



# **Branch Feeder Monitor**

## **BFM136/036**

MODBUS Communications Protocol

---

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

|    |          |   |
|----|----------|---|
| A4 | Sep 2009 | Added transformer correction setup.<br>Added TCP event notification client.<br>Added GPRS setup and communication counters. |
| A5 | Oct 2010 | Added phasor registers.<br>Number of tariffs is extended to 6 (F/W 18.4.1 and later)  |
| A6 | Feb 2013 | Added exported kWh/kvarh and exported kW/kvar demands (F/W 18.5.1 and later)  |
| A7 | Jan 2018 | Added reset maximum demands and reset Billing/TOU maximum demands for all submeters (F/W 18.5.8 )                           |
| A8 | Jul 2024 | Updated manual  |

Modbus is a trademark of Schneider Electric.



# Table of Contents

---

|   |           |
|---|-----------|
| <b>Chapter 1 General.....</b>                                 | <b>5</b>  |
| <b>Chapter 2 Modbus Protocol Implementation.....</b>          | <b>6</b>  |
| 2.1    Transmission Modes .....                               | 6         |
| 2.2    Address Field.....                                     | 6         |
| 2.3    Function Field .....                                   | 6         |
| 2.4    Exception Responses .....                              | 6         |
| 2.5    Modbus Register Addresses .....                        | 6         |
| 2.6    Submeter Addressing .....                              | 7         |
| 2.7    Data Formats .....                                     | 8         |
| 2.7.1    16-bit Scaled Integer Format.....                    | 8         |
| 2.7.2    32-bit Long Integer Format .....                     | 9         |
| 2.8    User Assignable Registers .....                        | 9         |
| 2.9    Password Protection.....                               | 10        |
| 2.10    Data Recording and File Transfer .....                | 10        |
| 2.10.1    Log File Organization .....                         | 10        |
| 2.10.2    File Transfers .....                                | 11        |
| 2.11    TCP Notification Client .....                         | 13        |
| <b>Chapter 3 Modbus Register Map.....</b>                     | <b>14</b> |
| 3.1    Modbus Setup Registers .....                           | 14        |
| 3.2    16-bit Scaled Analog Values - Basic Register Set ..... | 15        |
| 3.3    16-bit Scaled Analog Values .....                      | 17        |
| 3.4    32-bit Binary and Analog Values .....                  | 30        |
| 3.5    Minimum/Maximum Log Registers .....                    | 41        |
| 3.6    Device Control and Status Registers.....               | 45        |
| 3.7    Device Setup Registers .....                           | 48        |
| 3.8    File Transfer Blocks.....                              | 61        |
| 3.9    Billing/TOU Daily Profile Data Log.....                | 69        |
| <b>Chapter 4 Data Scales and Units.....</b>                   | <b>71</b> |
| <b>Chapter 5 Data Formats .....</b>                           | <b>72</b> |

## Chapter 1 General

This document specifies a subset of the Modbus serial communications protocol used to transfer data between a master computer station and the BFM136/036. The document provides the complete information necessary to develop third-party communications software capable of communication with the Series BFM136/036 instruments.

For additional information concerning communications operation, configuring the communications parameters, and communications connections see the BFM136/036 Installation and Operation Manual.

## Chapter 2 Modbus Protocol Implementation

For detailed information about Modbus protocol, Modbus 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 BFM136/036.

### 2.1 Transmission Modes

The BFM136/036 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 BFM136/036 Installation and Operation Manual for information on selecting the transmission mode in your meter.

### 2.2 Address Field

The address field contains a device submeter address (1-247) on a Modbus network. The user assigned device address (see Communication Ports Setup in Section 3.7) is used as a reference address of the first device submeter. See Submeter Addressing in Section 2.6 for more information on device addressing.

Broadcast mode using address 0 is not supported.

### 2.3 Function Field

The Modbus functions implemented in the BFM136/036 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 BFM136/036 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 BFM136/036 Modbus registers are numbered in the range of 0 to 65535. From Modbus applications, the BFM136/036 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 "4XXXXXX" addressing scheme.

To map the BFM136/036 register address to the range of the Modbus holding registers, add a value of 40001 to the device register address. When a register address exceeds 9999, use a 6-digit addressing scheme by adding 400001 to the BFM136/036 register address.

## 2.6 Submeter Addressing

Each active submeter in the BFM136/036 is assigned a unique communication address that allows accessing its private registers and setups. A separate Modbus address is engaged for each submeter for which at least one current input is allocated in the Channel Assignments Setup (see Section 3.7), and for each additional submeter, which is allocated as a target in the Billing/TOU Registers Source Setup (see Section 3.7).

The BFM136/036 can occupy up to 40 contiguous addresses starting with the device reference address. All submeter addresses are assigned automatically in a sequential order starting from the device base address that is programmed through the device Communication Setup. The following table illustrates submeter addressing in the device with the base address N.

| Device Base Address | Submeter Number | Submeter Address |
|---------------------|-----------------|------------------|
| N                   | SM 1            | N                |
|                     | SM 2            | N+1              |
|                     | ...             |                  |
|                     | SM 36           | N+35             |
|                     | SM 37           | N+36             |
|                     | ...             |                  |
|                     | SM 40           | N+39             |

Your device is factory preset to address 1 and occupies the range of addresses 1 through 12, configured for 12 three-phase submeters.

### NOTE

**Device setup settings, excluding the alarm setpoints and data log setup, are shared across all submeters. Though you can read/write them using any submeter address, your changes affect all submeters in the device. Note that the communication port setup may only be changed via the device base address.**

Select your submeters (both metering and Totalization) in a sequence without gaps so that your device would not occupy unnecessary network addresses.

If you connect a number of devices to a serial network, allocate a range of addresses for each device so that they do not overlap. For example, if you use three devices with 12 submeters in each one, assign the base address 1 to the first device, the address 13 to the second, and the address 25 to the third device so that they will occupy three non-overlapped address ranges 1 through 12, 13 through 24, and 25 through 36.

## 2.7 Data Formats

The BFM136/036 uses two data formats to pass data between a master application and the instrument: 16-bit short integer and 32-bit long integer 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.

### 2.7.1 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.

#### CONVERSION EXAMPLES

##### 1. Voltage readings

Voltage engineering scales (see Section 4):

$$HI = V_{max} = 600.0V$$

$$LO = 0V$$

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

$$\text{Volts reading} = 1449 \times (600.0 - 0) / (9999 - 0) + 0 = 86.9V$$

##### 2. Current readings

Assume device settings: CT primary current = 50A.

Current engineering scales (see Section 4):

$$HI = I_{max} = CT \text{ primary current} \times 2 = 50.00 \times 2 = 100.00A$$

$$LO = 0A$$

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

$$\text{Amps reading} = 250 \times (100.00 - 0) / (9999 - 0) + 0 = 2.50A$$

##### 3. Power readings

a) Assume device settings: CT primary current = 50A.

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

$$HI = P_{max} = V_{max} \times I_{max} \times 2 = (600.0 \times 1) \times (50.00 \times 2) \times 2 = 120,000W = 120 \text{ kW}$$

$$LO = -P_{max} = -120 \text{ kW}$$

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

$$\text{Watts reading} = 5500 \times (120 - (-120)) / (9999 - 0) + (-120) = 12.013kW$$

If the raw data reading is 4000 then the power reading in engineering units will be as follows:

$$\text{Watts reading} = 4000 \times (120 - (-120)) / (9999 - 0) + (-120) = -23.99kW$$

#### 4. Power Factor readings

Power factor engineering scales:

HI = 1.000.

LO = -1.000.

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

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

### 2.7.2 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):

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

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

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

## 2.8 User Assignable Registers

The BFM136/036 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 remapped.

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 4672 (1-second V1 voltage, scaled short integer) and 14720-14721 (kWh Import, long integer) via registers 0-2, do the following:

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

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

## 2.9 Password Protection

The BFM136/036 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 from the front panel display. For details, refer to your instrument Operation Manual.

When password protection is enabled, the user password you set in your instrument should be written into the device authorization register (44378-44379) before another write request is issued. If the correct password is not supplied while password protection is enabled, the 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.

## 2.10 Data Recording and File Transfer

### 2.10.1 Log File Organization

Historical files are stored to the non-volatile memory. The device memory is automatically partitioned between files and does not require additional settings. Each submeter has individual historical files.

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.

Each file has a wrap-around attribute (circular file), the most recent records overwrites 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 BFM136/036 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.

#### Data Log File

Data log file of each submeter can store up to 6 measured parameters per a record. 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 file can be triggered through the setpoints on a time basis using the meter clock.

### Billing/TOU Profile Log File

Data log file #16 is automatically 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 3.9 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.

Sections within a 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.

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 3.8), 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.

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

See Section 3.8 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 Profile Files

In a multi-section data profile 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.

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 BFM136/036 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.

## 2.11 TCP Notification Client

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

Notification messages are sent via a block of 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 | Submeter 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.

# Chapter 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> |          |   |  |       |        |     |                             |
| 0-119                              |          |   |  |       |        |     | Shared across all submeters |
| +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>    |          |   |  |       |        |     |                             |
| 120-239                            |          |   |  |       |        |     | Shared across all submeters |
| +0                                 |          | Register 0 address  | 0-65535                                |       | UINT16 | R/W |                             |
| +1                                 |          | Register 1 address  | 0-65535                                |       | UINT16 | R/W |                             |
|                                    |          |   |  |       |        |     |                             |
| +119                               |          | Register 119 address  | 0-65535                                |       | UINT16 | R/W |                             |
| <b>Modbus Conversion Scales</b>    |          |   |  |       |        |     |                             |
| 240                                |          | Low raw scale   | 0                                      |       | UINT16 | R/W | Shared across all submeters |
| 241                                |          | High raw scale  | 9999                                   |       | UINT16 | R/W |                             |
| 242                                |          | Voltage scale, in secondary volts   | 60-600 (default 600V)                  | 1V    | UINT16 | R/W |                             |
| 243                                |          | Current scale, in secondary amps = CT secondary current<br>(1A, 5A, 50A) x Current overload | 20, 100, 1000<br>(2.0A, 10.0A, 100.0A) | x0.1A | UINT16 | R   |                             |

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

| Address | Point ID | Description                             | Low and High Scales <sup>1</sup> | Units <sup>1</sup> | Type   | R/W | Notes |
|---------|----------|---|----------------------------------|--------------------|--------|-----|-------|
| 256-308 |          | <b>1-Second Values</b>                  |                                  |                    |        |     |       |
| +0      | 0x1100   | V1 Voltage                              | 0-Vmax                           | U1                 | UINT16 | R   |       |
| +1      | 0x1101   | V2 Voltage                              | 0-Vmax                           | U1                 | UINT16 | R   |       |
| +2      | 0x1102   | V3 Voltage                              | 0-Vmax                           | U1                 | UINT16 | R   |       |
| +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   |       |
| +12     | 0x110C   | kVA L1                                  | -Pmax-Pmax                       | U3                 | UINT16 | R   |       |
| +13     | 0x110D   | kVA L2                                  | -Pmax-Pmax                       | U3                 | UINT16 | R   |       |
| +14     | 0x110E   | kVA L3                                  | -Pmax-Pmax                       | U3                 | UINT16 | R   |       |
| +15     | 0x110F   | Power factor L1                         | -1.000-1.000                     | 0.001              | INT16  | R   |       |
| +16     | 0x1110   | Power factor L2                         | -1.000-1.000                     | 0.001              | INT16  | R   |       |
| +17     | 0x1111   | Power factor L3                         | -1.000-1.000                     | 0.001              | INT16  | R   |       |
| +18     | 0x1403   | Total PF                                | -1.000-1.000                     | 0.001              | INT16  | R   |       |
| +19     | 0x1400   | Total kW                                | -Pmax-Pmax                       | U3                 | INT16  | R   |       |
| +20     | 0x1401   | Total kvar                              | -Pmax-Pmax                       | U3                 | INT16  | R   |       |
| +21     | 0x1402   | Total kVA                               | -Pmax-Pmax                       | U3                 | UINT16 | R   |       |
| +22     | 0x1501   | In Current                              | 0-Imax                           | U2                 | UINT16 | R   |       |
| +23     | 0x1502   | Frequency                               | 4500-6500                        | 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   |       |

| Address | Point ID | Description                             | Low and High Scales <sup>1</sup> | Units <sup>1</sup> | Type   | R/W | Notes |
|---------|----------|---|----------------------------------|--------------------|--------|-----|-------|
| +28     | 0x3703   | I1 Maximum ampere demand                | 0-lmax                           | U2                 | UINT16 | R   |       |
| +29     | 0x3704   | I2 Maximum ampere demand                | 0-lmax                           | U2                 | UINT16 | R   |       |
| +30     | 0x3705   | I3 Maximum ampere demand                | 0-lmax                           | U2                 | UINT16 | R   |       |
| +31     | 0x1700   | kWh import (low)                        | 0-9999                           | ×0.1kWh            | UINT16 | R   | 2     |
| +32     | 0x1700   | kWh import (high)                       | 0-9999                           | ×1MWh              | UINT16 | R   | 2     |
| +33     |          | Reserved                                | 0                                |                    | UINT16 | R   |       |
| +34     |          | Reserved                                | 0                                |                    | UINT16 | R   |       |
| +35     | 0x1704   | kvarh import (low)                      | 0-9999                           | ×0.1kvarh          | UINT16 | R   | 2     |
| +36     | 0x1704   | kvarh import (high)                     | 0-9999                           | ×1Mvarh            | UINT16 | R   | 2     |
| +37     |          | Reserved                                | 0                                |                    | UINT16 | R   |       |
| +38     |          | Reserved                                | 0                                |                    | UINT16 | R   |       |
| +39     | 0x1112   | Reserved                                | 0                                |                    | UINT16 | R   |       |
| +40     | 0x1113   | Reserved                                | 0                                |                    | UINT16 | R   |       |
| +41     | 0x1114   | Reserved                                | 0                                |                    | UINT16 | R   |       |
| +42     | 0x1115   | Reserved                                | 0                                |                    | UINT16 | R   |       |
| +43     | 0x1116   | Reserved                                | 0                                |                    | UINT16 | R   |       |
| +44     | 0x1117   | Reserved                                | 0                                |                    | UINT16 | R   |       |
| +45     | 0x1708   | kVAh (low)                              | 0-9999                           | ×0.1kVAh           | UINT16 | R   | 2     |
| +46     | 0x1708   | kVAh (high)                             | 0-9999                           | ×1MVAh             | UINT16 | R   | 2     |
| +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     |          | Reserved                                | 0                                |                    | UINT16 | R   |       |
| +50     | 0x111B   | Reserved                                | 0                                |                    | UINT16 | R   |       |
| +51     | 0x111C   | Reserved                                | 0                                |                    | UINT16 | R   |       |
| +52     | 0x111D   | Reserved                                | 0                                |                    | UINT16 | R   |       |

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

<sup>2</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 Values

| Address   | Point ID | Description                 | Low and High Scales <sup>1</sup> | Units <sup>1</sup> | Type   | R/W | Notes |
|-----------|----------|-----------------------------|----------------------------------|--------------------|--------|-----|-------|
| 4352-4384 |          | <b>1-Cycle Phase Values</b> |                                  |                    |        |     |       |
| +0        | 0x0C00   | V1 Voltage                  | 0-Vmax                           | U1                 | UINT16 | R   |       |
| +1        | 0x0C01   | V2 Voltage                  | 0-Vmax                           | U1                 | UINT16 | R   |       |
| +2        | 0x0C02   | V3 Voltage                  | 0-Vmax                           | U1                 | UINT16 | R   |       |
| +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   |       |
| +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   | Reserved                    | 0                                |                    | UINT16 | R   |       |
| +19       | 0x0C13   | Reserved                    | 0                                |                    | UINT16 | R   |       |
| +20       | 0x0C14   | Reserved                    | 0                                |                    | UINT16 | R   |       |
| +21       | 0x0C15   | Reserved                    | 0                                |                    | UINT16 | R   |       |

| Address   | Point ID | Description                      | Low and High Scales <sup>1</sup> | Units <sup>1</sup> | Type   | R/W | Notes |
|-----------|----------|----------------------------------|----------------------------------|--------------------|--------|-----|-------|
| +22       | 0x0C16   | Reserved                         | 0                                |                    | UINT16 | R   |       |
| +23       | 0x0C17   | Reserved                         | 0                                |                    | UINT16 | R   |       |
| +24-26    |          | Reserved                         | 0                                |                    | UINT16 | R   |       |
| +27       | 0x0C1B   | Reserved                         | 0                                |                    | UINT16 | R   |       |
| +28       | 0x0C1C   | Reserved                         | 0                                |                    | UINT16 | R   |       |
| +29       | 0x0C1D   | Reserved                         | 0                                |                    | UINT16 | R   |       |
| +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   |       |
| 4416-4427 |          | <b>1-Cycle Low Phase Values</b>  |                                  |                    |        |     |       |
| +0        | 0xD00    | Low L-N voltage                  | 0-Vmax                           | U1                 | UINT16 | R   |       |
| +1        | 0xD01    | Low current                      | 0-Imax                           | U2                 | UINT16 | R   |       |
| +2        | 0xD02    | Low kW                           | -Pmax-Pmax                       | U3                 | INT16  | R   |       |
| +3        | 0xD03    | Low kvar                         | -Pmax-Pmax                       | U3                 | INT16  | R   |       |
| +4        | 0xD04    | Low kVA                          | 0-Pmax                           | U3                 | UINT16 | R   |       |
| +5        | 0xD05    | Low PF Lag                       | 0-100.0                          | 0.001              | UINT16 | R   |       |
| +5        | 0xD06    | Low PF Lead                      | 0-100.0                          | 0.001              | UINT16 | R   |       |
| +7        | 0xD07    | Reserved                         | 0                                |                    | UINT16 | R   |       |
| +8        | 0xD08    | Reserved                         | 0                                |                    | UINT16 | R   |       |
| +9        | 0xD09    | Reserved                         | 0                                |                    | UINT16 | R   |       |
| +10       | 0xD0A    | Reserved                         | 0                                |                    | UINT16 | R   |       |
| +11       | 0xD0B    | Low L-L voltage                  | 0-Vmax                           | U1                 | UINT16 | R   |       |
| 4480-4491 |          | <b>1-Cycle High Phase Values</b> |                                  |                    |        |     |       |
| +0        | 0xE00    | High L-N voltage                 | 0-Vmax                           | U1                 | UINT16 | R   |       |

| Address   | Point ID | Description                     | Low and High Scales <sup>1</sup> | Units <sup>1</sup> | Type   | R/W | Notes |
|-----------|----------|---------------------------------|----------------------------------|--------------------|--------|-----|-------|
| +1        | 0x0E01   | High current                    | 0-Imax                           | U2                 | UINT16 | R   |       |
| +2        | 0x0E02   | High kW                         | -Pmax-Pmax                       | U3                 | INT16  | R   |       |
| +3        | 0x0E03   | High kvar                       | -Pmax-Pmax                       | U3                 | INT16  | R   |       |
| +4        | 0x0E04   | High kVA                        | 0-Pmax                           | U3                 | UINT16 | R   |       |
| +5        | 0x0E05   | High PF Lag                     | 0-1.000                          | 0.001              | UINT16 | R   |       |
| +5        | 0x0E06   | High PF Lead                    | 0-1.000                          | 0.001              | UINT16 | R   |       |
| +7        | 0x0E07   | Reserved                        | 0                                |                    | UINT16 | R   |       |
| +8        | 0x0E08   | Reserved                        | 0                                |                    | UINT16 | R   |       |
| +9        | 0x0E09   | Reserved                        | 0                                |                    | UINT16 | R   |       |
| +10       | 0x0E0A   | Reserved                        | 0                                |                    | UINT16 | R   |       |
| +11       | 0x0E0B   | High L-L voltage                | 0-Vmax                           | U1                 | UINT16 | R   |       |
| 4544-4553 |          | <b>1-Cycle Total Values</b>     |                                  |                    |        |     |       |
| +0        | 0x0F00   | Total kW                        | -Pmax-Pmax                       | U3                 | INT16  | R   |       |
| +1        | 0x0F01   | Total kvar                      | -Pmax-Pmax                       | U3                 | INT16  | R   |       |
| +2        | 0x0F02   | Total kVA                       | 0-Pmax                           | U3                 | UINT16 | R   |       |
| +3        | 0x0F03   | Total PF                        | -1.000-1.000                     | 0.001              | INT16  | R   |       |
| +4        | 0x0F04   | Total PF lag                    | 0-1.000                          | 0.001              | UINT16 | R   |       |
| +5        | 0x0F05   | Total PF lead                   | 0-1.000                          | 0.001              | UINT16 |     |       |
| +5        | 0x0F06   | Total kW import                 | 0-Pmax                           | U3                 | UINT16 |     |       |
| +7        | 0x0F07   | Total kW export                 | 0-Pmax                           | U3                 | UINT16 | R   |       |
| +8        | 0x0F08   | Total kvar import               | 0-Pmax                           | U3                 | UINT16 | R   |       |
| +9        | 0x0F09   | Total kvar export               | 0-Pmax                           | U3                 | UINT16 | R   |       |
| 4608-4612 |          | <b>1-Cycle Auxiliary Values</b> |                                  |                    |        |     |       |
| +0        | 0x1000   | Not used                        |                                  |                    | UINT16 | R   |       |

| Address   | Point ID | Description                  | Low and High Scales <sup>1</sup> | Units <sup>1</sup> | Type   | R/W | Notes |
|-----------|----------|------------------------------|----------------------------------|--------------------|--------|-----|-------|
| +1        | 0x1001   | In (neutral) Current         | 0-lmax                           | U2                 | UINT16 | R   |       |
| +2        | 0x1002   | Frequency                    | 4500-6500                        | 0.01Hz             | UINT16 | R   |       |
| +3        | 0x1003   | Voltage unbalance            | 0-3000                           | ×0.1%              | UINT16 | R   |       |
| +4        | 0x1004   | Current unbalance            | 0-3000                           | ×0.1%              | UINT16 | R   |       |
| 4640-4655 |          | <b>Phasor</b>                |                                  |                    |        |     |       |
| +0        | 0x1080   | V1 Voltage magnitude         | 0-Vmax                           | U1                 | UINT16 | R   |       |
| +1        | 0x1081   | V2 Voltage magnitude         | 0-Vmax                           | U1                 | UINT16 | R   |       |
| +2        | 0x1082   | V3 Voltage magnitude         | 0-Vmax                           | U1                 | UINT16 | R   |       |
| +3        | 0x1083   | Not used                     |                                  |                    | UINT16 | R   |       |
| +4        | 0x1084   | I1 Current magnitude         | 0-lmax                           | U2                 | UINT16 | R   |       |
| +5        | 0x1085   | I2 Current magnitude         | 0-lmax                           | U2                 | UINT16 | R   |       |
| +5        | 0x1086   | I3 Current magnitude         | 0-lmax                           | U2                 | UINT16 | R   |       |
| +7        | 0x1087   | Not used                     |                                  |                    | UINT16 | R   |       |
| +8        | 0x1088   | V1 Voltage angle             | -180.0-180.0                     | 0.1°               | INT16  | R   |       |
| +9        | 0x1089   | V2 Voltage angle             | -180.0-180.0                     | 0.1°               | INT16  | R   |       |
| +10       | 0x108A   | V3 Voltage angle             | -180.0-180.0                     | 0.1°               | INT16  | R   |       |
| +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 Voltage                   | 0-Vmax                           | U1                 | UINT16 | R   |       |
| +1        | 0x1101   | V2 Voltage                   | 0-Vmax                           | U1                 | UINT16 | R   |       |

| Address | Point ID | Description     | Low and High Scales <sup>1</sup>    | Units <sup>1</sup> | Type   | R/W | Notes |
|---------|----------|-----------------|-------------------------------------|--------------------|--------|-----|-------|
| +2      | 0x1102   | V3 Voltage      | 0-Vmax                              | U1                 | UINT16 | R   |       |
| +3      | 0x1103   | I1 Current      | 0-I <sub>max</sub>                  | U2                 | UINT16 | R   |       |
| +4      | 0x1104   | I2 Current      | 0-I <sub>max</sub>                  | U2                 | UINT16 | R   |       |
| +5      | 0x1105   | I3 Current      | 0-I <sub>max</sub>                  | U2                 | UINT16 | R   |       |
| +6      | 0x1106   | kW L1           | -P <sub>max</sub> -P <sub>max</sub> | U3                 | INT16  | R   |       |
| +7      | 0x1107   | kW L2           | -P <sub>max</sub> -P <sub>max</sub> | U3                 | INT16  | R   |       |
| +8      | 0x1108   | kW L3           | -P <sub>max</sub> -P <sub>max</sub> | U3                 | INT16  | R   |       |
| +9      | 0x1109   | kvar L1         | -P <sub>max</sub> -P <sub>max</sub> | U3                 | INT16  | R   |       |
| +10     | 0x110A   | kvar L2         | -P <sub>max</sub> -P <sub>max</sub> | U3                 | INT16  | R   |       |
| +11     | 0x110B   | kvar L3         | -P <sub>max</sub> -P <sub>max</sub> | U3                 | INT16  | R   |       |
| +12     | 0x110C   | kVA L1          | 0-P <sub>max</sub>                  | U3                 | UINT16 | R   |       |
| +13     | 0x110D   | kVA L2          | 0-P <sub>max</sub>                  | U3                 | UINT16 | R   |       |
| +14     | 0x110E   | kVA L3          | 0-P <sub>max</sub>                  | 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   | Reserved        | 0                                   |                    | UINT16 | R   |       |
| +19     | 0x1113   | Reserved        | 0                                   |                    | UINT16 | R   |       |
| +20     | 0x1114   | Reserved        | 0                                   |                    | UINT16 | R   |       |
| +21     | 0x1115   | Reserved        | 0                                   |                    | UINT16 | R   |       |
| +22     | 0x1116   | Reserved        | 0                                   |                    | UINT16 | R   |       |
| +23     | 0x1117   | Reserved        | 0                                   |                    | UINT16 | R   |       |
| +24-26  |          | Reserved        | 0                                   |                    | UINT16 | R   |       |
| +27     | 0x111B   | Reserved        | 0                                   |                    | UINT16 | R   |       |

| Address   | Point ID | Description                       | Low and High Scales <sup>1</sup>    | Units <sup>1</sup> | Type   | R/W | Notes |
|-----------|----------|-----------------------------------|-------------------------------------|--------------------|--------|-----|-------|
| +28       | 0x111C   | Reserved                          | 0                                   |                    | UINT16 | R   |       |
| +29       | 0x111D   | Reserved                          | 0                                   |                    | UINT16 | R   |       |
| +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   |       |
| 4736-4747 |          | <b>1-Second Low Phase Values</b>  |                                     |                    |        |     |       |
| +0        | 0x1200   | Low L-N voltage                   | 0-Vmax                              | U1                 | UINT16 | R   |       |
| +1        | 0x1201   | Low current                       | 0-I <sub>max</sub>                  | U2                 | UINT16 | R   |       |
| +2        | 0x1202   | Low kW                            | -P <sub>max</sub> -P <sub>max</sub> | U3                 | INT16  | R   |       |
| +3        | 0x1203   | Low kvar                          | -P <sub>max</sub> -P <sub>max</sub> | U3                 | INT16  | R   |       |
| +4        | 0x1204   | Low kVA                           | 0-P <sub>max</sub>                  | U3                 | UINT16 | R   |       |
| +5        | 0x1205   | Low PF Lag                        | 0-1.000                             | 0.001              | UINT16 | R   |       |
| +6        | 0x1206   | Low PF Lead                       | 0-1.000                             | 0.001              | UINT16 | R   |       |
| +7        | 0x1207   | Reserved                          | 0                                   |                    | UINT16 | R   |       |
| +8        | 0x1208   | Reserved                          | 0                                   |                    | UINT16 | R   |       |
| +9        | 0x1209   | Reserved                          | 0                                   |                    | UINT16 | R   |       |
| +10       | 0x120A   | Reserved                          | 0                                   |                    | UINT16 | R   |       |
| +11       | 0x120B   | Low L-L voltage                   | 0-Vmax                              | U1                 | UINT16 | R   |       |
| 4800-4811 |          | <b>1-Second High Phase Values</b> |                                     |                    |        |     |       |
| +0        | 0x1300   | High L-N voltage                  | 0-Vmax                              | U1                 | UINT16 | R   |       |
| +1        | 0x1301   | High current                      | 0-I <sub>max</sub>                  | U2                 | UINT16 | R   |       |
| +2        | 0x1302   | High kW                           | -P <sub>max</sub> -P <sub>max</sub> | U3                 | INT16  | R   |       |
| +3        | 0x1303   | High kvar                         | -P <sub>max</sub> -P <sub>max</sub> | U3                 | INT16  | R   |       |
| +4        | 0x1304   | High kVA                          | 0-P <sub>max</sub>                  | U3                 | UINT16 | R   |       |

| <b>Address</b> | <b>Point ID</b> | <b>Description</b>               | <b>Low and High Scales<sup>1</sup></b> | <b>Units<sup>1</sup></b> | <b>Type</b> | <b>R/W</b> | <b>Notes</b> |
|----------------|-----------------|----------------------------------|--|--------------------------|-------------|------------|--------------|
| +5             | 0x1305          | High PF Lag                      | 0-1.000                                | 0.001                    | UINT16      | R          |              |
| +6             | 0x1306          | High PF Lead                     | 0-1.000                                | 0.001                    | UINT16      | R          |              |
| +7             | 0x1307          | Reserved                         | 0                                      |                          | UINT16      | R          |              |
| +8             | 0x1308          | Reserved                         | 0                                      |                          | UINT16      | R          |              |
| +9             | 0x1309          | Reserved                         | 0                                      |                          | UINT16      | R          |              |
| +10            | 0x130A          | Reserved                         | 0                                      |                          | UINT16      | R          |              |
| +11            | 0x130B          | High L-L voltage                 | 0-Vmax                                 | U1                       | UINT16      | R          |              |
| 4864-4873      |                 | <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      |            |              |
| +6             | 0x1406          | Total kW import                  | 0-Pmax                                 | U3                       | UINT16      |            |              |
| +7             | 0x1407          | Total kW export                  | 0-Pmax                                 | U3                       | UINT16      | R          |              |
| +8             | 0x1408          | Total kvar import                | 0-Pmax                                 | U3                       | UINT16      | R          |              |
| +9             | 0x1409          | Total kvar export                | 0-Pmax                                 | U3                       | UINT16      | R          |              |
| 4928-4932      |                 | <b>1-Second Auxiliary Values</b> |  |                          |             |            |              |
| +0             | 0x1000          | Not used                         |  |                          | UINT16      | R          |              |
| +1             | 0x1001          | In (neutral) Current             | 0-I <sub>max</sub>                     | U2                       | UINT16      | R          |              |
| +2             | 0x1002          | Frequency                        | 4500-6500                              | 0.01Hz                   | UINT16      | R          |              |
| +3             | 0x1003          | Voltage unbalance                | 0-3000                                 | x0.1%                    | UINT16      | R          |              |
| +4             | 0x1004          | Current unbalance                | 0-3000                                 | x0.1%                    | UINT16      | R          |              |

| Address   | Point ID | Description                                 | Low and High Scales <sup>1</sup> | Units <sup>1</sup> | Type   | R/W | Notes |
|-----------|----------|---|----------------------------------|--------------------|--------|-----|-------|
| 4992-5021 |          | <b>Present Demands</b>                      |                                  |                    |        |     |       |
| +0        | 0x1600   | V1 Volt demand                              | 0-Vmax                           | U1                 | UINT16 | R   |       |
| +1        | 0x1601   | V2 Volt demand                              | 0-Vmax                           | U1                 | UINT16 | R   |       |
| +2        | 0x1602   | V3 Volt demand                              | 0-Vmax                           | U1                 | UINT16 | R   |       |
| +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   | Not used                                    |                                  |                    | UINT16 | R   |       |
| +7        | 0x1607   | Not used                                    |                                  |                    | UINT16 | R   |       |
| +8        | 0x1608   | Not used                                    |                                  |                    | 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   | Not used                                    |                                  |                    | UINT16 | R   |       |
| +22       | 0x1616   | Not used                                    |                                  |                    | UINT16 | R   |       |

| Address   | Point ID | Description                                 | Low and High Scales <sup>1</sup> | Units <sup>1</sup> | Type   | R/W | Notes |
|-----------|----------|---|----------------------------------|--------------------|--------|-----|-------|
| +23       | 0x1617   | Not used                                    |                                  |                    | UINT16 | R   |       |
| +24       | 0x1618   | kW export sliding window demand             | 0-Pmax                           | U3                 | UINT16 | R   |       |
| +25       | 0x1619   | kvar export sliding window demand           | 0-Pmax                           | U3                 | UINT16 | R   |       |
| +26       | 0x161A   | kW export accumulated demand                | 0-Pmax                           | U3                 | UINT16 | R   |       |
| +27       | 0x161B   | kvar export accumulated demand              | 0-Pmax                           | U3                 | UINT16 | R   |       |
| +28       | 0x161C   | kW export predicted sliding window demand   | 0-Pmax                           | U3                 | UINT16 | R   |       |
| +29       | 0x161D   | kvar export predicted sliding window demand | 0-Pmax                           | U3                 | UINT16 | R   |       |
| 5056-5073 |          | <b>Total Energies</b>                       |                                  |                    |        |     |       |
| +0,1      | 0x1700   | kWh import                                  | 0-999,999,999                    | 0.1 kWh            | UINT32 | R   |       |
| +2,3      | 0x1701   | kWh export                                  | 0-999,999,999                    | 0.1 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                    | 0.1 kvarh          | UINT32 | R   |       |
| +10,11    | 0x1705   | kvarh export                                | 0-999,999,999                    | 0.1 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                    | 0.1 kVAh           | UINT32 | R   |       |
| 5088-5095 |          | <b>Billing Summary Registers</b>            |                                  |                    |        |     |       |
| +0,1      | 0x1780   | Summary energy register #1                  | 0-999,999,999                    | 0.1 kWh            | UINT32 | R   |       |
| +2,3      | 0x1781   | Summary energy register #2                  | 0-999,999,999                    | 0.1 kWh            | UINT32 | R   |       |
| +4,5      | 0x1782   | Summary energy register #3                  | 0-999,999,999                    | 0.1 kWh            | UINT32 | R   |       |
| +6,7      | 0x1783   | Summary energy register #4                  | 0-999,999,999                    | 0.1 kWh            | UINT32 | R   |       |
| 7104-7120 |          | <b>Maximum Demands</b>                      |                                  |                    |        |     |       |
| +0        | 0x3700   | V1 Maximum volt demand                      | 0-Vmax                           | U1                 | UINT16 | R   |       |

| Address   | Point ID | Description                               | Low and High Scales <sup>1</sup> | Units <sup>1</sup> | Type   | R/W | Notes |
|-----------|----------|---|----------------------------------|--------------------|--------|-----|-------|
| +1        | 0x3701   | V2 Maximum volt demand                    | 0-Vmax                           | U1                 | UINT16 | R   |       |
| +2        | 0x3702   | V3 Maximum volt demand                    | 0-Vmax                           | U1                 | UINT16 | R   |       |
| +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   |       |
| +6-8      |          | Not used                                  | 0                                |                    | UINT16 | R   |       |
| +9        | 0x3709   | Maximum kW import sliding window demand   | 0-Pmax                           | U3                 | UINT16 | R   |       |
| +10       | 0x370A   | Maximum kvar import sliding window demand | 0-Pmax                           | U3                 | UINT16 | R   |       |
| +11       | 0x370B   | Maximum kVA sliding window demand         | 0-Pmax                           | U3                 | UINT16 | R   |       |
| +12-14    |          | 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   |       |
| 7488-7499 |          | <b>Billing TOU Register #1</b>            |                                  |                    |        |     |       |
| +0,1      | 0x3D00   | Tariff #1 register                        | 0-999,999,999                    | 0.1 kWh            | UINT32 | R   |       |
| +2,3      | 0x3D01   | Tariff #2 register                        | 0-999,999,999                    | 0.1 kWh            | UINT32 | R   |       |
| +4,5      | 0x3D02   | Tariff #3 register                        | 0-999,999,999                    | 0.1 kWh            | UINT32 | R   |       |
| +6,7      | 0x3D03   | Tariff #4 register                        | 0-999,999,999                    | 0.1 kWh            | UINT32 | R   |       |
| +8,9      | 0x3D04   | Tariff #5 register                        | 0-999,999,999                    | 0.1 kWh            | UINT32 | R   |       |
| +10,11    | 0x3D05   | Tariff #6 register                        | 0-999,999,999                    | 0.1 kWh            | UINT32 | R   |       |
| 7552-7563 |          | <b>Billing TOU Register #2</b>            |                                  |                    |        |     |       |
| +0,1      | 0x3E00   | Tariff #1 register                        | 0-999,999,999                    | 0.1 kWh            | UINT32 | R   |       |
| +2,3      | 0x3E01   | Tariff #2 register                        | 0-999,999,999                    | 0.1 kWh            | UINT32 | R   |       |
| +4,5      | 0x3E02   | Tariff #3 register                        | 0-999,999,999                    | 0.1 kWh            | UINT32 | R   |       |
| +6,7      | 0x3E03   | Tariff #4 register                        | 0-999,999,999                    | 0.1 kWh            | UINT32 | R   |       |

| Address   | Point ID | Description                                | Low and High Scales <sup>1</sup> | Units <sup>1</sup> | Type   | R/W | Notes |
|-----------|----------|--|----------------------------------|--------------------|--------|-----|-------|
| +8,9      | 0x3E04   | Tariff #5 register                         | 0-999,999,999                    | 0.1 kWh            | UINT32 | R   |       |
| +10,11    | 0x3E05   | Tariff #6 register                         | 0-999,999,999                    | 0.1 kWh            | UINT32 | R   |       |
| 7616-7627 |          | <b>Billing TOU Register #3</b>             |                                  |                    |        |     |       |
| +0,1      | 0x3F00   | Tariff #1 register                         | 0-999,999,999                    | 0.1 kWh            | UINT32 | R   |       |
| +2,3      | 0x3F01   | Tariff #2 register                         | 0-999,999,999                    | 0.1 kWh            | UINT32 | R   |       |
| +4,5      | 0x3F02   | Tariff #3 register                         | 0-999,999,999                    | 0.1 kWh            | UINT32 | R   |       |
| +6,7      | 0x3F03   | Tariff #4 register                         | 0-999,999,999                    | 0.1 kWh            | UINT32 | R   |       |
| +8,9      | 0x3F04   | Tariff #5 register                         | 0-999,999,999                    | 0.1 kWh            | UINT32 | R   |       |
| +10,11    | 0x3F05   | Tariff #6 register                         | 0-999,999,999                    | 0.1 kWh            | UINT32 | R   |       |
| 7680-7691 |          | <b>Billing TOU Register #4</b>             |                                  |                    |        |     |       |
| +0,1      | 0x4000   | Tariff #1 register                         | 0-999,999,999                    | 0.1 kWh            | UINT32 | R   |       |
| +2,3      | 0x4001   | Tariff #2 register                         | 0-999,999,999                    | 0.1 kWh            | UINT32 | R   |       |
| +4,5      | 0x4002   | Tariff #2 register                         | 0-999,999,999                    | 0.1 kWh            | UINT32 | R   |       |
| +6,7      | 0x4003   | Tariff #4 register                         | 0-999,999,999                    | 0.1 kWh            | UINT32 | R   |       |
| +8,9      | 0x4004   | Tariff #5 register                         | 0-999,999,999                    | 0.1 kWh            | UINT32 | R   |       |
| +10,11    | 0x4005   | Tariff #6 register                         | 0-999,999,999                    | 0.1 kWh            | UINT32 | R   |       |
| 8000-8003 |          | <b>Billing Summary Accumulated Demands</b> |                                  |                    |        |     |       |
| +0        | 0x4500   | Summary register #1                        | 0-Pmax                           | U3                 | UINT16 | R   |       |
| +1        | 0x4501   | Summary register #2                        | 0-Pmax                           | U3                 | UINT16 | R   |       |
| +2        | 0x4502   | Summary register #3                        | 0-Pmax                           | U3                 | UINT16 | R   |       |
| +3        | 0x4503   | Summary register #4                        | 0-Pmax                           | U3                 | UINT16 | R   |       |
| 8032-8035 |          | <b>Billing Summary Block Demands</b>       |                                  |                    |        |     |       |
| +0        | 0x4580   | Summary register #1                        | 0-Pmax                           | U3                 | UINT16 | R   |       |
| +1        | 0x4581   | Summary register #2                        | 0-Pmax                           | U3                 | UINT16 | R   |       |

| Address   | Point ID | Description                                   | Low and High Scales <sup>1</sup> | Units <sup>1</sup> | Type   | R/W | Notes |
|-----------|----------|---|----------------------------------|--------------------|--------|-----|-------|
| +2        | 0x4582   | Summary register #3                           | 0-Pmax                           | U3                 | UINT16 | R   |       |
| +3        | 0x4583   | Summary register #4                           | 0-Pmax                           | U3                 | UINT16 | R   |       |
| 8064-8067 |          | <b>Billing Summary Sliding Window Demands</b> |                                  |                    |        |     |       |
| +0        | 0x4600   | Summary register #1                           | 0-Pmax                           | U3                 | UINT16 | R   |       |
| +1        | 0x4601   | Summary register #2                           | 0-Pmax                           | U3                 | UINT16 | R   |       |
| +2        | 0x4602   | Summary register #3                           | 0-Pmax                           | U3                 | UINT16 | R   |       |
| +3        | 0x4603   | Summary register #4                           | 0-Pmax                           | U3                 | UINT16 | R   |       |
| 8160-8163 |          | <b>Billing Summary Maximum Demands</b>        |                                  |                    |        |     |       |
| +0        | 0x4780   | Summary register #1                           | 0-Pmax                           | U3                 | UINT16 | R   |       |
| +1        | 0x4781   | Summary register #2                           | 0-Pmax                           | U3                 | UINT16 | R   |       |
| +2        | 0x4782   | Summary register #3                           | 0-Pmax                           | U3                 | UINT16 | R   |       |
| +3        | 0x4783   | Summary register #4                           | 0-Pmax                           | U3                 | UINT16 | R   |       |
| 8192-8197 |          | <b>Billing TOU Maximum Demand Register #1</b> |                                  |                    |        |     |       |
| +0        | 0x4800   | Tariff #1 register                            | 0-Pmax                           | U3                 | UINT16 | R   |       |
| +1        | 0x4801   | Tariff #2 register                            | 0-Pmax                           | U3                 | UINT16 | R   |       |
| +2        | 0x4802   | Tariff #3 register                            | 0-Pmax                           | U3                 | UINT16 | R   |       |
| +3        | 0x4803   | Tariff #4 register                            | 0-Pmax                           | U3                 | UINT16 | R   |       |
| +4        | 0x4804   | Tariff #5 register                            | 0-Pmax                           | U3                 | UINT16 | R   |       |
| +5        | 0x4805   | Tariff #6 register                            | 0-Pmax                           | U3                 | UINT16 | R   |       |
| 8224-8229 |          | <b>Billing TOU Maximum Demand Register #4</b> |                                  |                    |        |     |       |
| +0        | 0x4880   | Tariff #1 register                            | 0-Pmax                           | U3                 | UINT16 | R   |       |
| +1        | 0x4881   | Tariff #2 register                            | 0-Pmax                           | U3                 | UINT16 | R   |       |
| +2        | 0x4882   | Tariff #3 register                            | 0-Pmax                           | U3                 | UINT16 | R   |       |
| +3        | 0x4883   | Tariff #4register                             | 0-Pmax                           | U3                 | UINT16 | R   |       |

| Address   | Point ID | Description                                   | Low and High Scales <sup>1</sup> | Units <sup>1</sup> | Type   | R/W | Notes |
|-----------|----------|---|----------------------------------|--------------------|--------|-----|-------|
| +4        | 0x4884   | Tariff #5 register                            | 0-Pmax                           | U3                 | UINT16 | R   |       |
| +5        | 0x4885   | Tariff #6 register                            | 0-Pmax                           | U3                 | UINT16 | R   |       |
| 8256-8261 |          | <b>Billing TOU Maximum Demand Register #2</b> |                                  |                    |        |     |       |
| +0        | 0x4900   | Tariff #1 register                            | 0-Pmax                           | U3                 | UINT16 | R   |       |
| +1        | 0x4901   | Tariff #2 register                            | 0-Pmax                           | U3                 | UINT16 | R   |       |
| +2        | 0x4902   | Tariff #3 register                            | 0-Pmax                           | U3                 | UINT16 | R   |       |
| +3        | 0x4903   | Tariff #4 register                            | 0-Pmax                           | U3                 | UINT16 | R   |       |
| +4        | 0x4904   | Tariff #5 register                            | 0-Pmax                           | U3                 | UINT16 | R   |       |
| +5        | 0x4905   | Tariff #6 register                            | 0-Pmax                           | U3                 | UINT16 | R   |       |
| 8320-8325 |          | <b>Billing TOU Maximum Demand Register #3</b> |                                  |                    |        |     |       |
| +0        | 0x4A00   | Tariff #1 register                            | 0-Pmax                           | U3                 | UINT16 | R   |       |
| +1        | 0x4A01   | Tariff #2 register                            | 0-Pmax                           | U3                 | UINT16 | R   |       |
| +2        | 0x4A02   | Tariff #3 register                            | 0-Pmax                           | U3                 | UINT16 | R   |       |
| +3        | 0x4A03   | Tariff #4 register                            | 0-Pmax                           | U3                 | UINT16 | R   |       |
| +4        | 0x4A04   | Tariff #5 register                            | 0-Pmax                           | U3                 | UINT16 | R   |       |
| +5        | 0x4A05   | Tariff #6 register                            | 0-Pmax                           | U3                 | UINT16 | R   |       |

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

### 3.4 32-bit Binary and Analog Values

| Address     | Point ID | Description                     | Options/Range <sup>1</sup> | Units <sup>1</sup> | Type   | R/W | Notes                          |
|-------------|----------|---------------------------------|----------------------------|--------------------|--------|-----|--------------------------------|
| 11776-11777 | 0x0000   | <b>None</b>                     | 0                          |                    | UINT32 | R   |                                |
| 11840-11841 | 0x0080   | <b>Setpoint Status SP1-SP16</b> | 0x00000000<br>0x0000FFFF   | -                  | UINT32 | R   | Bitmap: 0=released, 1=operated |
| 13312-13377 |          | <b>1-Cycle Phase Values</b>     |                            |                    |        |     |                                |
| +0,1        | 0x0C00   | V1 Voltage                      | 0-Vmax                     | U1                 | UINT32 | R   |                                |
| +2,3        | 0x0C01   | V2 Voltage                      | 0-Vmax                     | U1                 | UINT32 | R   |                                |
| +4,5        | 0x0C02   | V3 Voltage                      | 0-Vmax                     | U1                 | UINT32 | R   |                                |
| +6,7        | 0x0C03   | I1 Current                      | 0-Imax                     | U2                 | UINT32 | R   |                                |
| +8,9        | 0x0C04   | I2 Current                      | 0-Imax                     | U2                 | UINT32 | R   |                                |
| +10,11      | 0x0C05   | I3 Current                      | 0-Imax                     | U2                 | UINT32 | R   |                                |
| +12,13      | 0x0C06   | kW L1                           | -Pmax-Pmax                 | U3                 | INT32  | R   |                                |
| +14,15      | 0x0C07   | kW L2                           | -Pmax-Pmax                 | U3                 | INT32  | R   |                                |
| +16,17      | 0x0C08   | kW L3                           | -Pmax-Pmax                 | U3                 | INT32  | R   |                                |
| +18,19      | 0x0C09   | kvar L1                         | -Pmax-Pmax                 | U3                 | INT32  | R   |                                |
| +20,21      | 0x0C0A   | kvar L2                         | -Pmax-Pmax                 | U3                 | INT32  | R   |                                |
| +22,23      | 0x0C0B   | kvar L3                         | -Pmax-Pmax                 | U3                 | INT32  | R   |                                |
| +24,25      | 0x0C0C   | kVA L1                          | 0-Pmax                     | U3                 | UINT32 | R   |                                |
| +26,27      | 0x0C0D   | kVA L2                          | 0-Pmax                     | U3                 | UINT32 | R   |                                |
| +28,29      | 0x0C0E   | kVA L3                          | 0-Pmax                     | U3                 | UINT32 | R   |                                |
| +30,31      | 0x0C0F   | Power factor L1                 | -1000-1000                 | x0.001             | INT32  | R   |                                |
| +32,33      | 0x0C10   | Power factor L2                 | -1000-1000                 | x0.001             | INT32  | R   |                                |
| +34,35      | 0x0C11   | Power factor L3                 | -1000-1000                 | x0.001             | INT32  | R   |                                |
| +36,37      | 0x0C12   | Reserved                        | 0                          |                    | UINT32 | R   |                                |
| +38,39      | 0x0C13   | Reserved                        | 0                          |                    | UINT32 | R   |                                |
| +40,41      | 0x0C14   | Reserved                        | 0                          |                    | UINT32 | R   |                                |
| +42,43      | 0x0C15   | Reserved                        | 0                          |                    | UINT32 | R   |                                |
| +44,45      | 0x0C16   | Reserved                        | 0                          |                    | UINT32 | R   |                                |
| +46,47      | 0x0C17   | Reserved                        | 0                          |                    | UINT32 | R   |                                |

| Address     | Point ID | Description                      | Options/Range <sup>1</sup> | Units <sup>1</sup> | Type   | R/W | Notes |
|-------------|----------|----------------------------------|----------------------------|--------------------|--------|-----|-------|
| +48,49      | 0x0C18   | Not used                         | 0                          |                    | UINT32 | R   |       |
| +50,51      | 0x0C19   | Not used                         | 0                          |                    | UINT32 | R   |       |
| +52,53      | 0x0C1A   | Not used                         | 0                          |                    | UINT32 | R   |       |
| +54,55      | 0x0C1B   | Reserved                         | 0                          |                    | UINT32 | R   |       |
| +56,57      | 0x0C1C   | Reserved                         | 0                          |                    | UINT32 | R   |       |
| +58,59      | 0x0C1D   | Reserved                         | 0                          |                    | UINT32 | R   |       |
| +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   |       |
| 13440-13453 |          | <b>1-Cycle Low Phase Values</b>  |                            |                    |        |     |       |
| +0,1        | 0x0D00   | Low L-N voltage                  | 0-Vmax                     | U1                 | UINT32 | R   |       |
| +2,3        | 0x0D01   | Low current                      | 0-Imax                     | U2                 | UINT32 | R   |       |
| +4,5        | 0x0D02   | Low kW                           | -Pmax-Pmax                 | U3                 | INT32  | R   |       |
| +6,7        | 0x0D03   | Low kvar                         | -Pmax-Pmax                 | U3                 | INT32  | R   |       |
| +8,9        | 0x0D04   | Low kVA                          | 0-Pmax                     | U3                 | UINT32 | R   |       |
| +10,11      | 0x0D05   | Low PF Lag                       | 0-1000                     | x0.001             | UINT32 | R   |       |
| +12,13      | 0x0D06   | Low PF Lead                      | 0-1000                     | x0.001             | UINT32 | R   |       |
| 13568-13581 |          | <b>1-Cycle High Phase Values</b> |                            |                    |        |     |       |
| +0,1        | 0x0E00   | High L-N voltage                 | 0-Vmax                     | U1                 | UINT32 | R   |       |
| +2,3        | 0x0E01   | High current                     | 0-Imax                     | U2                 | UINT32 | R   |       |
| +4,5        | 0x0E02   | High kW                          | -Pmax-Pmax                 | U3                 | INT32  | R   |       |
| +6,7        | 0x0E03   | High kvar                        | -Pmax-Pmax                 | U3                 | INT32  | R   |       |
| +8,9        | 0x0E04   | High kVA                         | 0-Pmax                     | U3                 | UINT32 | R   |       |
| +10,11      | 0x0E05   | High PF Lag                      | 0-1000                     | x0.001             | UINT32 | R   |       |
| +12,13      | 0x0E06   | High PF Lead                     | 0-1000                     | x0.001             | UINT32 | R   |       |
| 13696-13715 |          | <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   |       |

| Address     | Point ID | Description                     | Options/Range <sup>1</sup> | Units <sup>1</sup> | Type   | R/W | Notes |
|-------------|----------|---------------------------------|----------------------------|--------------------|--------|-----|-------|
| +6,7        | 0x0F03   | Total PF                        | -1000-1000                 | x0.001             | INT32  | R   |       |
| +8,9        | 0x0F04   | Total PF lag                    | 0-1000                     | x0.001             | UINT32 | R   |       |
| +10,11      | 0x0F05   | Total PF lead                   | 0-1000                     | x0.001             | UINT32 |     |       |
| +12,13      | 0x0F06   | Total kW import                 | 0-Pmax                     | U3                 | UINT32 |     |       |
| +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   |       |
| 13824-13833 |          | <b>1-Cycle Auxiliary Values</b> |                            |                    |        |     |       |
| +0,1        | 0x1500   | Not used                        |                            |                    | UINT32 | R   |       |
| +2,3        | 0x1501   | In (neutral) Current            | 0-I <sub>max</sub>         | U2                 | UINT32 | R   |       |
| +4,5        | 0x1502   | Frequency                       | 4500 – 6500                | x0.01Hz            | UINT32 | R   |       |
| +6,7        | 0x1503   | Voltage unbalance               | 0-3000                     | x0.1%              | UINT32 | R   |       |
| +8,9        | 0x1504   | Current unbalance               | 0-3000                     | x0.1%              | UINT32 | R   |       |
| 13888-13919 |          | <b>Phasor</b>                   |                            |                    |        |     |       |
| +0,1        | 0x1080   | V1 Voltage magnitude            | 0-V <sub>max</sub>         | U1                 | UINT32 | R   |       |
| +2,3        | 0x1081   | V2 Voltage magnitude            | 0-V <sub>max</sub>         | U1                 | UINT32 | R   |       |
| +4,5        | 0x1082   | V3 Voltage magnitude            | 0-V <sub>max</sub>         | U1                 | UINT32 | R   |       |
| +6,7        | 0x1083   | Not used                        |                            |                    | UINT32 | R   |       |
| +8,9        | 0x1084   | I1 Current magnitude            | 0-I <sub>max</sub>         | U2                 | UINT32 | R   |       |
| +10,11      | 0x1085   | I2 Current magnitude            | 0-I <sub>max</sub>         | U2                 | UINT32 | R   |       |
| +12,13      | 0x1086   | I3 Current magnitude            | 0-I <sub>max</sub>         | U2                 | UINT32 | R   |       |
| +14,15      | 0x1087   | Not used                        |                            |                    | UINT32 | R   |       |
| +16,17      | 0x1088   | V1 Voltage angle                | -1800-1800                 | x0.1°              | INT32  | R   |       |
| +18,19      | 0x1089   | V2 Voltage angle                | -1800-1800                 | x0.1°              | INT32  | R   |       |
| +20,21      | 0x108A   | V3 Voltage angle                | -1800-1800                 | x0.1°              | INT32  | R   |       |
| +22,23      | 0x108B   | Not used                        |                            |                    | INT32  | R   |       |
| +24,25      | 0x108C   | I1 Current angle                | -1800-1800                 | x0.1°              | INT32  | R   |       |
| +26,27      | 0x108D   | I2 Current angle                | -1800-1800                 | x0.1°              | INT32  | R   |       |
| +28,29      | 0x108E   | I3 Current angle                | -1800-1800                 | x0.1°              | INT32  | R   |       |

| Address     | Point ID | Description                  | Options/Range <sup>1</sup> | Units <sup>1</sup> | Type   | R/W | Notes |
|-------------|----------|------------------------------|----------------------------|--------------------|--------|-----|-------|
| +30,31      | 0x108F   | Not used                     |                            |                    | INT32  | R   |       |
| 13952-14017 |          | <b>1-Second Phase Values</b> |                            |                    |        |     |       |
| +0,1        | 0x1100   | V1 Voltage                   | 0-Vmax                     | U1                 | UINT32 | R   |       |
| +2,3        | 0x1101   | V2 Voltage                   | 0-Vmax                     | U1                 | UINT32 | R   |       |
| +4,5        | 0x1102   | V3 Voltage                   | 0-Vmax                     | U1                 | UINT32 | R   |       |
| +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                 | x0.001             | INT32  | R   |       |
| +32,33      | 0x1110   | Power factor L2              | -1000-1000                 | x0.001             | INT32  | R   |       |
| +34,35      | 0x1111   | Power factor L3              | -1000-1000                 | x0.001             | INT32  | R   |       |
| +36,37      | 0x1112   | Reserved                     | 0                          |                    | UINT32 | R   |       |
| +38,39      | 0x1113   | Reserved                     | 0                          |                    | UINT32 | R   |       |
| +40,41      | 0x1114   | Reserved                     | 0                          |                    | UINT32 | R   |       |
| +42,43      | 0x1115   | Reserved                     | 0                          |                    | UINT32 | R   |       |
| +44,45      | 0x1116   | Reserved                     | 0                          |                    | UINT32 | R   |       |
| +46,47      | 0x1117   | Reserved                     | 0                          |                    | UINT32 | R   |       |
| +48,49      | 0x1118   | Not used                     | 0                          |                    | UINT32 | R   |       |
| +50,51      | 0x1119   | Not used                     | 0                          |                    | UINT32 | R   |       |
| +52,53      | 0x111A   | Not used                     | 0                          |                    | UINT32 | R   |       |

| Address     | Point ID | Description                       | Options/Range <sup>1</sup> | Units <sup>1</sup> | Type   | R/W | Notes |
|-------------|----------|-----------------------------------|----------------------------|--------------------|--------|-----|-------|
| +54,55      | 0x111B   | Reserved                          | 0                          |                    | UINT32 | R   |       |
| +56,57      | 0x111C   | Reserved                          | 0                          |                    | UINT32 | R   |       |
| +58,59      | 0x111D   | Reserved                          | 0                          |                    | UINT32 | R   |       |
| +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   |       |
| 14080-14093 |          | <b>1-Second Low Phase Values</b>  |                            |                    |        |     |       |
| +0,1        | 0x1200   | Low L-N voltage                   | 0-Vmax                     | U1                 | UINT32 | R   |       |
| +2,3        | 0x1201   | Low current                       | 0-Imax                     | U2                 | UINT32 | R   |       |
| +4,5        | 0x1202   | Low kW                            | -Pmax-Pmax                 | U3                 | INT32  | R   |       |
| +6,7        | 0x1203   | Low kvar                          | -Pmax-Pmax                 | U3                 | INT32  | R   |       |
| +8,9        | 0x1204   | Low kVA                           | 0-Pmax                     | U3                 | UINT32 | R   |       |
| +10,11      | 0x1205   | Low PF Lag                        | 0-1000                     | x0.001             | UINT32 | R   |       |
| +12,13      | 0x1206   | Low PF Lead                       | 0-1000                     | x0.001             | UINT32 | R   |       |
| 14208-14221 |          | <b>1-Second High Phase Values</b> |                            |                    |        |     |       |
| +0,1        | 0x1300   | High L-N voltage                  | 0-Vmax                     | U1                 | UINT32 | R   |       |
| +2,3        | 0x1301   | High current                      | 0-Imax                     | U2                 | UINT32 | R   |       |
| +4,5        | 0x1302   | High kW                           | -Pmax-Pmax                 | U3                 | INT32  | R   |       |
| +6,7        | 0x1303   | High kvar                         | -Pmax-Pmax                 | U3                 | INT32  | R   |       |
| +8,9        | 0x1304   | High kVA                          | 0-Pmax                     | U3                 | UINT32 | R   |       |
| +10,11      | 0x1305   | High PF Lag                       | 0-1000                     | x0.001             | UINT32 | R   |       |
| +12,13      | 0x1306   | High PF Lead                      | 0-1000                     | x0.001             | UINT32 | R   |       |
| 14336-14355 |          | <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                 | x0.001             | INT32  | R   |       |
| +8,9        | 0x1404   | Total PF lag                      | 0-1000                     | x0.001             | UINT32 | R   |       |
| +10,11      | 0x1405   | Total PF lead                     | 0-1000                     | x0.001             | UINT32 |     |       |

| Address     | Point ID | Description                       | Options/Range <sup>1</sup> | Units <sup>1</sup> | Type   | R/W | Notes |
|-------------|----------|-----------------------------------|----------------------------|--------------------|--------|-----|-------|
| +12,13      | 0x1406   | Total kW import                   | 0-Pmax                     | U3                 | UINT32 |     |       |
| +14,15      | 0x1407   | Total kW export                   | 0-Pmax                     | U3                 | UINT32 | R   |       |
| +16,17      | 0x1408   | Total kvar import                 | 0-Pmax                     | U3                 | UINT32 | R   |       |
| +18,19      | 0x1409   | Total kvar export                 | 0-Pmax                     | U3                 | UINT32 | R   |       |
| 14464-14473 |          | <b>1-Second Auxiliary Values</b>  |                            |                    |        |     |       |
| +0,1        | 0x1500   | Not used                          |                            |                    | UINT32 | R   |       |
| +2,3        | 0x1501   | In (neutral) Current              | 0-I <sub>max</sub>         | U2                 | UINT32 | R   |       |
| +4,5        | 0x1502   | Frequency                         | 4500 – 6500                | x0.01Hz            | UINT32 | R   |       |
| +6,7        | 0x1503   | Voltage unbalance                 | 0-3000                     | x0.1%              | UINT32 | R   |       |
| +8,9        | 0x1504   | Current unbalance                 | 0-3000                     | x0.1%              | UINT32 | R   |       |
| 14592-14651 |          | <b>Present Demands</b>            |                            |                    |        |     |       |
| +0,1        | 0x1600   | V1 Volt demand                    | 0-V <sub>max</sub>         | U1                 | UINT32 | R   |       |
| +2,3        | 0x1601   | V2 Volt demand                    | 0-V <sub>max</sub>         | U1                 | UINT32 | R   |       |
| +4,5        | 0x1602   | V3 Volt demand                    | 0-V <sub>max</sub>         | U1                 | UINT32 | R   |       |
| +6,7        | 0x1603   | I1 Ampere demand                  | 0-I <sub>max</sub>         | U2                 | UINT32 | R   |       |
| +8,9        | 0x1604   | I2 Ampere demand                  | 0-I <sub>max</sub>         | U2                 | UINT32 | R   |       |
| +10,11      | 0x1605   | I3 Ampere demand                  | 0-I <sub>max</sub>         | U2                 | UINT32 | R   |       |
| +12,13      | 0x1606   | Not used                          |                            |                    | UINT32 | R   |       |
| +14,15      | 0x1607   | Not used                          |                            |                    | UINT32 | R   |       |
| +16,17      | 0x1608   | Not used                          |                            |                    | UINT32 | R   |       |
| +18,19      | 0x1609   | kW import sliding window demand   | 0-Pmax                     | U3                 | UINT32 | R   |       |
| +20,21      | 0x160A   | kvar import sliding window demand | 0-Pmax                     | U3                 | UINT32 | R   |       |
| +22,23      | 0x160B   | kVA sliding window demand         | 0-Pmax                     | U3                 | UINT32 | R   |       |
| +24,25      | 0x160C   | Not used                          | 0                          |                    | UINT32 | R   |       |
| +26,27      | 0x160D   | Not used                          | 0                          |                    | UINT32 | R   |       |
| +28,29      | 0x160E   | Not used                          | 0                          |                    | UINT32 | R   |       |
| +30,31      | 0x160F   | kW import accumulated demand      | 0-Pmax                     | U3                 | UINT32 | R   |       |
| +32,33      | 0x1610   | kvar import accumulated demand    | 0-Pmax                     | U3                 | UINT32 | R   |       |
| +34,35      | 0x1611   | kVA accumulated demand            | 0-Pmax                     | U3                 | UINT32 | R   |       |

| Address     | Point ID | Description                                 | Options/Range <sup>1</sup> | Units <sup>1</sup> | Type   | R/W | Notes |
|-------------|----------|---|----------------------------|--------------------|--------|-----|-------|
| +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   | Not used                                    |                            |                    | UINT32 | R   |       |
| +44,45      | 0x1616   | Not used                                    |                            |                    | UINT32 | R   |       |
| +46,47      | 0x1617   | Not used                                    |                            |                    | UINT32 | R   |       |
| +48,49      | 0x1618   | kW export sliding window demand             | 0-Pmax                     | U3                 | UINT32 | R   |       |
| +50,51      | 0x1619   | kvar export sliding window demand           | 0-Pmax                     | U3                 | UINT32 | R   |       |
| +52,53      | 0x161A   | kW export accumulated demand                | 0-Pmax                     | U3                 | UINT32 | R   |       |
| +54,55      | 0x161B   | kvar export accumulated demand              | 0-Pmax                     | U3                 | UINT32 | R   |       |
| +56,57      | 0x161C   | kW export predicted sliding window demand   | 0-Pmax                     | U3                 | UINT32 | R   |       |
| +58,59      | 0x161D   | kvar export predicted sliding window demand | 0-Pmax                     | U3                 | UINT32 | R   |       |
| 14720-14737 |          | <b>Total Energies</b>                       |                            |                    |        |     |       |
| +0,1        | 0x1700   | kWh import                                  | 0-999,999,999              | 0.1 kWh            | UINT32 | R   |       |
| +2,3        | 0x1701   | kWh export                                  | 0-999,999,999              | 0.1 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              | 0.1 kvarh          | UINT32 | R   |       |
| +10,11      | 0x1705   | kvarh export                                | 0-999,999,999              | 0.1 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              | 0.1 kVAh           | UINT32 | R   |       |
| 14784-14791 |          | <b>Billing Summary Registers</b>            |                            |                    |        |     |       |
| +0,1        | 0x1780   | Summary energy register #1                  | 0-999,999,999              | 0.1 kWh            | UINT32 | R   |       |
| +2,3        | 0x1781   | Summary energy register #2                  | 0-999,999,999              | 0.1 kWh            | UINT32 | R   |       |
| +4,5        | 0x1782   | Summary energy register #3                  | 0-999,999,999              | 0.1 kWh            | UINT32 | R   |       |
| +6,7        | 0x1783   | Summary energy register #4                  | 0-999,999,999              | 0.1 kWh            | UINT32 | R   |       |
| 18816-18839 |          | <b>Maximum Demands</b>                      |                            |                    |        |     |       |
| +0,1        | 0x3700   | V1 Maximum volt demand                      | 0-Vmax                     | U1                 | UINT32 | R   |       |

| Address     | Point ID | Description                               | Options/Range <sup>1</sup> | Units <sup>1</sup> | Type   | R/W | Notes |
|-------------|----------|---|----------------------------|--------------------|--------|-----|-------|
| +2,3        | 0x3701   | V2 Maximum volt demand                    | 0-Vmax                     | U1                 | UINT32 | R   |       |
| +4,5        | 0x3702   | V2 Maximum volt demand                    | 0-Vmax                     | U1                 | UINT32 | R   |       |
| +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   | Not used                                  | 0                          | U2                 | UINT32 | R   |       |
| +12,13      | 0x3706   | Not used                                  | 0                          |                    | UINT32 | R   |       |
| +14,15      | 0x3707   | Not used                                  | 0                          |                    | UINT32 | R   |       |
| +16,17      | 0x3708   | Not used                                  | 0                          |                    | UINT32 | R   |       |
| +18,19      | 0x3709   | Maximum kW import sliding window demand   | 0-Pmax                     | U3                 | UINT32 | R   |       |
| +20,21      | 0x370A   | Maximum kvar import sliding window demand | 0-Pmax                     | U3                 | UINT32 | R   |       |
| +22,23      | 0x370B   | Maximum kVA sliding window demand         | 0-Pmax                     | U3                 | UINT32 | R   |       |
| +24,25      | 0x3737   | Not used                                  |                            |                    | 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   |       |
| 19456-19459 |          | <b>Energy/TOU Parameters</b>              |                            |                    |        |     |       |
| +0,1        | 0x3C00   | Active tariff                             | 0-15                       |                    | UINT32 | R   |       |
| +2,3        | 0x3C01   | Active profile                            | 0-15                       |                    | UINT32 | R   |       |
| 19584-19595 |          | <b>Billing TOU Register #1</b>            |                            |                    |        |     |       |
| +0,1        | 0x3D00   | Tariff #1 register                        | 0-999,999,999              | 0.1 kWh            | UINT32 | R   |       |
| +2,3        | 0x3D01   | Tariff #2 register                        | 0-999,999,999              | 0.1 kWh            | UINT32 | R   |       |
| +4,5        | 0x3D02   | Tariff #3 register                        | 0-999,999,999              | 0.1 kWh            | UINT32 | R   |       |
| +6,7        | 0x3D03   | Tariff #4 register                        | 0-999,999,999              | 0.1 kWh            | UINT32 | R   |       |
| +8,9        | 0x3D04   | Tariff #5 register                        | 0-999,999,999              | 0.1 kWh            | UINT32 | R   |       |
| +10,11      | 0x3D05   | Tariff #6 register                        | 0-999,999,999              | 0.1 kWh            | UINT32 | R   |       |
| 19712-19723 |          | <b>Billing TOU Register #2</b>            |                            |                    |        |     |       |
| +0,1        | 0x3E00   | Tariff #1 register                        | 0-999,999,999              | 0.1 kWh            | UINT32 | R   |       |
| +2,3        | 0x3E01   | Tariff #2 register                        | 0-999,999,999              | 0.1 kWh            | UINT32 | R   |       |

| Address     | Point ID | Description                                   | Options/Range <sup>1</sup> | Units <sup>1</sup> | Type   | R/W | Notes |
|-------------|----------|---|----------------------------|--------------------|--------|-----|-------|
| +4,5        | 0x3E02   | Tariff #3 register                            | 0-999,999,999              | 0.1 kWh            | UINT32 | R   |       |
| +6,7        | 0x3E03   | Tariff #4 register                            | 0-999,999,999              | 0.1 kWh            | UINT32 | R   |       |
| +8,9        | 0x3E04   | Tariff #5 register                            | 0-999,999,999              | 0.1 kWh            | UINT32 | R   |       |
| +10, 11     | 0x3E05   | Tariff #6 register                            | 0-999,999,999              | 0.1 kWh            | UINT32 | R   |       |
| 19840-19851 |          | <b>Billing TOU Register #3</b>                |                            |                    |        |     |       |
| +0,1        | 0x3F00   | Tariff #1 register                            | 0-999,999,999              | 0.1 kWh            | UINT32 | R   |       |
| +2,3        | 0x3F01   | Tariff #2 register                            | 0-999,999,999              | 0.1 kWh            | UINT32 | R   |       |
| +4,5        | 0x3F02   | Tariff #3 register                            | 0-999,999,999              | 0.1 kWh            | UINT32 | R   |       |
| +6,7        | 0x3F03   | Tariff #4 register                            | 0-999,999,999              | 0.1 kWh            | UINT32 | R   |       |
| +8,9        | 0x3F04   | Tariff #5 register                            | 0-999,999,999              | 0.1 kWh            | UINT32 | R   |       |
| +10,11      | 0x3F05   | Tariff #6 register                            | 0-999,999,999              | 0.1 kWh            | UINT32 | R   |       |
| 19968-19979 |          | <b>Billing TOU Register #4</b>                |                            |                    |        |     |       |
| +0,1        | 0x4000   | Tariff #1 register                            | 0-999,999,999              | 0.1 kWh            | UINT32 | R   |       |
| +2,3        | 0x4001   | Tariff #2 register                            | 0-999,999,999              | 0.1 kWh            | UINT32 | R   |       |
| +4,5        | 0x4002   | Tariff #3 register                            | 0-999,999,999              | 0.1 kWh            | UINT32 | R   |       |
| +6,7        | 0x4003   | Tariff #4 register                            | 0-999,999,999              | 0.1 kWh            | UINT32 | R   |       |
| +8,9        | 0x4004   | Tariff #5 register                            | 0-999,999,999              | 0.1 kWh            | UINT32 | R   |       |
| +10,11      | 0x4005   | Tariff #6 register                            | 0-999,999,999              | 0.1 kWh            | UINT32 | R   |       |
| 20608-20615 |          | <b>Billing Summary Accumulated Demands</b>    |                            |                    |        |     |       |
| +0,1        | 0x4500   | Summary register #1                           | 0-Pmax                     | U3                 | UINT32 | R   |       |
| +2,3        | 0x4501   | Summary register #2                           | 0-Pmax                     | U3                 | UINT32 | R   |       |
| +4,5        | 0x4502   | Summary register #3                           | 0-Pmax                     | U3                 | UINT32 | R   |       |
| +6,7        | 0x4503   | Summary register #4                           | 0-Pmax                     | U3                 | UINT32 | R   |       |
| 20736-20743 |          | <b>Billing Summary Sliding Window Demands</b> |                            |                    |        |     |       |
| +0,1        | 0x4600   | Summary register #1                           | 0-Pmax                     | U3                 | UINT32 | R   |       |
| +2,3        | 0x4601   | Summary register #2                           | 0-Pmax                     | U3                 | UINT32 | R   |       |
| +4,5        | 0x4602   | Summary register #3                           | 0-Pmax                     | U3                 | UINT32 | R   |       |
| +6,7        | 0x4603   | Summary register #4                           | 0-Pmax                     | U3                 | UINT32 | R   |       |
| 20928-20935 |          | <b>Billing Summary Maximum Demands</b>        |                            |                    |        |     |       |

| Address     | Point ID | Description                                   | Options/Range <sup>1</sup> | Units <sup>1</sup> | Type   | R/W | Notes |
|-------------|----------|---|----------------------------|--------------------|--------|-----|-------|
| +0,1        | 0x4780   | Summary register #1                           | 0-Pmax                     | U3                 | UINT32 | R   |       |
| +2,3        | 0x4781   | Summary register #2                           | 0-Pmax                     | U3                 | UINT32 | R   |       |
| +4,5        | 0x4782   | Summary register #3                           | 0-Pmax                     | U3                 | UINT32 | R   |       |
| +6,7        | 0x4783   | Summary register #4                           | 0-Pmax                     | U3                 | UINT32 | R   |       |
| 20992-21003 |          | <b>Billing TOU Maximum Demand Register #1</b> |                            |                    |        |     |       |
| +0,1        | 0x4800   | Tariff #1 register                            | 0-Pmax                     | U3                 | UINT32 | R   |       |
| +2,3        | 0x4801   | Tariff #2 register                            | 0-Pmax                     | U3                 | UINT32 | R   |       |
| +4,5        | 0x4802   | Tariff #3 register                            | 0-Pmax                     | U3                 | UINT32 | R   |       |
| +6,7        | 0x4803   | Tariff #4 register                            | 0-Pmax                     | U3                 | UINT32 | R   |       |
| +8,9        | 0x4804   | Tariff #5 register                            | 0-Pmax                     | U3                 | UINT32 | R   |       |
| +10,11      | 0x4805   | Tariff #6 register                            | 0-Pmax                     | U3                 | UINT32 | R   |       |
| 21120-21131 |          | <b>Billing TOU Maximum Demand Register #2</b> |                            |                    |        |     |       |
| +0,1        | 0x4900   | Tariff #1 register                            | 0-Pmax                     | U3                 | UINT32 | R   |       |
| +2,3        | 0x4901   | Tariff #2 register                            | 0-Pmax                     | U3                 | UINT32 | R   |       |
| +4,5        | 0x4902   | Tariff #3 register                            | 0-Pmax                     | U3                 | UINT32 | R   |       |
| +6,7        | 0x4903   | Tariff #4 register                            | 0-Pmax                     | U3                 | UINT32 | R   |       |
| +8,9        | 0x4904   | Tariff #5 register                            | 0-Pmax                     | U3                 | UINT32 | R   |       |
| +10,11      | 0x4905   | Tariff #6 register                            | 0-Pmax                     | U3                 | UINT32 | R   |       |
| 21248-21259 |          | <b>Billing TOU Maximum Demand Register #3</b> |                            |                    |        |     |       |
| +0,1        | 0x4A00   | Tariff #1 register                            | 0-Pmax                     | U3                 | UINT32 | R   |       |
| +2,3        | 0x4A01   | Tariff #2 register                            | 0-Pmax                     | U3                 | UINT32 | R   |       |
| +4,5        | 0x4A02   | Tariff #3 register                            | 0-Pmax                     | U3                 | UINT32 | R   |       |
| +6,7        | 0x4A03   | Tariff #4 register                            | 0-Pmax                     | U3                 | UINT32 | R   |       |
| +8,9        | 0x4A04   | Tariff #5 register                            | 0-Pmax                     | U3                 | UINT32 | R   |       |
| +10,11      | 0x4A05   | Tariff #6 register                            | 0-Pmax                     | U3                 | UINT32 | R   |       |
| 21056-21067 |          | <b>Billing TOU Maximum Demand Register #4</b> |                            |                    |        |     |       |
| +0,1        | 0x4880   | Tariff #1 register                            | 0-Pmax                     | U3                 | UINT32 | R   |       |
| +2,3        | 0x4881   | Tariff #2 register                            | 0-Pmax                     | U3                 | UINT32 | R   |       |
| +4,5        | 0x4882   | Tariff #3 register                            | 0-Pmax                     | U3                 | UINT32 | R   |       |

| Address | Point ID | Description   | Options/Range <sup>1</sup> | Units <sup>1</sup> | Type   | R/W | Notes            |
|---------|----------|---|----------------------------|--------------------|--------|-----|------------------|
| +6,7    | 0x4883   | Tariff #4 register                                      | 0-Pmax                     | U3                 | UINT32 | R   |                  |
| +8,9    | 0x4884   | Tariff #5 register                                      | 0-Pmax                     | U3                 | UINT32 | R   |                  |
| +10,11  | 0x4885   | Tariff #6 register                                      | 0-Pmax                     | U3                 | UINT32 | R   |                  |
|         |          | <b>Generic TOU Season Energy Registers ID's</b>         |                            |                    |        |     | Point references |
|         | 0x7000   | Tariff #1 register                                      | 0-999,999,999              | 0.1 kWh            | UINT32 | R   |                  |
|         | 0x7001   | Tariff #2 register                                      | 0-999,999,999              | 0.1 kWh            | UINT32 | R   |                  |
|         | 0x7002   | Tariff #3 register                                      | 0-999,999,999              | 0.1 kWh            | UINT32 | R   |                  |
|         | 0x7003   | Tariff #4 register                                      | 0-999,999,999              | 0.1 kWh            | UINT32 | R   |                  |
|         | 0x7004   | Tariff #5 register                                      | 0-999,999,999              | 0.1 kWh            | UINT32 | R   |                  |
|         | 0x7005   | Tariff #6 register                                      | 0-999,999,999              | 0.1 kWh            | UINT32 | R   |                  |
|         |          | <b>Generic TOU Season Maximum Demand Registers ID's</b> |                            |                    |        |     | Point references |
|         | 0x7100   | Tariff #1 register                                      | 0-Pmax                     | U3                 | UINT32 | R   |                  |
|         | 0x7101   | Tariff #2 register                                      | 0-Pmax                     | U3                 | UINT32 | R   |                  |
|         | 0x7102   | Tariff #3 register                                      | 0-Pmax                     | U3                 | UINT32 | R   |                  |
|         | 0x7103   | Tariff #4 register                                      | 0-Pmax                     | U3                 | UINT32 | R   |                  |
|         | 0x7104   | Tariff #5 register                                      | 0-Pmax                     | U3                 | UINT32 | R   |                  |
|         | 0x7105   | Tariff #6 register                                      | 0-Pmax                     | U3                 | UINT32 | R   |                  |

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

### 3.5 Minimum/Maximum Log Registers

| Address          | Point ID | Description                                     | Options/Range <sup>1</sup> | Units <sup>1</sup> | Type             | R/W    | Notes |
|------------------|----------|---|----------------------------|--------------------|------------------|--------|-------|
| 37504-37519      |          | <b>Billing Summary 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      |       |
| +8,9<br>+10,11   | 0x4782   | Summary register #3 Maximum Demand<br>Timestamp | 0-Pmax                     | U3                 | UINT32           | R      |       |
| +12,13<br>+14,15 | 0x4783   | Summary register #4 Maximum Demand<br>Timestamp | 0-Pmax                     | U3                 | UINT32           | R      |       |
| 37632-37699      |          | <b>Maximum Demands</b>                          |                            |                    |                  |        |       |
| +0,1<br>+2,3     | 0x3700   | V1 Maximum volt demand<br>Timestamp             | 0-Vmax                     | U1<br>sec          | UINT32<br>UINT32 | R<br>R |       |
| +4,5<br>+6,7     | 0x3701   | V2 Maximum volt demand<br>Timestamp             | 0-Vmax                     | U1<br>sec          | UINT32<br>UINT32 | R<br>R |       |
| +8,9<br>+10,11   | 0x3702   | V3 Maximum volt demand<br>Timestamp             | 0-Vmax                     | U1<br>sec          | UINT32<br>UINT32 | R<br>R |       |
| +12,13<br>+14,15 | 0x3703   | I1 Maximum ampere demand<br>Timestamp           | 0-Imax                     | U2<br>sec          | UINT32<br>UINT32 | R<br>R |       |
| +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   | I2 Maximum ampere demand<br>Timestamp           | 0-Imax                     | U2<br>sec          | UINT32<br>UINT32 | R<br>R |       |
| +24,25<br>+26,27 | 0x3706   | Not used  | 0                          |                    | UINT32<br>UINT32 | R<br>R |       |
| +28,29<br>+30,31 | 0x3707   | Not used  | 0                          |                    | UINT32<br>UINT32 | R<br>R |       |

| Address          | Point ID | Description  | Options/Range <sup>1</sup> | Units <sup>1</sup> | Type             | R/W    | Notes |
|------------------|----------|--|----------------------------|--------------------|------------------|--------|-------|
| +32,33<br>+34,35 | 0x3708   | Not used   | 0                          |                    | 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 | 0x370C   | 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 |       |
| 38144-38167      |          | <b>Billing TOU Maximum Demand Register #1</b>          |                            |                    |                  |        |       |
| +0,1<br>+2,3     | 0x4800   | Tariff #1 register<br>Timestamp                        | 0-Pmax                     | U3<br>sec          | UINT32<br>UINT32 | R<br>R |       |
| +4,5<br>+6,7     | 0x4801   | Tariff #2 register<br>Timestamp                        | 0-Pmax                     | U3<br>sec          | UINT32<br>UINT32 | R<br>R |       |
| +8,9<br>+10,11   | 0x4802   | Tariff #3 register<br>Timestamp                        | 0-Pmax                     | U3<br>sec          | UINT32<br>UINT32 | R<br>R |       |
| +12,13<br>+14,15 | 0x4803   | Tariff #4 register<br>Timestamp                        | 0-Pmax                     | U3<br>sec          | UINT32<br>UINT32 | R<br>R |       |
| +16,17           | 0x4804   | Tariff #5 register                                     | 0-Pmax                     | U3                 | UINT32           | R      |       |

| Address          | Point ID | Description                                   | Options/Range <sup>1</sup> | Units <sup>1</sup> | Type             | R/W    | Notes |
|------------------|----------|---|----------------------------|--------------------|------------------|--------|-------|
| +18,19           |          | Timestamp                                     |                            | sec                | UINT32           | R      |       |
| +20,21<br>+22,23 | 0x4805   | Tariff #6 register<br>Timestamp               | 0-Pmax                     | U3<br>sec          | UINT32<br>UINT32 | R<br>R |       |
| 38400-38423      |          | <b>Billing TOU Maximum Demand Register #2</b> |                            |                    |                  |        |       |
| +0,1<br>+2,3     | 0x4900   | Tariff #1 register<br>Timestamp               | 0-Pmax                     | U3<br>sec          | UINT32<br>UINT32 | R<br>R |       |
| +4,5<br>+6,7     | 0x4901   | Tariff #2 register<br>Timestamp               | 0-Pmax                     | U3<br>sec          | UINT32<br>UINT32 | R<br>R |       |
| +8,9<br>+10,11   | 0x4902   | Tariff #3 register<br>Timestamp               | 0-Pmax                     | U3<br>sec          | UINT32<br>UINT32 | R<br>R |       |
| +12,13<br>+14,15 | 0x4903   | Tariff #4 register<br>Timestamp               | 0-Pmax                     | U3<br>sec          | UINT32<br>UINT32 | R<br>R |       |
| +16,17<br>+18,19 | 0x4904   | Tariff #5 register<br>Timestamp               | 0-Pmax                     | U3<br>sec          | UINT32<br>UINT32 | R<br>R |       |
| +20,21<br>+22,23 | 0x4905   | Tariff #6 register<br>Timestamp               | 0-Pmax                     | U3<br>sec          | UINT32<br>UINT32 | R<br>R |       |
| 38656-38679      |          | <b>Billing TOU Maximum Demand Register #3</b> |                            |                    |                  |        |       |
| +0,1<br>+2,3     | 0x4A00   | Tariff #1 register<br>Timestamp               | 0-Pmax                     | U3<br>sec          | UINT32<br>UINT32 | R<br>R |       |
| +4,5<br>+6,7     | 0x4A01   | Tariff #2 register<br>Timestamp               | 0-Pmax                     | U3<br>sec          | UINT32<br>UINT32 | R<br>R |       |
| +8,9<br>+10,11   | 0x4A02   | Tariff #3 register<br>Timestamp               | 0-Pmax                     | U3<br>sec          | UINT32<br>UINT32 | R<br>R |       |
| +12,13<br>+14,15 | 0x4A03   | Tariff #4 register<br>Timestamp               | 0-Pmax                     | U3<br>sec          | UINT32<br>UINT32 | R<br>R |       |
| +16,17<br>+18,19 | 0x4A04   | Tariff #5 register<br>Timestamp               | 0-Pmax                     | U3<br>sec          | UINT32<br>UINT32 | R<br>R |       |
| +20,21           | 0x4A05   | Tariff #6 register                            | 0-Pmax                     | U3                 | UINT32           | R      |       |

| Address          | Point ID | Description                                   | Options/Range <sup>1</sup> | Units <sup>1</sup> | Type             | R/W    | Notes |
|------------------|----------|---|----------------------------|--------------------|------------------|--------|-------|
| +22,23           |          | Timestamp                                     |                            | sec                | UINT32           | R      |       |
| 38272-38295      |          | <b>Billing TOU Maximum Demand Register #4</b> |                            |                    |                  |        |       |
| +0,1<br>+2,3     | 0x4880   | Tariff #1 register<br>Timestamp               | 0-Pmax                     | U3<br>sec          | UINT32<br>UINT32 | R<br>R |       |
| +4,5<br>+6,7     | 0x4881   | Tariff #2 register<br>Timestamp               | 0-Pmax                     | U3<br>sec          | UINT32<br>UINT32 | R<br>R |       |
| +8,9<br>+10,11   | 0x4882   | Tariff #3 register<br>Timestamp               | 0-Pmax                     | U3<br>sec          | UINT32<br>UINT32 | R<br>R |       |
| +12,13<br>+14,15 | 0x4883   | Tariff #4 register<br>Timestamp               | 0-Pmax                     | U3<br>sec          | UINT32<br>UINT32 | R<br>R |       |
| +16,17<br>+18,19 | 0x4884   | Tariff #5 register<br>Timestamp               | 0-Pmax                     | U3<br>sec          | UINT32<br>UINT32 | R<br>R |       |
| +20,21<br>+22,23 | 0x4885   | Tariff #6 register<br>Timestamp               | 0-Pmax                     | U3<br>sec          | UINT32<br>UINT32 | R<br>R |       |

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

## 3.6 Device Control and Status Registers

| Address                               | Point ID | Description   | Options/Range   | Units | Type   | R/W | Notes                        |
|---------------------------------------|----------|---|---|-------|--------|-----|------------------------------|
| <b>Reset/Clear Registers</b>          |          |   |   |       |        |     |                              |
|                                       | 44103    | Clear maximum demands   | <u>Individual for each submeter</u><br>0 = clear all maximum demands<br>1 = clear power demands<br>2 = clear volt and ampere demands<br>3 = clear volt demands<br>4 = clear ampere demands<br><u>All submeters</u><br>129 = clear all maximum demands<br>130 = clear power demands<br>132 = clear volt and ampere demands |       | UINT16 | W   |                              |
|                                       | 44105    | Clear Billing/TOU maximum demands   | 0 = Individual submeter<br>7 = All submeters  |       | UINT16 | W   |                              |
|                                       | 44108    | Clear operation/event counters  | 6 = clear communication counters  |       | UINT16 | W   | Individual for each submeter |
| <b>Setpoint Status Registers</b>      |          |   |   |       |        |     |                              |
|                                       | 44294    | Setpoints 1-4 status (bitmap: 0=released, 1=operated)   | 0x00000000 - 0x0000000F   |       | UINT32 | R   | Individual for each submeter |
| <b>Setpoint Alarm Latch Registers</b> |          |   |   |       |        |     |                              |
|                                       | 44310    | Setpoints 1-4 alarm status, nonvolatile (bitmap).<br>Read: 0 = no setpoint operations logged, 1=setpoint has been operated at least once since the last alarm reset.<br>Write: 0=clear setpoint alarm bit, 1=no effect. | 0x0000 - 0x000F   |       | UINT16 | R/W | Individual for each submeter |

| Address                              | Point ID | Description  | Options/Range   | Units | Type   | R/W | Notes                       |
|--------------------------------------|----------|--|---|-------|--------|-----|-----------------------------|
| 44312-44325                          |          | Reserved   |   |       |        |     |                             |
| <b>Device Diagnostics Register</b>   |          |  |   |       |        |     |                             |
| 44326-44327                          |          | Device self-diagnostics flags, nonvolatile (bitmap).<br>Read: 0=no faults logged, 1=diagnostic bit has been set at least once since the last reset.<br>Write: 0=clear diagnostic bit, 1=no effect. | F23   |       | UINT32 | R/W | Shared across all submeters |
| 44328-44341                          |          | Reserved   |   |       |        |     |                             |
| <b>Port Identification Registers</b> |          |  |   |       |        |     |                             |
| 44342                                |          | Current port number  | 0=COM1, 1=COM2  |       | UINT16 | R   |                             |
| 44343                                |          | Communication interface  | 0=RS-232, 1=RS-422,<br>2=RS-485, 3=Infrared,<br>4=Dial-Up Modem,<br>5=RF Modem, 6=Ethernet,<br>8=GSM/GPRS |       | UINT16 | R   |                             |
| <b>Current Network Settings</b>      |          |  |   |       |        |     |                             |
| 44346-44377                          |          |  |   |       |        |     |                             |
| +0, 1                                |          | Active device IP Address   |   |       | UINT32 | R   | Network byte order          |
| +2, 3                                |          | Active network subnet mask   |   |       | UINT32 | R   | Network byte order          |
| +4, 5                                |          | Active network default gateway   |   |       | UINT32 | R   | Network byte order          |
| 44352-44377                          |          | Reserved   |   |       |        |     |                             |
| <b>Device Authorization Register</b> |          |  |   |       |        |     |                             |
| 44378-44379                          |          | When write: 8-digit password. When read: 0 = access permitted, -1 = authorization required.  | 0 - 99999999 (write)<br>0/-1 (read)   |       | INT32  | R/W |                             |
| <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,   |       | UINT16 | R   |                             |

| Address                             | Point ID | Description                                    | Options/Range  | Units | Type   | R/W | Notes       |
|-------------------------------------|----------|--|----------------|-------|--------|-----|-------------|
|                                     |          |  | 2 = registered |       |        |     |             |
| 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 |
| <b>Factory Diagnostic Registers</b> |          |  |                |       |        |     |             |
| 45952-46079                         |          | Factory diagnostic registers                   |                |       | UINT32 | R   |             |

## 3.7 Device Setup Registers

| Address   | Point ID | Description                      | Options/Range   | Units     | Type   | R/W | Notes                                       |
|---|----------|----------------------------------|-----------------|-----------|--------|-----|---|
| <b>Control/Alarm Setpoints Setup</b>              |          |                                  |                 |           |        |     |   |
| 2576-2607   |          |                                  |                 |           |        |     | Individually configurable for each submeter |
| +0  |          | Trigger parameter ID             | F12             |           | UINT16 | R/W |   |
| +1  |          | Action                           | F14             |           | UINT16 | R/W |   |
| +2  |          | Operate delay                    | 0-9999          | × 0.1 sec | UINT16 | R/W |   |
| +3  |          | Release delay                    | 0-9999          | × 0.1 sec | UINT16 | R/W |   |
| +4,5  |          | Operate limit                    | See Section 3.4 |           | INT32  | R/W |   |
| +6,7  |          | Release limit                    | See Section 3.4 |           | INT32  | R/W |   |
| 2576-2583   |          | <b>Setpoint #1</b>               |                 |           |        |     |   |
| 2584-2591   |          | <b>Setpoint #2</b>               |                 |           |        |     |   |
| 2592-2599   |          | <b>Setpoint #3</b>               |                 |           |        |     |   |
| 2600-2607   |          | <b>Setpoint #4</b>               |                 |           |        |     |   |
| <b>Factory Device Settings and Identification</b> |          |                                  |                 |           |        |     |   |
| 46080-46207                                       |          |                                  |                 |           |        |     | Shared across all submeters                 |
| +0, 1   |          | Device serial number             |                 |           | UINT32 | R   |   |
| +2, 3   |          | Device model ID                  | 136/036         |           | UINT32 | R   |   |
| +4-11   |          | Device model name                | "BFM136/036"    |           | CHAR16 | R   | Null-terminated string                      |
| +12-13  |          | Device options (bitmap)          |                 |           | UINT32 | R   |   |
| +14-19  |          | Reserved                         |                 |           | UINT16 | R   |   |
| +20   |          | Device firmware version number   |                 |           | UINT16 | R   |   |
| +21   |          | Device firmware build number     |                 |           | UINT16 | R   |   |
| +22   |          | RF modem firmware version number |                 |           | UINT16 | R   |   |
| +23   |          | RF modem firmware build number   |                 |           | UINT16 | R   |   |
| +24   |          | Boot loader version number       |                 |           | UINT16 | R   |   |
| +25   |          | Boot loader build number         |                 |           | UINT16 | R   |   |
| +26-31  |          | Reserved                         |                 |           | UINT16 | R   |   |
| +32   |          | V1-V3 inputs range               | 120, 277        | V         | UINT16 | R   |   |

| Address            | Point ID | Description                           | Options/Range                  | Units | Type   | R/W | Notes                       |
|--------------------|----------|---------------------------------------|--------------------------------|-------|--------|-----|-----------------------------|
| +33                |          | V1-V3 inputs overload                 | 125                            | %     | UINT16 | R   |                             |
| +34                |          | Reserved                              |                                |       | UINT16 | R   |                             |
| +35                |          | Reserved                              |                                |       | UINT16 | R   |                             |
| +36                |          | I1-I3 inputs range                    | 1, 5, 50                       | A     | UINT16 | R   |                             |
| +37                |          | I1-I3 inputs overload                 | 200                            | %     | UINT16 | R   |                             |
| +38-95             |          | Reserved                              |                                | A     | UINT16 | R   |                             |
| +96                |          | Ethernet MAC address 0-1              | 0x0500                         |       | UINT16 | R   |                             |
| +97                |          | Ethernet MAC address 2-3              | 0x00F0                         |       | UINT16 | R   |                             |
| +98                |          | Ethernet MAC address 4-5              | 0x0000-0xFFFF                  |       | UINT16 | R   |                             |
| +99-128            |          | Reserved                              |                                |       | UINT16 | R   |                             |
| <b>Basic Setup</b> |          |                                       |                                |       |        |     |                             |
| 46208-46271        |          |                                       |                                |       |        |     | Shared across all submeters |
| +0                 |          | Wiring mode                           | 1 = 4LN3 (4-wire WYE)          |       | UINT16 | R/W |                             |
| +1                 |          | PT ratio (primary to secondary ratio) | 10 - 65000                     | × 0.1 | UINT16 | R/W |                             |
| +2                 |          | PT secondary (Line-to-Line)           | 480                            | V     | UINT16 | R/W | Not used                    |
| +3                 |          | Reserved                              |                                |       | UINT16 | R/W |                             |
| +4                 |          | Reserved                              |                                |       | UINT16 | R/W |                             |
| +5                 |          | CT primary current                    | 1-10000                        | A     | UINT16 | R/W |                             |
| +6                 |          | CT secondary current                  | 1, 5, 50                       | A     | UINT16 | R/W |                             |
| +7-16              |          | Reserved                              |                                |       | UINT16 | R/W |                             |
| +17                |          | Nominal line frequency                | 50, 60                         | Hz    | UINT16 | R/W |                             |
| +18-23             |          | Reserved                              |                                |       | UINT16 | R/W |                             |
| +24                |          | Maximum demand load current           | 0-10000 (0=CT primary current) | A     | UINT16 | R/W |                             |
| +25-31             |          | Reserved                              |                                |       | UINT16 | R/W |                             |

| Address                     | Point ID | Description                          | Options/Range  | Units    | Type   | R/W | Notes  |
|-----------------------------|----------|--------------------------------------|--|----------|--------|-----|--|
| <b>Demands Setup</b>        |          |                                      |  |          |        |     |  |
| 46240-46255                 |          |                                      |  |          |        |     | Shared across all submeters  |
| +0                          |          | Power block demand period            | 1, 2, 3, 5, 10, 15, 30, 60   | min      | UINT16 | R/W |  |
| +1                          |          | Number of blocks in a sliding window | 1-15   |          | UINT16 | R/W |  |
| +2-7                        |          | Reserved                             |  |          | UINT16 | R/W |  |
| +8                          |          | Volt demand period                   | 0-9000   | sec      | UINT16 | R/W |  |
| +9                          |          | Ampere demand period                 | 0-9000   | sec      | UINT16 | R/W |  |
| <b>Device Options Setup</b> |          |                                      |  |          |        |     |  |
| 46256-46399                 |          |                                      |  |          |        |     | Shared across all submeters  |
| +0                          |          | Power calculation mode               | 0=using reactive power:<br>$S = f(P, Q)$ ,<br>1=using non-active power:<br>$Q = f(S, P)$ |          | UINT16 | R/W |  |
| +1                          |          | Energy roll value                    | 2 = 0.1x106, 3 = 0.1x107,<br>4 = 0.1x108, 5 = 0.1x109                                    |          | UINT16 | R/W |  |
| +2-6                        |          | Reserved                             |  |          | UINT16 | R/W |  |
| +7                          |          | Energy test mode                     | 0 = disabled, 1 = Wh pulse test,<br>2 = varh pulse test                                  |          | UINT16 | R/W |  |
| +8                          |          | Wh LED pulse rate, Wh/pulse          | 1 – 10000  | × 0.01Wh | UINT16 | R/W |  |
| +9                          |          | Reserved                             |  |          | UINT16 | R/W |  |
| +10                         |          | Wh LED pulse source                  | 0 = disabled, 1-40 = submeter  |          | UINT16 | R/W |  |
| +11-143                     |          | Reserved                             |  |          | UINT16 | R/W |  |
| <b>Local Settings</b>       |          |                                      |  |          |        |     |  |
| 46400-46415                 |          |                                      |  |          |        |     | Shared across all submeters  |
| +0                          |          | Local time offset, min               | 0-+/-720   |          | INT16  | R/W | Offset in minutes from UTC<br>(Universal Coordinated or Greenwich Mean time) |

| Address                       | Point ID | Description                               | Options/Range   | Units     | Type   | R/W | Notes                       |
|-------------------------------|----------|---|---|-----------|--------|-----|-----------------------------|
| +1                            |          | Daylight savings time (DST) option        | 0=DST disabled (standard time only), 1=DST enabled                  |           | UINT16 | R/W |                             |
| +2                            |          | DST start month                           | 1-12  |           | UINT16 | R/W |                             |
| +3                            |          | DST start week of the month               | 1=1st, 2=2nd, 3=3rd,<br>4=4th week, 5=the last week of<br>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,<br>4=4th week, 5=the last week of<br>the month |           | UINT16 | R/W |                             |
| +7                            |          | DST end weekday                           | 1-7 (1=Sun, 7=Sat)  |           | UINT16 | R/W |                             |
| +8                            |          | Reserved                                  |   |           | UINT16 | R/W |                             |
| +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 |     |                             |
| <b>Clock Setup and Status</b> |          |   |   |           |        |     |                             |
| 46416-46447                   |          |   |   |           |        |     | Shared across all submeters |
| +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 |                             |

| Address                          | Point ID | Description                       | Options/Range  | Units | Type   | R/W | Notes                       |
|----------------------------------|----------|-----------------------------------|--|-------|--------|-----|-----------------------------|
| +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,<br>1=daylight savings time is active  |       | UINT16 | R   |                             |
| +13-31                           |          | Reserved                          |  |       | UINT16 |     |                             |
| <b>Communication Ports Setup</b> |          |                                   |  |       |        |     |                             |
| 46448-46575                      |          |                                   |  |       |        |     | Shared across all submeters |
| +0                               |          | Communication protocol            | 0=Modbus RTU,<br>1=Modbus ASCII  |       | UINT16 | R/W |                             |
| +1                               |          | Communication interface           | 0=RS-232, 1=RS-422,<br>2=RS-485, 3=Infrared,<br>4=Dial-Up Modem,<br>5=RF Modem   |       | UINT16 | R/W |                             |
| +2                               |          | Device reference address          | 1-247  |       | UINT16 | R/W |                             |
| +3                               |          | Baud rate                         | 1=300 bps, 2=600 bps,<br>3=1200 bps, 4=2400 bps,<br>5=4800 bps, 6=9600 bps,<br>7=19200 bps, 8=38400 bps,<br>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                               |          | CTS mode                          | 0=not used, 1=wait for CTS<br>before sending data  |       | UINT16 | R/W |                             |
| +6                               |          | RTS mode                          | 0=not used,<br>1=RTS is asserted during the<br>transmission  |       | UINT16 | R/W |                             |
| +7                               |          | Minimum delay before sending data | 0-1000 (default = 5)   | ms    | UINT16 | R/W |                             |

| Address               | Point ID | Description              | Options/Range                       | Units | Type   | R/W | Notes                       |
|-----------------------|----------|--------------------------|-------------------------------------|-------|--------|-----|-----------------------------|
| +8                    |          | Inter-character time-out | 0-1000 (default = 4-character time) | ms    | UINT16 | R/W |                             |
| +9-15                 |          | Reserved                 |                                     |       |        |     |                             |
| 46448-46463           |          | <b>COM1 Setup</b>        |                                     |       |        |     |                             |
| 46464-46479           |          | <b>COM2 Setup</b>        |                                     |       |        |     |                             |
| 46480-46575           |          | Reserved                 |                                     |       |        |     |                             |
| <b>Network Setup</b>  |          |                          |                                     |       |        |     |                             |
| 46576-46607           |          |                          |                                     |       |        |     | Shared across all submeters |
| +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                    |       | UINT32 | R/W |                             |
| +10,11                |          | Primary DNS IP address   | 0x00000000-0xFFFFFFFF               |       | UINT32 | R/W | Network byte order          |
| +12,13                |          | Secondary DNS IP address | 0x00000000-0xFFFFFFFF               |       | UINT32 | R/W | Network byte order          |
| +14-31                |          | Reserved                 |                                     |       |        |     |                             |
| <b>RF Modem Setup</b> |          |                          |                                     |       |        |     |                             |
| 46608-46639           |          |                          |                                     |       |        |     | Shared across all submeters |
| +0                    |          | MAC net ID               | 0-255                               |       | UINT16 | R/W | Read as 0                   |
| +1                    |          | MAC node ID              | 1-255                               |       | UINT16 | R/W | Read as 0                   |
| +2                    |          | Net cluster ID           | 0-255                               |       | UINT16 | R/W | Read as 0                   |
| +3                    |          | Net node ID              | 1-255                               |       | UINT16 | R/W | Read as 0                   |
| +4                    |          | Node type                | 0=master, 1=RN+, 2= RN-, 3=RFD      |       | UINT16 | R/W | Read as 0                   |
| +5                    |          | RF channel               | 0=907MHz, 1=910MHz,                 |       | UINT16 | R/W | Read as 0                   |

| Address                           | Point ID | Description                                 | Options/Range  | Units | Type   | R/W | Notes                       |
|-----------------------------------|----------|---|--|-------|--------|-----|-----------------------------|
|                                   |          |   | 2= 912MHz, 3=915MHz,<br>4=917MHz, 5=920MHz,<br>6=922MHz                                |       |        |     |                             |
| +6                                |          | RF send power                               | 0-255 (2=-20dBm, 9=-10dBm,<br>160=0dBm, 255=4dBm)                                      |       | UINT16 | R/W | Read as 0                   |
| +7                                |          | Number of cluster child nodes (master only) | 0-255  |       | UINT16 | R/W | Read as 0                   |
| +8                                |          | Network cluster tree depth (master only)    | 0-255  |       | UINT16 | R/W | Read as 0                   |
| +9                                |          | Network routing algorithm (master only)     | 0=AODV (Ad-hoc on-demand<br>vector), 1=cluster tree,<br>2=hybrid (cluster tree + AODV) |       | UINT16 | R/W | Read as 0                   |
| +10-31                            |          | Reserved                                    |  |       |        |     |                             |
| 46640-46703                       |          | <b>Reserved</b>                             |  |       |        |     |                             |
| <b>Password Setup</b>             |          |   |  |       |        |     |                             |
| 46704-46715                       |          |   |  |       |        |     | Shared across all submeters |
| +0, 1                             |          | Communications password (8 digits)          | 0 - 99999999   |       | UINT32 | R/W | Read as 0                   |
| +2                                |          | Password protection enable                  | 0 = disabled, 1 = enabled  |       | UINT16 | R/W |                             |
| +3                                |          | Reserved                                    |  |       | UINT16 | R/W |                             |
| +4-11                             |          | Local Login name                            |  |       | CHAR16 | R/W | Null-terminated string      |
| 46712-46767                       |          | Reserved                                    |  |       |        |     |                             |
| <b>Expert Power Service Setup</b> |          |   |  |       |        |     |                             |
| 46768-46783                       |          |   |  |       |        |     | Shared across all submeters |
| +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,<br>1=client enabled   |       | UINT32 | R/W |                             |
| +6,7                              |          | Time to next session                        | 1-99999  | min   | UINT32 | R/W |                             |
| +8,9                              |          | Not used                                    |  |       | UINT32 | R   |                             |

| Address   | Point ID | Description                               | Options/Range                 | Units | Type   | R/W | Notes                       |
|---|----------|---|-------------------------------|-------|--------|-----|-----------------------------|
| +10,11  |          | Not used                                  |                               |       | UINT32 | R   |                             |
| +12,13  |          | Connection idle timeout                   | 1-120                         | min   | UINT32 | R/W |                             |
| +14-15  |          | Reserved                                  |                               |       | UINT32 |     |                             |
| <b>Internet Service Provider (ISP) accounts</b> |          |   |                               |       |        |     |                             |
| 46784-46831                                     |          |   |                               |       |        |     | Shared across all submeters |
| +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                                     |          |   |                               |       |        |     | Shared across all submeters |
| +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                                     |          |   |                               |       |        |     | Shared across all submeters |
| +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>Channel Assignments</b>                      |          |   |                               |       |        |     |                             |
| 46928-47071                                     |          |   |                               |       |        |     | Shared across all submeters |
| +0  |          | Channel CT primary current                | 1-10000 A                     | A     | UINT16 | R/W |                             |
| +1  |          | Submeter's phase L1 current input channel | 0=not assigned, 1-36 = I1-I36 |       | UINT16 | R/W |                             |
| +2  |          | Submeter's phase L2 current input channel | 0=not assigned, 1-36 = I1-I36 |       | UINT16 | R/W |                             |

| Address                             | Point ID | Description                               | Options/Range                 | Units  | Type   | R/W | Notes                                       |
|-------------------------------------|----------|---|-------------------------------|--------|--------|-----|---|
| +3                                  |          | Submeter's phase L3 current input channel | 0=not assigned, 1-36 = I1-I36 |        | UINT16 | R/W |   |
| 46928-46931                         |          | <b>Submeter #1 channels</b>               |                               |        |        |     |   |
| 46932-46935                         |          | <b>Submeter #2 channels</b>               |                               |        |        |     |   |
|                                     |          | ...                                       |                               |        |        |     |   |
| 47068-47071                         |          | <b>Submeter #36 channels</b>              |                               |        |        |     |   |
| <b>Transformer Correction Setup</b> |          |   |                               |        |        |     |   |
| 47072-47231                         |          |   |                               |        |        |     | Shared across all submeters                 |
| +0                                  |          | Ratio correction factor                   | 900-1100                      | ×0.001 | UINT16 | R/W |   |
| +1                                  |          | Phase angle error                         | -600 to 600                   | min    | INT16  | R/W |   |
| +2, 3                               |          | Reserved                                  |                               |        | INT16  | R/W |   |
| 47072-47075                         |          | <b>V1 transformer correction</b>          |                               |        |        |     |   |
| 47076-47079                         |          | <b>V2 transformer correction</b>          |                               |        |        |     |   |
| 47080-47083                         |          | <b>V3 transformer correction</b>          |                               |        |        |     |   |
| 47084-47087                         |          | <b>Reserved</b>                           |                               |        |        |     |   |
| 47088-47091                         |          | <b>I1 transformer correction</b>          |                               |        |        |     |   |
| 47092-47095                         |          | <b>I2 transformer correction</b>          |                               |        |        |     |   |
|                                     |          | ...                                       |                               |        |        |     |   |
| 47228-47231                         |          | <b>I36 transformer correction</b>         |                               |        |        |     |   |
| <b>Data Log #1 Setup</b>            |          |   |                               |        |        |     |   |
| 54006-54037                         |          |   |                               |        |        |     | Individually configurable for each submeter |
| +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 |   |

| Address                                      | Point ID | Description                                   | Options/Range | Units | Type   | R/W | Notes                       |
|--|----------|---|---------------|-------|--------|-----|-----------------------------|
| +5   |          | Data log parameter #6 ID                      | 0x0000-0xFFFF |       | UINT16 | R/W |                             |
| +6-31  |          | Reserved                                      |               |       | UINT16 | R/W |                             |
| <b>Data Log #16 (Profile Data Log) Setup</b> |          |   |               |       |        |     |                             |
| 54486-54517                                  |          |   |               |       |        |     | Shared across all submeters |
| +0   |          | Data log parameter #1 ID                      | 0x1780        |       | UINT16 | R   | Summary register #1         |
| +1   |          | Data log parameter #2 ID                      | 0x7000        |       | UINT16 | R   | Tariff #1 register          |
| +2   |          | Data log parameter #3 ID                      | 0x7001        |       | UINT16 | R   | Tariff #2 register          |
| +3   |          | Data log parameter #4 ID                      | 0x7002        |       | UINT16 | R   | Tariff #3 register          |
| +4   |          | Data log parameter #5 ID                      | 0x7003        |       | UINT16 | R   | Tariff #4 register          |
| +5   |          | Data log parameter #6 ID                      | 0x7004        |       | UINT16 | R   | Tariff #5 register          |
| +6   |          | Data log parameter #7 ID                      | 0x7005        |       | UINT16 | R   | Tariff #6 register          |
| +7-31  |          | Not used                                      |               |       | UINT16 | R   |                             |
| <b>TOU Daily Profile Setup</b>               |          |   |               |       |        |     |                             |
| 55574-55701                                  |          |   |               |       |        |     | Shared across all submeters |
| +0   |          | 1 <sup>st</sup> tariff change                 | F10           |       | UINT16 | R/W |                             |
| +1   |          | 2 <sup>nd</sup> tariff change                 | F10           |       | UINT16 | R/W |                             |
| +2   |          | 3 <sup>rd</sup> tariff change                 | F10           |       | UINT16 | R/W |                             |
| +3   |          | 4 <sup>th</sup> tariff change                 | F10           |       | UINT16 | R/W |                             |
| +4   |          | 5 <sup>th</sup> tariff change                 | F10           |       | UINT16 | R/W |                             |
| +5   |          | 6 <sup>th</sup> tariff change                 | F10           |       | UINT16 | R/W |                             |
| +6   |          | 7 <sup>th</sup> tariff change                 | F10           |       | UINT16 | R/W |                             |
| +7   |          | 8 <sup>th</sup> tariff change                 | F10           |       | UINT16 | R/W |                             |
| 55574-55581                                  |          | <b>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> |               |       |        |     |                             |

| Address                   | Point ID | Description                             | Options/Range  | Units  | Type | R/W | Notes                       |
|---------------------------|----------|---|--|--------|------|-----|-----------------------------|
| 55606-55613               |          | Daily profile #5: Season 2, Day type 1  |  |        |      |     |                             |
| 55614-55621               |          | Daily profile #6: Season 2, Day type 2  |  |        |      |     |                             |
| 55622-55629               |          | Daily profile #7: Season 2, Day type 3  |  |        |      |     |                             |
| 55630-55637               |          | Daily profile #8: Season 2, Day type 4  |  |        |      |     |                             |
| 55638-55645               |          | Daily profile #9: Season 3, Day type 1  |  |        |      |     |                             |
| 55646-55653               |          | Daily profile #10: Season 3, Day type 2 |  |        |      |     |                             |
| 55654-55661               |          | Daily profile #11: Season 3, Day type 3 |  |        |      |     |                             |
| 55662-55669               |          | Daily profile #12: Season 3, Day type 4 |  |        |      |     |                             |
| 55670-55677               |          | Daily profile #13: Season 4, Day type 1 |  |        |      |     |                             |
| 55678-55685               |          | Daily profile #14: Season 4, Day type 2 |  |        |      |     |                             |
| 55686-55693               |          | Daily profile #15: Season 4, Day type 3 |  |        |      |     |                             |
| 55694-55701               |          | Daily profile #16: Season 4, Day type 4 |  |        |      |     |                             |
| 55702-55711               |          | Reserved                                |  |        |      |     |                             |
| <b>TOU Calendar Setup</b> |          |   |  |        |      |     |                             |
| 55712-56031               |          |   |  |        |      |     | Shared across all submeters |
| +0-9                      |          | Calendar entry record                   |  |        |      | 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,<br>Day types 0-3 | UINT16 | R/W  |     |                             |
| +1                        |          | Week of month                           | 0=all, 1=1st, 2=2nd, 3=3 <sup>rd</sup> ,<br>4=4th, 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  |     |                             |

| Address                            | Point ID | Description               | Options/Range  | Units | Type   | R/W | Notes                       |
|------------------------------------|----------|---------------------------|--|-------|--------|-----|-----------------------------|
| +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                               |          | Reserved                  |  |       | 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                  |  |       |        |     |                             |
| <b>Billing/TOU Registers Setup</b> |          |                           |  |       |        |     |                             |
| 56672-56927                        |          |                           |  |       |        |     | Shared across all submeters |
| +0                                 |          | Not used                  |  |       | UINT16 | R/W |                             |
| +1                                 |          | Units of measurement      | 0=none, 1=kWh, 2=kvarh,<br>3=kVAh  |       | UINT16 | R/W |                             |
| +2                                 |          | Flags                     | Bit 0: TOU enabled<br>Bit 1: Use profile enabled<br>Bit 2: Max. Demand profile enabled<br>Bit 3: Summary (total) profile enabled (set automatically) |       | 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>  |  |       |        |     |                             |
| 56688-56927                        |          | Reserved                  |  |       |        |     |                             |

| Address                                   | Point ID | Description                      | Options/Range                                       | Units  | Type   | R/W | Notes                       |
|---|----------|----------------------------------|---|--------|--------|-----|-----------------------------|
| <b>Billing/TOU Registers Source Setup</b> |          |                                  |   |        |        |     |                             |
| 56928-57183                               |          |                                  |   |        |        |     | Shared across all submeters |
| +0  |          | Energy source ID                 | F11   |        | UINT16 | R/W |                             |
| +1  |          | Target summary register/submeter | 0-3=register #1-4,<br>0x7F00-0x7F27=submeter #1-#40 |        | UINT16 | R/W |                             |
| +2, 3                                     |          | Multiplier                       | 0-1000000   | x0.001 | 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>          |   |        |        |     |                             |
| 56944-57183                               |          | Reserved                         |   |        |        |     |                             |

## 3.8 File Transfer Blocks

| Address                             | Point ID | Description   | Options/Range   | Units     | Type   | R/W | Notes   |
|-------------------------------------|----------|---|---|-----------|--------|-----|---|
| <b>File Transfer Control Blocks</b> |          |   |   |           |        |     |   |
| 63120-63151                         |          | <b>File Request Block</b>                             |   |           |        |     |   |
| +0                                  |          | File function   | 1 = ACK - acknowledgement<br>3 = set file position<br>5 = reset file position<br>7 = find<br>11 = read 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   | UINT16    | R/W    |     | See file response headings  |
| +6                                  |          | Find key: N/A   |   | UINT16    | R/W    |     |   |
| +7                                  |          | Find key: N/A   |   | 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 $\mu$ sec |   | $\mu$ sec | 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 $\mu$ sec   |   | $\mu$ sec | UINT32 | R/W | Note 3  |
| +16-31                              |          | Reserved  |   | UINT16    | R/W    |     |   |
| 63152-64943                         |          | <b>File Response Block</b>                            |   |           |        |     |   |
|                                     |          | Data transfer area [0 – 1791]                         |   | UINT16    | R      |     |   |

| Address     | Point ID | Description                     | Options/Range                 | Units | Type   | R/W | Notes |
|-------------|----------|---------------------------------|-------------------------------|-------|--------|-----|-------|
| 64944-64951 |          | <b>File Info Request Block</b>  |                               |       |        |     |       |
| +0          |          | File function                   | 9 = read file info            |       | UINT16 | R/W |       |
| +1          |          | File ID                         | F2                            |       | UINT16 | R/W |       |
| +2          |          | Section number                  | 0-31, 0xFFFF = use channel ID |       | UINT16 | R/W |       |
| +3          |          | Section channel ID              | F6, F7                        |       | UINT16 | R/W |       |
| +4          |          | Not used                        | 0                             |       | UINT16 | R/W |       |
| +5          |          | Request variation               | 0, 1, 2                       |       | UINT16 | R/W |       |
| +6-7        |          | Reserved                        |                               |       | UINT16 | R/W |       |
| 64952-65151 |          | <b>File Info Response Block</b> |                               |       |        |     |       |
|             |          | Data transfer area [0 - 199]    |                               |       | UINT16 | R   |       |

**NOTES:**

1. File sections for partitioned (multi-section) files, 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  |          | Reserved                                       | 0             |       | UINT16 | R   |                          |
| 64960-64997   |          | <b>File Info</b>                               |               |       |        |     |                          |
| +0  |          | File type                                      | 0             |       | UINT16 | R   |                          |
| +1  |          | File attributes                                | F3            |       | UINT16 | R   |                          |
| +2  |          | File (section) status                          | F4            |       | UINT16 | R   |                          |
| +3  |          | Number of sections in the file                 | 0-32          |       | UINT16 | R   | 0 = non-partitioned file |
| +4,5  |          | File channel mask (channels 1-32), bitmap      | F8, F9        |       | UINT32 | R   |                          |
| +6,7  |          | File channel mask (channels 33-64), bitmap     | F8, F9        |       | UINT32 | R   |                          |
| +8  |          | Number of records in the file                  | 0-65535       |       | UINT16 | R   |                          |
| +9  |          | Number of records until the end of the file    | 0-65535       |       | UINT16 | R   |                          |
| +10   |          | Current record (read position) sequence number | 0-65535       |       | UINT16 | R   |                          |
| +11   |          | Current write position sequence number         | 0-65535       |       | UINT16 | R   |                          |
| +12   |          | First (oldest) record sequence number          | 0-65535       |       | UINT16 | R   |                          |
| +13   |          | Last (newest) record sequence number           | 0-65535       |       | UINT16 | R   |                          |
| +14,15  |          | Last record time, seconds since 1/1/1970       | F1            | sec   | UINT32 | R   |                          |
| +16,17  |          | Last record time, fractional seconds           |               | µsec  | UINT32 | R   |                          |
| +18,19  |          | First record time, seconds since 1/1/1970      | F1            | sec   | UINT32 | R   |                          |
| +20,21  |          | First record time, fractional seconds          |               | µsec  | UINT32 | R   |                          |
| +22,23  |          | Not used                                       | 0             |       | UINT32 | R   |                          |

| Address   | Point ID | Description                                    | Options/Range | Units | Type   | R/W | Notes |
|---|----------|--|---------------|-------|--------|-----|-------|
| +24,25  |          | Not used                                       | 0             | μsec  | UINT32 | R   |       |
| +26,27  |          | Not used                                       | 0             | sec   | UINT32 | R   |       |
| +28,29  |          | Not used                                       | 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  | 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                             | 8             |       | UINT16 | R   |       |
| +6  |          | Request variation                              | 1             |       | UINT16 | R   |       |
| +7  |          | Reserved                                       | 0             |       | UINT16 | R   |       |
| 64960-64997   |          | <b>File Info</b>                               |               |       |        |     |       |
| +0  |          | File (section) status                          | F4            |       | UINT16 | R   |       |
| +1  |          | Number of records in the file                  | 0-65535       |       | UINT16 | R   |       |
| +2  |          | Number of records until the end of the file    | 0-65535       |       | UINT16 | R   |       |
| +3  |          | Current record (read position) sequence number | 0-65535       |       | UINT16 | R   |       |
| +4,5  |          | Current record time, seconds since 1/1/1970    | F1            | sec   | UINT32 | R   |       |
| +6,7  |          | Current record time, fractional seconds        |               | μsec  | UINT32 | R   |       |
| <b>File Info Response Block (Variation 2 – Data log record structure)</b> |          |  |               |       |        |     |       |
| 64952-64959   |          | <b>Block Heading</b>                           |               |       |        |     |       |
| +0  |          | File function                                  | 9             |       | UINT16 | R   |       |
| +1  |          | File ID  | 1             |       | UINT16 | R   |       |

| Address   | Point ID | Description                       | Options/Range | Units | Type   | R/W | Notes |
|---|----------|-----------------------------------|---------------|-------|--------|-----|-------|
| +2  |          | Section number                    | 0             |       | UINT16 | R   |       |
| +3  |          | Section channel ID                | 0             |       | UINT16 | R   |       |
| +4  |          | Number of records in the block    | 1             |       | UINT16 | R   |       |
| +5  |          | Record size, words                | 18            |       | UINT16 | R   |       |
| +6  |          | Request variation                 | 2             |       | UINT16 | R   |       |
| +7  |          | Reserved                          | 0             |       | UINT16 | R   |       |
| 64960-64997   |          | <b>File Info</b>                  |               |       |        |     |       |
| +0  |          | Not used                          | 0             |       | UINT16 | R   |       |
| +1  |          | Number of fields in a data record | 1-5           |       | UINT16 | R   |       |
| +2  |          | Field 1 ID                        |               |       | UINT16 | R   |       |
| +3  |          | Field 2 ID                        |               |       | UINT16 | R   |       |
| +4  |          | Field 3 ID                        |               |       | UINT16 | R   |       |
| +5  |          | Field 4 ID                        |               |       | UINT16 | R   |       |
| +6  |          | Field 5 ID                        |               |       | UINT16 | R   |       |
| +7  |          | Field 6 ID                        |               |       | UINT16 | R   |       |
| +8-17   |          | Not used                          |               |       | UINT16 | R   |       |
| <b>File Info Response Block (Variation 2 – Profile data log record structure)</b> |          |                                   |               |       |        |     |       |
| 64952-64959   |          | <b>Block Heading</b>              |               |       |        |     |       |
| +0  |          | File function                     | 9             |       | UINT16 | R   |       |
| +1  |          | File ID                           | 16            |       | UINT16 | R   |       |
| +2  |          | Section number                    | 0-7           |       | UINT16 | R   |       |
| +3  |          | Section channel ID                | F6, F7        |       | UINT16 | R   |       |
| +4  |          | Number of records in the block    | 1             |       | UINT16 | R   |       |
| +5  |          | Record size, words                | 18            |       | UINT16 | R   |       |
| +6  |          | Request variation                 | 2             |       | UINT16 | R   |       |
| +7  |          | Reserved                          | 0             |       | UINT16 | R   |       |
| 64960-64997   |          | <b>File Info</b>                  |               |       |        |     |       |
| +0  |          | Not used                          | 0             |       | UINT16 | R   |       |
| +1  |          | Number of fields in a data record | 1-5           |       | UINT16 | R   |       |

| Address                         | Point ID | Description                                   | Options/Range | Units     | Type   | R/W | Notes                  |
|---------------------------------|----------|---|---------------|-----------|--------|-----|------------------------|
| +2                              |          | Field 1 ID                                    | 0x1780-0x1783 |           | UINT16 | R   | Summary register #1-#4 |
| +3                              |          | Field 2 ID                                    | 0x7000        |           | UINT16 | R   | Tariff #1 register     |
| +4                              |          | Field 3 ID                                    | 0x7001        |           | UINT16 | R   | Tariff #2 register     |
| +5                              |          | Field 4 ID                                    | 0x7002        |           | UINT16 | R   | Tariff #3 register     |
| +6                              |          | Field 5 ID                                    | 0x7003        |           | UINT16 | R   | Tariff #4 register     |
| +7                              |          | Field 6 ID                                    | 0x7004        |           | UINT16 | R   | Tariff #5 register     |
| +8                              |          | Field 7 ID                                    | 0x7005        |           | UINT16 | R   | Tariff #6 register     |
| +9-17                           |          | Not used                                      |               |           | UINT16 | R   |                        |
| <b>Event Log Response Block</b> |          |   |               |           |        |     |                        |
| 63152-63159                     |          | <b>Block Heading</b>                          |               |           |        |     |                        |
| +0                              |          | Last file function                            | 1, 3, 5, 11   |           | UINT16 | R   |                        |
| +1                              |          | File ID                                       | 0             |           | UINT16 | R   |                        |
| +2                              |          | Section number                                | 0             |           | UINT16 | R   |                        |
| +3                              |          | Section channel ID                            | 0             |           | UINT16 | R   |                        |
| +4                              |          | Number of records in the block                | 1-32          |           | UINT16 | R   |                        |
| +5                              |          | Record size, words                            | 12            |           | UINT16 | R   |                        |
| +6                              |          | Request variation                             | 0             |           | UINT16 | R   |                        |
| +7                              |          | Reserved                                      | 0             |           | UINT16 | R   |                        |
| 63160-63543                     |          | <b>Event Log Records</b>                      |               |           |        |     |                        |
| +0                              |          | Record status                                 | F5            |           | INT16  | R   |                        |
| +1                              |          | Record sequence number                        | 0-65535       |           | UINT16 | R   |                        |
| +2,3                            |          | Trigger time, seconds since 1/1/1970          | F1            | sec       | UINT32 | R   |                        |
| +4,5                            |          | Trigger time, fractional seconds in $\mu$ sec |               | $\mu$ sec | UINT32 | R   |                        |
| +6                              |          | Event number                                  | 1-65535       |           | UINT16 | R   |                        |
| +7                              |          | Event point/source ID                         | F19           |           | UINT16 | R   |                        |
| +8                              |          | Event effect                                  | F20           |           | UINT16 | R   |                        |
| +9                              |          | Reserved                                      | 0             |           | UINT16 | R   |                        |
| +10,11                          |          | Value triggered                               |               |           | INT32  | R   |                        |
| 63160-63171                     |          | <b>Record #1</b>                              |               |           |        |     |                        |

| Address                                | Point ID | Description                             | Options/Range               | Units | Type   | R/W | Notes |
|--|----------|---|-----------------------------|-------|--------|-----|-------|
|  |          | ...                                     |                             |       |        |     |       |
| 63532-63543                            |          | Record #32                              |                             |       |        |     |       |
| <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                           |       | 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                      | 8 + 2× Number of parameters |       | UINT16 | R   |       |
| +6                                     |          | Request variation                       | 0                           |       | UINT16 | R   |       |
| +7                                     |          | Reserved                                | 0                           |       | UINT16 | R   |       |
| 63160-64439                            |          | <b>Data Log Records</b>                 |                             |       |        |     |       |
| +0                                     |          | Record status                           | F5                          |       | INT16  | R   |       |
| +1                                     |          | Record sequence number                  | 0-65535                     |       | UINT16 | R   |       |
| +2,3                                   |          | Record time, seconds since 1/1/1970     | F1                          | sec   | UINT32 | R   |       |
| +4,5                                   |          | Record time, fractional seconds in µsec |                             | µsec  | UINT32 | R   |       |
| +6                                     |          | Trigger event type                      | F22                         |       | INT16  | R   |       |
| +7                                     |          | Trigger event number                    | 0                           |       | UINT16 | R   |       |
| +8,9                                   |          | Log value #1                            |                             |       | INT32  | R   |       |
| +10,11                                 |          | Log value #2                            |                             |       | INT32  | R   |       |
|  |          | ...                                     |                             |       |        | R   |       |
| 63160-...                              |          | <b>Record #1 (variable length)</b>      |                             |       |        |     |       |
|  |          | ...                                     |                             |       |        |     |       |
|  |          | <b>Record #16 (variable length)</b>     |                             |       |        |     |       |
| <b>Profile Data Log Response Block</b> |          |   |                             |       |        |     |       |
| 63152-63159                            |          | <b>Block Heading</b>                    |                             |       |        |     |       |
| +0                                     |          | Last file function                      | 1, 3, 5, 11                 |       | UINT16 | R   |       |
| +1                                     |          | File ID                                 | 16                          |       | UINT16 | R   |       |

| Address     | Point ID | Description                                  | Options/Range            | Units     | Type   | R/W | Notes |
|-------------|----------|--|--------------------------|-----------|--------|-----|-------|
| +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                           | 10-18                    |           | UINT16 | R   |       |
| +6          |          | Request variation                            | 0                        |           | UINT16 | R   |       |
| +7          |          | Reserved                                     | 0                        |           | UINT16 | R   |       |
| 63160-64439 |          | <b>Data Log Records</b>                      |                          |           |        |     |       |
| +0          |          | Record status                                | F5                       |           | INT16  | R   |       |
| +1          |          | Record sequence number                       | 0 - 65535                |           | UINT16 | R   |       |
| +2,3        |          | Record time, seconds since 1/1/1970          | F1                       | sec       | UINT32 | R   |       |
| +4,5        |          | Record time, fractional seconds in $\mu$ sec |                          | $\mu$ sec | UINT32 | R   |       |
| +6          |          | Trigger event type                           | 0                        |           | INT16  | R   |       |
| +7          |          | Trigger event number                         | 0                        |           | UINT16 | R   |       |
| +8,9        |          | Log value #1                                 | Total (summary) register |           | INT32  | R   |       |
| +10,11      |          | Log value #2                                 | Tariff #1 register       |           | INT32  | R   |       |
| +12,13      |          | Log value #3                                 | Tariff #2 register       |           | INT32  | R   |       |
| +14,15      |          | Log value #4                                 | Tariff #3 register       |           | INT32  | R   |       |
| +16,17      |          | Log value #5                                 | Tariff #4 register       |           | INT32  | R   |       |
| +18,19      |          | Log value #6                                 | Tariff #5 register       |           | INT32  | R   |       |
| +20,21      |          | Log value #7                                 | Tariff #6 register       |           | INT32  | R   |       |
| 63160-...   |          | <b>Record #1</b> (variable length)           |                          |           |        |     |       |
|             |          | ...  |                          |           |        |     |       |
|             |          | <b>Record #16</b> (variable length)          |                          |           |        |     |       |

**NOTE:**

If you read the block through a TCP connection and change a file ID or the number of records in the block, your assignments for the transfer block will be effective only within the current connection socket. Since the device cannot guarantee that your next connection will be made through the same socket, you should not make any assumptions regarding the present block settings. When you open a new connection, always check the block heading before accessing data records.

### 3.9 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 | 0.1 kWh            | UINT32 |       |
|                                       | 2                             | TRF1        | 0x7000   | Tariff #1 energy reading                | 0-999,999,999 | 0.1 kWh            | UINT32 |       |
|                                       | 3                             | TRF2        | 0x7001   | Tariff #2 energy reading                | 0-999,999,999 | 0.1 kWh            | UINT32 |       |
|                                       | 4                             | TRF3        | 0x7002   | Tariff #3 energy reading                | 0-999,999,999 | 0.1 kWh            | UINT32 |       |
|                                       | 5                             | TRF4        | 0x7003   | Tariff #4 energy reading                | 0-999,999,999 | 0.1 kWh            | UINT32 |       |
|                                       | 6                             | TRF5        | 0x7004   | Tariff #5 energy reading                | 0-999,999,999 | 0.1 kWh            | UINT32 |       |
|                                       | 7                             | TRF6        | 0x7005   | Tariff #6 energy reading                | 0-999,999,999 | 0.1 kWh            | UINT32 |       |
| ...                                   |                               |             |          | ...                                     |               |                    |        |       |
| 3/3                                   |                               |             |          | <b>Energy Register #4</b>               |               |                    |        |       |
|                                       | 1                             | REG4        | 0x1783   | Summary (total) energy reading          | 0-999,999,999 | 0.1 kWh            | UINT32 |       |
|                                       | 2                             | TRF1        | 0x7000   | Tariff #1 energy reading                | 0-999,999,999 | 0.1 kWh            | UINT32 |       |
|                                       | 3                             | TRF2        | 0x7001   | Tariff #2 energy reading                | 0-999,999,999 | 0.1 kWh            | UINT32 |       |
|                                       | 4                             | TRF3        | 0x7002   | Tariff #3 energy reading                | 0-999,999,999 | 0.1 kWh            | UINT32 |       |
|                                       | 5                             | TRF4        | 0x7003   | Tariff #4 energy reading                | 0-999,999,999 | 0.1 kWh            | UINT32 |       |
|                                       | 6                             | TRF5        | 0x7004   | Tariff #5 energy reading                | 0-999,999,999 | 0.1 kWh            | UINT32 |       |
|                                       | 7                             | TRF6        | 0x7005   | Tariff #6 energy reading                | 0-999,999,999 | 0.1 kWh            | UINT32 |       |
| 16/4                                  |                               |             |          | <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 |       |

| 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 |
|---------------------------------------|-------------------------------|-------------|----------|---|--------|--------------------|--------|-------|
|                                       | 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 |       |
| ...                                   |                               |             |          | ...                                     |        |                    |        |       |
| 19/7                                  |                               |             |          | <b>Daily Maximum Demand Register #4</b> |        |                    |        |       |
|                                       | 1                             | REG4 MD     | 0x4783   | 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 |       |

<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".

# Chapter 4 Data Scales and Units

| Code               | Condition    | Value/Range                 | Notes |
|--------------------|--------------|-----------------------------|-------|
| <b>Data Scales</b> |              |                             |       |
| Vmax               |              | Voltage scale x PT Ratio, V | 1     |
| Imax               |              | CT Primary current x 2, A   |       |
| Pmax               |              | Vmax x Imax x 2, W          | 2     |
| <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> The default Voltage scale is 600V. You can change it via the Device Data Scale setup (see Section 3.1) or via the Device Options setup in PAS.

<sup>2</sup> Pmax is rounded to whole kilowatts. With PT=1.0, if Pmax is greater than 9,999,000 W, it is truncated to 9,999,000 W.

# Chapter 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               | Data log   |       |
|   | 16              | Daily profile log file   |       |
| <b>File Attributes</b>                      |                 |  |       |
| F3  | Bit 0           | 0=Non-wrap (stop when filled),<br>1=Wrap-around (circular file)  |       |
|   | Bit 5 = 1       | TOU daily profile log  |       |
| <b>File Status Word</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</b>              |                 |  |       |
| F5  | Bit 0 = 1       | The last record of the file is being read  |       |
|   | Bit 8 = 1       | File is empty  |       |
|   | Bit 9 = 1       | Reading after EOF  |       |
|   | Bit 10 = 1      | Corrupted record (CRC error)   |       |
|   | Bit 11 = 1      | No file section found for the requested channel  |       |
|   | Bit 12 = 1      | Reading after the end of a data block  |       |
|   | Bit 13 = 1      | File is not accessible   |       |
|   | Bit 14 = 1      | Record not found   |       |
|   | Bit 15 = 1      | Generic read error (with one of the bits 8-14)   |       |
| <b>Billing/TOU Profile Log Channel ID</b>   |                 |  |       |
| F6  | 0-3             | Billing/TOU energy registers #1-#4   |       |
|   | 16-19           | Billing/TOU maximum demand registers #1-#4   |       |
| <b>Billing/TOU Profile Log Channel Mask</b> |                 |  |       |
| F8  | Bit 0:15 = 1    | Billing/TOU energy registers #1-#4   |       |
|   | Bit 16:31 = 1   | Billing/TOU maximum demand registers #1-#4   |       |
| <b>TOU Tariff Change Time</b>               |                 |  |       |
| F10   | Bits 8:15 = 0-5 | Tariff number #1-#6  |       |
|   | Bits 2:7 = 0-23 | Tariff start hour  |       |
|   | Bits 0:1 = 0-3  | Tariff start quarter of an hour  |       |
| <b>Billing Register Source ID</b>           |                 |  |       |
| F11   | 0x0000          | None   |       |
|   | 0x1700          | kWh import   |       |
|   | 0x1701          | kWh export   |       |

| Format Code                           | Value             | Description                                | Notes |
|---------------------------------------|-------------------|--|-------|
|                                       | 0x1704            | kvarh import                               |       |
|                                       | 0x1705            | kvarh export                               |       |
|                                       | 0x1708            | kVAh total                                 |       |
|                                       | 0x7F00-0x7F27     | Submeter #1-#40                            |       |
| <b>Setpoint Trigger Parameters ID</b> |                   |  |       |
| F12                                   | 0x0B02            | Day of week                                |       |
|                                       | 0x0B05            | Day of month                               |       |
|                                       | 0x0B06            | Hour                                       |       |
|                                       | 0x0B07            | Minutes                                    |       |
|                                       | 0x0B08            | Seconds                                    |       |
|                                       | 0x0B09            | Minute interval                            |       |
|                                       | 0x1100            | High voltage V1                            |       |
|                                       | 0x1101            | High voltage V2                            |       |
|                                       | 0x1102            | High voltage V3                            |       |
|                                       | 0x9100            | Low voltage V1                             |       |
|                                       | 0x9101            | Low voltage V2                             |       |
|                                       | 0x9102            | Low voltage V3                             |       |
|                                       | 0x111E            | High voltage V12                           |       |
|                                       | 0x111F            | High voltage V23                           |       |
|                                       | 0x1120            | High voltage V31                           |       |
|                                       | 0x911E            | Low voltage V12                            |       |
|                                       | 0x911F            | Low voltage V23                            |       |
|                                       | 0x9120            | Low voltage V31                            |       |
|                                       | 0x1103            | High current I1                            |       |
|                                       | 0x1104            | High current I2                            |       |
|                                       | 0x1105            | High current I3                            |       |
|                                       | 0x9103            | Low current I1                             |       |
|                                       | 0x9104            | Low current I2                             |       |
|                                       | 0x9105            | Low current I3                             |       |
|                                       | 0x1002            | High frequency                             |       |
|                                       | 0x9002            | Low frequency                              |       |
|                                       | 0x1406            | High kW import                             |       |
|                                       | 0x1408            | High kvar import                           |       |
|                                       | 0x1402            | High kVA                                   |       |
| <b>Setpoint Action ID</b>             |                   |  |       |
| F14                                   | 0x5100            | Send event notification                    |       |
|                                       | 0x7000            | Event log                                  |       |
|                                       | 0x7100            | Data log                                   |       |
| <b>Event Source/Point ID</b>          |                   |  |       |
| F19                                   | <b>Appendix A</b> | <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     | Data/Function point ID (low byte, see F21) |       |
|                                       |                   | <b>Self-Check Diagnostics Events</b>       |       |

| Format Code                   | Value         | Description                                | Notes |
|-------------------------------|---------------|--|-------|
|                               | 0x5D00-0x5DFF | Data/Function point ID (low byte, see F21) |       |
|                               |               | <b>Self-Update Events</b>                  |       |
|                               | 0x5E08        | RTC DST/Standard time update               |       |
|                               |               | <b>Run-time Error</b>                      |       |
|                               | 0x6014        | Library error                              |       |
|                               | 0x6015        | RTOS Kernel error                          |       |
|                               | 0x6016        | Task error                                 |       |
|                               |               | <b>Hardware Diagnostics Events</b>         |       |
|                               | 0x6202        | RAM/Data error                             |       |
|                               | 0x6203        | CPU watchdog reset                         |       |
|                               | 0x6204        | Sampling fault                             |       |
|                               | 0x6205        | CPU exception                              |       |
|                               | 0x6206        | Reserved                                   |       |
|                               | 0x6207        | Software watchdog reset                    |       |
|                               | 0x620E        | Expanded memory/Data flash memory fault    |       |
|                               | 0x620F        | CPU EEPROM fault                           |       |
|                               |               | <b>External Events</b>                     |       |
|                               | 0x6300        | Power down                                 |       |
|                               | 0x6308        | Power up                                   |       |
|                               | 0x6309        | External reset                             |       |
| <b>Event Effect ID</b>        |               |  |       |
|                               |               | <b>Communications/Self-check Events</b>    |       |
|                               | 0x0000        | None                                       |       |
|                               | 0x6000        | Total energy registers cleared             |       |
|                               | 0x6100        | Maximum demands cleared                    |       |
|                               | 0x6101        | Power maximum demands cleared              |       |
|                               | 0x6102        | Volt/Ampere maximum demands cleared        |       |
|                               | 0x6103        | Volt maximum demands cleared               |       |
|                               | 0x6104        | Ampere maximum demands cleared             |       |
|                               | 0x6200        | TOU energy registers cleared               |       |
|                               | 0x6300        | TOU demand registers cleared               |       |
|                               | 0x6A00-0x6A10 | Log file cleared (low byte = File ID)      |       |
|                               | 0x6B06        | Communication counters 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>           |       |
|                               | 0xE100-0xE11F | Setpoint operated (low byte = setpoint ID) |       |
|                               | 0xE200-0xE21F | Setpoint released (low byte = setpoint ID) |       |
|                               |               | <b>Setpoint Action Events</b>              |       |
|                               | See F14       | Setpoint action ID                         |       |
| <b>Data/Function Point ID</b> |               |  |       |
|                               |               | <b>Data Location</b>                       |       |
| F21                           | 0x03          | Data memory                                |       |
|                               | 0x04          | Factory setup                              |       |

| Format Code               | Value         | Description                     | Notes |
|---------------------------|---------------|---------------------------------|-------|
|                           | 0x05          | Access/Password setup           |       |
|                           | 0x06          | Basic setup                     |       |
|                           | 0x07          | Communications setup            |       |
|                           | 0x08          | Real-time clock                 |       |
|                           | 0x09          | Digital inputs setup            |       |
|                           | 0x0E          | Timers setup                    |       |
|                           | 0x10          | Event/alarm setpoints           |       |
|                           | 0x12          | User assignable register map    |       |
|                           | 0x14          | Data log setup                  |       |
|                           | 0x15          | File/Memory setup               |       |
|                           | 0x16          | TOU energy registers setup      |       |
|                           | 0x18          | TOU daily profiles              |       |
|                           | 0x19          | TOU calendar                    |       |
|                           | 0x1D          | RO Setup                        |       |
|                           | 0x1C          | User selectable options         |       |
|                           | 0x23          | Calibration registers           |       |
|                           | 0x24          | Date/Time Setup                 |       |
|                           | 0x25          | Net setup                       |       |
|                           | 0x2A          | Device mode control             |       |
|                           | 0x2B          | Channels setup                  |       |
|                           | 0x2B-0x3F     | Reserved                        |       |
| <b>Event Type ID</b>      |               |                                 |       |
| F22                       | 0x0000        | SP: Generic setpoint event      |       |
|                           | 0x0001-0x0010 | SP1-SP16: Setpoint #1-#16 event |       |
| <b>Device Diagnostics</b> |               |                                 |       |
| F23                       | Bit 0 = 1     | N/A                             |       |
|                           | Bit 1 = 1     | N/A                             |       |
|                           | 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 14 = 1    | Data Flash memory fault         |       |