



# **Powermeter and Power Quality Analyzer PM175**

Modbus Communications Protocol  
GOST 13109-97/GOST 32144-2013 extensions

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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.

#### REVISION HISTORY

|    |           |  |
|----|-----------|--|
| A1 | Mar 2009  | Initial release. Applicable to F/W versions 25.10.XX.  |
| A2 | July 2009 | Added high and low permissible limits for voltage and frequency variations   |
| A3 | Nov 2009  | F/W version 25.10.5 or higher.<br>Added TCP event notification client.<br>Added GPRS setup and communication counters. |
| A4 | Jan 2011  | F/W version 25.10.8 or higher.<br>Added present PQ values registers.   |
| A5 | Aug 2014  | F/W versions 25.8.XX.<br>Added GOST 54149-2010 setup and compliance statistics.  |
| A6 | July 2015 | GOST 54149-2010 is replaced with GOST 32144-2013.<br>Added 3-second power and power factor readings.                   |

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# Table of Contents

|   |           |
|---|-----------|
| <b>1 GENERAL .....</b>  | <b>9</b>  |
| <b>2 MODBUS PROTOCOL IMPLEMENTATION.....</b>                                      | <b>10</b> |
| 2.1 Transmission Modes.....   | 10        |
| 2.2 Address Field.....  | 10        |
| 2.3 Function Field.....   | 10        |
| 2.4 Exception Responses.....  | 10        |
| 2.5 Modbus Register Addresses .....   | 10        |
| 2.6 Data Formats.....   | 11        |
| 2.6.1 16-BIT SCALED INTEGER FORMAT .....  | 11        |
| 2.6.2 32-BIT LONG INTEGER FORMAT .....  | 12        |
| 2.6.3 32-BIT MODULO-10000 FORMAT .....  | 13        |
| 2.7 User Assignable Registers.....  | 13        |
| 2.8 Password Protection .....   | 13        |
| 2.9 Data Recording and File Transfers .....                                       | 14        |
| 2.9.1 LOG FILE ORGANIZATION .....   | 14        |
| Multi-section Files .....   | 14        |
| Data Log Files .....  | 14        |
| Profile Data Log Files.....   | 15        |
| Power Quality Statistics Log Files .....  | 15        |
| Waveform Log Files.....   | 15        |
| 2.9.2 FILE TRANSFERS .....  | 15        |
| Common File Transfer .....  | 16        |
| Reading Multi-section Data Log Files.....   | 16        |
| Reading Multi-section Waveform Files .....  | 17        |
| Reading Real-time Waveforms .....   | 17        |
| 2.10 TCP Notification Client.....   | 17        |
| <b>3 MODBUS REGISTER MAP .....</b>  | <b>19</b> |
| 3.1 Modbus Setup Registers.....   | 19        |
| Modbus Assignable Registers .....   | 19        |
| Assignable Registers Map .....  | 19        |
| Modbus Conversion Scales .....  | 19        |
| Device Data Scales .....  | 19        |
| 3.2 16-bit Scaled Analog Registers and Energy Counters - Basic Register Set ..... | 20        |
| 3.3 16-bit Scaled Analog Registers, Binary Registers and Counters .....           | 22        |
| None.....   | 22        |
| Setpoint Status (bitmap) .....  | 22        |
| Special Inputs .....  | 22        |
| Event Flags (bitmap) .....  | 22        |
| Digital Inputs (bitmap) .....   | 22        |
| Relay Outputs (bitmap) .....  | 22        |
| Counters .....  | 22        |
| 1/2-Cycle Values .....  | 22        |
| 1-Cycle Phase Values .....  | 22        |
| 1-Cycle Total Values.....   | 23        |
| 1-Cycle Auxiliary Values.....   | 23        |
| Phasor .....  | 23        |
| 1-Second Phase Values.....  | 24        |
| 3-Second Powers .....   | 25        |
| 1-Second Total Values .....   | 25        |
| 1-Second Auxiliary Values.....  | 25        |
| Present Harmonic Demands .....  | 26        |
| Present Volt, Ampere and Power Demands .....                                      | 26        |
| Total Energies .....  | 27        |
| Phase Energies.....   | 27        |
| Symmetrical Components .....  | 27        |
| V1/V12 Harmonics .....  | 27        |

|   |           |
|---|-----------|
| V2/V23 Harmonics .....  | 27        |
| V3/V31 Harmonics .....  | 28        |
| I1 Harmonics .....  | 28        |
| I2 Harmonics .....  | 28        |
| I3 Harmonics .....  | 28        |
| Fundamental Phase Values .....  | 28        |
| Flicker .....   | 28        |
| Fundamental Total Values .....  | 29        |
| Minimum 1-Cycle Phase Values .....                                      | 29        |
| Minimum 1-Cycle Total Values .....                                      | 29        |
| Minimum 1-Cycle Auxiliary Values .....                                  | 29        |
| Maximum 1-Cycle Phase Values .....                                      | 29        |
| Maximum 1-Cycle Total Values .....                                      | 30        |
| Maximum 1-Cycle Auxiliary Values .....                                  | 30        |
| Maximum Demands .....   | 30        |
| Maximum Harmonic Demands .....  | 31        |
| Scaled Analog Inputs.....   | 31        |
| Raw Analog Inputs.....  | 31        |
| TOU Parameters .....  | 31        |
| Scaled Analog Outputs.....  | 31        |
| TOU Energy Register #1 .....  | 31        |
| TOU Energy Register #2 .....  | 31        |
| TOU Energy Register #3 .....  | 31        |
| TOU Energy Register #4 .....  | 32        |
| TOU Energy Register #5 .....  | 32        |
| TOU Energy Register #6 .....  | 32        |
| TOU Energy Register #7 .....  | 32        |
| TOU Energy Register #8 .....  | 32        |
| Summary Energy Accumulated Demands .....                                | 32        |
| Summary Energy Block Demands.....                                       | 32        |
| Summary Energy Sliding Window Demands .....                             | 32        |
| Summary Energy Maximum Demands.....                                     | 32        |
| TOU Maximum Demand Register #1 .....                                    | 33        |
| TOU Maximum Demand Register #2 .....                                    | 33        |
| TOU Maximum Demand Register #3 .....                                    | 33        |
| TOU Maximum Demand Register #4 .....                                    | 33        |
| TOU Maximum Demand Register #5 .....                                    | 33        |
| TOU Maximum Demand Register #6 .....                                    | 33        |
| TOU Maximum Demand Register #7 .....                                    | 33        |
| TOU Maximum Demand Register #8 .....                                    | 33        |
| V1/V12 Harmonic Angles .....  | 34        |
| V2/V23 Harmonic Angles .....  | 34        |
| V3/V31 Harmonic Angles .....  | 34        |
| I1 Harmonic Angles.....   | 34        |
| I2 Harmonic Angles.....   | 34        |
| I3 Harmonic Angles.....   | 34        |
| 3-Second RMS Values.....  | 34        |
| 1-Minute RMS Values .....   | 35        |
| 10-Minute RMS Values.....   | 35        |
| 3-Second Total Harmonics .....  | 35        |
| 10-Minute Total Harmonics.....  | 36        |
| <b>3.4 32-bit Analog Registers, Binary Registers and Counters .....</b> | <b>37</b> |
| Setpoint Status SP1-SP16 (bitmap) .....                                 | 37        |
| Special Inputs .....  | 37        |
| Event Flags (bitmap) .....  | 37        |
| Digital Inputs (bitmap) .....   | 37        |
| Relay Outputs (bitmap) .....  | 37        |
| Counters .....  | 37        |
| 1/2-Cycle Values .....  | 37        |
| 1-Cycle Phase Values .....  | 37        |
| 1-Cycle Total Values.....   | 38        |
| 1-Cycle Auxiliary Values.....   | 38        |

|  |    |
|--|----|
| Phasor .....                                 | 38 |
| 1-Second Phase Values.....                   | 39 |
| 3-Second Powers .....                        | 40 |
| 1-Second Total Values.....                   | 40 |
| 1-Second Auxiliary Values.....               | 40 |
| Present Harmonic Demands .....               | 41 |
| Present Volt, Ampere and Power Demands ..... | 41 |
| Total Energies .....                         | 42 |
| Summary Energy Registers .....               | 42 |
| Phase Energies.....                          | 42 |
| Symmetrical Components .....                 | 42 |
| V1/V12 Harmonics .....                       | 42 |
| V2/V23 Harmonics .....                       | 43 |
| V3/V31 Harmonics .....                       | 43 |
| I1 Harmonics .....                           | 43 |
| I2 Harmonics .....                           | 43 |
| I3 Harmonics .....                           | 43 |
| Fundamental Phase Values.....                | 43 |
| Flicker.....                                 | 44 |
| Fundamental Total Values .....               | 44 |
| Minimum 1-Cycle Phase Values.....            | 44 |
| Minimum 1-Cycle Total Values .....           | 44 |
| Minimum 1-Cycle Auxiliary Values .....       | 44 |
| Maximum 1-Cycle Phase Values .....           | 45 |
| Maximum 1-Cycle Total Values .....           | 45 |
| Maximum 1-Cycle Auxiliary Values .....       | 45 |
| Maximum Demands .....                        | 45 |
| Maximum Harmonic Demands .....               | 46 |
| Scaled Analog Inputs.....                    | 46 |
| Raw Analog Inputs .....                      | 46 |
| TOU Parameters .....                         | 46 |
| Scaled Analog Outputs.....                   | 46 |
| TOU Energy Register #1 .....                 | 46 |
| TOU Energy Register #2 .....                 | 46 |
| TOU Energy Register #3 .....                 | 47 |
| TOU Energy Register #4 .....                 | 47 |
| TOU Energy Register #5 .....                 | 47 |
| TOU Energy Register #6 .....                 | 47 |
| TOU Energy Register #7 .....                 | 47 |
| TOU Energy Register #8 .....                 | 47 |
| Summary Energy Accumulated Demands .....     | 47 |
| Summary Energy Block Demands.....            | 47 |
| Summary Energy Sliding Window Demands .....  | 47 |
| Summary Energy Maximum Demands.....          | 48 |
| TOU Maximum Demand Register #1 .....         | 48 |
| TOU Maximum Demand Register #2 .....         | 48 |
| TOU Maximum Demand Register #3 .....         | 48 |
| TOU Maximum Demand Register #4 .....         | 48 |
| TOU Maximum Demand Register #5 .....         | 48 |
| TOU Maximum Demand Register #6 .....         | 48 |
| TOU Maximum Demand Register #7 .....         | 48 |
| TOU Maximum Demand Register #8 .....         | 49 |
| V1/V12 Harmonic Angles .....                 | 49 |
| V2/V23 Harmonic Angles .....                 | 49 |
| V3/V31 Harmonic Angles .....                 | 49 |
| I1 Harmonic Angles.....                      | 49 |
| I2 Harmonic Angles.....                      | 49 |
| I3 Harmonic Angles.....                      | 49 |
| 3-Second RMS Values.....                     | 49 |
| 1-Minute RMS Values .....                    | 50 |
| 10-Minute RMS Values.....                    | 50 |
| 3-Sec Total Harmonics.....                   | 50 |

|   |           |
|---|-----------|
| 10-Minute Total Harmonics.....                      | 51        |
| Present PQ Measurements (GOST 13109).....           | 51        |
| Present PQ Measurements (GOST 32144).....           | 52        |
| V1/V12 Voltage Interharmonics.....                  | 53        |
| V2/V23 Voltage Interharmonics.....                  | 53        |
| V3/V31 Voltage Interharmonics.....                  | 53        |
| Generic TOU Energy Registers.....                   | 53        |
| Generic TOU Maximum Demand Registers.....           | 54        |
| Generic Data.....                                   | 54        |
| <b>3.5 Minimum/Maximum Log Registers.....</b>       | <b>56</b> |
| Minimum Phase Values.....                           | 56        |
| Minimum Total Values.....                           | 57        |
| Minimum Auxiliary Values.....                       | 57        |
| Maximum Phase Values.....                           | 57        |
| Maximum Total Values.....                           | 58        |
| Maximum Auxiliary Values.....                       | 58        |
| Summary Energy Maximum Demands.....                 | 58        |
| Maximum Demands.....                                | 58        |
| Maximum Harmonic Demands.....                       | 59        |
| TOU Maximum Demand Register #1.....                 | 60        |
| TOU Maximum Demand Register #2.....                 | 60        |
| TOU Maximum Demand Register #3.....                 | 60        |
| TOU Maximum Demand Register #4.....                 | 60        |
| TOU Maximum Demand Register #5.....                 | 60        |
| TOU Maximum Demand Register #6.....                 | 61        |
| TOU Maximum Demand Register #7.....                 | 61        |
| TOU Maximum Demand Register #8.....                 | 61        |
| <b>3.6 Device Control and Status Registers.....</b> | <b>62</b> |
| Device Restart Register.....                        | 62        |
| Device Identification.....                          | 62        |
| Device Authorization Registers.....                 | 62        |
| User Event Flags Registers (bit map).....           | 62        |
| Remote Relay Control Registers (bit map).....       | 62        |
| Reset/Clear Registers.....                          | 63        |
| Device Mode Control Registers.....                  | 63        |
| Memory Status Registers.....                        | 63        |
| Log Notification Registers (bit map).....           | 63        |
| Setpoint Status Registers (bit map).....            | 63        |
| Setpoint Alarm Latch Registers (bit map).....       | 63        |
| Device Diagnostics Register (bit map).....          | 63        |
| Current Port Number.....                            | 63        |
| Current Network Settings.....                       | 64        |
| Communication Status.....                           | 64        |
| Communication Counters.....                         | 64        |
| <b>3.7 Device Setup Registers.....</b>              | <b>65</b> |
| Device Identification.....                          | 65        |
| Factory Device Settings.....                        | 65        |
| Basic Setup.....                                    | 65        |
| Communication Ports Setup.....                      | 66        |
| Device Options Setup.....                           | 67        |
| Alarm/Event Setpoints Setup.....                    | 67        |
| Pulse Counters Setup.....                           | 68        |
| Local Settings.....                                 | 68        |
| Clock Indication and Setup.....                     | 69        |
| Network Setup.....                                  | 69        |
| Password Setup.....                                 | 69        |
| Expert Power Service Setup.....                     | 70        |
| Internet Service Provider (ISP) accounts.....       | 70        |
| GPRS Setup.....                                     | 70        |
| TCP Notification Client Setup.....                  | 70        |
| DNP Options Setup.....                              | 70        |
| DNP Events Setup.....                               | 71        |

|  |            |
|--|------------|
| DNP Class 0 Point Assignments .....                                      | 71         |
| GOST 13109 PQ Recorder Triggers Setup .....                              | 72         |
| GOST 13109 Advanced Setup .....  | 72         |
| GOST 13109 Harmonic Voltage Limits .....                                 | 73         |
| GOST 32144 PQ Recorder Triggers Setup .....                              | 73         |
| GOST 32144 Advanced Setup .....  | 74         |
| GOST 32144 Harmonic Voltage Limits .....                                 | 75         |
| GOST 32144 Interharmonic Voltage Limits .....                            | 75         |
| File Setup .....   | 75         |
| Waveform Recorder Setup .....  | 76         |
| Data Log Setup .....   | 77         |
| TOU Daily Profile Setup .....  | 77         |
| TOU Calendar Setup .....   | 78         |
| Summary Energy/TOU Registers Setup .....                                 | 79         |
| Summary Energy/TOU Registers Source Setup .....                          | 79         |
| Periodic Timers Setup .....  | 79         |
| Digital Inputs Setup .....   | 80         |
| Relay Outputs Setup .....  | 80         |
| Analog Inputs Setup .....  | 80         |
| Analog Outputs Setup .....   | 80         |
| Analog Expander Setup .....  | 81         |
| <b>3.8 Analog and Digital I/O Configuration .....</b>                    | <b>82</b>  |
| I/O Slots Configuration Info .....                                       | 82         |
| I/O Type Info .....  | 82         |
| <b>3.9 File Transfer Registers .....</b>                                 | <b>83</b>  |
| File Transfer Control Blocks .....                                       | 83         |
| File Info Response Block (Variation 0 – File info) .....                 | 84         |
| File Info Response Block (Variation 1 – Current record info) .....       | 85         |
| File Info Response Block (Variation 2 – Data log record structure) ..... | 85         |
| Event Log Response Block .....   | 86         |
| Data Log Response Block .....  | 86         |
| Waveform Log Response Block .....  | 87         |
| Power Quality (PQ) Log Response Block .....                              | 87         |
| <b>3.10 GOST 13109 Compliance Statistics Data Log .....</b>              | <b>89</b>  |
| <b>3.11 GOST 13109 Harmonic Statistics Data Log .....</b>                | <b>96</b>  |
| <b>3.12 GOST 32144 Compliance Statistics Data Log .....</b>              | <b>98</b>  |
| <b>3.13 GOST 32144 Harmonic Statistics Data Log .....</b>                | <b>105</b> |
| <b>3.14 Billing/TOU Daily Profile Data Log .....</b>                     | <b>108</b> |
| <b>4 DATA SCALES AND UNITS .....</b>                                     | <b>110</b> |
| Data Scales .....  | 110        |
| Data Units .....   | 110        |
| <b>5 DATA FORMATS .....</b>  | <b>111</b> |
| Timestamp .....  | 111        |
| File ID .....  | 111        |
| File Attributes .....  | 111        |
| File Status Word (bitmap) .....  | 111        |
| File Record Status Word (bitmap) .....                                   | 111        |
| TOU Profile Log Channel ID .....   | 111        |
| Waveform Log Channel ID .....  | 111        |
| Profile Log Sections Mask .....  | 111        |
| Waveform Log Channel Mask .....  | 111        |
| TOU Tariff Change Time .....   | 112        |
| Billing/TOU Energy Register Source ID .....                              | 112        |
| Setpoint Trigger Parameters ID .....                                     | 112        |
| Pulse Inputs .....   | 112        |
| Relays .....   | 112        |
| Setpoint Action ID .....   | 114        |
| Counter Source ID .....  | 115        |
| Relay Output Pulse Source ID .....                                       | 115        |
| AO Output/Analog Expander Parameters ID .....                            | 115        |

|                            |     |
|----------------------------|-----|
| Event Cause/Point ID ..... | 116 |
| Event Effect ID .....      | 116 |
| Data Point ID .....        | 116 |
| Event Type ID .....        | 117 |
| Device Diagnostics .....   | 117 |
| DNP Object Types .....     | 118 |
| DNP Class 0 Objects .....  | 118 |
| Wiring Mode .....          | 118 |
| Instrument Options .....   | 119 |
| I/O Slot Types .....       | 119 |



# 1 General

This document specifies a subset of the Modbus communications protocol used to transfer data between a master computer station and the PM175. The document provides the complete information necessary to develop third-party communications software capable of communication with the PM175. Refer to the PM175 Installation and 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 [www.modbus.org](http://www.modbus.org) Website. The following paragraphs outline some issues concerning the implementation of the Modbus protocol in the PM175.

### 2.1 Transmission Modes

The PM175 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 PM175 Installation and Operation Manual for information on selecting the transmission mode in your meter.

### 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 PM175 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 |
| 08 <sup>1</sup> | Loop-back test            | Communications test      |

<sup>1</sup> The PM175 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 PM175 Modbus registers are numbered in the range of 0 to 65535. From the Modbus applications, the PM175 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 PM175 register address to the range of the Modbus holding registers, add a value of 40001 to the PM175 register address. When a register address exceeds 9999, use a 6-digit addressing scheme by adding 400001 to the PM175 register address.

## 2.6 Data Formats

The PM175 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 6656 through 10935 contain scaled 16-bit values.

### 2.6.1 16-bit Scaled Integer Format

16-bit scaled analog data is transmitted in a single 16-bit Modbus register being scaled to the range of 0 to 9999. To get a true reading, a reverse conversion should be done using the following formula:

$$Y = \frac{X \times (HI - LO)}{9999} + LO$$

where:

- Y - true reading in engineering units
- X - raw input data in the range of 0 to 9999
- LO and HI - data low and high scales in engineering units

The engineering scales are indicated for every scaled 16-bit register. Refer to Section 4 "Data Scales and Units" for applicable data scales and measurement units.

The default voltage scale in the device is 144V (120V+20%). It can be changed through register 242 (see Section 3.1, Device Data Scales), or via the supplemental PAS software.

The recommended voltage scale is 120V+20% = 144V for using with external PT's, and 690V+20% = 828V for a direct connection to power line.

### CONVERSION EXAMPLES

#### 1. Voltage readings

a) Assume device settings (direct wiring): PT ratio = 1; Voltage scale = 828V (690V + 20%).

Voltage engineering scales (see Section 4):

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

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

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

b) Assume device settings (wiring via PT): PT ratio = 14,400V : 120V = 120; Voltage scale = 144V.

Voltage engineering scales (see Section 4):

$$\begin{aligned} HI\_ENG &= V_{max} = 144.0 \times PT \text{ ratio} = 144 \times 120 = 17,280V \\ LO\_ENG &= 0V \end{aligned}$$

If the raw data reading is 8314 then the voltage reading in engineering units will be as follows:

$$\text{Volts reading} = 8314 \times (17,280 - 0) / 9999 + 0 = 14,368V$$

#### 2. Current readings

Assume device settings: CT primary current = 200A.

Current engineering scales (see Section 4):

$$HI\_ENG = I_{max} = CT \text{ primary current} \times 2 = 200.00 \times 2 = 400.00A$$

$$LO\_ENG = 0A$$

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

$$\text{Amps reading} = 250 \times (400.00 - 0)/(9999 - 0) + 0 = 10.00A$$

### 3. Power readings

a) Assume device settings (direct wiring): Wiring 4LL3; PT = 1; CT primary current = 200A; Voltage scale = 828V.

Active Power engineering scales (see Section 4):

$$HI\_ENG = P_{max} = V_{max} \times I_{max} \times 2 = (828.0 \times 1) \times (200.00 \times 2) \times 2 = 662,400W = 662.400kW$$

$$LO\_ENG = -P_{max} = -662.400kW$$

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

$$\text{Watts reading} = 5500 \times (662.400 - (-662.400))/(9999 - 0) + (-662.400) = 66.313kW$$

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

$$\text{Watts reading} = 500 \times (662.400 - (-662.400))/(9999 - 0) + (-662.400) = -596.153kW$$

b) Assume device settings (wiring via PT): Wiring 4LN3; PT = 120; CT primary current = 200A.

Active Power engineering scales (see Section 4):

$$HI\_ENG = P_{max} = V_{max} \times I_{max} \times 3 = (828 \times 120) \times (200.00 \times 2) \times 3/1000 = 119,232kW$$

$$LO\_ENG = -P_{max} = -119,232kW$$

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

$$\text{Watts reading} = 5500 \times (119,232 - (-119,232))/(9999 - 0) + (-119,232) = 11,936kW$$

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

$$\text{Watts reading} = 500 \times (119,232 - (-119,232))/(9999 - 0) + (-119,232) = -107,307kW$$

### 4. Power Factor readings

Power factor engineering scales (see Section 3.3):

$$HI\_ENG = 1.000.$$

$$LO\_ENG = -1.000.$$

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:

$$(13952) = 3464$$

$$(13953) = 1$$

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:

$$(14336) = 64747 \text{ (unsigned)}$$

$$(14337) = 65535 \text{ (unsigned) or } -1 \text{ (signed value).}$$

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 a decimal pre-multiplier to pass fractional numbers in an 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 PM175 contains 120 user assignable registers in the address range of 0 to 119, any of which you can map to any register address accessible in the instrument. Registers that reside in different locations may be accessed by a single request by re-mapping them to adjacent addresses in the user assignable registers area.

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.

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, if you want to read registers 7136 (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 7136 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 PM175 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 or via the front display. For details, refer to your instrument Installation and Operation Manual.

When password protection is enabled, the user password you set in your instrument should be written into the device authorization register (2575) before another write request is issued. If the correct password is not supplied while password protection is enabled, the instrument 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 a 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 PM175 automatically performs de-fragmentation of the memory each time you re-organize your files. This helps keep all free memory in one continuous chunk and thus 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 PM175 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 16) sections for multi-channel recording. An ordinal file consists of a single section. Some files, such as daily 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. Each section 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**

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 the data log files can be triggered through the setpoints, either on a time basis using the meter clock or periodic timers, or upon any event detected by the setpoints.

## Profile Data Log Files

Data log file #16 can be configured for a daily profile log 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. A file record stores the summary data (total of all tariffs) and all tariff data for each configured Billing/TOU register. See Section 3.14 for information on the file record structure.

The number of sections is taken automatically from the Billing/TOU Registers setup. Since each Billing/TOU energy register has a shadow maximum demand register, the number of sections in the file can be twice the number of the allocated Billing/TOU registers. Always configure the Billing/TOU registers before you allocate memory for your profile log file.

New records are added to the file automatically every day at midnight. You can review the list of parameters recorded to the file through the file info request/response blocks using info requests with variation 2 (see Section 3.9), or through the Data log #16 setup - it shows the list of parameters for the first file section, which represents the first configured energy usage register.

## Power Quality Statistics Log Files

Data log files #9 and #10 are configured to store the power quality statistics data on a daily or weekly basis. They are organized as multi-section files. See Sections 3.10-3.13 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 six AC channels simultaneously: three voltage and three current waveforms. The number of sections in a file, or channels that a file can store, is defined when you set up the file. The channels that a file will record are selected in the waveform log setup. 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 PM175 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.

A single waveform record for a channel can contain up to 512 points of the sampled input signal. Refer to the line frequency field in the channel header record to correctly set up the time scale for the waveforms.

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 be plotted together. Each record within a series has a unique serial number that allows tracking the sequence of records in a series. A single waveform series can hold up to 81,920 points (2,560 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 648-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 services use 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 the last file update, and more.

See Section 3.9 File Transfer Registers for information on register locations.

### 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 wish 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.
- 5) 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.
- 5) 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 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.
- 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.

## **2.10TCP 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 16 Modbus registers using write function 16. The following table shows the message exchange structure.

| Modbus Register | Description  | Type   | Comment                      |
|-----------------|--|--------|------------------------------|
| +0-1            | Device serial number                               | UINT32 |                              |
| +2-4            | Device MAC address                                 | CHAR6  |                              |
| +5              | Device address                                     | UINT16 | Device port address          |
| +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          | Event timestamp, seconds                           | UINT32 | Local time since Jan 1, 1970 |
| +12-13          | Event timestamp, seconds fraction, in microseconds | UINT32 |                              |
| +14-15          | Reserved   | UINT32 | Written as 0                 |

After receiving a write acknowledgement from a server, a TCP connection is still open for 10 seconds (20 seconds via GPRS) 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, or when using wireless GPRS communications. The notification client will respond to all server requests as if it were a regular incoming connection.

If the server does not close a connection, it will be closed in 20 seconds if there is no activity on the socket. 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. See "TCP Notification Client Setup" for more information on the client setup. 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.

# 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                                 |          | Mapped register 0 address   | 0-65535               |       | UINT16 | R/W |       |
| +1                                 |          | Mapped register 1 address   | 0-65535               |       | UINT16 | R/W |       |
|                                    |          |   |                       |       |        |     |       |
| +119                               |          | Mapped register 119 address   | 0-65535               |       | UINT16 | R/W |       |
| <b>Modbus Conversion Scales</b>    |          |   |                       |       |        |     |       |
| 240                                |          | Low raw scale   | 0                     |       | UINT16 | R   |       |
| 241                                |          | High raw scale  | 9999                  |       | UINT16 | R   |       |
| <b>Device Data Scales</b>          |          |   |                       |       |        |     |       |
| 242                                |          | Voltage scale, in secondary volts   | 60-828 (default 144V) | 1V    | UINT16 | R/W |       |
| 243                                |          | Current scale, in secondary amps = CT secondary current (1A, 5A) × Current overload | 20, 100 (2.0A, 10.0A) | ×0.1A | UINT16 | R   |       |

### 3.2 16-bit Scaled Analog Registers and Energy Counters - Basic Register Set

| Address | Point ID | Description                             | Low and High Scales <sup>2</sup> | Units <sup>2</sup> | Type   | R/W | Notes |
|---------|----------|---|----------------------------------|--------------------|--------|-----|-------|
| 256-308 |          |   |                                  |                    |        |     |       |
| +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 (neutral) 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                | 0-Imax                           | U2                 | UINT16 | R   |       |
| +29     | 0x3704   | I2 Maximum ampere demand                | 0-Imax                           | U2                 | UINT16 | R   |       |
| +30     | 0x3705   | I3 Maximum ampere demand                | 0-Imax                           | U2                 | UINT16 | R   |       |
| +31     |          | kWh import (low)                        | 0-9999                           | 1kWh               | UINT16 | R   | 6     |
| +32     |          | kWh import (high)                       | 0-9999                           | ×10MWh             | UINT16 | R   | 6     |
| +33     |          | kWh export (low)                        | 0-9999                           | 1kWh               | UINT16 | R   | 6     |
| +34     |          | kWh export (high)                       | 0-9999                           | ×10MWh             | UINT16 | R   | 6     |
| +35     |          | +kvarh net (low)                        | 0-9999                           | 1kvarh             | UINT16 | R   | 4, 6  |
| +36     |          | +kvarh net (high)                       | 0-9999                           | ×10Mvarh           | UINT16 | R   | 4, 6  |
| +37     |          | -kvarh net (low)                        | 0-9999                           | 1kvarh             | UINT16 | R   | 5, 6  |
| +38     |          | -kvarh net (high)                       | 0-9999                           | ×10Mvarh           | UINT16 | R   | 5, 6  |

| Address | Point ID | Description                                   | Low and High Scales <sup>2</sup> | Units <sup>2</sup> | Type   | R/W | Notes |
|---------|----------|---|----------------------------------|--------------------|--------|-----|-------|
| +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                           | 1kVAh              | UINT16 | R   | 6     |
| +46     |          | kVAh (high)                                   | 0-9999                           | 10MVAh             | 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:**

<sup>1</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>2</sup> 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".

<sup>3</sup> On a 3-s interval.

<sup>4</sup> Positive readings of kvarh net.

<sup>5</sup> Negative readings of kvarh net.

<sup>6</sup> If you use these energy registers instead of 32-bit registers, limit the energy roll value to 8 digits (see Device Options Setup) to avoid overflow.

### 3.3 16-bit Scaled Analog Registers, Binary Registers and Counters

| Address   | Point ID | Description                     | Low and High Scales <sup>3</sup>               | Units <sup>3</sup> | Type   | R/W | Notes |
|-----------|----------|---------------------------------|--|--------------------|--------|-----|-------|
| 3584      | 0x0000   | <b>None</b>                     | 0  |                    | UINT16 | R   |       |
| 3616      | 0x0080   | <b>Setpoint Status (bitmap)</b> | 0x0000-0xFFFF                                  |                    | UINT16 | R   |       |
| 3648-3649 |          | <b>Special Inputs</b>           |  |                    |        |     |       |
| +0        | 0x0100   | Not used                        | 0  |                    | UINT16 | R   |       |
| +1        | 0x0101   | Phase rotation order            | 0=error, 1=positive (ABC),<br>2=negative (CBA) |                    | UINT16 | R   |       |
| 3776      | 0x0300   | <b>Event Flags (bitmap)</b>     | 0x0000-0x00FF                                  |                    | UINT16 | R   |       |
| 3968      | 0x0600   | <b>Digital Inputs (bitmap)</b>  | 0x0000-0x000F                                  |                    | UINT16 | R   |       |
| 4096      | 0x0800   | <b>Relay Outputs (bitmap)</b>   | 0x0000-0x000F                                  |                    | UINT16 | R   |       |
| 4224-4231 |          | <b>Counters</b>                 |  |                    |        |     |       |
| +0,1      | 0x0A00   | Counter #1                      | 0-999,999                                      |                    | UINT32 | R/W |       |
| +2,3      | 0x0A01   | Counter #2                      | 0-999,999                                      |                    | UINT32 | R/W |       |
| +4,5      | 0x0A02   | Counter #3                      | 0-999,999                                      |                    | UINT32 | R/W |       |
| +6,7      | 0x0A03   | Counter #4                      | 0-999,999                                      |                    | UINT32 | R/W |       |
| 4320-4331 |          | <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   | Not used                        | 0  |                    | 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   | Not used                        | 0  |                    | UINT16 | R   |       |
| +11       | 0x0B8B   | In Current                      | 0-Imax   | U2                 | UINT16 | R   |       |
| 4352-4384 |          | <b>1-Cycle Phase Values</b>     |  |                    |        |     |       |
| +0        | 0x0C00   | V1/V12 Voltage                  | 0-Vmax   | U1                 | UINT16 | R   | 1     |
| +1        | 0x0C01   | V2/V23 Voltage                  | 0-Vmax   | U1                 | UINT16 | R   | 1     |
| +2        | 0x0C02   | V3/V31 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/V12 Voltage THD              | 0-999.9                          | 0.1%               | UINT16 | R   | 2, 5  |
| +19       | 0x0C13   | V2/V23 Voltage THD              | 0-999.9                          | 0.1%               | UINT16 | R   | 2, 5  |
| +20       | 0x0C14   | V3/V31 Voltage THD              | 0-999.9                          | 0.1%               | UINT16 | R   | 2, 5  |
| +21       | 0x0C15   | I1 Current THD                  | 0-999.9                          | 0.1%               | UINT16 | R   | 5     |
| +22       | 0x0C16   | I2 Current THD                  | 0-999.9                          | 0.1%               | UINT16 | R   | 5     |
| +23       | 0x0C17   | I3 Current THD                  | 0-999.9                          | 0.1%               | UINT16 | R   | 5     |
| +24       | 0x0C18   | I1 K-Factor                     | 1.0-999.9                        | 0.1                | UINT16 | R   | 5     |
| +25       | 0x0C19   | I2 K-Factor                     | 1.0-999.9                        | 0.1                | UINT16 | R   | 5     |
| +26       | 0x0C1A   | I3 K-Factor                     | 1.0-999.9                        | 0.1                | UINT16 | R   | 5     |
| +27       | 0x0C1B   | I1 Current TDD                  | 0-100.0                          | 0.1%               | UINT16 | R   | 5     |
| +28       | 0x0C1C   | I2 Current TDD                  | 0-100.0                          | 0.1%               | UINT16 | R   | 5     |
| +29       | 0x0C1D   | I3 Current TDD                  | 0-100.0                          | 0.1%               | UINT16 | R   | 5     |
| +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   |       |
| 4544-4556 |          | <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 | R   |       |
| +5        | 0x0F06   | Total kW import                 | 0-Pmax                           | U3                 | UINT32 | R   |       |
| +7        | 0x0F07   | Total kW export                 | 0-Pmax                           | U3                 | UINT32 | R   |       |
| +8        | 0x0F08   | Total kvar import               | 0-Pmax                           | U3                 | UINT32 | R   |       |
| +9        | 0x0F09   | Total kvar export               | 0-Pmax                           | U3                 | UINT32 | R   |       |
| +10       | 0x0FOA   | 3-phase average L-N/L-L voltage | 0-Vmax                           | U1                 | UINT32 | R   | 1     |
| +11       | 0x0FOB   | 3-phase average L-L voltage     | 0-Vmax                           | U1                 | UINT32 | R   |       |
| +12       | 0x0FOC   | 3-phase average current         | 0-Imax                           | U2                 | UINT32 | R   |       |
| 4608-4612 |          | <b>1-Cycle Auxiliary Values</b> |                                  |                    |        |     |       |
| +0        | 0x1000   | Not used                        |                                  |                    | UINT16 | R   |       |
| +1        | 0x1001   | In (neutral) Current            | 0-Imax                           | U2                 | UINT16 | R   |       |
| +2        | 0x1002   | Frequency                       | 0-Fmax                           | 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   |       |
| 4640-4655 |          | <b>Phasor</b>                   |                                  |                    |        |     |       |
| +0        | 0x1080   | V1/V12 Voltage magnitude        | 0-Vmax                           | U1                 | UINT16 | R   | 2     |

| Address   | Point ID | Description                  | Low and High Scales <sup>3</sup> | Units <sup>3</sup> | Type   | R/W | Notes |
|-----------|----------|------------------------------|----------------------------------|--------------------|--------|-----|-------|
| +1        | 0x1081   | V2/V23 Voltage magnitude     | 0-Vmax                           | U1                 | UINT16 | R   | 2     |
| +2        | 0x1082   | V3/V31 Voltage magnitude     | 0-Vmax                           | U1                 | UINT16 | R   | 2     |
| +3        | 0x1083   | Not used                     |                                  |                    | 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   | Not used                     |                                  |                    | UINT16 | R   |       |
| +8        | 0x1088   | V1/V12 Voltage angle         | -180.0-180.0                     | 0.1°               | INT16  | R   | 2     |
| +9        | 0x1089   | V2/V23 Voltage angle         | -180.0-180.0                     | 0.1°               | INT16  | R   | 2     |
| +10       | 0x108A   | V3/V31 Voltage angle         | -180.0-180.0                     | 0.1°               | INT16  | R   | 2     |
| +11       | 0x108B   | Not used                     |                                  |                    | 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   | Not used                     |                                  |                    | INT16  | R   |       |
| 4672-4704 |          | <b>1-Second Phase 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                       | 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/V12 Voltage THD           | 0-999.9                          | 0.1%               | UINT16 | R   | 2,6   |
| +19       | 0x1113   | V2/V23 Voltage THD           | 0-999.9                          | 0.1%               | UINT16 | R   | 2,6   |
| +20       | 0x1114   | V3/V31 Voltage THD           | 0-999.9                          | 0.1%               | UINT16 | R   | 2,6   |
| +21       | 0x1115   | I1 Current THD               | 0-999.9                          | 0.1%               | UINT16 | R   | 6     |
| +22       | 0x1116   | I2 Current THD               | 0-999.9                          | 0.1%               | UINT16 | R   | 6     |
| +23       | 0x1117   | I3 Current THD               | 0-999.9                          | 0.1%               | UINT16 | R   | 6     |
| +24       | 0x1118   | I1 K-Factor                  | 1.0-999.9                        | 0.1                | UINT16 | R   | 6     |
| +25       | 0x1119   | I2 K-Factor                  | 1.0-999.9                        | 0.1                | UINT16 | R   | 6     |
| +26       | 0x111A   | I3 K-Factor                  | 1.0-999.9                        | 0.1                | UINT16 | R   | 6     |



| Address   | Point ID | Description                      | Low and High Scales <sup>3</sup> | Units <sup>3</sup> | Type   | R/W | Notes |
|-----------|----------|----------------------------------|----------------------------------|--------------------|--------|-----|-------|
| +27       | 0x111B   | I1 Current TDD                   | 0-100.0                          | 0.1%               | UINT16 | R   | 6     |
| +28       | 0x111C   | I2 Current TDD                   | 0-100.0                          | 0.1%               | UINT16 | R   | 6     |
| +29       | 0x111D   | I3 Current TDD                   | 0-100.0                          | 0.1%               | UINT16 | R   | 6     |
| +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   |       |
| 4768-4783 |          | <b>3-Second Powers</b>           |                                  |                    |        |     |       |
| +0        | 0x1280   | kW L1                            | -Pmax-Pmax                       | U3                 | INT16  | R   |       |
| +1        | 0x1281   | kW L2                            | -Pmax-Pmax                       | U3                 | INT16  | R   |       |
| +2        | 0x1282   | kW L3                            | -Pmax-Pmax                       | U3                 | INT16  | R   |       |
| +3        | 0x1283   | kvar L1                          | -Pmax-Pmax                       | U3                 | INT16  | R   |       |
| +4        | 0x1284   | kvar L2                          | -Pmax-Pmax                       | U3                 | INT16  | R   |       |
| +5        | 0x1285   | kvar L3                          | -Pmax-Pmax                       | U3                 | INT16  | R   |       |
| +6        | 0x1286   | kVA L1                           | 0-Pmax                           | U3                 | UINT16 | R   |       |
| +7        | 0x1287   | kVA L2                           | 0-Pmax                           | U3                 | UINT16 | R   |       |
| +8        | 0x1288   | kVA L3                           | 0-Pmax                           | U3                 | UINT16 | R   |       |
| +9        | 0x1289   | Power factor L1                  | -1.000-1.000                     | 0.001              | INT16  | R   |       |
| +10       | 0x128A   | Power factor L2                  | -1.000-1.000                     | 0.001              | INT16  | R   |       |
| +11       | 0x128B   | Power factor L3                  | -1.000-1.000                     | 0.001              | INT16  | R   |       |
| +12       | 0x128C   | Total kW                         | -Pmax-Pmax                       | U3                 | INT16  | R   |       |
| +13       | 0x128D   | Total kvar                       | -Pmax-Pmax                       | U3                 | INT16  | R   |       |
| +14       | 0x128E   | Total kVA                        | 0-Pmax                           | U3                 | UINT16 | R   |       |
| +15       | 0x128F   | Total PF                         | -1.000-1.000                     | 0.001              | INT16  | R   |       |
| 4864-4876 |          | <b>1-Second Total Values</b>     |                                  |                    |        |     |       |
| +0        | 0x1400   | Total kW                         | -Pmax-Pmax                       | U3                 | INT16  | R   |       |
| +1        | 0x1401   | Total kvar                       | -Pmax-Pmax                       | U3                 | INT16  | R   |       |
| +2        | 0x1402   | Total kVA                        | 0-Pmax                           | U3                 | UINT16 | R   |       |
| +3        | 0x1403   | Total PF                         | -1.000-1.000                     | 0.001              | INT16  | R   |       |
| +4        | 0x1404   | Total PF lag                     | 0-1.000                          | 0.001              | UINT16 | R   |       |
| +5        | 0x1405   | Total PF lead                    | 0-1.000                          | 0.001              | UINT16 | R   |       |
| +5        | 0x1406   | Total kW import                  | 0-Pmax                           | U3                 | UINT32 | R   |       |
| +7        | 0x1407   | Total kW export                  | 0-Pmax                           | U3                 | UINT32 | R   |       |
| +8        | 0x1408   | Total kvar import                | 0-Pmax                           | U3                 | UINT32 | R   |       |
| +9        | 0x1409   | Total kvar export                | 0-Pmax                           | U3                 | UINT32 | R   |       |
| +10       | 0x140A   | 3-phase average L-N/L-L voltage  | 0-Vmax                           | U1                 | UINT32 | R   | 1     |
| +11       | 0x140B   | 3-phase average L-L voltage      | 0-Vmax                           | U1                 | UINT32 | R   |       |
| +12       | 0x140C   | 3-phase average current          | 0-Imax                           | U2                 | UINT32 | R   |       |
| 4928-4932 |          | <b>1-Second Auxiliary Values</b> |                                  |                    |        |     |       |
| +0        | 0x1500   | Not used                         |                                  |                    | UINT16 | R   |       |
| +1        | 0x1501   | In (neutral) Current             | 0-Imax                           | U2                 | UINT16 | R   |       |
| +2        | 0x1502   | Frequency                        | 0-Fmax                           | 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   |       |

| Address   | Point ID | Description                                   | Low and High Scales <sup>3</sup> | Units <sup>3</sup> | Type   | R/W | Notes |
|-----------|----------|---|----------------------------------|--------------------|--------|-----|-------|
| 4960-4971 |          | <b>Present Harmonic Demands</b>               |                                  |                    |        |     |       |
| +0        | 0x1580   | V1/V12 THD demand                             | 0-999.9                          | 0.1%               | UINT16 | R   | 2     |
| +1        | 0x1581   | V2/V23 THD demand                             | 0-999.9                          | 0.1%               | UINT16 | R   | 2     |
| +2        | 0x1582   | V3/V31 THD demand                             | 0-999.9                          | 0.1%               | UINT16 | R   | 2     |
| +3        | 0x1583   | Not used                                      |                                  |                    | 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   | Not used                                      |                                  |                    | 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   | Not used                                      |                                  |                    | UINT16 | R   |       |
| 4992-5021 |          | <b>Present Volt, Ampere and Power Demands</b> |                                  |                    |        |     |       |
| +0        | 0x1600   | V1/V12 Volt demand                            | 0-Vmax                           | U1                 | UINT16 | R   | 2     |
| +1        | 0x1601   | V2/V23 Volt demand                            | 0-Vmax                           | U1                 | UINT16 | R   | 2     |
| +2        | 0x1602   | V3/V31 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   |       |
| +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                                      |                                  |                    | UINT16 | R   |       |
| +13       | 0x160D   | Not used                                      |                                  |                    | UINT16 | R   |       |
| +14       | 0x160E   | Not used                                      |                                  |                    | 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   |       |

| Address   | Point ID | Description                                 | Low and High Scales <sup>3</sup> | Units <sup>3</sup> | Type   | R/W | Notes |
|-----------|----------|---|----------------------------------|--------------------|--------|-----|-------|
| +29       | 0x161D   | kvar export predicted sliding window demand | 0-Pmax                           | U3                 | UINT16 | R   |       |
| 5056-5073 |          | <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   | Not used                                    |                                  |                    | INT32  | R   |       |
| +6,7      | 0x1703   | Not used                                    |                                  |                    | 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   | Not used                                    |                                  |                    | INT32  | R   |       |
| +14,15    | 0x1707   | Not used                                    |                                  |                    | UINT32 | R   |       |
| +16,17    | 0x1708   | kVAh total                                  | 0-999,999,999                    | 1 kVAh             | UINT32 | R   |       |
| 5120-5137 |          | <b>Phase Energies</b>                       |                                  |                    |        |     |       |
| +0,1      | 0x1800   | kWh import L1                               | 0-999,999,999                    | 1 kWh              | UINT32 | R   |       |
| +2,3      | 0x1801   | kWh import L2                               | 0-999,999,999                    | 1 kWh              | UINT32 | R   |       |
| +4,5      | 0x1802   | kWh import L3                               | 0-999,999,999                    | 1 kWh              | UINT32 | R   |       |
| +6,7      | 0x1803   | kvarh import L1                             | 0-999,999,999                    | 1 kvarh            | UINT32 | R   |       |
| +8,9      | 0x1804   | kvarh import L2                             | 0-999,999,999                    | 1 kvarh            | UINT32 | R   |       |
| +10,11    | 0x1805   | kvarh import L3                             | 0-999,999,999                    | 1 kvarh            | UINT32 | R   |       |
| +12,13    | 0x1806   | kVAh total L1                               | 0-999,999,999                    | 1 kVAh             | UINT32 | R   |       |
| +14,15    | 0x1807   | kVAh total L2                               | 0-999,999,999                    | 1 kVAh             | UINT32 | R   |       |
| +16,17    | 0x1808   | kVAh total L3                               | 0-999,999,999                    | 1 kVAh             | UINT32 | 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   |       |
| 5184-5233 |          | <b>V1/V12 Harmonics</b>                     |                                  |                    |        |     | 2,7   |
| +0        | 0x1900   | H01 Harmonic magnitude                      | 0-100.00                         | 0.01%              | UINT16 | R   |       |
| +1        | 0x1901   | H02 Harmonic magnitude                      | 0-100.00                         | 0.01%              | UINT16 | R   |       |
|           |          | ...   |                                  |                    |        |     |       |
| +49       | 0x1931   | H50 Harmonic magnitude                      | 0-100.00                         | 0.01%              | UINT16 | R   |       |
| 5248-5297 |          | <b>V2/V23 Harmonics</b>                     |                                  |                    |        |     | 2,7   |
| +0        | 0x1A00   | H01 Harmonic magnitude                      | 0-100.00                         | 0.01%              | UINT16 | R   |       |
| +1        | 0x1A01   | H02 Harmonic magnitude                      | 0-100.00                         | 0.01%              | UINT16 | R   |       |
|           |          | ...   |                                  |                    |        |     |       |
| +49       | 0x1A31   | H50 Harmonic magnitude                      | 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 |
|-----------|----------|---------------------------------|----------------------------------|--------------------|--------|-----|-------|
| 5312-5361 |          | <b>V3/V31 Harmonics</b>         |                                  |                    |        |     | 2,7   |
| +0        | 0x1B00   | H01 Harmonic magnitude          | 0-100.00                         | 0.01%              | UINT16 | R   |       |
| +1        | 0x1B01   | H02 Harmonic magnitude          | 0-100.00                         | 0.01%              | UINT16 | R   |       |
|           |          | ...                             |                                  |                    |        |     |       |
| +49       | 0x1B31   | H50 Harmonic magnitude          | 0-100.00                         | 0.01%              | UINT16 | R   |       |
| 5376-5425 |          | <b>I1 Harmonics</b>             |                                  |                    |        |     | 7     |
| +0        | 0x1C00   | H01 Harmonic magnitude          | 0-100.00                         | 0.01%              | UINT16 | R   |       |
| +1        | 0x1C01   | H02 Harmonic magnitude          | 0-100.00                         | 0.01%              | UINT16 | R   |       |
|           |          | ...                             |                                  |                    |        |     |       |
| +49       | 0x1C31   | H50 Harmonic magnitude          | 0-100.00                         | 0.01%              | UINT16 | R   |       |
| 5440-5489 |          | <b>I2 Harmonics</b>             |                                  |                    |        |     | 7     |
| +0        | 0x1D00   | H01 Harmonic magnitude          | 0-100.00                         | 0.01%              | UINT16 | R   |       |
| +1        | 0x1D01   | H02 Harmonic magnitude          | 0-100.00                         | 0.01%              | UINT16 | R   |       |
|           |          | ...                             |                                  |                    |        |     |       |
| +49       | 0x1D31   | H50 Harmonic magnitude          | 0-100.00                         | 0.01%              | UINT16 | R   |       |
| 5504-5553 |          | <b>I3 Harmonics</b>             |                                  |                    |        |     | 7     |
| +0        | 0x1E00   | H01 Harmonic magnitude          | 0-100.00                         | 0.01%              | UINT16 | R   |       |
| +1        | 0x1E01   | H02 Harmonic magnitude          | 0-100.00                         | 0.01%              | UINT16 | R   |       |
|           |          | ...                             |                                  |                    |        |     |       |
| +49       | 0x1E31   | H50 Harmonic magnitude          | 0-100.00                         | 0.01%              | UINT16 | R   |       |
| 6208-6225 |          | <b>Fundamental Phase Values</b> |                                  |                    |        |     | 5     |
| +0        | 0x2900   | V1/V12 Voltage                  | 0-Vmax                           | U1                 | UINT16 | R   | 2     |
| +1        | 0x2901   | V2/V23 Voltage                  | 0-Vmax                           | U1                 | UINT16 | R   | 2     |
| +2        | 0x2902   | V3/V31 Voltage                  | 0-Vmax                           | U1                 | UINT16 | R   | 2     |
| +3        | 0x2903   | I1 Current                      | 0-Imax                           | U2                 | UINT16 | R   |       |
| +4        | 0x2904   | I2 Current                      | 0-Imax                           | U2                 | UINT16 | R   |       |
| +5        | 0x2905   | I3 Current                      | 0-Imax                           | U2                 | UINT16 | R   |       |
| +6        | 0x2906   | kW L1                           | -Pmax-Pmax                       | U3                 | INT16  | R   |       |
| +7        | 0x2907   | kW L2                           | -Pmax-Pmax                       | U3                 | INT16  | R   |       |
| +8        | 0x2908   | kW L3                           | -Pmax-Pmax                       | U3                 | INT16  | R   |       |
| +9        | 0x2909   | kvar L1                         | -Pmax-Pmax                       | U3                 | INT16  | R   |       |
| +10       | 0x290A   | kvar L2                         | -Pmax-Pmax                       | U3                 | INT16  | R   |       |
| +11       | 0x290B   | kvar L3                         | -Pmax-Pmax                       | U3                 | INT16  | R   |       |
| +12       | 0x290C   | kVA L1                          | 0-Pmax                           | U3                 | UINT16 | R   |       |
| +13       | 0x290D   | kVA L2                          | 0-Pmax                           | U3                 | UINT16 | R   |       |
| +14       | 0x290E   | kVA L3                          | 0-Pmax                           | U3                 | UINT16 | R   |       |
| +15       | 0x290F   | Power factor L1                 | -1.000-1.000                     | 0.001              | INT16  | R   |       |
| +16       | 0x2910   | Power factor L2                 | -1.000-1.000                     | 0.001              | INT16  | R   |       |
| +17       | 0x2911   | Power factor L3                 | -1.000-1.000                     | 0.001              | INT16  | R   |       |
| 6240-6251 |          | <b>Flicker</b>                  |                                  |                    |        |     | 2     |
| +0        | 0x2980   | V1 Pst                          | 0-100.00                         | 0.01               | UINT16 | R   |       |
| +1        | 0x2981   | V2 Pst                          | 0-100.00                         | 0.01               | UINT16 | R   |       |
| +2        | 0x2982   | V3 Pst                          | 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          |
|-----------|---------------|---|----------------------------------|--------------------|--------|-----|----------------|
| +3        | 0x2983        | V1 Plt                                  | 0-100.00                         | 0.01               | UINT16 | R   |                |
| +4        | 0x2984        | V2 Plt                                  | 0-100.00                         | 0.01               | UINT16 | R   |                |
| +5        | 0x2985        | V3 Plt                                  | 0-100.00                         | 0.01               | UINT16 | R   |                |
| 6272-6275 |               | <b>Fundamental Total Values</b>         |                                  |                    |        |     | 5              |
| +0        | 0x2A00        | Total fundamental kW                    | -Pmax-Pmax                       | U3                 | INT16  | R   |                |
| +1        | 0x2A01        | Total fundamental kvar                  | -Pmax-Pmax                       | U3                 | INT16  | R   |                |
| +2        | 0x2A02        | Total fundamental kVA                   | 0-Pmax                           | U3                 | UINT16 | R   |                |
| +3        | 0x2A03        | Total fundamental PF                    | -1.000-1.000                     | 0.001              | INT16  | R   |                |
| 6400-6429 |               | <b>Minimum 1-Cycle Phase Values</b>     |                                  |                    |        |     |                |
| +0        | 0x2C00        | V1/V12 Voltage                          | 0-Vmax                           | U1                 | UINT16 | R   | 2              |
| +1        | 0x2C01        | V2/V23 Voltage                          | 0-Vmax                           | U1                 | UINT16 | R   | 2              |
| +2        | 0x2C02        | V3/V31 Voltage                          | 0-Vmax                           | U1                 | UINT16 | R   | 2              |
| +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   |                |
| +6-17     | 0x2C06-0x2C11 | Not used                                | 0                                |                    | INT16  | R   |                |
| +18       | 0x2C12        | V1/V12 Voltage THD                      | 0-9999                           | 0.1%               | UINT16 | R   | 2,5            |
| +19       | 0x2C13        | V2/V23 Voltage THD                      | 0-9999                           | 0.1%               | UINT16 | R   | 2,5            |
| +20       | 0x2C14        | V3/V31 Voltage THD                      | 0-999.9                          | 0.1%               | UINT16 | R   | 2,5            |
| +21       | 0x2C15        | I1 Current THD                          | 0-999.9                          | 0.1%               | UINT16 | R   | 5              |
| +22       | 0x2C16        | I2 Current THD                          | 0-999.9                          | 0.1%               | UINT16 | R   | 5              |
| +23       | 0x2C17        | I3 Current THD                          | 0-999.9                          | 0.1%               | UINT16 | R   | 5              |
| +24       | 0x2C18        | I1 K-Factor                             | 1.0-999.9                        | 0.1                | UINT16 | R   | 5              |
| +25       | 0x2C19        | I2 K-Factor                             | 1.0-999.9                        | 0.1                | UINT16 | R   | 5              |
| +26       | 0x2C1A        | I3 K-Factor                             | 1.0-999.9                        | 0.1                | UINT16 | R   | 5              |
| +27       | 0x2C1B        | I1 Current TDD                          | 0-100.0                          | 0.1%               | UINT16 | R   | 5              |
| +28       | 0x2C1C        | I2 Current TDD                          | 0-100.0                          | 0.1%               | UINT16 | R   | 5              |
| +29       | 0x2C1D        | I3 Current TDD                          | 0-100.0                          | 0.1%               | UINT16 | R   | 5              |
| 6464-6467 |               | <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 |
| 6528-6530 |               | <b>Minimum 1-Cycle Auxiliary Values</b> |                                  |                    |        |     |                |
| +0        | 0x2E00        | Not used                                |                                  | U2                 | UINT16 | R   |                |
| +1        | 0x2E01        | In Current                              | 0-Imax                           | U2                 | UINT16 | R   |                |
| +2        | 0x2E02        | Frequency                               | 0-Fmax                           | 0.01Hz             | UINT16 | R   |                |
| 6912-6941 |               | <b>Maximum 1-Cycle Phase Values</b>     |                                  |                    |        |     |                |
| +0        | 0x3400        | V1/V12 Voltage                          | 0-Vmax                           | U1                 | UINT16 | R   | 2              |
| +1        | 0x3401        | V2/V23 Voltage                          | 0-Vmax                           | U1                 | UINT16 | R   | 2              |
| +2        | 0x3402        | V3/V31 Voltage                          | 0-Vmax                           | U1                 | UINT16 | R   | 2              |
| +3        | 0x3403        | I1 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          |
|-----------|---------------|---|----------------------------------|--------------------|--------|-----|----------------|
| +4        | 0x3404        | I2 Current                                | 0-Imax                           | U2                 | UINT16 | R   |                |
| +5        | 0x3405        | I3 Current                                | 0-Imax                           | U2                 | UINT16 | R   |                |
| +6-17     | 0x3406-0x3411 | Not used                                  | 0                                |                    | INT16  | R   |                |
| +18       | 0x3412        | V1 Voltage THD                            | 0-999.9                          | 0.1%               | UINT16 | R   | 2, 5           |
| +19       | 0x3413        | V2 Voltage THD                            | 0-999.9                          | 0.1%               | UINT16 | R   | 2, 5           |
| +20       | 0x3414        | V3 Voltage THD                            | 0-999.9                          | 0.1%               | UINT16 | R   | 2, 5           |
| +21       | 0x3415        | I1 Current THD                            | 0-999.9                          | 0.1%               | UINT16 | R   | 5              |
| +22       | 0x3416        | I2 Current THD                            | 0-999.9                          | 0.1%               | UINT16 | R   | 5              |
| +23       | 0x3417        | I3 Current THD                            | 0-999.9                          | 0.1%               | UINT16 | R   | 5              |
| +24       | 0x3418        | I1 K-Factor                               | 1.0-999.9                        | 0.1                | UINT16 | R   | 5              |
| +25       | 0x3419        | I2 K-Factor                               | 1.0-999.9                        | 0.1                | UINT16 | R   | 5              |
| +26       | 0x341A        | I3 K-Factor                               | 1.0-999.9                        | 0.1                | UINT16 | R   | 5              |
| +27       | 0x341B        | I1 Current TDD                            | 0-100.0                          | 0.1%               | UINT16 | R   | 5              |
| +28       | 0x341C        | I2 Current TDD                            | 0-100.0                          | 0.1%               | UINT16 | R   | 5              |
| +29       | 0x341D        | I3 Current TDD                            | 0-100.0                          | 0.1%               | UINT16 | R   | 5              |
| 6976-6979 |               | <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 |
| 7040-7042 |               | <b>Maximum 1-Cycle Auxiliary Values</b>   |                                  |                    |        |     |                |
| +0        | 0x3600        | Not used                                  |                                  | U2                 | UINT16 | R   |                |
| +1        | 0x3601        | In Current                                | 0-Imax                           | U2                 | UINT16 | R   |                |
| +2        | 0x3602        | Frequency                                 | 0-Fmax                           | 0.01Hz             | UINT16 | R   |                |
| 7104-7120 |               | <b>Maximum Demands</b>                    |                                  |                    |        |     |                |
| +0        | 0x3700        | V1/V12 Maximum volt demand                | 0-Vmax                           | U1                 | UINT16 | R   | 2              |
| +1        | 0x3701        | V2/V23 Maximum volt demand                | 0-Vmax                           | U1                 | UINT16 | R   | 2              |
| +2        | 0x3702        | V3/V31 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                                  |                                  |                    | UINT16 | R   |                |
| +7        | 0x3707        | Not used                                  |                                  |                    | UINT16 | R   |                |
| +8        | 0x3708        | Not used                                  |                                  |                    | 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                                  |                                  |                    | UINT16 | R   |                |
| +13       | 0x370D        | Not used                                  |                                  |                    | UINT16 | R   |                |
| +14       | 0x370E        | Not used                                  |                                  |                    | 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   |                |

| Address   | Point ID | Description                     | Low and High Scales <sup>3</sup>  | Units <sup>3</sup> | Type   | R/W | Notes |
|-----------|----------|---------------------------------|---|--------------------|--------|-----|-------|
| 7200-7211 |          | <b>Maximum Harmonic Demands</b> |   |                    |        |     |       |
| +0        | 0x3880   | V1/V12 THD demand               | 0-999.9   | 0.1%               | UINT16 | R   | 2     |
| +1        | 0x3881   | V2/V23 THD demand               | 0-999.9   | 0.1%               | UINT16 | R   | 2     |
| +2        | 0x3882   | V3/V31 THD demand               | 0-999.9   | 0.1%               | UINT16 | R   | 2     |
| +3        | 0x3883   | Not used                        |   |                    | 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   | Not used                        |   |                    | 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   | Not used                        |   |                    | UINT16 | R   |       |
| 7360-7361 |          | <b>Scaled Analog Inputs</b>     |   |                    |        |     |       |
| +0        | 0x3B00   | Analog input AI1                | AI1min-AI1Max   |                    | UINT16 | R   |       |
| +1        | 0x3B01   | Analog input AI2                | AI2min-AI2Max   |                    | UINT16 | R   |       |
| 7392-7393 |          | <b>Raw Analog Inputs</b>        |   |                    |        |     |       |
| +0        | 0x3B80   | Analog input AI1                | 0-4095  |                    | UINT16 | R   |       |
| +1        | 0x3B81   | Analog input AI2                | 0-4095  |                    | UINT16 | R   |       |
| 7424-7425 |          | <b>TOU Parameters</b>           |   |                    |        |     |       |
| +0        | 0x3C00   | Active tariff                   | 0-7   |                    | UINT16 | R/W |       |
| +1        | 0x3C01   | Active profile                  | 0-15:<br>0-3 = Season 1 Profile #1-4,<br>4-7 = Season 2 Profile #1-4,<br>8-11 = Season 3 Profile #1-4,<br>12-15 = Season 4 Profile #1-4 |                    | UINT16 | R/W |       |
| 7456-7457 |          | <b>Scaled Analog Outputs</b>    |   |                    |        |     |       |
| +0        | 0x3C80   | Analog output AO1               | 0-4095  |                    | UINT16 | R/W |       |
| +1        | 0x3C81   | Analog output AO2               | 0-4095  |                    | UINT16 | R/W |       |
| 7488-7503 |          | <b>TOU Energy Register #1</b>   |   |                    |        |     |       |
| +0,1      | 0x3D00   | Tariff #1 register              | 0-999,999,999   | 1 kWh              | UINT32 | R   |       |
| +2,3      | 0x3D01   | Tariff #2 register              | 0-999,999,999   | 1 kWh              | UINT32 | R   |       |
|           |          | ...                             |   |                    |        | R   |       |
| +14,15    | 0x3D07   | Tariff #8 register              | 0-999,999,999   | 1 kWh              | UINT32 | R   |       |
| 7552-7567 |          | <b>TOU Energy Register #2</b>   |   |                    |        |     |       |
| +0,1      | 0x3E00   | Tariff #1 register              | 0-999,999,999   | 1 kWh              | UINT32 | R   |       |
| +2,3      | 0x3E01   | Tariff #2 register              | 0-999,999,999   | 1 kWh              | UINT32 | R   |       |
|           |          | ...                             |   |                    |        | R   |       |
| +14,15    | 0x3E07   | Tariff #8 register              | 0-999,999,999   | 1 kWh              | UINT32 | R   |       |
| 7616-7631 |          | <b>TOU Energy Register #3</b>   |   |                    |        |     |       |
| +0,1      | 0x3F00   | Tariff #1 register              | 0-999,999,999   | 1 kWh              | UINT32 | R   |       |
| +2,3      | 0x3F01   | Tariff #2 register              | 0-999,999,999   | 1 kWh              | UINT32 | R   |       |
|           |          | ...                             |   |                    |        | R   |       |

| Address   | Point ID | Description                                  | Low and High Scales <sup>3</sup> | Units <sup>3</sup> | Type   | R/W | Notes |
|-----------|----------|--|----------------------------------|--------------------|--------|-----|-------|
| +14,15    | 0x3F07   | Tariff #8 register                           | 0-999,999,999                    | 1 kWh              | UINT32 | R   |       |
| 7680-7695 |          | <b>TOU Energy Register #4</b>                |                                  |                    |        |     |       |
| +0,1      | 0x4000   | Tariff #1 register                           | 0-999,999,999                    | 1 kWh              | UINT32 | R   |       |
| +2,3      | 0x4001   | Tariff #2 register                           | 0-999,999,999                    | 1 kWh              | UINT32 | R   |       |
|           |          | ...  |                                  |                    |        | R   |       |
| +14,15    | 0x4007   | Tariff #8 register                           | 0-999,999,999                    | 1 kWh              | UINT32 | R   |       |
| 7744-7759 |          | <b>TOU Energy Register #5</b>                |                                  |                    |        |     |       |
| +0,1      | 0x4100   | Tariff #1 register                           | 0-999,999,999                    | 1 kWh              | UINT32 | R   |       |
| +2,3      | 0x4101   | Tariff #2 register                           | 0-999,999,999                    | 1 kWh              | UINT32 | R   |       |
|           |          | ...  |                                  |                    |        | R   |       |
| +14,15    | 0x4107   | Tariff #8 register                           | 0-999,999,999                    | 1 kWh              | UINT32 | R   |       |
| 7808-7823 |          | <b>TOU Energy Register #6</b>                |                                  |                    |        |     |       |
| +0,1      | 0x4200   | Tariff #1 register                           | 0-999,999,999                    | 1 kWh              | UINT32 | R   |       |
| +2,3      | 0x4201   | Tariff #2 register                           | 0-999,999,999                    | 1 kWh              | UINT32 | R   |       |
|           |          | ...  |                                  |                    |        | R   |       |
| +14,15    | 0x4207   | Tariff #8 register                           | 0-999,999,999                    | 1 kWh              | UINT32 | R   |       |
| 7872-7887 |          | <b>TOU Energy Register #7</b>                |                                  |                    |        |     |       |
| +0,1      | 0x4300   | Tariff #1 register                           | 0-999,999,999                    | 1 kWh              | UINT32 | R   |       |
| +2,3      | 0x4301   | Tariff #2 register                           | 0-999,999,999                    | 1 kWh              | UINT32 | R   |       |
|           |          | ...  |                                  |                    |        | R   |       |
| +14,15    | 0x4307   | Tariff #8 register                           | 0-999,999,999                    | 1 kWh              | UINT32 | R   |       |
| 7936-7951 |          | <b>TOU Energy Register #8</b>                |                                  |                    |        |     |       |
| +0,1      | 0x4400   | Tariff #1 register                           | 0-999,999,999                    | 1 kWh              | UINT32 | R   |       |
| +2,3      | 0x4401   | Tariff #2 register                           | 0-999,999,999                    | 1 kWh              | UINT32 | R   |       |
|           |          | ...  |                                  |                    |        | R   |       |
| +14,15    | 0x4407   | Tariff #8 register                           | 0-999,999,999                    | 1 kWh              | UINT32 | R   |       |
| 8000-8007 |          | <b>Summary Energy Accumulated Demands</b>    |                                  |                    |        |     |       |
| +0        | 0x4500   | Summary register #1 demand                   | 0-Pmax                           | U3                 | UINT16 | R   |       |
| +1        | 0x4501   | Summary register #2 demand                   | 0-Pmax                           | U3                 | UINT16 | R   |       |
|           |          | ...  |                                  |                    |        | R   |       |
| +7        | 0x4507   | Summary register #8 demand                   | 0-Pmax                           | U3                 | UINT16 | R   |       |
| 8032-8039 |          | <b>Summary Energy Block Demands</b>          |                                  |                    |        |     |       |
| +0        | 0x4580   | Summary register #1 demand                   | 0-Pmax                           | U3                 | UINT16 | R   |       |
| +1        | 0x4581   | Summary register #2 demand                   | 0-Pmax                           | U3                 | UINT16 | R   |       |
|           |          | ...  |                                  |                    |        | R   |       |
| +7        | 0x4587   | Summary register #8 demand                   | 0-Pmax                           | U3                 | UINT16 | R   |       |
| 8064-8071 |          | <b>Summary Energy Sliding Window Demands</b> |                                  |                    |        |     |       |
| +0        | 0x4600   | Summary register #1 demand                   | 0-Pmax                           | U3                 | UINT16 | R   |       |
| +1        | 0x4601   | Summary register #2 demand                   | 0-Pmax                           | U3                 | UINT16 | R   |       |
|           |          | ...  |                                  |                    |        | R   |       |
| +7        | 0x4607   | Summary register #8 demand                   | 0-Pmax                           | U3                 | UINT16 | R   |       |
| 8160-8167 |          | <b>Summary Energy Maximum Demands</b>        |                                  |                    |        |     |       |
| +0        | 0x4780   | Summary register #1 maximum demand           | 0-Pmax                           | U3                 | UINT16 | R   |       |



| Address   | Point ID | Description                           | Low and High Scales <sup>3</sup> | Units <sup>3</sup> | Type   | R/W | Notes |
|-----------|----------|---------------------------------------|----------------------------------|--------------------|--------|-----|-------|
| +1        | 0x4781   | Summary register #2 maximum demand    | 0-Pmax                           | U3                 | UINT16 | R   |       |
|           |          | ...                                   |                                  |                    |        | R   |       |
| +7        | 0x4787   | Summary register #8 maximum demand    | 0-Pmax                           | U3                 | UINT16 | R   |       |
| 8192-8199 |          | <b>TOU Maximum Demand Register #1</b> |                                  |                    |        |     |       |
| +0        | 0x4800   | Tariff #1 maximum demand              | 0-Pmax                           | U3                 | UINT16 | R   |       |
| +1        | 0x4801   | Tariff #2 maximum demand              | 0-Pmax                           | U3                 | UINT16 | R   |       |
|           |          | ...                                   |                                  |                    |        | R   |       |
| +7        | 0x4807   | Tariff #8 maximum demand              | 0-Pmax                           | U3                 | UINT16 | R   |       |
| 8256-8263 |          | <b>TOU Maximum Demand Register #2</b> |                                  |                    |        |     |       |
| +0        | 0x4900   | Tariff #1 maximum demand              | 0-Pmax                           | U3                 | UINT16 | R   |       |
| +1        | 0x4901   | Tariff #2 maximum demand              | 0-Pmax                           | U3                 | UINT16 | R   |       |
|           |          | ...                                   |                                  |                    |        | R   |       |
| +7        | 0x4907   | Tariff #8 maximum demand              | 0-Pmax                           | U3                 | UINT16 | R   |       |
| 8320-8327 |          | <b>TOU Maximum Demand Register #3</b> |                                  |                    |        |     |       |
| +0        | 0x4A00   | Tariff #1 maximum demand              | 0-Pmax                           | U3                 | UINT16 | R   |       |
| +1        | 0x4A01   | Tariff #2 maximum demand              | 0-Pmax                           | U3                 | UINT16 | R   |       |
|           |          | ...                                   |                                  |                    |        | R   |       |
| +7        | 0x4A07   | Tariff #8 maximum demand              | 0-Pmax                           | U3                 | UINT16 | R   |       |
| 8224-8231 |          | <b>TOU Maximum Demand Register #4</b> |                                  |                    |        |     |       |
| +0        | 0x4880   | Tariff #1 maximum demand              | 0-Pmax                           | U3                 | UINT16 | R   |       |
| +1        | 0x4881   | Tariff #2 maximum demand              | 0-Pmax                           | U3                 | UINT16 | R   |       |
|           |          | ...                                   |                                  |                    |        | R   |       |
| +7        | 0x4887   | Tariff #8 maximum demand              | 0-Pmax                           | U3                 | UINT16 | R   |       |
| 8288-8295 |          | <b>TOU Maximum Demand Register #5</b> |                                  |                    |        |     |       |
| +0        | 0x4980   | Tariff #1 maximum demand              | 0-Pmax                           | U3                 | UINT16 | R   |       |
| +1        | 0x4981   | Tariff #2 maximum demand              | 0-Pmax                           | U3                 | UINT16 | R   |       |
|           |          | ...                                   |                                  |                    |        | R   |       |
| +7        | 0x4987   | Tariff #8 maximum demand              | 0-Pmax                           | U3                 | UINT16 | R   |       |
| 8352-8359 |          | <b>TOU Maximum Demand Register #6</b> |                                  |                    |        |     |       |
| +0        | 0x4A80   | Tariff #1 maximum demand              | 0-Pmax                           | U3                 | UINT16 | R   |       |
| +1        | 0x4A81   | Tariff #2 maximum demand              | 0-Pmax                           | U3                 | UINT16 | R   |       |
|           |          | ...                                   |                                  |                    |        | R   |       |
| +7        | 0x4A87   | Tariff #8 maximum demand              | 0-Pmax                           | U3                 | UINT16 | R   |       |
| 8896-8903 |          | <b>TOU Maximum Demand Register #7</b> |                                  |                    |        |     |       |
| +0        | 0x5300   | Tariff #1 maximum demand              | 0-Pmax                           | U3                 | UINT16 | R   |       |
| +1        | 0x5301   | Tariff #2 maximum demand              | 0-Pmax                           | U3                 | UINT16 | R   |       |
|           |          | ...                                   |                                  |                    |        | R   |       |
| +7        | 0x5307   | Tariff #8 maximum demand              | 0-Pmax                           | U3                 | UINT16 | R   |       |
| 8928-8935 |          | <b>TOU Maximum Demand Register #8</b> |                                  |                    |        |     |       |
| +0        | 0x5380   | Tariff #1 maximum demand              | 0-Pmax                           | U3                 | UINT16 | R   |       |
| +1        | 0x5381   | Tariff #2 maximum demand              | 0-Pmax                           | U3                 | UINT16 | R   |       |
|           |          | ...                                   |                                  |                    |        | R   |       |
| +7        | 0x5387   | Tariff #8 maximum demand              | 0-Pmax                           | U3                 | UINT16 | R   |       |

| Address     | Point ID      | Description                         | Low and High Scales <sup>3</sup> | Units <sup>3</sup> | Type   | R/W | Notes |
|-------------|---------------|-------------------------------------|----------------------------------|--------------------|--------|-----|-------|
| 9984-10033  |               | <b>V1/V12 Harmonic Angles</b>       |                                  |                    |        |     | 2, 4  |
| +0          | 0x6400        | H01 Harmonic angle                  | -180.0-180.0                     | 0.1°               | INT16  | R   |       |
| +1          | 0x6401        | H02 Harmonic angle                  | -180.0-180.0                     | 0.1°               | INT16  | R   |       |
|             |               | ...                                 |                                  |                    |        |     |       |
| +49         | 0x6431        | H50 Harmonic angle                  | -180.0-180.0                     | 0.1°               | INT16  | R   |       |
| 10048-10097 |               | <b>V2/V23 Harmonic Angles</b>       |                                  |                    |        |     | 2, 4  |
| +0          | 0x6500        | H01 Harmonic angle                  | -180.0-180.0                     | 0.1°               | INT16  | R   |       |
| +1          | 0x6501        | H02 Harmonic angle                  | -180.0-180.0                     | 0.1°               | INT16  | R   |       |
|             |               | ...                                 |                                  |                    |        |     |       |
| +49         | 0x6531        | H50 Harmonic angle                  | -180.0-180.0                     | 0.1°               | INT16  | R   |       |
| 10112-10161 |               | <b>V3/V31 Harmonic Angles</b>       |                                  |                    |        |     | 2, 4  |
| +0          | 0x6600        | H01 Harmonic angle                  | -180.0-180.0                     | 0.1°               | INT16  | R   |       |
| +1          | 0x6601        | H02 Harmonic angle                  | -180.0-180.0                     | 0.1°               | INT16  | R   |       |
|             |               | ...                                 |                                  |                    |        |     |       |
| +49         | 0x6631        | H50 Harmonic angle                  | -180.0-180.0                     | 0.1°               | INT16  | R   |       |
| 10240-10289 |               | <b>I1 Harmonic Angles</b>           |                                  |                    |        |     | 4     |
| +0          | 0x6800        | H01 Harmonic angle                  | -180.0-180.0                     | 0.1°               | INT16  | R   |       |
| +1          | 0x6801        | H02 Harmonic angle                  | -180.0-180.0                     | 0.1°               | INT16  | R   |       |
|             |               | ...                                 |                                  |                    |        |     |       |
| +49         | 0x6831        | H50 Harmonic angle                  | -180.0-180.0                     | 0.1°               | INT16  | R   |       |
| 10304-10353 |               | <b>I2 Harmonic Angles</b>           |                                  |                    |        |     | 4     |
| +0          | 0x6900        | H01 Harmonic angle                  | -180.0-180.0                     | 0.1°               | INT16  | R   |       |
| +1          | 0x6901        | H02 Harmonic angle                  | -180.0-180.0                     | 0.1°               | INT16  | R   |       |
|             |               | ...                                 |                                  |                    |        |     |       |
| +49         | 0x6931        | H50 Harmonic angle                  | -180.0-180.0                     | 0.1°               | INT16  | R   |       |
| 10368-10417 |               | <b>I3 Harmonic Angles</b>           |                                  |                    |        |     | 4     |
| +0          | 0x6A00        | H01 Harmonic angle                  | -180.0-180.0                     | 0.1°               | INT16  | R   |       |
| +1          | 0x6A01        | H02 Harmonic angle                  | -180.0-180.0                     | 0.1°               | INT16  | R   |       |
|             |               | ...                                 |                                  |                    |        |     |       |
| +49         | 0x6A31        | H50 Harmonic angle                  | -180.0-180.0                     | 0.1°               | INT16  | R   |       |
| 10528-10554 |               | <b>3-Second RMS Values</b>          |                                  |                    |        |     |       |
| +0          | 0x6C80        | V1 voltage                          | 0-Vmax                           | U1                 | UINT16 | R   | 2     |
| +1          | 0x6C81        | V2 voltage                          | 0-Vmax                           | U1                 | UINT16 | R   | 2     |
| +2          | 0x6C82        | V3 voltage                          | 0-Vmax                           | U1                 | UINT16 | R   | 2     |
| +3-16       | 0x6C83-0x6C90 | Not used                            | 0                                |                    | UINT16 | R   |       |
| +17         | 0x6C91        | Zero-sequence voltage               | 0-Vmax                           | U1                 | UINT16 | R   |       |
| +18         | 0x6C92        | Zero-sequence current               | 0-Imax                           | U2                 | UINT16 | R   |       |
| +19         | 0x6C93        | Not used                            | 0                                |                    | UINT16 | R   |       |
| +20         | 0x6C94        | Negative-sequence voltage unbalance | 0-300.0                          | 0.1%               | UINT16 | R   |       |
| +21         | 0x6C95        | Negative-sequence current unbalance | 0-300.0                          | 0.1%               | UINT16 | R   |       |
| +22-23      | 0x6C96-0x6C97 | Not used                            | 0                                |                    | UINT16 | R   |       |

| Address     | Point ID      | Description                         | Low and High Scales <sup>3</sup> | Units <sup>3</sup> | Type   | R/W | Notes   |
|-------------|---------------|-------------------------------------|----------------------------------|--------------------|--------|-----|---|
| +24         | 0x6C98        | Frequency                           | 0-100.00                         | 0.01Hz             | UINT16 | R   | 10-sec value GOST 514149, 20-sec value GOST 13109 |
| +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 Values</b>          |                                  |                    |        |     | GOST 13109 only                                   |
| +0          | 0x7600        | V1 Voltage                          | 0-Vmax                           | U1                 | UINT16 | R   | <sup>2</sup>                                      |
| +1          | 0x7601        | V2 Voltage                          | 0-Vmax                           | U1                 | UINT16 | R   | <sup>2</sup>                                      |
| +2          | 0x7602        | V3 Voltage                          | 0-Vmax                           | U1                 | UINT16 | R   | <sup>2</sup>                                      |
| +3-16       | 0x7603-0x7610 | Not used                            | 0                                |                    | UINT16 | R   |   |
| +17         | 0x7611        | Zero-sequence voltage               | 0-Vmax                           | U1                 | UINT16 | R   |   |
| +18         | 0x7612        | Zero-sequence current               | 0-Imax                           | U2                 | UINT16 | R   |   |
| +19         | 0x7613        | Not used                            | 0                                |                    | UINT16 | R   |   |
| +20         | 0x7614        | Negative-sequence voltage unbalance | 0-300.0                          | 0.1%               | UINT16 | R   |   |
| +21         | 0x7615        | Negative-sequence current unbalance | 0-300.0                          | 0.1%               | UINT16 | R   |   |
| +22-24      | 0x7616-0x7618 | Not used                            | 0                                |                    | 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 Values</b>         |                                  |                    |        |     |   |
| +0          | 0x6D00        | V1 Voltage                          | 0-Vmax                           | U1                 | UINT16 | R   | <sup>2</sup>                                      |
| +1          | 0x6D01        | V2 Voltage                          | 0-Vmax                           | U1                 | UINT16 | R   | <sup>2</sup>                                      |
| +2          | 0x6D02        | V3 Voltage                          | 0-Vmax                           | U1                 | UINT16 | R   | <sup>2</sup>                                      |
| +3-16       | 0x6D03-0x6D10 | Not used                            | 0                                |                    | UINT16 | R   |   |
| +17         | 0x6D11        | Zero-sequence voltage               | 0-Vmax                           | U1                 | UINT16 | R   |   |
| +18         | 0x6D12        | Zero-sequence current               | 0-Imax                           | U2                 | UINT16 | R   |   |
| +19         | 0x6D13        | Not used                            | 0                                |                    | UINT16 | R   |   |
| +20         | 0x6D14        | Negative-sequence voltage unbalance | 0-300.0                          | 0.1%               | UINT16 | R   |   |
| +21         | 0x6D15        | Negative-sequence current unbalance | 0-300.0                          | 0.1%               | UINT16 | R   |   |
| +22-24      | 0x6D16-0x6D18 | Not used                            | 0                                |                    | 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   |   |
| 10656-10674 |               | <b>3-Second Total 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          | 0x6E03        | Not used                            | 0                                |                    | 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          | 0x6E03        | Not used                            | 0                                |                    | UINT16 | R   |   |

| Address     | Point ID      | Description                      | Low and High Scales <sup>3</sup> | Units <sup>3</sup> | Type   | R/W | Notes        |
|-------------|---------------|----------------------------------|----------------------------------|--------------------|--------|-----|--------------|
| +8-15       | 0x6E04-0x6E89 | Not used                         | 0                                |                    | UINT16 | R   |              |
| +16         | 0x6E90        | I1 TDD                           | 0-100.0                          | 0.1%               | UINT16 | R   |              |
| +17         | 0x6E91        | I2 TDD                           | 0-100.0                          | 0.1%               | UINT16 | R   |              |
| +18         | 0x6E92        | I3 TDD                           | 0-100.0                          | 0.1%               | UINT16 | R   |              |
| 10688-10706 |               | <b>10-Minute Total 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        | Not used                         | 0                                |                    | 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        | Not used                         | 0                                |                    | UINT16 | R   |              |
| +8          | 0x6F08        | V1 interharmonic THD             | 0-999.9                          | 0.1%               | UINT16 | R   |              |
| +9          | 0x6F09        | V2 interharmonic THD             | 0-999.9                          | 0.1%               | UINT16 | R   |              |
| +10         | 0x6FOA        | V3 interharmonic THD             | 0-999.9                          | 0.1%               | UINT16 | R   |              |
| +11         | 0x6FOB        | Not used                         | 0                                |                    | UINT16 | R   |              |
| +12         | 0x6FOC        | I1 interharmonic THD             | 0-999.9                          | 0.1%               | UINT16 | R   |              |
| +13         | 0x6F0D        | I2 interharmonic THD             | 0-999.9                          | 0.1%               | UINT16 | R   |              |
| +14         | 0x6FOE        | I3 interharmonic THD             | 0-999.9                          | 0.1%               | UINT16 | R   |              |
| +15         | 0x6FOF        | Not used                         | 0                                |                    | UINT16 | R   |              |
| +16         | 0x6F10        | I1 TDD                           | 0-100.0                          | 0.1%               | UINT16 | R   |              |
| +17         | 0x6F11        | I2 TDD                           | 0-100.0                          | 0.1%               | UINT16 | R   |              |
| +18         | 0x6F12        | I3 TDD                           | 0-100.0                          | 0.1%               | 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". For analog data scaling formulas and examples, see Section 2.6.1, "16-bit Scaled Integer Format".
- <sup>4</sup> Harmonic angles are referenced to the fundamental voltage harmonic H01 on phase L1.
- <sup>5</sup> On a 16-cycle interval.
- <sup>6</sup> On a 3-s interval.
- <sup>7</sup> 16-cycle interval for GOST 13109, programmable 0.2-s, 3-s, 10-min interval for GOST 32144.

### 3.4 32-bit Analog Registers, Binary Registers and Counters

| 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   |       |
| 11840       | 0x0080   | <b>Setpoint Status SP1-SP16 (bitmap)</b> | 0x00000000-0x0000FFFF                          |                    | UINT32 | R   |       |
| 11904-11907 |          | <b>Special Inputs</b>                    |  |                    |        |     |       |
| +0,1        | 0x0100   | Not used                                 | 0  |                    | UINT32 | R   |       |
| +2,3        | 0x0101   | Phase rotation order                     | 0=error, 1=positive (ABC),<br>2=negative (CBA) |                    | UINT32 | R   |       |
| 12160-12161 | 0x0300   | <b>Event Flags (bitmap)</b>              | 0x00000000-0x000000FF                          |                    | UINT32 | R   |       |
| 12544-12545 | 0x0600   | <b>Digital Inputs (bitmap)</b>           | 0x00000000-0x0000000F                          |                    | UINT32 | R   |       |
| 12800-12801 | 0x0800   | <b>Relay Outputs (bitmap)</b>            | 0x00000000-0x0000000F                          |                    | UINT32 | R   |       |
| 13056-13063 |          | <b>Counters</b>                          |  |                    |        |     |       |
| +0,1        | 0x0A00   | Counter #1                               | 0-999,999                                      |                    | UINT32 | R/W |       |
| +2,3        | 0x0A01   | Counter #2                               | 0-999,999                                      |                    | UINT32 | R/W |       |
| +4,5        | 0x0A02   | Counter #3                               | 0-999,999                                      |                    | UINT32 | R/W |       |
| +6,7        | 0x0A03   | Counter #4                               | 0-999,999                                      |                    | UINT32 | R/W |       |
| 13248-13297 |          | <b>1/2-Cycle Values</b>                  |  |                    |        |     |       |
| +0,1        | 0x0B80   | V1 Voltage                               | 0-Vmax   | U1                 | UINT32 | R   | 1     |
| +2,3        | 0x0B81   | V2 Voltage                               | 0-Vmax   | U1                 | UINT32 | R   | 1     |
| +4,5        | 0x0B82   | V3 Voltage                               | 0-Vmax   | U1                 | UINT32 | R   | 1     |
| +6,7        | 0x0B83   | Not used                                 | 0  |                    | 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   | Not used                                 | 0  |                    | UINT32 | R   |       |
| +22,23      | 0x0B8B   | In Current                               | 0-Imax   | U2                 | UINT32 | R   |       |
| 13312-13377 |          | <b>1-Cycle Phase Values</b>              |  |                    |        |     |       |
| +0,1        | 0x0C00   | V1/V12 Voltage                           | 0-Vmax   | U1                 | UINT32 | R   | 1     |
| +2,3        | 0x0C01   | V2/V23 Voltage                           | 0-Vmax   | U1                 | UINT32 | R   | 1     |
| +4,5        | 0x0C02   | V3/V31 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   |       |

| Address     | Point ID | Description                     | Options/Range <sup>3</sup> | Units <sup>3</sup> | Type   | R/W | Notes |
|-------------|----------|---------------------------------|----------------------------|--------------------|--------|-----|-------|
| +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/V12 Voltage THD              | 0-9999                     | ×0.1%              | UINT32 | R   | 2, 5  |
| +38,39      | 0x0C13   | V2/V23 Voltage THD              | 0-9999                     | ×0.1%              | UINT32 | R   | 2, 5  |
| +40,41      | 0x0C14   | V3/V31 Voltage THD              | 0-9999                     | ×0.1%              | UINT32 | R   | 2, 5  |
| +42,43      | 0x0C15   | I1 Current THD                  | 0-9999                     | ×0.1%              | UINT32 | R   | 5     |
| +44,45      | 0x0C16   | I2 Current THD                  | 0-9999                     | ×0.1%              | UINT32 | R   | 5     |
| +46,47      | 0x0C17   | I3 Current THD                  | 0-9999                     | ×0.1%              | UINT32 | R   | 5     |
| +48,49      | 0x0C18   | I1 K-Factor                     | 10-9999                    | ×0.1               | UINT32 | R   | 5     |
| +50,51      | 0x0C19   | I2 K-Factor                     | 10-9999                    | ×0.1               | UINT32 | R   | 5     |
| +52,53      | 0x0C1A   | I3 K-Factor                     | 10-9999                    | ×0.1               | UINT32 | R   | 5     |
| +54,55      | 0x0C1B   | I1 Current TDD                  | 0-1000                     | ×0.1%              | UINT32 | R   | 5     |
| +56,57      | 0x0C1C   | I2 Current TDD                  | 0-1000                     | ×0.1%              | UINT32 | R   | 5     |
| +58,59      | 0x0C1D   | I3 Current TDD                  | 0-1000                     | ×0.1%              | UINT32 | R   | 5     |
| +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   |       |
| 13696-13703 |          | <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                    | 0-1.000                    | ×0.001             | UINT16 | R   |       |
| +10,11      | 0x0F05   | Total PF lead                   | 0-1.000                    | ×0.001             | UINT16 | R   |       |
| +12,13      | 0x0F06   | Total kW import                 | 0-Pmax                     | U3                 | UINT32 | R   |       |
| +14,15      | 0x0F07   | Total kW export                 | 0-Pmax                     | U3                 | UINT32 | R   |       |
| +16,17      | 0x0F08   | Total kvar import               | 0-Pmax                     | U3                 | UINT32 | R   |       |
| +18,19      | 0x0F09   | Total kvar export               | 0-Pmax                     | U3                 | UINT32 | R   |       |
| +20,21      | 0x0FOA   | 3-phase average L-N/L-L voltage | 0-Vmax                     | U1                 | UINT32 | R   | 1     |
| +22,23      | 0x0FOB   | 3-phase average L-L voltage     | 0-Vmax                     | U1                 | UINT32 | R   |       |
| +24,25      | 0x0FOC   | 3-phase average current         | 0-Imax                     | U2                 | UINT32 | R   |       |
| 13824-13833 |          | <b>1-Cycle Auxiliary Values</b> |                            |                    |        |     |       |
| +0,1        | 0x1000   | Not used                        |                            |                    | UINT32 | R   |       |
| +2,3        | 0x1001   | In (neutral) Current            | 0-Imax                     | U2                 | UINT32 | R   |       |
| +4,5        | 0x1002   | Frequency                       | 0-Fmax                     | ×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   |       |
| 13888-13919 |          | <b>Phasor</b>                   |                            |                    |        |     |       |
| +0,1        | 0x1080   | V1/V12 Voltage magnitude        | 0-Vmax                     | U1                 | UINT32 | R   | 2     |

| Address     | Point ID | Description                  | Options/Range <sup>3</sup> | Units <sup>3</sup> | Type   | R/W | Notes |
|-------------|----------|------------------------------|----------------------------|--------------------|--------|-----|-------|
| +2,3        | 0x1081   | V2/V23 Voltage magnitude     | 0-Vmax                     | U1                 | UINT32 | R   | 2     |
| +4,5        | 0x1082   | V3/V31 Voltage magnitude     | 0-Vmax                     | U1                 | UINT32 | R   | 2     |
| +6,7        | 0x1083   | Not used                     |                            |                    | 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   | Not used                     |                            |                    | UINT32 | R   |       |
| +16,17      | 0x1088   | V1/V12 Voltage angle         | -1800-1800                 | ×0.1°              | INT32  | R   | 2     |
| +18,19      | 0x1089   | V2/V23 Voltage angle         | -1800-1800                 | ×0.1°              | INT32  | R   | 2     |
| +20,21      | 0x108A   | V3/V31 Voltage angle         | -1800-1800                 | ×0.1°              | INT32  | R   | 2     |
| +22,23      | 0x108B   | Not used                     |                            |                    | 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   | Not used                     |                            |                    | INT32  | R   |       |
| 13952-14017 |          | <b>1-Second Phase Values</b> |                            |                    |        |     |       |
| +0,1        | 0x1100   | V1/V12 Voltage               | 0-Vmax                     | U1                 | UINT32 | R   | 1     |
| +2,3        | 0x1101   | V2/V23 Voltage               | 0-Vmax                     | U1                 | UINT32 | R   | 1     |
| +4,5        | 0x1102   | V3/V31 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   |       |
| +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/V12 Voltage THD           | 0-9999                     | ×0.1%              | UINT32 | R   | 2,6   |
| +38,39      | 0x1113   | V2/V23 Voltage THD           | 0-9999                     | ×0.1%              | UINT32 | R   | 2,6   |
| +40,41      | 0x1114   | V3/V31 Voltage THD           | 0-9999                     | ×0.1%              | UINT32 | R   | 2,6   |
| +42,43      | 0x1115   | I1 Current THD               | 0-9999                     | ×0.1%              | UINT32 | R   | 6     |
| +44,45      | 0x1116   | I2 Current THD               | 0-9999                     | ×0.1%              | UINT32 | R   | 6     |
| +46,47      | 0x1117   | I3 Current THD               | 0-9999                     | ×0.1%              | UINT32 | R   | 6     |
| +48,49      | 0x1118   | I1 K-Factor                  | 10-9999                    | ×0.1               | UINT32 | R   | 6     |
| +50,51      | 0x1119   | I2 K-Factor                  | 10-9999                    | ×0.1               | UINT32 | R   | 6     |
| +52,53      | 0x111A   | I3 K-Factor                  | 10-9999                    | ×0.1               | UINT32 | R   | 6     |

| Address     | Point ID | Description                      | Options/Range <sup>3</sup> | Units <sup>3</sup> | Type   | R/W | Notes |
|-------------|----------|----------------------------------|----------------------------|--------------------|--------|-----|-------|
| +54,55      | 0x111B   | I1 Current TDD                   | 0-1000                     | ×0.1%              | UINT32 | R   | 6     |
| +56,57      | 0x111C   | I2 Current TDD                   | 0-1000                     | ×0.1%              | UINT32 | R   | 6     |
| +58,59      | 0x111D   | I3 Current TDD                   | 0-1000                     | ×0.1%              | UINT32 | R   | 6     |
| +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   |       |
| 14144-14175 |          | <b>3-Second Powers</b>           |                            |                    |        |     |       |
| +0,1        | 0x1280   | kW L1                            | -Pmax-Pmax                 | U3                 | INT32  | R   |       |
| +2,3        | 0x1281   | kW L2                            | -Pmax-Pmax                 | U3                 | INT32  | R   |       |
| +4,5        | 0x1282   | kW L3                            | -Pmax-Pmax                 | U3                 | INT32  | R   |       |
| +6,7        | 0x1283   | kvar L1                          | -Pmax-Pmax                 | U3                 | INT32  | R   |       |
| +8,9        | 0x1284   | kvar L2                          | -Pmax-Pmax                 | U3                 | INT32  | R   |       |
| +10,11      | 0x1285   | kvar L3                          | -Pmax-Pmax                 | U3                 | INT32  | R   |       |
| +12,13      | 0x1286   | kVA L1                           | 0-Pmax                     | U3                 | UINT32 | R   |       |
| +14,15      | 0x1287   | kVA L2                           | 0-Pmax                     | U3                 | UINT32 | R   |       |
| +16,17      | 0x1288   | kVA L3                           | 0-Pmax                     | U3                 | UINT32 | R   |       |
| +18,19      | 0x1289   | Power factor L1                  | -1000-1000                 | ×0.001             | INT32  | R   |       |
| +20,21      | 0x128A   | Power factor L2                  | -1000-1000                 | ×0.001             | INT32  | R   |       |
| +22,23      | 0x128B   | Power factor L3                  | -1000-1000                 | ×0.001             | INT32  | R   |       |
| +24,25      | 0x128C   | Total kW                         | -Pmax-Pmax                 | U3                 | INT32  | R   |       |
| +26,27      | 0x128D   | Total kvar                       | -Pmax-Pmax                 | U3                 | INT32  | R   |       |
| +28,29      | 0x128E   | Total kVA                        | 0-Pmax                     | U3                 | UINT32 | R   |       |
| +30,31      | 0x128F   | Total PF                         | -1000-1000                 | ×0.001             | INT32  | R   |       |
| 14336-14343 |          | <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                     | 0-1.000                    | ×0.001             | UINT16 | R   |       |
| +10,11      | 0x1405   | Total PF lead                    | 0-1.000                    | ×0.001             | UINT16 | R   |       |
| +12,13      | 0x1406   | Total kW import                  | 0-Pmax                     | U3                 | UINT32 | R   |       |
| +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/L-L voltage  | 0-Vmax                     | U1                 | UINT32 | R   | 1     |
| +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   |       |
| 14464-14473 |          | <b>1-Second Auxiliary Values</b> |                            |                    |        |     |       |
| +0,1        | 0x1500   | Not used                         |                            |                    | UINT32 | R   |       |
| +2,3        | 0x1501   | In (neutral) Current             | 0-Imax                     | U2                 | UINT32 | R   |       |
| +4,5        | 0x1502   | Frequency                        | 0-Fmax                     | ×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   |       |



| Address     | Point ID | Description                                   | Options/Range <sup>3</sup> | Units <sup>3</sup> | Type   | R/W | Notes |
|-------------|----------|---|----------------------------|--------------------|--------|-----|-------|
| 14528-14551 |          | <b>Present Harmonic Demands</b>               |                            |                    |        |     |       |
| +0,1        | 0x1580   | V1/V12 THD demand                             | 0-9999                     | ×0.1%              | UINT32 | R   | 2     |
| +2,3        | 0x1581   | V2/V23 THD demand                             | 0-9999                     | ×0.1%              | UINT32 | R   | 2     |
| +4,5        | 0x1582   | V3/V31 THD demand                             | 0-9999                     | ×0.1%              | UINT32 | R   | 2     |
| +6,7        | 0x1583   | Not used                                      |                            |                    | UINT32 | R   |       |
| +8,9        | 0x1584   | I1 THD demand                                 | 0-9999                     | ×0.1%              | UINT32 | R   |       |
| +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   | Not used                                      |                            |                    | 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   | Not used                                      |                            |                    | UINT32 | R   |       |
| 14592-14651 |          | <b>Present Volt, Ampere and Power Demands</b> |                            |                    |        |     |       |
| +0,1        | 0x1600   | V1/V12 Volt demand                            | 0-Vmax                     | U1                 | UINT32 | R   | 2     |
| +2,3        | 0x1601   | V2/V23 Volt demand                            | 0-Vmax                     | U1                 | UINT32 | R   | 2     |
| +4,5        | 0x1602   | V3/V31 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                                      |                            |                    | UINT32 | R   |       |
| +26,27      | 0x160D   | Not used                                      |                            |                    | UINT32 | R   |       |
| +28,29      | 0x160E   | Not used                                      |                            |                    | 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   |       |

| Address     | Point ID | Description                                 | Options/Range <sup>3</sup> | Units <sup>3</sup> | Type   | R/W | Notes |
|-------------|----------|---|----------------------------|--------------------|--------|-----|-------|
| +58,59      | 0x161D   | kvar export predicted sliding window demand | 0-Pmax                     | U3                 | UINT32 | R   |       |
| 14720-14737 |          | <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   | Not used                                    |                            |                    | INT32  | R   |       |
| +6,7        | 0x1703   | Not used                                    |                            |                    | 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   | Not used                                    |                            |                    | INT32  | R   |       |
| +14,15      | 0x1707   | Not used                                    |                            |                    | UINT32 | R   |       |
| +16,17      | 0x1708   | kVAh total                                  | 0-999,999,999              | 1 kVAh             | UINT32 | R   |       |
| 14784-14799 |          | <b>Summary Energy 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   |       |
|             |          | ...   |                            |                    |        |     |       |
| +14,15      | 0x1787   | Summary energy register #8                  | 0-999,999,999              | 1 kWh              | UINT32 | R   |       |
| 14848-14865 |          | <b>Phase Energies</b>                       |                            |                    |        |     |       |
| +0,1        | 0x1800   | kWh import L1                               | 0-999,999,999              | 1 kWh              | UINT32 | R   |       |
| +2,3        | 0x1801   | kWh import L2                               | 0-999,999,999              | 1 kWh              | UINT32 | R   |       |
| +4,5        | 0x1802   | kWh import L3                               | 0-999,999,999              | 1 kWh              | UINT32 | R   |       |
| +6,7        | 0x1803   | kvarh import L1                             | 0-999,999,999              | 1 kvarh            | UINT32 | R   |       |
| +8,9        | 0x1804   | kvarh import L2                             | 0-999,999,999              | 1 kvarh            | UINT32 | R   |       |
| +10,11      | 0x1805   | kvarh import L3                             | 0-999,999,999              | 1 kvarh            | UINT32 | R   |       |
| +12,13      | 0x1806   | kVAh total L1                               | 0-999,999,999              | 1 kVAh             | UINT32 | R   |       |
| +14,15      | 0x1807   | kVAh total L2                               | 0-999,999,999              | 1 kVAh             | UINT32 | R   |       |
| +16,17      | 0x1808   | kVAh total L3                               | 0-999,999,999              | 1 kVAh             | 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   |       |
| 14976-15075 |          | <b>V1/V12 Harmonics</b>                     |                            |                    |        |     | 2,7   |
| +0,1        | 0x1900   | H01 Harmonic magnitude                      | 0-10000                    | ×0.01%             | UINT32 | R   |       |
| +2,3        | 0x1901   | H02 Harmonic magnitude                      | 0-10000                    | ×0.01%             | UINT32 | R   |       |
|             |          | ...   |                            |                    |        |     |       |
| +98,99      | 0x1931   | H50 Harmonic magnitude                      | 0-10000                    | ×0.01%             | UINT32 | R   |       |

| Address     | Point ID | Description                     | Options/Range <sup>3</sup> | Units <sup>3</sup> | Type   | R/W | Notes |
|-------------|----------|---------------------------------|----------------------------|--------------------|--------|-----|-------|
| 15104-15203 |          | <b>V2/V23 Harmonics</b>         |                            |                    |        |     | 2,7   |
| +0,1        | 0x1A00   | H01 Harmonic magnitude          | 0-10000                    | ×0.01%             | UINT32 | R   |       |
| +2,3        | 0x1A01   | H02 Harmonic magnitude          | 0-10000                    | ×0.01%             | UINT32 | R   |       |
|             |          | ...                             |                            |                    |        |     |       |
| +98,99      | 0x1A31   | H50 Harmonic magnitude          | 0-10000                    | ×0.01%             | UINT32 | R   |       |
| 15232-15331 |          | <b>V3/V31 Harmonics</b>         |                            |                    |        |     | 2,7   |
| +0,1        | 0x1B00   | H01 Harmonic magnitude          | 0-10000                    | ×0.01%             | UINT32 | R   |       |
| +2,3        | 0x1B01   | H02 Harmonic magnitude          | 0-10000                    | ×0.01%             | UINT32 | R   |       |
|             |          | ...                             |                            |                    |        |     |       |
| +98,99      | 0x1B31   | H50 Harmonic magnitude          | 0-10000                    | ×0.01%             | UINT32 | R   |       |
| 15360-15459 |          | <b>I1 Harmonics</b>             |                            |                    |        |     | 7     |
| +0,1        | 0x1C00   | H01 Harmonic magnitude          | 0-10000                    | ×0.01%             | UINT32 | R   |       |
| +2,3        | 0x1C01   | H02 Harmonic magnitude          | 0-10000                    | ×0.01%             | UINT32 | R   |       |
|             |          | ...                             |                            |                    |        |     |       |
| +98,99      | 0x1C31   | H50 Harmonic magnitude          | 0-10000                    | ×0.01%             | UINT32 | R   |       |
| 15488-15587 |          | <b>I2 Harmonics</b>             |                            |                    |        |     | 7     |
| +0,1        | 0x1D00   | H01 Harmonic magnitude          | 0-10000                    | ×0.01%             | UINT32 | R   |       |
| +2,3        | 0x1D01   | H02 Harmonic magnitude          | 0-10000                    | ×0.01%             | UINT32 | R   |       |
|             |          | ...                             |                            |                    |        |     |       |
| +98,99      | 0x1D31   | H50 Harmonic magnitude          | 0-10000                    | ×0.01%             | UINT32 | R   |       |
| 15616-15715 |          | <b>I3 Harmonics</b>             |                            |                    |        |     | 7     |
| +0,1        | 0x1E00   | H01 Harmonic magnitude          | 0-10000                    | ×0.01%             | UINT32 | R   |       |
| +2,3        | 0x1E01   | H02 Harmonic magnitude          | 0-10000                    | ×0.01%             | UINT32 | R   |       |
|             |          | ...                             |                            |                    |        |     |       |
| +98,99      | 0x1E31   | H50 Harmonic magnitude          | 0-10000                    | ×0.01%             | UINT32 | R   |       |
| 17024-17059 |          | <b>Fundamental Phase Values</b> |                            |                    |        |     | 5     |
| +0,1        | 0x2900   | V1/V12 Voltage                  | 0-Vmax                     | U1                 | UINT32 | R   | 2     |
| +2,3        | 0x2901   | V2/V23 Voltage                  | 0-Vmax                     | U1                 | UINT32 | R   | 2     |
| +4,5        | 0x2902   | V3/V31 Voltage                  | 0-Vmax                     | U1                 | UINT32 | R   | 2     |
| +6,7        | 0x2903   | I1 Current                      | 0-Imax                     | U2                 | UINT32 | R   |       |
| +8,9        | 0x2904   | I2 Current                      | 0-Imax                     | U2                 | UINT32 | R   |       |
| +10,11      | 0x2905   | I3 Current                      | 0-Imax                     | U2                 | UINT32 | R   |       |
| +12,13      | 0x2906   | kW L1                           | -Pmax-Pmax                 | U3                 | INT32  | R   |       |
| +14,15      | 0x2907   | kW L2                           | -Pmax-Pmax                 | U3                 | INT32  | R   |       |
| +16,17      | 0x2908   | kW L3                           | -Pmax-Pmax                 | U3                 | INT32  | R   |       |
| +18,19      | 0x2909   | kvar L1                         | -Pmax-Pmax                 | U3                 | INT32  | R   |       |
| +20,21      | 0x290A   | kvar L2                         | -Pmax-Pmax                 | U3                 | INT32  | R   |       |
| +22,23      | 0x290B   | kvar L3                         | -Pmax-Pmax                 | U3                 | INT32  | R   |       |
| +24,25      | 0x290C   | kVA L1                          | 0-Pmax                     | U3                 | UINT32 | R   |       |
| +26,27      | 0x290D   | kVA L2                          | 0-Pmax                     | U3                 | UINT32 | R   |       |
| +28,29      | 0x290E   | kVA L3                          | 0-Pmax                     | U3                 | UINT32 | R   |       |
| +30,31      | 0x290F   | Power factor L1                 | -1000-1000                 | ×0.001             | INT32  | R   |       |
| +32,33      | 0x2910   | Power factor L2                 | -1000-1000                 | ×0.001             | INT32  | R   |       |

| Address     | Point ID      | Description                             | Options/Range <sup>3</sup> | Units <sup>3</sup> | Type   | R/W | Notes          |
|-------------|---------------|---|----------------------------|--------------------|--------|-----|----------------|
| +34,35      | 0x2911        | Power factor L3                         | -1000-1000                 | ×0.001             | INT32  | R   |                |
| 17088-17099 |               | <b>Flicker</b>                          |                            |                    |        |     | 2              |
| +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   |                |
| 17152-17159 |               | <b>Fundamental Total Values</b>         |                            |                    |        |     | 5              |
| +0,1        | 0x2A00        | Total fundamental kW                    | -Pmax-Pmax                 | U3                 | INT32  | R   |                |
| +2,3        | 0x2A01        | Total fundamental kvar                  | -Pmax-Pmax                 | U3                 | INT32  | R   |                |
| +4,5        | 0x2A02        | Total fundamental kVA                   | 0-Pmax                     | U3                 | UINT32 | R   |                |
| +6,7        | 0x2A03        | Total fundamental PF                    | -1000-1000                 | ×0.001             | INT32  | R   |                |
| 17408-17467 |               | <b>Minimum 1-Cycle Phase Values</b>     |                            |                    |        |     |                |
| +0,1        | 0x2C00        | V1/V12 Voltage                          | 0-Vmax                     | U1                 | UINT32 | R   | 2              |
| +2,3        | 0x2C01        | V2/V23 Voltage                          | 0-Vmax                     | U1                 | UINT32 | R   | 2              |
| +4,5        | 0x2C02        | V3/V31 Voltage                          | 0-Vmax                     | U1                 | UINT32 | R   | 2              |
| +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   |                |
| +12-35      | 0x2C06-0x2C11 | Not used                                | 0                          |                    | INT32  | R   |                |
| +36,37      | 0x2C12        | V1/V12 Voltage THD                      | 0-9999                     | ×0.1%              | UINT32 | R   | 2, 5           |
| +38,39      | 0x2C13        | V2/V23 Voltage THD                      | 0-9999                     | ×0.1%              | UINT32 | R   | 2, 5           |
| +40,41      | 0x2C14        | V3/V31 Voltage THD                      | 0-9999                     | ×0.1%              | UINT32 | R   | 2, 5           |
| +42,43      | 0x2C15        | I1 Current THD                          | 0-9999                     | ×0.1%              | UINT32 | R   | 5              |
| +44,45      | 0x2C16        | I2 Current THD                          | 0-9999                     | ×0.1%              | UINT32 | R   | 5              |
| +46,47      | 0x2C17        | I3 Current THD                          | 0-9999                     | ×0.1%              | UINT32 | R   | 5              |
| +48,49      | 0x2C18        | I1 K-Factor                             | 10-9999                    | ×0.1               | UINT32 | R   | 5              |
| +50,51      | 0x2C19        | I2 K-Factor                             | 10-9999                    | ×0.1               | UINT32 | R   | 5              |
| +52,53      | 0x2C1A        | I3 K-Factor                             | 10-9999                    | ×0.1               | UINT32 | R   | 5              |
| +54,55      | 0x2C1B        | I1 Current TDD                          | 0-1000                     | ×0.1%              | UINT32 | R   | 5              |
| +56,57      | 0x2C1C        | I2 Current TDD                          | 0-1000                     | ×0.1%              | UINT32 | R   | 5              |
| +58,59      | 0x2C1D        | I3 Current TDD                          | 0-1000                     | ×0.1%              | UINT32 | R   | 5              |
| 17536-17543 |               | <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 |
| 17664-17669 |               | <b>Minimum 1-Cycle Auxiliary Values</b> |                            |                    |        |     |                |
| +0,1        | 0x2E00        | Not used                                |                            |                    | UINT32 | R   |                |
| +2,3        | 0x2E01        | In Current                              | 0-Imax                     | U2                 | UINT32 | R   |                |
| +4,5        | 0x2E02        | Frequency                               | 0-Fmax                     | ×0.01Hz            | UINT32 | R   |                |

| Address     | Point ID      | Description                               | Options/Range <sup>3</sup> | Units <sup>3</sup> | Type   | R/W | Notes          |
|-------------|---------------|---|----------------------------|--------------------|--------|-----|----------------|
| 18432-18491 |               | <b>Maximum 1-Cycle Phase Values</b>       |                            |                    |        |     |                |
| +0,1        | 0x3400        | V1/V12 Voltage                            | 0-Vmax                     | U1                 | UINT32 | R   | 2              |
| +2,3        | 0x3401        | V2/V23 Voltage                            | 0-Vmax                     | U1                 | UINT32 | R   | 2              |
| +4,5        | 0x3402        | V3/V31 Voltage                            | 0-Vmax                     | U1                 | UINT32 | R   | 2              |
| +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   |                |
| +12-35      | 0x3406-0x3411 | Not used                                  | 0                          |                    | INT32  | R   |                |
| +36,37      | 0x3412        | V1/V12 Voltage THD                        | 0-9999                     | ×0.1%              | UINT32 | R   | 2, 5           |
| +38,39      | 0x3413        | V2/V23 Voltage THD                        | 0-9999                     | ×0.1%              | UINT32 | R   | 2, 5           |
| +40,41      | 0x3414        | V3/V31 Voltage THD                        | 0-9999                     | ×0.1%              | UINT32 | R   | 2, 5           |
| +42,43      | 0x3415        | I1 Current THD                            | 0-9999                     | ×0.1%              | UINT32 | R   | 5              |
| +44,45      | 0x3416        | I2 Current THD                            | 0-9999                     | ×0.1%              | UINT32 | R   | 5              |
| +46,47      | 0x3417        | I3 Current THD                            | 0-9999                     | ×0.1%              | UINT32 | R   | 5              |
| +48,49      | 0x3418        | I1 K-Factor                               | 10-9999                    | ×0.1               | UINT32 | R   | 5              |
| +50,51      | 0x3419        | I2 K-Factor                               | 10-9999                    | ×0.1               | UINT32 | R   | 5              |
| +52,53      | 0x341A        | I3 K-Factor                               | 10-9999                    | ×0.1               | UINT32 | R   | 5              |
| +54,55      | 0x341B        | I1 Current TDD                            | 0-1000                     | ×0.1%              | UINT32 | R   | 5              |
| +56,57      | 0x341C        | I2 Current TDD                            | 0-1000                     | ×0.1%              | UINT32 | R   | 5              |
| +58,59      | 0x341D        | I3 Current TDD                            | 0-1000                     | ×0.1%              | UINT32 | R   | 5              |
| 18560-18567 |               | <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 |
| 18688-18693 |               | <b>Maximum 1-Cycle Auxiliary Values</b>   |                            |                    |        |     |                |
| +0,1        | 0x3600        | Not used                                  |                            |                    | UINT32 | R   |                |
| +2,3        | 0x3601        | In Current                                | 0-Imax                     | U2                 | UINT32 | R   |                |
| +4,5        | 0x3602        | Frequency                                 | 0-Fmax                     | ×0.01Hz            | UINT32 | R   |                |
| 18816-18849 |               | <b>Maximum Demands</b>                    |                            |                    |        |     |                |
| +0,1        | 0x3700        | V1/V12 Maximum volt demand                | 0-Vmax                     | U1                 | UINT32 | R   | 2              |
| +2,3        | 0x3701        | V2/V23 Maximum volt demand                | 0-Vmax                     | U1                 | UINT32 | R   | 2              |
| +4,5        | 0x3702        | V3/V31 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                                  |                            |                    | UINT32 | R   |                |
| +14,15      | 0x3707        | Not used                                  |                            |                    | UINT32 | R   |                |
| +16,17      | 0x3708        | Not used                                  |                            |                    | 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   |                |

| Address     | Point ID | Description                               | Options/Range <sup>3</sup>  | Units <sup>3</sup> | Type   | R/W | Notes        |
|-------------|----------|---|---|--------------------|--------|-----|--------------|
| +24,25      | 0x3737   | Not used                                  |   |                    | UINT32 | R   |              |
| +26,27      | 0x370D   | Not used                                  |   |                    | UINT32 | R   |              |
| +28,29      | 0x370E   | Not used                                  |   |                    | 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   |              |
| 19008-19031 |          | <b>Maximum Harmonic Demands</b>           |   |                    |        |     |              |
| +0,1        | 0x3880   | V1/V12 THD demand                         | 0-9999  | ×0.1%              | UINT32 | R   | <sup>2</sup> |
| +2,3        | 0x3881   | V2/V23 THD demand                         | 0-9999  | ×0.1%              | UINT32 | R   | <sup>2</sup> |
| +4,5        | 0x3882   | V3/V31 THD demand                         | 0-9999  | ×0.1%              | UINT32 | R   | <sup>2</sup> |
| +6,7        | 0x3883   | Not used                                  |   |                    | 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   | Not used                                  |   |                    | UINT32 | R   |              |
| +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   | Not used                                  |   |                    | UINT32 | R   |              |
| 19328-19359 |          | <b>Scaled Analog Inputs</b>               |   |                    |        |     |              |
| +0,1        | 0x3B00   | Analog input AI1                          | AI1min-AI1Max   |                    | UINT32 | R   |              |
| +2,3        | 0x3B01   | Analog input AI2                          | AI2min-AI2Max   |                    | UINT32 | R   |              |
| 19392-19393 |          | <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   |              |
| 19456-19459 |          | <b>TOU Parameters</b>                     |   |                    |        |     |              |
| +0,1        | 0x3C00   | Active tariff                             | 0-7   |                    | UINT32 | R   |              |
| +2,3        | 0x3C01   | Active profile                            | 0-15:<br>1-3 = Season 1 Profile #1-4,<br>4-7 = Season 2 Profile #1-4,<br>8-11 = Season 3 Profile #1-4,<br>12-15 = Season 4 Profile #1-4 |                    | UINT32 | R   |              |
| 19520-19524 |          | <b>Scaled Analog Outputs</b>              |   |                    |        |     |              |
| +0,1        | 0x3C80   | Analog output AO1                         | 0-4095  |                    | UINT32 | R/W |              |
| +2,3        | 0x3C81   | Analog output AO2                         | 0-4095  |                    | UINT32 | R/W |              |
| 19584-19599 |          | <b>TOU Energy Register #1</b>             |   |                    |        |     |              |
| +0,1        | 0x3D00   | Tariff #1 register                        | 0-999,999,999   | 1 kWh              | UINT32 | R   |              |
| +2,3        | 0x3D01   | Tariff #2 register                        | 0-999,999,999   | 1 kWh              | UINT32 | R   |              |
|             |          | ...                                       |   |                    |        | R   |              |
| +14,15      | 0x3D07   | Tariff #8 register                        | 0-999,999,999   | 1 kWh              | UINT32 | R   |              |
| 19712-19727 |          | <b>TOU Energy Register #2</b>             |   |                    |        |     |              |
| +0,1        | 0x3E00   | Tariff #1 register                        | 0-999,999,999   | 1 kWh              | UINT32 | R   |              |
| +2,3        | 0x3E01   | Tariff #2 register                        | 0-999,999,999   | 1 kWh              | UINT32 | R   |              |
|             |          | ...                                       |   |                    |        | R   |              |

| Address     | Point ID | Description                                  | Options/Range <sup>3</sup> | Units <sup>3</sup> | Type   | R/W | Notes |
|-------------|----------|--|----------------------------|--------------------|--------|-----|-------|
| +14,15      | 0x3E07   | Tariff #8 register                           | 0-999,999,999              | 1 kWh              | UINT32 | R   |       |
| 19840-19855 |          | <b>TOU Energy Register #3</b>                |                            |                    |        |     |       |
| +0,1        | 0x3F00   | Tariff #1 register                           | 0-999,999,999              | 1 kWh              | UINT32 | R   |       |
| +2,3        | 0x3F01   | Tariff #2 register                           | 0-999,999,999              | 1 kWh              | UINT32 | R   |       |
|             |          | ...  |                            |                    |        | R   |       |
| +14,15      | 0x3F07   | Tariff #8 register                           | 0-999,999,999              | 1 kWh              | UINT32 | R   |       |
| 19968-19983 |          | <b>TOU Energy Register #4</b>                |                            |                    |        |     |       |
| +0,1        | 0x4000   | Tariff #1 register                           | 0-999,999,999              | 1 kWh              | UINT32 | R   |       |
| +2,3        | 0x4001   | Tariff #2 register                           | 0-999,999,999              | 1 kWh              | UINT32 | R   |       |
|             |          | ...  |                            |                    |        | R   |       |
| +14,15      | 0x4007   | Tariff #8 register                           | 0-999,999,999              | 1 kWh              | UINT32 | R   |       |
| 20096-20111 |          | <b>TOU Energy Register #5</b>                |                            |                    |        |     |       |
| +0,1        | 0x4100   | Tariff #1 register                           | 0-999,999,999              | 1 kWh              | UINT32 | R   |       |
| +2,3        | 0x4101   | Tariff #2 register                           | 0-999,999,999              | 1 kWh              | UINT32 | R   |       |
|             |          | ...  |                            |                    |        | R   |       |
| +14,15      | 0x4107   | Tariff #8 register                           | 0-999,999,999              | 1 kWh              | UINT32 | R   |       |
| 20224-20239 |          | <b>TOU Energy Register #6</b>                |                            |                    |        |     |       |
| +0,1        | 0x4200   | Tariff #1 register                           | 0-999,999,999              | 1 kWh              | UINT32 | R   |       |
| +2,3        | 0x4201   | Tariff #2 register                           | 0-999,999,999              | 1 kWh              | UINT32 | R   |       |
|             |          | ...  |                            |                    |        | R   |       |
| +14,15      | 0x4207   | Tariff #8 register                           | 0-999,999,999              | 1 kWh              | UINT32 | R   |       |
| 20352-20367 |          | <b>TOU Energy Register #7</b>                |                            |                    |        |     |       |
| +0,1        | 0x4300   | Tariff #1 register                           | 0-999,999,999              | 1 kWh              | UINT32 | R   |       |
| +2,3        | 0x4301   | Tariff #2 register                           | 0-999,999,999              | 1 kWh              | UINT32 | R   |       |
|             |          | ...  |                            |                    |        | R   |       |
| +14,15      | 0x4307   | Tariff #8 register                           | 0-999,999,999              | 1 kWh              | UINT32 | R   |       |
| 20480-20495 |          | <b>TOU Energy Register #8</b>                |                            |                    |        |     |       |
| +0,1        | 0x4400   | Tariff #1 register                           | 0-999,999,999              | 1 kWh              | UINT32 | R   |       |
| +2,3        | 0x4401   | Tariff #2 register                           | 0-999,999,999              | 1 kWh              | UINT32 | R   |       |
|             |          | ...  |                            |                    |        | R   |       |
| +14,15      | 0x4407   | Tariff #8 register                           | 0-999,999,999              | 1 kWh              | UINT32 | R   |       |
| 20608-20623 |          | <b>Summary Energy Accumulated Demands</b>    |                            |                    |        |     |       |
| +0,1        | 0x4500   | Summary register #1 demand                   | 0-Pmax                     | U3                 | UINT32 | R   |       |
| +2,3        | 0x4501   | Summary register #2 demand                   | 0-Pmax                     | U3                 | UINT32 | R   |       |
|             |          | ...  |                            |                    |        |     |       |
| +14,15      | 0x4507   | Summary register #8 demand                   | 0-Pmax                     | U3                 | UINT32 | R   |       |
| 20672-20687 |          | <b>Summary Energy Block Demands</b>          |                            |                    |        |     |       |
| +0,1        | 0x4580   | Summary register #1 demand                   | 0-Pmax                     | U3                 | UINT32 | R   |       |
| +2,3        | 0x4581   | Summary register #2 demand                   | 0-Pmax                     | U3                 | UINT32 | R   |       |
|             |          | ...  |                            |                    |        |     |       |
| +14,15      | 0x4587   | Summary register #8 demand                   | 0-Pmax                     | U3                 | UINT32 | R   |       |
| 20736-20751 |          | <b>Summary Energy Sliding Window Demands</b> |                            |                    |        |     |       |
| +0,1        | 0x4600   | Summary register #1 demand                   | 0-Pmax                     | U3                 | UINT32 | R   |       |

| Address     | Point ID | Description                           | Options/Range <sup>3</sup> | Units <sup>3</sup> | Type   | R/W | Notes |
|-------------|----------|---------------------------------------|----------------------------|--------------------|--------|-----|-------|
| +2,3        | 0x4601   | Summary register #2 demand            | 0-Pmax                     | U3                 | UINT32 | R   |       |
|             |          | ...                                   |                            |                    |        |     |       |
| +14,15      | 0x4607   | Summary register #8 demand            | 0-Pmax                     | U3                 | UINT32 | R   |       |
| 20928-20943 |          | <b>Summary Energy Maximum Demands</b> |                            |                    |        |     |       |
| +0,1        | 0x4780   | Summary register #1 maximum demand    | 0-Pmax                     | U3                 | UINT32 | R   |       |
| +2,3        | 0x4781   | Summary register #2 maximum demand    | 0-Pmax                     | U3                 | UINT32 | R   |       |
|             |          | ...                                   |                            |                    |        |     |       |
| +14,15      | 0x4787   | Summary register #8 maximum demand    | 0-Pmax                     | U3                 | UINT32 | R   |       |
| 20992-21023 |          | <b>TOU Maximum Demand Register #1</b> |                            |                    |        |     |       |
| +0,1        | 0x4800   | Tariff #1 maximum demand              | 0-Pmax                     | U3                 | UINT32 | R   |       |
| +2,3        | 0x4801   | Tariff #2 maximum demand              | 0-Pmax                     | U3                 | UINT32 | R   |       |
|             |          | ...                                   |                            |                    |        | R   |       |
| +14,15      | 0x4807   | Tariff #8 maximum demand              | 0-Pmax                     | U3                 | UINT32 | R   |       |
| 21120-21135 |          | <b>TOU Maximum Demand Register #2</b> |                            |                    |        |     |       |
| +0,1        | 0x4900   | Tariff #1 maximum demand              | 0-Pmax                     | U3                 | UINT32 | R   |       |
| +2,3        | 0x4901   | Tariff #2 maximum demand              | 0-Pmax                     | U3                 | UINT32 | R   |       |
|             |          | ...                                   |                            |                    |        | R   |       |
| +14,15      | 0x4907   | Tariff #8 maximum demand              | 0-Pmax                     | U3                 | UINT32 | R   |       |
| 21248-21263 |          | <b>TOU Maximum Demand Register #3</b> |                            |                    |        |     |       |
| +0,1        | 0x4A00   | Tariff #1 maximum demand              | 0-Pmax                     | U3                 | UINT32 | R   |       |
| +2,3        | 0x4A01   | Tariff #2 maximum demand              | 0-Pmax                     | U3                 | UINT32 | R   |       |
|             |          | ...                                   |                            |                    |        | R   |       |
| +14,15      | 0x4A07   | Tariff #8 maximum demand              | 0-Pmax                     | U3                 | UINT32 | R   |       |
| 21056-21071 |          | <b>TOU Maximum Demand Register #4</b> |                            |                    |        |     |       |
| +0,1        | 0x4880   | Tariff #1 maximum demand              | 0-Pmax                     | U3                 | UINT32 | R   |       |
| +2,3        | 0x4881   | Tariff #2 maximum demand              | 0-Pmax                     | U3                 | UINT32 | R   |       |
|             |          | ...                                   |                            |                    |        | R   |       |
| +14,15      | 0x4887   | Tariff #8 maximum demand              | 0-Pmax                     | U3                 | UINT32 | R   |       |
| 21184-21199 |          | <b>TOU Maximum Demand Register #5</b> |                            |                    |        |     |       |
| +0,1        | 0x4980   | Tariff #1 maximum demand              | 0-Pmax                     | U3                 | UINT32 | R   |       |
| +2,3        | 0x4981   | Tariff #2 maximum demand              | 0-Pmax                     | U3                 | UINT32 | R   |       |
|             |          | ...                                   |                            |                    |        | R   |       |
| +14,15      | 0x4987   | Tariff #8 maximum demand              | 0-Pmax                     | U3                 | UINT32 | R   |       |
| 21312-21325 |          | <b>TOU Maximum Demand Register #6</b> |                            |                    |        |     |       |
| +0,1        | 0x4A80   | Tariff #1 maximum demand              | 0-Pmax                     | U3                 | UINT32 | R   |       |
| +2,3        | 0x4A81   | Tariff #2 maximum demand              | 0-Pmax                     | U3                 | UINT32 | R   |       |
|             |          | ...                                   |                            |                    |        | R   |       |
| +14,15      | 0x4A87   | Tariff #8 maximum demand              | 0-Pmax                     | U3                 | UINT32 | R   |       |
| 22400-22415 |          | <b>TOU Maximum Demand Register #7</b> |                            |                    |        |     |       |
| +0,1        | 0x5300   | Tariff #1 maximum demand              | 0-Pmax                     | U3                 | UINT32 | R   |       |
| +2,3        | 0x5301   | Tariff #2 maximum demand              | 0-Pmax                     | U3                 | UINT32 | R   |       |
|             |          | ...                                   |                            |                    |        | R   |       |
| +14,15      | 0x5307   | Tariff #8 maximum demand              | 0-Pmax                     | U3                 | UINT32 | R   |       |



| Address     | Point ID      | Description                           | Options/Range <sup>3</sup> | Units <sup>3</sup> | Type   | R/W | Notes |
|-------------|---------------|---------------------------------------|----------------------------|--------------------|--------|-----|-------|
| 22464-22479 |               | <b>TOU Maximum Demand Register #8</b> |                            |                    |        |     |       |
| +0,1        | 0x5380        | Tariff #1 maximum demand              | 0-Pmax                     | U3                 | UINT32 | R   |       |
| +2,3        | 0x5381        | Tariff #2 maximum demand              | 0-Pmax                     | U3                 | UINT32 | R   |       |
|             |               | ...                                   |                            |                    |        | R   |       |
| +14,15      | 0x5387        | Tariff #8 maximum demand              | 0-Pmax                     | U3                 | UINT32 | R   |       |
| 24576-24675 |               | <b>V1/V12 Harmonic Angles</b>         |                            |                    |        |     | 2, 4  |
| +0,1        | 0x6400        | H01 Harmonic angle                    | -1800-1800                 | ×0.1°              | INT32  | R   |       |
| +2,3        | 0x6401        | H02 Harmonic angle                    | -1800-1800                 | ×0.1°              | INT32  | R   |       |
|             |               | ...                                   |                            |                    |        |     |       |
| +98,99      | 0x6431        | H50 Harmonic angle                    | -1800-1800                 | ×0.1°              | INT32  | R   |       |
| 24704-24803 |               | <b>V2/V23 Harmonic Angles</b>         |                            |                    |        |     | 2, 4  |
| +0,1        | 0x6500        | H01 Harmonic angle                    | -1800-1800                 | ×0.1°              | INT32  | R   |       |
| +2,3        | 0x6501        | H02 Harmonic angle                    | -1800-1800                 | ×0.1°              | INT32  | R   |       |
|             |               | ...                                   |                            |                    |        |     |       |
| +98,99      | 0x6531        | H50 Harmonic angle                    | -1800-1800                 | ×0.1°              | INT32  | R   |       |
| 24832-24931 |               | <b>V3/V31 Harmonic Angles</b>         |                            |                    |        |     | 2, 4  |
| +0,1        | 0x6600        | H01 Harmonic angle                    | -1800-1800                 | ×0.1°              | INT32  | R   |       |
| +2,3        | 0x6601        | H02 Harmonic angle                    | -1800-1800                 | ×0.1°              | INT32  | R   |       |
|             |               | ...                                   |                            |                    |        |     |       |
| +98,99      | 0x6631        | H50 Harmonic angle                    | -1800-1800                 | ×0.1°              | INT32  | R   |       |
| 25088-25187 |               | <b>I1 Harmonic Angles</b>             |                            |                    |        |     | 4     |
| +0,1        | 0x6800        | H01 Harmonic angle                    | -1800-1800                 | ×0.1°              | INT32  | R   |       |
| +2,3        | 0x6801        | H02 Harmonic angle                    | -1800-1800                 | ×0.1°              | INT32  | R   |       |
|             |               | ...                                   |                            |                    |        |     |       |
| +98,99      | 0x6831        | H50 Harmonic angle                    | -1800-1800                 | ×0.1°              | INT32  | R   |       |
| 25216-25315 |               | <b>I2 Harmonic Angles</b>             |                            |                    |        |     | 4     |
| +0,1        | 0x6900        | H01 Harmonic angle                    | -1800-1800                 | ×0.1°              | INT32  | R   |       |
| +2,3        | 0x6901        | H02 Harmonic angle                    | -1800-1800                 | ×0.1°              | INT32  | R   |       |
|             |               | ...                                   |                            |                    |        |     |       |
| +98,99      | 0x6931        | H50 Harmonic angle                    | -1800-1800                 | ×0.1°              | INT32  | R   |       |
| 25344-25443 |               | <b>I3 Harmonic Angles</b>             |                            |                    |        |     | 4     |
| +0,1        | 0x6A00        | H01 Harmonic angle                    | -1800-1800                 | ×0.1°              | INT32  | R   |       |
| +2,3        | 0x6A01        | H02 Harmonic angle                    | -1800-1800                 | ×0.1°              | INT32  | R   |       |
|             |               | ...                                   |                            |                    |        |     |       |
| +98,99      | 0x6A31        | H50 Harmonic angle                    | -1800-1800                 | ×0.1°              | INT32  | R   |       |
| 25664-25713 |               | <b>3-Second RMS Values</b>            |                            |                    |        |     |       |
| +0,1        | 0x6C80        | V1 voltage                            | 0-Vmax                     | U1                 | UINT32 | R   | 2     |
| +2,3        | 0x6C81        | V2 voltage                            | 0-Vmax                     | U1                 | UINT32 | R   | 2     |
| +4,5        | 0x6C82        | V3 voltage                            | 0-Vmax                     | U1                 | UINT32 | R   | 2     |
| +6-33       | 0x6C83-0x6C90 | Not used                              | 0                          |                    | UINT32 | R   |       |
| +34,35      | 0x6C91        | Zero-sequence voltage                 | 0-Vmax                     | U1                 | UINT32 | R   |       |
| +36,37      | 0x6C92        | Zero-sequence current                 | 0-Imax                     | U2                 | UINT32 | R   |       |

| Address     | Point ID          | Description                         | Options/Range <sup>3</sup> | Units <sup>3</sup> | Type  | R/W | Notes   |
|-------------|-------------------|-------------------------------------|----------------------------|--------------------|-------|-----|---|
| +38,39      | 0x6C93            | Not used                            | 0                          |                    | UIN32 | R   |   |
| +40,41      | 0x6C94            | Negative-sequence voltage unbalance | 0-3000                     | ×0.1%              | UIN32 | R   |   |
| +42,43      | 0x6C95            | Negative-sequence current unbalance | 0-3000                     | ×0.1%              | UIN32 | R   |   |
| +44-47      | 0x6C96-<br>0x6C97 | Not used                            | 0                          |                    | UIN32 | R   |   |
| +48,49      | 0x6C98            | Frequency                           | 0-10000                    | ×0.01Hz            | UIN32 | R   | 10-sec value GOST 514149, 20-sec value GOST 13109 |
| +50,51      | 0x6C99            | Positive-sequence voltage           | 0-Vmax                     | U1                 | UIN32 | R   |   |
| +52,53      | 0x6C9A            | Zero-sequence voltage unbalance     | 0-300.0                    | ×0.1%              | UIN32 | R   |   |
| 26880-26993 |                   | <b>1-Minute RMS Values</b>          |                            |                    |       |     |   |
| +0,1        | 0x7600            | V1 Voltage                          | 0-Vmax                     | U1                 | UIN32 | R   | <sup>2</sup>                                      |
| +2,3        | 0x7601            | V2 Voltage                          | 0-Vmax                     | U1                 | UIN32 | R   | <sup>2</sup>                                      |
| +4,5        | 0x7602            | V3 Voltage                          | 0-Vmax                     | U1                 | UIN32 | R   | <sup>2</sup>                                      |
| +6-33       | 0x7603-<br>0x7610 | Not used                            | 0                          |                    | UIN32 | R   |   |
| +34,35      | 0x7611            | Zero-sequence voltage               | 0-Vmax                     | U1                 | UIN32 | R   |   |
| +36,37      | 0x7612            | Zero-sequence current               | 0-Imax                     | U2                 | UIN32 | R   |   |
| +38,39      | 0x7613            | Not used                            | 0                          |                    | UIN32 | R   |   |
| +40,41      | 0x7614            | Negative-sequence voltage unbalance | 0-3000                     | ×0.1%              | UIN32 | R   |   |
| +42,43      | 0x7615            | Negative-sequence current unbalance | 0-3000                     | ×0.1%              | UIN32 | R   |   |
| +44-49      | 0x7616-<br>0x7618 | Not used                            | 0                          |                    | UIN32 | R   |   |
| +50,51      | 0x7619            | Positive-sequence voltage           | 0-Vmax                     | U1                 | UIN32 | R   |   |
| +52,53      | 0x761A            | Zero-sequence voltage unbalance     | 0-300.0                    | ×0.1%              | UIN32 | R   |   |
| 25728-25781 |                   | <b>10-Minute RMS Values</b>         |                            |                    |       |     |   |
| +0,1        | 0x6D00            | V1 Voltage                          | 0-Vmax                     | U1                 | UIN32 | R   | <sup>2</sup>                                      |
| +2,3        | 0x6D01            | V2 Voltage                          | 0-Vmax                     | U1                 | UIN32 | R   | <sup>2</sup>                                      |
| +4,5        | 0x6D02            | V3 Voltage                          | 0-Vmax                     | U1                 | UIN32 | R   | <sup>2</sup>                                      |
| +6-33       |                   | Not used                            | 0                          |                    | UIN32 | R   |   |
| +34,35      | 0x6D11            | Zero-sequence voltage               | 0-Vmax                     | U1                 | UIN32 | R   |   |
| +36,37      | 0x6D12            | Zero-sequence current               | 0-Imax                     | U2                 | UIN32 | R   |   |
| +38,39      | 0x6D13            | Not used                            | 0                          |                    | UIN32 | R   |   |
| +40,41      | 0x6D14            | Negative-sequence voltage unbalance | 0-3000                     | ×0.1%              | UIN32 | R   |   |
| +42,43      | 0x6D15            | Negative-sequence current unbalance | 0-3000                     | ×0.1%              | UIN32 | R   |   |
| +44-49      | 0x6D16-<br>0x6D18 | Not used                            | 0                          |                    | UIN32 | R   |   |
| +50,51      | 0x6D19            | Positive-sequence voltage           | 0-Vmax                     | U1                 | UIN32 | R   |   |
| +52,53      | 0x6D1A            | Zero-sequence voltage unbalance     | 0-300.0                    | ×0.1%              | UIN32 | R   |   |
| 25920-25957 |                   | <b>3-Sec Total Harmonics</b>        |                            |                    |       |     |   |
| +0,1        | 0x6E80            | V1 THD                              | 0-9999                     | ×0.1%              | UIN32 | R   | <sup>2</sup>                                      |
| +2,3        | 0x6E81            | V2 THD                              | 0-9999                     | ×0.1%              | UIN32 | R   | <sup>2</sup>                                      |
| +4,5        | 0x6E82            | V3 THD                              | 0-9999                     | ×0.1%              | UIN32 | R   | <sup>2</sup>                                      |
| +6,7        | 0x6E83            | Not used                            | 0                          |                    | UIN32 | R   |   |

| Address     | Point ID          | Description   | Options/Range <sup>3</sup> | Units <sup>3</sup> | Type   | R/W | Notes                   |
|-------------|-------------------|---|----------------------------|--------------------|--------|-----|-------------------------|
| +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   |                         |
| +14-31      | 0x6E87-<br>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   |                         |
| 25984-26021 |                   | <b>10-Minute Total 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            | Not used  | 0                          |                    | 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            | Not used  | 0                          |                    | UINT32 | R   |                         |
| +16,17      | 0x6F08            | Not used  | 0-9999                     | ×0.1%              | UINT32 | R   |                         |
| +18,19      | 0x6F09            | Not used  | 0-9999                     | ×0.1%              | UINT32 | R   |                         |
| +20,21      | 0x6FOA            | Not used  | 0-9999                     | ×0.1%              | UINT32 | R   |                         |
| +22,23      | 0x6FOB            | Not used  | 0                          |                    | UINT32 | R   |                         |
| +24,25      | 0x6FOC            | Not used  | 0-9999                     | ×0.1%              | UINT32 | R   |                         |
| +26,27      | 0x6FOD            | Not used  | 0-9999                     | ×0.1%              | UINT32 | R   |                         |
| +28,29      | 0x6FOE            | Not used  | 0-9999                     | ×0.1%              | UINT32 | R   |                         |
| +30,31      | 0x6FOF            | 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   |                         |
| 27136-27215 |                   | <b>Present PQ Measurements (GOST 13109)</b>           |                            |                    |        |     |                         |
| +0,1        | 0x7800            | Voltage variation (δUy) on phase A/AB, +/-%Un         |                            | 0.01%              | INT32  | R   | Last 1-min measurement  |
| +2,3        | 0x7801            | Voltage variation (δUy) on phase B/BC, +/-%Un         |                            | 0.01%              | INT32  | R   | "                       |
| +4,5        | 0x7802            | Voltage variation (δUy) on phase C/CA, +/-%Un         |                            | 0.01%              | INT32  | R   | "                       |
| +6,7        | 0x7803            | Positive sequence voltage variation (δUy), +/-%Un     |                            | 0.01%              | INT32  | R   | "                       |
| +8,9        | 0x7804            | Voltage change (δUt) on phase A/AB, %Un               |                            | 0.01%              | UINT32 | R   | Last 10-min measurement |
| +10,11      | 0x7805            | Repetition rate of voltage changes (FδUt) A/AB, 1/min |                            | 1/min × 0.01       | UINT32 | R   | "                       |
| +12,13      | 0x7806            | Voltage change (δUt) on phase B/BC, %Un               |                            | 0.01%              | UINT32 | R   | "                       |
| +14,15      | 0x7807            | Repetition rate of voltage changes (FδUt) B/BC, 1/min |                            | 1/min × 0.01       | UINT32 | R   | "                       |
| +16,17      | 0x7808            | Voltage change (δUt) on phase C/CA, %Un               |                            | 0.01%              | UINT32 | R   | "                       |
| +18,19      | 0x7809            | Repetition rate of voltage changes (FδUt) C/CA, 1/min |                            | 1/min × 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 |

| Address     | Point ID | Description                                       | Options/Range <sup>3</sup> | Units <sup>3</sup> | Type   | R/W | Notes                   |
|-------------|----------|---|----------------------------|--------------------|--------|-----|-------------------------|
| +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   |
| +44,45      | 0x7816   | Not used  |                            |                    | UINT32 | R   |                         |
| +46,47      | 0x7817   | Not used  |                            |                    | UINT32 | R   |                         |
| +48,49      | 0x7818   | Not used  |                            |                    | UINT32 | R   |                         |
| +50,51      | 0x7819   | Not used  |                            |                    | UINT32 | R   |                         |
| +52,53      | 0x781A   | Voltage dip, dip depth on phase A/AB, %Un         |                            | 0.01%              | UINT32 | R   |                         |
| +54,55      | 0x781B   | Voltage dip, dip depth on phase B/BC, %Un         |                            | 0.01%              | UINT32 | R   |                         |
| +56,57      | 0x781C   | Voltage dip, dip depth on phase C/CA, %Un         |                            | 0.01%              | UINT32 | R   |                         |
| +58,59      | 0x781D   | Voltage dip, duration of a polyphase dip          |                            | ms                 | UINT32 | R   |                         |
| +60,61      | 0x781E   | Overvoltage, voltage magnitude on phase A/AB, %Un |                            | 0.01%              | UINT32 | R   |                         |
| +62,63      | 0x781F   | Overvoltage, voltage magnitude on phase B/BC, %Un |                            | 0.01%              | UINT32 | R   |                         |
| +64,65      | 0x7820   | Overvoltage, voltage magnitude on phase C/CA, %Un |                            | 0.01%              | UINT32 | R   |                         |
| +66,67      | 0x7821   | Overvoltage, duration of a polyphase overvoltage  |                            | ms                 | UINT32 | R   |                         |
| +68,69      | 0x7822   | Impulsive voltage on phase A/AB, %Un peak         |                            | 0.01%              | UINT32 | R   |                         |
| +70,71      | 0x7823   | Impulsive voltage, impulse duration on phase A/AB |                            | us                 | UINT32 | R   |                         |
| +72,73      | 0x7824   | Impulsive voltage on phase B/BC, %Un peak         |                            | 0.01%              | UINT32 | R   |                         |
| +74,75      | 0x7825   | Impulsive voltage, impulse duration on phase B/BC |                            | us                 | UINT32 | R   |                         |
| +76,77      | 0x7826   | Impulsive voltage on phase C/CA, %Un peak         |                            | 0.01%              | UINT32 | R   |                         |
| +78,79      | 0x7827   | Impulsive voltage, impulse duration on phase C/CA |                            | us                 | UINT32 | R   |                         |
| 27136-27215 |          | <b>Present PQ Measurements (GOST 32144)</b>       |                            |                    |        |     |                         |
| +0,1        | 0x7800   | Voltage variation on phase A/AB, +/-%Un           |                            | 0.01%              | INT32  | R   | Last 10-min measurement |
| +2,3        | 0x7801   | Voltage variation on phase B/BC, +/-%Un           |                            | 0.01%              | INT32  | R   | "                       |
| +4,5        | 0x7802   | Voltage variation on phase C/CA, +/-%Un           |                            | 0.01%              | INT32  | R   | "                       |
| +6,7        | 0x7803   | Not used  |                            |                    | INT32  | R   |                         |
| +8,9        | 0x7804   | Rapid voltage change on phase A/AB, %Un           |                            | 0.01%              | UINT32 | R   | Last 3-sec measurement  |
| +10,11      | 0x7805   | Not used  |                            |                    | UINT32 | R   | "                       |
| +12,13      | 0x7806   | Rapid voltage change on phase B/BC, %Un           |                            | 0.01%              | UINT32 | R   | "                       |
| +14,15      | 0x7807   | Not used  |                            |                    | UINT32 | R   | "                       |
| +16,17      | 0x7808   | Rapid voltage change on phase C/CA, %Un           |                            | 0.01%              | UINT32 | R   | "                       |
| +18,19      | 0x7809   | Not used  |                            |                    | 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   | "                       |

| Address     | Point ID | Description   | Options/Range <sup>3</sup> | Units <sup>3</sup> | Type   | R/W | Notes                   |
|-------------|----------|---|----------------------------|--------------------|--------|-----|-------------------------|
| +32,33      | 0x7810   | Voltage THD (KU) on phase A/AB, %                   |                            | 0.1%               | UINT32 | R   | Last 10-min 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, +/-Hz                          |                            | 0.01 Hz            | INT32  | R   | Last 10-s measurement   |
| +44,45      | 0x7816   | Voltage interruption, residual voltage A/AB, %Un    |                            | 0.01%              | UINT32 | R   |                         |
| +46,47      | 0x7817   | Voltage interruption, residual voltage B/BC, %Un    |                            | 0.01%              | UINT32 | R   |                         |
| +48,49      | 0x7818   | Voltage interruption, residual voltage C/CA, %Un    |                            | 0.01%              | UINT32 | R   |                         |
| +50,51      | 0x7819   | Duration of a polyphase interruption                |                            | ms                 | UINT32 | R   |                         |
| +52,53      | 0x781A   | Voltage dip, residual voltage oh phase A/AB, %Un    |                            | 0.01%              | UINT32 | R   |                         |
| +54,55      | 0x781B   | Voltage dip, residual voltage on phase B/BC, %Un    |                            | 0.01%              | UINT32 | R   |                         |
| +56,57      | 0x781C   | Voltage dip, residual voltage on phase C/CA, %Un    |                            | 0.01%              | UINT32 | R   |                         |
| +58,59      | 0x781D   | Voltage dip, duration of a polyphase dip            |                            | ms                 | UINT32 | R   |                         |
| +60,61      | 0x781E   | Voltage swell, voltage magnitude on phase A/AB, %Un |                            | 0.01%              | UINT32 | R   |                         |
| +62,63      | 0x781F   | Voltage swell, voltage magnitude on phase B/BC, %Un |                            | 0.01%              | UINT32 | R   |                         |
| +64,65      | 0x7820   | Voltage swell, voltage magnitude on phase C/CA, %Un |                            | 0.01%              | UINT32 | R   |                         |
| +66,67      | 0x7821   | Voltage swell, duration of a polyphase swell        |                            | ms                 | UINT32 | R   |                         |
| +68,69      | 0x7822   | Impulsive voltage on phase A/AB, %Un peak           |                            | 0.01%              | UINT32 | R   |                         |
| +70,71      | 0x7823   | Impulsive voltage, impulse duration on phase A/AB   |                            | us                 | UINT32 | R   |                         |
| +72,73      | 0x7824   | Impulsive voltage on phase B/BC, %Un peak           |                            | 0.01%              | UINT32 | R   |                         |
| +74,75      | 0x7825   | Impulsive voltage, impulse duration on phase B/BC   |                            | us                 | UINT32 | R   |                         |
| +76,77      | 0x7826   | Impulsive voltage on phase C/CA, %Un peak           |                            | 0.01%              | UINT32 | R   |                         |
| +78,79      | 0x7827   | Impulsive voltage, impulse duration on phase C/CA   |                            | us                 | UINT32 | R   |                         |
| 30208-30307 |          | <b>V1/V12 Voltage Interharmonics</b>                |                            |                    |        |     | 2,7                     |
| +0,1        | 0x9000   | H01 Interharmonic magnitude                         | 0-10000                    | ×0.01%             | UINT32 | R   |                         |
| +2,3        | 0x9001   | H02 Interharmonic magnitude                         | 0-10000                    | ×0.01%             | UINT32 | R   |                         |
|             |          | ...   |                            |                    |        |     |                         |
| +98,99      | 0x9031   | H50 Interharmonic magnitude                         | 0-10000                    | ×0.01%             | UINT32 | R   |                         |
| 30336-39435 |          | <b>V2/V23 Voltage Interharmonics</b>                |                            |                    |        |     | 2,7                     |
| +0,1        | 0x9100   | H01 Interharmonic magnitude                         | 0-10000                    | ×0.01%             | UINT32 | R   |                         |
| +2,3        | 0x9101   | H02 Interharmonic magnitude                         | 0-10000                    | ×0.01%             | UINT32 | R   |                         |
|             |          | ...   |                            |                    |        |     |                         |
| +98,99      | 0x9131   | H50 Interharmonic magnitude                         | 0-10000                    | ×0.01%             | UINT32 | R   |                         |
| 30464-30563 |          | <b>V3/V31 Voltage Interharmonics</b>                |                            |                    |        |     | 2,7                     |
| +0,1        | 0x9200   | H01 Interharmonic magnitude                         | 0-10000                    | ×0.01%             | UINT32 | R   |                         |
| +2,3        | 0x9201   | H02 Interharmonic magnitude                         | 0-10000                    | ×0.01%             | UINT32 | R   |                         |
|             |          | ...   |                            |                    |        |     |                         |
| +98,99      | 0x9231   | H50 Interharmonic magnitude                         | 0-10000                    | ×0.01%             | UINT32 | R   |                         |
|             |          | <b>Generic TOU Energy Registers</b>                 |                            |                    |        |     | Point references        |
|             | 0x7000   | Tariff #1 register                                  | 0-999,999,999              | 1 kWh              | UINT32 |     |                         |
|             | 0x7001   | Tariff #2 register                                  | 0-999,999,999              | 1 kWh              | UINT32 |     |                         |
|             |          | ...   |                            |                    |        |     |                         |

| Address | Point ID | Description                                 | Options/Range <sup>3</sup> | Units <sup>3</sup> | Type   | R/W | Notes            |
|---------|----------|---|----------------------------|--------------------|--------|-----|------------------|
|         | 0x7007   | Tariff #8 register                          | 0-999,999,999              | 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 |     |                  |
|         |          | ...   |                            |                    |        |     |                  |
|         | 0x7107   | Tariff #8 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                |
|         | 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 |     |                  |
|         | 0x7414   | Voltage unbalance                           | 0-3000                     | ×0.1%              | 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                |
|         | 0x7421   | V1 interharmonic THD                        | 0-9999                     | ×0.1%              | UINT32 |     | 2                |
|         | 0x7422   | V2 interharmonic THD                        | 0-9999                     | ×0.1%              | UINT32 |     | 2                |
|         | 0x7423   | V3 interharmonic THD                        | 0-9999                     | ×0.1%              | UINT32 |     | 2                |
|         | 0x7421   | Not used                                    | 0-9999                     | ×0.1%              | UINT32 |     |                  |
|         | 0x7422   | Not used                                    | 0-9999                     | ×0.1%              | UINT32 |     |                  |
|         | 0x7423   | Not used                                    | 0-9999                     | ×0.1%              | 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                     | 0-10000                    | ×0.01%             | UINT32 |     | 2                |
|         | 0x1901   | V1 H02 harmonic voltage                     | 0-10000                    | ×0.01%             | UINT32 |     | 2                |
|         |          | ...   |                            |                    |        |     |                  |
|         | 0x1931   | V1 H50 harmonic voltage                     | 0-10000                    | ×0.01%             | UINT32 |     | 2                |
|         | 0x1A00   | V2 H01 harmonic voltage                     | 0-10000                    | ×0.01%             | UINT32 |     | 2                |
|         | 0x1A01   | V2 H02 harmonic voltage                     | 0-10000                    | ×0.01%             | UINT32 |     | 2                |
|         |          | ...   |                            |                    |        |     |                  |
|         | 0x1A31   | V2 H50 harmonic voltage                     | 0-10000                    | ×0.01%             | UINT32 |     | 2                |
|         | 0x1B00   | V3 H01 harmonic voltage                     | 0-10000                    | ×0.01%             | UINT32 |     | 2                |
|         | 0x1B01   | V3 H02 harmonic voltage                     | 0-10000                    | ×0.01%             | UINT32 |     | 2                |
|         |          | ...   |                            |                    |        |     |                  |

| Address | Point ID | Description                                       | Options/Range <sup>3</sup> | Units <sup>3</sup> | Type   | R/W | Notes |
|---------|----------|---|----------------------------|--------------------|--------|-----|-------|
|         | 0x1B31   | V3 H50 harmonic voltage                           | 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     |
|         | 0x2983   | V1 Plt  | 0-10000                    | ×0.01              | UINT32 |     | 2     |
|         | 0x2984   | V2 Plt  | 0-10000                    | ×0.01              | UINT32 |     | 2     |
|         | 0x2985   | V3 Plt  | 0-10000                    | ×0.01              | UINT32 |     | 2     |
|         | 0xC481   | Voltage change on phase A/AB, %Un                 | 0-10000                    | ×0.01%             | UINT32 |     | 2     |
|         | 0xC486   | Voltage change on phase B/BC, %Un                 | 0-10000                    | ×0.01%             | UINT32 |     | 2     |
|         | 0xC48B   | Voltage change on phase C/CA, %Un                 | 0-10000                    | ×0.01%             | UINT32 |     | 2     |
|         | 0xCF02   | Rapid voltage change on phase A/AB, %Un           | 0-10000                    | ×0.01%             | UINT32 |     | 2     |
|         | 0xCF04   | Rapid voltage change on phase B/BC, %Un           | 0-10000                    | ×0.01%             | UINT32 |     | 2     |
|         | 0xCF06   | Rapid voltage change on phase C/CA, %Un           | 0-10000                    | ×0.01%             | UINT32 |     | 2     |
|         | 0xD083   | Maximum 1st signaling voltage A/AB magnitude, %Un | 0-10000                    | ×0.01%             | UINT32 |     | 2     |
|         | 0xD084   | Maximum 2nd signaling voltage A/AB magnitude, %Un | 0-10000                    | ×0.01%             | UINT32 |     | 2     |
|         | 0xD085   | Maximum 3rd signaling voltage A/AB magnitude, %Un | 0-10000                    | ×0.01%             | UINT32 |     | 2     |
|         | 0xD086   | Maximum 4th signaling voltage A/AB magnitude, %Un | 0-10000                    | ×0.01%             | UINT32 |     | 2     |
|         | 0xD087   | Maximum 1st signaling voltage B/BC magnitude, %Un | 0-10000                    | ×0.01%             | UINT32 |     | 2     |
|         | 0xD088   | Maximum 2nd signaling voltage B/BC magnitude, %Un | 0-10000                    | ×0.01%             | UINT32 |     | 2     |
|         | 0xD089   | Maximum 3rd signaling voltage B/BC magnitude, %Un | 0-10000                    | ×0.01%             | UINT32 |     | 2     |
|         | 0xD08A   | Maximum 4th signaling voltage B/BC magnitude, %Un | 0-10000                    | ×0.01%             | UINT32 |     | 2     |
|         | 0xD08B   | Maximum 1st signaling voltage C/CA magnitude, %Un | 0-10000                    | ×0.01%             | UINT32 |     | 2     |
|         | 0xD08C   | Maximum 2nd signaling voltage C/CA magnitude, %Un | 0-10000                    | ×0.01%             | UINT32 |     | 2     |
|         | 0xD08D   | Maximum 3rd signaling voltage C/CA magnitude, %Un | 0-10000                    | ×0.01%             | UINT32 |     | 2     |
|         | 0xD08E   | Maximum 4th signaling voltage C/CA magnitude, %Un | 0-10000                    | ×0.01%             | UINT32 |     | 2     |

**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> Harmonic angles are referenced to the fundamental voltage harmonic H01 on phase L1.
- <sup>5</sup> On a 16-cycle interval GOST 13109, 200-ms interval GOST 32144.
- <sup>6</sup> On a 3-s interval.
- <sup>7</sup> 16-cycle interval for GOST 13109, programmable 0.2-s, 3-s, 10-min interval for GOST 32144.

### 3.5 Minimum/Maximum Log Registers

| Address              | Point ID          | Description                          | Options/Range/Format <sup>2</sup> | Units <sup>2</sup> | Type             | R/W    | Notes           |
|----------------------|-------------------|--------------------------------------|-----------------------------------|--------------------|------------------|--------|-----------------|
| 35840-35959          |                   | <b>Minimum Phase Values</b>          |                                   |                    |                  |        |                 |
| +0,1<br>+2,3         | 0x2C00            | Min. V1/V12 Voltage<br>Timestamp     | 0-Vmax<br>F1                      | U1<br>sec          | UINT32<br>UINT32 | R<br>R | <sup>1</sup>    |
| +4,5<br>+6,7         | 0x2C01            | Min. V2/V23 Voltage<br>Timestamp     | 0-Vmax<br>F1                      | U1<br>sec          | UINT32<br>UINT32 | R<br>R | <sup>1</sup>    |
| +8,9<br>+10,11       | 0x2C02            | Min. V3/V31 Voltage<br>Timestamp     | 0-Vmax<br>F1                      | U1<br>sec          | UINT32<br>UINT32 | R<br>R | <sup>1</sup>    |
| +12,13<br>+14,15     | 0x2C03            | Min. I1 Current<br>Timestamp         | 0-Imax<br>F1                      | U2<br>sec          | UINT32<br>UINT32 | R<br>R |                 |
| +16,17<br>+18,19     | 0x2C04            | Min. I2 Current<br>Timestamp         | 0-Imax                            | U2<br>sec          | UINT32<br>UINT32 | R<br>R |                 |
| +20,21<br>+22,23     | 0x2C05            | Min. I3 Current<br>Timestamp         | 0-Imax                            | U2<br>sec          | UINT32<br>UINT32 | R<br>R |                 |
| +24-71               | 0x2C06-<br>0x2C11 | Not used                             | 0                                 |                    | INT32            | R      |                 |
| +72,73<br>+74,75     | 0x2C12            | Min. V1/V12 Voltage THD<br>Timestamp | 0-9999                            | ×0.1%<br>sec       | UINT32<br>UINT32 | R<br>R | <sup>1, 3</sup> |
| +76,77<br>+78,79     | 0x2C13            | Min. V2/V23 Voltage THD<br>Timestamp | 0-9999                            | ×0.1%<br>sec       | UINT32<br>UINT32 | R<br>R | <sup>1, 3</sup> |
| +80,81<br>+82,83     | 0x2C14            | Min. V3/V31 Voltage THD<br>Timestamp | 0-9999                            | ×0.1%<br>sec       | UINT32<br>UINT32 | R<br>R | <sup>1, 3</sup> |
| +84,85<br>+86,87     | 0x2C15            | Min. I1 Current THD<br>Timestamp     | 0-9999                            | ×0.1%<br>sec       | UINT32<br>UINT32 | R<br>R | <sup>3</sup>    |
| +88,89<br>+90,91     | 0x2C16            | Min. I2 Current THD<br>Timestamp     | 0-9999                            | ×0.1%<br>sec       | UINT32<br>UINT32 | R<br>R | <sup>3</sup>    |
| +92,93<br>+94,95     | 0x2C17            | Min. I3 Current THD<br>Timestamp     | 0-9999                            | ×0.1%<br>sec       | UINT32<br>UINT32 | R<br>R | <sup>3</sup>    |
| +96,97<br>+98,99     | 0x2C18            | Min. I1 K-Factor<br>Timestamp        | 10-9999                           | ×0.1<br>sec        | UINT32<br>UINT32 | R<br>R | <sup>3</sup>    |
| +100,101<br>+102,103 | 0x2C19            | Min. I2 K-Factor<br>Timestamp        | 10-9999                           | ×0.1<br>sec        | UINT32<br>UINT32 | R<br>R | <sup>3</sup>    |
| +104,105<br>+106,107 | 0x2C1A            | Min. I3 K-Factor<br>Timestamp        | 10-9999                           | ×0.1<br>sec        | UINT32<br>UINT32 | R<br>R | <sup>3</sup>    |
| +108,109<br>+110,111 | 0x2C1B            | Min. I1 Current TDD<br>Timestamp     | 0-1000                            | ×0.1%<br>sec       | UINT32<br>UINT32 | R<br>R | <sup>3</sup>    |
| +112,113<br>+114,115 | 0x2C1C            | Min. I2 Current TDD<br>Timestamp     | 0-1000                            | ×0.1%<br>sec       | UINT32<br>UINT32 | R<br>R | <sup>3</sup>    |
| +116,117<br>+118,119 | 0x2C1D            | Min. I3 Current TDD<br>Timestamp     | 0-1000                            | ×0.1%<br>sec       | UINT32<br>UINT32 | R<br>R | <sup>3</sup>    |



| Address          | Point ID          | Description                          | Options/Range/Format <sup>2</sup> | Units <sup>2</sup> | Type             | R/W    | Notes           |
|------------------|-------------------|--------------------------------------|-----------------------------------|--------------------|------------------|--------|-----------------|
| 36096-36111      |                   | <b>Minimum Total Values</b>          |                                   |                    |                  |        |                 |
| +0,1<br>+2,3     | 0x2D00            | Min. Total kW<br>Timestamp           | -Pmax-Pmax                        | U3<br>sec          | UINT32<br>UINT32 | R<br>R |                 |
| +4,5<br>+6,7     | 0x2D01            | Min. Total kvar<br>Timestamp         | -Pmax-Pmax                        | U3<br>sec          | UINT32<br>UINT32 | R<br>R |                 |
| +8,9<br>+10,11   | 0x2D02            | Min. Total kVA<br>Timestamp          | 0-Pmax                            | U3<br>sec          | UINT32<br>UINT32 | R<br>R |                 |
| +12,13<br>+14,15 | 0x2D03            | Min. Total PF<br>Timestamp           | -1000-1000                        | ×0.001<br>sec      | INT32<br>UINT32  | R<br>R |                 |
| 36352-36362      |                   | <b>Minimum Auxiliary Values</b>      |                                   |                    |                  |        |                 |
| +0,1<br>+2,3     | 0x2E00            | Not used                             |                                   |                    | UINT32<br>UINT32 | R<br>R |                 |
| +4,5<br>+6,7     | 0x2E01            | Min. In Current<br>Timestamp         | 0-Imax                            | U2<br>sec          | UINT32<br>UINT32 | R<br>R |                 |
| +8,9<br>+10,11   | 0x2E02            | Min. Frequency<br>Timestamp          | 0-Fmax                            | ×0.01Hz<br>sec     | UINT32<br>UINT32 | R<br>R |                 |
| 36864-36983      |                   | <b>Maximum Phase Values</b>          |                                   |                    |                  |        |                 |
| +0,1<br>+2,3     | 0x3400            | Max. V1/V12 Voltage<br>Timestamp     | 0-Vmax                            | U1<br>sec          | UINT32<br>UINT32 | R<br>R | <sup>1</sup>    |
| +4,5<br>+6,7     | 0x3401            | Max. V2/V23 Voltage<br>Timestamp     | 0-Vmax                            | U1<br>sec          | UINT32<br>UINT32 | R<br>R | <sup>1</sup>    |
| +8,9<br>+10,11   | 0x3402            | Max. V3/V31 Voltage<br>Timestamp     | 0-Vmax                            | U1<br>sec          | UINT32<br>UINT32 | R<br>R | <sup>1</sup>    |
| +12,13<br>+14,15 | 0x3403            | Max. I1 Current<br>Timestamp         | 0-Imax                            | U2<br>sec          | UINT32<br>UINT32 | R<br>R |                 |
| +16,17<br>+18,19 | 0x3404            | Max. I2 Current<br>Timestamp         | 0-Imax                            | U2<br>sec          | UINT32<br>UINT32 | R<br>R |                 |
| +20,21<br>+22,23 | 0x3405            | Max. I3 Current<br>Timestamp         | 0-Imax                            | U2<br>sec          | UINT32<br>UINT32 | R<br>R |                 |
| +24-71           | 0x3406-<br>0x3411 | Not used                             | 0                                 |                    | INT32            | R      |                 |
| +72,73<br>+74,75 | 0x3412            | Max. V1/V12 Voltage THD<br>Timestamp | 0-9999                            | ×0.1%<br>sec       | UINT32<br>UINT32 | R<br>R | <sup>1, 3</sup> |
| +76,77<br>+78,79 | 0x3413            | Max. V2/V23 Voltage THD<br>Timestamp | 0-9999                            | ×0.1%<br>sec       | UINT32<br>UINT32 | R<br>R | <sup>1, 3</sup> |
| +80,81<br>+82,83 | 0x3414            | Max. V3/V31 Voltage THD<br>Timestamp | 0-9999                            | ×0.1%<br>sec       | UINT32<br>UINT32 | R<br>R | <sup>1, 3</sup> |
| +84,85<br>+86,87 | 0x3415            | Max. I1 Current THD<br>Timestamp     | 0-9999                            | ×0.1%<br>sec       | UINT32<br>UINT32 | R<br>R | <sup>3</sup>    |
| +88,89<br>+90,91 | 0x3416            | Max. I2 Current THD<br>Timestamp     | 0-9999                            | ×0.1%<br>sec       | UINT32<br>UINT32 | R<br>R | <sup>3</sup>    |
| +92,93<br>+94,95 | 0x3417            | Max. I3 Current THD<br>Timestamp     | 0-9999                            | ×0.1%<br>sec       | UINT32<br>UINT32 | R<br>R | <sup>3</sup>    |
| +96,97           | 0x3418            | Max. I1 K-Factor                     | 10-9999                           | ×0.1               | UINT32           | R      | <sup>3</sup>    |

| Address              | Point ID | Description                                     | Options/Range/Format <sup>2</sup> | Units <sup>2</sup> | Type             | R/W    | Notes        |
|----------------------|----------|---|-----------------------------------|--------------------|------------------|--------|--------------|
| +98,99               |          | Timestamp                                       |                                   | sec                | UINT32           | R      |              |
| +100,101<br>+102,103 | 0x3419   | Max. I2 K-Factor<br>Timestamp                   | 10-9999                           | ×0.1<br>sec        | UINT32<br>UINT32 | R<br>R | <sup>3</sup> |
| +104,105<br>+106,107 | 0x341A   | Max. I3 K-Factor<br>Timestamp                   | 10-9999                           | ×0.1<br>sec        | UINT32<br>UINT32 | R<br>R | <sup>3</sup> |
| +108,109<br>+110,111 | 0x341B   | Max. I1 Current TDD<br>Timestamp                | 0-1000                            | ×0.1%<br>sec       | UINT32<br>UINT32 | R<br>R | <sup>3</sup> |
| +112,113<br>+114,115 | 0x341C   | Max. I2 Current TDD<br>Timestamp                | 0-1000                            | ×0.1%<br>sec       | UINT32<br>UINT32 | R<br>R | <sup>3</sup> |
| +116,117<br>+118,119 | 0x341D   | Max. I3 Current TDD<br>Timestamp                | 0-1000                            | ×0.1%<br>sec       | UINT32<br>UINT32 | R<br>R | <sup>3</sup> |
| 37120-37135          |          | <b>Maximum Total Values</b>                     |                                   |                    |                  |        |              |
| +0,1<br>+2,3         | 0x3500   | Max. Total kW<br>Timestamp                      | -Pmax-Pmax                        | U3<br>sec          | INT32<br>UINT32  | R<br>R |              |
| +4,5<br>+6,7         | 0x3501   | Max. Total kvar<br>Timestamp                    | -Pmax-Pmax                        | U3<br>sec          | INT32<br>UINT32  | R<br>R |              |
| +8,9<br>+10,11       | 0x3502   | Max. Total kVA<br>Timestamp                     | 0-Pmax                            | U3<br>sec          | UINT32<br>UINT32 | R<br>R |              |
| +12,13<br>+14,15     | 0x3503   | Max. Total PF<br>Timestamp                      | -1000-1000                        | ×0.001<br>sec      | INT32<br>UINT32  | R<br>R |              |
| 37376-37387          |          | <b>Maximum Auxiliary Values</b>                 |                                   |                    |                  |        |              |
| +0,1<br>+2,3         | 0x3600   | Not used  |                                   |                    | UINT32<br>UINT32 | R<br>R |              |
| +4,5<br>+6,7         | 0x3601   | Max. In Current<br>Timestamp                    | 0-Imax                            | U2<br>sec          | UINT32<br>UINT32 | R<br>R |              |
| +8,9<br>+10,11       | 0x3602   | Max. Frequency<br>Timestamp                     | 0-Fmax                            | ×0.01Hz<br>sec     | UINT32<br>UINT32 | R<br>R |              |
| 37504-37535          |          | <b>Summary Energy Maximum Demands</b>           |                                   |                    |                  |        |              |
| +0,1<br>+2,3         | 0x4780   | Summary register #1 Maximum Demand<br>Timestamp | 0-Pmax                            | U3                 | UINT32           | R      |              |
| +4,5<br>+6,7         | 0x4781   | Summary register #2 Maximum Demand<br>Timestamp | 0-Pmax                            | U3                 | UINT32           | R      |              |
|                      |          | ...   |                                   |                    |                  |        |              |
| +28,29<br>+30,31     | 0x4783   | Summary register #8 Maximum Demand<br>Timestamp | 0-Pmax                            | U3                 | UINT32           | R      |              |
| 37632-37695          |          | <b>Maximum Demands</b>                          |                                   |                    |                  |        |              |
| +0,1<br>+2,3         | 0x3700   | V1/V12 Maximum volt demand<br>Timestamp         | 0-Vmax                            | U1<br>sec          | UINT32<br>UINT32 | R<br>R | <sup>1</sup> |
| +4,5<br>+6,7         | 0x3701   | V2/V23 Maximum volt demand<br>Timestamp         | 0-Vmax                            | U1<br>sec          | UINT32<br>UINT32 | R<br>R | <sup>1</sup> |
| +8,9<br>+10,11       | 0x3702   | V3/V31 Maximum volt demand<br>Timestamp         | 0-Vmax                            | U1<br>sec          | UINT32<br>UINT32 | R<br>R | <sup>1</sup> |
| +12,13<br>+14,15     | 0x3703   | I1 Maximum ampere demand<br>Timestamp           | 0-Imax                            | U2<br>sec          | UINT32<br>UINT32 | R<br>R |              |

| Address          | Point ID | Description  | Options/Range/Format <sup>2</sup> | Units <sup>2</sup> | Type             | R/W    | Notes        |
|------------------|----------|--|-----------------------------------|--------------------|------------------|--------|--------------|
| +16,17<br>+18,19 | 0x3704   | I2 Maximum ampere demand<br>Timestamp                  | 0-Imax                            | U2<br>sec          | UINT32<br>UINT32 | R<br>R |              |
| +20,21<br>+22,23 | 0x3705   | I3 Maximum ampere demand<br>Timestamp                  | 0-Imax                            | U2<br>sec          | UINT32<br>UINT32 | R<br>R |              |
| +24,25<br>+26,27 | 0x3706   | Not used<br>Timestamp                                  |                                   |                    | UINT32<br>UINT32 | R<br>R |              |
| +28,29<br>+30,31 | 0x3707   | Not used<br>Timestamp                                  |                                   |                    | UINT32<br>UINT32 | R<br>R |              |
| +32,33<br>+34,35 | 0x3708   | Not used<br>Timestamp                                  |                                   |                    | UINT32<br>UINT32 | R<br>R |              |
| +36,37<br>+38,39 | 0x3709   | Maximum kW import sliding window demand<br>Timestamp   | 0-Pmax                            | U3<br>sec          | UINT32<br>UINT32 | R<br>R |              |
| +40,41<br>+42,43 | 0x370A   | Maximum kvar import sliding window demand<br>Timestamp | 0-Pmax                            | U3<br>sec          | UINT32<br>UINT32 | R<br>R |              |
| +44,45<br>+46,47 | 0x370B   | Maximum kVA sliding window demand<br>Timestamp         | 0-Pmax                            | U3<br>sec          | UINT32<br>UINT32 | R<br>R |              |
| +48,49<br>+50,51 | 0x3737   | Not used<br>Timestamp                                  |                                   |                    | UINT32<br>UINT32 | R<br>R |              |
| +52,53<br>+54,55 | 0x370D   | Not used<br>Timestamp                                  |                                   |                    | UINT32<br>UINT32 | R<br>R |              |
| +56,57<br>+58,59 | 0x370E   | Not used<br>Timestamp                                  |                                   |                    | UINT32<br>UINT32 | R<br>R |              |
| +60,61<br>+62,63 | 0x370F   | Maximum kW export sliding window demand<br>Timestamp   | 0-Pmax                            | U3<br>sec          | UINT32<br>UINT32 | R<br>R |              |
| +64,65<br>+66,67 | 0x3710   | Maximum kvar export sliding window demand<br>Timestamp | 0-Pmax                            | U3<br>sec          | UINT32<br>UINT32 | R<br>R |              |
| 38016-38063      |          | <b>Maximum Harmonic Demands</b>                        |                                   |                    |                  |        |              |
| +0,1<br>+2,3     | 0x3880   | V1/V12 THD demand<br>Timestamp                         | 0-9999                            | ×0.1%<br>sec       | UINT32<br>UINT32 | R<br>R | <sup>1</sup> |
| +4,5<br>+6,7     | 0x3881   | V2/V23 THD demand<br>Timestamp                         | 0-9999                            | ×0.1%<br>sec       | UINT32<br>UINT32 | R<br>R | <sup>1</sup> |
| +8,9<br>+10,11   | 0x3882   | V3/V31 THD demand<br>Timestamp                         | 0-9999                            | ×0.1%<br>sec       | UINT32<br>UINT32 | R<br>R | <sup>1</sup> |
| +12,13<br>+14,15 | 0x3883   | Not used   |                                   |                    | UINT32<br>UINT32 | R<br>R |              |
| +16,17<br>+18,19 | 0x3884   | I1 THD demand<br>Timestamp                             | 0-9999                            | ×0.1%<br>sec       | UINT32<br>UINT32 | R<br>R |              |
| +20,21<br>+22,23 | 0x3885   | I2 THD demand<br>Timestamp                             | 0-9999                            | ×0.1%<br>sec       | UINT32<br>UINT32 | R<br>R |              |
| +24,25<br>+26,27 | 0x3886   | I3 THD demand<br>Timestamp                             | 0-9999                            | ×0.1%<br>sec       | UINT32<br>UINT32 | R<br>R |              |
| +28,29<br>+30,31 | 0x3887   | Not used   |                                   |                    | UINT32<br>UINT32 | R<br>R |              |
| +32,33           | 0x3888   | I1 TDD demand  | 0-1000                            | ×0.1%              | UINT32           | R      |              |

| Address     | Point ID | Description                           | Options/Range/Format <sup>2</sup> | Units <sup>2</sup> | Type   | R/W | Notes |
|-------------|----------|---------------------------------------|-----------------------------------|--------------------|--------|-----|-------|
| +34,35      |          | Timestamp                             |                                   | sec                | UINT32 | R   |       |
| +36,37      | 0x3889   | I2 TDD demand                         | 0-1000                            | ×0.1%              | UINT32 | R   |       |
| +38,39      |          | Timestamp                             |                                   | sec                | UINT32 | R   |       |
| +40,41      | 0x388A   | I3 TDD demand                         | 0-1000                            | ×0.1%              | UINT32 | R   |       |
| +42,43      |          | Timestamp                             |                                   | sec                | UINT32 | R   |       |
| +44,45      | 0x388B   | Not used                              |                                   |                    | UINT32 | R   |       |
| +46,47      |          |                                       |                                   |                    | UINT32 | R   |       |
| 38144-38175 |          | <b>TOU Maximum Demand Register #1</b> |                                   |                    |        |     |       |
| +0,1        | 0x4800   | Tariff #1 maximum demand              | 0-Pmax                            | U3                 | UINT32 | R   |       |
| +2,3        |          | Timestamp                             |                                   | sec                | UINT32 | R   |       |
| +4,5        | 0x4801   | Tariff #2 maximum demand              | 0-Pmax                            | U3                 | UINT32 | R   |       |
| +6,7        |          | Timestamp                             |                                   | sec                | UINT32 | R   |       |
|             |          | ...                                   |                                   |                    |        | R   |       |
| +28,29      | 0x4807   | Tariff #8 maximum demand              | 0-Pmax                            | U3                 | UINT32 | R   |       |
| +30,31      |          | Timestamp                             |                                   | sec                | UINT32 | R   |       |
| 38400-38431 |          | <b>TOU Maximum Demand Register #2</b> |                                   |                    |        |     |       |
| +0,1        | 0x4900   | Tariff #1 maximum demand              | 0-Pmax                            | U3                 | UINT32 | R   |       |
| +2,3        |          | Timestamp                             |                                   | sec                | UINT32 | R   |       |
| +4,5        | 0x4901   | Tariff #2 maximum demand              | 0-Pmax                            | U3                 | UINT32 | R   |       |
| +6,7        |          | Timestamp                             |                                   | sec                | UINT32 | R   |       |
|             |          | ...                                   |                                   |                    |        | R   |       |
| +28,29      | 0x4907   | Tariff #8 maximum demand              | 0-Pmax                            | U3                 | UINT32 | R   |       |
| +30,31      |          | Timestamp                             |                                   | sec                | UINT32 | R   |       |
| 38656-38687 |          | <b>TOU Maximum Demand Register #3</b> |                                   |                    |        |     |       |
| +0,1        | 0x4A00   | Tariff #1 maximum demand              | 0-Pmax                            | U3                 | UINT32 | R   |       |
| +2,3        |          | Timestamp                             |                                   | sec                | UINT32 | R   |       |
| +4,5        | 0x4A01   | Tariff #2 maximum demand              | 0-Pmax                            | U3                 | UINT32 | R   |       |
| +6,7        |          | Timestamp                             |                                   | sec                | UINT32 | R   |       |
|             |          | ...                                   |                                   |                    |        | R   |       |
| +28,29      | 0x4A07   | Tariff #8 maximum demand              | 0-Pmax                            | U3                 | UINT32 | R   |       |
| +30,31      |          | Timestamp                             |                                   | sec                | UINT32 | R   |       |
| 38272-38313 |          | <b>TOU Maximum Demand Register #4</b> |                                   |                    |        |     |       |
| +0,1        | 0x4880   | Tariff #1 maximum demand              | 0-Pmax                            | U3                 | UINT32 | R   |       |
| +2,3        |          | Timestamp                             |                                   | sec                | UINT32 | R   |       |
| +4,5        | 0x4881   | Tariff #2 maximum demand              | 0-Pmax                            | U3                 | UINT32 | R   |       |
| +6,7        |          | Timestamp                             |                                   | sec                | UINT32 | R   |       |
|             |          | ...                                   |                                   |                    |        | R   |       |
| +28,29      | 0x4887   | Tariff #8 maximum demand              | 0-Pmax                            | U3                 | UINT32 | R   |       |
| +30,31      |          | Timestamp                             |                                   | sec                | UINT32 | R   |       |
| 38528-38559 |          | <b>TOU Maximum Demand Register #5</b> |                                   |                    |        |     |       |
| +0,1        | 0x4980   | Tariff #1 maximum demand              | 0-Pmax                            | U3                 | UINT32 | R   |       |
| +2,3        |          | Timestamp                             |                                   | sec                | UINT32 | R   |       |
| +4,5        | 0x4981   | Tariff #2 maximum demand              | 0-Pmax                            | U3                 | UINT32 | R   |       |
| +6,7        |          | Timestamp                             |                                   | sec                | UINT32 | R   |       |

| Address          | Point ID | Description                           | Options/Range/Format <sup>2</sup> | Units <sup>2</sup> | Type             | R/W    | Notes |
|------------------|----------|---------------------------------------|-----------------------------------|--------------------|------------------|--------|-------|
|                  |          | ...                                   |                                   |                    |                  | R      |       |
| +28,29<br>+30,31 | 0x4987   | Tariff #8 maximum demand<br>Timestamp | 0-Pmax                            | U3<br>sec          | UINT32<br>UINT32 | R<br>R |       |
| 38784-38815      |          | <b>TOU Maximum Demand Register #6</b> |                                   |                    |                  |        |       |
| +0,1<br>+2,3     | 0x4A80   | Tariff #1 maximum demand<br>Timestamp | 0-Pmax                            | U3<br>sec          | UINT32<br>UINT32 | R<br>R |       |
| +4,5<br>+6,7     | 0x4A81   | Tariff #2 maximum demand<br>Timestamp | 0-Pmax                            | U3<br>sec          | UINT32<br>UINT32 | R<br>R |       |
|                  |          | ...                                   |                                   |                    |                  | R      |       |
| +28,29<br>+30,31 | 0x4A87   | Tariff #8 maximum demand<br>Timestamp | 0-Pmax                            | U3<br>sec          | UINT32<br>UINT32 | R<br>R |       |
| 38912-38943      |          | <b>TOU Maximum Demand Register #7</b> |                                   |                    |                  |        |       |
| +0,1<br>+2,3     | 0x5300   | Tariff #1 maximum demand<br>Timestamp | 0-Pmax                            | U3<br>sec          | UINT32<br>UINT32 | R<br>R |       |
| +4,5<br>+6,7     | 0x5301   | Tariff #2 maximum demand<br>Timestamp | 0-Pmax                            | U3<br>sec          | UINT32<br>UINT32 | R<br>R |       |
|                  |          | ...                                   |                                   |                    |                  | R      |       |
| +28,29<br>+30,31 | 0x5307   | Tariff #8 maximum demand<br>Timestamp | 0-Pmax                            | U3<br>sec          | UINT32<br>UINT32 | R<br>R |       |
| 39040-39071      |          | <b>TOU Maximum Demand Register #8</b> |                                   |                    |                  |        |       |
| +0,1<br>+2,3     | 0x5380   | Tariff #1 maximum demand<br>Timestamp | 0-Pmax                            | U3<br>sec          | UINT32<br>UINT32 | R<br>R |       |
| +4,5<br>+6,7     | 0x5381   | Tariff #2 maximum demand<br>Timestamp | 0-Pmax                            | U3<br>sec          | UINT32<br>UINT32 | R<br>R |       |
|                  |          | ...                                   |                                   |                    |                  | R      |       |
| +28,29<br>+30,31 | 0x5387   | Tariff #8 maximum demand<br>Timestamp | 0-Pmax                            | U3<br>sec          | UINT32<br>UINT32 | R<br>R |       |

**NOTES:**

<sup>1</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>2</sup> For volts, amps, power and frequency scales and units, refer to Section 4 "Data Scales and Units".

<sup>3</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>Device Restart Register</b>                  |          |  |  |       |        |     |   |
| 2560  |          | Warm restart of the device   | 0 when read,<br>0xFFFF when written = restart the device |       | UINT16 | R/W |   |
| <b>Device Identification</b>                    |          |  |  |       |        |     |   |
| 2561-2562                                       |          | Not used   | 0  |       | UINT16 | R   |   |
| 2563  |          | Firmware build number  | 1-99   |       | UINT16 | R   |   |
| 2564  |          | Not used   | 0  |       | UINT16 | R   |   |
| 2565  |          | Firmware version number  | 2500-2599  |       | UINT16 | R   | Two higher decimal digits = major version number, two lower decimal digits = minor version number |
| 2566,2567                                       |          | Instrument options   | F28  |       | UINT32 | R   |   |
| <b>Device Authorization Registers</b>           |          |  |  |       |        |     |   |
| 2575  |          | Write: 4-digit password. Read: 0 = access permitted, -1 = authorization required.              | 0-9999 (write)<br>0/-1 (read)                            |       | INT16  | R/W |   |
| 44378-44379                                     |          | Write: 8-digit password. Read: 0 = access permitted, -1 = authorization required.              | 0 - 99999999 (write)<br>0/-1 (read)                      |       | INT32  | R/W |   |
| <b>User Event Flags Registers (bit map)</b>     |          |  |  |       |        |     |   |
| 44032   |          | Event flags set register (0 = no effect, 1 = set)  | 0x0000 - 0x00FF  |       | UINT16 | W   |   |
| 44034   |          | Event flags clear register (0=clear, 1 = no effect)  | 0x0000 - 0x00FF  |       | UINT16 | W   |   |
| 44036   |          | Event flags status (0 = cleared, 1 = set)  | 0x0000 - 0x00FF  |       | UINT16 | R   |   |
| <b>Remote Relay Control Registers (bit map)</b> |          |  |  |       |        |     |   |
| 44038-44045                                     |          | Not used   |  |       | UINT16 |     |   |
| 44046   |          | Force relay operate register<br>(0 = no effect, 1 = operate)                                   | 0x0000 - 0x000F  |       | UINT16 | W   |   |
| 44050   |          | Force relay release register<br>(0 = no effect, 1 = release)                                   | 0x0000 - 0x000F  |       | UINT16 | W   |   |
| 44054   |          | Locally latched relays status<br>(0 = unlatched, 1 = locally latched)                          | 0x0000 - 0x000F  |       | UINT16 | R   |   |
| 44058   |          | Remote latched relays status<br>(0 = unlatched, 1 = remote latched)                            | 0x0000 - 0x000F  |       | UINT16 | R   |   |
| 44062   |          | Remote relay control disabled status (0 = remote control enabled, 1 = remote control disabled) | 0x0000 - 0x000F  |       | UINT16 | R   | Remote relay control is disabled if the internal pulse source is linked to the relay              |
| 44066   |          | Relay status (0 = open, 1 = closed)  | 0x0000 - 0x000F  |       | UINT16 | R   |   |
| 44070   |          | Latch relays (0 = not latched mode, 1 = latched mode)  | 0x0000 - 0x000F  |       | UINT16 | R   |   |
| 44074   |          | Pulse relays (0 = not pulse mode, 1 = pulse mode)  | 0x0000 - 0x000F  |       | UINT16 | R   |   |
| 44078   |          | KYZ relays (0 = not KYZ mode, 1 = KYZ mode)  | 0x0000 - 0x000F  |       | UINT16 | R   |   |
| 44082   |          | Relay polarity (0 = normal mode, 1 = inverting mode)   | 0x0000 - 0x000F  |       | UINT16 | R   |   |

| Address   | Point ID | Description  | Options/Range   | Units | Type   | R/W | Notes |
|---|----------|--|---|-------|--------|-----|-------|
| 44086-44101                                     |          | Reserved   |   |       | UINT16 |     |       |
| <b>Reset/Clear Registers</b>                    |          |  |   |       |        |     |       |
| 44102   |          | Clear energies   | 0   |       | UINT16 | W   |       |
| 44103   |          | Clear maximum demands  | 0 = clear all maximum demands<br>1 = clear power demands<br>2 = clear volt, ampere and harmonic demands |       | UINT16 | W   |       |
| 44104   |          | Clear summary and TOU energy registers   | 0   |       | UINT16 | W   |       |
| 44105   |          | Clear summary and TOU maximum demands  | 0   |       | UINT16 | W   |       |
| 44106   |          | Clear counters   | 0 = clear all counters,<br>1-4 = clear counter #1-#4  |       | UINT16 | W   |       |
| 44107   |          | Clear Min/Max log  | 0   |       | UINT16 | W   |       |
| 44108   |          | Clear operation/event counters   | 0 = clear GOST 13109 statistics<br>1 = clear communication counters                                     |       | UINT16 | W   |       |
| 44109-44133                                     |          | Reserved   |   |       | UINT16 |     |       |
| <b>Device Mode Control Registers</b>            |          |  |   |       |        |     |       |
| 44134-44135                                     |          | Reserved   |   |       | UINT16 |     |       |
| 44136   |          | PQ recorder  | 0 = disabled, 1 = enabled   |       | UINT16 | R/W |       |
| 44137-44165                                     |          | Reserved   |   |       | 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   | 0   |       | UINT32 | R   |       |
| <b>Setpoint Status Registers (bit map)</b>      |          |  |   |       |        |     |       |
| 44294-44295                                     |          | Setpoints 1-16 status (0 = released, 1 = operated)   | 0x00000000 - 0x0000FFFF   |       | UINT32 | R   |       |
| 44296-44309                                     |          | Reserved   |   |       | UINT32 | R   |       |
| <b>Setpoint Alarm Latch Registers (bit map)</b> |          |  |   |       |        |     |       |
| 44310-44311                                     |          | Setpoints 1-16 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 alarm bit, 1 = no effect. | 0x00000000 - 0x0000FFFF   |       | UINT32 | R/W |       |
| 44312-44325                                     |          | 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 |       |
| 44328-44341                                     |          | Reserved   |   |       |        |     |       |
| <b>Current Port Number</b>                      |          |  |   |       |        |     |       |
| 44342   |          | Active port number   | 0-1 = serial port COM1-COM2   |       | UINT16 | R   |       |

| Address                         | Point ID | Description                                    | Options/Range  | Units | Type   | R/W | Notes              |
|---------------------------------|----------|--|--|-------|--------|-----|--------------------|
| 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>Communication Status</b>     |          |  |  |       |        |     |                    |
| 44394                           |          | RSSI (received signal strength)                | 0 = not known or not detectable,<br>51-113 = -51 to -113 dBm |       | UINT16 | R   |                    |
| 44395                           |          | GPRS status                                    | 0 = not connected,<br>1 = not registered,<br>2 = registered  |       | UINT16 | R   |                    |
| 44396-44409                     |          | Reserved                                       |  |       | UINT16 | R   | 65535 = N/A        |
| <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        |



### 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           | 0-999999  |       | UINT32 | R   |  |
| +2,3                           |          | Device model ID                | 17500   |       | UINT32 | R   |  |
| +4-11                          |          | Device model name              | "PM175"   |       | CHAR16 | R   | Null-terminated string   |
| +12-13                         |          | Device options (bitmap)        | 0   |       | UINT32 | R   |  |
| +14-19                         |          | Not used                       |   |       | UINT16 | R   |  |
| +20                            |          | Device firmware version number | 2500-2599   |       | UINT16 | R   | Two higher decimal digits = major version number, two lower decimal digits = minor version number  |
| +21                            |          | Device firmware build number   | 1-99  |       | UINT16 | R   |  |
| +22,23                         |          | Not used                       |   |       | UINT16 | R   |  |
| +24                            |          | Boot loader version number     |   |       | UINT16 | R   | Two higher decimal digits = major version number, two lower decimal digits = minor version number  |
| +25                            |          | Boot loader build number       | 1-99  |       | UINT16 | R   |  |
| +26-31                         |          | Reserved                       |   |       | UINT16 | R   |  |
| <b>Factory Device Settings</b> |          |                                |   |       |        |     |  |
| 46112-46178                    |          |                                |   |       |        |     |  |
| +0                             |          | V1-V3 input range              | 690, 120 (option U)   | V     | UINT16 | R   | Does not limit the 690V input range  |
| +1                             |          | V1-V3 input overload           | 120   | %     | UINT16 | R   |  |
| +2,3                           |          | Not used                       |   |       | UINT16 | R   |  |
| +4                             |          | I1-I3 input range              | 1, 5  | A     | UINT16 | R   |  |
| +5                             |          | I1-I3 input overload           | 200   | %     | UINT16 | R   |  |
| +6-13                          |          | Not used                       |   |       | UINT16 | R   |  |
| +13-63                         |          | Not used                       |   |       | 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   |  |
| <b>Basic Setup</b>             |          |                                |   |       |        |     |  |
| 2304-2324                      |          |                                |   |       |        |     |  |
| +0                             |          | Wiring mode                    | F26   |       | UINT16 | R/W |  |
| +1                             |          | PT ratio                       | 10 to 65000   | ×0.1  | UINT16 | R/W |  |
| +2                             |          | CT primary current             | 1 to 50,000   | A     | UINT16 | R/W |  |
| +3                             |          | Power block demand period      | 1,2,3,5,10,15,20,30,60 min,<br>255 = external synchronization | min   | UINT16 | R/W | If the external synchronization is selected, the DI1 input is considered a pulse or KYZ input. The pulse edge restarts the power demand block accumulation interval. |

| Address                          | Point ID | Description                                      | Options/Range  | Units | Type   | R/W | Notes                        |
|----------------------------------|----------|--|--|-------|--------|-----|------------------------------|
| +4                               |          | Volt/ampere/harmonic demand period               | 0 to 1800  | sec   | UINT16 | R/W |                              |
| +5-7                             |          | Reserved   |  |       | UINT16 | R   | Read as 65535                |
| +8                               |          | Number of blocks in a sliding window             | 1 to 15  |       | UINT16 | R/W |                              |
| +9-10                            |          | Reserved   |  |       | UINT16 | R   | Read as 65535                |
| +11                              |          | Nominal line frequency                           | 50, 60   | Hz    | UINT16 | R/W |                              |
| +12                              |          | Maximum demand load current                      | 0 to 50,000 (0 = CT primary current)   | A     | UINT16 | R/W |                              |
| +13                              |          | Nominal secondary voltage (alternative register) | 500 to 7000, 65535 = N/A   | ×0.1V | UINT16 | R/W |                              |
| +14-17                           |          | Reserved   |  |       | UINT16 | R   | Read as 65535                |
| +18                              |          | Nominal secondary voltage                        | 50 to 700  | V     | UINT16 | R/W |                              |
| +19                              |          | Reserved   |  |       | UINT16 | R   | Read as 65535                |
| +20                              |          | PT ratio multiplication factor                   | ×1, ×10  |       | UINT16 | R/W |                              |
| <b>Communication Ports Setup</b> |          |  |  |       |        |     |                              |
| 2344-2359                        |          |  |  |       |        |     |                              |
| +0                               |          | Communication protocol                           | COM1: 0=Modbus RTU, 1=Modbus ASCII, 2=DNP3.0, 5=Profibus DP<br>COM2: 0=Modbus RTU, 1=Modbus ASCII, 2=DNP3.0                |       | UINT16 | R/W |                              |
| +1                               |          | Interface  | COM1: 0=RS-232, 1=RS-422, 2=RS-485, 4=Dial-up Modem, 6=Ethernet, 7=Profibus, 8=GSM/GPRS<br>COM2: 1=RS-422, 2=RS-485        |       | UINT16 | R/W |                              |
| +2                               |          | Device address                                   | Modbus: 1-247<br>DNP3.0: 0-65532<br>Profibus DP: 0-126   |       | 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,<br>1=8 bits/no parity,<br>2=8 bits/even parity   |       | UINT16 | R/W |                              |
| +5                               |          | Flow control                                     | 0=no flow control<br>1=software (XON/XOFF)<br>2=hardware (CTS)   |       | UINT16 | R/W | N/A for COM2 (read as 65535) |
| +6                               |          | RTS mode   | 0=not used,<br>1=RTS is permanently asserted<br>2=RTS is asserted during the transmission                                  |       | UINT16 | R/W | N/A for COM2 (read as 65535) |
| 2344-2351                        |          | <b>COM1 Setup</b>                                |  |       |        |     |                              |
| 2352-2359                        |          | <b>COM2 Setup</b>                                |  |       |        |     |                              |

| Address                            | Point ID | Description                        | Options/Range  | Units | Type   | R/W | Notes                               |
|------------------------------------|----------|------------------------------------|--|-------|--------|-----|-------------------------------------|
| <b>Device Options Setup</b>        |          |                                    |  |       |        |     |                                     |
| 2376-2386                          |          |                                    |  |       |        |     |                                     |
| +0                                 |          | Power calculation mode             | 0=using reactive power: $S=f(P,Q)$ ,<br>1=using non-active power:<br>$Q=f(S,P)$  |       | UINT16 | R/W |                                     |
| +1                                 |          | Energy roll value                  | 0= $1 \times 10^4$ , 1= $1 \times 10^5$ , 2= $1 \times 10^6$ ,<br>3= $1 \times 10^7$ , 4= $1 \times 10^8$ , 5= $1 \times 10^9$ |       | UINT16 | R/W |                                     |
| +2                                 |          | Phase energy calculation mode      | 0=disabled, 1=enabled  |       | UINT16 | R/W |                                     |
| +3                                 |          | Reserved                           |  |       | UINT16 | R/W | Read as 65535                       |
| +4                                 |          | Analog expander output option      | 0=none<br>1=0-20 mA<br>2=4-20 mA<br>3=0-1 mA<br>4= $\pm 1$ mA  |       | UINT16 | R/W |                                     |
| +5                                 |          | Battery mode                       | 0 = battery is OFF, 1 = battery is ON  |       | UINT16 | R/W |                                     |
| +6-9                               |          | Reserved                           |  |       | UINT16 | R/W | Read as 65535                       |
| +10                                |          | Energy LED test mode               | 0=disabled, 1=Wh test, 2=varh test   |       | UINT16 | R/W | LED pulse rate is 10,000 pulses/kWh |
| <b>Alarm/Event Setpoints Setup</b> |          |                                    |  |       |        |     |                                     |
| 352-1055                           |          |                                    |  |       |        |     |                                     |
| +0                                 |          | Condition #1: Logical operator     | 0 = OR, 1 = AND  |       | UINT16 | R/W |                                     |
| +1                                 |          | Condition #1: Trigger parameter ID | F12  |       | UINT16 | R/W |                                     |
| +2                                 |          | Condition #1: Not used             | 0  |       | UINT16 | R/W |                                     |
| +3                                 |          | Condition #1: Not used             | 0  |       | UINT16 | R/W |                                     |
| +4,5                               |          | Condition #1: Operate limit        | See Section 3.3  |       | UINT32 | R/W | Scaled value                        |
| +6,7                               |          | Condition #1: Release limit        | See Section 3.3  |       | UINT32 | R/W | Scaled value                        |
| +8                                 |          | Condition #2: Logical operator     | 0 = OR, 1 = AND  |       | UINT16 | R/W |                                     |
| +9                                 |          | Condition #2: Trigger parameter ID | F12  |       | UINT16 | R/W |                                     |
| +10                                |          | Condition #2: Not used             | 0  |       | UINT16 | R/W |                                     |
| +11                                |          | Condition #2: Not used             | 0  |       | UINT16 | R/W |                                     |
| +12,13                             |          | Condition #2: Operate limit        | See Section 3.3  |       | UINT32 | R/W | Scaled value                        |
| +14,15                             |          | Condition #2: Release limit        | See Section 3.3  |       | UINT32 | R/W | Scaled value                        |
| +16                                |          | Condition #3: Logical operator     | 0 = OR, 1 = AND  |       | UINT16 | R/W |                                     |
| +17                                |          | Condition #3: Trigger parameter ID | F12  |       | UINT16 | R/W |                                     |
| +18                                |          | Condition #3: Not used             | 0  |       | UINT16 | R/W |                                     |
| +19                                |          | Condition #3: Not used             | 0  |       | UINT16 | R/W |                                     |
| +20,21                             |          | Condition #3: Operate limit        | See Section 3.3  |       | UINT32 | R/W | Scaled value                        |
| +22,23                             |          | Condition #3: Release limit        | See Section 3.3  |       | UINT32 | R/W | Scaled value                        |
| +24                                |          | Condition #4: Logical operator     | 0 = OR, 1 = AND  |       | UINT16 | R/W |                                     |
| +25                                |          | Condition #4: Trigger parameter ID | F12  |       | UINT16 | R/W |                                     |
| +26                                |          | Condition #4: Not used             | 0  |       | UINT16 | R/W |                                     |
| +27                                |          | Condition #4: Not used             | 0  |       | UINT16 | R/W |                                     |
| +28,29                             |          | Condition #4: Operate limit        | See Section 3.3  |       | UINT32 | R/W | Scaled value                        |

| Address                     | Point ID | Description                        | Options/Range                                      | Units    | Type   | R/W | Notes        |
|-----------------------------|----------|------------------------------------|--|----------|--------|-----|--------------|
| +30,31                      |          | Condition #4: Release limit        | See Section 3.3                                    |          | UINT32 | R/W | Scaled value |
| +32                         |          | Action #1: Action type             | F14  |          | UINT16 | R/W |              |
| +33                         |          | Action #1: Action target           | F14  |          | UINT16 | R/W |              |
| +34                         |          | Action #2: Action type             | F14  |          | UINT16 | R/W |              |
| +35                         |          | Action #2: Action target           | F14  |          | UINT16 | R/W |              |
| +36                         |          | Action #3: Action type             | F14  |          | UINT16 | R/W |              |
| +37                         |          | Action #3: Action target           | F14  |          | UINT16 | R/W |              |
| +38                         |          | Action #4: Action type             | F14  |          | UINT16 | R/W |              |
| +39                         |          | Action #4: Action target           | F14  |          | UINT16 | R/W |              |
| +40                         |          | Not used                           | 0  |          | UINT16 | R/W |              |
| +41                         |          | Operate delay                      | 0-9999   | ×0.1 sec | UINT16 | R/W |              |
| +42                         |          | Release delay                      | 0-9999   | ×0.1 sec | UINT16 | R/W |              |
| +43                         |          | Not used                           | 0  |          | UINT16 | R/W |              |
| 352-395                     |          | <b>Setpoint #1</b>                 |  |          |        |     |              |
| 396-439                     |          | <b>Setpoint #2</b>                 |  |          |        |     |              |
| 440-483                     |          | <b>Setpoint #3</b>                 |  |          |        |     |              |
| 484-527                     |          | <b>Setpoint #4</b>                 |  |          |        |     |              |
| 528-571                     |          | <b>Setpoint #5</b>                 |  |          |        |     |              |
| 572-615                     |          | <b>Setpoint #6</b>                 |  |          |        |     |              |
| 616-659                     |          | <b>Setpoint #7</b>                 |  |          |        |     |              |
| 660-703                     |          | <b>Setpoint #8</b>                 |  |          |        |     |              |
| 704-747                     |          | <b>Setpoint #9</b>                 |  |          |        |     |              |
| 748-791                     |          | <b>Setpoint #10</b>                |  |          |        |     |              |
| 792-835                     |          | <b>Setpoint #11</b>                |  |          |        |     |              |
| 836-879                     |          | <b>Setpoint #12</b>                |  |          |        |     |              |
| 880-923                     |          | <b>Setpoint #13</b>                |  |          |        |     |              |
| 924-967                     |          | <b>Setpoint #14</b>                |  |          |        |     |              |
| 968-1011                    |          | <b>Setpoint #15</b>                |  |          |        |     |              |
| 1012-1055                   |          | <b>Setpoint #16</b>                |  |          |        |     |              |
| <b>Pulse Counters Setup</b> |          |                                    |  |          |        |     |              |
| 2940-2947                   |          |                                    |  |          |        |     |              |
| +0                          |          | Source digital input ID            | 0=not assigned, 1-4=DI1-DI4                        |          | UINT16 | R/W |              |
| +1                          |          | Multiplier                         | 0-9999   |          | UINT16 | R/W |              |
| 2940-2941                   |          | <b>Counter #1 Setup</b>            |  |          |        |     |              |
| 2942-2943                   |          | <b>Counter #2 Setup</b>            |  |          |        |     |              |
| 2944-2945                   |          | <b>Counter #3 Setup</b>            |  |          |        |     |              |
| 2946-2947                   |          | <b>Counter #4 Setup</b>            |  |          |        |     |              |
| <b>Local Settings</b>       |          |                                    |  |          |        |     |              |
| 46400-46415                 |          |                                    |  |          |        |     |              |
| +0                          |          | Reserved                           |  |          | INT16  | R/W |              |
| +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 |              |

| Address                           | Point ID | Description                               | Options/Range   | Units     | Type   | R/W | Notes  |
|-----------------------------------|----------|---|---|-----------|--------|-----|--|
| +3                                |          | DST start week of the month               | 1=1st, 2=2nd, 3=3rd, 4=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=1st, 2=2nd, 3=3rd, 4=4th week, 5=the 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              | 1-4 = DI1-DI4, 32767 = meter clock                            |           | UINT16 | R/W | A DI input is considered a pulse or KYZ input. The pulse edge adjusts the clock at the nearest whole minute. |
| +9                                |          | Country code                              | ITU country calling code                                      |           | UINT16 | R/W |  |
| +10                               |          | DST start hour                            | 1-6   |           | UINT16 | R/W |  |
| +11                               |          | DST end hour                              | 1-6   |           | UINT16 | R/W |  |
| +12-15                            |          | Reserved                                  |   |           | UINT16 | R/W |  |
| <b>Clock Indication and Setup</b> |          |   |   |           |        |     |  |
| 46416-46447                       |          |   |   |           |        |     |  |
| +0,1                              |          | Local time, in seconds, since Jan 1, 1970 | F1  | sec       | UINT32 | R/W |  |
| +2,3                              |          | Fractional seconds, $\mu$ sec             |   | $\mu$ sec | UINT32 | R/W |  |
| +4                                |          | Fractional seconds, milliseconds          | 0-999   | ms        | 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 is active, 1=daylight savings time is active  |           | UINT16 | R   |  |
| +13-31                            |          | Reserved                                  |   |           | UINT16 |     |  |
| <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 |  |
| +10-127                           |          | Reserved                                  |   |           |        | R/W |  |
| <b>Password Setup</b>             |          |   |   |           |        |     |  |
| 46704-46707                       |          |   |   |           |        |     |  |
| +0,1                              |          | Communications password (4 digits)        | 0-9999  |           | UINT32 | R/W | Read as 0  |
| +2                                |          | Password protection enabled               | 0 = disabled, 1 = enabled                                     |           | UINT16 | R/W |  |

| Address   | Point ID | Description  | Options/Range  | Units | Type   | R/W | Notes                   |
|---|----------|--|--|-------|--------|-----|-------------------------|
| +3  |          | Reserved   |  |       | UINT16 | R/W |                         |
| <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) accounts</b> |          |  |  |       |        |     |                         |
| 46784-46831                                     |          |  |  |       |        |     |                         |
| +0-15   |          | ISP telephone number                                 |  |       | CHAR32 | R/W |                         |
| +16-31  |          | Login name   |  |       | CHAR32 | R/W |                         |
| +32-47  |          | Login password                                       |  |       | CHAR32 | R/W |                         |
| <b>GPRS Setup</b>                               |          |  |  |       |        |     |                         |
| 46832-46879                                     |          |  |  |       |        |     |                         |
| +0-15   |          | Access Point Name (APN)                              |  |       | CHAR32 | R/W |                         |
| +16-31  |          | User name  |  |       | CHAR32 | R/W |                         |
| +32-39  |          | Password   |  |       | CHAR16 | R/W |                         |
| +40-47  |          | Reserved   |  |       | CHAR16 | R/W |                         |
| <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>DNP Options Setup</b>                        |          |  |  |       |        |     |                         |
| 51158-51183                                     |          |  |  |       |        |     |                         |
| +0  |          | Default Binary Input static object variation         | F24 (default 0)  |       | UINT16 | R/W |                         |
| +1  |          | Default Binary Input Change object variation         | F24 (default 1)  |       | UINT16 | R/W |                         |
| +2  |          | Default Binary Counter object variation              | F24 (default 3)  |       | UINT16 | R/W |                         |
| +3  |          | Default Frozen Binary Counter object variation       | F24 (default 4)  |       | UINT16 | R/W |                         |
| +4  |          | Reserved   |  |       | UINT16 | R/W |                         |
| +5  |          | Default 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  |          | Default 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= $\times 1$ (default), 1= $\times 10$ , 2= $\times 100$ , 3= $\times 1000$ |       | UINT16 | R/W |                         |

| Address                              | Point ID | Description   | Options/Range  | Units | Type   | R/W | Notes   |
|--------------------------------------|----------|---|--|-------|--------|-----|---|
| +12                                  |          | 16-bit AI Scaling   | 0=disabled, 1=enabled (default)  |       | UINT16 | R/W |   |
| +13                                  |          | Number of points allocated for Analog Input change events   | 0 to 64 (default 32)   |       | UINT16 | R/W |   |
| +14                                  |          | Number of points allocated for Binary Input change events   | 0 to 32 (default 0)  |       | UINT16 | R/W |   |
| +15                                  |          | Number of points allocated for Binary Counter change events | 0 to 64 (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)   |       | UINT32 | R/W |   |
| +24                                  |          | Voltage scale, volts secondary                              | 60 to 828V (default 144V)  | V     | UINT16 | R/W |   |
| +25                                  |          | Current scale, amps secondary                               | 100  | ×0.1A | UINT16 | R/W |   |
| 51184-51189                          |          | Reserved  |  |       |        |     |   |
| <b>DNP Events Setup</b>              |          |   |  |       |        |     |   |
| 51190-51445                          |          |   |  |       |        |     |   |
| +0,1                                 |          | Threshold/Deadband  | 0 to 4.3×10 <sup>9</sup>   |       | 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 |   |
| +3                                   |          | Event scan control field (bitmap)                           | Bits 0-1 - DNP Object:<br>0 = none, 1=AI, 2=BI, 3=BC<br>Bit 2 – Object change event scan:<br>0= event disabled, 1=enabled<br>Bits 5-6 - DNP event poll class:<br>0=Class 1, 1=Class 2, 2=Class 3<br>Bit 7 - Event log on an event:<br>0= disabled, 1=enabled<br>Bits 8-9 – Threshold/Deadband relation:<br>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 Assignments</b> |          |   |  |       |        |     |   |
| 51702-51797                          |          |   |  |       |        |     |   |
| +0                                   |          | DNP object and variation                                    | F25  |       | UINT16 | R/W |   |

| Address                                      | Point ID | Description                                      | Options/Range   | Units  | Type   | R/W | Notes |
|--|----------|--|---|--------|--------|-----|-------|
|  | +1       | Start point number                               | Point number for the selected object  |        | UINT16 | R/W |       |
|  | +2       | Number of 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>               |   |        |        |     |       |
| 51798-51893                                  |          | Reserved   |   |        |        |     |       |
| <b>GOST 13109 PQ Recorder Triggers Setup</b> |          |  |   |        |        |     |       |
| 50134-50453                                  |          |  |   |        |        |     |       |
|  | +0       | High normally permissible limit, %               | -2000-20000   | ×0.01% | INT16  | R/W |       |
|  | +1       | Hysteresis, % of threshold                       | 0-500   | ×0.1%  | UINT16 | R/W |       |
|  | +2       | Log options, bitmap                              | Bit 0 – waveform log on event start:<br>0 = disabled, 1 = enabled;<br>Bit 1 – waveform log on event end:<br>0 = disabled, 1 = enabled;<br>Bit 2 – PQ log on normally permissible limit:<br>0 = enabled, 1 = disabled.<br>Bit 3 – PQ log on maximum permissible limit:<br>0 = enabled, 1 = disabled. |        | UINT16 | R/W |       |
|  | +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, %                | -2000-20000   | ×0.01% | INT16  | R/W |       |
|  | +13      | Low normally permissible limit, %                | -2000-20000   | ×0.01% | INT16  | R/W |       |
|  | +14      | Low maximum permissible limit, %                 | -2000-20000   | ×0.01% | INT16  | 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>GOST 13109 Advanced Setup</b>             |          |  |   |        |        |     |       |
| 50838-50879                                  |          |  |   |        |        |     |       |



| Address     | Point ID | Description                                  | Options/Range   | Units  | Type   | R/W | Notes |
|-------------|----------|--|---|--------|--------|-----|-------|
|             |          | <b>GOST 13109 Compliance Statistics</b>      |   |        |        |     |       |
| +0          |          | Evaluation                                   | 0=disabled, 1=enabled   |        | UINT16 | R/W |       |
| +1          |          | Evaluation period                            | 0=daily   |        | UINT16 | R/W |       |
| +2          |          | Start time                                   | 0-1439  | min    | UINT16 | R/W |       |
| +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 13109-97 limit curve                    | 0=curve 1, 1= curve 2   |        | UINT16 | R/W |       |
|             |          | <b>Flicker</b>                               |   |        |        |     |       |
| +10         |          | Pst period                                   | 1-10  | min    | UINT16 | R/W |       |
| +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   | ×0.01% | UINT16 | R/W |       |
| +1          |          | H03 limit                                    | 1-10000   | ×0.01% | UINT16 | R/W |       |
| +2          |          | H04 limit                                    | 1-10000   | ×0.01% | UINT16 | R/W |       |
|             |          | ...  |   |        |        |     |       |
| +38         |          | H40 limit                                    | 1-10000   | ×0.01% | UINT16 | R/W |       |
| +39-63      |          | Reserved                                     |   |        |        |     |       |
|             |          | <b>GOST 32144 PQ Recorder Triggers Setup</b> |   |        |        |     |       |
| 50134-50373 |          |  |   |        |        |     |       |
| +0          |          | High 95% permissible limit, %                | -2000-20000   | ×0.01% | INT16  | R/W |       |
| +1          |          | Hysteresis, % of threshold                   | 0-500   | ×0.1%  | UINT16 | R/W |       |
| +2          |          | Log options, bitmap                          | Bit 0 – waveform log on event start:<br>0 = disabled, 1 = enabled;<br>Bit 1 – waveform log on event end:<br>0 = disabled, 1 = enabled;<br>Bit 2 – PQ log on 95% permissible<br>limit: |        | UINT16 | R/W |       |

| Address                          | Point ID | Description                                     | Options/Range   | Units  | Type   | R/W | Notes |
|----------------------------------|----------|---|---|--------|--------|-----|-------|
|                                  |          |   | 0 = enabled, 1 = disabled.<br>Bit 3 – PQ log on 100% permissible limit:<br>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 100% permissible limit, %                  | -2000-20000   | ×0.01% | INT16  | R/W |       |
| +13                              |          | Low 95% permissible limit, %                    | -2000-20000   | ×0.01% | INT16  | R/W |       |
| +14                              |          | Low 100% permissible limit, %                   | -2000-20000   | ×0.01% | INT16  | R/W |       |
| +15                              |          | Not used  | 0   |        | UINT16 | R/W |       |
| 50134-50149                      |          | <b>Frequency variation, +/-dF, %Fn</b>          |   |        |        |     |       |
| 50150-50165                      |          | <b>Voltage variation, +/-dU, %Un</b>            |   |        |        |     |       |
| 50166-50181                      |          | <b>Rapid voltage changes, +/-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>Voltage interharmonic components, %</b>      |   |        |        |     |       |
| 50262-50277                      |          | <b>Signaling voltage, %Un</b>                   |   |        |        |     |       |
| 50278-50293                      |          | <b>Voltage unbalance, %</b>                     |   |        |        |     |       |
| 50294-50309                      |          | <b>Voltage interruptions</b>                    |   |        |        |     |       |
| 50310-50325                      |          | <b>Voltage dips, %Un</b>                        |   |        |        |     |       |
| 50326-50341                      |          | <b>Voltage swells, %Un</b>                      |   |        |        |     |       |
| 50342-50357                      |          | <b>Impulsive voltage, %Un peak</b>              |   |        |        |     |       |
| 50358-50373                      |          | <b>Voltage variation, light load +/-dU, %Un</b> |   |        |        |     |       |
| 50373-50453                      |          | Reserved  |   |        |        |     |       |
| <b>GOST 32144 Advanced Setup</b> |          |   |   |        |        |     |       |
| 50838-50879                      |          | <b>GOST 32144 Compliance Statistics</b>         |   |        |        |     |       |
| +0                               |          | Evaluation                                      | 0=disabled, 1=enabled   |        | UINT16 | R/W |       |
| +1                               |          | Evaluation period                               | 0=daily, 1=weekly   |        | UINT16 | R/W |       |
| +2                               |          | First day of the week                           | 1=Sunday, 7=Saturday  |        | UINT16 | R/W |       |
| +3                               |          | Start time                                      | 0-1439  | min    | UINT16 | R/W |       |
| +4-7                             |          | Not used  |   |        | UINT16 | R/W |       |
|                                  |          | <b>Rapid Voltage Changes</b>                    |   |        |        |     |       |
| +8                               |          | Repetition rate, per hour, maximum              | 1-10  |        | UINT16 | R/W |       |
| +9                               |          | Not used  |   |        | UINT16 | R/W |       |
|                                  |          | <b>Flicker</b>                                  |   |        |        |     |       |
| +10                              |          | Pst period                                      | 1-10  | min    | UINT16 | R/W |       |
| +11                              |          | Not used  |   |        | UINT16 | R/W |       |
|                                  |          | <b>Harmonic Voltage</b>                         |   |        |        |     |       |
| +12                              |          | THD, up to order                                | 25-50   |        | UINT16 | R/W |       |
| +13                              |          | Harmonics, up to order                          | 25-50   |        | UINT16 | R/W |       |

| Address  | Point ID | Description                     | Options/Range                     | Units  | Type   | R/W | Notes |
|--|----------|---------------------------------|-----------------------------------|--------|--------|-----|-------|
| +14-15   |          | Not used                        |                                   |        | UINT16 | R/W |       |
|  |          | <b>Interharmonic Voltage</b>    |                                   |        |        |     |       |
| +16  |          | Evaluation                      | 0=disabled, 1=enabled             |        | UINT16 | R/W |       |
| +17  |          | THD, up to order                | 25-50                             |        | UINT16 | R/W |       |
| +18  |          | Interharmonics, up to order     | 25-50                             |        | UINT16 | R/W |       |
| +19  |          | Not used                        |                                   |        | UINT16 | R/W |       |
|  |          | <b>Mains Signaling Voltage</b>  |                                   |        |        |     |       |
| +20  |          | Evaluation                      | 0=disabled, 1=enabled             |        | UINT16 | R/W |       |
| +21  |          | 1st signaling frequency         | 1100-30000                        | ×0.1Hz | UINT16 | R/W |       |
| +22  |          | 2nd signaling frequency         | 1100-30000                        | ×0.1Hz | UINT16 | R/W |       |
| +23  |          | 3rd signaling frequency         | 1100-30000                        | ×0.1Hz | UINT16 | R/W |       |
| +24  |          | 4th signaling frequency         | 1100-30000                        | ×0.1Hz | UINT16 | R/W |       |
| +25-34   |          | Not used                        | 0                                 |        | UINT16 | R/W |       |
|  |          | <b>Data Monitoring Options</b>  |                                   |        |        |     |       |
| +35  |          | Harmonics aggregation interval  | 0=0.2 s, 1=3 s, 2=10 min          |        | 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 32144 Harmonic Voltage Limits</b>      |          |                                 |                                   |        |        |     |       |
| 50902-50965                                    |          |                                 |                                   |        |        |     |       |
| +0   |          | H02 limit                       | 1-10000                           | ×0.01% | UINT16 | R/W |       |
| +1   |          | H03 limit                       | 1-10000                           | ×0.01% | UINT16 | R/W |       |
| +2   |          | H04 limit                       | 1-10000                           | ×0.01% | UINT16 | R/W |       |
|  |          | ...                             |                                   |        |        |     |       |
| +48  |          | H50 limit                       | 1-10000                           | ×0.01% | UINT16 | R/W |       |
| +49-63   |          | Reserved                        |                                   |        |        |     |       |
| <b>GOST 32144 Interharmonic Voltage Limits</b> |          |                                 |                                   |        |        |     |       |
| 50966-51029                                    |          |                                 |                                   |        |        |     |       |
| +0   |          | H02 limit                       | 1-10000                           | ×0.01% | UINT16 | R/W |       |
| +1   |          | H03 limit                       | 1-10000                           | ×0.01% | UINT16 | R/W |       |
| +2   |          | H04 limit                       | 1-10000                           | ×0.01% | UINT16 | R/W |       |
|  |          | ...                             |                                   |        |        |     |       |
| +48  |          | H50 limit                       | 1-10000                           | ×0.01% | UINT16 | R/W |       |
| +49-63   |          | Reserved                        |                                   |        |        |     |       |
| <b>File Setup</b>                              |          |                                 |                                   |        |        |     |       |
| 52598-53877                                    |          |                                 |                                   |        |        |     |       |
| +0   |          | File type                       | 0                                 |        | UINT16 | R/W |       |
| +1   |          | File attributes (bitmap)        | F3                                |        | UINT16 | R/W |       |

| Address                        | Point ID | Description                                | Options/Range  | Units | Type   | R/W | Notes                                     |
|--------------------------------|----------|--|--|-------|--------|-----|---|
| +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,<br>40 for GOST 13109 Statistics log,<br>80 for GOST 13109 Harmonics log,<br>42 for GOST 32144 Statistics log,<br>80 for GOST 32144 Harmonics log |       | UINT16 | R/W | Not changeable for non-conventional files |
| +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 File Setup</b>                |  |       |        |     |   |
| 52608-52617                    |          | <b>Data Log #1 File Setup</b>              |  |       |        |     |   |
| 52618-52627                    |          | <b>Data Log #2 File Setup</b>              |  |       |        |     |   |
| 52628-52637                    |          | <b>Data Log #3 File Setup</b>              |  |       |        |     |   |
| 52638-52647                    |          | <b>Data Log #4 File Setup</b>              |  |       |        |     |   |
| 52648-52657                    |          | <b>Data Log #5 File Setup</b>              |  |       |        |     |   |
| 52658-52667                    |          | <b>Data Log #6 File Setup</b>              |  |       |        |     |   |
| 52668-52677                    |          | <b>Data Log #7 File Setup</b>              |  |       |        |     |   |
| 52678-52687                    |          | <b>Data Log #8 File Setup</b>              |  |       |        |     |   |
| 52688-52697                    |          | <b>Data Log #9 File Setup</b>              |  |       |        |     | GOST 13109 compliance statistics          |
| 52698-52707                    |          | <b>Data Log #10 File Setup</b>             |  |       |        |     | GOST 13109 harmonic statistics            |
| 52708-52717                    |          | <b>Data Log #11 File Setup</b>             |  |       |        |     |   |
| 52718-52727                    |          | <b>Data Log #12 File Setup</b>             |  |       |        |     |   |
| 52728-52737                    |          | <b>Data Log #13 File Setup</b>             |  |       |        |     |   |
| 52738-52747                    |          | <b>Data Log #14 File Setup</b>             |  |       |        |     |   |
| 52748-52757                    |          | <b>Data Log #15 File Setup</b>             |  |       |        |     |   |
| 52758-52767                    |          | <b>Data Log #16 File Setup</b>             |  |       |        |     |   |
| 52768-52777                    |          | <b>Waveform Log #1 File Setup</b>          |  |       |        |     |   |
| 52778-52787                    |          | <b>Waveform Log #2 File Setup</b>          |  |       |        |     |   |
| 52788-52857                    |          | <b>Reserved</b>                            |  |       |        |     |   |
| 52858-52867                    |          | <b>GOST 13109/32144 PQ Log File Setup</b>  |  |       |        |     |   |
| 52868-53877                    |          | Reserved                                   |  |       |        |     |   |
| <b>Waveform Recorder Setup</b> |          |  |  |       |        |     |   |
| 53878-53949                    |          |  |  |       |        |     |   |
| +0                             |          | Sampling rate, samples per cycle           | 32, 64, 128  |       | UINT16 | R/W | Ignored when written                      |
| +1                             |          | Number of cycles per series                | 16-2560 (32 samples/cycle),<br>8-1280 (64 samples/cycle),<br>4-640 (128 samples/cycle)   |       | UINT16 | R/W |   |
| +3                             |          | Not used                                   | 0  |       | UINT16 | R/W |   |
| +4                             |          | Number of cycles before a trigger          | 1-20   |       | UINT16 | R/W |   |
| +4,5                           |          | File channel mask, bitmap                  | F9, 0x00000033   |       | UINT32 | R/W | Ignored when written                      |
| +6,7                           |          | Not used                                   | 0  |       | UINT32 | R/W |   |

| Address                        | Point ID | Description                   | Options/Range | Units | Type   | R/W | Notes                          |
|--------------------------------|----------|-------------------------------|---------------|-------|--------|-----|--------------------------------|
| 53878-53885                    |          | <b>Waveform Log #1 Setup</b>  |               |       |        |     |                                |
| 53886-53893                    |          | <b>Waveform Log #2 Setup</b>  |               |       |        |     |                                |
| <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>     |               |       |        |     |                                |
| <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 |                                |

| Address                   | Point ID | Description                                    | Options/Range   | Units | Type   | R/W | Notes |
|---------------------------|----------|--|---|-------|--------|-----|-------|
| +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>Daily profile #1: Season 1, Day type 1</b>  |   |       |        |     |       |
| 55582-55589               |          | <b>Daily profile #2: Season 1, Day type 2</b>  |   |       |        |     |       |
| 55590-55597               |          | <b>Daily profile #3: Season 1, Day type 3</b>  |   |       |        |     |       |
| 55598-55605               |          | <b>Daily profile #4: Season 1, Day type 4</b>  |   |       |        |     |       |
| 55606-55613               |          | <b>Daily profile #5: Season 2, Day type 1</b>  |   |       |        |     |       |
| 55614-55621               |          | <b>Daily profile #6: Season 2, Day type 2</b>  |   |       |        |     |       |
| 55622-55629               |          | <b>Daily profile #7: Season 2, Day type 3</b>  |   |       |        |     |       |
| 55630-55637               |          | <b>Daily profile #8: Season 2, Day type 4</b>  |   |       |        |     |       |
| 55638-55645               |          | <b>Daily profile #9: Season 3, Day type 1</b>  |   |       |        |     |       |
| 55646-55653               |          | <b>Daily profile #10: Season 3, Day type 2</b> |   |       |        |     |       |
| 55654-55661               |          | <b>Daily profile #11: Season 3, Day type 3</b> |   |       |        |     |       |
| 55662-55669               |          | <b>Daily profile #12: Season 3, Day type 4</b> |   |       |        |     |       |
| 55670-55677               |          | <b>Daily profile #13: Season 4, Day type 1</b> |   |       |        |     |       |
| 55678-55685               |          | <b>Daily profile #14: Season 4, Day type 2</b> |   |       |        |     |       |
| 55686-55693               |          | <b>Daily profile #15: Season 4, Day type 3</b> |   |       |        |     |       |
| 55694-55701               |          | <b>Daily profile #16: Season 4, Day type 4</b> |   |       |        |     |       |
| 55702-55711               |          | Reserved                                       |   |       |        |     |       |
| <b>TOU Calendar Setup</b> |          |  |   |       |        |     |       |
| 55712-56031               |          |  |   |       |        |     |       |
| +0-9                      |          | <b>Calendar entry record</b>                   |   |       |        | R/W |       |
| +0                        |          | Daily profile                                  | 0-3 = Season 1, Day types 0-3<br>4-7 = Season 2, Day types 0-3<br>8-11 = Season 3, Day types 0-3<br>12-15 = Season 4, Day types 0-3 |       | UINT16 | R/W |       |
| +1                        |          | Week of month                                  | 0=all, 1=1st, 2=2nd, 3=3 <sup>rd</sup> , 4=4th,<br>5=last week of the month   |       | UINT16 | R/W |       |
| +2                        |          | Weekday  | 0=all, 1-7 (Sun=1, Sat=7)   |       | UINT16 | R/W |       |
| +3                        |          | Till Weekday                                   | 0=all, 1-7 (Sun=1, Sat=7)   |       | UINT16 | R/W |       |
| +4                        |          | Month  | 0=all, 1-12=January - December  |       | UINT16 | R/W |       |
| +5                        |          | Day of month                                   | 0=all, 1-31= day 1-31   |       | UINT16 | R/W |       |
| +6                        |          | Till Month                                     | 0=all, 1-12=January - December  |       | UINT16 | R/W |       |
| +7                        |          | Till Day of month                              | 0=all, 1-31= day 1-31   |       | UINT16 | R/W |       |
| +8-9                      |          | Not used                                       |   |       | UINT16 | R/W |       |
| 55712-55721               |          | <b>Calendar entry #1</b>                       |   |       |        |     |       |
| 55722-55731               |          | <b>Calendar entry #2</b>                       |   |       |        |     |       |
| 55732-55741               |          | <b>Calendar entry #3</b>                       |   |       |        |     |       |
| ...                       |          |  |   |       |        |     |       |
| 56022-56031               |          | <b>Calendar entry #32</b>                      |   |       |        |     |       |
| 56032-56191               |          | Reserved                                       |   |       |        |     |       |

| Address  | Point ID | Description                    | Options/Range  | Units   | Type   | R/W | Notes |
|--|----------|--------------------------------|--|---------|--------|-----|-------|
| <b>Summary Energy/TOU Registers Setup</b>        |          |                                |  |         |        |     |       |
| 56672-56703                                      |          |                                |  |         |        |     |       |
| +0   |          | Not used                       |  |         | UINT16 | R/W |       |
| +1   |          | Units of measurement           | 0=none, 1=kWh, 2=kvarh, 3=kVAh, 4=m <sup>3</sup> , 5=CF (cubic feet), 6=CCF (hundred cubic feet)   |         | UINT16 | R/W |       |
| +2   |          | Flags (bitmap)                 | Bit 0=1 - TOU enabled<br>Bit 1=1 - Use profile enabled<br>Bit 2=1 - Max. Demand profile enabled<br>Bit 3=1 - Summary (total) profile enabled |         | UINT16 | R/W |       |
| +3   |          | Not used                       | 0  |         | UINT16 | R/W |       |
| 56672-56675                                      |          | <b>Register #1 Setup</b>       |  |         |        |     |       |
| 56676-56679                                      |          | <b>Register #2 Setup</b>       |  |         |        |     |       |
| 56680-56683                                      |          | <b>Register #3 Setup</b>       |  |         |        |     |       |
| 56684-56687                                      |          | <b>Register #4 Setup</b>       |  |         |        |     |       |
| 56688-56691                                      |          | <b>Register #5 Setup</b>       |  |         |        |     |       |
| 56692-56695                                      |          | <b>Register #6 Setup</b>       |  |         |        |     |       |
| 56696-56699                                      |          | <b>Register #7 Setup</b>       |  |         |        |     |       |
| 56700-56703                                      |          | <b>Register #8 Setup</b>       |  |         |        |     |       |
| <b>Summary Energy/TOU Registers Source Setup</b> |          |                                |  |         |        |     |       |
| 56928-57183                                      |          |                                |  |         |        |     |       |
| +0   |          | Energy source ID               | F11  |         | UINT16 | R/W |       |
| +1   |          | Target summary register number | 0-7 = register #1-#8   |         | UINT16 | R/W |       |
| +2,3   |          | Multiplier                     | 0-1000000  | ×0.001  | INT32  | R/W |       |
| 56928-56931                                      |          | <b>Energy Source #1</b>        |  |         |        |     |       |
| 56932-56935                                      |          | <b>Energy Source #2</b>        |  |         |        |     |       |
| 56936-56939                                      |          | <b>Energy Source #3</b>        |  |         |        |     |       |
| 56940-56943                                      |          | <b>Energy Source #4</b>        |  |         |        |     |       |
| 56944-56947                                      |          | <b>Energy Source #5</b>        |  |         |        |     |       |
| 56948-56951                                      |          | <b>Energy Source #6</b>        |  |         |        |     |       |
| 56952-56955                                      |          | <b>Energy Source #7</b>        |  |         |        |     |       |
| 56956-56959                                      |          | <b>Energy Source #8</b>        |  |         |        |     |       |
| <b>Periodic Timers Setup</b>                     |          |                                |  |         |        |     |       |
| 61024-61031                                      |          |                                |  |         |        |     |       |
| +0, 1  |          | Time interval, in seconds      | 0=timer disabled, 1,000-9999,000 ms (1-9999 sec)   | 0.001 s | UINT32 | R/W |       |
| 61024-61025                                      |          | <b>Timer #1 Setup</b>          |  | 0.001 s | UINT32 | R/W |       |
| 61026-61027                                      |          | <b>Timer #2 Setup</b>          |  | 0.001 s | UINT32 | R/W |       |
| 61028-61029                                      |          | <b>Timer #3 Setup</b>          |  | 0.001 s | UINT32 | R/W |       |
| 61030-61031                                      |          | <b>Timer #4 Setup</b>          |  | 0.001 s | UINT32 | R/W |       |

| Address                     | Point ID | Description                | Options/Range   | Units | Type   | R/W | Notes  |
|-----------------------------|----------|----------------------------|---|-------|--------|-----|--|
| <b>Digital Inputs Setup</b> |          |                            |   |       |        |     |  |
| 61728-61743                 |          |                            |   |       |        |     |  |
| +0                          |          | Pulse mode                 | 0 = pulse, 1 = KYZ  |       | UINT16 | R/W |  |
| +1                          |          | Polarity                   | 0 = normal, 1 = inverting   |       | UINT16 | R/W |  |
| +2                          |          | De-bounce time, ms         | 1-1000  |       | UINT16 | R/W | Debounce time will be the same for both inputs |
| +3                          |          | Not used                   |   |       | UINT16 | R/W |  |
| 61728-61731                 |          | <b>DI1 Setup</b>           |   |       |        |     |  |
| 61732-61735                 |          | <b>DI2 Setup</b>           |   |       |        |     |  |
| 61736-61739                 |          | <b>DI3 Setup</b>           |   |       |        |     |  |
| 61740-61743                 |          | <b>DI4 Setup</b>           |   |       |        |     |  |
| <b>Relay Outputs Setup</b>  |          |                            |   |       |        |     |  |
| 61984-62007                 |          |                            |   |       |        |     |  |
| +0                          |          | Operation Mode             | 0=latched, 1=unlatched, 2=pulse, 3=KYZ  |       | UINT16 | R/W |  |
| +1                          |          | Polarity                   | Bit 0 – Polarity:<br>0=normal, 1=inverting,<br>Bit 1 - Retentive mode:<br>0=disabled, 1=enabled |       | UINT16 | R/W |  |
| +2                          |          | Pulse width, ms            | 1-1000  |       | UINT16 | R/W |  |
| +3                          |          | Pulse source ID            | F17   |       | UINT16 | R/W |  |
| +4                          |          | Units per pulse            | 1-10000   | x0.1  | UINT16 | R/W |  |
| +5                          |          | Not used                   |   |       | UINT16 | R/W |  |
| 61984-61989                 |          | <b>RO1 Setup</b>           |   |       |        |     |  |
| 61990-61995                 |          | <b>RO2 Setup</b>           |   |       |        |     |  |
| 61996-62001                 |          | <b>RO3 Setup</b>           |   |       |        |     |  |
| 62002-62007                 |          | <b>RO4 Setup</b>           |   |       |        |     |  |
| <b>Analog Inputs Setup</b>  |          |                            |   |       |        |     |  |
| 62368-62379                 |          |                            |   |       |        |     |  |
| +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)  |   |       | INT32  | R/W |  |
| +4,5                        |          | Full scale value (20/1 mA) |   |       | INT32  | R/W |  |
| 62368-62373                 |          | <b>AI1 Setup</b>           |   |       |        |     |  |
| 62374-62379                 |          | <b>AI2 Setup</b>           |   |       |        |     |  |
| <b>Analog Outputs Setup</b> |          |                            |   |       |        |     |  |
| 62560-62571                 |          |                            |   |       |        |     |  |
| +0                          |          | Output parameter ID        | F18   |       | UINT16 | R/W |  |
| +1                          |          | Not used                   | 0   |       | UINT16 | R/W |  |
| +2,3                        |          | Zero scale value (0/4 mA)  | See Section 3.4   |       | INT32  | R/W |  |
| +4,5                        |          | Full scale value (20/1 mA) | See Section 3.4   |       | INT32  | R/W |  |
| 62560-62565                 |          | <b>AO1 Setup</b>           |   |       |        |     |  |
| 62566-62571                 |          | <b>AO2 Setup</b>           |   |       |        |     |  |



| Address                      | Point ID | Description                   | Options/Range   | Units | Type   | R/W | Notes  |
|------------------------------|----------|-------------------------------|-----------------|-------|--------|-----|--|
| <b>Analog Expander Setup</b> |          |                               |                 |       |        |     |  |
| 62752-62847                  |          |                               |                 |       |        |     | Analog expander outputs settings will not be in effect until the analog expander output is globally enabled through the Device Options setup |
| +0                           |          | Output parameter ID           | F18             |       | UINT16 | R/W |  |
| +1                           |          | Not used                      | 0               |       | UINT16 | R/W |  |
| +2,3                         |          | Zero scale value (0/4 mA)     | See Section 3.4 |       | INT32  | R/W |  |
| +4,5                         |          | Full scale value (20/1 mA)    | See Section 3.4 |       | INT32  | R/W |  |
| 62752-62757                  |          | <b>AX8 #1 Channel 1 Setup</b> |                 |       |        |     |  |
| 62758-62763                  |          | <b>AX8 #1 Channel 2 Setup</b> |                 |       |        |     |  |
| ...                          |          | ...                           |                 |       |        |     |  |
| 62794-62799                  |          | <b>AX8 #1 Channel 8 Setup</b> |                 |       |        |     |  |
| 62800-62805                  |          | <b>AX8 #2 Channel 1 Setup</b> |                 |       |        |     |  |
| 62806-62811                  |          | <b>AX8 #2 Channel 2 Setup</b> |                 |       |        |     |  |
| ...                          |          | ...                           |                 |       |        |     |  |
| 62842-62847                  |          | <b>AX8 #2 Channel 8 Setup</b> |                 |       |        |     |  |

### 3.8 Analog and Digital I/O Configuration

| Address                             | Point ID | Description                        | Options/Range | Units | Type   | R/W | Notes |
|-------------------------------------|----------|------------------------------------|---------------|-------|--------|-----|-------|
| <b>I/O Slots Configuration Info</b> |          |                                    |               |       |        |     |       |
| 63008-63055                         |          |                                    |               |       |        |     |       |
|                                     | +0       | I/O type                           | F29           |       | UINT16 | R   |       |
|                                     | +1       | Number of I/Os on the slot         | 0-4           |       | UINT16 | R   |       |
|                                     | +2       | First I/O number on the slot       | 0             |       | UINT16 | R   |       |
|                                     | +3       | Last I/O number on the slot        | 0-3           |       | UINT16 | R   |       |
| 63008-63011                         |          | <b>DI Slot Configuration</b>       |               |       |        |     |       |
| 63012-63015                         |          | <b>RO Slot Configuration</b>       |               |       |        |     |       |
| 63016-63019                         |          | <b>AI/AO Slot Configuration</b>    |               |       |        |     |       |
| 63020-63055                         |          | Reserved                           |               |       |        |     |       |
| <b>I/O Type Info</b>                |          |                                    |               |       |        |     |       |
| 63056-63119                         |          |                                    |               |       |        |     |       |
|                                     | +0       | Number of I/O slots of this type   | 0-1           |       | UINT16 | R   |       |
|                                     | +1       | Total number of I/O's of this type | 0-4           |       | UINT16 | R   |       |
|                                     | +2       | Number of I/O's in the slot        | 0-4           |       | UINT16 | R   |       |
|                                     | +3       | Not used                           | 0             |       | UINT16 | R   |       |
| 63056-63059                         |          | <b>DI Type Info</b>                |               |       |        |     |       |
| 63060-63063                         |          | <b>RO Type Info</b>                |               |       |        |     |       |
| 63064-63067                         |          | <b>AI Type Info</b>                |               |       |        |     |       |
| 63068-63071                         |          | <b>AO Type Info</b>                |               |       |        |     |       |
| 63076-63119                         |          | Reserved                           |               |       |        |     |       |

### 3.9 File Transfer Registers

| 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<br>3 = set file position<br>5 = reset file position<br>7 = find<br>11 = read file<br>127 = erase file |       | UINT16 | R/W | 1 - clears the file transfer block<br>3 - changes the file position<br>5 - sets the file position at the first (oldest) record<br>7 - finds a record matching an event or/and time (see Note 3)<br>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 |   |
| +7                                  |          | Find key: Event number                           | 1-65535   |       | UINT16 | R/W |   |
| +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                              |          | Not used   |   |       | 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                                |          | Not used   |   |       | 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, like Billing/TOU profile 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, 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 time. 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  | 16            |       | 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  |          | Not used                                       | 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   |                          |
| +20, 21   |          | First record time, fractional seconds          |               | µsec  | UINT32 | R   |                          |
| +22, 23   |          | Null   | 0             |       | UINT32 | R   |                          |

| Address   | Point ID | Description                                    | Options/Range   | Units | Type   | R/W | Notes |
|---|----------|--|---|-------|--------|-----|-------|
| +24, 25   |          | Null   | 0   | µsec  | UINT32 | R   |       |
| +26, 27   |          | Null   | 0   | sec   | UINT32 | R   |       |
| +28, 29   |          | Null   | 0   | µsec  | UINT32 | R   |       |
| +30   |          | Maximum number of records                      | 0-65535   |       | UINT16 | R   |       |
| +31   |          | Number of parameters per data section record   | 0-16  |       | 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  |          | Not used                                       | 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  |          | Not used                                       | 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,<br>40 for GOST 13109 Compliance log,<br>80 for GOST 13109 Harmonics log,<br>42 for GOST 32144 Compliance log,<br>80 for GOST 32144 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                              |          | Not used                                      | 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                              |          | Not used                                      | 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   |           | UINT16 | R   |       |
| +2                              |          | Section number                                | 0-7  |           | UINT16 | R   |       |
| +3                              |          | Section channel ID                            | F6   |           | UINT16 | R   |       |
| +4                              |          | Number of records in the block                | 1-16   |           | UINT16 | R   |       |
| +5                              |          | Record size, words                            | 8 + 2×Number of parameters   |           | UINT16 | R   |       |
| +6                              |          | Request variation                             | 0 = regular log, 4 = GOST 13109/<br>GOST 32144 online statistics (with<br>file ID = 9, 10) |           | UINT16 | R   |       |
| +7                              |          | Not used                                      | 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                   | 0-65535                         |           | 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 #16</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                                | 17-18, 128 (F2)                 |           | UINT16 | R   |              |
| +2   |          | Section number                         | 0-9                             |           | 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   |          | Not used                               | 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                       | ×0.1 µsec | UINT16 | R   |              |
| +17  |          | Sampling rate, samples/cycle           | 32, 64, 128                     |           | UINT16 | R   |              |
| +18  |          | Sampling frequency                     | 4500-6500                       | ×0.01 Hz  | UINT16 | R   |              |
| +19  |          | Channel offset, sampling units         | 0                               |           | INT16  | R   |              |
| +20, 21                                      |          | Channel multiplier, primary units      | See Generic Data in Section 3.4 |           | UINT32 | R   |              |
| +22  |          | Channel divisor, sampling units        | 32767                           |           | UINT16 | R   |              |
| +23  |          | Length of a sample series, data points | 512                             |           | UINT16 | R   |              |
| +24-127                                      |          | Not used                               | 0                               |           | UINT16 | R   |              |
| +128   |          | <b>Sample Series</b>                   |                                 |           |        |     |              |
| +128-639                                     |          | Sample data series points [0...511]    | -32768 - 32767                  |           | INT16  | R   | <sup>1</sup> |
| <b>Power Quality (PQ) 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                                     | 26                              |           | UINT16 | R   |       |
| +2          |          | Section number                              | 0                               |           | UINT16 | R   |       |
| +3          |          | Section channel ID                          | 0                               |           | UINT16 | R   |       |
| +4          |          | Number of records in the block              | 1-16                            |           | UINT16 | R   |       |
| +5          |          | Record size, words                          | 18                              |           | UINT16 | R   |       |
| +6          |          | Request variation                           | 0                               |           | UINT16 | R   |       |
| +7          |          | Not used                                    | 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         |          | Not used                                    | 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   |       |
| 63160-63179 |          | <b>Record #1</b>                            |                                 |           |        |     |       |
|             |          | ...   |                                 |           |        |     |       |
| 63430-63447 |          | <b>Record #16</b>                           |                                 |           |        |     |       |

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

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

#### NOTES:

1. If a file is read through a TCP connection, your assignments for the transfer 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 file status and pointers before reading file records.
2. 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.



### 3.10 GOST 13109 Compliance Statistics Data Log

| File Channel/ Section | Record Field No. | Point Label  | Point ID | Description <sup>1</sup>   | Range | Units | Type   | Notes |
|-----------------------|------------------|--------------|----------|--|-------|-------|--------|-------|
| 0/0                   |                  |              |          | <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 |       |
| 1/1                   |                  |              |          | <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  |       |

| File Channel/<br>Section | Record Field No. | Point Label  | Point ID | Description <sup>1</sup>   | Range | Units | Type   | Notes |
|--------------------------|------------------|--------------|----------|--|-------|-------|--------|-------|
|                          | 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 |       |
| 2/2                      |                  |              |          | <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 |       |

| File Channel/<br>Section | Record Field No. | Point Label  | Point ID | Description <sup>1</sup>   | Range | Units        | Type   | Notes |
|--------------------------|------------------|--------------|----------|--|-------|--------------|--------|-------|
|                          | 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 |       |
| 3/3                      |                  |              |          | <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 |       |
| 4/4                      |                  |              |          | <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 |       |

| File Channel/<br>Section | Record Field No. | Point Label | Point ID | Description <sup>1</sup>   | Range | Units | Type   | Notes |
|--------------------------|------------------|-------------|----------|--|-------|-------|--------|-------|
|                          | 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 |       |
|                          | 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 |       |
| 5/5                      |                  |             |          | <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 |       |
| 6/6                      |                  |             |          | <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 |       |

| File Channel/<br>Section | Record Field No. | Point Label  | Point ID | Description <sup>1</sup>                                      | Range | Units   | Type   | Notes |
|--------------------------|------------------|--------------|----------|---|-------|---------|--------|-------|
| 7/7                      |                  |              |          | <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 |       |
|                          | 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 |       |
| 8/8                      |                  |              |          | <b>Voltage Dips (indicative statistics)</b>                   |       |         |        |       |
|                          | 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 |       |

| File Channel/<br>Section | Record Field No. | Point Label | Point ID | Description <sup>1</sup>  | Range | Units | Type   | Notes |
|--------------------------|------------------|-------------|----------|---|-------|-------|--------|-------|
|                          | 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 |       |
|                          | 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 |       |
| 9/9                      |                  |             |          | <b>Impulsive Voltages</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 |       |
| 10/10                    |                  |             |          | <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 |       |

| File Channel/<br>Section | Record Field No. | Point Label   | Point ID | Description <sup>1</sup>   | Range | Units | Type   | Notes |
|--------------------------|------------------|---------------|----------|--|-------|-------|--------|-------|
|                          | 3                | N13 140%/1s   | 0xC802   | Number of polyphase overvoltages with Ua >140% and duration <=1 s  |       |       | UINT32 |       |
|                          | 4                | N14 160%/1s   | 0xC803   | Number of polyphase overvoltages with Ua >160% and duration <=1 s  |       |       | UINT32 |       |
|                          | 5                | N15 200%/1s   | 0xC804   | Number of polyphase overvoltages with Ua >200% and duration <=1 s  |       |       | UINT32 |       |
|                          | 6                | N21 110%/20s  | 0xC805   | Number of polyphase overvoltages with Ua >110% and duration <=20s  |       |       | UINT32 |       |
|                          | 7                | N22 120%/20s  | 0xC806   | Number of polyphase overvoltages with Ua >120% and duration <=20 s |       |       | UINT32 |       |
|                          | 8                | N23 140%/20s  | 0xC807   | Number of polyphase overvoltages with Ua >140% and duration <=20 s |       |       | UINT32 |       |
|                          | 9                | N24 160%/20s  | 0xC808   | Number of polyphase overvoltages with Ua >160% and duration <=20 s |       |       | UINT32 |       |
|                          | 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 Channel/ Section | Record Field No. | Point Label | Point ID | Description <sup>1</sup>   | Range | Units | Type   | Notes |
|-----------------------|------------------|-------------|----------|--|-------|-------|--------|-------|
| 0/0                   |                  |             |          | <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 |       |
|                       | 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 |       |
| 1/1                   |                  |             |          | <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 |       |
| 2/2                   |                  |             |          | <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 |       |
| 3/3                   |                  |             |          | <b>V1 Harmonic Components</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 |       |



| File Channel/<br>Section | Record Field No. | Point Label | Point ID | Description <sup>1</sup>                                    | Range | Units | Type   | Notes |
|--------------------------|------------------|-------------|----------|---|-------|-------|--------|-------|
|                          | 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 |       |
| 4/4                      |                  |             |          | <b>V2 Harmonic Components</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 |       |
|                          | 78               | %H40 max2   | 0xCCCD   | Maximum daily value of H40 on phase B/BC, %                 |       | 0.01% | UINT32 |       |
| 5/5                      |                  |             |          | <b>V3 Harmonic Components</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   | 0xCCCD   | 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 GOST 32144 Compliance Statistics Data Log

| File Channel/ Section | Record Field No. | Point Label  | Point ID | Description <sup>1</sup>  | Range | Units   | Type   | Notes |
|-----------------------|------------------|--------------|----------|---|-------|---------|--------|-------|
| 0/0                   |                  |              |          | <b>Frequency Variation</b>  |       |         |        |       |
|                       | 1                | Nnv          | 0xCE00   | Number of non-valid 10-sec intervals                              |       |         | UINT32 |       |
|                       | 2                | N            | 0xCE01   | Number of valid 10-sec intervals                                  |       |         | UINT32 |       |
|                       | 3                | N1           | 0xCE02   | Number of values exceeded 95% permissible limit                   |       |         | UINT32 |       |
|                       | 4                | N2           | 0xCE03   | Number of values exceeded maximum permissible limit               |       |         | UINT32 |       |
|                       | 5                | df min1      | 0xCE04   | Minimum 95% probability weekly frequency variation, +/-Hz         |       | 0.01 Hz | INT32  |       |
|                       | 6                | df max1      | 0xCE05   | Maximum 95% probability weekly frequency variation, +/-Hz         |       | 0.01 Hz | INT32  |       |
|                       | 7                | df min2      | 0xCE06   | Minimum weekly frequency variation, +/-Hz                         |       | 0.01 Hz | INT32  |       |
|                       | 8                | df max2      | 0xCE07   | Maximum weekly frequency variation, +/-Hz                         |       | 0.01 Hz | INT32  |       |
|                       | 9                | df lim1 high | 0xCE08   | High 95% permissible limit of frequency variation, Hz             |       | 0.01 Hz | INT32  |       |
|                       | 10               | df lim2 high | 0xCE09   | High maximum permissible limit of frequency variation, Hz         |       | 0.01 Hz | INT32  |       |
|                       | 11               | df lim1 low  | 0xCE0A   | Low 95% permissible limit of frequency variation, Hz              |       | 0.01 Hz | INT32  |       |
|                       | 12               | df lim2 low  | 0xCE0B   | Low maximum permissible limit of frequency variation, Hz          |       | 0.01 Hz | INT32  |       |
| 1/1                   |                  |              |          | <b>Voltage Variation, peak load</b>                               |       |         |        |       |
|                       | 1                | Nnv          | 0xCE80   | Number of non-valid 10-min intervals                              |       |         | UINT32 |       |
|                       | 2                | N            | 0xCE81   | Number of valid 10-min intervals                                  |       |         | UINT32 |       |
|                       | 3                | V1 N1        | 0xCE82   | Number of values exceeded maximum permissible limit on phase A/AB |       |         | UINT32 |       |
|                       | 4                | V1 dU min    | 0xCE83   | Minimum weekly variation on phase A/AB, +/-%Un                    |       | 0.01%   | INT32  |       |
|                       | 5                | V1 dU max    | 0xCE84   | Maximum weekly variation on phase A/AB, +/-%Un                    |       | 0.01%   | INT32  |       |
|                       | 6                | V2 N1        | 0xCE85   | Number of values exceeded maximum permissible limit on phase B/BC |       |         | UINT32 |       |
|                       | 7                | V2 dU min    | 0xCE86   | Minimum weekly variation on phase B/BC, +/-%Un                    |       | 0.01%   | INT32  |       |
|                       | 8                | V2 dU max    | 0xCE87   | Maximum weekly variation on phase B/BC, +/-%Un                    |       | 0.01%   | INT32  |       |
|                       | 9                | V3 N1        | 0xCE88   | Number of values exceeded maximum permissible limit on phase C/CA |       |         | UINT32 |       |
|                       | 10               | V3 dU min    | 0xCE89   | Minimum weekly variation on phase C/CA, +/-%Un                    |       | 0.01%   | INT32  |       |
|                       | 11               | V3 dU max    | 0xCE8A   | Maximum weekly variation on phase C/CA, +/-%Un                    |       | 0.01%   | INT32  |       |
|                       | 12               | dU lim high  | 0xCE8B   | High maximum permissible limit of voltage variation, %Un          |       | 0.01%   | INT32  |       |
|                       | 13               | dU lim low   | 0xCE8C   | Low maximum permissible limit of voltage variation, %Un           |       | 0.01%   | INT32  |       |
| 2/2                   |                  |              |          | <b>Rapid Voltage Changes</b>                                      |       |         |        |       |
|                       | 1                | N1           | 0xCF00   | Number of polyphase incidents                                     |       |         | UINT32 |       |
|                       | 2                | V1 N1        | 0xCF01   | Number of incidents on phase A/AB                                 |       |         | UINT32 |       |
|                       | 3                | V1 dU        | 0xCF02   | Maximum voltage change on phase A/AB, %Un                         |       | 0.01%   | UINT32 |       |
|                       | 4                | V2 N1        | 0xCF03   | Number of incidents on phase B/BC                                 |       |         | UINT32 |       |
|                       | 5                | V2 dU        | 0xCF04   | Maximum voltage change on phase B/BC, %Un                         |       | 0.01%   | UINT32 |       |
|                       | 6                | V3 N1        | 0xCF05   | Number of incidents on phase C/CA                                 |       |         | UINT32 |       |
|                       | 7                | V3 dU        | 0xCF06   | Maximum voltage change on phase C/CA, %Un                         |       | 0.01%   | UINT32 |       |
|                       | 8                | dU lim       | 0xCF07   | Maximum permissible limit of voltage changes, Un%                 |       | 0.01%   | UINT32 |       |
| 3/3                   |                  |              |          | <b>Flicker</b>  |       |         |        |       |
|                       | 1                | Pst Nnv      | 0xCF80   | Number of non-valid 10-min intervals                              |       |         | UINT32 |       |

| File Channel/<br>Section | Record Field No. | Point Label | Point ID | Description <sup>1</sup>  | Range | Units | Type   | Notes |
|--------------------------|------------------|-------------|----------|---|-------|-------|--------|-------|
|                          | 2                | Pst N       | 0xCF81   | Number of valid 10-min intervals                                      |       |       | UINT32 |       |
|                          | 3                | V1 Pst N1   | 0xCF82   | Number of Pst values exceeded maximum permissible limit on phase A/AB |       |       | UINT32 |       |
|                          | 4                | V1 Pst max  | 0xCF83   | Maximum Pst on phase A/AB   |       | 0.01  | UINT32 |       |
|                          | 5                | V2 Pst N1   | 0xCF84   | Number of Pst values exceeded maximum permissible limit on phase B/BC |       |       | UINT32 |       |
|                          | 6                | V2 Pst max  | 0xCF85   | Maximum Pst on phase B/BC   |       | 0.01  | UINT32 |       |
|                          | 7                | V3 Pst N1   | 0xCF86   | Number of Pst values exceeded maximum permissible limit on phase C/CA |       |       | UINT32 |       |
|                          | 8                | V3 Pst max  | 0xCF87   | Maximum Pst on phase C/CA   |       | 0.01  | UINT32 |       |
|                          | 9                | Pst lim     | 0xCF88   | Maximum permissible limit for Pst                                     |       | 0.01  | UINT32 |       |
|                          | 10               | Plt Nnv     | 0xCF89   | Number of non-valid 2-hour intervals                                  |       |       | UINT32 |       |
|                          | 11               | Plt N       | 0xCF8A   | Number of valid 2-hour intervals                                      |       |       | UINT32 |       |
|                          | 12               | V1 Plt N1   | 0xCF8B   | Number of Plt values exceeded maximum permissible limit on phase A/AB |       |       | UINT32 |       |
|                          | 13               | V1 Plt max  | 0xCF8C   | Maximum Plt on phase A/AB   |       | 0.01  | UINT32 |       |
|                          | 14               | V2 Plt N1   | 0xCF8D   | Number of Plt values exceeded maximum permissible limit on phase B/BC |       |       | UINT32 |       |
|                          | 15               | V2 Plt max  | 0xCF8E   | Maximum Plt on phase B/BC   |       | 0.01  | UINT32 |       |
|                          | 16               | V3 Plt N1   | 0xCF8F   | Number of Plt values exceeded maximum permissible limit on phase C/CA |       |       | UINT32 |       |
|                          | 17               | V3 Plt max  | 0xCF90   | Maximum Plt on phase C/CA   |       | 0.01  | UINT32 |       |
|                          | 18               | Plt lim     | 0xCF91   | Maximum permissible limit for Plt                                     |       | 0.01  | UINT32 |       |
| 4/4                      |                  |             |          | <b>Voltage THD</b>  |       |       |        |       |
|                          | 1                | Nnv         | 0xD000   | Number of non-valid 10-min intervals                                  |       |       | UINT32 |       |
|                          | 2                | N           | 0xD001   | Number of valid 10-min intervals                                      |       |       | UINT32 |       |
|                          | 3                | V1 N1       | 0xD002   | Number of THD values exceeded 95% permissible limit on phase A/AB     |       |       | UINT32 |       |
|                          | 4                | V1 N2       | 0xD003   | Number of THD values exceeded maximum permissible limit on phase A/AB |       |       | UINT32 |       |
|                          | 5                | V1 THD max1 | 0xD004   | Maximum 95% probability weekly THD on phase A/AB, %                   |       | 0.1%  | UINT32 |       |
|                          | 6                | V1 THD max2 | 0xD005   | Maximum weekly THD on phase A/AB, %                                   |       | 0.1%  | UINT32 |       |
|                          | 7                | V2 N1       | 0xD006   | Number of THD values exceeded 95% permissible limit on phase B/BC     |       |       | UINT32 |       |
|                          | 8                | V2 N2       | 0xD007   | Number of THD values exceeded maximum permissible limit on phase B/BC |       |       | UINT32 |       |
|                          | 9                | V2 THD max1 | 0xD008   | Maximum 95% probability weekly THD on phase B/BC, %                   |       | 0.1%  | UINT32 |       |
|                          | 10               | V2 THD max2 | 0xD009   | Maximum weekly THD on phase B/BC, %                                   |       | 0.1%  | UINT32 |       |
|                          | 11               | V3 N1       | 0xD00A   | Number of THD values exceeded 95% permissible limit on phase C/CA     |       |       | UINT32 |       |
|                          | 12               | V3 N2       | 0xD00B   | Number of THD values exceeded maximum permissible limit on phase C/CA |       |       | UINT32 |       |
|                          | 13               | V3 THD max1 | 0xD00C   | Maximum 95% probability weekly THD on phase C/CA, %                   |       | 0.1%  | UINT32 |       |
|                          | 14               | V3 THD max2 | 0xD00D   | Maximum weekly THD on phase C/CA, %                                   |       | 0.1%  | UINT32 |       |
|                          | 15               | THD lim1    | 0xD00E   | 95% permissible limit of THD, %                                       |       | 0.1%  | UINT32 |       |
|                          | 16               | THD lim2    | 0xD00F   | Maximum permissible limit of THD, %                                   |       | 0.1%  | UINT32 |       |
| 5/5                      |                  |             |          | <b>Voltage Unbalance</b>  |       |       |        |       |
|                          | 1                | Nnv         | 0xD100   | Number of non-valid 10-min intervals                                  |       |       | UINT32 |       |
|                          | 2                | N           | 0xD101   | Number of valid 10-min intervals                                      |       |       | UINT32 |       |
|                          | 3                | K2u N1      | 0xD102   | Number of negative-sequence values exceeded 95% permissible limit     |       |       | UINT32 |       |
|                          | 4                | K2u N2      | 0xD103   | Number of negative-sequence values exceeded maximum permissible limit |       |       | UINT32 |       |
|                          | 5                | K2u max1    | 0xD104   | Maximum 95% probability weekly negative-sequence unbalance, %         |       | 0.1%  | UINT32 |       |
|                          | 6                | K2u max2    | 0xD105   | Maximum weekly negative-sequence unbalance, %                         |       | 0.1%  | UINT32 |       |

| File Channel/<br>Section | Record Field No. | Point Label | Point ID | Description <sup>1</sup>  | Range | Units  | Type   | Notes |
|--------------------------|------------------|-------------|----------|---|-------|--------|--------|-------|
|                          | 7                | K2u lim1    | 0xD106   | 95% permissible limit of negative-sequence unbalance, %           |       | 0.1%   | UINT32 |       |
|                          | 8                | K2u lim2    | 0xD107   | Maximum permissible limit of negative-sequence unbalance, %       |       | 0.1%   | UINT32 |       |
|                          | 9                | K0u N1      | 0xD108   | Number of zero-sequence values exceeded 95% permissible limit     |       |        | UINT32 |       |
|                          | 10               | K0u N2      | 0xD109   | Number of zero-sequence values exceeded maximum permissible limit |       |        | UINT32 |       |
|                          | 11               | K0u max1    | 0xD10A   | Maximum 95% probability weekly zero-sequence unbalance, %         |       | 0.1%   | UINT32 |       |
|                          | 12               | K0u max2    | 0xD10B   | Maximum weekly zero-sequence unbalance, %                         |       | 0.1%   | UINT32 |       |
|                          | 13               | K0u lim1    | 0xD10C   | 95% permissible limit of zero-sequence unbalance, %               |       | 0.1%   | UINT32 |       |
|                          | 14               | K0u lim2    | 0xD10D   | Maximum permissible limit of zero-sequence unbalance, %           |       | 0.1%   | UINT32 |       |
| 6/6                      |                  |             |          | <b>Signaling Voltage</b>  |       |        |        |       |
|                          | 1                | Nnv         | 0xD080   | Number of non-valid 3-sec intervals                               |       |        | UINT32 |       |
|                          | 2                | N           | 0xD081   | Number of valid 3-sec intervals                                   |       |        | UINT32 |       |
|                          | 3                | N1          | 0xD082   | Number of polyphase incidents, N1                                 |       |        | UINT32 |       |
|                          | 4                | V1 Sig1     | 0xD083   | Maximum 1st signaling voltage magnitude on phase V1, %Un          |       | 0.01%  | UINT32 |       |
|                          | 5                | V1 Sig2     | 0xD084   | Maximum 2nd signaling voltage magnitude on phase V1, %Un          |       | 0.01%  | UINT32 |       |
|                          | 6                | V1 Sig3     | 0xD085   | Maximum 3rd signaling voltage magnitude on phase V1, %Un          |       | 0.01%  | UINT32 |       |
|                          | 7                | V1 Sig4     | 0xD086   | Maximum 4th signaling voltage magnitude on phase V1, %Un          |       | 0.01%  | UINT32 |       |
|                          | 8                | V2 Sig1     | 0xD087   | Maximum 1st signaling voltage magnitude on phase V2, %Un          |       | 0.01%  | UINT32 |       |
|                          | 9                | V2 Sig2     | 0xD088   | Maximum 2nd signaling voltage magnitude on phase V2, %Un          |       | 0.01%  | UINT32 |       |
|                          | 10               | V2 Sig3     | 0xD089   | Maximum 3rd signaling voltage magnitude on phase V2, %Un          |       | 0.01%  | UINT32 |       |
|                          | 11               | V2 Sig4     | 0xD08A   | Maximum 4th signaling voltage magnitude on phase V2, %Un          |       | 0.01%  | UINT32 |       |
|                          | 12               | V3 Sig1     | 0xD08B   | Maximum 1st signaling voltage magnitude on phase V3, %Un          |       | 0.01%  | UINT32 |       |
|                          | 13               | V3 Sig2     | 0xD08C   | Maximum 2nd signaling voltage magnitude on phase V3, %Un          |       | 0.01%  | UINT32 |       |
|                          | 14               | V3 Sig3     | 0xD08D   | Maximum 3rd signaling voltage magnitude on phase V3, %Un          |       | 0.01%  | UINT32 |       |
|                          | 15               | V3 Sig4     | 0xD08E   | Maximum 4th signaling voltage magnitude on phase V3, %Un          |       | 0.01%  | UINT32 |       |
|                          | 16               | Sig1 frq    | 0xD08F   | 1st signaling frequency   |       | 0.01Hz | UINT32 |       |
|                          | 17               | Sig2 frq    | 0xD090   | 2nd signaling frequency   |       | 0.01Hz | UINT32 |       |
|                          | 18               | Sig3 frq    | 0xD091   | 3rd signaling frequency   |       | 0.01Hz | UINT32 |       |
|                          | 19               | Sig4 frq    | 0xD092   | 4th signaling frequency   |       | 0.01Hz | UINT32 |       |
|                          | 20               | V Sig1 lim  | 0xD093   | Maximum permissible 1st signaling voltage magnitude, %Un          |       | 0.01%  | UINT32 |       |
|                          | 21               | V Sig2 lim  | 0xD094   | Maximum permissible 2nd signaling voltage magnitude, %Un          |       | 0.01%  | UINT32 |       |
|                          | 22               | V Sig3 lim  | 0xD095   | Maximum permissible 3rd signaling voltage magnitude, %Un          |       | 0.01%  | UINT32 |       |
|                          | 23               | V Sig4 lim  | 0xD096   | Maximum permissible 4th signaling voltage magnitude, %Un          |       | 0.01%  | UINT32 |       |
| 7/7                      |                  |             |          | <b>Voltage Interruptions</b> (indicative statistics)              |       |        |        |       |
|                          | 1                | N1 0,5s     | 0xD180   | Number of polyphase interruptions <=500ms                         |       |        | UINT32 |       |
|                          | 2                | N2 1s       | 0xD181   | Number of polyphase interruptions <=1s                            |       |        | UINT32 |       |
|                          | 3                | N3 5s       | 0xD182   | Number of polyphase interruptions <=5s                            |       |        | UINT32 |       |
|                          | 4                | N4 20s      | 0xD183   | Number of polyphase interruptions <=20s                           |       |        | UINT32 |       |
|                          | 5                | N5 60s      | 0xD184   | Number of polyphase interruptions <=60s                           |       |        | UINT32 |       |
|                          | 6                | N6 180s     | 0xD185   | Number of polyphase interruptions <=180s                          |       |        | UINT32 |       |
|                          | 7                | N7 >180s    | 0xD186   | Number of polyphase interruptions >180s                           |       |        | UINT32 |       |
|                          | 8                | V min       | 0xD187   | Minimum residual voltage, %Un                                     |       | 0.01%  | UINT32 |       |

| File Channel/<br>Section | Record Field No. | Point Label  | Point ID | Description <sup>1</sup>  | Range | Units | Type   | Notes |
|--------------------------|------------------|--------------|----------|---|-------|-------|--------|-------|
|                          | 9                | dt max       | 0xD188   | Maximum duration of a polyphase interruption                          |       | ms    | UINT32 |       |
|                          | 10               | dt tot       | 0xD189   | Total duration of polyphase interruptions                             |       | ms    | UINT32 |       |
| 8/8                      |                  |              |          | <b>Voltage Dips</b> (indicative statistics)                           |       |       |        |       |
|                          | 1                | N11 90%/0,2s | 0xD200   | Number of polyphase dips <90% and duration <=0.2 s                    |       |       | UINT32 |       |
|                          | 2                | N12 90%/0,5s | 0xD205   | Number of polyphase dips <90% and duration <=0.5 s                    |       |       | UINT32 |       |
|                          | 3                | N13 90%/1s   | 0xD20A   | Number of polyphase dips <90% and duration <=1 s                      |       |       | UINT32 |       |
|                          | 4                | N14 90%/5s   | 0xD20F   | Number of polyphase dips <90% and duration <=5 s                      |       |       | UINT32 |       |
|                          | 5                | N15 90%/20s  | 0xD214   | Number of polyphase dips <90% and duration <=20 s                     |       |       | UINT32 |       |
|                          | 6                | N16 90%/60s  | 0xD219   | Number of polyphase dips <90% and duration <=60 s                     |       |       | UINT32 |       |
|                          | 7                | N21 85%/0,2s | 0xD201   | Number of polyphase dips <85% and duration <=0.2 s                    |       |       | UINT32 |       |
|                          | 8                | N22 85%/0,5s | 0xD206   | Number of polyphase dips <85% and duration <=0.5 s                    |       |       | UINT32 |       |
|                          | 9                | N23 85%/1s   | 0xD20B   | Number of polyphase dips <85% and duration <=1 s                      |       |       | UINT32 |       |
|                          | 10               | N24 85%/5s   | 0xD210   | Number of polyphase dips <85% and duration <=5 s                      |       |       | UINT32 |       |
|                          | 11               | N25 85%/20s  | 0xD215   | Number of polyphase dips <85% and duration <=20 s                     |       |       | UINT32 |       |
|                          | 12               | N26 85%/60s  | 0xD21A   | Number of polyphase dips <85% and duration <=60 s                     |       |       | UINT32 |       |
|                          | 13               | N31 70%/0,2s | 0xD202   | Number of polyphase dips <70% and duration <=0.2 s                    |       |       | UINT32 |       |
|                          | 14               | N32 70%/0,5s | 0xD207   | Number of polyphase dips <70% and duration <=0.5 s                    |       |       | UINT32 |       |
|                          | 15               | N33 70%/1s   | 0xD20C   | Number of polyphase dips <70% and duration <=1 s                      |       |       | UINT32 |       |
|                          | 16               | N34 70%/5s   | 0xD211   | Number of polyphase dips <70% and duration <=5 s                      |       |       | UINT32 |       |
|                          | 17               | N35 70%/20s  | 0xD216   | Number of polyphase dips <70% and duration <=20 s                     |       |       | UINT32 |       |
|                          | 18               | N36 70%/60s  | 0xD21B   | Number of polyphase dips <70% and duration <=60 s                     |       |       | UINT32 |       |
|                          | 19               | N41 40%/0,2s | 0xD203   | Number of polyphase dips <40% and duration <=0.2 s                    |       |       | UINT32 |       |
|                          | 20               | N42 40%/0,5s | 0xD208   | Number of polyphase dips <40% and duration <=0.5 s                    |       |       | UINT32 |       |
|                          | 21               | N43 40%/1s   | 0xD20D   | Number of polyphase dips <40% and duration <=1 s                      |       |       | UINT32 |       |
|                          | 22               | N44 40%/5s   | 0xD212   | Number of polyphase dips <40% and duration <=5 s                      |       |       | UINT32 |       |
|                          | 23               | N45 40%/20s  | 0xD217   | Number of polyphase dips <40% and duration <=20 s                     |       |       | UINT32 |       |
|                          | 24               | N46 40%/60s  | 0xD21C   | Number of polyphase dips <40% and duration <=60 s                     |       |       | UINT32 |       |
|                          | 25               | N51 10%/0,2s | 0xD204   | Number of polyphase dips <10% and duration <=0.2 s                    |       |       | UINT32 |       |
|                          | 26               | N52 10%/0,5s | 0xD209   | Number of polyphase dips <10% and duration <=0.5 s                    |       |       | UINT32 |       |
|                          | 27               | N53 10%/1s   | 0xD20E   | Number of polyphase dips <10% and duration <=1 s                      |       |       | UINT32 |       |
|                          | 28               | N54 10%/5s   | 0xD213   | Number of polyphase dips <10% and duration <=5 s                      |       |       | UINT32 |       |
|                          | 29               | N55 10%/20s  | 0xD218   | Number of polyphase dips <10% and duration <=20 s                     |       |       | UINT32 |       |
|                          | 30               | N56 10%/60s  | 0xD21D   | Number of polyphase dips <10% and duration <=60 s                     |       |       | UINT32 |       |
|                          | 31               | dt max 90%   | 0xD21E   | Maximum duration of a polyphase dip < 90%                             |       | ms    | UINT32 |       |
|                          | 32               | dt max 85%   | 0xD21F   | Maximum duration of a polyphase dip < 85%                             |       | ms    | UINT32 |       |
|                          | 33               | dt max 70%   | 0xD220   | Maximum duration of a polyphase dip < 70%                             |       | ms    | UINT32 |       |
|                          | 34               | dt max 40%   | 0xD221   | Maximum duration of a polyphase dip < 40%                             |       | ms    | UINT32 |       |
|                          | 35               | dt max 10%   | 0xD222   | Maximum duration of a polyphase dip < 10%                             |       | ms    | UINT32 |       |
|                          | 36               | V min 0.2s   | 0xD223   | Minimum residual voltage of polyphase dips with duration <=0.2 s, %Un |       | 0.01% | UINT32 |       |
|                          | 37               | V min 0.5s   | 0xD224   | Minimum residual voltage of polyphase dips with duration <=0.5 s, %Un |       | 0.01% | UINT32 |       |
|                          | 38               | V min 1s     | 0xD225   | Minimum residual voltage of polyphase dips with duration <=1 s, %Un   |       | 0.01% | UINT32 |       |

| File Channel/<br>Section | Record Field No. | Point Label   | Point ID | Description <sup>1</sup>   | Range | Units | Type   | Notes |
|--------------------------|------------------|---------------|----------|--|-------|-------|--------|-------|
|                          | 39               | V min 5s      | 0xD226   | Minimum residual voltage of polyphase dips with duration <=5 s, %Un  |       | 0.01% | UINT32 |       |
|                          | 40               | V min 20s     | 0xD227   | Minimum residual voltage of polyphase dips with duration <=20 s, %Un |       | 0.01% | UINT32 |       |
|                          | 41               | V min 60s     | 0xD228   | Minimum residual voltage of polyphase dips with duration <=60 s, %Un |       | 0.01% | UINT32 |       |
|                          | 42               | dt tot        | 0xD229   | Total duration of polyphase dips                                     |       | ms    | UINT32 |       |
| 9/9                      |                  |               |          | <b>Voltage Swells</b> (indicative statistics)                        |       |       |        |       |
|                          | 1                | N11 110%/0,2s | 0xD280   | Number of polyphase swells >110% and duration <=0.2 s                |       |       | UINT32 |       |
|                          | 2                | N12 110%/0,5s | 0xD284   | Number of polyphase swells >110% and duration <=0.5 s                |       |       | UINT32 |       |
|                          | 3                | N13 110%/1s   | 0xD288   | Number of polyphase swells >110% and duration <=1 s                  |       |       | UINT32 |       |
|                          | 4                | N14 110%/5s   | 0xD28C   | Number of polyphase swells >110% and duration <=5 s                  |       |       | UINT32 |       |
|                          | 5                | N15 110%/20s  | 0xD290   | Number of polyphase swells >110% and duration <=20 s                 |       |       | UINT32 |       |
|                          | 6                | N16 110%/60s  | 0xD294   | Number of polyphase swells >110% and duration <=60 s                 |       |       | UINT32 |       |
|                          | 7                | N21 120%/0,2s | 0xD281   | Number of polyphase swells >120% and duration <=0.2 s                |       |       | UINT32 |       |
|                          | 8                | N22 120%/0,5s | 0xD285   | Number of polyphase swells >120% and duration <=0.5 s                |       |       | UINT32 |       |
|                          | 9                | N23 120%/1s   | 0xD289   | Number of polyphase swells >120% and duration <=1 s                  |       |       | UINT32 |       |
|                          | 10               | N24 120%/5s   | 0xD28D   | Number of polyphase swells >120% and duration <=5 s                  |       |       | UINT32 |       |
|                          | 11               | N25 120%/20s  | 0xD291   | Number of polyphase swells >120% and duration <=20 s                 |       |       | UINT32 |       |
|                          | 12               | N26 120%/60s  | 0xD295   | Number of polyphase swells >120% and duration <=60 s                 |       |       | UINT32 |       |
|                          | 13               | N31 140%/0,2s | 0xD282   | Number of polyphase swells >140% and duration <=0.2 s                |       |       | UINT32 |       |
|                          | 14               | N32 140%/0,5s | 0xD286   | Number of polyphase swells >140% and duration <=0.5 s                |       |       | UINT32 |       |
|                          | 15               | N33 140%/1s   | 0xD28A   | Number of polyphase swells >140% and duration <=1 s                  |       |       | UINT32 |       |
|                          | 16               | N34 140%/5s   | 0xD28E   | Number of polyphase swells >140% and duration <=5 s                  |       |       | UINT32 |       |
|                          | 17               | N35 140%/20s  | 0xD292   | Number of polyphase swells >140% and duration <=20 s                 |       |       | UINT32 |       |
|                          | 18               | N36 140%/60s  | 0xD296   | Number of polyphase swells >140% and duration <=60 s                 |       |       | UINT32 |       |
|                          | 19               | N41 160%/0,2s | 0xD283   | Number of polyphase swells >160% and duration <=0.2 s                |       |       | UINT32 |       |
|                          | 20               | N42 160%/0,5s | 0xD287   | Number of polyphase swells >160% and duration <=0.5 s                |       |       | UINT32 |       |
|                          | 21               | N43 160%/1s   | 0xD28B   | Number of polyphase swells >160% and duration <=1 s                  |       |       | UINT32 |       |
|                          | 22               | N44 160%/5s   | 0xD28F   | Number of polyphase swells >160% and duration <=5 s                  |       |       | UINT32 |       |
|                          | 23               | N45 160%/20s  | 0xD293   | Number of polyphase swells >160% and duration <=20 s                 |       |       | UINT32 |       |
|                          | 24               | N46 160%/60s  | 0xD297   | Number of polyphase swells >160% and duration <=60 s                 |       |       | UINT32 |       |
|                          | 25               | dt max 110%   | 0xD298   | Maximum duration of polyphase swells with >110%                      |       | ms    | UINT32 |       |
|                          | 26               | dt max 120%   | 0xD299   | Maximum duration of polyphase swells with >120%                      |       | ms    | UINT32 |       |
|                          | 27               | dt max 140%   | 0xD29A   | Maximum duration of polyphase swells with >140%                      |       | ms    | UINT32 |       |
|                          | 28               | dt max 160%   | 0xD29B   | Maximum duration of polyphase swells with >160%                      |       | ms    | UINT32 |       |
|                          | 29               | V max 0,2s    | 0xD29C   | Maximum polyphase swell voltage with duration <=0.2 s, %Un           |       | 0.01% | UINT32 |       |
|                          | 30               | V max 0,5s    | 0xD29D   | Maximum polyphase swell voltage with duration <=0.5 s, %Un           |       | 0.01% | UINT32 |       |
|                          | 31               | V max 1s      | 0xD29E   | Maximum polyphase swell voltage with duration <=1 s, %Un             |       | 0.01% | UINT32 |       |
|                          | 32               | V max 5s      | 0xD29F   | Maximum polyphase swell voltage with duration <=5 s, %Un             |       | 0.01% | UINT32 |       |
|                          | 33               | V max 20s     | 0xD2A0   | Maximum polyphase swell voltage with duration <=20 s, %Un            |       | 0.01% | UINT32 |       |
|                          | 34               | V max 60s     | 0xD2A1   | Maximum polyphase swell voltage with duration <=60 s, %Un            |       | 0.01% | UINT32 |       |
|                          | 35               | dt tot        | 0xD2A2   | Total duration of polyphase swells                                   |       | ms    | UINT32 |       |

| File Channel/<br>Section | Record Field No. | Point Label    | Point ID | Description <sup>1</sup>  | Range | Units | Type   | Notes |
|--------------------------|------------------|----------------|----------|---|-------|-------|--------|-------|
| 10/10                    |                  |                |          | <b>Impulsive Voltages</b> (indicative statistics)                 |       |       |        |       |
|                          | 1                | N11 20%/0,1ms  | 0xD300   | Number of polyphase impulses >20% and duration <=0.1 ms           |       |       | UINT32 |       |
|                          | 2                | N12 20%/0,2ms  | 0xD301   | Number of polyphase impulses >20% and duration <=0.2 ms           |       |       | UINT32 |       |
|                          | 3                | N13 20%/0,5ms  | 0xD302   | Number of polyphase impulses >20% and duration <=0.5 ms           |       |       | UINT32 |       |
|                          | 4                | N14 20%/1ms    | 0xD303   | Number of polyphase impulses >20% and duration <=1 ms             |       |       | UINT32 |       |
|                          | 5                | N15 20%/5ms    | 0xD304   | Number of polyphase impulses >20% and duration <=5 ms             |       |       | UINT32 |       |
|                          | 6                | N16 20%/10ms   | 0xD305   | Number of polyphase impulses >20% and duration <=10 ms            |       |       | UINT32 |       |
|                          | 7                | N21 100%/0,1ms | 0xD306   | Number of polyphase impulses >100% and duration <=0.1 ms          |       |       | UINT32 |       |
|                          | 8                | N22 100%/0,2ms | 0xD307   | Number of polyphase impulses >100% and duration <=0.2 ms          |       |       | UINT32 |       |
|                          | 9                | N23 100%/0,5ms | 0xD308   | Number of polyphase impulses >100% and duration <=0.5 ms          |       |       | UINT32 |       |
|                          | 10               | N24 100%/1ms   | 0xD309   | Number of polyphase impulses >100% and duration <=1 ms            |       |       | UINT32 |       |
|                          | 11               | N25 100%/5ms   | 0xD30A   | Number of polyphase impulses >100% and duration <=5 ms            |       |       | UINT32 |       |
|                          | 12               | N26 100%/10ms  | 0xD30B   | Number of polyphase impulses >100% and duration <=10 ms           |       |       | UINT32 |       |
|                          | 13               | N31 200%/0,1ms | 0xD30C   | Number of polyphase impulses >200% and duration <=0.1 ms          |       |       | UINT32 |       |
|                          | 14               | N32 200%/0,2ms | 0xD30D   | Number of polyphase impulses >200% and duration <=0.2 ms          |       |       | UINT32 |       |
|                          | 15               | N33 200%/0,5ms | 0xD30E   | Number of polyphase impulses >200% and duration <=0.5 ms          |       |       | UINT32 |       |
|                          | 16               | N34 200%/1ms   | 0xD30F   | Number of polyphase impulses >200% and duration <=1 ms            |       |       | UINT32 |       |
|                          | 17               | N35 200%/5ms   | 0xD310   | Number of polyphase impulses >200% and duration <=5 ms            |       |       | UINT32 |       |
|                          | 18               | N36 200%/10ms  | 0xD311   | Number of polyphase impulses >200% and duration <=10 ms           |       |       | UINT32 |       |
|                          | 19               | N41 300%/0,1ms | 0xD312   | Number of polyphase impulses >300% and duration <=0.1 ms          |       |       | UINT32 |       |
|                          | 20               | N42 300%/0,2ms | 0xD313   | Number of polyphase impulses >300% and duration <=0.2 ms          |       |       | UINT32 |       |
|                          | 21               | N43 300%/0,5ms | 0xD314   | Number of polyphase impulses >300% and duration <=0.5 ms          |       |       | UINT32 |       |
|                          | 22               | N44 300%/1ms   | 0xD315   | Number of polyphase impulses >300% and duration <=1 ms            |       |       | UINT32 |       |
|                          | 23               | N45 300%/5ms   | 0xD316   | Number of polyphase impulses >300% and duration <=5 ms            |       |       | UINT32 |       |
|                          | 24               | N46 300%/10ms  | 0xD317   | Number of polyphase impulses >300% and duration <=10 ms           |       |       | UINT32 |       |
|                          | 25               | N51 400%/0,1ms | 0xD318   | Number of polyphase impulses >400% and duration <=0.1 ms          |       |       | UINT32 |       |
|                          | 26               | N52 400%/0,2ms | 0xD319   | Number of polyphase impulses >400% and duration <=0.2 ms          |       |       | UINT32 |       |
|                          | 27               | N53 400%/0,5ms | 0xD31A   | Number of polyphase impulses >400% and duration <=0.5 ms          |       |       | UINT32 |       |
|                          | 28               | N54 400%/1ms   | 0xD31B   | Number of polyphase impulses >400% and duration <=1 ms            |       |       | UINT32 |       |
|                          | 29               | N55 400%/5ms   | 0xD31C   | Number of polyphase impulses >400% and duration <=5 ms            |       |       | UINT32 |       |
|                          | 30               | N56 400%/10ms  | 0xD31D   | Number of polyphase impulses >400% and duration <=10 ms           |       |       | UINT32 |       |
|                          | 31               | V max 0,1ms    | 0xD31E   | Maximum impulsive voltage with duration <=0.1 ms, %Un peak        |       | 0.01% | UINT32 |       |
|                          | 32               | V max 0,2ms    | 0xD31F   | Maximum impulsive voltage with duration <=0.2 ms, %Un peak        |       | 0.01% | UINT32 |       |
|                          | 33               | V max 0,5ms    | 0xD320   | Maximum impulsive voltage with duration <=0.5 ms, %Un peak        |       | 0.01% | UINT32 |       |
|                          | 34               | V max 1ms      | 0xD321   | Maximum impulsive voltage with duration <=1 ms, %Un peak          |       | 0.01% | UINT32 |       |
|                          | 35               | V max 5ms      | 0xD322   | Maximum impulsive voltage with duration <=5 ms, %Un peak          |       | 0.01% | UINT32 |       |
|                          | 36               | V max 10ms     | 0xD323   | Maximum impulsive voltage with duration <=10 ms, %Un peak         |       | 0.01% | UINT32 |       |
| 11/11                    |                  |                |          | <b>Voltage Variation, light load</b>                              |       |       |        |       |
|                          | 1                | Nnv            | 0xD380   | Number of non-valid 10-min intervals                              |       |       | UINT32 |       |
|                          | 2                | N              | 0xD381   | Number of valid 10-min intervals                                  |       |       | UINT32 |       |
|                          | 3                | V1 N1          | 0xD382   | Number of values exceeded maximum permissible limit on phase A/AB |       |       | UINT32 |       |

| File Channel/<br>Section | Record Field No. | Point Label | Point ID | Description <sup>1</sup>  | Range | Units | Type   | Notes |
|--------------------------|------------------|-------------|----------|---|-------|-------|--------|-------|
|                          | 4                | V1 dU min   | 0xD383   | Minimum weekly variation on phase A/AB, +/-%Un                    |       | 0.01% | INT32  |       |
|                          | 5                | V1 dU max   | 0xD384   | Maximum weekly variation on phase A/AB, +/-%Un                    |       | 0.01% | INT32  |       |
|                          | 6                | V2 N1       | 0xD385   | Number of values exceeded maximum permissible limit on phase B/BC |       |       | UINT32 |       |
|                          | 7                | V2 dU min   | 0xD386   | Minimum weekly variation on phase B/BC, +/-%Un                    |       | 0.01% | INT32  |       |
|                          | 8                | V2 dU max   | 0xD387   | Maximum weekly variation on phase B/BC, +/-%Un                    |       | 0.01% | INT32  |       |
|                          | 9                | V3 N1       | 0xD388   | Number of values exceeded maximum permissible limit on phase C/CA |       |       | UINT32 |       |
|                          | 10               | V3 dU min   | 0xD389   | Minimum weekly variation on phase C/CA, +/-%Un                    |       | 0.01% | INT32  |       |
|                          | 11               | V3 dU max   | 0xD38A   | Maximum weekly variation on phase C/CA, +/-%Un                    |       | 0.01% | INT32  |       |
|                          | 12               | dU lim high | 0xD38B   | High maximum permissible limit of voltage variation, %Un          |       | 0.01% | INT32  |       |
|                          | 13               | dU lim low  | 0xD38C   | Low maximum permissible limit of voltage variation, %Un           |       | 0.01% | INT32  |       |
| 12/12                    |                  |             |          | <b>Flagged Data (daily)</b>                                       |       |       |        |       |
|                          | 1                | BegTm1      | 0xD400   | 1st weekday: beginning time                                       | F1    |       | UINT32 |       |
|                          | 2                | EndTm1      | 0xD401   | 1st weekday: end time   | F1    |       | UINT32 |       |
|                          | 3                | N1          | 0xD402   | 1st weekday: total number of 10-min measurement intervals         |       |       | UINT32 |       |
|                          | 4                | Nnv1        | 0xD403   | 1st weekday: number of non-valid (flagged) 10-min intervals       |       |       | UINT32 |       |
|                          | 5                | BegTm2      | 0xD404   | 2nd weekday: beginning time                                       | F1    |       | UINT32 |       |
|                          | 6                | EndTm2      | 0xD405   | 2nd weekday: end time   | F1    |       | UINT32 |       |
|                          | 7                | N2          | 0xD406   | 2nd weekday: total number of 10-min measurement intervals         |       |       | UINT32 |       |
|                          | 8                | Nnv2        | 0xD407   | 2nd weekday: number of non-valid (flagged) 10-min intervals       |       |       | UINT32 |       |
|                          | 9                | BegTm3      | 0xD408   | 3rd weekday: beginning time                                       | F1    |       | UINT32 |       |
|                          | 10               | EndTm3      | 0xD409   | 3rd weekday: end time   | F1    |       | UINT32 |       |
|                          | 11               | N3          | 0xD40A   | 3rd weekday: total number of 10-min measurement intervals         |       |       | UINT32 |       |
|                          | 12               | Nnv3        | 0xD40B   | 3rd weekday: number of non-valid (flagged) 10-min intervals       |       |       | UINT32 |       |
|                          | 13               | BegTm4      | 0xD40C   | 4th weekday: beginning time                                       | F1    |       | UINT32 |       |
|                          | 14               | EndTm4      | 0xD40D   | 4th weekday: end time   | F1    |       | UINT32 |       |
|                          | 15               | N4          | 0xD40E   | 4th weekday: total number of 10-min measurement intervals         |       |       | UINT32 |       |
|                          | 16               | Nnv4        | 0xD40F   | 4th weekday: number of non-valid (flagged) 10-min intervals       |       |       | UINT32 |       |
|                          | 17               | BegTm5      | 0xD410   | 5th weekday: beginning time                                       | F1    |       | UINT32 |       |
|                          | 18               | EndTm5      | 0xD411   | 5th weekday: end time   | F1    |       | UINT32 |       |
|                          | 19               | N5          | 0xD412   | 5th weekday: total number of 10-min measurement intervals         |       |       | UINT32 |       |
|                          | 20               | Nnv5        | 0xD413   | 5th weekday: number of non-valid (flagged) 10-min intervals       |       |       | UINT32 |       |
|                          | 21               | BegTm6      | 0xD414   | 6th weekday: beginning time                                       | F1    |       | UINT32 |       |
|                          | 22               | EndTm6      | 0xD415   | 6th weekday: end time   | F1    |       | UINT32 |       |
|                          | 23               | N6          | 0xD416   | 6th weekday: total number of 10-min measurement intervals         |       |       | UINT32 |       |
|                          | 24               | Nnv6        | 0xD417   | 6th weekday: number of non-valid (flagged) 10-min intervals       |       |       | UINT32 |       |
|                          | 25               | BegTm7      | 0xD418   | 7th weekday: beginning time                                       | F1    |       | UINT32 |       |
|                          | 26               | EndTm7      | 0xD419   | 7th weekday: end time   | F1    |       | UINT32 |       |
|                          | 27               | N7          | 0xD41A   | 7th weekday: total number of 10-min measurement intervals         |       |       | UINT32 |       |
|                          | 28               | Nnv7        | 0xD41B   | 7th weekday: number of non-valid (flagged) 10-min intervals       |       |       | 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.



### 3.13 GOST 32144 Harmonic Statistics Data Log

| File Channel/ Section | Record Field No. | Point Label | Point ID | Description <sup>1</sup>   | Range | Units | Type   | Notes |
|-----------------------|------------------|-------------|----------|--|-------|-------|--------|-------|
| 0/0                   |                  |             |          | <b>V1 Harmonic Compliance</b>  |       |       | UINT32 |       |
|                       | 1                | Nnv         | 0xCC00   | Number of non-valid 10-min intervals                                   |       |       | UINT32 |       |
|                       | 2                | N           | 0xCC01   | Number of valid 10-min 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 |       |
|                       | 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 |       |
| 1/1                   |                  |             |          | <b>V2 Harmonic Compliance</b>  |       |       | UINT32 |       |
|                       | 1                | Nnv         | 0xCC00   | Number of non-valid 10-min intervals                                   |       |       | UINT32 |       |
|                       | 2                | N           | 0xCC01   | Number of valid 10-min 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 |       |
| 2/2                   |                  |             |          | <b>V3 Harmonic Compliance</b>  |       |       | UINT32 |       |
|                       | 1                | Nnv         | 0xCC00   | Number of non-valid 10-min intervals                                   |       |       | UINT32 |       |
|                       | 2                | N           | 0xCC01   | Number of valid 10-min 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 |       |
| 3/3                   |                  |             |          | <b>V1 Harmonic Components</b>  |       |       | UINT32 |       |
|                       | 1                | %H02 max1   | 0xCC80   | Maximum 95% probability weekly value of H02 on phase A/AB, %           |       | 0.01% | UINT32 |       |
|                       | 2                | %H03 max1   | 0xCC81   | Maximum 95% probability weekly value of H03 on phase A/AB, %           |       | 0.01% | UINT32 |       |
|                       |                  | ...         |          |  |       |       | UINT32 |       |
|                       | 39               | %H40 max1   | 0xCCA6   | Maximum 95% probability weekly value of H40 on phase A/AB, %           |       | 0.01% | UINT32 |       |
|                       | 40               | %H02 max2   | 0xCCA7   | Maximum weekly value of H02 on phase A/AB, %                           |       | 0.01% | UINT32 |       |

| File Channel/ Section | Record Field No. | Point Label | Point ID | Description <sup>1</sup>   | Range | Units | Type   | Notes |
|-----------------------|------------------|-------------|----------|--|-------|-------|--------|-------|
|                       | 41               | %H03 max2   | 0xCCA8   | Maximum weekly value of H03 on phase A/AB, %                           |       | 0.01% | UINT32 |       |
|                       |                  | ...         |          |  |       |       | UINT32 |       |
|                       | 78               | %H40 max2   | 0xCCCD   | Maximum weekly value of H40 on phase A/AB, %                           |       | 0.01% | UINT32 |       |
| 4/4                   |                  |             |          | <b>V2 Harmonic Components</b>  |       |       | UINT32 |       |
|                       | 1                | %H02 max1   | 0xCC80   | Maximum 95% probability weekly value of H02 on phase B/BC, %           |       | 0.01% | UINT32 |       |
|                       | 2                | %H03 max1   | 0xCC81   | Maximum 95% probability weekly value of H03 on phase B/BC, %           |       | 0.01% | UINT32 |       |
|                       |                  | ...         |          |  |       |       | UINT32 |       |
|                       | 39               | %H40 max1   | 0xCCA6   | Maximum 95% probability weekly value of H40 on phase B/BC, %           |       | 0.01% | UINT32 |       |
|                       | 40               | %H02 max2   | 0xCCA7   | Maximum weekly value of H02 on phase B/BC, %                           |       | 0.01% | UINT32 |       |
|                       | 41               | %H03 max2   | 0xCCA8   | Maximum weekly value of H03 on phase B/BC, %                           |       | 0.01% | UINT32 |       |
|                       |                  | ...         |          |  |       |       | UINT32 |       |
|                       | 78               | %H40 max2   | 0xCCCD   | Maximum weekly value of H40 on phase B/BC, %                           |       | 0.01% | UINT32 |       |
| 5/5                   |                  |             |          | <b>V3 Harmonic Components</b>  |       |       | UINT32 |       |
|                       | 1                | %H02 max1   | 0xCC80   | Maximum 95% probability weekly value of H02 on phase C/CA, %           |       | 0.01% | UINT32 |       |
|                       | 2                | %H03 max1   | 0xCC81   | Maximum 95% probability weekly value of H03 on phase C/CA, %           |       | 0.01% | UINT32 |       |
|                       |                  | ...         |          |  |       |       | UINT32 |       |
|                       | 39               | %H40 max1   | 0xCCA6   | Maximum 95% probability weekly value of H40 on phase C/CA, %           |       | 0.01% | UINT32 |       |
|                       | 40               | %H02 max2   | 0xCCA7   | Maximum weekly value of H02 on phase C/CA, %                           |       | 0.01% | UINT32 |       |
|                       | 41               | %H03 max2   | 0xCCA8   | Maximum weekly value of H03 on phase C/CA, %                           |       | 0.01% | UINT32 |       |
|                       |                  | ...         |          |  |       |       | UINT32 |       |
|                       | 78               | %H40 max2   | 0xCCCD   | Maximum weekly value of H40 on phase C/CA, %                           |       | 0.01% | UINT32 |       |
| 6/-                   |                  |             |          | <b>V1 Interharmonic Compliance (reserved)</b>                          |       |       | UINT32 |       |
|                       | 1                | Nnv         | 0xCC00   | Number of non-valid 10-min intervals                                   |       |       | UINT32 |       |
|                       | 2                | N           | 0xCC01   | Number of valid 10-min 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 |       |
|                       | 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 |       |
| 7/-                   |                  |             |          | <b>V2 Interharmonic Compliance (reserved)</b>                          |       |       | UINT32 |       |
|                       | 1                | Nnv         | 0xCC00   | Number of non-valid 10-min intervals                                   |       |       | UINT32 |       |
|                       | 2                | N           | 0xCC01   | Number of valid 10-min 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 |       |

| File Channel/ Section | Record Field No. | Point Label | Point ID | Description <sup>1</sup>   | Range | Units | Type   | Notes |
|-----------------------|------------------|-------------|----------|--|-------|-------|--------|-------|
|                       |                  | ...         |          |  |       |       | UINT32 |       |
|                       | 80               | H40 N2      | 0xCC4F   | Number of H40 values exceeded maximum permissible limit on phase B/BC  |       |       | UINT32 |       |
| 8/-                   |                  |             |          | <b>V3 Interharmonic Compliance (reserved)</b>                          |       |       | UINT32 |       |
|                       | 1                | Nnv         | 0xCC00   | Number of non-valid 10-min intervals                                   |       |       | UINT32 |       |
|                       | 2                | N           | 0xCC01   | Number of valid 10-min 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 |       |
| 9/6                   |                  |             |          | <b>V1 Interharmonic Components</b>                                     |       |       | UINT32 |       |
|                       | 1                | %H02 max1   | 0xCC80   | Maximum 95% probability weekly value of H02 on phase A/AB, %           |       | 0.01% | UINT32 |       |
|                       | 2                | %H03 max1   | 0xCC81   | Maximum 95% probability weekly value of H03 on phase A/AB, %           |       | 0.01% | UINT32 |       |
|                       |                  | ...         |          |  |       |       | UINT32 |       |
|                       | 39               | %H40 max1   | 0xCCA6   | Maximum 95% probability weekly value of H40 on phase A/AB, %           |       | 0.01% | UINT32 |       |
|                       | 40               | %H02 max2   | 0xCCA7   | Maximum weekly value of H02 on phase A/AB, %                           |       | 0.01% | UINT32 |       |
|                       | 41               | %H03 max2   | 0xCCA8   | Maximum weekly value of H03 on phase A/AB, %                           |       | 0.01% | UINT32 |       |
|                       |                  | ...         |          |  |       |       | UINT32 |       |
|                       | 78               | %H40 max2   | 0xCCCD   | Maximum weekly value of H40 on phase A/AB, %                           |       | 0.01% | UINT32 |       |
| 10/7                  |                  |             |          | <b>V2 Interharmonic Components</b>                                     |       |       | UINT32 |       |
|                       | 1                | %H02 max1   | 0xCC80   | Maximum 95% probability weekly value of H02 on phase B/BC, %           |       | 0.01% | UINT32 |       |
|                       | 2                | %H03 max1   | 0xCC81   | Maximum 95% probability weekly value of H03 on phase B/BC, %           |       | 0.01% | UINT32 |       |
|                       |                  | ...         |          |  |       |       | UINT32 |       |
|                       | 39               | %H40 max1   | 0xCCA6   | Maximum 95% probability weekly value of H40 on phase B/BC, %           |       | 0.01% | UINT32 |       |
|                       | 40               | %H02 max2   | 0xCCA7   | Maximum weekly value of H02 on phase B/BC, %                           |       | 0.01% | UINT32 |       |
|                       | 41               | %H03 max2   | 0xCCA8   | Maximum weekly value of H03 on phase B/BC, %                           |       | 0.01% | UINT32 |       |
|                       |                  | ...         |          |  |       |       | UINT32 |       |
|                       | 78               | %H40 max2   | 0xCCCD   | Maximum weekly value of H40 on phase B/BC, %                           |       | 0.01% | UINT32 |       |
| 11/8                  |                  |             |          | <b>V3 Interharmonic Components</b>                                     |       |       | UINT32 |       |
|                       | 1                | %H02 max1   | 0xCC80   | Maximum 95% probability weekly value of H02 on phase C/CA, %           |       | 0.01% | UINT32 |       |
|                       | 2                | %H03 max1   | 0xCC81   | Maximum 95% probability weekly value of H03 on phase C/CA, %           |       | 0.01% | UINT32 |       |
|                       |                  | ...         |          |  |       |       | UINT32 |       |
|                       | 39               | %H40 max1   | 0xCCA6   | Maximum 95% probability weekly value of H40 on phase C/CA, %           |       | 0.01% | UINT32 |       |
|                       | 40               | %H02 max2   | 0xCCA7   | Maximum weekly value of H02 on phase C/CA, %                           |       | 0.01% | UINT32 |       |
|                       | 41               | %H03 max2   | 0xCCA8   | Maximum weekly value of H03 on phase C/CA, %                           |       | 0.01% | UINT32 |       |
|                       |                  | ...         |          |  |       |       | UINT32 |       |
|                       | 78               | %H40 max2   | 0xCCCD   | Maximum weekly 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.

### 3.14 Billing/TOU Daily Profile Data Log

| File Channel/<br>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                             | REG1        | 0x1780   | Summary (total) energy reading          | 0-999,999,999 | 1 kWh              | UINT32 |       |
|                                       | 2                             | TRF1        | 0x7000   | Tariff #1 energy reading                | 0-999,999,999 | 1 kWh              | UINT32 |       |
|                                       | 3                             | TRF2        | 0x7001   | Tariff #2 energy reading                | 0-999,999,999 | 1 kWh              | UINT32 |       |
|                                       | 4                             | TRF3        | 0x7002   | Tariff #3 energy reading                | 0-999,999,999 | 1 kWh              | UINT32 |       |
|                                       | 5                             | TRF4        | 0x7003   | Tariff #4 energy reading                | 0-999,999,999 | 1 kWh              | UINT32 |       |
|                                       | 6                             | TRF5        | 0x7004   | Tariff #5 energy reading                | 0-999,999,999 | 1 kWh              | UINT32 |       |
|                                       | 7                             | TRF6        | 0x7005   | Tariff #6 energy reading                | 0-999,999,999 | 1 kWh              | UINT32 |       |
|                                       | 8                             | TRF7        | 0x7006   | Tariff #7 energy reading                | 0-999,999,999 | 1 kWh              | UINT32 |       |
|                                       | 9                             | TRF8        | 0x7007   | Tariff #8 energy reading                | 0-999,999,999 | 1 kWh              | UINT32 |       |
| ...                                   |                               |             |          | ...                                     |               |                    |        |       |
| 7/7                                   |                               |             |          | <b>Energy Register #8</b>               |               |                    |        |       |
|                                       | 1                             | REG8        | 0x1787   | Summary (total) energy reading          | 0-999,999,999 | 1 kWh              | UINT32 |       |
|                                       | 2                             | TRF1        | 0x7000   | Tariff #1 energy reading                | 0-999,999,999 | 1 kWh              | UINT32 |       |
|                                       | 3                             | TRF2        | 0x7001   | Tariff #2 energy reading                | 0-999,999,999 | 1 kWh              | UINT32 |       |
|                                       | 4                             | TRF3        | 0x7002   | Tariff #3 energy reading                | 0-999,999,999 | 1 kWh              | UINT32 |       |
|                                       | 5                             | TRF4        | 0x7003   | Tariff #4 energy reading                | 0-999,999,999 | 1 kWh              | UINT32 |       |
|                                       | 6                             | TRF5        | 0x7004   | Tariff #5 energy reading                | 0-999,999,999 | 1 kWh              | UINT32 |       |
|                                       | 7                             | TRF6        | 0x7005   | Tariff #6 energy reading                | 0-999,999,999 | 1 kWh              | UINT32 |       |
|                                       | 8                             | TRF7        | 0x7006   | Tariff #7 energy reading                | 0-999,999,999 | 1 kWh              | UINT32 |       |
|                                       | 9                             | TRF8        | 0x7007   | Tariff #8 energy reading                | 0-999,999,999 | 1 kWh              | UINT32 |       |
| 16/8                                  |                               |             |          | <b>Daily Maximum Demand Register #1</b> |               |                    |        |       |
|                                       | 1                             | REG1 MD     | 0x4780   | Summary (total) max. demand reading     | 0-Pmax        | U3                 | UINT32 |       |
|                                       | 2                             | TRF1 MD     | 0x7100   | Tariff #1 max. demand reading           | 0-Pmax        | U3                 | UINT32 |       |
|                                       | 3                             | TRF2 MD     | 0x7101   | Tariff #2 max. demand reading           | 0-Pmax        | U3                 | UINT32 |       |
|                                       | 4                             | TRF3 MD     | 0x7102   | Tariff #3 max. demand reading           | 0-Pmax        | U3                 | UINT32 |       |
|                                       | 5                             | TRF4 MD     | 0x7103   | Tariff #4 max. demand reading           | 0-Pmax        | U3                 | UINT32 |       |
|                                       | 6                             | TRF5 MD     | 0x7104   | Tariff #5 max. demand reading           | 0-Pmax        | U3                 | UINT32 |       |
|                                       | 7                             | TRF6 MD     | 0x7105   | Tariff #6 max. demand reading           | 0-Pmax        | U3                 | UINT32 |       |
|                                       | 8                             | TRF7 MD     | 0x7106   | Tariff #7 max. demand reading           | 0-Pmax        | U3                 | UINT32 |       |
|                                       | 9                             | TRF8 MD     | 0x7107   | Tariff #8 max. demand reading           | 0-Pmax        | U3                 | UINT32 |       |
| ...                                   |                               |             |          | ...                                     |               |                    |        |       |
| 23/15                                 |                               |             |          | <b>Daily Maximum Demand Register #8</b> |               |                    |        |       |
|                                       | 1                             | REG8 MD     | 0x4787   | Summary (total) max. demand reading     | 0-Pmax        | U3                 | UINT32 |       |
|                                       | 2                             | TRF1 MD     | 0x7100   | Tariff #1 max. demand reading           | 0-Pmax        | U3                 | UINT32 |       |
|                                       | 3                             | TRF2 MD     | 0x7101   | Tariff #2 max. demand reading           | 0-Pmax        | U3                 | UINT32 |       |
|                                       | 4                             | TRF3 MD     | 0x7102   | Tariff #3 max. demand reading           | 0-Pmax        | U3                 | UINT32 |       |
|                                       | 5                             | TRF4 MD     | 0x7103   | Tariff #4 max. demand reading           | 0-Pmax        | U3                 | UINT32 |       |
|                                       | 6                             | TRF5 MD     | 0x7104   | Tariff #5 max. demand reading           | 0-Pmax        | U3                 | UINT32 |       |

| File Channel/<br>Section <sup>1</sup> | Record Field No. <sup>2</sup> | Point Label | Point ID | Description                   | Range  | Units <sup>3</sup> | Type   | Notes |
|---------------------------------------|-------------------------------|-------------|----------|-------------------------------|--------|--------------------|--------|-------|
|                                       | 7                             | TRF6 MD     | 0x7105   | Tariff #6 max. demand reading | 0-Pmax | U3                 | UINT32 |       |
|                                       | 8                             | TRF7 MD     | 0x7106   | Tariff #7 max. demand reading | 0-Pmax | U3                 | UINT32 |       |
|                                       | 9                             | TRF8 MD     | 0x7107   | Tariff #8 max. demand reading | 0-Pmax | U3                 | UINT32 |       |

<sup>1</sup> An energy use profile section is allocated for registers for which a source input is selected in the Billing/TOU Register setup and for which energy use profile is enabled. A maximum demand profile section is allocated for registers for which maximum demand profile is enabled in the Billing/TOU Register setup. 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 $\times$ PT Ratio, V  | 2     |
| I <sub>max</sub>                       |   | Current scale $(2A/10A) \times$ CT Ratio = CT Primary current $\times$ 2, A                   | 1, 3  |
| P <sub>max</sub>                       | Wiring 4LN3, 3LN3, 3BLN3                    | Vmax $\times$ I <sub>max</sub> $\times$ 3, W  | 4     |
|  | Wiring 4LL3, 3LL3, 3BLL3, 3OP2, 3OP3, 3DIR2 | Vmax $\times$ I <sub>max</sub> $\times$ 2, W  |       |
| F <sub>max</sub>                       | Nominal frequency 50 or 60 Hz               | 100 Hz  |       |
| AI <sub>min</sub><br>AI <sub>max</sub> | +/-1mA                                      | AI <sub>min</sub> = -AI full scale $\times$ 2<br>AI <sub>max</sub> = AI full scale $\times$ 2 |       |
|  | 0-20mA                                      | AI <sub>min</sub> = AI zero scale<br>AI <sub>max</sub> = AI full scale                        |       |
|  | 4-20mA                                      | AI <sub>min</sub> = AI zero scale<br>AI <sub>max</sub> = AI full scale                        |       |
|  | 0-1mA                                       | AI <sub>min</sub> = AI zero scale<br>AI <sub>max</sub> = AI full scale                        |       |
| <b>Data Units</b>                      |   |   |       |
| U1                                     | PT Ratio = 1                                | 0.1 V   |       |
|  | PT Ratio > 1                                | 1 V   |       |
| U2                                     |   | 0.01 A  |       |
| U3                                     | PT Ratio = 1                                | 0.001 kW/kvar/kVA   |       |
|  | PT Ratio > 1                                | 1 kW/kvar/kVA   |       |

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

<sup>2</sup> The default Voltage scale is 144V (120V +20%). You can change it via the Device Data Scale setup (see Section 3.1) or via the Device Options setup in PAS.

<sup>3</sup> The default Current scale is  $2 \times$  CT secondary current ( $2 \times 1A$  or  $2 \times 5A$  depending on the order).

<sup>4</sup> P<sub>max</sub> is rounded to whole kilowatts. With PT=1.0, 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 13109/32144 Compliance Statistics   |                    |
|   | 10                               | Data log #10 – GOST 13109/32144 Harmonic Statistics  |                    |
|   | 17-18                            | Waveform log #1-2  |                    |
|   | 26                               | Power quality (PQ) 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 4:7 =                       | Multi-section data log file attributes:  |                    |
|   | 0                                | Regular 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 |
|   | 7                                | GOST 32144 Compliance Statistics   | Multi-section file |
| 8                                       | GOST 32144 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>TOU Profile Log Channel ID</b>       |                                  |  |                    |
| F6                                      | 0-7                              | Billing/TOU energy usage registers #1-#8   |                    |
|   | 16-23                            | Billing/TOU maximum demand registers #1-#8   |                    |
| <b>Waveform Log Channel ID</b>          |                                  |  |                    |
| F7                                      | 0                                | V1/V12   | 1                  |
|   | 1                                | V2/V23   | 1                  |
|   | 2                                | V3/V31   | 1                  |
|   | 4                                | I1   |                    |
|   | 5                                | I2   |                    |
|   | 6                                | I3   |                    |
|   | <b>Profile Log Sections Mask</b> |  |                    |
| F8                                      | Bit 0:7 = 1                      | Billing/TOU energy usage registers #1-#8   |                    |
|   | Bit 16:23 = 1                    | Billing/TOU maximum demand registers #1-#8   |                    |
| <b>Waveform Log Channel Mask</b>        |                                  |  |                    |
| F9                                      | Bit 0 = 1                        | Channel V1/V12   | 1                  |
|   | Bit 1 = 1                        | Channel V2/V23   | 1                  |
|   | Bit 2 = 1                        | Channel V3/V31   | 1                  |
|   | Bit 3 = 1                        | N/A  |                    |
|   | Bit 4 = 1                        | Channel I1   |                    |
|   | Bit 5 = 1                        | Channel I2   |                    |

| Format Code                                  | Value           | Description                              | Notes |
|--|-----------------|--|-------|
|  | Bit 6 = 1       | Channel I3                               |       |
| <b>TOU Tariff Change Time</b>                |                 |  |       |
| F10  | Bits 8:15 = 0-7 | Tariff number #1-#8                      |       |
|  | Bits 2:7 = 0-23 | Tariff start hour                        |       |
|  | Bits 0:1 = 0-3  | Tariff start quarter of an hour          |       |
| <b>Billing/TOU Energy Register Source ID</b> |                 |  |       |
| F11  | 0x0000          | None                                     |       |
|  | 0x0700-0x0703   | Pulse input DI1-DI4                      |       |
|  | 0x1700          | kWh import                               |       |
|  | 0x1701          | kWh export                               |       |
|  | 0x1704          | kvarh import                             |       |
|  | 0x1705          | kvarh export                             |       |
|  | 0x1708          | kVAh total                               |       |
| <b>Setpoint Trigger Parameters ID</b>        |                 |  |       |
| F12  | 0x0000          | None (condition is not active)           |       |
|  |                 | <b>Setpoint Status</b>                   |       |
|  | 0x0080-0x008F   | Setpoint #1-#16 ON                       |       |
|  |                 | <b>Event Flags</b>                       |       |
|  | 0x0300-0x0307   | Event flag #1-#8 ON                      |       |
|  | 0x8300-0x8307   | Event flag #1-#8 OFF                     |       |
|  |                 | <b>Internal Events</b>                   |       |
|  | 0x0400          | kWh import pulse                         |       |
|  | 0x0401          | kWh export pulse                         |       |
|  | 0x0403          | kvarh import pulse                       |       |
|  | 0x0404          | kvarh export pulse                       |       |
|  | 0x0405          | kvarh total pulse                        |       |
|  | 0x0406          | kVAh total pulse                         |       |
|  | 0x0407          | Start new demand interval                |       |
|  | 0x0408          | Start new tariff interval                |       |
|  | 0x0409          | Start new volt/ampere demand interval    |       |
|  | 0x040A          | Start new sliding window demand interval |       |
|  |                 | <b>Timers</b>                            |       |
|  | 0x0500          | Timer #1                                 |       |
|  | 0x0501          | Timer #2                                 |       |
|  |                 | <b>Status Inputs</b>                     |       |
|  | 0x0600          | Status input #1 ON                       |       |
|  | 0x0601          | Status input #2 ON                       |       |
|  | 0x0602          | Status input #3 ON                       |       |
|  | 0x0603          | Status input #4 ON                       |       |
|  | 0x8600          | Status input #1 OFF                      |       |
|  | 0x8601          | Status input #2 OFF                      |       |
|  | 0x8602          | Status input #3 OFF                      |       |
|  | 0x8603          | Status input #4 OFF                      |       |
|  |                 | <b>Pulse Inputs</b>                      |       |
|  | 0x0700          | Pulse input #1                           |       |
|  | 0x0701          | Pulse input #2                           |       |
|  | 0x0702          | Pulse input #3                           |       |
|  | 0x0703          | Pulse input #4                           |       |
|  |                 | <b>Relays</b>                            |       |
|  | 0x0800          | Relay #1 ON                              |       |
|  | 0x0801          | Relay #2 ON                              |       |
|  | 0x0802          | Relay #3 ON                              |       |
|  | 0x0803          | Relay #4 ON                              |       |
|  | 0x8800          | Relay #1 OFF                             |       |
|  | 0x8801          | Relay #2 OFF                             |       |
|  | 0x8802          | Relay #3 OFF                             |       |
|  | 0x8803          | Relay #4 OFF                             |       |
|  |                 | <b>Static Events</b>                     |       |
|  | 0x8901          | Positive phase rotation reversal         | 3     |
|  | 0x8902          | Negative phase rotation reversal         | 3     |
|  | 0x0903          | GOST13109/32144 PQ event                 |       |
|  |                 | <b>Pulse Counters</b>                    |       |
|  | 0x0A00          | High pulse counter #1                    |       |
|  | 0x0A01          | High pulse counter #2                    |       |
|  | 0x0A02          | High pulse counter #3                    |       |
|  | 0x0A03          | High pulse counter #4                    |       |
|  |                 | <b>Time and Date Parameters</b>          |       |



| Format Code | Value  | Description                                    | Notes |
|-------------|--------|--|-------|
|             | 0x0B02 | Day of week                                    |       |
|             | 0x0B03 | Year   |       |
|             | 0x0B04 | Month  |       |
|             | 0x0B05 | Day of month                                   |       |
|             | 0x0B06 | Hour   |       |
|             | 0x0B07 | Minutes  |       |
|             | 0x0B08 | Seconds  |       |
|             | 0x0B09 | Minute interval (1,2,3,4,5,10,15,20,30,60 min) |       |
|             |        | <b>1-Cycle Phase Values</b>                    |       |
|             | 0x0C03 | High I1 current                                |       |
|             | 0x0C04 | High I2 current                                |       |
|             | 0x0C05 | High I3 current                                |       |
|             | 0x8C03 | Low I1 current                                 |       |
|             | 0x8C04 | Low I2 current                                 |       |
|             | 0x8C05 | Low I3 current                                 |       |
|             |        | <b>1-Cycle Values on any Phase</b>             |       |
|             | 0x0E00 | High voltage                                   | 1     |
|             | 0x8D00 | Low voltage                                    | 1     |
|             | 0x0E01 | High current                                   |       |
|             | 0x8D01 | Low current                                    |       |
|             | 0x0E07 | High voltage THD                               | 1     |
|             | 0x0E08 | High current THD                               |       |
|             | 0x0E09 | High K-Factor                                  |       |
|             | 0x0E0A | High current TDD                               |       |
|             |        | <b>1-Cycle Auxiliary Values</b>                |       |
|             | 0x1002 | High frequency                                 |       |
|             | 0x9002 | Low frequency                                  |       |
|             | 0x1003 | High voltage unbalance                         | 1     |
|             | 0x1004 | High current unbalance                         |       |
|             |        | <b>1-Sec Phase Values</b>                      |       |
|             | 0x1103 | High I1 current                                |       |
|             | 0x1104 | High I2 current                                |       |
|             | 0x1105 | High I3 current                                |       |
|             | 0x9103 | Low I1 current                                 |       |
|             | 0x9104 | Low I2 current                                 |       |
|             | 0x9105 | Low I3 current                                 |       |
|             |        | <b>1-Sec Values on any Phase</b>               |       |
|             | 0x1300 | High voltage                                   | 1     |
|             | 0x9200 | Low voltage                                    | 1     |
|             | 0x1301 | High current                                   |       |
|             | 0x9201 | Low current                                    |       |
|             |        | <b>1-Sec Total Values</b>                      |       |
|             | 0x1406 | High total kW import                           |       |
|             | 0x1407 | High total kW export                           |       |
|             | 0x1408 | High total kvar import                         |       |
|             | 0x1409 | High total kvar export                         |       |
|             | 0x1402 | High total kVA                                 |       |
|             | 0x9404 | Low total PF Lag                               |       |
|             | 0x9405 | Low total PF Lead                              |       |
|             |        | <b>1-Sec Auxiliary Values</b>                  |       |
|             | 0x1501 | High neutral current                           |       |
|             | 0x1502 | High frequency                                 |       |
|             | 0x9502 | Low frequency                                  |       |
|             | 0x1503 | High voltage unbalance                         | 1     |
|             | 0x1504 | High current unbalance                         |       |
|             |        | <b>Present Demands</b>                         |       |
|             | 0x1600 | High V1/V12 Volt demand                        | 1     |
|             | 0x1601 | High V2/V23 Volt demand                        | 1     |
|             | 0x1602 | High V3/V31 Volt demand                        | 1     |
|             | 0x1603 | High I1 Ampere demand                          |       |
|             | 0x1604 | High I2 Ampere demand                          |       |
|             | 0x1605 | High I3 Ampere demand                          |       |
|             | 0x1606 | High block kW import demand                    |       |
|             | 0x1607 | High block kvar import demand                  |       |
|             | 0x1608 | High block kVA demand                          |       |
|             | 0x1609 | High sliding window kW import demand           |       |
|             | 0x160A | High sliding window kvar import demand         |       |

| Format Code               | Value              | Description                            | Notes                                      |
|---------------------------|--------------------|--|--|
|                           | 0x160B             | High sliding window kVA demand         |  |
|                           | 0x160F             | High accumulated kW import demand      |  |
|                           | 0x1610             | High accumulated kvar import demand    |  |
|                           | 0x1611             | High accumulated kVA demand            |  |
|                           | 0x1612             | High predicted kW import demand        |  |
|                           | 0x1613             | High predicted kvar import demand      |  |
|                           | 0x1614             | High predicted kVA demand              |  |
|                           | 0x1616             | High block kW export demand            |  |
|                           | 0x1617             | High block kvar export demand          |  |
|                           | 0x1618             | High sliding window kW export demand   |  |
|                           | 0x1619             | High sliding window kvar export demand |  |
|                           | 0x161A             | High accumulated kW export demand      |  |
|                           | 0x161B             | High accumulated kvar export demand    |  |
|                           | 0x161C             | High predicted kW export demand        |  |
|                           | 0x161D             | High predicted kvar export demand      |  |
| <b>Setpoint Action ID</b> |                    |  |  |
| F14                       | <b>Action type</b> | <b>Target</b>                          |  |
|                           | 0x00               | 0x00                                   | No action                                  |
|                           | 0x20               | 0x00                                   | Set Event flag #1                          |
|                           | 0x20               | 0x01                                   | Set Event flag #2                          |
|                           | 0x20               | 0x02                                   | Set Event flag #3                          |
|                           | 0x20               | 0x03                                   | Set Event flag #4                          |
|                           | 0x21               | 0x00                                   | Clear Event flag #1                        |
|                           | 0x21               | 0x01                                   | Clear Event flag #2                        |
|                           | 0x21               | 0x02                                   | Clear Event flag #3                        |
|                           | 0x21               | 0x03                                   | Clear Event flag #4                        |
|                           | 0x30               | 0x00                                   | Operate Relay #1                           |
|                           | 0x30               | 0x01                                   | Operate Relay #2                           |
|                           | 0x30               | 0x02                                   | Operate Relay #3                           |
|                           | 0x30               | 0x03                                   | Operate Relay #4                           |
|                           | 0x31               | 0x00                                   | Release latched Relay #1                   |
|                           | 0x31               | 0x01                                   | Release latched Relay #2                   |
|                           | 0x31               | 0x02                                   | Release latched Relay #3                   |
|                           | 0x31               | 0x03                                   | Release latched Relay #4                   |
|                           | 0x40               | 0x00                                   | Increment counter #1                       |
|                           | 0x40               | 0x01                                   | Increment counter #2                       |
|                           | 0x40               | 0x02                                   | Increment counter #3                       |
|                           | 0x40               | 0x03                                   | Increment counter #4                       |
|                           | 0x41               | 0x00                                   | Clear counter #1                           |
|                           | 0x41               | 0x01                                   | Clear counter #2                           |
|                           | 0x41               | 0x02                                   | Clear counter #3                           |
|                           | 0x41               | 0x03                                   | Clear counter #4                           |
|                           | 0x64               | 0x00                                   | Clear all counters                         |
|                           | 0x51               | 0x00                                   | Send event notification                    |
|                           | 0x60               | 0x00                                   | Reset total energy                         |
|                           | 0x61               | 0x00                                   | Reset all total maximum demands            |
|                           | 0x61               | 0x01                                   | Reset power maximum demands                |
|                           | 0x61               | 0x02                                   | Reset volt/ampere/harmonic maximum demands |
|                           | 0x62               | 0x00                                   | Reset TOU energy                           |
|                           | 0x63               | 0x00                                   | Reset TOU maximum demands                  |
|                           | 0x65               | 0x00                                   | Clear Min/Max registers                    |
|                           | 0x70               | 0x00                                   | Event log                                  |
|                           | 0x71               | 0x00                                   | Data log #1                                |
|                           | 0x71               | 0x01                                   | Data log #2                                |
|                           | 0x71               | 0x02                                   | Data log #3                                |
|                           | 0x71               | 0x03                                   | Data log #4                                |
|                           | 0x71               | 0x04                                   | Data log #5                                |
|                           | 0x71               | 0x05                                   | Data log #6                                |
|                           | 0x71               | 0x06                                   | Data log #7                                |
|                           | 0x71               | 0x07                                   | Data log #8                                |
|                           | 0x71               | 0x0A                                   | Data log #11                               |
|                           | 0x71               | 0x0B                                   | Data log #12                               |
|                           | 0x71               | 0x0C                                   | Data log #13                               |
|                           | 0x71               | 0x0D                                   | Data log #14                               |
|                           | 0x71               | 0x0E                                   | Data log #15                               |
|                           | 0x71               | 0x0F                                   | Data log #16                               |
|                           | 0x72               | 0x00                                   | Waveform log #1                            |

| Format Code                                    | Value                           | Description                     | Notes           |  |
|--|---------------------------------|---------------------------------|-----------------|--|
|  | 0x73                            | 0x00                            | Waveform log #2 |  |
| <b>Counter Source ID</b>                       |                                 |                                 |                 |  |
| F16  | 0x0000                          | None                            |                 |  |
|  | 0x0001-0x0004                   | Pulse input DI1-DI4             |                 |  |
| <b>Relay Output Pulse Source ID</b>            |                                 |                                 |                 |  |
| F17  | 0x0000                          | None                            |                 |  |
|  | 0x0400                          | kWh import pulse                |                 |  |
|  | 0x0401                          | kWh export pulse                |                 |  |
|  | 0x0403                          | kvarh import pulse              |                 |  |
|  | 0x0404                          | kvarh export pulse              |                 |  |
|  | 0x0405                          | kvarh total pulse               |                 |  |
|  | 0x0406                          | kVAh pulse                      |                 |  |
| <b>AO Output/Analog Expander Parameters ID</b> |                                 |                                 |                 |  |
| F18  | 0x0000                          | None (output disabled)          | <sup>2</sup>    |  |
|  | <b>1-Cycle Phase Values</b>     |                                 |                 |  |
|  | 0x0C00                          | V1/V12 Voltage                  |                 |  |
|  | 0x0C01                          | V2/V23 Voltage                  |                 |  |
|  | 0x0C02                          | V3/V31 Voltage                  |                 |  |
|  | 0x0C03                          | I1 Current                      |                 |  |
|  | 0x0C04                          | I2 Current                      |                 |  |
|  | 0x0C05                          | I3 Current                      |                 |  |
|  | 0x0C1E                          | V12 Voltage                     |                 |  |
|  | 0x0C1F                          | V23 Voltage                     |                 |  |
|  | 0x0C20                          | V31 Voltage                     |                 |  |
|  | <b>1-Cycle Total Values</b>     |                                 |                 |  |
|  | 0x0F00                          | Total kW                        |                 |  |
|  | 0x0F01                          | Total kvar                      |                 |  |
|  | 0x0F02                          | Total kVA                       |                 |  |
|  | 0x0F03                          | Total PF                        |                 |  |
|  | 0x0F04                          | Total PF Lag                    |                 |  |
|  | 0x0F05                          | Total PF Lead                   |                 |  |
|  | 0x0F0A                          | 3-phase average L-N/L-L voltage | <sup>1</sup>    |  |
|  | 0x0F0B                          | 3-phase average L-L voltage     |                 |  |
|  | 0x0F0C                          | 3-phase average current         |                 |  |
|  | <b>1-Cycle Auxiliary Values</b> |                                 |                 |  |
|  | 0x1001                          | In Current                      |                 |  |
|  | 0x1002                          | Frequency                       |                 |  |
|  | <b>1-Sec Phase Values</b>       |                                 |                 |  |
|  | 0x1100                          | V1/V12 Voltage                  |                 |  |
|  | 0x1101                          | V2/V23 Voltage                  |                 |  |
|  | 0x1102                          | V3/V31 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>       |                                 |                 |  |
|  | 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/L-L voltage | <sup>1</sup>    |  |
|  | 0x140B                          | 3-phase average L-L voltage     |                 |  |
|  | 0x140C                          | 3-phase average current         |                 |  |
|  | <b>1-Sec Auxiliary Values</b>   |                                 |                 |  |
|  | 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  |                 |  |

| Format Code                 | Value   | Description                                  | Notes |
|-----------------------------|---|--|-------|
| <b>Event Cause/Point ID</b> |   |  |       |
| F19                         | <b>Setpoint Operation Events</b>                    |  |       |
|                             | 0x0000-0x59FF                                       | Trigger parameter ID                         |       |
|                             | 0x6400-0xFFFF                                       | Trigger parameter ID                         |       |
|                             | <b>Setpoint Action Events</b>                       |  |       |
|                             | 0x5A00-0x5A0F                                       | Setpoint #1-#16                              |       |
|                             | <b>Communications Events</b>                        |  |       |
|                             | 0x5B00-0x5BFF                                       | Point ID (low byte, see F21)                 |       |
|                             | <b>Front Panel Operations</b>                       |  |       |
|                             | 0x5C00-0x5CFF                                       | Point ID (low byte, see F21)                 |       |
|                             | <b>Self-Check Diagnostics Events</b>                |  |       |
|                             | 0x5D00-0x5DFF                                       | Point ID (low byte, see F21)                 |       |
|                             | <b>Self-Update Events</b>                           |  |       |
|                             | 0x5E08  | RTC DST/Standard time update                 | 4     |
|                             | <b>Hardware Diagnostics Events</b>                  |  |       |
|                             | 0x6202  | RAM/Data error                               |       |
|                             | 0x6203  | Hardware watchdog reset                      |       |
|                             | 0x6204  | Sampling fault                               |       |
|                             | 0x6205  | CPU exception                                |       |
|                             | 0x6206  | Reserved                                     |       |
|                             | 0x6207  | Software watchdog reset                      |       |
|                             | 0x620D  | Low battery                                  |       |
|                             | 0x620F  | EEPROM fault                                 |       |
|                             | <b>External Events</b>                              |  |       |
|                             | 0x6300  | Power down                                   |       |
| 0x6308                      | Power up  |  |       |
| 0x6309                      | External reset                                      |  |       |
| <b>Event Effect ID</b>      |   |  |       |
| F20                         | <b>Communications/Self-check/Front Panel Events</b> |  |       |
|                             | 0x0000  | None   |       |
|                             | 0x6000  | Total energy registers cleared               |       |
|                             | 0x6100  | All total maximum demands cleared            |       |
|                             | 0x6101  | Power maximum demands cleared                |       |
|                             | 0x6102  | Volt/Ampere/Harmonic maximum demands cleared |       |
|                             | 0x6200  | Billing/TOU energy registers cleared         |       |
|                             | 0x6300  | Billing/TOU maximum demand registers cleared |       |
|                             | 0x6400  | All counters cleared                         |       |
|                             | 0x6401-0x6403                                       | Counter cleared (low byte = counter ID)      |       |
|                             | 0x6500  | Min/Max log cleared                          |       |
|                             | 0x6A00-0x6A1A                                       | Log file cleared (low byte = File ID)        |       |
|                             | 0x6B00  | GOST 13109/32144 statistics cleared          |       |
|                             | 0xF100-0xF10F                                       | Setpoint cleared (low byte = setpoint ID)    |       |
|                             | 0xF200  | Setup/Data cleared                           |       |
|                             | 0xF300  | Setup reset (set by default)                 |       |
|                             | 0xF400  | Setup changed                                |       |
|                             | 0xF500  | RTC set                                      |       |
|                             | <b>Setpoint Operation Events</b>                    |  |       |
|                             | 0xE100-0xE10F                                       | Setpoint operated (low byte = setpoint ID)   |       |
|                             | 0xE200-0xE20F                                       | Setpoint released (low byte = setpoint ID)   |       |
|                             | <b>Setpoint Action Events</b>                       |  |       |
|                             | See F14   | Setpoint action ID                           |       |
|                             | <b>Data Point ID</b>                                |  |       |
| F21                         | <b>Data Locations</b>                               |  |       |
|                             | 0x03  | Data memory                                  |       |
|                             | 0x04  | Factory setup                                |       |
|                             | 0x05  | Access/Password setup                        |       |
|                             | 0x06  | Basic setup                                  |       |
|                             | 0x07  | Communications setup                         |       |
|                             | 0x08  | Real-time clock                              | 4     |
|                             | 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                      |  |       |

| Format Code               | Value         | Description                              | Notes |
|---------------------------|---------------|--|-------|
|                           | 0x14          | Data log setup                           |       |
|                           | 0x15          | File/Memory setup                        |       |
|                           | 0x16          | TOU energy registers setup               |       |
|                           | 0x18          | TOU daily profiles                       |       |
|                           | 0x19          | TOU calendar                             |       |
|                           | 0x1B          | 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                       |       |
|                           | 0x2B-0x4E     | Reserved                                 |       |
|                           | 0x4F          | Tampering attempt                        |       |
| <b>Event Type ID</b>      |               |  |       |
| F22                       |               | <b>Setpoint Events</b>                   |       |
|                           | 0x0000        | SP: Generic setpoint event               |       |
|                           | 0x0001-0x0010 | SP1-SP16: Setpoint #1-#16 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>PQ Events (GOST 32144 categories)</b> |       |
|                           | 0x0700        | PQE: Generic PQ event                    |       |
|                           | 0x0701        | PQE1: Frequency variation                |       |
|                           | 0x0702        | PQE2: Voltage variation                  |       |
|                           | 0x0703        | PQE3: Rapid voltage change               |       |
|                           | 0x0704        | PQE4: Flicker                            |       |
|                           | 0x0705        | PQE5: Voltage THD                        |       |
|                           | 0x0706        | PQE6: Voltage harmonic components        |       |
|                           | 0x0707        | PQE7: Voltage interharmonic components   |       |
|                           | 0x0708        | PQE8: Signaling voltage                  |       |
|                           | 0x0709        | PQE9: Voltage unbalance                  |       |
|                           | 0x070A        | PQE10: Voltage interruptions             |       |
|                           | 0x070B        | PQE11: Voltage dips                      |       |
|                           | 0x070C        | PQE12: Voltage swells                    |       |
|                           | 0x070D        | PQE13: Impulsive voltage                 |       |
|                           |               | <b>Data Log Events</b>                   |       |
|                           | 0x0900        | Online PQ statistics                     |       |
| <b>Device Diagnostics</b> |               |  |       |
| F23                       | Bit 0         | Reserved                                 |       |
|                           | Bit 1         | Reserved                                 |       |
|                           | Bit 2 = 1     | RAM/Data error                           |       |
|                           | Bit 3 = 1     | CPU watchdog reset                       |       |
|                           | Bit 4 = 1     | 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                                |       |
|                           | Bit 12        | Reserved                                 |       |
|                           | Bit 13 = 1    | Low battery                              |       |
|                           | Bit 14        | Reserved                                 |       |

| Format Code                | Value                                | Description  | Notes |
|----------------------------|--------------------------------------|--|-------|
|                            | Bit 15 = 1                           | EEPROM fault   |       |
| <b>DNP Object Types</b>    |                                      |  |       |
| F24                        |                                      | <b>Static Binary Input Objects</b>   |       |
|                            | 0                                    | Single-Bit Binary Input  |       |
|                            | 1                                    | Binary Input With Status   |       |
|                            |                                      | <b>Binary Input Change Event Objects</b>   |       |
|                            | 0                                    | Binary Input Change Without Time   |       |
|                            | 1                                    | Binary Input Change With Time  |       |
|                            |                                      | <b>Static Binary Counters</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 Events</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 Counters</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>Static Analog Input Objects</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 Events</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   |       |
|                            | 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 with 2 CTs (2 element)  |       |
|                            | 1                                    | 4LN3 - 4-wire WYE with 3 PTs (3 element), line-to-neutral voltage readings               |       |
|                            | 2                                    | 3DIR2 - 3-wire direct connection with 2 CTs (2 element)                                  |       |
|                            | 3                                    | 4LL3 - 4-wire WYE with 3 PTs (3 element), line-to-line voltage readings                  |       |
|                            | 4                                    | 3OP3 - 3-wire open delta with 3 CTs (2 1/2 element)                                      |       |
|                            | 5                                    | 3LN3 - 4-wire WYE with 2 PTs (2 1/2 element), line-to-neutral voltage readings           |       |
|                            | 6                                    | 3LL3 - 4-wire WYE with 2 PTs (2 1/2 element), line-to-line voltage readings              |       |
|                            | 8                                    | 3BLN3 - 3-wire broken delta with 2 PTs (2 1/2 element), line-to-neutral voltage readings |       |

| Format Code               | Value                 | Description   | Notes      |                |
|---------------------------|-----------------------|---|------------|----------------|
|                           | 9                     | 3BLL3 - 3-wire broken delta with 2 PTs (2 1/2 element), line-to-line voltage readings |            |                |
| <b>Instrument Options</b> |                       |   |            |                |
| F28                       | Bit 0=1               | 120V Option   |            |                |
|                           | Bit 1=1               | 690V Option   |            |                |
|                           | Bits 2-5              | Reserved  |            |                |
|                           | Bit 6=1               | Analog output 0/4 or 4/20mA   |            |                |
|                           | Bit 7=1               | Analog output 0-1mA   |            |                |
|                           | Bit 8=1               | Analog output $\pm 1$ mA  |            |                |
|                           | Bit 9=1               | RO option   |            |                |
|                           | Bit 10=1              | DI option   |            |                |
|                           | Bit 11                | Reserved  |            |                |
|                           | Bit 12=1              | Setup is secured by a password (authorization required)                               |            |                |
|                           | Bit 13                | Reserved  |            |                |
|                           | Bit 14=1              | Analog expander option $\pm 1$ mA   |            |                |
|                           | Bit 15                | Reserved  |            |                |
|                           | Bits 16-18            | Number of RO - 1  |            |                |
|                           | Bits 19-22            | Number of DI - 1  |            |                |
| Bits 23-24                | Number of AO - 1      |   |            |                |
| Bits 25-29                | Reserved              |   |            |                |
| Bits 30-31=11             | Memory module 1MBytes |   |            |                |
| <b>I/O Slot Types</b>     |                       |   |            |                |
| F29                       | DI                    | DRY   | 00000000B  |                |
|                           | RO                    |   | 00100000B  |                |
|                           | AI                    | $\pm 1$ mA  | 01010000B  |                |
|                           | AI                    | 0-20 mA   | 01010001B  |                |
|                           | AI                    | 4-20 mA   | 01010010B  |                |
|                           | AI                    | 0-1 mA  | 01010011B  |                |
|                           | AO                    | $\pm 1$ mA  | 01100000B  |                |
|                           | AO                    | 0-20 mA   | 01100001B  |                |
|                           | AO                    | 4-20 mA   | 01100010B  |                |
|                           | AO                    | 0-1 mA  | 01100011B  |                |
|                           | Empty slot            |   | 1111xxxxxB | x = don't care |

**NOTES:**

<sup>1</sup> **Voltage**

When the 4LN3, 3LN3 or 3BLN3 wiring mode is selected, the voltages and voltage waveforms will be line-to-neutral; for any other wiring mode, they will be line-to-line.

<sup>2</sup> **Analog Outputs**

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> **Phase Reversal Trigger**

The setpoint is operated when the actual phase sequence does not match the designated phase rotation order.

<sup>4</sup> The event value field shows the present meter time in the F1 format.