	1	0	0	×	×	0	1
AI (4AI/4AO)	4-20 mA	0	1	0	0	×	×	1	0
AI (4AI/4AO)	0-1 mA	0	1	0	0	×	×	1	1
AI (8AI)	0-50 mA	0	1	0	1	0	1	0	0
AI (8AI)	±10 V	0	1	0	1	0	1	0	1
AO (4AI/4AO)	±1 mA	0	1	0	0	0	0	×	×
AO (4AI/4AO)	0-20 mA	0	1	0	0	0	1	×	×
AO (4AI/4AO)	4-20 mA	0	1	0	0	1	0	×	×
AO (4AI/4AO)	0-1 mA	0	1	0	0	1	1	×	×
XM	64MB	1	0	0	0	0	0	0	0
XM	128MB	1	0	0	0	0	0	0	1
Empty slot		1	1	1	1	1	1	1	1

× = don't care

3. The same de-bounce time is used for each group of eight adjacent digital inputs. To assign de-bounce time for a group, write the desired value into the setup register for the first DI in the group, e.g., DI1, DI9, DI17 and so on. The device will assign this value to the following seven inputs automatically. Any attempt to change de-bounce time for an input that is not the first in the group will be ignored. No error will occur.

### 3.9 File Transfer Blocks

Address	Point ID	Description	Options/Range	Units	Type	R/W	Notes
<b>File Transfer Control Blocks</b>							
63120-63151		<b>File Request Block</b>					
+0		File function	1 = ACK - acknowledgement 3 = set file position 5 = reset file position 7 = find 11 = read file 127 = erase file		UINT16	R/W	1 - clears the file transfer block 3 - changes the file position 5 - sets the file position at the first (oldest) record 7 - finds a record matching an event or/and time (see Note 3) 11 - opens the file for reading from the present file position
+1		File ID	F2		UINT16	R/W	
+2		Section number (functions 3, 5, 11)	0-31, 0xFFFF = use channel ID		UINT16	R/W	
+3		Section channel ID (functions 3, 5, 11)	F6, F7		UINT16	R/W	
+4		Record sequence number (functions 3, 11)	0-65535		UINT16	R/W	The record sequence number with function 11 does not change the file position (see Note 2).
+5		Request variation (function 11)	0, 4		UINT16	R/W	See file response headings
+6		Find key: Event type	F22		UINT16	R/W	Note 3
+7		Find key: Event number	1 - 65535		UINT16	R/W	Note 3
+8, 9		Find key: Start time, seconds since 1/1/1970	F1	sec	UINT32	R/W	Note 3
+10, 11		Find key: Start time, fractional seconds in µsec		µsec	UINT32	R/W	Note 3
+12, 13		Find key: End time, seconds since 1/1/1970	F1	sec	UINT32	R/W	Note 3
+14, 15		Find key: End time, fractional seconds in µsec		µsec	UINT32	R/W	Note 3
+16-31		Reserved			UINT16	R/W	
63152-64943		<b>File Response Block</b>					
		Data transfer area [0 - 1791]			UINT16	R	
64944-64951		<b>File Info Request Block</b>					
+0		File function	9 = read file info		UINT16	R/W	
+1		File ID	F2		UINT16	R/W	
+2		Section number	0-31, 0xFFFF = use channel ID		UINT16	R/W	
+3		Section channel ID	F6, F7		UINT16	R/W	
+4		Not used	0		UINT16	R/W	
+5		Request variation	0, 1, 2		UINT16	R/W	
+6-7		Reserved			UINT16	R/W	
64952-65151		<b>File Info Response Block</b>					
		Data transfer area [0 - 199]			UINT16	R	

**NOTES:**

1. File sections for partitioned (multi-section) files, such as TOU profile log files and waveform log files, can be requested either by a section number, or by a section channel ID. If a section number is set to 0xFFFF, the section channel ID will be used to identify the section. The section number will be returned in the response block. If a section number is written, then the corresponding channel ID will be returned in the file response block.
2. The record sequence number with function 11 (Read-File) does not change the file position and is used only as a reference to track the order of records. The file transfer block will continue to hold the same data until it is acknowledged, or until the file position is explicitly moved to another record. For multi-section Waveform files that use a single read pointer for all file sections, the Read-File request, which addresses a different file section, will refill the transfer block with data of the record from the requested file section with the identical sequence number. After acknowledgment, the file position will be moved to the next record.
3. Function 7 (Find) puts into the file request block the sequence number of the first record in the file that matches the event or/and the time. If the file ID is set to 0xFFFF, the device will search for the desired record in the waveform file that is preset by default for the fault and power quality recorders or a setpoint, depending on the event type. The file ID where a record is found is returned in the file response block header. Any one of the find keys can be omitted by setting it to 0. If one or a number of find keys are omitted, the device will use the remaining keys to locate the matching record. If the record could not be found, the device responds to the write request with the exception code 3 (illegal data). The status of the operation can be read through the file status word in the file info block.

**File Response Blocks**

Address	Point ID	Description	Options/Range	Units	Type	R/W	Notes
<b>File Info Response Block (Variation 0 – File info)</b>							
64952-64959		<b>Block Heading</b>					
+0		File function	9		UINT16	R	
+1		File ID	F2		UINT16	R	
+2		Section number	0-31		UINT16	R	
+3		Section channel ID	F6, F7		UINT16	R	
+4		Number of records in the block	1		UINT16	R	
+5		Record size, words	36		UINT16	R	
+6		Request variation	0		UINT16	R	
+7		Reserved	0		UINT16	R	
64960-64997		<b>File Info</b>					
+0		File type	0		UINT16	R	
+1		File attributes	F3		UINT16	R	
+2		File (section) status	F4		UINT16	R	
+3		Number of sections in the file	0-32		UINT16	R	0 = non-partitioned file
+4, 5		File channel mask (channels 1-32), bitmap	F8, F9		UINT32	R	
+6, 7		File channel mask (channels 33-64), bitmap	F8, F9		UINT32	R	
+8		Number of records in the file	0-65535		UINT16	R	
+9		Number of records until the end of the file	0-65535		UINT16	R	
+10		Current record (read position) sequence number	0-65535		UINT16	R	
+11		Current write position sequence number	0-65535		UINT16	R	
+12		First (oldest) record sequence number	0-65535		UINT16	R	
+13		Last (newest) record sequence number	0-65535		UINT16	R	
+14, 15		Last record time, seconds since 1/1/1970	F1	sec	UINT32	R	
+16, 17		Last record time, fractional seconds		µsec	UINT32	R	
+18, 19		First record time, seconds since 1/1/1970	F1	sec	UINT32	R	

Address	Point ID	Description	Options/Range	Units	Type	R/W	Notes
+20, 21		First record time, fractional seconds		µsec	UINT32	R	
+22, 23		Creation time, seconds since 1/1/1970	F1	sec	UINT32	R	
+24, 25		Creation time, fractional seconds		µsec	UINT32	R	
+26, 27		Reset time, seconds since 1/1/1970	F1	sec	UINT32	R	
+28, 29		Reset time, fractional seconds		µsec	UINT32	R	
+30		Maximum number of records	0-65535		UINT16	R	
+31		Number of parameters per data section record	0-52		UINT16	R	
+32		Section record size, bytes		Byte	UINT16	R	
+33		File record size, bytes		Byte	UINT16	R	
+34, 35		Allocated file size, bytes		Byte	UINT32	R	
<b>File Info Response Block (Variation 1 – Current record info)</b>							
64952-64959		<b>Block Heading</b>					
+0		File function	9		UINT16	R	
+1		File ID	F2		UINT16	R	
+2		Section number	0-31		UINT16	R	
+3		Section channel ID	F6, F7		UINT16	R	
+4		Number of records in the block	1		UINT16	R	
+5		Record size, words	8		UINT16	R	
+6		Request variation	1		UINT16	R	
+7		Reserved	0		UINT16	R	
64960-64997		<b>File Info</b>					
+0		File (section) status	F4		UINT16	R	
+1		Number of records in the file	0-65535		UINT16	R	
+2		Number of records until the end of the file	0-65535		UINT16	R	
+3		Current record (read position) sequence number	0-65535		UINT16	R	
+4, 5		Current record time, seconds since 1/1/1970	F1	sec	UINT32	R	
+6, 7		Current record time, fractional seconds		µsec	UINT32	R	
<b>File Info Response Block (Variation 2 – Data log record structure)</b>							
64952-64959		<b>Block Heading</b>					
+0		File function	9		UINT16	R	
+1		File ID	1-16		UINT16	R	
+2		Section number	0-15		UINT16	R	
+3		Section channel ID	F6, F7		UINT16	R	
+4		Number of records in the block	1		UINT16	R	
+5		Record size, words	2 + Number of parameters		UINT16	R	
+6		Request variation	2		UINT16	R	
+7		Reserved	0		UINT16	R	
64960-64997		<b>File Info</b>					
+0		Not used	0		UINT16	R	
+1		Number of fields in a data record	1-16 for conventional files, 40 for GOST 13109 Compliance log, 80 for GOST 13109 Harmonics log		UINT16	R	
+2		Field 1 parameter ID	0-0xFFFF		UINT16	R	

Address	Point ID	Description	Options/Range	Units	Type	R/W	Notes
+3		Field 2 parameter ID	0-0xFFFF		UINT16	R	
...		...					
<b>Event Log Response Block</b>							
63152-63159		<b>Block Heading</b>					
+0		Last file function	1, 3, 5, 11		UINT16	R	
+1		File ID	0		UINT16	R	
+2		Section number	0		UINT16	R	
+3		Section channel ID	0		UINT16	R	
+4		Number of records in the block	1-32		UINT16	R	
+5		Record size, words	12		UINT16	R	
+6		Request variation	0		UINT16	R	
+7		Reserved	0		UINT16	R	
63160-63543		<b>Event Log Records</b>					
+0		Record status	F5		INT16	R	
+1		Record sequence number	0-65535		UINT16	R	
+2, 3		Trigger time, seconds since 1/1/1970	F1	sec	UINT32	R	
+4, 5		Trigger time, fractional seconds in $\mu$ sec		$\mu$ sec	UINT32	R	
+6		Event number	1-65535		UINT16	R	
+7		Event point/source ID	F19		UINT16	R	
+8		Event effect	F20		UINT16	R	
+9		Reserved	0		UINT16	R	
+10, 11		Value triggered			INT32	R	
63160-63171		<b>Record #1</b>					
...		...					
63532-63543		<b>Record #32</b>					
<b>Data Log Response Block</b>							
63152-63159		<b>Block Heading</b>					
+0		Last file function	1, 3, 5, 11		UINT16	R	
+1		File ID	1-16 (F2)		UINT16	R	
+2		Section number	0-31		UINT16	R	
+3		Section channel ID	F6		UINT16	R	
+4		Number of records in the block	1-32		UINT16	R	
+5		Record size, words	8 + 2×Number of parameters		UINT16	R	
+6		Request variation	0 = regular log, 4 = GOST 13109 online statistics (with file ID = 9, 10)		UINT16	R	
+7		Reserved	0		UINT16	R	
63160-64439		<b>Data Log Records</b>					
+0		Record status	F5		INT16	R	
+1		Record sequence number	0-65535		UINT16	R	
+2, 3		Record time, seconds since 1/1/1970	F1	sec	UINT32	R	
+4, 5		Record time, fractional seconds in $\mu$ sec		$\mu$ sec	UINT32	R	
+6		Trigger event type	F22		INT16	R	



Address	Point ID	Description	Options/Range	Units	Type	R/W	Notes
+7		Trigger event number	1-65535		UINT16	R	
+8, 9		Log value #1			INT32	R	
+10, 11		Log value #2			INT32	R	
...		...				R	
63160-...		<b>Record #1</b> (variable length)					
		...					
		<b>Record #32</b> (variable length)					
<b>Waveform Log Response Block</b>							
63152-63159		<b>Block Heading</b>					
+0		Last file function	1, 3, 5, 11		UINT16	R	
+1		File ID	17-24, 128 (F2)		UINT16	R	
+2		Section number	0-9 (0-25 for V10.6.XX)		UINT16	R	
+3		Section channel ID	F7		UINT16	R	
+4		Number of records in the block	1		UINT16	R	
+5		Record size, words	640		UINT16	R	
+6		Request variation	0		UINT16	R	
+7		Reserved	0		UINT16	R	
63160-63799		<b>Waveform Log Record</b>					
+0		Record status	F5		INT16	R	
+1		Record sequence number	0 - 65535		UINT16	R	
+2, 3		Start time, seconds since 1/1/1970	F1	sec	UINT32	R	
+4, 5		Start time, fractional seconds		µsec	UINT32	R	
+6, 7		Trigger time, seconds since 1/1/1970	F1	sec	UINT32	R	
+8, 9		Trigger time, fractional seconds		µsec	UINT32	R	
+10		Record series number	1-65535		UINT16	R	
+11		Record serial number in a series	0-65535		UINT16	R	
+12		Trigger event type	F22		UINT16	R	
+13		Trigger event number	1-65535		UINT16	R	
+14		Source point ID (generic)	See Generic Data in Section 3.4		UINT16	R	
+15		Trigger reference sample index	0-511		UINT16	R	
+16		Sampling rate, µsec/sample	600-27000	×0.1µsec	UINT16	R	For VDC channel, ×1µsec
+17		Sampling rate, samples/cycle	16, 32, 64, 128		UINT16	R	
+18		Sampling frequency	4500-6500	×0.01Hz	UINT16	R	
+19		Channel offset, sampling units	+/-32767		INT16	R	
+20, 21		Channel multiplier, primary units	See Generic Data in Section 3.4		UINT32	R	
+22		Channel divisor, sampling units	2147-8191		UINT16	R	
+23		Length of a sample series, data points	64-512		UINT16	R	
+24-127		Not used	0		UINT16	R	
+ 128		<b>Sample Series</b>					
+128-639		Sample data series points [0...511]	+/-8191		INT16	R	<sup>1</sup>
<b>Sequence of Events (SOE) Log Response Block</b>							
63152-63159		<b>Block Heading</b>					
+0		Last file function	1, 3, 5, 11		UINT16	R	

Address	Point ID	Description	Options/Range	Units	Type	R/W	Notes
+1		File ID	25		UINT16	R	
+2		Section number	0		UINT16	R	
+3		Section channel ID	0		UINT16	R	
+4		Number of records in the block	1-32		UINT16	R	
+5		Record size, words	10		UINT16	R	
+6		Request variation	0		UINT16	R	
+7		Reserved	0		UINT16	R	
63160-63479		<b>SOE Log Records</b>					
+0		Record status	F5		INT16	R	
+1		Record sequence number	0-65535		UINT16	R	
+2, 3		Trigger time, seconds since 1/1/1970	F1	sec	UINT32	R	
+4, 5		Trigger time, fractional seconds in $\mu$ sec		$\mu$ sec	UINT32	R	
+6		Fault event type	F22		UINT16	R	
+7		Fault event number	1-65535		UINT16	R	
+8		Fault source point status	0 = Open/Off, 1 = Closed/On		UINT16	R	
+9		GPS clock sync status	0 = time unlocked, 1 = time locked		UINT16	R	
63160-63169		<b>Record #1</b>					
		...					
63470-63479		<b>Record #32</b>					
<b>Power Quality (PQ) Log Response Block</b>							
63152-63159		<b>Block Heading</b>					
+0		Last file function	1, 3, 5, 11		UINT16	R	
+1		File ID	26		UINT16	R	
+2		Section number	0		UINT16	R	
+3		Section channel ID	0		UINT16	R	
+4		Number of records in the block	1 -32		UINT16	R	
+5		Record size, words	18		UINT16	R	
+6		Request variation	0		UINT16	R	
+7		Reserved	0		UINT16	R	
63160-63799		<b>PQ Log Records</b>					
+0		Record status	F5		INT16	R	
+1		Record sequence number	0-65535		UINT16	R	
+2, 3		Start time, seconds since 1/1/1970	F1	sec	UINT32	R	
+4, 5		Start time, fractional seconds in $\mu$ sec		$\mu$ sec	UINT32	R	
+6, 7		End time, seconds since 1/1/1970	F1	sec	UINT32	R	
+8, 9		End time, fractional seconds in $\mu$ sec		$\mu$ sec	UINT32	R	
+10		PQ event type	F22		UINT16	R	
+11		PQ event number	1-65535		UINT16	R	
+12		Point ID (generic)	See Generic Data in Section 3.4		UINT16	R	
+13		Reserved	0		UINT16	R	
+14, 15		Value reference (base), primary units	See Generic Data in Section 3.4		INT32	R	
+16, 17		Value magnitude, primary units	See Generic Data in Section 3.4		INT32	R	

Address	Point ID	Description	Options/Range	Units	Type	R/W	Notes
63160-63179		<b>Record #1</b>					
		...					
63780-63799		<b>Record #32</b>					
<b>Fault Log Response Block</b>							
63152-63159		<b>Block Heading</b>					
+0		Last file function	1, 3, 5, 11		UINT16	R	
+1		File ID	27		UINT16	R	
+2		Section number	0		UINT16	R	
+3		Section channel ID	0		UINT16	R	
+4		Number of records in the block	1-32		UINT16	R	
+5		Record size, words	22		UINT16	R	
+6		Request variation	0		UINT16	R	
+7		Reserved	0		UINT16	R	
63160-64183		<b>Fault Log Records</b>					
+0		Record status	F5		INT16	R	
+1		Record sequence number	0-65535		UINT16	R	
+2, 3		Start time, seconds since 1/1/1970	F1	sec	UINT32	R	
+4, 5		Start time, fractional seconds in $\mu$ sec		$\mu$ sec	UINT32	R	
+6, 7		End time, seconds since 1/1/1970	F1	sec	UINT32	R	
+8, 9		End time, fractional seconds in $\mu$ sec		$\mu$ sec	UINT32	R	
+10		Fault event type	F22		UINT16	R	
+11		Fault event number	1-65535		UINT16	R	
+12		Current phase point ID (generic)	0-65535		UINT16	R	
+13		Volts phase point ID (generic)	0-65535		UINT16	R	
+14, 15		Current reference (base), primary units	See Generic Data in Section 3.4	U2	INT32	R	
+16, 17		Current magnitude, primary units	See Generic Data in Section 3.4	U2	INT32	R	
+18, 19		Volts reference (base), primary units	See Generic Data in Section 3.4	U1	INT32	R	
+20, 21		Volts magnitude, primary units	See Generic Data in Section 3.4	U1	INT32	R	
63160-63191		<b>Record #1</b>					
		...					
64152-64183		<b>Record #32</b>					

<sup>1</sup> To restore the original sampled data in the channel units (e.g., Volts, Amps), the following conversion should be applied:

$$\text{Sampled Data [primary units]} = \frac{(\text{Data Sample} - \text{Channel Offset}) \times \text{Channel Multiplier}}{\text{Channel Divisor}}$$

## File Response Block Alias

Address	Point ID	Description	Options/Range	Units	Type	R/W	Notes
<b>File Response Block Alias</b>							
3072-3079		<b>Block Heading</b>					
+0		File function	11		UINT16	R	
+1		File ID	0, 25, 26, 27		UINT16	R/W	
+2		Section number	0		UINT16	R	
+3		Section channel ID	0		UINT16	R	
+4		Number of records in the block	1 - 10		UINT16	R/W	Write: sets the block size
+5		Record size, words	18		UINT16	R	
+6		Request variation	0		UINT16	R	
+7		Reserved	0		UINT16	R	
3080-3583		<b>Last 1-10 file records</b>					
<b>Power Quality (PQ) Log Response Block Alias</b>							
3072-3079		<b>Block Heading</b>					
+0		File function	11		UINT16	R	
+1		File ID	26		UINT16	R/W	
+2		Section number	0		UINT16	R	
+3		Section channel ID	0		UINT16	R	
+4		Number of records in the block	1 - 10		UINT16	R/W	Write: sets the block size
+5		Record size, words	18		UINT16	R	
+6		Request variation	0		UINT16	R	
+7		Reserved	0		UINT16	R	
3080-3259		<b>PQ Log Records</b>					
+0		Record status	F5		INT16	R	
+1		Record sequence number	0 - 65535		UINT16	R	
+2, 3		Start time, seconds since 1/1/1970	F1	sec	UINT32	R	
+4, 5		Start time, fractional seconds in $\mu$ sec		$\mu$ sec	UINT32	R	
+6, 7		End time, seconds since 1/1/1970	F1	sec	UINT32	R	
+8, 9		End time, fractional seconds in $\mu$ sec		$\mu$ sec	UINT32	R	
+10		PQ event type	F22		UINT16	R	
+11		PQ event number	1 - 65535		UINT16	R	
+12		Point ID (generic)	See Generic Data in Section 3.4		UINT16	R	
+13		Reserved	0		UINT16	R	
+14, 15		Value reference (base), primary units	See Generic Data in Section 3.4		INT32	R	
+16, 17		Value magnitude, primary units	See Generic Data in Section 3.4		INT32	R	
3080-3097		<b>Record #1</b>					
		...					
3242-3259		<b>Record #10</b>					

The block of registers 3072-3583 is the alias for the common file response block. It is intended for continuous polling of the last 1 to 10 records of the event files (Event Log, SOE Log, PQ Log or Fault Log) from SCADA systems. The alias block is preset at factory to provide access to the last ten PQ Log records. You can change factory assignments to point to another log file or change the number of the records in the transfer block by re-writing of the corresponding registers in the block heading. To update records in the alias block, at least one of the block heading registers 3072-3079 must be read first.

**NOTES:**

1. Registers 3080-3259 share the same data transfer buffer as the common file transfer block registers 63152-64943. Reading data from the common transfer block within the same connection session can destroy data in the alias transfer block. To guarantee that the alias block contains correct data, always read block heading registers 3072-3079 before accessing data records in the alias block.
2. If you read the block through a TCP connection and change a file ID or the number of records in the block, your assignments for the transfer block will be effective only within the current connection socket. Since the device cannot guarantee that your next connection will be made through the same socket, you should not make any assumptions regarding the present block settings. When you open a new connection, always check the block heading before accessing data records.

### 3.10 GOST 13109 Compliance Statistics Data Log

File Section	Record Field No.	Point Label	Point ID	Description <sup>1</sup>	Range	Units	Type	Notes
0				<b>Voltage Variation, peak load</b>				
	1	Nnv	0xC400	Number of non-valid 1-min intervals			UINT32	
	2	N	0xC401	Number of valid 1-min intervals			UINT32	
	3	V1 N1	0xC402	Number of values exceeded normally permissible limit on phase A/AB			UINT32	
	4	V1 N2	0xC403	Number of values exceeded maximum permissible limit on phase A/AB			UINT32	
	5	V1 dU min1	0xC404	Minimum 95% probability daily variation on phase A/AB, +/-%Un		0.01%	INT32	
	6	V1 dU max1	0xC405	Maximum 95% probability daily variation on phase A/AB, +/-%Un		0.01%	INT32	
	7	V1 dU min2	0xC406	Minimum daily variation on phase A/AB, +/-%Un		0.01%	INT32	
	8	V1 dU max2	0xC407	Maximum daily variation on phase A/AB, +/-%Un		0.01%	INT32	
	9	V2 N1	0xC408	Number of values exceeded normally permissible limit on phase B/BC			UINT32	
	10	V2 N2	0xC409	Number of values exceeded maximum permissible limit on phase B/BC			UINT32	
	11	V2 dU min1	0xC40A	Minimum 95% probability daily variation on phase B/BC, +/-%Un		0.01%	INT32	
	12	V2 dU max1	0xC40B	Maximum 95% probability daily variation on phase B/BC, +/-%Un		0.01%	INT32	
	13	V2 dU min2	0xC40C	Minimum daily variation on phase B/BC, +/-%Un		0.01%	INT32	
	14	V2 dU max2	0xC40D	Maximum daily variation on phase B/BC, +/-%Un		0.01%	INT32	
	15	V3 N1	0xC40E	Number of values exceeded normally permissible limit on phase C/CA			UINT32	
	16	V3 N2	0xC40F	Number of values exceeded maximum permissible limit on phase C/CA			UINT32	
	17	V3 dU min1	0xC410	Minimum 95% probability daily variation on phase C/CA, +/-%Un		0.01%	INT32	
	18	V3 dU max1	0xC411	Maximum 95% probability daily variation on phase C/CA, +/-%Un		0.01%	INT32	
	19	V3 dU min2	0xC412	Minimum daily variation on phase C/CA, +/-%Un		0.01%	INT32	
	20	V3 dU max2	0xC413	Maximum daily variation on phase C/CA, +/-%Un		0.01%	INT32	
	21	Vp N1	0xC414	Number of positive sequence values exceeded normally permissible limit			UINT32	
	22	Vp N2	0xC415	Number of positive sequence values exceeded maximum permissible limit			UINT32	
	23	Vp dU min1	0xC416	Minimum positive sequence 95% probability daily variation, +/-%Un		0.01%	INT32	
	24	Vp dU max1	0xC417	Maximum positive sequence 95% probability daily variation, +/-%Un		0.01%	INT32	
	25	Vp dU min2	0xC418	Minimum positive sequence daily variation, +/-%Un		0.01%	INT32	
	26	Vp dU max2	0xC419	Maximum positive sequence daily variation, +/-%Un		0.01%	INT32	
	27	dU lim1 high	0xC41A	High normally permissible limit of voltage variation, %Un		0.01%	UINT32	
	28	dU lim2 high	0xC41B	High maximum permissible limit of voltage variation, %Un		0.01%	UINT32	
	29	dU lim1 low	0xC41C	Low normally permissible limit of voltage variation, %Un		0.01%	UINT32	
30	dU lim2 low	0xC41D	Low maximum permissible limit of voltage variation, %Un		0.01%	UINT32		
1				<b>Voltage Variation, light load</b>				
	1	Nnv	0xC400	Number of non-valid 1-min intervals			UINT32	
	2	N	0xC401	Number of valid 1-min intervals			UINT32	
	3	V1 N1	0xC402	Number of values exceeded normally permissible limit on phase A/AB			UINT32	
	4	V1 N2	0xC403	Number of values exceeded maximum permissible limit on phase A/AB			UINT32	
	5	V1 dU min1	0xC404	Minimum 95% probability daily variation on phase A/AB, +/-%Un		0.01%	INT32	
	6	V1 dU max1	0xC405	Maximum 95% probability daily variation on phase A/AB, +/-%Un		0.01%	INT32	
7	V1 dU min2	0xC406	Minimum daily variation on phase A/AB, +/-%Un		0.01%	INT32		

File Section	Record Field No.	Point Label	Point ID	Description <sup>1</sup>	Range	Units	Type	Notes
	8	V1 dU max2	0xC407	Maximum daily variation on phase A/AB, +/-%Un		0.01%	INT32	
	9	V2 N1	0xC408	Number of values exceeded normally permissible limit on phase B/BC			UINT32	
	10	V2 N2	0xC409	Number of values exceeded maximum permissible limit on phase B/BC			UINT32	
	11	V2 dU min1	0xC40A	Minimum 95% probability daily variation on phase B/BC, +/-%Un		0.01%	INT32	
	12	V2 dU max1	0xC40B	Maximum 95% probability daily variation on phase B/BC, +/-%Un		0.01%	INT32	
	13	V2 dU min2	0xC40C	Minimum daily variation on phase B/BC, +/-%Un		0.01%	INT32	
	14	V2 dU max2	0xC40D	Maximum daily variation on phase B/BC, +/-%Un		0.01%	INT32	
	15	V3 N1	0xC40E	Number of values exceeded normally permissible limit on phase C/CA			UINT32	
	16	V3 N2	0xC40F	Number of values exceeded maximum permissible limit on phase C/CA			UINT32	
	17	V3 dU min1	0xC410	Minimum 95% probability daily variation on phase C/CA, +/-%Un		0.01%	INT32	
	18	V3 dU max1	0xC411	Maximum 95% probability daily variation on phase C/CA, +/-%Un		0.01%	INT32	
	19	V3 dU min2	0xC412	Minimum daily variation on phase C/CA, +/-%Un		0.01%	INT32	
	20	V3 dU max2	0xC413	Maximum daily variation on phase C/CA, +/-%Un		0.01%	INT32	
	21	Vp N1	0xC414	Number of positive sequence values exceeded normally permissible limit			UINT32	
	22	Vp N2	0xC415	Number of positive sequence values exceeded maximum permissible limit			UINT32	
	23	Vp dU min1	0xC416	Minimum positive sequence 95% probability daily variation, +/-%Un		0.01%	INT32	
	24	Vp dU max1	0xC417	Maximum positive sequence 95% probability daily variation, +/-%Un		0.01%	INT32	
	25	Vp dU min2	0xC418	Minimum positive sequence daily variation, +/-%Un		0.01%	INT32	
	26	Vp dU max2	0xC419	Maximum positive sequence daily variation, +/-%Un		0.01%	INT32	
	27	dU lim1 high	0xC41A	High normally permissible limit of voltage variation, %Un		0.01%	UINT32	
	28	dU lim2 high	0xC41B	High maximum permissible limit of voltage variation, %Un		0.01%	UINT32	
	29	dU lim1 low	0xC41C	Low normally permissible limit of voltage variation, %Un		0.01%	UINT32	
	30	dU lim2 low	0xC41D	Low maximum permissible limit of voltage variation, %Un		0.01%	UINT32	
2				<b>Voltage Variation, daily load</b>				
	1	Nnv	0xC400	Number of non-valid 1-min intervals			UINT32	
	2	N	0xC401	Number of valid 1-min intervals			UINT32	
	3	V1 N1	0xC402	Number of values exceeded normally permissible limit on phase A/AB			UINT32	
	4	V1 N2	0xC403	Number of values exceeded maximum permissible limit on phase A/AB			UINT32	
	5	V1 dU min1	0xC404	Minimum 95% probability daily variation on phase A/AB, +/-%Un		0.01%	INT32	
	6	V1 dU max1	0xC405	Maximum 95% probability daily variation on phase A/AB, +/-%Un		0.01%	INT32	
	7	V1 dU min2	0xC406	Minimum daily variation on phase A/AB, +/-%Un		0.01%	INT32	
	8	V1 dU max2	0xC407	Maximum daily variation on phase A/AB, +/-%Un		0.01%	INT32	
	9	V2 N1	0xC408	Number of values exceeded normally permissible limit on phase B/BC			UINT32	
	10	V2 N2	0xC409	Number of values exceeded maximum permissible limit on phase B/BC			UINT32	
	11	V2 dU min1	0xC40A	Minimum 95% probability daily variation on phase B/BC, +/-%Un		0.01%	INT32	
	12	V2 dU max1	0xC40B	Maximum 95% probability daily variation on phase B/BC, +/-%Un		0.01%	INT32	
	13	V2 dU min2	0xC40C	Minimum daily variation on phase B/BC, +/-%Un		0.01%	INT32	
	14	V2 dU max2	0xC40D	Maximum daily variation on phase B/BC, +/-%Un		0.01%	INT32	
	15	V3 N1	0xC40E	Number of values exceeded normally permissible limit on phase C/CA			UINT32	
	16	V3 N2	0xC40F	Number of values exceeded maximum permissible limit on phase C/CA			UINT32	
	17	V3 dU min1	0xC410	Minimum 95% probability daily variation on phase C/CA, +/-%Un		0.01%	INT32	
	18	V3 dU max1	0xC411	Maximum 95% probability daily variation on phase C/CA, +/-%Un		0.01%	INT32	

File Section	Record Field No.	Point Label	Point ID	Description <sup>1</sup>	Range	Units	Type	Notes
	19	V3 dU min2	0xC412	Minimum daily variation on phase C/CA, +/-%Un		0.01%	INT32	
	20	V3 dU max2	0xC413	Maximum daily variation on phase C/CA, +/-%Un		0.01%	INT32	
	21	Vp N1	0xC414	Number of positive sequence values exceeded normally permissible limit			UINT32	
	22	Vp N2	0xC415	Number of positive sequence values exceeded maximum permissible limit			UINT32	
	23	Vp dU min1	0xC416	Minimum positive sequence 95% probability daily variation, +/-%Un		0.01%	INT32	
	24	Vp dU max1	0xC417	Maximum positive sequence 95% probability daily variation, +/-%Un		0.01%	INT32	
	25	Vp dU min2	0xC418	Minimum positive sequence daily variation, +/-%Un		0.01%	INT32	
	26	Vp dU max2	0xC419	Maximum positive sequence daily variation, +/-%Un		0.01%	INT32	
	27	dU lim1 high	0xC41A	High normally permissible limit of voltage variation, %Un		0.01%	UINT32	
	28	dU lim2 high	0xC41B	High maximum permissible limit of voltage variation, %Un		0.01%	UINT32	
	29	dU lim1 low	0xC41C	Low normally permissible limit of voltage variation, %Un		0.01%	UINT32	
	30	dU lim2 low	0xC41D	Low maximum permissible limit of voltage variation, %Un		0.01%	UINT32	
3				<b>Voltage Change</b>				
	1	V1 N1	0xC480	Number of incidents on phase A/AB			UINT32	
	2	V1 dUt	0xC481	Maximum voltage change on phase A/AB, %Un		0.01%	UINT32	
	3	V1 FdUt	0xC482	Repetition rate of voltage changes on phase A/AB, 1/min		1/min × 0.01	UINT32	
	4	V1 dUt lim	0xC483	Exceeded voltage change limit on phase A/AB, Un%		0.01%	UINT32	
	5	V1 FdUt lim	0xC484	Exceeded repetition rate of voltage changes on phase A/AB, 1/min			UINT32	
	6	V2 N1	0xC485	Number of incidents on phase B/BC			UINT32	
	7	V2 dUt	0xC486	Maximum voltage change on phase B/BC, %Un		0.01%	UINT32	
	8	V2 FdUt	0xC487	Repetition rate of voltage changes on phase B/BC, 1/min		1/min × 0.01	UINT32	
	9	V2 dUt lim	0xC488	Exceeded voltage change limit on phase B/BC, Un%		0.01%	UINT32	
	10	V2 FdUt lim	0xC489	Exceeded repetition rate of voltage changes on phase B/BC, 1/min			UINT32	
	11	V3 N1	0xC48A	Number of incidents on phase C/CA			UINT32	
	12	V3 dUt	0xC48B	Maximum voltage change on phase C/CA, %Un		0.01%	UINT32	
	13	V3 FdUt	0xC48C	Repetition rate of voltage changes on phase C/CA, 1/min		1/min × 0.01	UINT32	
	14	V3 dUt lim	0xC48D	Exceeded voltage change limit on phase C/CA, Un%		0.01%	UINT32	
	15	V3 FdUt lim	0xC48E	Exceeded repetition rate of voltage changes on phase C/CA, 1/min			UINT32	
4				<b>Flicker</b>				
	1	Pst Nnv	0xC500	Number of non-valid 10-min intervals			UINT32	
	2	Pst N	0xC501	Number of valid 10-min intervals			UINT32	
	3	V1 Pst N1	0xC502	Number of Pst values exceeded maximum permissible limit on phase A/AB			UINT32	
	4	V1 Pst Max	0xC503	Maximum Pst on phase A/AB		0.01	UINT32	
	5	V2 Pst N1	0xC504	Number of Pst values exceeded maximum permissible limit on phase B/BC			UINT32	
	6	V2 Pst Max	0xC505	Maximum Pst on phase B/BC		0.01	UINT32	
	7	V3 Pst N1	0xC506	Number of Pst values exceeded maximum permissible limit on phase C/CA			UINT32	
	8	V3 Pst Max	0xC507	Maximum Pst on phase C/CA		0.01	UINT32	
	9	Pst lim	0xC508	Maximum permissible limit for Pst		0.01	UINT32	
	10	Plt Nnv	0xC509	Number of non-valid 2-hour intervals			UINT32	
	11	Plt N	0xC50A	Number of valid 2-hour intervals			UINT32	
	12	V1 Plt N1	0xC50B	Number of Plt values exceeded maximum permissible limit on phase A/AB			UINT32	
	13	V1 Plt Max	0xC50C	Maximum Plt on phase A/AB		0.01	UINT32	



File Section	Record Field No.	Point Label	Point ID	Description <sup>1</sup>	Range	Units	Type	Notes
	14	V2 Plt N1	0xC50D	Number of Plt values exceeded maximum permissible limit on phase B/BC			UINT32	
	15	V2 Plt Max	0xC50E	Maximum Plt on phase B/BC		0.01	UINT32	
	16	V3 Plt N1	0xC50F	Number of Plt values exceeded maximum permissible limit on phase C/CA			UINT32	
	17	V3 Plt Max	0xC510	Maximum Plt on phase C/CA		0.01	UINT32	
	18	Plt lim	0xC511	Maximum permissible limit for Plt		0.01	UINT32	
5				<b>Voltage THD</b>				
	1	Nnv	0xC580	Number of non-valid 3-sec intervals			UINT32	
	2	N	0xC581	Number of valid 3-sec intervals			UINT32	
	3	V1 N1	0xC582	Number of THD values exceeded normally permissible limit on phase A/AB			UINT32	
	4	V1 N2	0xC583	Number of THD values exceeded maximum permissible limit on phase A/AB			UINT32	
	5	V1 THD max1	0xC584	Maximum 95% probability daily THD on phase A/AB, %		0.1%	UINT32	
	6	V1 THD max2	0xC585	Maximum daily THD on phase A/AB, %		0.1%	UINT32	
	7	V2 N1	0xC586	Number of THD values exceeded normally permissible limit on phase B/BC			UINT32	
	8	V2 N2	0xC587	Number of THD values exceeded maximum permissible limit on phase B/BC			UINT32	
	9	V2 THD max1	0xC588	Maximum 95% probability daily THD on phase B/BC, %		0.1%	UINT32	
	10	V2 THD max2	0xC589	Maximum daily THD on phase B/BC, %		0.1%	UINT32	
	11	V3 N1	0xC58A	Number of THD values exceeded normally permissible limit on phase C/CA			UINT32	
	12	V3 N2	0xC58B	Number of THD values exceeded maximum permissible limit on phase C/CA			UINT32	
	13	V3 THD max1	0xC58C	Maximum 95% probability daily THD on phase C/CA, %		0.1%	UINT32	
	14	V3 THD max2	0xC58D	Maximum daily THD on phase C/CA, %		0.1%	UINT32	
	15	THD lim1	0xC58E	Normally permissible limit of THD, %		0.1%	UINT32	
	16	THD lim2	0xC58F	Maximum permissible limit of THD, %		0.1%	UINT32	
6				<b>Voltage Unbalance</b>				
	1	Nnv	0xC600	Number of non-valid 3-sec intervals			UINT32	
	2	N	0xC601	Number of valid 3-sec intervals			UINT32	
	3	K2u N1	0xC602	Number of negative-sequence values exceeded normally permissible limit			UINT32	
	4	K2u N2	0xC603	Number of negative-sequence values exceeded maximum permissible limit			UINT32	
	5	K2u max1	0xC604	Maximum 95% probability daily negative-sequence unbalance, %		0.1%	UINT32	
	6	K2u max2	0xC605	Maximum daily negative-sequence unbalance, %		0.1%	UINT32	
	7	K2u lim1	0xC606	Normally permissible limit of negative-sequence unbalance, %		0.1%	UINT32	
	8	K2u lim2	0xC607	Maximum permissible limit of negative-sequence unbalance, %		0.1%	UINT32	
	9	K0u N1	0xC608	Number of zero-sequence values exceeded normally permissible limit			UINT32	
	10	K0u N2	0xC609	Number of zero-sequence values exceeded maximum permissible limit			UINT32	
	11	K0u max1	0xC60A	Maximum 95% probability daily zero-sequence unbalance, %		0.1%	UINT32	
	12	K0u max2	0xC60B	Maximum daily zero-sequence unbalance, %		0.1%	UINT32	
	13	K0u lim1	0xC60C	Normally permissible limit of zero-sequence unbalance, %		0.1%	UINT32	
	14	K0u lim2	0xC60D	Maximum permissible limit of zero-sequence unbalance, %		0.1%	UINT32	
7				<b>Frequency Variation</b>				
	1	Nnv	0xC680	Number of non-valid 20-sec intervals			UINT32	
	2	N	0xC681	Number of valid 20-sec intervals			UINT32	
	3	N1	0xC682	Number of values exceeded normally permissible limit			UINT32	
	4	N2	0xC683	Number of values exceeded maximum permissible limit			UINT32	

File Section	Record Field No.	Point Label	Point ID	Description <sup>1</sup>	Range	Units	Type	Notes
	5	df min1	0xC684	Minimum 95% probability daily frequency variation, +/-Hz		0.01 Hz	INT32	
	6	df max1	0xC685	Maximum 95% probability daily frequency variation, +/-Hz		0.01 Hz	INT32	
	7	df min2	0xC686	Minimum daily frequency variation, +/-Hz		0.01 Hz	INT32	
	8	df max2	0xC687	Maximum daily frequency variation, +/-Hz		0.01 Hz	INT32	
	9	df lim1 high	0xC688	High normally permissible limit of frequency variation, Hz		0.01 Hz	UINT32	
	10	df lim2 high	0xC689	High maximum permissible limit of frequency variation, Hz		0.01 Hz	UINT32	
	11	df lim1 low	0xC68A	Low normally permissible limit of frequency variation, Hz		0.01 Hz	UINT32	
	12	df lim2 low	0xC68B	Low maximum permissible limit of frequency variation, Hz		0.01 Hz	UINT32	
8				<b>Voltage Dips</b> (indicative statistics)				
	1	N11 10%/0.2s	0xC700	Number of polyphase dips with depth >10% and duration <=0.2 s			UINT32	
	2	N12 35%/0,2s	0xC701	Number of polyphase dips with depth >35% and duration <=0.2 s			UINT32	
	3	N13 99%/0,2s	0xC702	Number of polyphase dips with depth >99% and duration <=0.2 s			UINT32	
	4	N21 10%/0.5s	0xC703	Number of polyphase dips with depth >10% and duration <=0.5 s			UINT32	
	5	N22 35%/0,5s	0xC704	Number of polyphase dips with depth >35% and duration <=0.5 s			UINT32	
	6	N23 99%/0,5s	0xC705	Number of polyphase dips with depth >99% and duration <=0.5 s			UINT32	
	7	N31 10%/0.7s	0xC706	Number of polyphase dips with depth >10% and duration <=0.7 s			UINT32	
	8	N32 35%/0,7s	0xC707	Number of polyphase dips with depth >35% and duration <=0.7 s			UINT32	
	9	N33 99%/0,7s	0xC708	Number of polyphase dips with depth >99% and duration <=0.7 s			UINT32	
	10	N41 10%/1.5s	0xC709	Number of polyphase dips with depth >10% and duration <=1.5 s			UINT32	
	11	N42 35%/1,5s	0xC70A	Number of polyphase dips with depth >35% and duration <=1.5 s			UINT32	
	12	N43 99%/1,5s	0xC70B	Number of polyphase dips with depth >99% and duration <=1.5 s			UINT32	
	13	N51 10%/3.0s	0xC70C	Number of polyphase dips with depth >10% and duration <=3.0 s			UINT32	
	14	N52 35%/3,0s	0xC70D	Number of polyphase dips with depth >35% and duration <=3.0 s			UINT32	
	15	N53 99%/3,0s	0xC70E	Number of polyphase dips with depth >99% and duration <=3.0 s			UINT32	
	16	N61 10%/30s	0xC70F	Number of polyphase dips with depth >10% and duration <=30 s			UINT32	
	17	N62 35%/30s	0xC710	Number of polyphase dips with depth >35% and duration <=30 s			UINT32	
	18	N63 99%/30s	0xC711	Number of polyphase dips with depth >99% and duration <=30 s			UINT32	
	19	N71 10%/>30s	0xC712	Number of polyphase dips with depth >10% and duration >30 s			UINT32	
	20	N72 35%/>30s	0xC713	Number of polyphase dips with depth >35% and duration >30 s			UINT32	
	21	N73 99%/>30s	0xC714	Number of polyphase dips with depth >99% and duration >30 s			UINT32	
	22	dt max 10%	0xC715	Maximum duration of polyphase dips with depth >10%		ms	UINT32	
	23	dt max 35%	0xC716	Maximum duration of polyphase dips with depth >35%		ms	UINT32	
	24	dt max 99%	0xC717	Maximum duration of polyphase dips with depth >99%		ms	UINT32	
	25	dU 0.2s	0xC718	Maximum depth of polyphase dips with duration <=0.2 s, %Un		0.01%	UINT32	
	26	dU 0.5s	0xC719	Maximum depth of polyphase dips with duration <=0.5 s, %Un		0.01%	UINT32	
	27	dU 0.7s	0xC71A	Maximum depth of polyphase dips with duration <=0.7 s, %Un		0.01%	UINT32	
	28	dU 1.5s	0xC71B	Maximum depth of polyphase dips with duration <=1.5 s, %Un		0.01%	UINT32	
	29	dU 3.0s	0xC71C	Maximum depth of polyphase dips with duration <=3.0 s, %Un		0.01%	UINT32	
	30	dU 30s	0xC71D	Maximum depth of polyphase dips with duration <=30 s, %Un		0.01%	UINT32	
	31	dU >30s	0xC71E	Maximum depth of polyphase dips with duration >30 s, %Un		0.01%	UINT32	
	32	dt tot	0xC71F	Total duration of polyphase dips		ms	UINT32	
	33	V1 N1	0xC720	Number of dips on phase A/AB			UINT32	

File Section	Record Field No.	Point Label	Point ID	Description <sup>1</sup>	Range	Units	Type	Notes
	34	V1 dU max	0xC721	Maximum depth of dips on phase A/AB, %Un		0.01%	UINT32	
	35	V2 N1	0xC722	Number of dips on phase B/BC			UINT32	
	36	V2 dU max	0xC723	Maximum depth of dips on phase B/BC, %Un		0.01%	UINT32	
	37	V3 N1	0xC724	Number of dips on phase C/CA			UINT32	
	38	V3 dU max	0xC725	Maximum depth of dips on phase C/CA, %Un		0.01%	UINT32	
9				<b>Impulsive Voltage</b> (indicative statistics)				
	1	N1 20%	0xC780	Number of polyphase impulses with amplitude >20%			UINT32	
	2	N2 100%	0xC781	Number of polyphase impulses with amplitude >100%			UINT32	
	3	N3 200%	0xC782	Number of polyphase impulses with amplitude >200%			UINT32	
	4	N4 300%	0xC783	Number of polyphase impulses with amplitude >300%			UINT32	
	5	N5 400%	0xC784	Number of polyphase impulses with amplitude >400%			UINT32	
	6	V1 N1 20%	0xC785	Number of impulses on phase A/AB with amplitude >20%			UINT32	
	7	V1 N2 100%	0xC786	Number of impulses on phase A/AB with amplitude >100%			UINT32	
	8	V1 N3 200%	0xC787	Number of impulses on phase A/AB with amplitude >200%			UINT32	
	9	V1 N4 300%	0xC788	Number of impulses on phase A/AB with amplitude >300%			UINT32	
	10	V1 N5 400%	0xC789	Number of impulses on phase A/AB with amplitude >400%			UINT32	
	11	V2 N1 20%	0xC78A	Number of impulses on phase B/BC with amplitude >20%			UINT32	
	12	V2 N2 100%	0xC78B	Number of impulses on phase B/BC with amplitude >100%			UINT32	
	13	V2 N3 200%	0xC78C	Number of impulses on phase B/BC with amplitude >200%			UINT32	
	14	V2 N4 300%	0xC78D	Number of impulses on phase B/BC with amplitude >300%			UINT32	
	15	V2 N5 400%	0xC78E	Number of impulses on phase B/BC with amplitude >400%			UINT32	
	16	V3 N1 20%	0xC78F	Number of impulses on phase C/CA with amplitude >20%			UINT32	
	17	V3 N2 100%	0xC790	Number of impulses on phase C/CA with amplitude >100%			UINT32	
	18	V3 N3 200%	0xC791	Number of impulses on phase C/CA with amplitude >200%			UINT32	
	19	V3 N4 300%	0xC792	Number of impulses on phase C/CA with amplitude >300%			UINT32	
	20	V3 N5 400%	0xC793	Number of impulses on phase C/CA with amplitude >400%			UINT32	
	21	V1 max	0xC794	Maximum impulsive voltage on phase A/AB		U1	UINT32	
	22	V1 dt	0xC795	Duration of the maximum voltage impulse on phase A/AB		us	UINT32	
	23	V2 max	0xC796	Maximum impulsive voltage on phase B/BC		U1	UINT32	
	24	V2 dt	0xC797	Duration of the maximum voltage impulse on phase B/BC		us	UINT32	
	25	V3 max	0xC798	Maximum impulsive voltage on phase C/CA		U1	UINT32	
	26	V4 dt	0xC799	Duration of the maximum voltage impulse on phase C/CA		us	UINT32	
10				<b>Temporary Overvoltages</b> (indicative statistics)				
	1	N11 110%/1s	0xC800	Number of polyphase overvoltages with U <sub>a</sub> >110% and duration ≤ 1 s			UINT32	
	2	N12 120%/1s	0xC801	Number of polyphase overvoltages with U <sub>a</sub> >120% and duration ≤ 1 s			UINT32	
	3	N13 140%/1s	0xC802	Number of polyphase overvoltages with U <sub>a</sub> >140% and duration ≤ 1 s			UINT32	
	4	N14 160%/1s	0xC803	Number of polyphase overvoltages with U <sub>a</sub> >160% and duration ≤ 1 s			UINT32	
	5	N15 200%/1s	0xC804	Number of polyphase overvoltages with U <sub>a</sub> >200% and duration ≤ 1 s			UINT32	
	6	N21 110%/20s	0xC805	Number of polyphase overvoltages with U <sub>a</sub> >110% and duration ≤ 20s			UINT32	
	7	N22 120%/20s	0xC806	Number of polyphase overvoltages with U <sub>a</sub> >120% and duration ≤ 20 s			UINT32	
	8	N23 140%/20s	0xC807	Number of polyphase overvoltages with U <sub>a</sub> >140% and duration ≤ 20 s			UINT32	
	9	N24 160%/20s	0xC808	Number of polyphase overvoltages with U <sub>a</sub> >160% and duration ≤ 20 s			UINT32	

File Section	Record Field No.	Point Label	Point ID	Description <sup>1</sup>	Range	Units	Type	Notes
	10	N25 200%/20s	0xC809	Number of polyphase overvoltages with Ua >200% and duration <=20 s			UINT32	
	11	N31 110%/60s	0xC80A	Number of polyphase overvoltages with Ua >110% and duration <=60 s			UINT32	
	12	N31 120%/60s	0xC80B	Number of polyphase overvoltages with Ua >120% and duration <=60 s			UINT32	
	13	N33 140%/60s	0xC80C	Number of polyphase overvoltages with Ua >140% and duration <=60 s			UINT32	
	14	N34 160%/60s	0xC80D	Number of polyphase overvoltages with Ua >160% and duration <=60 s			UINT32	
	15	N35 200%/60s	0xC80E	Number of polyphase overvoltages with Ua >200% and duration <=60 s			UINT32	
	16	N41 110%/>60s	0xC80F	Number of polyphase overvoltages with Ua >110% and duration >60 s			UINT32	
	17	N42 120%/>60s	0xC810	Number of polyphase overvoltages with Ua >120% and duration >60 s			UINT32	
	18	N43 140%/>60s	0xC811	Number of polyphase overvoltages with Ua >140% and duration >60 s			UINT32	
	19	N44 160%/>60s	0xC812	Number of polyphase overvoltages with Ua >160% and duration >60 s			UINT32	
	20	N45 200%/>60s	0xC813	Number of polyphase overvoltages with Ua >200% and duration >60 s			UINT32	
	21	dt max 110%	0xC814	Maximum duration of polyphase overvoltages with Ua >110%		ms	UINT32	
	22	dt max 120%	0xC815	Maximum duration of polyphase overvoltages with Ua >120%		ms	UINT32	
	23	dt max 140%	0xC816	Maximum duration of polyphase overvoltages with Ua >140%		ms	UINT32	
	24	dt max 160%	0xC817	Maximum duration of polyphase overvoltages with Ua >160%		ms	UINT32	
	25	dt max 200%	0xC818	Maximum duration of polyphase overvoltages with Ua >200%		ms	UINT32	
	26	Vpu max 1s	0xC819	Maximum polyphase overvoltage factor with duration <=1 s		0.01	UINT32	
	27	Vpu max 20s	0xC81A	Maximum polyphase overvoltage factor with duration <=20 s		0.01	UINT32	
	28	Vpu max 60s	0xC81B	Maximum polyphase overvoltage factor with duration <=60 s		0.01	UINT32	
	29	Vpu max >60s	0xC81C	Maximum polyphase overvoltage factor with duration >60 s		0.01	UINT32	
	30	dt tot	0xC81D	Total duration of polyphase overvoltages		ms	UINT32	
	31	V1 N1	0xC81E	Number of overvoltages on phase A/AB			UINT32	
	32	V1pu max	0xC81F	Maximum overvoltage factor on phase A/AB		0.01	UINT32	
	33	V2 N1	0xC820	Number of overvoltages on phase B/BC			UINT32	
	34	V2pu max	0xC821	Maximum overvoltage factor on phase B/BC		0.01	UINT32	
	35	V3 N1	0xC822	Number of overvoltages on phase C/CA			UINT32	
	36	V3pu max	0xC823	Maximum overvoltage factor on phase C/CA		0.01	UINT32	

<sup>1</sup> When the 4LN3, 3LN3 or 3BLN wiring mode is selected, the voltages will be line-to-neutral; for any other wiring mode, they will be line-to-line voltages.

### 3.11 GOST 13109 Harmonic Statistics Data Log

File Section	Record Field No.	Point Label	Point ID	Description <sup>1</sup>	Range	Units	Type	Notes
0				<b>V1 Harmonic Compliance</b>			UINT32	
	1	Nnv	0xCC00	Number of non-valid 3-sec intervals			UINT32	
	2	N	0xCC01	Number of valid 3-sec intervals			UINT32	
	3	H02 N1	0xCC02	Number of H02 values exceeded normally permissible limit on phase A/AB			UINT32	
	4	H03 N1	0xCC03	Number of H03 values exceeded normally permissible limit on phase A/AB			UINT32	
		...					UINT32	
	41	H40 N1	0xCC28	Number of H40 values exceeded normally permissible limit on phase A/AB			UINT32	
	42	H02 N2	0xCC29	Number of H02 values exceeded maximum permissible limit on phase A/AB			UINT32	

File Section	Record Field No.	Point Label	Point ID	Description <sup>1</sup>	Range	Units	Type	Notes
	43	H03 N2	0xCC2A	Number of H03 values exceeded maximum permissible limit on phase A/AB			UINT32	
		...					UINT32	
	80	H40 N2	0xCC4F	Number of H40 values exceeded maximum permissible limit on phase A/AB			UINT32	
1				<b>V2 Harmonic Compliance</b>			UINT32	
	1	Nnv	0xCC00	Number of non-valid 3-sec intervals			UINT32	
	2	N	0xCC01	Number of valid 3-sec intervals			UINT32	
	3	H02 N1	0xCC02	Number of H02 values exceeded normally permissible limit on phase B/BC			UINT32	
	4	H03 N1	0xCC03	Number of H03 values exceeded normally permissible limit on phase B/BC			UINT32	
		...					UINT32	
	41	H40 N1	0xCC28	Number of H40 values exceeded normally permissible limit on phase B/BC			UINT32	
	42	H02 N2	0xCC29	Number of H02 values exceeded maximum permissible limit on phase B/BC			UINT32	
	43	H03 N2	0xCC2A	Number of H03 values exceeded maximum permissible limit on phase B/BC			UINT32	
		...					UINT32	
	80	H40 N2	0xCC4F	Number of H40 values exceeded maximum permissible limit on phase B/BC			UINT32	
2				<b>V3 Harmonic Compliance</b>			UINT32	
	1	Nnv	0xCC00	Number of non-valid 3-sec intervals			UINT32	
	2	N	0xCC01	Number of valid 3-sec intervals			UINT32	
	3	H02 N1	0xCC02	Number of H02 values exceeded normally permissible limit on phase C/CA			UINT32	
	4	H03 N1	0xCC03	Number of H03 values exceeded normally permissible limit on phase C/CA			UINT32	
		...					UINT32	
	41	H40 N1	0xCC28	Number of H40 values exceeded normally permissible limit on phase C/CA			UINT32	
	42	H02 N2	0xCC29	Number of H02 values exceeded maximum permissible limit on phase C/CA			UINT32	
	43	H03 N2	0xCC2A	Number of H03 values exceeded maximum permissible limit on phase C/CA			UINT32	
		...					UINT32	
	80	H40 N2	0xCC4F	Number of H40 values exceeded maximum permissible limit on phase C/CA			UINT32	
3				<b>V1 Harmonic Distortion</b>			UINT32	
	1	%H02 max1	0xCC80	Maximum 95% probability daily value of H02 on phase A/AB, %		0.01%	UINT32	
	2	%H03 max1	0xCC81	Maximum 95% probability daily value of H03 on phase A/AB, %		0.01%	UINT32	
		...					UINT32	
	39	%H40 max1	0xCCA6	Maximum 95% probability daily value of H40 on phase A/AB, %		0.01%	UINT32	
	40	%H02 max2	0xCCA7	Maximum daily value of H02 on phase A/AB, %		0.01%	UINT32	
	41	%H03 max2	0xCCA8	Maximum daily value of H03 on phase A/AB, %		0.01%	UINT32	
		...					UINT32	
	78	%H40 max2	0xCCCD	Maximum daily value of H40 on phase A/AB, %		0.01%	UINT32	
4				<b>V2 Harmonic Distortion</b>			UINT32	
	1	%H02 max1	0xCC80	Maximum 95% probability daily value of H02 on phase B/BC, %		0.01%	UINT32	
	2	%H03 max1	0xCC81	Maximum 95% probability daily value of H03 on phase B/BC, %		0.01%	UINT32	
		...					UINT32	
	39	%H40 max1	0xCCA6	Maximum 95% probability daily value of H40 on phase B/BC, %		0.01%	UINT32	
	40	%H02 max2	0xCCA7	Maximum daily value of H02 on phase B/BC, %		0.01%	UINT32	
	41	%H03 max2	0xCCA8	Maximum daily value of H03 on phase B/BC, %		0.01%	UINT32	
		...					UINT32	

File Section	Record Field No.	Point Label	Point ID	Description <sup>1</sup>	Range	Units	Type	Notes
	78	%H40 max2	0xCCCC	Maximum daily value of H40 on phase B/BC, %		0.01%	UINT32	
5				<b>V3 Harmonic Distortion</b>			UINT32	
	1	%H02 max1	0xCC80	Maximum 95% probability daily value of H02 on phase C/CA, %		0.01%	UINT32	
	2	%H03 max1	0xCC81	Maximum 95% probability daily value of H03 on phase C/CA, %		0.01%	UINT32	
		...					UINT32	
	39	%H40 max1	0xCCA6	Maximum 95% probability daily value of H40 on phase C/CA, %		0.01%	UINT32	
	40	%H02 max2	0xCCA7	Maximum daily value of H02 on phase C/CA, %		0.01%	UINT32	
	41	%H03 max2	0xCCA8	Maximum daily value of H03 on phase C/CA, %		0.01%	UINT32	
		...					UINT32	
	78	%H40 max2	0xCCCC	Maximum daily value of H40 on phase C/CA, %		0.01%	UINT32	

<sup>1</sup> When the 4LN3, 3LN3 or 3BLN wiring mode is selected, the voltages will be line-to-neutral; for any other wiring mode, they will be line-to-line voltages.

### 3.12 Billing/TOU Daily and Monthly Profile Data Logs

File Channel/ Section <sup>1</sup>	Record Field No. <sup>2</sup>	Point Label	Point ID	Description	Range	Units <sup>3</sup>	Type	Notes
0/0				<b>Energy Register #1</b>				
	1	TRF1	0x7000	Tariff #1 energy reading	-999,999,999-999,999,999	1 kWh	UINT32	
	2	TRF2	0x7001	Tariff #2 energy reading	-999,999,999-999,999,999	1 kWh	UINT32	
	3	TRF3	0x7002	Tariff #3 energy reading	-999,999,999-999,999,999	1 kWh	UINT32	
	4	TRF4	0x7003	Tariff #4 energy reading	-999,999,999-999,999,999	1 kWh	UINT32	
	5	TRF5	0x7004	Tariff #5 energy reading	-999,999,999-999,999,999	1 kWh	UINT32	
	6	TRF6	0x7005	Tariff #6 energy reading	-999,999,999-999,999,999	1 kWh	UINT32	
	7	TRF7	0x7006	Tariff #7 energy reading	-999,999,999-999,999,999	1 kWh	UINT32	
	8	TRF8	0x7007	Tariff #8 energy reading	-999,999,999-999,999,999	1 kWh	UINT32	
	9	TRF9	0x7008	Tariff #9 energy reading	-999,999,999-999,999,999	1 kWh	UINT32	
	10	TRF10	0x7009	Tariff #10 energy reading	-999,999,999-999,999,999	1 kWh	UINT32	
	11	TRF11	0x700A	Tariff #11 energy reading	-999,999,999-999,999,999	1 kWh	UINT32	
	12	TRF12	0x700B	Tariff #12 energy reading	-999,999,999-999,999,999	1 kWh	UINT32	
	13	TRF13	0x700C	Tariff #13 energy reading	-999,999,999-999,999,999	1 kWh	UINT32	
	14	TRF14	0x700D	Tariff #14 energy reading	-999,999,999-999,999,999	1 kWh	UINT32	
	15	TRF15	0x700E	Tariff #15 energy reading	-999,999,999-999,999,999	1 kWh	UINT32	
	16	TRF16	0x700F	Tariff #16 energy reading	-999,999,999-999,999,999	1 kWh	UINT32	
...				...				
15/15				<b>Energy Register #16</b>				
	1	TRF1	0x7000	Tariff #1 energy reading	-999,999,999-999,999,999	1 kWh	UINT32	
	2	TRF2	0x7001	Tariff #2 energy reading	-999,999,999-999,999,999	1 kWh	UINT32	
	3	TRF3	0x7002	Tariff #3 energy reading	-999,999,999-999,999,999	1 kWh	UINT32	
	4	TRF4	0x7003	Tariff #4 energy reading	-999,999,999-999,999,999	1 kWh	UINT32	
	5	TRF5	0x7004	Tariff #5 energy reading	-999,999,999-999,999,999	1 kWh	UINT32	
	6	TRF6	0x7005	Tariff #6 energy reading	-999,999,999-999,999,999	1 kWh	UINT32	
	7	TRF7	0x7006	Tariff #7 energy reading	-999,999,999-999,999,999	1 kWh	UINT32	
	8	TRF8	0x7007	Tariff #8 energy reading	-999,999,999-999,999,999	1 kWh	UINT32	
	9	TRF9	0x7008	Tariff #9 energy reading	-999,999,999-999,999,999	1 kWh	UINT32	
	10	TRF10	0x7009	Tariff #10 energy reading	-999,999,999-999,999,999	1 kWh	UINT32	
	11	TRF11	0x700A	Tariff #11 energy reading	-999,999,999-999,999,999	1 kWh	UINT32	
	12	TRF12	0x700B	Tariff #12 energy reading	-999,999,999-999,999,999	1 kWh	UINT32	
	13	TRF13	0x700C	Tariff #13 energy reading	-999,999,999-999,999,999	1 kWh	UINT32	
	14	TRF14	0x700D	Tariff #14 energy reading	-999,999,999-999,999,999	1 kWh	UINT32	
	15	TRF15	0x700E	Tariff #15 energy reading	-999,999,999-999,999,999	1 kWh	UINT32	
	16	TRF16	0x700F	Tariff #16 energy reading	-999,999,999-999,999,999	1 kWh	UINT32	
16/16				<b>Maximum Demand Register #1</b>				
	1	TRF1 MD	0x7100	Tariff #1 max. demand reading	0-Pmax	U3	UINT32	
	2	TRF2 MD	0x7101	Tariff #2 max. demand reading	0-Pmax	U3	UINT32	

File Channel/ Section <sup>1</sup>	Record Field No. <sup>2</sup>	Point Label	Point ID	Description	Range	Units <sup>3</sup>	Type	Notes
	3	TRF3 MD	0x7102	Tariff #3 max. demand reading	0-Pmax	U3	UINT32	
	4	TRF4 MD	0x7103	Tariff #4 max. demand reading	0-Pmax	U3	UINT32	
	5	TRF5 MD	0x7104	Tariff #5 max. demand reading	0-Pmax	U3	UINT32	
	6	TRF6 MD	0x7105	Tariff #6 max. demand reading	0-Pmax	U3	UINT32	
	7	TRF7 MD	0x7106	Tariff #7 max. demand reading	0-Pmax	U3	UINT32	
	8	TRF8 MD	0x7107	Tariff #8 max. demand reading	0-Pmax	U3	UINT32	
	9	TRF9 MD	0x7108	Tariff #9 max. demand reading	0-Pmax	U3	UINT32	
	10	TRF10 MD	0x7109	Tariff #10 max. demand reading	0-Pmax	U3	UINT32	
	11	TRF11 MD	0x710A	Tariff #11 max. demand reading	0-Pmax	U3	UINT32	
	12	TRF12 MD	0x710B	Tariff #12 max. demand reading	0-Pmax	U3	UINT32	
	13	TRF13 MD	0x710C	Tariff #13 max. demand reading	0-Pmax	U3	UINT32	
	14	TRF14 MD	0x710D	Tariff #14 max. demand reading	0-Pmax	U3	UINT32	
	15	TRF15 MD	0x710E	Tariff #15 max. demand reading	0-Pmax	U3	UINT32	
	16	TRF16 MD	0x710F	Tariff #16 max. demand reading	0-Pmax	U3	UINT32	
...				...				
32/32				<b>Maximum Demand Register #16</b>				
	1	TRF1 MD	0x7100	Tariff #1 max. demand reading	0-Pmax	U3	UINT32	
	2	TRF2 MD	0x7101	Tariff #2 max. demand reading	0-Pmax	U3	UINT32	
	3	TRF3 MD	0x7102	Tariff #3 max. demand reading	0-Pmax	U3	UINT32	
	4	TRF4 MD	0x7103	Tariff #4 max. demand reading	0-Pmax	U3	UINT32	
	5	TRF5 MD	0x7104	Tariff #5 max. demand reading	0-Pmax	U3	UINT32	
	6	TRF6 MD	0x7105	Tariff #6 max. demand reading	0-Pmax	U3	UINT32	
	7	TRF7 MD	0x7106	Tariff #7 max. demand reading	0-Pmax	U3	UINT32	
	8	TRF8 MD	0x7107	Tariff #8 max. demand reading	0-Pmax	U3	UINT32	
	9	TRF9 MD	0x7108	Tariff #9 max. demand reading	0-Pmax	U3	UINT32	
	10	TRF10 MD	0x7109	Tariff #10 max. demand reading	0-Pmax	U3	UINT32	
	11	TRF11 MD	0x710A	Tariff #11 max. demand reading	0-Pmax	U3	UINT32	
	12	TRF12 MD	0x710B	Tariff #12 max. demand reading	0-Pmax	U3	UINT32	
	13	TRF13 MD	0x710C	Tariff #13 max. demand reading	0-Pmax	U3	UINT32	
	14	TRF14 MD	0x710D	Tariff #14 max. demand reading	0-Pmax	U3	UINT32	
	15	TRF15 MD	0x710E	Tariff #15 max. demand reading	0-Pmax	U3	UINT32	
	16	TRF16 MD	0x710F	Tariff #16 max. demand reading	0-Pmax	U3	UINT32	

<sup>1</sup> An energy use profile section and a maximum demand profile section are allocated for registers for which a source input is selected in the Billing/TOU Register setup and for which TOU profile is enabled. Not configured sections/channels are not available for download. Refer to the file channel mask in the file info for configured channels.

<sup>2</sup> The number of parameters in a section is automatically configured depending on the number of actually used tariffs selected in the TOU Daily Profiles.

<sup>3</sup> For power scale and units, refer to Section 4 "Data Scales and Units".



## 4 Data Scales and Units

Code	Condition	Value/Range	Notes
<b>Data Scales</b>			
Vmax		Voltage Scale × PT Ratio, V	2
V4max		Voltage Scale × V4 PT Ratio, V	2
I <sub>max</sub>		Current Scale × CT Ratio <sup>1</sup> , A,	3
I <sub>4max</sub>		Current Scale × I4 CT Ratio <sup>1</sup> , A,	3
I <sub>xmax</sub>	1A secondary	30 × CT <sub>x</sub> Ratio <sup>1</sup> , A	
	5A secondary	150 × CT <sub>x</sub> Ratio <sup>1</sup> , A	
I <sub>4xmax</sub>	1A secondary	30 × I4 <sub>x</sub> CT <sub>x</sub> Ratio <sup>1</sup> , A	
	5A secondary	150 × I4 <sub>x</sub> CT <sub>x</sub> Ratio <sup>1</sup> , A	
P <sub>max</sub>	PT Ratio = 1	V <sub>max</sub> × I <sub>max</sub> × 2, W	4
	PT Ratio > 1	(V <sub>max</sub> × I <sub>max</sub> × 2)/1000, kW	
AI <sub>min</sub> AI <sub>max</sub>	+/-1mA	AI <sub>min</sub> = -AI full scale × 2 AI <sub>max</sub> = AI full scale × 2	
	0-20mA	AI <sub>min</sub> = AI zero scale AI <sub>max</sub> = AI full scale	
	4-20mA	AI <sub>min</sub> = AI zero scale AI <sub>max</sub> = AI full scale	
	0-1mA	AI <sub>min</sub> = AI zero scale AI <sub>max</sub> = AI full scale	
	0-50mA	AI <sub>min</sub> = AI zero scale AI <sub>max</sub> = AI full scale × 2	
	+/-10V	AI <sub>min</sub> = -AI full scale AI <sub>max</sub> = AI full scale	
<b>Data Units</b>			
U1	PT Ratio = 1	0.1V	
	PT Ratio > 1	1V	
U2		0.01A	
U3	PT Ratio = 1	1W/Var/VA	
	PT Ratio > 1	1kW/kvar/kVA	
U4	V4 PT Ratio = 1	0.1V	
	V4 PT Ratio > 1	1V	

<sup>1</sup> CT Ratio = CT primary current/CT secondary current

<sup>2</sup> The default Voltage Scale is 828V. You can change it via the Modbus Setup registers (see Section 3.1) or via the Device Options setup in PAS.

<sup>3</sup> The default Current Scale is 4 × CT secondary current for devices with a 400% overload (ANSI) or 2 × CT secondary current for devices with a 200% overload (IEC). You can change it via the Modbus Setup registers (see Section 3.1) or via the Device Options setup in PAS.

<sup>4</sup> P<sub>max</sub> is rounded to whole kilowatts. If P<sub>max</sub> is greater than 9,999,000 W, it is truncated to 9,999,000 W.

## 5 Data Formats

Format Code	Value	Description	Notes
<b>Timestamp</b>			
F1		Local time in a UNIX-style format. Represents the number of seconds since midnight (00:00:00), January 1, 1970. The time is valid after January 1, 2000.	
<b>File ID</b>			
F2	0	Event log	
	1-8, 11-16	Data log #1-#8, #11-#16	
	9	Data log #9 – GOST 13109 Compliance Statistics	
	10	Data log #10 – GOST 13109 Harmonic Statistics	
	17-24	Waveform log #1-#8	
	25	Sequence-of-events (SOE) log	
	26	Power quality (PQ) log	
	27	Fault log	
	128	Real time waveform capture	
<b>File Attributes</b>			
F3	Bit 0 = 0	Non-wrap file (stop when full)	
	Bit 0 = 1	Wrap-around (circular) file	
	Bit 1 = 1	Fixed (non-changeable) file attributes	
	Bits 4:6 =	Multi-section data log file attributes:	
	0	Regular file	
	1	TOU monthly profile log	Multi-section file
	2	TOU daily profile log	Multi-section file
	5	GOST 13109 Compliance Statistics	Multi-section file
	6	GOST 13109 Harmonic Statistics	Multi-section file
<b>File Status Word (bitmap)</b>			
F4	Bit 0 = 1	The last record of the file is being read	
	Bit 8 = 1	File is empty	
	Bit 9 = 1	Reading after EOF	
	Bit 10 = 1	Corrupted record (CRC error)	
	Bit 11 = 1	No file section found for the requested channel	
	Bit 12 = 1	Reading after the end of a data block	
	Bit 13 = 1	File is not accessible	
	Bit 14 = 1	Record not found	
	Bit 15 = 1	Generic read error (with one of the bits 8-14)	
<b>File Record Status Word (bitmap)</b>			
F5	Bit 0 = 1	The last record of the file is being read	
	Bit 8 = 1	File is empty	
	Bit 9 = 1	Reading after EOF	
	Bit 10 = 1	Corrupted record (CRC error)	
	Bit 11 = 1	No file section found for the requested channel	
	Bit 12 = 1	Reading after the end of a data block	
	Bit 13 = 1	File is not accessible	
	Bit 14 = 1	Record not found	
	Bit 15 = 1	Generic read error (with one of the bits 8-14)	
<b>Billing/TOU Profile Log Channel ID</b>			
F6	0-15	Billing/TOU energy registers #1-#16	
	16-31	Billing/TOU maximum demand registers #1-#16	
<b>Waveform Log Channel ID</b>			
F7	0	V1	1
	1	V2	1
	2	V3	1
	3	V4	
	4	I1	
	5	I2	
	6	I3	
	7	I4	
	8	I1x	
	9	I2x	
	10	I3x	
	11	I4x	
	12	VDC	
	13	DI1-16	
	14	DI17-32	
	15	DI33-48	

Format Code	Value	Description	Notes
	16	AI1	
	17	AI2	
	18	AI3	
	19	AI4	
	20	AI5	
	21	AI6	
	22	AI7	
	23	AI8	
	24	AI9	
	25	AI10	
	26	AI11	
	27	AI12	
	28	AI13	
	29	AI14	
	30	AI15	
	31	AI16	
<b>Billing/TOU Profile Log Channel Mask</b> (bitmap)			
F8	Bit 0:15 = 1	Billing/TOU energy registers #1-#16	
	Bit 16:31 = 1	Billing/TOU maximum demand registers #1-#16	
<b>Waveform Log Channel Mask</b> (bitmap)			
F9	Bit 0	Channel V1	1
	Bit 1	Channel V2	1
	Bit 2	Channel V3	1
	Bit 3	Channel V4	
	Bit 4	Channel I1	
	Bit 5	Channel I2	
	Bit 6	Channel I3	
	Bit 7	Channel I4	
	Bit 8	Channel I1x	
	Bit 9	Channel I2x	
	Bit 10	Channel I3x	
	Bit 11	Channel I4x	
	Bit 12	Channel VDC	
	Bit 13	Channels DI1-16	
	Bit 14	Channels DI17-32	
	Bit 15	Channels DI33-48	
	Bit 16	Channel AI1	
	Bit 17	Channel AI2	
	Bit 18	Channel AI3	
	Bit 19	Channel AI4	
	Bit 20	Channel AI5	
	Bit 21	Channel AI6	
	Bit 22	Channel AI7	
	Bit 23	Channel AI8	
	Bit 24	Channel AI9	
	Bit 25	Channel AI10	
	Bit 26	Channel AI11	
	Bit 27	Channel AI12	
	Bit 28	Channel AI13	
	Bit 29	Channel AI14	
	Bit 30	Channel AI15	
	Bit 31	Channel AI16	
<b>TOU Tariff Change Time</b>			
F10	Bits 8:15 = 0-15	Tariff number #1-#16	
	Bits 2:7 = 0-23	Tariff start hour	
	Bits 0:1 = 0-3	Tariff start quarter of an hour	
<b>Billing/TOU Register Source ID</b>			
F11	0x0000	None	
	0x0700-0x077F	Pulse input DI1-DI128	
	0x1700	kWh import	
	0x1701	kWh export	
	0x1702	kWh net	
	0x1703	kWh total	
	0x1704	kvarh import	
	0x1705	kvarh export	
	0x1706	kvarh net	
	0x1707	kvarh total	

Format Code	Value	Description	Notes
	0x1708	kVAh total	
	0x1780-0x178F	Billing/TOU register #1-#16	
<b>Setpoint Trigger Parameters ID</b>			
F12	0x0000-0xFFFF	Any data point ID excluding energy counters	See Section 3.4
	0x0480-0x048F	External trigger #1-#16 (UDP broadcast trigger message)	
<b>Setpoint Relational Operator</b>			
F13	0 = NONE	No relation (used with pulsed events)	
	1 = GREATER OR EQUAL	Analog value or counter is over the operate limit	
	2 = LESS OR EQUAL	Analog value or counter is under the operate limit	
	3 = EQUAL	Analog value or counter is equal to the operate limit	
	4 = NOT EQUAL	Analog value or counter is not equal to the operate limit	
	5 = ON	Binary status is 1/ON	
	6 = OFF	Binary status is 0/OFF	
	7 = NEW	New Min/Max value logged for the point	
	8 = Delta	The absolute value of the difference between the last reported value and the current value exceeds the specified threshold	
	12 = Delta+	Incremental delta - the positive difference between the current value and the last reported value exceeds the specified threshold	
	13 = Delta-	Decremental delta - the positive difference between the last reported value and the current value exceeds the specified threshold	
	14 = rDelta	Relative delta - the absolute value of the difference between the last tested value and the current value exceeds the specified threshold	
	15 = rDelta+	Incremental relative delta - the positive difference between the current value and the last tested value exceeds the specified threshold	
	16 = rDelta-	Decremental relative delta - the positive difference between the last tested value and the current value exceeds the specified threshold	
<b>Setpoint Action ID</b>			
F14	0x0000	No action	
	0x2000-0x203F	Set user event flag #1-#64	
	0x2100-0x213F	Clear user event flag #1-#64	
	0x3000-0x303F	Operate relay RO1-RO64	
	0x3100-0x313F	Release latched relay RO1-RO64	
	0x3700-0x373F	Unblock relay RO1-RO64	
	0x3800-0x3807	Unblock direct control port. Lower digit 0-7: 0=all ports, 1=COM1, 2=COM2, 3=COM3, 4=COM4, 5=COM5, 6=USB, 7=Ethernet	
	0x3900-0x3901	Close breaker XCBR1-XCBR2	
	0x3902-0x390F	Close switch XSWI1-XSWI14	
	0x3A00-0x3A01	Open breaker XCBR1-XCBR2	
	0x3A02-0x3A0F	Open switch XSWI1-XSWI14	
	0x4000-0x401F	Increment counter #1-#32	
	0x4100-0x411F	Decrement counter #1-#32	
	0x4200-0x421F	Clear counter #1-#32	
	0x5100	Send event notification	
	0x5300	Remote control	
	0x6000	Reset total energy registers	
	0x6100	Reset total maximum demand registers	
	0x6200	Reset Billing/TOU energy	
	0x6300	Reset Billing/TOU maximum demands	
	0x6400	Clear all counters	
	0x6500	Clear Min/Max log registers	
	0x7000	Event log on setpoint operated	
	0x7001	Event log on setpoint released	
	0x7002	Event log on any setpoint transition	
	0x7100-0x710F	Data log 1-16	
	0x7200-0x7207	Waveform Log 1-8	
	0x7400	SOE (Sequence of Events) Log	
	0x8000-0x800F	External trigger #1-#16 (UDP broadcast trigger message)	
<b>Energy Pulse Source ID</b>			
F15	0x0000	None	
	0x0400	kWh Import pulse	

Format Code	Value	Description	Notes
	0x0401	kWh Export pulse	
	0x0402	kWh Total pulse	
	0x0403	kvarh Import pulse	
	0x0404	kvarh Export pulse	
	0x0405	kvarh Total pulse	
	0x0406	kVAh pulse	
<b>Counter Source ID</b>			
F16	0x0000	None	
	0x0700-0x077F	Pulse input DI1-DI128	
<b>Relay Output Pulse Source ID</b>			
F17	0x0000	None	
	0x0400	kWh Import pulse	
	0x0401	kWh Export pulse	
	0x0402	kWh Total pulse	
	0x0403	kvarh Import pulse	
	0x0404	kvarh Export pulse	
	0x0405	kvarh Total pulse	
	0x0406	kVAh pulse	
	0x0407	Start of power demand interval pulse	
	0x0408	Start of tariff interval pulse	
<b>AO Parameters ID (see Section 3.4 for data scales)</b>			
F18	0x0000	None (output disabled)	2
		<b>1-Cycle Phase Values</b>	
	0x0C00	V1 Voltage	
	0x0C01	V2 Voltage	
	0x0C02	V3 Voltage	
	0x0C03	I1 Current	
	0x0C04	I2 Current	
	0x0C05	I3 Current	
	0x0C12	V1 Voltage THD	
	0x0C13	V2 Voltage THD	
	0x0C14	V3 Voltage THD	
	0x0C15	I1 Current THD	
	0x0C16	I2 Current THD	
	0x0C17	I3 Current THD	
	0x0C18	I1 K-Factor	
	0x0C19	I2 K-Factor	
	0x0C1A	I3 K-Factor	
	0x0C1B	I1 Current TDD	
	0x0C1C	I2 Current TDD	
	0x0C1D	I3 Current TDD	
	0x0C1E	V12 Voltage	
	0x0C1F	V23 Voltage	
	0x0C20	V31 Voltage	
		<b>1-Cycle Total Value</b>	
	0x0F00	Total kW	
	0x0F01	Total kvar	
	0x0F02	Total kVA	
	0x0F03	Total PF	
	0x0F04	Total PF Lag	
	0x0F05	Total PF Lead	
		<b>1-Cycle Auxiliary Values</b>	
	0x1000	I4 Current	
	0x1001	In Current	
	0x1002	Frequency	
	0x1005	DC voltage	
		<b>1-Sec Phase Values</b>	
	0x1100	V1 Voltage	
	0x1101	V2 Voltage	
	0x1102	V3 Voltage	
	0x1103	I1 Current	
	0x1104	I2 Current	
	0x1105	I3 Current	
	0x111E	V12 Voltage	
	0x111F	V23 Voltage	
	0x1120	V31 Voltage	
		<b>1-Sec Total Values</b>	

Format Code	Value	Description	Notes
	0x1400	Total kW	
	0x1401	Total kvar	
	0x1402	Total kVA	
	0x1403	Total PF	
	0x1404	Total PF Lag	
	0x1405	Total PF Lead	
	0x140A	3-phase average L-N voltage	
	0x140B	3-phase average L-L voltage	
	0x140C	3-phase average current	
		<b>1-Sec Auxiliary Values</b>	
	0x1500	I4 Current	
	0x1501	In Current	
	0x1502	Frequency	
		<b>Present Demands</b>	
	0x160F	Accumulated kW import demand	
	0x1610	Accumulated kvar import demand	
	0x1611	Accumulated kVA demand	
	0x161A	Accumulated kW export demand	
	0x161B	Accumulated kvar export demand	
<b>Event Source/Point ID</b>			
F19		<b>Setpoint Operation Events</b>	
	0x0000-0x59FF	Trigger parameter ID	
	0x6400-0xFFFF	Trigger parameter ID	
		<b>Setpoint Action Events</b>	
	0x5A00-0x5A3F	Setpoint #1-#64	
		<b>Communications Events</b>	
	0x5B00-0x5BFF	Data/Function point ID (low byte, see F21)	
		<b>Self-Check Diagnostics Events</b>	
	0x5D00-0x5DFF	Data/Function point ID (low byte, see F21)	
		<b>Self-Update Events</b>	
	0x5E08	RTC DST/Standard time update	3
		<b>Run-time Error</b>	
	0x6014	Library error	
	0x6015	RTOS Kernel error	
	0x6016	Task error	
		<b>Control Events</b>	
	0x6100	XSWIn_OpOpn = operation "Open" (n=see F20 Control Events)	
	0x6101	XSWIn_OpCls = operation "Close" (n=see F20 Control Events)	
	0x6102	XSWIn_Pos = switch position change (n=see F20 Control Events, position=Value)	
	0x6103	Remote control (Value: 0=OFF, 1=ON)	
		<b>Hardware Diagnostics Events</b>	
	0x6201	Permanent fault	
	0x6202	RAM/Data error	
	0x6203	CPU watchdog reset	
	0x6204	DSP/Sampling fault	
	0x6205	CPU exception	
	0x6206	Reserved	
	0x6207	Software watchdog reset	
	0x620E	Expanded memory fault (Event effect = File ID + 1)	
	0x620F	CPU EEPROM fault	
	0x6210	AC board EEPROM fault	
	0x6211	I/O board EEPROM fault	
		<b>External Events</b>	
	0x6300	Power down	
	0x6308	Power up	
	0x6309	External reset	
	0x6318	IRIG-B signal lost	
	0x6319	IRIG-B time unlocked	
	0x631A	IRIG-B time locked	
	0x6320	SNTP server failed	4
	0x6321	SNTP server reconnected	4
<b>Event Effect ID</b>			
F20		<b>Communications/Self-check/Self-update Events</b>	
	0x0000	None	
	0x6000	Total energy registers cleared	

Format Code	Value	Description	Notes
	0x6100	All total maximum demands cleared	
	0x6101	Power maximum demands cleared	
	0x6102	Volt/Ampere maximum demands cleared	
	0x6103	Volt maximum demands cleared	
	0x6104	Ampere maximum demands cleared	
	0x6105	Harmonic maximum demands cleared	
	0x6200	Billing/TOU energy registers cleared	
	0x6300	Billing/TOU demand registers cleared	
	0x6400	All counters cleared	
	0x6401-0x641F	Counter cleared (low byte = counter ID)	
	0x6500	Min/Max log cleared	
	0x6A00-0x6A1B	Log file cleared (low byte = File ID)	
	0x6B00	GOST 13109 statistics cleared	
	0xF100-0xF13F	Setpoint cleared (low byte = setpoint ID)	
	0xF200	Setup/Data cleared	
	0xF300	Setup reset (set by default)	
	0xF400	Setup changed	
	0xF500	RTC set	3
	0xF600	Device function/option enabled	
	0xF700	Device function/option disabled	
	0xF800	Device function restarted	
	0xF900	Device function stopped	
		<b>Control Events</b>	
	0xA0XX	Position change (bits 0:7=switch number)	
	0xA1XX	Operation activated (bits 0:7=switch number)	
	0xA2XX	Operation terminated (bits 0:7=switch number)	
	0xA3XX	Operation terminated by timeout (bits 0:7=switch number)	
		<b>Setpoint Operation Events</b>	
	0xE100-0xE13F	Setpoint operated (low byte = setpoint ID)	
	0xE200-0xE23F	Setpoint released (low byte = setpoint ID)	
		<b>Setpoint Action Events</b>	
	See F14	Setpoint action ID	
<b>Data/Function Point ID</b>			
F21		<b>Data Location</b>	
	0x03	Data memory	
	0x04	Factory setup	
	0x05	Access/Password setup	
	0x06	Basic setup	
	0x07	Communications setup	
	0x08	Real-time clock	
	0x09	Digital inputs setup	
	0x0A	Pulse counters setup	
	0x0B	AO setup	
	0x0E	Timers setup	
	0x10	Event/alarm setpoints	
	0x11	Pulsing setup	
	0x12	User assignable register map	
	0x13	Programmable Min/Max log setup	
	0x14	Data log setup	
	0x15	File/Memory setup	
	0x16	Billing/TOU registers setup	
	0x18	TOU daily profiles	
	0x19	TOU calendar	
	0x1A	TOU calendar years	
	0x1D	RO Setup	
	0x1C	User selectable options	
	0x1F	DNP 3.0 class 0 map	
	0x20	DNP 3.0 options setup	
	0x21	DNP 3.0 events setup	
	0x22	DNP 3.0 event setpoints	
	0x23	Calibration registers	
	0x24	Date/Time Setup	
	0x25	Net setup	
	0x26	AI setup	
	0x27	Waveform log setup	
	0x28	PQ log setup	

Format Code	Value	Description	Notes
	0x29	Fault log setup	
	0x2A	Device mode control	
	0x2B-0x3F	Reserved	
		<b>Device Mode/Option</b>	
	0x40	General device operations	
	0x41	Energy test mode	
	0x42	Setpoints mode	
	0x43	PQ recorder	
	0x44	Fault recorder	
		<b>Device Diagnostics</b>	
	0x80	Device diagnostics	
	0x81	Critical error	
<b>Event Type ID</b>			
F22		<b>Setpoint Events</b>	
	0x0000	SP: Generic setpoint event	
	0x0001-0x0040	SP1-SP64: Setpoint #1-#64 event	
		<b>IEEE 1159 PQ Events (IEEE 1159 categories)</b>	
	0x0100	PQE: Generic IEEE1159 PQ event	
	0x0102	PQE11: Impulsive transient	
	0x010C	PQE211: Sag, instantaneous	
	0x010D	PQE212: Swell, instantaneous	
	0x010F	PQE221: Interruption, momentary	
	0x0110	PQE222: Sag, momentary	
	0x0111	PQE223: Swell, momentary	
	0x0113	PQE231: Interruption, temporary	
	0x0114	PQE232: Sag, temporary	
	0x0115	PQE233: Swell, temporary	
	0x0117	PQE31: Interruption, sustained	
	0x0118	PQE32: Undervoltage	
	0x0119	PQE33: Overvoltage	
	0x011A	PQE4: Voltage imbalance	
	0x011D	PQE52: Harmonics	
	0x011E	PQE53: Interharmonics	
	0x0121	PQE6: Voltage fluctuations (flicker)	
	0x0122	PQE7: Frequency variation	
		<b>Fault Events</b>	
	0x0200	FE: Generic fault event	
	0x0201	FE1: Zero-sequence current	
	0x0202	FE2: Zero-sequence voltage	
	0x0203	FE3: Current unbalance	
	0x0204	FE4: Voltage unbalance	
	0x0205	FE5: Overcurrent and undervoltage	
	0x0206	FE6: Undervoltage	
	0x0207	FE7: Neutral current (I4)	
		<b>DI Events</b>	
	0x0300	DI: Generic DI event	
	0x0301-0x0380	DI1-DI128: DI1-DI128 event	
		<b>RO Events</b>	
	0x0400	RO: Generic RO event	
	0x0401-0x0440	RO1-RO64: RO1-RO64 event	
		<b>PQ Events (GOST 13109 categories)</b>	
	0x0600	PQE: Generic PQ event	
	0x0601	PQE1: Voltage variation	
	0x0602	PQE2: Voltage change	
	0x0603	PQE3: Flicker	
	0x0604	PQE4: Voltage THD	
	0x0605	PQE5: Voltage harmonic components	
	0x0606	PQE6: Voltage unbalance	
	0x0607	PQE7: Frequency variation	
	0x0608	PQE8: Voltage dips	
	0x0609	PQE9: Impulsive voltage	
	0x060A	PQE10: Temporary overvoltages	
<b>Device Diagnostics (bitmap)</b>			
F23	Bit 0 = 1	Critical error - device operations stop	
	Bit 1 = 1	Permanent fault (critical error)	
	Bit 2 = 1	RAM/Data error	
	Bit 3 = 1	CPU watchdog reset	



Format Code	Value	Description	Notes
	Bit 4 = 1	DSP/Sampling fault	
	Bit 5 = 1	CPU exception	
	Bit 6	Reserved	
	Bit 7 = 1	Software watchdog reset	
	Bit 8 = 1	Power down	
	Bit 9 = 1	Device reset	
	Bit 10 = 1	Configuration reset	
	Bit 11 = 1	RTC fault (critical error)	
	Bit 12 = 1	Configuration fault (critical error)	
	Bit 13	Reserved	
	Bit 14 = 1	Expanded memory fault	
	Bit 15 = 1	CPU EEPROM fault	
	Bit 16 = 1	AC board EEPROM fault	
	Bit 17 = 1	I/O board EEPROM fault	
	Bit 18	Reserved	
	Bit 19	Reserved	
	Bit 20 = 1	C Library error	
	Bit 21 = 1	RTOS Kernel error	
	Bit 22 = 1	Task error	
	Bit 23	Reserved	
	Bit 24 = 1	IRIG-B signal lost	
	Bit 25 = 1	IRIG-B time unlocked	
<b>DNP Object Types</b>			
F24		<b>Binary Input Static Object</b>	
	0	Single-Bit Binary Input	
	1	Binary Input With Status	
		<b>Binary Input Change Event Object</b>	
	0	Binary Input Change Without Time	
	1	Binary Input Change With Time	
		<b>Binary Counter</b>	
	0	32-bit Binary Counter	
	1	32-bit Binary Counter Without Flag	
	2	16-bit Binary Counter	
	3	16-bit Binary Counter Without Flag	
		<b>Binary Counter Change Event</b>	
	0	32-bit Counter Change Event Without Time	
	1	32-bit Counter Change Event With Time	
	2	16-bit Counter Change Event Without Time	
	3	16-bit Counter Change Event With Time	
		<b>Frozen Binary Counter</b>	
	0	32-bit Frozen Counter	
	1	32-bit Frozen Counter Without Flag	
	2	32-bit Frozen Counter With Time of Freeze	
	3	16-bit Frozen Counter	
	4	16-bit Frozen Counter Without Flag	
	5	16-bit Frozen Counter With Time of Freeze	
		<b>Analog Input</b>	
	0	32-bit Analog Input	
	1	32-bit Analog Input Without Flag	
	2	16-bit Analog Input	
	3	16-bit Analog Input Without Flag	
		<b>Analog Input Change Event</b>	
	0	32-bit Analog Change Event Without Time	
	1	32-bit Analog Change Event With Time	
	2	16-bit Analog Change Event Without Time	
	3	16-bit Analog Change Event With Time	
<b>DNP Class 0 Objects</b>			
F25	0x1E01	Analog Input 30:01	
	0x1E02	Analog Input 30:02	
	0x1E03	Analog Input 30:03	
	0x1E04	Analog Input 30:04	
	0x2801	Analog Output 40:01	
	0x2802	Analog Output 40:02	
	0x0101	Binary Input 01:01	
	0x0102	Binary Input 01:02	
	0x1401	Binary Counter 20:01	
	0x1402	Binary Counter 20:02	

Format Code	Value	Description	Notes
	0x1405	Binary Counter 20:05	
	0x1406	Binary Counter 20:06	
	0x1501	Frozen Counter 21:01	
	0x1502	Frozen Counter 21:02	
	0x1505	Frozen Counter 21:05	
	0x1506	Frozen Counter 21:06	
	0x1509	Frozen Counter 21:09	
	0x150A	Frozen Counter 21:10	
<b>Wiring Mode</b>			
F26	0	3OP2 - 3-wire open delta using 2 CTs (2 element)	
	1	4LN3 - 4-wire WYE using 3 PTs (3 element), line-to-neutral voltage readings	
	2	3DIR2 - 3-wire direct connection using 2 CTs (2 element)	
	3	4LL3 - 4-wire WYE using 3 PTs (3 element), line-to-line voltage readings	
	4	3OP3 - 3-wire open delta using 3 CTs (2 1/2 element)	
	5	3LN3 - 4-wire WYE using 2 PTs (2 1/2 element), line-to-neutral voltage readings	
	6	3LL3 - 4-wire WYE using 2 PTs (2 1/2 element), line-to-line voltage readings	
	8	3BLN3 - 3-wire broken delta using 2 PTs (2 1/2 element), line-to-neutral voltage readings	
	9	3BLL3 - 3-wire broken delta using 2 PTs (2 1/2 element), line-to-line voltage readings	
<b>IEC 61850 Measured Value Indices</b>			
F27	0	Phase voltage	
	1	Auxiliary voltage V4	
	2	DC voltage	
	3	Phase currents	
	4	Neutral current	
	5	Auxiliary current I4	
	6	Phase currents (extended inputs)	
	7	Neutral current (extended inputs)	
	8	Auxiliary current I4 (extended inputs)	
	9	Voltage sequence	
	10	Current sequence	
	11	Current sequence (extended inputs)	
	12	Voltage unbalance	
	13	Current unbalance	
	14	Active power	
	15	Reactive power	
	16	Active power import/export	
	17	Reactive power import/export	
	18	Apparent power	
	19	Active power demand	
	20	Reactive power demand	
	21	Apparent power demand	
	22	Power factor	
	23	Power factor lag/lead	
	24	Frequency	
	25	Voltage THD	
	26	Current THD	
	27	Voltage interharmonic THD	
	28	Current interharmonic THD	
	29	Current TDD	
	30	Current K-factor	
	31	Not used	
	32	Not used	
	33	Analog input #1	
	34	Analog input #2	
	35	Analog input #3	
	36	Analog input #4	
	37	Analog input #5	
	38	Analog input #6	
	39	Analog input #7	
	40	Analog input #8	
	41	Analog input #9	
42	Analog input #10		

Format Code	Value	Description	Notes
	43	Analog input #11	
	44	Analog input #12	
	45	Analog input #13	
	46	Analog input #14	
	47	Analog input #15	
	48	Analog input #16	

**NOTES:**

- <sup>1</sup> When the 4LN3 or 3LN3 wiring mode is selected, the voltages will be line-to-neutral; for any other wiring mode, they will be line-to-line voltages.
- <sup>2</sup> 1) For bi-directional analog output ( $\pm 1$  mA), the zero scale setup corresponds to the center (0 mA) of the scale range, and the direction of the current matches the sign of the output parameter. Unsigned parameters are output within the current range 0 to +1 mA and can be scaled as in the case of single-ended analog output (0-1 mA).  
For signed values, such as powers and signed power factor, the scale is always symmetrical with regard to 0 mA, and the full scale corresponds to +1 mA output for positive readings and to -1 mA output for negative readings. The zero scale (0 mA output) is permanently set in the instrument to zero for all parameters except the signed power factor for which it is set to 1.000 (see Note 2). In write requests, the zero scale is ignored.
- 2) Except for the signed power factor, the setup scale is continuous within the entire value range. For signed power factor, the setup scale is broken at +1.000 in order to provide continuous output current when the power factor changes close to  $\pm 1.000$ . The setup scale is symmetrical in the range of -0 to +0 with a center at 1.000 (-1.000 is assumed to be equal to +1.000). Negative power factor is output as -1.000 minus measured value, and non-negative power factor is output as +1.000 minus measured value. To set the entire range for power factor from -0 to +0, the scales would be specified as -0 to 0. Because of the fact that negative zero may not be transmitted through communications, the value of -0.001 is used to specify the scale of -0, and both +0.001 and 0.000 are used to specify the scale of +0.
- <sup>3</sup> The event value field shows the present device time in the F1 format (starting with V10.4.12).
- <sup>4</sup> The event value field shows the server IP address in a network byte order.