SATEC
Powerful Solutions

Powermeter and Power Quality Analyzer PM174

Modbus Communications Protocol

Reference Guide

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

REVISION HISTORY

A2	Apr 2007	F/W version 24.1.4 or higher Added GE EGD protocol setup
A3	Sep 2007	F/W version 24.1.9 or higher Added the AX8 Analog Expander setup
A4	June 2008	F/W version 24.1.10 or higher Added DST start/end hour setup. Added the current unbalance trigger. Added PROFIBUS option. Fixed EN50160 Harmonic voltage compliance statistics record structure. Fixed 16-bit I1-I3 harmonic angles addresses.
A5	July 2009	F/W version 24.2.4 or higher. CT primary current extended to 50,000A. Added four-quadrant kvarh and imported/exported kVAh energy counters. Added instrument transformer correction.
A6	Nov 2009	F/W version 24.2.5 or higher. Added TCP event notification client. Added GPRS setup and communication counters.
A7	April 2013	F/W version 24.3.1 or higher. Added event-controlled waveform recording option. Added fault recorder setup and fault log file response block structure. Modified event notification message structure.

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Table of Contents

1 General

This document specifies a subset of the Modbus serial communications protocol used to transfer data between a master computer station and the PM174. The document provides the complete information necessary to develop third-party communications software capable of communication with the PM174.

Refer to the PM174 Installation and Operation Manual for more information on communication connections and configuring communication parameters in your device.

2 Modbus Protocol Implementation

For detailed information on the Modbus protocol, message framing and error checking, refer to the Modbus Protocol Reference Guide. It can be downloaded from the www.modbus.org Website. The following paragraphs outline some issues concerning the implementation of the Modbus protocol in the PM174.

2.1 Transmission Modes

The PM174 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 PM174 Installation and Operation Manual for information on selecting the transmission mode in your meter.

2.2 Address Field

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

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

2.3 Function Field

The Modbus functions implemented in the PM174 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[1]	Loop-back test	Communications test

[1] The PM174 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 PM174 Modbus registers are numbered in the range of 0 to 65535. From the Modbus applications, the PM174 Modbus registers can be accessed by simulating holding registers of the Modicon 584, 884 or 984 Programmable Controller, using a 5-digit "4XXXX" or 6-digit "4XXXXX" addressing scheme.

To map the PM174 register address to the range of the Modbus holding registers, add a value of 40001 to the PM174 register address. When a register address exceeds 9999, use a 6-digit addressing scheme by adding 400001 to the PM174 register address.

2.6 Data Formats

The PM174 uses three data formats to pass data between a master application and the instrument: 16-bit short integer, 32-bit long integer and 32-bit modulo-10000 formats. Binary values and counters are always transmitted in 32-bit registers, while analog values can be read both in 32-bit and in 16-bit scaled registers.

Analog registers 256 through 308 and 6656 through 10935 contain scaled 16-bit values.

2.6.1 16-bit Scaled Integer Format

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

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

where:

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

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

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

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

CONVERSION EXAMPLES

1. Voltage readings

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

Voltage engineering scales (see Section 4):

HI_ENG = Vmax = 828.0 × PT ratio = 828.0 × 1 = 828.0V

LO_ENG = 0V

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

Volts reading = 1449 × (828.0 - 0)/(9999 - 0) + 0 = 120.0V

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

Voltage engineering scales (see Section 4):

HI_ENG = Vmax = 144.0 × PT ratio = 144 × 120 = 17,280V

LO_ENG = 0V

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

Volts reading = 8314 × (17,280 - 0)/9999 + 0 = 14,368V

2. Current readings

Assume device settings: CT primary current = 200A.

Current engineering scales (see Section 4):

HI_ENG = Imax = CT primary current × 2 = 200.00 × 2 = 400.00A

LO_ENG = 0A

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

Amps reading = 250 × (400.00 - 0)/(9999 - 0) + 0 = 10.00A

3. Power readings

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

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

HI_ENG = Pmax = Vmax × Imax × 2 = (828.0 × 1) × (200.00 × 2) × 2 = 662,400W = 662kW

LO_ENG = -Pmax = -662kW

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

Watts reading = 5500 × (662 - (-662))/(9999 - 0) + (-662) = 66.3kW

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

Watts reading = 500 × (662 - (-662))/(9999 - 0) + (-662) = -595.8W

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

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

HI_ENG = Pmax = Vmax × Imax × 3 = (828 × 120) × (200.00 × 2) × 3/1000 = 119,232kW

LO_ENG = -Pmax = -119,232kW

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

Watts reading = 5500 × (119,232 - (-119,232))/(9999 - 0) + (-119,232) = 11,936kW

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

Watts reading = 500 × (119,232 - (-119,232))/(9999 - 0) + (-119,232) = -107,307kW

4. Power Factor readings

Power factor engineering scales (see Section 3.3):

HI_ENG = 1.000.

LO_ENG = -1.000.

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

Power factor reading = 8900 × (1.000 - (-1.000))/(9999 - 0) + (-1.000) = 0.78

2.6.2 32-bit Long Integer Format

32-bit long integer data is transmitted in two adjacent 16-bit Modbus registers as unsigned (UINT32) or signed (INT32) whole numbers. The first register contains the low-order word (lower 16 bits) and the second register contains the high order word (higher 16 bits). The low-order word always starts at an even Modbus address.

The value range for unsigned data is 0 to 4,294,967,295; for signed data the range is -2,147,483,648 to 2,147,483,647.

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

32-bit value = (signed short) high_order_register × 65536L + (unsigned short) low_order_register

Examples

1. Unsigned 32-bit Values

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

(13952) = 3464

(13953) = 1

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

2. Signed 32-bit Values

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

(14336) = 64747 (unsigned)

(14337) = 65535 (unsigned) or -1(signed value).

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

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

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

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

2.6.3 32-bit Modulo-10000 Format

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

2.7 User Assignable Registers

The PM174 contains 120 user assignable registers in the address range of 0 to 119, any of which you can map to any register address accessible in the instrument. Registers that reside in different locations may be accessed by a single request by re-mapping them to adjacent addresses in the user assignable registers area.

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

To build your own register map, write to map registers 120 to 239 the actual addresses you want to read from or write to via the assignable area (registers 0 to 119). 32-bit long registers should always be aligned at even addresses. For example, if you want to read registers 7136 (1-second V1 voltage, scaled short integer) and 14720-14721 (kWh Import, long integer) via registers 0-2, do the following:

- write 14720 to register 120
- write 14721 to register 121
- write 7136 to register 122

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

2.8 Password Protection

The PM174 has a password protection option allowing you to protect your setups, cumulative registers and logs from being changed or cleared through communications. You can disable or enable password protection through communications or via the front display. For details, refer to your instrument Installation and Operation Manual.

When password protection is enabled, the user password you set in your instrument should be written into the device authorization register (2575) before another write request is issued. If the correct password is not supplied while password protection is enabled, the instrument will respond to all write requests with the exception code 01 (illegal operation). It is recommended to clear the password register after you have completed your changes in order to activate password protection.

2.9 Data Recording and File Transfers

2.9.1 Log File Organization

Historical files are stored to the non-volatile memory with a battery backup. Memory is allocated for each file statically when you set up your files and will not change unless you re-organize the files. The PM174 automatically performs de-fragmentation of the memory each time you re-organize your files. This helps keep all free memory in one continuous chunk and thus prevents possible leakage of memory caused by fragmentation.

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

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

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

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

The PM174 keeps a separate read pointer for each communication port so that access to the same file through a different port will not affect current active sessions for other ports.

Multi-section Files

Log files can have one or more (up to 16) sections for multi-channel recording. An ordinal file consists of a single section. Some files, such as daily profile log files and waveform log files, are arranged as multi-section files.

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

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

Data Log Files

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

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

Profile Data Log File

Data log file #16 can be configured for a daily profile log of the energy usage and maximum demand registers. A profile log file is organized as a multi-section file that has a separate section for each energy and maximum demand register. A file record stores the summary data (total of all tariffs) and all tariff data for each configured Billing/TOU register. See Section 3.10 for information on the file record structure.

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

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

Waveform Log Files

Waveform log files are organized as multi-section files that store data for each recording channel in a separate section. A waveform log file can record up to six AC channels simultaneously: three voltage and three current waveforms. The number of sections in a file, or channels that a file can store, is defined when you set up the file. The channels that a file will record are selected in the waveform log setup. All selected channels are recorded in successive file sections.

A waveform file has a single read pointer for all sections, so that data from all channels of a single record can be read together without repositioning the file pointer. When you point to a particular file record, data from all sections related to the same event are all available for a read. Moreover, the PM174 takes all channel data for the currently accessed record to a separate buffer, so that even when the record is overwritten at the time of reading, you are still prevented from receiving partially updated data.

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

If a waveform log is configured to record more samples per event than a single record can hold, the waveform recorder will store as many records per event as required to record the entire event. All waveform records related to the event are merged in a series and have the same series number, so that they can be plotted together. Each record within a series has a unique serial number that allows tracking the sequence of records in a series. A single waveform series can hold up to 81,920 points (2,560 cycles at a rate of 32 samples per cycle) of a sampled AC signal.

2.9.2 File Transfers

File transfer protocol provides both data transfer and information services. File transfer is performed through two blocks of registers: a 32-word master request block and a 648-word read-only file response block. After a master application has written the request into the file request block, the requested data is available for a read through the file response block registers. File transfer functions allow changing the file or section position in order to point to the desired record.

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

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

Common File Transfer

Log files can be read either in a sequence record-by-record, or in a random order. Each Read-File request fills the file response block with the data of the record pointed to by the file (or section) read pointer. If you want to begin reading a file from a particular record,

which sequence number is known, you can change the pointer position by issuing the Set-File-Position request with the desired sequence number. If you want to read a file from the beginning, send the Reset-File-Position request that moves the pointer to the oldest file record. If you do not change the file position, then you will continue reading the file from the record following the one you have read the last time you accessed the file.

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

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

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

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

1. If you wish to begin reading a file from a particular record or from the first record, use either the Set-File-Position request with the desired record sequence number, or the Reset-File-Position request. Preset a section number and channel ID to zero.

2. Write the Read-File request with a section number and channel ID set to zero.

3. Read the record data from the file response block.

4. Write an acknowledgment for the file. You need not fill all the request fields: only the file function is required. The file pointer will be moved to the next file record.

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

Reading Multi-section Data Log Files

In a multi-section data log file, all user requests including an acknowledgment, the Read-File, Set-File-Position and Reset-File-Position requests, relate to a particular file section rather than to the file itself. The only request that affects the entire file is the Erase-File that clears all the file sections together.

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

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

1. If you wish to begin reading a file section from a particular record or from the first record, use either the Set-File-Position request with the desired record sequence number, or the Reset-File-Position request. Specify either a section number, or the channel ID for the section from where you want to read data. If you use a channel ID, preset the section number field to 0xFFFF.

2. Write the Read-File request with the section number and channel ID as shown in the previous step.

3. Read the record data from the file response block.

4. Write an acknowledgment for the file. The file section pointer will be moved to the next record.

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

Reading Multi-section Waveform Files

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

1. If you want to begin reading a file from a particular record or from the first record, use either the Set-File-Position request with the desired record sequence number, or the Reset-File-Position request. Preset the section field to zero.

2. Write the Read-File request. Address you request to the first file section (its number is always zero), or to the first file channel (if you know channel's ID). If you use a channel ID, preset the section number field to 0xFFFF.

3. Read the channel's data from the file response block. Store the received record's sequence number.

4. Write the Read-File request for the next file section or channel using the stored record sequence number. The file response block will be refilled with the data for the requested channel that is related to the record with the same sequence number.

5. Repeat steps 3, 4 until all the channel records with the current sequence number are read.

6. Write an acknowledgment. The file pointer will be moved to the next record.

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

Reading Real-time Waveforms

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

1. Write the Read-File request for file 128. Address you request to the first file section (its number is always zero), or to the first file channel (if you know channel's ID). If you use a channel ID, preset the section number field to 0xFFFF.

2. Read the channel's data from the file response block.

3. Write the Read-File request for the next file section or channel. The file response block will be refilled with the data for the requested channel.

4. Repeat steps 3, 4 until all the channel records are read.

5. Write an acknowledgment to release the buffer.

2.10 TCP Notification Client

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

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

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

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

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

After receiving a write acknowledgement from a server, a TCP connection is still open for 10 seconds (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.

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

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

The server's IP address, port number and starting Modbus register address are programmable in the meter. To configure and enable the notification client in your meter via PAS, select Communication Setup in the Meter Setup menu, and click on the TCP Notification Client Setup tab. See "Setting-up TCP Notification Client" in the meter manual for more information on the client setup.

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

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

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

3 Modbus Register Map

3.1 Modbus Setup Registers

Address	Point ID	Description	Options/Range	Units	Type	R/W	Notes
Modbus Assignable Registers							
0-119							
+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	
Assignable Registers Map							
120-239							
+0		Mapped register 0 address	0-65535		UINT16	R/W	
+1		Mapped register 1 address	0-65535		UINT16	R/W	
+119		Mapped register 119 address	0-65535		UINT16	R/W	
Modbus Conversion Scales							
240		Low raw scale	0		UINT16	R	
241		High raw scale	9999		UINT16	R	
Device Data Scales							
242		Voltage scale, in secondary volts	60-828 (default 144V)	1V	UINT16	R/W	
243		Current scale, in secondary amps = CT secondary current (1A, 5A) × Current overload	20, 100 (2.0A, 10.0A)	×0.1A	UINT16	R	

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

Address	Point ID	Description	Low and High Scales[2]	Units[2]	Type	R/W	Notes
256-308							
+0	0x1100	V1/V12 Voltage	0-Vmax	U1	UINT16	R	[1]
+1	0x1101	V2/V23 Voltage	0-Vmax	U1	UINT16	R	[1]
+2	0x1102	V3/V31 Voltage	0-Vmax	U1	UINT16	R	[1]
+3	0x1103	I1 Current	0-Imax	U2	UINT16	R	
+4	0x1104	I2 Current	0-Imax	U2	UINT16	R	
+5	0x1105	I3 Current	0-Imax	U2	UINT16	R	
+6	0x1106	kW L1	-Pmax-Pmax	U3	INT16	R	
+7	0x1107	kW L2	-Pmax-Pmax	U3	INT16	R	
+8	0x1108	kW L3	-Pmax-Pmax	U3	INT16	R	
+9	0x1109	kvar L1	-Pmax-Pmax	U3	INT16	R	
+10	0x110A	kvar L2	-Pmax-Pmax	U3	INT16	R	
+11	0x110B	kvar L3	-Pmax-Pmax	U3	INT16	R	
+12	0x110C	kVA L1	-Pmax-Pmax	U3	UINT16	R	
+13	0x110D	kVA L2	-Pmax-Pmax	U3	UINT16	R	
+14	0x110E	kVA L3	-Pmax-Pmax	U3	UINT16	R	
+15	0x110F	Power factor L1	-1.000-1.000	0.001	INT16	R	
+16	0x1110	Power factor L2	-1.000-1.000	0.001	INT16	R	
+17	0x1111	Power factor L3	-1.000-1.000	0.001	INT16	R	
+18	0x1403	Total PF	-1.000-1.000	0.001	INT16	R	
+19	0x1400	Total kW	-Pmax-Pmax	U3	INT16	R	
+20	0x1401	Total kvar	-Pmax-Pmax	U3	INT16	R	
+21	0x1402	Total kVA	-Pmax-Pmax	U3	UINT16	R	
+22	0x1501	In (neutral) Current	0-Imax	U2	UINT16	R	
+23	0x1502	Frequency	45.00-65.00	0.01Hz	UINT16	R	
+24	0x3709	Maximum kW import sliding window demand	-Pmax-Pmax	U3	UINT16	R	
+25	0x160F	kW import accumulated demand	-Pmax-Pmax	U3	UINT16	R	
+26	0x370B	Maximum kVA sliding window demand	-Pmax-Pmax	U3	UINT16	R	
+27	0x1611	kVA accumulated demand	-Pmax-Pmax	U3	UINT16	R	
+28	0x3703	I1 Maximum ampere demand	0-Imax	U2	UINT16	R	
+29	0x3704	I2 Maximum ampere demand	0-Imax	U2	UINT16	R	
+30	0x3705	I3 Maximum ampere demand	0-Imax	U2	UINT16	R	
+31		kWh import (low)	0-9999	1kWh	UINT16	R	[6]
+32		kWh import (high)	0-9999	×10MWh	UINT16	R	[6]
+33		kWh export (low)	0-9999	1kWh	UINT16	R	[6]
+34		kWh export (high)	0-9999	×10MWh	UINT16	R	[6]
+35		+kvarh net (low)	0-9999	1kvarh	UINT16	R	[4,6]
+36		+kvarh net (high)	0-9999	×10Mvarh	UINT16	R	[4,6]
+37		-kvarh net (low)	0-9999	1kvarh	UINT16	R	[5,6]
+38		-kvarh net (high)	0-9999	×10Mvarh	UINT16	R	[5,6]

Address	Point ID	Description	Low and High Scales[2]	Units[2]	Type	R/W	Notes
+39	0x1112	V1/V12 Voltage THD	0-999.9	0.1%	UINT16	R	[3]
+40	0x1113	V2/V23 Voltage THD	0-999.9	0.1%	UINT16	R	[3]
+41	0x1114	V3/V31 Voltage THD	0-999.9	0.1%	UINT16	R	[3]
+42	0x1115	I1 Current THD	0-999.9	0.1%	UINT16	R	[3]
+43	0x1116	I2 Current THD	0-999.9	0.1%	UINT16	R	[3]
+44	0x1117	I3 Current THD	0-999.9	0.1%	UINT16	R	[3]
+45		kVAh (low)	0-9999	1kVAh	UINT16	R	[6]
+46		kVAh (high)	0-9999	10MVAh	UINT16	R	[6]
+47	0x1609	Present kW import sliding window demand	-Pmax-Pmax	U3	UINT16	R	
+48	0x160B	Present kVA sliding window demand	-Pmax-Pmax	U3	UINT16	R	
+49	0x1615	PF (import) at Max. kVA sliding window demand	0-1.000	0.001	UINT16	R	
+50	0x111B	I1 Current TDD	0-100.0	0.1%	UINT16	R	[3]
+51	0x111C	I2 Current TDD	0-100.0	0.1%	UINT16	R	[3]
+52	0x111D	I3 Current TDD	0-100.0	0.1%	UINT16	R	[3]

NOTES:

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

[2] All analog registers except of harmonics are 1-second average values. For volts, amps and power scales and units, refer to Section 4 "Data Scales and Units". For analog data scaling formulas and examples, see Section 2.6.1, "16-bit Scaled Integer Format".

[3] On a 3-s interval.

[4] Positive readings of kvarh net.

[5] Negative readings of kvarh net.

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

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

Address	Point ID	Description	Low and High Scales[3]	Units[3]	Type	R/W	Notes
3584	0x0000	**None**	0		UINT16	R	
3616	0x0080	**Setpoint Status (bitmap)**	0x0000-0xFFFF		UINT16	R	
3648-3649		**Special Inputs**					
+0	0x0100	Reserved	0		UINT16	R	
+1	0x0101	Phase rotation order	0=error, 1=positive (ABC), 2=negative (CBA)		UINT16	R	
3776	0x0300	**Event Flags (bitmap)**	0x0000-0x00FF		UINT16	R	
3968	0x0600	**Digital Inputs (bitmap)**	0x0000-0x000F		UINT16	R	
4096	0x0800	**Relay Outputs (bitmap)**	0x0000-0x000F		UINT16	R	
4224-4231		**Counters**					
+0,1	0x0A00	Counter #1	0-999,999		UINT32	R/W	
+2,3	0x0A01	Counter #2	0-999,999		UINT32	R/W	
+4,5	0x0A02	Counter #3	0-999,999		UINT32	R/W	
+6,7	0x0A03	Counter #4	0-999,999		UINT32	R/W	
4320-4331		**1/2-Cycle Values**					
+0	0x0B80	V1 Voltage	0-Vmax	U1	UINT16	R	[1]
+1	0x0B81	V2 Voltage	0-Vmax	U1	UINT16	R	[1]
+2	0x0B82	V3 Voltage	0-Vmax	U1	UINT16	R	[1]
+3	0x0B83	Reserved	0		UINT16	R	
+4	0x0B84	V12 Voltage	0-Vmax	U1	UINT16	R	
+5	0x0B85	V23 Voltage	0-Vmax	U1	UINT16	R	
+5	0x0B86	V31 Voltage	0-Vmax	U1	UINT16	R	
+7	0x0B87	I1 Current	0-Imax	U2	UINT16	R	
+8	0x0B88	I2 Current	0-Imax	U2	UINT16	R	
+9	0x0B89	I3 Current	0-Imax	U2	UINT16	R	
+10	0x0B8A	Reserved	0		UINT16	R	
+11	0x0B8B	In Current	0-Imax	U2	UINT16	R	
4352-4384		**1-Cycle Phase Values**					
+0	0x0C00	V1/V12 Voltage	0-Vmax	U1	UINT16	R	[1]
+1	0x0C01	V2/V23 Voltage	0-Vmax	U1	UINT16	R	[1]
+2	0x0C02	V3/V31 Voltage	0-Vmax	U1	UINT16	R	[1]
+3	0x0C03	I1 Current	0-Imax	U2	UINT16	R	
+4	0x0C04	I2 Current	0-Imax	U2	UINT16	R	
+5	0x0C05	I3 Current	0-Imax	U2	UINT16	R	
+6	0x0C06	kW L1	-Pmax-Pmax	U3	INT16	R	
+7	0x0C07	kW L2	-Pmax-Pmax	U3	INT16	R	
+8	0x0C08	kW L3	-Pmax-Pmax	U3	INT16	R	
+9	0x0C09	kvar L1	-Pmax-Pmax	U3	INT16	R	
+10	0x0C0A	kvar L2	-Pmax-Pmax	U3	INT16	R	
+11	0x0C0B	kvar L3	-Pmax-Pmax	U3	INT16	R	

Address	Point ID	Description	Low and High Scales[3]	Units[3]	Type	R/W	Notes
+12	0x0C0C	kVA L1	0-Pmax	U3	UINT16	R	
+13	0x0C0D	kVA L2	0-Pmax	U3	UINT16	R	
+14	0x0C0E	kVA L3	0-Pmax	U3	UINT16	R	
+15	0x0C0F	Power factor L1	-1.000-1.000	0.001	INT16	R	
+16	0x0C10	Power factor L2	-1.000-1.000	0.001	INT16	R	
+17	0x0C11	Power factor L3	-1.000-1.000	0.001	INT16	R	
+18	0x0C12	V1/V12 Voltage THD	0-999.9	0.1%	UINT16	R	2, 5
+19	0x0C13	V2/V23 Voltage THD	0-999.9	0.1%	UINT16	R	2, 5
+20	0x0C14	V3/V31 Voltage THD	0-999.9	0.1%	UINT16	R	2, 5
+21	0x0C15	I1 Current THD	0-999.9	0.1%	UINT16	R	5
+22	0x0C16	I2 Current THD	0-999.9	0.1%	UINT16	R	5
+23	0x0C17	I3 Current THD	0-999.9	0.1%	UINT16	R	5
+24	0x0C18	I1 K-Factor	1.0-999.9	0.1	UINT16	R	5
+25	0x0C19	I2 K-Factor	1.0-999.9	0.1	UINT16	R	5
+26	0x0C1A	I3 K-Factor	1.0-999.9	0.1	UINT16	R	5
+27	0x0C1B	I1 Current TDD	0-100.0	0.1%	UINT16	R	5
+28	0x0C1C	I2 Current TDD	0-100.0	0.1%	UINT16	R	5
+29	0x0C1D	I3 Current TDD	0-100.0	0.1%	UINT16	R	5
+30	0x0C1E	V12 Voltage	0-Vmax	U1	UINT16	R	
+31	0x0C1F	V23 Voltage	0-Vmax	U1	UINT16	R	
+32	0x0C20	V31 Voltage	0-Vmax	U1	UINT16	R	
4416-4428		**1-Cycle Total Values**					
+0	0x0F00	Total kW	-Pmax-Pmax	U3	INT16	R	
+1	0x0F01	Total kvar	-Pmax-Pmax	U3	INT16	R	
+2	0x0F02	Total kVA	0-Pmax	U3	UINT16	R	
+3	0x0F03	Total PF	-1.000-1.000	0.001	INT16	R	
+4	0x0F04	Total PF lag	0-1.000	0.001	UINT16	R	
+5	0x0F05	Total PF lead	0-1.000	0.001	UINT16	R	
+5	0x0F06	Total kW import	0-Pmax	U3	UINT32	R	
+7	0x0F07	Total kW export	0-Pmax	U3	UINT32	R	
+8	0x0F08	Total kvar import	0-Pmax	U3	UINT32	R	
+9	0x0F09	Total kvar export	0-Pmax	U3	UINT32	R	
+10	0x0F0A	3-phase average L-N/L-L voltage	0-Vmax	U1	UINT32	R	1
+11	0x0F0B	3-phase average L-L voltage	0-Vmax	U1	UINT32	R	
+12	0x0F0C	3-phase average current	0-Imax	U2	UINT32	R	
4608-4612		**1-Cycle Auxiliary Values**					
+0	0x1000	Not used			UINT16	R	
+1	0x1001	In (neutral) Current	0-Imax	U2	UINT16	R	
+2	0x1002	Frequency	0-Fmax	0.01Hz	UINT16	R	
+3	0x1003	Voltage unbalance	0-300.0	0.1%	UINT16	R	
+4	0x1004	Current unbalance	0-300.0	0.1%	UINT16	R	
4640-4655		**Phasor**					
+0	0x1080	V1/V12 Voltage magnitude	0-Vmax	U1	UINT16	R	2

Address	Point ID	Description	Low and High Scales[3]	Units[3]	Type	R/W	Notes
+1	0x1081	V2/V23 Voltage magnitude	0-Vmax	U1	UINT16	R	2
+2	0x1082	V3/V31 Voltage magnitude	0-Vmax	U1	UINT16	R	2
+3	0x1083	Not used			UINT16	R	
+4	0x1084	I1 Current magnitude	0-Imax	U2	UINT16	R	
+5	0x1085	I2 Current magnitude	0-Imax	U2	UINT16	R	
+5	0x1086	I3 Current magnitude	0-Imax	U2	UINT16	R	
+7	0x1087	Not used			UINT16	R	
+8	0x1088	V1/V12 Voltage angle	-180.0-180.0	0.1°	INT16	R	2
+9	0x1089	V2/V23 Voltage angle	-180.0-180.0	0.1°	INT16	R	2
+10	0x108A	V3/V31 Voltage angle	-180.0-180.0	0.1°	INT16	R	2
+11	0x108B	Not used			INT16	R	
+12	0x108C	I1 Current angle	-180.0-180.0	0.1°	INT16	R	
+13	0x108D	I2 Current angle	-180.0-180.0	0.1°	INT16	R	
+14	0x108E	I3 Current angle	-180.0-180.0	0.1°	INT16	R	
+15	0x108F	Not used			INT16	R	
4672-4704		**1-Second Phase Values**					
+0	0x1100	V1/V12 Voltage	0-Vmax	U1	UINT16	R	1
+1	0x1101	V2/V23 Voltage	0-Vmax	U1	UINT16	R	1
+2	0x1102	V3/V31 Voltage	0-Vmax	U1	UINT16	R	1
+3	0x1103	I1 Current	0-Imax	U2	UINT16	R	
+4	0x1104	I2 Current	0-Imax	U2	UINT16	R	
+5	0x1105	I3 Current	0-Imax	U2	UINT16	R	
+6	0x1106	kW L1	-Pmax-Pmax	U3	INT16	R	
+7	0x1107	kW L2	-Pmax-Pmax	U3	INT16	R	
+8	0x1108	kW L3	-Pmax-Pmax	U3	INT16	R	
+9	0x1109	kvar L1	-Pmax-Pmax	U3	INT16	R	
+10	0x110A	kvar L2	-Pmax-Pmax	U3	INT16	R	
+11	0x110B	kvar L3	-Pmax-Pmax	U3	INT16	R	
+12	0x110C	kVA L1	0-Pmax	U3	UINT16	R	
+13	0x110D	kVA L2	0-Pmax	U3	UINT16	R	
+14	0x110E	kVA L3	0-Pmax	U3	UINT16	R	
+15	0x110F	Power factor L1	-1.000-1.000	0.001	INT16	R	
+16	0x1110	Power factor L2	-1.000-1.000	0.001	INT16	R	
+17	0x1111	Power factor L3	-1.000-1.000	0.001	INT16	R	
+18	0x1112	V1/V12 Voltage THD	0-999.9	0.1%	UINT16	R	2, 6
+19	0x1113	V2/V23 Voltage THD	0-999.9	0.1%	UINT16	R	2, 6
+20	0x1114	V3/V31 Voltage THD	0-999.9	0.1%	UINT16	R	2, 6
+21	0x1115	I1 Current THD	0-999.9	0.1%	UINT16	R	6
+22	0x1116	I2 Current THD	0-999.9	0.1%	UINT16	R	6
+23	0x1117	I3 Current THD	0-999.9	0.1%	UINT16	R	6
+24	0x1118	I1 K-Factor	1.0-999.9	0.1	UINT16	R	6
+25	0x1119	I2 K-Factor	1.0-999.9	0.1	UINT16	R	6
+26	0x111A	I3 K-Factor	1.0-999.9	0.1	UINT16	R	6

Address	Point ID	Description	Low and High Scales[3]	Units[3]	Type	R/W	Notes
+27	0x111B	I1 Current TDD	0-100.0	0.1%	UINT16	R	[6]
+28	0x111C	I2 Current TDD	0-100.0	0.1%	UINT16	R	[6]
+29	0x111D	I3 Current TDD	0-100.0	0.1%	UINT16	R	[6]
+30	0x111E	V12 Voltage	0-Vmax	U1	UINT16	R	
+31	0x111F	V23 Voltage	0-Vmax	U1	UINT16	R	
+32	0x1120	V31 Voltage	0-Vmax	U1	UINT16	R	
4864-4876		**1-Second Total Values**					
+0	0x1400	Total kW	-Pmax-Pmax	U3	INT16	R	
+1	0x1401	Total kvar	-Pmax-Pmax	U3	INT16	R	
+2	0x1402	Total kVA	0-Pmax	U3	UINT16	R	
+3	0x1403	Total PF	-1.000-1.000	0.001	INT16	R	
+4	0x1404	Total PF lag	0-1.000	0.001	UINT16	R	
+5	0x1405	Total PF lead	0-1.000	0.001	UINT16	R	
+5	0x1406	Total kW import	0-Pmax	U3	UINT32	R	
+7	0x1407	Total kW export	0-Pmax	U3	UINT32	R	
+8	0x1408	Total kvar import	0-Pmax	U3	UINT32	R	
+9	0x1409	Total kvar export	0-Pmax	U3	UINT32	R	
+10	0x140A	3-phase average L-N/L-L voltage	0-Vmax	U1	UINT32	R	[1]
+11	0x140B	3-phase average L-L voltage	0-Vmax	U1	UINT32	R	
+12	0x140C	3-phase average current	0-Imax	U2	UINT32	R	
4928-4932		**1-Second Auxiliary Values**					
+0	0x1500	Not used			UINT16	R	
+1	0x1501	In (neutral) Current	0-Imax	U2	UINT16	R	
+2	0x1502	Frequency	0-Fmax	0.01Hz	UINT16	R	
+3	0x1503	Voltage unbalance	0-300.0	0.1%	UINT16	R	
+4	0x1504	Current unbalance	0-300.0	0.1%	UINT16	R	
4960-4971		**Present Harmonic Demands**					
+0	0x1580	V1/V12 THD demand	0-999.9	0.1%	UINT16	R	[2]
+1	0x1581	V2/V23 THD demand	0-999.9	0.1%	UINT16	R	[2]
+2	0x1582	V3/V31 THD demand	0-999.9	0.1%	UINT16	R	[2]
+3	0x1583	Not used			UINT16	R	
+4	0x1584	I1 THD demand	0-999.9	0.1%	UINT16	R	
+5	0x1585	I2 THD demand	0-999.9	0.1%	UINT16	R	
+5	0x1586	I3 THD demand	0-999.9	0.1%	UINT16	R	
+7	0x1587	Not used			UINT16	R	
+8	0x1588	I1 TDD demand	0-100.0	0.1%	UINT16	R	
+9	0x1589	I2 TDD demand	0-100.0	0.1%	UINT16	R	
+10	0x158A	I3 TDD demand	0-100.0	0.1%	UINT16	R	
+11	0x158B	Not used			UINT16	R	
4992-5021		**Present Volt, Ampere and Power Demands**					
+0	0x1600	V1/V12 Volt demand	0-Vmax	U1	UINT16	R	[2]
+1	0x1601	V2/V23 Volt demand	0-Vmax	U1	UINT16	R	[2]
+2	0x1602	V3/V31 Volt demand	0-Vmax	U1	UINT16	R	[2]

Address	Point ID	Description	Low and High Scales[3]	Units[3]	Type	R/W	Notes
+3	0x1603	I1 Ampere demand	0-Imax	U2	UINT16	R	
+4	0x1604	I2 Ampere demand	0-Imax	U2	UINT16	R	
+5	0x1605	I3 Ampere demand	0-Imax	U2	UINT16	R	
+6	0x1606	kW import block demand	0-Pmax	U3	UINT16	R	
+7	0x1607	kvar import block demand	0-Pmax	U3	UINT16	R	
+8	0x1608	kVA block demand	0-Pmax	U3	UINT16	R	
+9	0x1609	kW import sliding window demand	0-Pmax	U3	UINT16	R	
+10	0x160A	kvar import sliding window demand	0-Pmax	U3	UINT16	R	
+11	0x160B	kVA sliding window demand	0-Pmax	U3	UINT16	R	
+12	0x160C	Not used			UINT16	R	
+13	0x160D	Not used			UINT16	R	
+14	0x160E	Not used			UINT16	R	
+15	0x160F	kW import accumulated demand	0-Pmax	U3	UINT16	R	
+16	0x1610	kvar import accumulated demand	0-Pmax	U3	UINT16	R	
+17	0x1611	kVA accumulated demand	0-Pmax	U3	UINT16	R	
+18	0x1612	kW import predicted sliding window demand	0-Pmax	U3	UINT16	R	
+19	0x1613	kvar import predicted sliding window demand	0-Pmax	U3	UINT16	R	
+20	0x1614	kVA predicted sliding window demand	0-Pmax	U3	UINT16	R	
+21	0x1615	PF (import) at Max. kVA sliding window demand	0-1.000	0.001	UINT16	R	
+22	0x1616	kW export block demand	0-Pmax	U3	UINT16	R	
+23	0x1617	kvar export block demand	0-Pmax	U3	UINT16	R	
+24	0x1618	kW export sliding window demand	0-Pmax	U3	UINT16	R	
+25	0x1619	kvar export sliding window demand	0-Pmax	U3	UINT16	R	
+26	0x161A	kW export accumulated demand	0-Pmax	U3	UINT16	R	
+27	0x161B	kvar export accumulated demand	0-Pmax	U3	UINT16	R	
+28	0x161C	kW export predicted sliding window demand	0-Pmax	U3	UINT16	R	
+29	0x161D	kvar export predicted sliding window demand	0-Pmax	U3	UINT16	R	
5056-5073		**Total Energies**					
+0,1	0x1700	kWh import	0-999,999,999	1 kWh	UINT32	R	
+2,3	0x1701	kWh export	0-999,999,999	1 kWh	UINT32	R	
+4,5		Not used			INT32	R	
+6,7		Not used			UINT32	R	
+8,9	0x1704	kvarh import	0-999,999,999	1 kvarh	UINT32	R	
+10,11	0x1705	kvarh export	0-999,999,999	1 kvarh	UINT32	R	
+12,13		Not used			INT32	R	
+14,15		Not used			UINT32	R	
+16,17	0x1708	kVAh total	0-999,999,999	1 kVAh	UINT32	R	
5120-5137		**Phase Energies**					
+0,1	0x1800	kWh import L1	0-999,999,999	1 kWh	UINT32	R	
+2,3	0x1801	kWh import L2	0-999,999,999	1 kWh	UINT32	R	
+4,5	0x1802	kWh import L3	0-999,999,999	1 kWh	UINT32	R	
+6,7	0x1803	kvarh import L1	0-999,999,999	1 kvarh	UINT32	R	
+8,9	0x1804	kvarh import L2	0-999,999,999	1 kvarh	UINT32	R	

Address	Point ID	Description	Low and High Scales[3]	Units[3]	Type	R/W	Notes
+10,11	0x1805	kvarh import L3	0-999,999,999	1 kvarh	UINT32	R	
+12,13	0x1806	kVAh total L1	0-999,999,999	1 kVAh	UINT32	R	
+14,15	0x1807	kVAh total L2	0-999,999,999	1 kVAh	UINT32	R	
+16,17	0x1808	kVAh total L3	0-999,999,999	1 kVAh	UINT32	R	
5152-5161		**Symmetrical Components**					
+0	0x1880	Positive-sequence voltage	0-Vmax	U1	UINT16	R	
+1	0x1881	Negative-sequence voltage	0-Vmax	U1	UINT16	R	
+2	0x1882	Zero-sequence voltage	0-Vmax	U1	UINT16	R	
+3	0x1883	Negative-sequence voltage unbalance	0-300.0	0.1%	UINT16	R	
+4	0x1884	Zero-sequence voltage unbalance	0-300.0	0.1%	UINT16	R	
+5	0x1885	Positive-sequence current	0-Imax	U2	UINT16	R	
+6	0x1886	Negative-sequence current	0-Imax	U2	UINT16	R	
+7	0x1887	Zero-sequence current	0-Imax	U2	UINT16	R	
+8	0x1888	Negative-sequence current unbalance	0-300.0	0.1%	UINT16	R	
+9	0x1889	Zero-sequence current unbalance	0-300.0	0.1%	UINT16	R	
5184-5233		**V1/V12 Harmonic Distortion**					[2]
+0	0x1900	H01 Harmonic distortion	0-100.00	0.01%	UINT16	R	
+1	0x1901	H02 Harmonic distortion	0-100.00	0.01%	UINT16	R	
		…					
+49	0x1931	H50 Harmonic distortion	0-100.00	0.01%	UINT16	R	
5248-5297		**V2/V23 Harmonic Distortion**					[2]
+0	0x1A00	H01 Harmonic distortion	0-100.00	0.01%	UINT16	R	
+1	0x1A01	H02 Harmonic distortion	0-100.00	0.01%	UINT16	R	
		…					
+49	0x1A31	H50 Harmonic distortion	0-100.00	0.01%	UINT16	R	
5312-5361		**V3/V31 Harmonic Distortion**					[2]
+0	0x1B00	H01 Harmonic distortion	0-100.00	0.01%	UINT16	R	
+1	0x1B01	H02 Harmonic distortion	0-100.00	0.01%	UINT16	R	
		…					
+49	0x1B31	H50 Harmonic distortion	0-100.00	0.01%	UINT16	R	
5376-5425		**I1 Harmonic Distortion**					
+0	0x1C00	H01 Harmonic distortion	0-100.00	0.01%	UINT16	R	
+1	0x1C01	H02 Harmonic distortion	0-100.00	0.01%	UINT16	R	
		…					
+49	0x1C31	H50 Harmonic distortion	0-100.00	0.01%	UINT16	R	
5440-5489		**I2 Harmonic Distortion**					
+0	0x1D00	H01 Harmonic distortion	0-100.00	0.01%	UINT16	R	
+1	0x1D01	H02 Harmonic distortion	0-100.00	0.01%	UINT16	R	
		…					
+49	0x1D31	H50 Harmonic distortion	0-100.00	0.01%	UINT16	R	

Address	Point ID	Description	Low and High Scales[3]	Units[3]	Type	R/W	Notes
5504-5553		**I3 Harmonic Distortion**					
+0	0x1E00	H01 Harmonic distortion	0-100.00	0.01%	UINT16	R	
+1	0x1E01	H02 Harmonic distortion	0-100.00	0.01%	UINT16	R	
		…					
+49	0x1E31	H50 Harmonic distortion	0-100.00	0.01%	UINT16	R	
6208-6225		**Fundamental Phase Values**					5
+0	0x2900	V1/V12 Voltage	0-Vmax	U1	UINT16	R	2
+1	0x2901	V2/V23 Voltage	0-Vmax	U1	UINT16	R	2
+2	0x2902	V3/V31 Voltage	0-Vmax	U1	UINT16	R	2
+3	0x2903	I1 Current	0-Imax	U2	UINT16	R	
+4	0x2904	I2 Current	0-Imax	U2	UINT16	R	
+5	0x2905	I3 Current	0-Imax	U2	UINT16	R	
+6	0x2906	kW L1	-Pmax-Pmax	U3	INT16	R	
+7	0x2907	kW L2	-Pmax-Pmax	U3	INT16	R	
+8	0x2908	kW L3	-Pmax-Pmax	U3	INT16	R	
+9	0x2909	kvar L1	-Pmax-Pmax	U3	INT16	R	
+10	0x290A	kvar L2	-Pmax-Pmax	U3	INT16	R	
+11	0x290B	kvar L3	-Pmax-Pmax	U3	INT16	R	
+12	0x290C	kVA L1	0-Pmax	U3	UINT16	R	
+13	0x290D	kVA L2	0-Pmax	U3	UINT16	R	
+14	0x290E	kVA L3	0-Pmax	U3	UINT16	R	
+15	0x290F	Power factor L1	-1.000-1.000	0.001	INT16	R	
+16	0x2910	Power factor L2	-1.000-1.000	0.001	INT16	R	
+17	0x2911	Power factor L3	-1.000-1.000	0.001	INT16	R	
6240-6251		**Flicker**					2
+0	0x2980	V1 Pst	0-100.00	0.01	UINT16	R	
+1	0x2981	V2 Pst	0-100.00	0.01	UINT16	R	
+2	0x2982	V3 Pst	0-100.00	0.01	UINT16	R	
+3	0x2983	V1 Plt	0-100.00	0.01	UINT16	R	
+4	0x2984	V2 Plt	0-100.00	0.01	UINT16	R	
+5	0x2985	V3 Plt	0-100.00	0.01	UINT16	R	
6272-6275		**Fundamental Total Values**					5
+0	0x2A00	Total fundamental kW	-Pmax-Pmax	U3	INT16	R	
+1	0x2A01	Total fundamental kvar	-Pmax-Pmax	U3	INT16	R	
+2	0x2A02	Total fundamental kVA	0-Pmax	U3	UINT16	R	
+3	0x2A03	Total fundamental PF	-1.000-1.000	0.001	INT16	R	
6400-6429		**Minimum 1-Cycle Phase Values**					
+0	0x2C00	V1/V12 Voltage	0-Vmax	U1	UINT16	R	2
+1	0x2C01	V2/V23 Voltage	0-Vmax	U1	UINT16	R	2
+2	0x2C02	V3/V31 Voltage	0-Vmax	U1	UINT16	R	2
+3	0x2C03	I1 Current	0-Imax	U2	UINT16	R	
+4	0x2C04	I2 Current	0-Imax	U2	UINT16	R	
+5	0x2C05	I3 Current	0-Imax	U2	UINT16	R	

Address	Point ID	Description	Low and High Scales[3]	Units[3]	Type	R/W	Notes
+6-17	0x2C06-0x2C11	Not used	0		INT16	R	
+18	0x2C12	V1/V12 Voltage THD	0-9999	0.1%	UINT16	R	2, 5
+19	0x2C13	V2/V23 Voltage THD	0-9999	0.1%	UINT16	R	2, 5
+20	0x2C14	V3/V31 Voltage THD	0-999.9	0.1%	UINT16	R	2, 5
+21	0x2C15	I1 Current THD	0-999.9	0.1%	UINT16	R	5
+22	0x2C16	I2 Current THD	0-999.9	0.1%	UINT16	R	5
+23	0x2C17	I3 Current THD	0-999.9	0.1%	UINT16	R	5
+24	0x2C18	I1 K-Factor	1.0-999.9	0.1	UINT16	R	5
+25	0x2C19	I2 K-Factor	1.0-999.9	0.1	UINT16	R	5
+26	0x2C1A	I3 K-Factor	1.0-999.9	0.1	UINT16	R	5
+27	0x2C1B	I1 Current TDD	0-100.0	0.1%	UINT16	R	5
+28	0x2C1C	I2 Current TDD	0-100.0	0.1%	UINT16	R	5
+29	0x2C1D	I3 Current TDD	0-100.0	0.1%	UINT16	R	5
6464-6467		**Minimum 1-Cycle Total Values**					
+0	0x2D00	Total kW	-Pmax-Pmax	U3	INT16	R	
+1	0x2D01	Total kvar	-Pmax-Pmax	U3	INT16	R	
+2	0x2D02	Total kVA	0-Pmax	U3	UINT16	R	
+3	0x2D03	Total PF	0-1.000	0.001	UINT16	R	Absolute value
6528-6530		**Minimum 1-Cycle Auxiliary Values**					
+0	0x2E00	Not used		U2	UINT16	R	
+1	0x2E01	In Current	0-Imax	U2	UINT16	R	
+2	0x2E02	Frequency	0-Fmax	0.01Hz	UINT16	R	
6912-6941		**Maximum 1-Cycle Phase Values**					
+0	0x3400	V1/V12 Voltage	0-Vmax	U1	UINT16	R	2
+1	0x3401	V2/V23 Voltage	0-Vmax	U1	UINT16	R	2
+2	0x3402	V3/V31 Voltage	0-Vmax	U1	UINT16	R	2
+3	0x3403	I1 Current	0-Imax	U2	UINT16	R	
+4	0x3404	I2 Current	0-Imax	U2	UINT16	R	
+5	0x3405	I3 Current	0-Imax	U2	UINT16	R	
+6-17	0x3406-0x3411	Not used	0		INT16	R	
+18	0x3412	V1 Voltage THD	0-999.9	0.1%	UINT16	R	2, 5
+19	0x3413	V2 Voltage THD	0-999.9	0.1%	UINT16	R	2, 5
+20	0x3414	V3 Voltage THD	0-999.9	0.1%	UINT16	R	2, 5
+21	0x3415	I1 Current THD	0-999.9	0.1%	UINT16	R	5
+22	0x3416	I2 Current THD	0-999.9	0.1%	UINT16	R	5
+23	0x3417	I3 Current THD	0-999.9	0.1%	UINT16	R	5
+24	0x3418	I1 K-Factor	1.0-999.9	0.1	UINT16	R	5
+25	0x3419	I2 K-Factor	1.0-999.9	0.1	UINT16	R	5
+26	0x341A	I3 K-Factor	1.0-999.9	0.1	UINT16	R	5
+27	0x341B	I1 Current TDD	0-100.0	0.1%	UINT16	R	5
+28	0x341C	I2 Current TDD	0-100.0	0.1%	UINT16	R	5

Address	Point ID	Description	Low and High Scales[3]	Units[3]	Type	R/W	Notes
+29	0x341D	I3 Current TDD	0-100.0	0.1%	UINT16	R	[5]
6976-6979		**Maximum 1-Cycle Total Values**					
+0	0x3500	Total kW	-Pmax-Pmax	U3	INT16	R	
+1	0x3501	Total kvar	-Pmax-Pmax	U3	INT16	R	
+2	0x3502	Total kVA	0-Pmax	U3	UINT16	R	
+3	0x3503	Total PF	0-1.000	0.001	UINT16	R	Absolute value
7040-7042		**Maximum 1-Cycle Auxiliary Values**					
+0	0x3600	Not used		U2	UINT16	R	
+1	0x3601	In Current	0-Imax	U2	UINT16	R	
+2	0x3602	Frequency	0-Fmax	0.01Hz	UINT16	R	
7104-7120		**Maximum Demands**					
+0	0x3700	V1/V12 Maximum volt demand	0-Vmax	U1	UINT16	R	[2]
+1	0x3701	V2/V23 Maximum volt demand	0-Vmax	U1	UINT16	R	[2]
+2	0x3702	V3/V31 Maximum volt demand	0-Vmax	U1	UINT16	R	[2]
+3	0x3703	I1 Maximum ampere demand	0-Imax	U2	UINT16	R	
+4	0x3704	I2 Maximum ampere demand	0-Imax	U2	UINT16	R	
+5	0x3705	I3 Maximum ampere demand	0-Imax	U2	UINT16	R	
+6	0x3706	Not used			UINT16	R	
+7	0x3707	Not used			UINT16	R	
+8	0x3708	Not used			UINT16	R	
+9	0x3709	Maximum kW import sliding window demand	0-Pmax	U3	UINT16	R	
+10	0x370A	Maximum kvar import sliding window demand	0-Pmax	U3	UINT16	R	
+11	0x370B	Maximum kVA sliding window demand	0-Pmax	U3	UINT16	R	
+12	0x370C	Not used			UINT16	R	
+13	0x370D	Not used			UINT16	R	
+14	0x370E	Not used			UINT16	R	
+15	0x370F	Maximum kW export sliding window demand	0-Pmax	U3	UINT16	R	
+16	0x3710	Maximum kvar export sliding window demand	0-Pmax	U3	UINT16	R	
7200-7211		**Maximum Harmonic Demands**					
+0	0x3880	V1/V12 THD demand	0-999.9	0.1%	UINT16	R	[2]
+1	0x3881	V2/V23 THD demand	0-999.9	0.1%	UINT16	R	[2]
+2	0x3882	V3/V31 THD demand	0-999.9	0.1%	UINT16	R	[2]
+3	0x3883	Not used			UINT16	R	
+4	0x3884	I1 THD demand	0-999.9	0.1%	UINT16	R	
+5	0x3885	I2 THD demand	0-999.9	0.1%	UINT16	R	
+6	0x3886	I3 THD demand	0-999.9	0.1%	UINT16	R	
+7	0x3887	Not used			UINT16	R	
+8	0x3888	I1 TDD demand	0-100.0	0.1%	UINT16	R	
+9	0x3889	I2 TDD demand	0-100.0	0.1%	UINT16	R	
+10	0x388A	I3 TDD demand	0-100.0	0.1%	UINT16	R	
+11	0x388B	Not used			UINT16	R	
7360-7361		**Scaled Analog Inputs**					
+0	0x3B00	Analog input AI1	AI1min-AI1Max		UINT16	R	

Address	Point ID	Description	Low and High Scales[3]	Units[3]	Type	R/W	Notes
+1	0x3B01	Analog input AI2	AI2min-AI2Max		UINT16	R	
7392-7393		**Raw Analog Inputs**					
+0	0x3B80	Analog input AI1	0-4095		UINT16	R	
+1	0x3B81	Analog input AI2	0-4095		UINT16	R	
7424-7425		**TOU Parameters**					
+0	0x3C00	Active tariff	0-7		UINT16	R/W	
+1	0x3C01	Active profile	0-15: 0-3 = Season 1 Profile #1-4, 4-7 = Season 2 Profile #1-4, 8-11 = Season 3 Profile #1-4, 12-15 = Season 4 Profile #1-4		UINT16	R/W	
7456-7457		**Scaled Analog Outputs**					
+0	0x3C80	Analog output AO1	0-4095		UINT16	R/W	
+1	0x3C81	Analog output AO2	0-4095		UINT16	R/W	
7488-7503		**Billing TOU Energy Register #1**					
+0,1	0x3D00	Tariff #1 register	0-999,999,999	1 kWh	UINT32	R	
+2,3	0x3D01	Tariff #2 register	0-999,999,999	1 kWh	UINT32	R	
		...				R	
+14,15	0x3D07	Tariff #8 register	0-999,999,999	1 kWh	UINT32	R	
7552-7567		**Billing TOU Energy Register #2**					
+0,1	0x3E00	Tariff #1 register	0-999,999,999	1 kWh	UINT32	R	
+2,3	0x3E01	Tariff #2 register	0-999,999,999	1 kWh	UINT32	R	
		...				R	
+14,15	0x3E07	Tariff #8 register	0-999,999,999	1 kWh	UINT32	R	
7616-7631		**Billing TOU Energy Register #3**					
+0,1	0x3F00	Tariff #1 register	0-999,999,999	1 kWh	UINT32	R	
+2,3	0x3F01	Tariff #2 register	0-999,999,999	1 kWh	UINT32	R	
		...				R	
+14,15	0x3F07	Tariff #8 register	0-999,999,999	1 kWh	UINT32	R	
7680-7695		**Billing TOU Energy Register #4**					
+0,1	0x4000	Tariff #1 register	0-999,999,999	1 kWh	UINT32	R	
+2,3	0x4001	Tariff #2 register	0-999,999,999	1 kWh	UINT32	R	
		...				R	
+14,15	0x4007	Tariff #8 register	0-999,999,999	1 kWh	UINT32	R	
7744-7759		**Billing TOU Energy Register #5**					
+0,1	0x4100	Tariff #1 register	0-999,999,999	1 kWh	UINT32	R	
+2,3	0x4101	Tariff #2 register	0-999,999,999	1 kWh	UINT32	R	
		...				R	
+14,15	0x4107	Tariff #8 register	0-999,999,999	1 kWh	UINT32	R	
7808-7823		**Billing TOU Energy Register #6**					
+0,1	0x4200	Tariff #1 register	0-999,999,999	1 kWh	UINT32	R	
+2,3	0x4201	Tariff #2 register	0-999,999,999	1 kWh	UINT32	R	

Address	Point ID	Description	Low and High Scales[3]	Units[3]	Type	R/W	Notes
		...				R	
+14,15	0x4207	Tariff #8 register	0-999,999,999	1 kWh	UINT32	R	
7872-7887		**Billing TOU Energy Register #7**					
+0,1	0x4300	Tariff #1 register	0-999,999,999	1 kWh	UINT32	R	
+2,3	0x4301	Tariff #2 register	0-999,999,999	1 kWh	UINT32	R	
		...				R	
+14,15	0x4307	Tariff #8 register	0-999,999,999	1 kWh	UINT32	R	
7936-7951		**Billing TOU Energy Register #8**					
+0,1	0x4400	Tariff #1 register	0-999,999,999	1 kWh	UINT32	R	
+2,3	0x4401	Tariff #2 register	0-999,999,999	1 kWh	UINT32	R	
		...				R	
+14,15	0x4407	Tariff #8 register	0-999,999,999	1 kWh	UINT32	R	
8000-8007		**Billing Summary Accumulated Demands**					
+0	0x4500	Summary register #1 demand	0-Pmax	U3	UINT16	R	
+1	0x4501	Summary register #2 demand	0-Pmax	U3	UINT16	R	
		...				R	
+7	0x4507	Summary register #8 demand	0-Pmax	U3	UINT16	R	
8032-8039		**Billing Summary Block Demands**					
+0	0x4580	Summary register #1 demand	0-Pmax	U3	UINT16	R	
+1	0x4581	Summary register #2 demand	0-Pmax	U3	UINT16	R	
		...				R	
+7	0x4587	Summary register #8 demand	0-Pmax	U3	UINT16	R	
8064-8071		**Billing Summary Sliding Window Demands**					
+0	0x4600	Summary register #1 demand	0-Pmax	U3	UINT16	R	
+1	0x4601	Summary register #2 demand	0-Pmax	U3	UINT16	R	
		...				R	
+7	0x4607	Summary register #8 demand	0-Pmax	U3	UINT16	R	
8160-8167		**Billing Summary Maximum Demands**					
+0	0x4780	Summary register #1 maximum demand	0-Pmax	U3	UINT16	R	
+1	0x4781	Summary register #2 maximum demand	0-Pmax	U3	UINT16	R	
		...				R	
+7	0x4787	Summary register #8 maximum demand	0-Pmax	U3	UINT16	R	
8192-8199		**Billing TOU Maximum Demand Register #1**					
+0	0x4800	Tariff #1 maximum demand	0-Pmax	U3	UINT16	R	
+1	0x4801	Tariff #2 maximum demand	0-Pmax	U3	UINT16	R	
		...				R	
+7	0x4807	Tariff #8 maximum demand	0-Pmax	U3	UINT16	R	
8256-8263		**Billing TOU Maximum Demand Register #2**					
+0	0x4900	Tariff #1 maximum demand	0-Pmax	U3	UINT16	R	
+1	0x4901	Tariff #2 maximum demand	0-Pmax	U3	UINT16	R	
		...				R	

Address	Point ID	Description	Low and High Scales[3]	Units[3]	Type	R/W	Notes
+7	0x4907	Tariff #8 maximum demand	0-Pmax	U3	UINT16	R	
8320-8327		**Billing TOU Maximum Demand Register #3**					
+0	0x4A00	Tariff #1 maximum demand	0-Pmax	U3	UINT16	R	
+1	0x4A01	Tariff #2 maximum demand	0-Pmax	U3	UINT16	R	
		...				R	
+7	0x4A07	Tariff #8 maximum demand	0-Pmax	U3	UINT16	R	
8224-8231		**Billing TOU Maximum Demand Register #4**					
+0	0x4880	Tariff #1 maximum demand	0-Pmax	U3	UINT16	R	
+1	0x4881	Tariff #2 maximum demand	0-Pmax	U3	UINT16	R	
		...				R	
+7	0x4887	Tariff #8 maximum demand	0-Pmax	U3	UINT16	R	
8288-8295		**Billing TOU Maximum Demand Register #5**					
+0	0x4980	Tariff #1 maximum demand	0-Pmax	U3	UINT16	R	
+1	0x4981	Tariff #2 maximum demand	0-Pmax	U3	UINT16	R	
		...				R	
+7	0x4987	Tariff #8 maximum demand	0-Pmax	U3	UINT16	R	
8352-8359		**Billing TOU Maximum Demand Register #6**					
+0	0x4A80	Tariff #1 maximum demand	0-Pmax	U3	UINT16	R	
+1	0x4A81	Tariff #2 maximum demand	0-Pmax	U3	UINT16	R	
		...				R	
+7	0x4A87	Tariff #8 maximum demand	0-Pmax	U3	UINT16	R	
8896-8903		**Billing TOU Maximum Demand Register #7**					
+0	0x5300	Tariff #1 maximum demand	0-Pmax	U3	UINT16	R	
+1	0x5301	Tariff #2 maximum demand	0-Pmax	U3	UINT16	R	
		...				R	
+7	0x5307	Tariff #8 maximum demand	0-Pmax	U3	UINT16	R	
8928-8935		**Billing TOU Maximum Demand Register #8**					
+0	0x5380	Tariff #1 maximum demand	0-Pmax	U3	UINT16	R	
+1	0x5381	Tariff #2 maximum demand	0-Pmax	U3	UINT16	R	
		...				R	
+7	0x5387	Tariff #8 maximum demand	0-Pmax	U3	UINT16	R	
9984-10033		**V1/V12 Harmonic Angles**				R	2, 4
+0	0x6400	H01 Harmonic angle	-180.0-180.0	0.1°	INT16	R	
+1	0x6401	H02 Harmonic angle	-180.0-180.0	0.1°	INT16	R	
		...					
+49	0x6431	H50 Harmonic angle	-180.0-180.0	0.1°	INT16	R	
10048-10097		**V2/V23 Harmonic Angles**				R	2, 4
+0	0x6500	H01 Harmonic angle	-180.0-180.0	0.1°	INT16	R	
+1	0x6501	H02 Harmonic angle	-180.0-180.0	0.1°	INT16	R	
		...					
+49	0x6531	H50 Harmonic angle	-180.0-180.0	0.1°	INT16	R	

Address	Point ID	Description	Low and High Scales[3]	Units[3]	Type	R/W	Notes
10112-10161		**V3/V31 Harmonic Angles**					[2, 4]
+0	0x6600	H01 Harmonic angle	-180.0-180.0	0.1°	INT16	R	
+1	0x6601	H02 Harmonic angle	-180.0-180.0	0.1°	INT16	R	
		…					
+49	0x6631	H50 Harmonic angle	-180.0-180.0	0.1°	INT16	R	
10240-10289		**I1 Harmonic Angles**					[4]
+0	0x6800	H01 Harmonic angle	-180.0-180.0	0.1°	INT16	R	
+1	0x6801	H02 Harmonic angle	-180.0-180.0	0.1°	INT16	R	
		…					
+49	0x6831	H50 Harmonic angle	-180.0-180.0	0.1°	INT16	R	
10304-10353		**I2 Harmonic Angles**					[4]
+0	0x6900	H01 Harmonic angle	-180.0-180.0	0.1°	INT16	R	
+1	0x6901	H02 Harmonic angle	-180.0-180.0	0.1°	INT16	R	
		…					
+49	0x6931	H50 Harmonic angle	-180.0-180.0	0.1°	INT16	R	
10368-10417		**I3 Harmonic Angles**					[4]
+0	0x6A00	H01 Harmonic angle	-180.0-180.0	0.1°	INT16	R	
+1	0x6A01	H02 Harmonic angle	-180.0-180.0	0.1°	INT16	R	
		…					
+49	0x6A31	H50 Harmonic angle	-180.0-180.0	0.1°	INT16	R	
10560-10581		**10-Minute Volts and Symmetrical Components**					
+0	0x6D00	V1 Voltage	0-Vmax	U1	UINT16	R	[2]
+1	0x6D01	V2 Voltage	0-Vmax	U1	UINT16	R	[2]
+2	0x6D02	V3 Voltage	0-Vmax	U1	UINT16	R	[2]
+3-16		Reserved	0		UINT16	R	
+17	0x6D11	Zero-sequence voltage	0-Vmax	U1	UINT16	R	
+18	0x6D12	Zero-sequence current	0-Imax	U2	UINT16	R	
+19	0x6D13	Reserved	0		UINT16	R	
+20	0x6D14	Negative-sequence voltage unbalance	0-300.0	0.1%	UINT16	R	
+21	0x6D15	Negative-sequence current unbalance	0-300.0	0.1%	UINT16	R	
10688-10706		**10-Minute Total Harmonics**					
+0	0x6F00	V1 THD	0-999.9	0.1%	UINT16	R	[2]
+1	0x6F01	V2 THD	0-999.9	0.1%	UINT16	R	[2]
+2	0x6F02	V3 THD	0-999.9	0.1%	UINT16	R	[2]
+3	0x6F03	Reserved	0		UINT16	R	
+4	0x6F04	I1 THD	0-999.9	0.1%	UINT16	R	
+5	0x6F05	I2 THD	0-999.9	0.1%	UINT16	R	
+6	0x6F06	I3 THD	0-999.9	0.1%	UINT16	R	
+7	0x6F07	Reserved	0		UINT16	R	
+8	0x6F08	V1 Inter-harmonics THD	0-999.9	0.1%	UINT16	R	[2]
+9	0x6F09	V2 Inter-harmonics THD	0-999.9	0.1%	UINT16	R	[2]
+10	0x6F0A	V3 Inter-harmonics THD	0-999.9	0.1%	UINT16	R	[2]

Address	Point ID	Description	Low and High Scales[3]	Units[3]	Type	R/W	Notes
+11	0x6F0B	Reserved	0		UINT16	R	
+12	0x6F0C	I1 Inter-harmonics THD	0-999.9	0.1%	UINT16	R	
+13	0x6F0D	I2 Inter-harmonics THD	0-999.9	0.1%	UINT16	R	
+14	0x6F0E	I3 Inter-harmonics THD	0-999.9	0.1%	UINT16	R	
+15	0x6F0F	Reserved	0		UINT16	R	
+16	0x6F10	I1 TDD	0-100.0	0.1%	UINT16	R	
+17	0x6F11	I2 TDD	0-100.0	0.1%	UINT16	R	
+18	0x6F12	I3 TDD	0-100.0	0.1%	UINT16	R	

NOTES:

[1] When the 4LN3, 4LL3, 3LN3, 3LL3, 3BLN3 or 3BLL3 wiring mode is selected, the voltages will be line-to-neutral; for any other wiring mode, they will be line-to-line.

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

[3] For volts, amps, power and frequency scales and units refer to Section 4 "Data Scales and Units". For analog data scaling formulas and examples, see Section 2.6.1, "16-bit Scaled Integer Format".

[4] Harmonic angles are referenced to the fundamental voltage harmonic H01 on phase L1.

[5] On a 0.2-s interval.

[6] On a 3-s interval.

3.4 32-bit Analog Registers, Binary Registers and Counters

Address	Point ID	Description	Options/Range[3]	Units[3]	Type	R/W	Notes
11776-11777	0x0000	**None**	0		UINT32	R	
11840	0x0080	**Setpoint Status SP1-SP16 (bitmap)**	0x00000000-0x0000FFFF		UINT32	R	
11904-11907		**Special Inputs**					
+0,1	0x0100	Reserved	0		UINT32	R	
+2,3	0x0101	Phase rotation order	0=error, 1=positive (ABC), 2=negative (CBA)		UINT32	R	
12160-12161	0x0300	**Event Flags (bitmap)**	0x00000000-0x000000FF		UINT32	R	
12544-12545	0x0600	**Digital Inputs (bitmap)**	0x00000000-0x0000000F		UINT32	R	
12800-12801	0x0800	**Relay Outputs (bitmap)**	0x00000000-0x0000000F		UINT32	R	
13056-13063		**Counters**					
+0,1	0x0A00	Counter #1	0-999,999		UINT32	R/W	
+2,3	0x0A01	Counter #2	0-999,999		UINT32	R/W	
+4,5	0x0A02	Counter #3	0-999,999		UINT32	R/W	
+6,7	0x0A03	Counter #4	0-999,999		UINT32	R/W	
13248-13297		**1/2-Cycle Values**					
+0, 1	0x0B80	V1 Voltage	0-Vmax	U1	UINT32	R	[1]
+2, 3	0x0B81	V2 Voltage	0-Vmax	U1	UINT32	R	[1]
+4, 5	0x0B82	V3 Voltage	0-Vmax	U1	UINT32	R	[1]
+6, 7	0x0B83	Reserved	0		UINT32	R	
+8, 9	0x0B84	V12 Voltage	0-Vmax	U1	UINT32	R	
+10, 11	0x0B85	V23 Voltage	0-Vmax	U1	UINT32	R	
+12, 13	0x0B86	V31 Voltage	0-Vmax	U1	UINT32	R	
+14, 15	0x0B87	I1 Current	0-Imax	U2	UINT32	R	
+16, 17	0x0B88	I2 Current	0-Imax	U2	UINT32	R	
+18, 19	0x0B89	I3 Current	0-Imax	U2	UINT32	R	
+20, 21	0x0B8A	Reserved	0		UINT32	R	
+22, 23	0x0B8B	In Current	0-Imax	U2	UINT32	R	
13312-13377		**1-Cycle Phase Values**					
+0,1	0x0C00	V1/V12 Voltage	0-Vmax	U1	UINT32	R	[1]
+2,3	0x0C01	V2/V23 Voltage	0-Vmax	U1	UINT32	R	[1]
+4,5	0x0C02	V3/V31 Voltage	0-Vmax	U1	UINT32	R	[1]
+6,7	0x0C03	I1 Current	0-Imax	U2	UINT32	R	
+8,9	0x0C04	I2 Current	0-Imax	U2	UINT32	R	
+10,11	0x0C05	I3 Current	0-Imax	U2	UINT32	R	
+12,13	0x0C06	kW L1	-Pmax-Pmax	U3	INT32	R	
+14,15	0x0C07	kW L2	-Pmax-Pmax	U3	INT32	R	
+16,17	0x0C08	kW L3	-Pmax-Pmax	U3	INT32	R	
+18,19	0x0C09	kvar L1	-Pmax-Pmax	U3	INT32	R	
+20,21	0x0C0A	kvar L2	-Pmax-Pmax	U3	INT32	R	
+22,23	0x0C0B	kvar L3	-Pmax-Pmax	U3	INT32	R	

Address	Point ID	Description	Options/Range[3]	Units[3]	Type	R/W	Notes
+24,25	0x0C0C	kVA L1	0-Pmax	U3	UINT32	R	
+26,27	0x0C0D	kVA L2	0-Pmax	U3	UINT32	R	
+28,29	0x0C0E	kVA L3	0-Pmax	U3	UINT32	R	
+30,31	0x0C0F	Power factor L1	-1000-1000	×0.001	INT32	R	
+32,33	0x0C10	Power factor L2	-1000-1000	×0.001	INT32	R	
+34,35	0x0C11	Power factor L3	-1000-1000	×0.001	INT32	R	
+36,37	0x0C12	V1/V12 Voltage THD	0-9999	×0.1%	UINT32	R	2, 5
+38,39	0x0C13	V2/V23 Voltage THD	0-9999	×0.1%	UINT32	R	2, 5
+40,41	0x0C14	V3/V31 Voltage THD	0-9999	×0.1%	UINT32	R	2, 5
+42,43	0x0C15	I1 Current THD	0-9999	×0.1%	UINT32	R	5
+44,45	0x0C16	I2 Current THD	0-9999	×0.1%	UINT32	R	5
+46,47	0x0C17	I3 Current THD	0-9999	×0.1%	UINT32	R	5
+48,49	0x0C18	I1 K-Factor	10-9999	×0.1	UINT32	R	5
+50,51	0x0C19	I2 K-Factor	10-9999	×0.1	UINT32	R	5
+52,53	0x0C1A	I3 K-Factor	10-9999	×0.1	UINT32	R	5
+54,55	0x0C1B	I1 Current TDD	0-1000	×0.1%	UINT32	R	5
+56,57	0x0C1C	I2 Current TDD	0-1000	×0.1%	UINT32	R	5
+58,59	0x0C1D	I3 Current TDD	0-1000	×0.1%	UINT32	R	5
+60,61	0x0C1E	V12 Voltage	0-Vmax	U1	UINT32	R	
+62,63	0x0C1F	V23 Voltage	0-Vmax	U1	UINT32	R	
+64,65	0x0C20	V31 Voltage	0-Vmax	U1	UINT32	R	
13696-13703		**1-Cycle Total Values**					
+0,1	0x0F00	Total kW	-Pmax-Pmax	U3	INT32	R	
+2,3	0x0F01	Total kvar	-Pmax-Pmax	U3	INT32	R	
+4,5	0x0F02	Total kVA	0-Pmax	U3	UINT32	R	
+6,7	0x0F03	Total PF	-1000-1000	×0.001	INT32	R	
+8,9	0x0F04	Total PF lag	0-1.000	×0.001	UINT16	R	
+10,11	0x0F05	Total PF lead	0-1.000	×0.001	UINT16	R	
+12,13	0x0F06	Total kW import	0-Pmax	U3	UINT32	R	
+14,15	0x0F07	Total kW export	0-Pmax	U3	UINT32	R	
+16,17	0x0F08	Total kvar import	0-Pmax	U3	UINT32	R	
+18,19	0x0F09	Total kvar export	0-Pmax	U3	UINT32	R	
+20,21	0x0F0A	3-phase average L-N/L-L voltage	0-Vmax	U1	UINT32	R	1
+22,23	0x0F0B	3-phase average L-L voltage	0-Vmax	U1	UINT32	R	
+24,25	0x0F0C	3-phase average current	0-Imax	U2	UINT32	R	
13824-13833		**1-Cycle Auxiliary Values**					
+0,1	0x1000	Not used			UINT32	R	
+2,3	0x1001	In (neutral) Current	0-Imax	U2	UINT32	R	
+4,5	0x1002	Frequency	0-Fmax	×0.01Hz	UINT32	R	
+6,7	0x1003	Voltage unbalance	0-3000	×0.1%	UINT32	R	
+8,9	0x1004	Current unbalance	0-3000	×0.1%	UINT32	R	
13888-13919		**Phasor**					
+0,1	0x1080	V1/V12 Voltage magnitude	0-Vmax	U1	UINT32	R	2

Address	Point ID	Description	Options/Range[3]	Units[3]	Type	R/W	Notes
+2,3	0x1081	V2/V23 Voltage magnitude	0-Vmax	U1	UINT32	R	2
+4,5	0x1082	V3/V31 Voltage magnitude	0-Vmax	U1	UINT32	R	2
+6,7	0x1083	Not used			UINT32	R	
+8,9	0x1084	I1 Current magnitude	0-Imax	U2	UINT32	R	
+10,11	0x1085	I2 Current magnitude	0-Imax	U2	UINT32	R	
+12,13	0x1086	I3 Current magnitude	0-Imax	U2	UINT32	R	
+14,15	0x1087	Not used			UINT32	R	
+16,17	0x1088	V1/V12 Voltage angle	-1800-1800	×0.1°	INT32	R	2
+18,19	0x1089	V2/V23 Voltage angle	-1800-1800	×0.1°	INT32	R	2
+20,21	0x108A	V3/V31 Voltage angle	-1800-1800	×0.1°	INT32	R	2
+22,23	0x108B	Not used			INT32	R	
+24,25	0x108C	I1 Current angle	-1800-1800	×0.1°	INT32	R	
+26,27	0x108D	I2 Current angle	-1800-1800	×0.1°	INT32	R	
+28,29	0x108E	I3 Current angle	-1800-1800	×0.1°	INT32	R	
+30,31	0x108F	Not used			INT32	R	
13952-14017		**1-Second Phase Values**					
+0,1	0x1100	V1/V12 Voltage	0-Vmax	U1	UINT32	R	1
+2,3	0x1101	V2/V23 Voltage	0-Vmax	U1	UINT32	R	1
+4,5	0x1102	V3/V31 Voltage	0-Vmax	U1	UINT32	R	1
+6,7	0x1103	I1 Current	0-Imax	U2	UINT32	R	
+8,9	0x1104	I2 Current	0-Imax	U2	UINT32	R	
+10,11	0x1105	I3 Current	0-Imax	U2	UINT32	R	
+12,13	0x1106	kW L1	-Pmax-Pmax	U3	INT32	R	
+14,15	0x1107	kW L2	-Pmax-Pmax	U3	INT32	R	
+16,17	0x1108	kW L3	-Pmax-Pmax	U3	INT32	R	
+18,19	0x1109	kvar L1	-Pmax-Pmax	U3	INT32	R	
+20,21	0x110A	kvar L2	-Pmax-Pmax	U3	INT32	R	
+22,23	0x110B	kvar L3	-Pmax-Pmax	U3	INT32	R	
+24,25	0x110C	kVA L1	0-Pmax	U3	UINT32	R	
+26,27	0x110D	kVA L2	0-Pmax	U3	UINT32	R	
+28,29	0x110E	kVA L3	0-Pmax	U3	UINT32	R	
+30,31	0x110F	Power factor L1	-1000-1000	×0.001	INT32	R	
+32,33	0x1110	Power factor L2	-1000-1000	×0.001	INT32	R	
+34,35	0x1111	Power factor L3	-1000-1000	×0.001	INT32	R	
+36,37	0x1112	V1/V12 Voltage THD	0-9999	×0.1%	UINT32	R	2, 6
+38,39	0x1113	V2/V23 Voltage THD	0-9999	×0.1%	UINT32	R	2, 6
+40,41	0x1114	V3/V31 Voltage THD	0-9999	×0.1%	UINT32	R	2, 6
+42,43	0x1115	I1 Current THD	0-9999	×0.1%	UINT32	R	6
+44,45	0x1116	I2 Current THD	0-9999	×0.1%	UINT32	R	6
+46,47	0x1117	I3 Current THD	0-9999	×0.1%	UINT32	R	6
+48,49	0x1118	I1 K-Factor	10-9999	×0.1	UINT32	R	6
+50,51	0x1119	I2 K-Factor	10-9999	×0.1	UINT32	R	6
+52,53	0x111A	I3 K-Factor	10-9999	×0.1	UINT32	R	6

Address	Point ID	Description	Options/Range[3]	Units[3]	Type	R/W	Notes
+54,55	0x111B	I1 Current TDD	0-1000	×0.1%	UINT32	R	[6]
+56,57	0x111C	I2 Current TDD	0-1000	×0.1%	UINT32	R	[6]
+58,59	0x111D	I3 Current TDD	0-1000	×0.1%	UINT32	R	[6]
+60,61	0x111E	V12 Voltage	0-Vmax	U1	UINT32	R	
+62,63	0x111F	V23 Voltage	0-Vmax	U1	UINT32	R	
+64,65	0x1120	V31 Voltage	0-Vmax	U1	UINT32	R	
14336-14343		**1-Second Total Values**					
+0,1	0x1400	Total kW	-Pmax-Pmax	U3	INT32	R	
+2,3	0x1401	Total kvar	-Pmax-Pmax	U3	INT32	R	
+4,5	0x1402	Total kVA	0-Pmax	U3	UINT32	R	
+6,7	0x1403	Total PF	-1000-1000	×0.001	INT32	R	
+8,9	0x1404	Total PF lag	0-1.000	×0.001	UINT16	R	
+10,11	0x1405	Total PF lead	0-1.000	×0.001	UINT16	R	
+12,13	0x1406	Total kW import	0-Pmax	U3	UINT32	R	
+14,15	0x1407	Total kW export	0-Pmax	U3	UINT32	R	
+16,17	0x1408	Total kvar import	0-Pmax	U3	UINT32	R	
+18,19	0x1409	Total kvar export	0-Pmax	U3	UINT32	R	
+20,21	0x140A	3-phase average L-N/L-L voltage	0-Vmax	U1	UINT32	R	[1]
+22,23	0x140B	3-phase average L-L voltage	0-Vmax	U1	UINT32	R	
+24,25	0x140C	3-phase average current	0-Imax	U2	UINT32	R	
14464-14473		**1-Second Auxiliary Values**					
+0,1	0x1500	Not used			UINT32	R	
+2,3	0x1501	In (neutral) Current	0-Imax	U2	UINT32	R	
+4,5	0x1502	Frequency	0-Fmax	×0.01Hz	UINT32	R	
+6,7	0x1503	Voltage unbalance	0-3000	×0.1%	UINT32	R	
+8,9	0x1504	Current unbalance	0-3000	×0.1%	UINT32	R	
14528-14551		**Present Harmonic Demands**					
+0,1	0x1580	V1/V12 THD demand	0-9999	×0.1%	UINT32	R	[2]
+2,3	0x1581	V2/V23 THD demand	0-9999	×0.1%	UINT32	R	[2]
+4,5	0x1582	V3/V31 THD demand	0-9999	×0.1%	UINT32	R	[2]
+6,7	0x1583	Not used			UINT32	R	
+8,9	0x1584	I1 THD demand	0-9999	×0.1%	UINT32	R	
+10,11	0x1585	I2 THD demand	0-9999	×0.1%	UINT32	R	
+12,13	0x1586	I3 THD demand	0-9999	×0.1%	UINT32	R	
+14,15	0x1587	Not used			UINT32	R	
+16,17	0x1588	I1 TDD demand	0-1000	×0.1%	UINT32	R	
+18,19	0x1589	I2 TDD demand	0-1000	×0.1%	UINT32	R	
+20,21	0x158A	I3 TDD demand	0-1000	×0.1%	UINT32	R	
+22,23	0x158B	Not used			UINT32	R	
14592-14651		**Present Volt, Ampere and Power Demands**					
+0,1	0x1600	V1/V12 Volt demand	0-Vmax	U1	UINT32	R	[2]
+2,3	0x1601	V2/V23 Volt demand	0-Vmax	U1	UINT32	R	[2]
+4,5	0x1602	V3/V31 Volt demand	0-Vmax	U1	UINT32	R	[2]

Address	Point ID	Description	Options/Range[3]	Units[3]	Type	R/W	Notes
+6,7	0x1603	I1 Ampere demand	0-Imax	U2	UINT32	R	
+8,9	0x1604	I2 Ampere demand	0-Imax	U2	UINT32	R	
+10,11	0x1605	I3 Ampere demand	0-Imax	U2	UINT32	R	
+12,13	0x1606	kW import block demand	0-Pmax	U3	UINT32	R	
+14,15	0x1607	kvar import block demand	0-Pmax	U3	UINT32	R	
+16,17	0x1608	kVA block demand	0-Pmax	U3	UINT32	R	
+18,19	0x1609	kW import sliding window demand	0-Pmax	U3	UINT32	R	
+20,21	0x160A	kvar import sliding window demand	0-Pmax	U3	UINT32	R	
+22,23	0x160B	kVA sliding window demand	0-Pmax	U3	UINT32	R	
+24,25	0x160C	Not used			UINT32	R	
+26,27	0x160D	Not used			UINT32	R	
+28,29	0x160E	Not used			UINT32	R	
+30,31	0x160F	kW import accumulated demand	0-Pmax	U3	UINT32	R	
+32,33	0x1610	kvar import accumulated demand	0-Pmax	U3	UINT32	R	
+34,35	0x1611	kVA accumulated demand	0-Pmax	U3	UINT32	R	
+36,37	0x1612	kW import predicted sliding window demand	0-Pmax	U3	UINT32	R	
+38,39	0x1613	kvar import predicted sliding window demand	0-Pmax	U3	UINT32	R	
+40,41	0x1614	kVA predicted sliding window demand	0-Pmax	U3	UINT32	R	
+42,43	0x1615	PF (import) at Max. kVA sliding window demand	0-1000	×0.001	UINT32	R	
+44,45	0x1616	kW export block demand	0-Pmax	U3	UINT32	R	
+46,47	0x1617	kvar export block demand	0-Pmax	U3	UINT32	R	
+48,49	0x1618	kW export sliding window demand	0-Pmax	U3	UINT32	R	
+50,51	0x1619	kvar export sliding window demand	0-Pmax	U3	UINT32	R	
+52,53	0x161A	kW export accumulated demand	0-Pmax	U3	UINT32	R	
+54,55	0x161B	kvar export accumulated demand	0-Pmax	U3	UINT32	R	
+56,57	0x161C	kW export predicted sliding window demand	0-Pmax	U3	UINT32	R	
+58,59	0x161D	kvar export predicted sliding window demand	0-Pmax	U3	UINT32	R	
14720-14737		**Total Energies**					
+0,1	0x1700	kWh import	0-999,999,999	1 kWh	UINT32	R	
+2,3	0x1701	kWh export	0-999,999,999	1 kWh	UINT32	R	
+4,5	0x1702	Not used			INT32	R	
+6,7	0x1703	Not used			UINT32	R	
+8,9	0x1704	kvarh import	0-999,999,999	1 kvarh	UINT32	R	
+10,11	0x1705	kvarh export	0-999,999,999	1 kvarh	UINT32	R	
+12,13	0x1706	Not used			INT32	R	
+14,15	0x1707	Not used			UINT32	R	
+16,17	0x1708	kVAh total	0-999,999,999	1 kVAh	UINT32	R	
14784-14799		**Billing Summary Energy Registers**					
+0,1	0x1780	Summary energy register #1	0-999,999,999	1 kWh	UINT32	R	
+2,3	0x1781	Summary energy register #2	0-999,999,999	1 kWh	UINT32	R	
		...					
+14,15	0x1787	Summary energy register #8	0-999,999,999	1 kWh	UINT32	R	

Address	Point ID	Description	Options/Range[3]	Units[3]	Type	R/W	Notes
14848-14865		**Phase Energies**					
+0,1	0x1800	kWh import L1	0-999,999,999	1 kWh	UINT32	R	
+2,3	0x1801	kWh import L2	0-999,999,999	1 kWh	UINT32	R	
+4,5	0x1802	kWh import L3	0-999,999,999	1 kWh	UINT32	R	
+6,7	0x1803	kvarh import L1	0-999,999,999	1 kvarh	UINT32	R	
+8,9	0x1804	kvarh import L2	0-999,999,999	1 kvarh	UINT32	R	
+10,11	0x1805	kvarh import L3	0-999,999,999	1 kvarh	UINT32	R	
+12,13	0x1806	kVAh total L1	0-999,999,999	1 kVAh	UINT32	R	
+14,15	0x1807	kVAh total L2	0-999,999,999	1 kVAh	UINT32	R	
+16,17	0x1808	kVAh total L3	0-999,999,999	1 kVAh	UINT32	R	
14912-14931		**Symmetrical Components**					
+0, 1	0x1880	Positive-sequence voltage	0-Vmax	U1	UINT32	R	
+2, 3	0x1881	Negative-sequence voltage	0-Vmax	U1	UINT32	R	
+4, 5	0x1882	Zero-sequence voltage	0-Vmax	U1	UINT32	R	
+6, 7	0x1883	Negative-sequence voltage unbalance	0-3000	×0.1%	UINT32	R	
+8, 9	0x1884	Zero-sequence voltage unbalance	0-3000	×0.1%	UINT32	R	
+10, 11	0x1885	Positive-sequence current	0-Imax	U2	UINT32	R	
+12, 13	0x1886	Negative-sequence current	0-Imax	U2	UINT32	R	
+14, 15	0x1887	Zero-sequence current	0-Imax	U2	UINT32	R	
+16, 17	0x1888	Negative-sequence current unbalance	0-3000	×0.1%	UINT32	R	
+18, 19	0x1889	Zero-sequence current unbalance	0-3000	×0.1%	UINT32	R	
14976-15075		**V1/V12 Harmonic Distortion**					[2]
+0,1	0x1900	H01 Harmonic distortion	0-10000	0.01%	UINT32	R	
+2,3	0x1901	H02 Harmonic distortion	0-10000	0.01%	UINT32	R	
		…					
+98,99	0x1931	H50 Harmonic distortion	0-10000	0.01%	UINT32	R	
15104-15203		**V2/V23 Harmonic Distortion**					[2]
+0,1	0x1A00	H01 Harmonic distortion	0-10000	0.01%	UINT32	R	
+2,3	0x1A01	H02 Harmonic distortion	0-10000	0.01%	UINT32	R	
		…					
+98,99	0x1A31	H50 Harmonic distortion	0-10000	0.01%	UINT32	R	
15232-15331		**V3/V31 Harmonic Distortion**					[2]
+0,1	0x1B00	H01 Harmonic distortion	0-10000	0.01%	UINT32	R	
+2,3	0x1B01	H02 Harmonic distortion	0-10000	0.01%	UINT32	R	
		…					
+98,99	0x1B31	H50 Harmonic distortion	0-10000	0.01%	UINT32	R	
15360-15459		**I1 Harmonic Distortion**					
+0,1	0x1C00	H01 Harmonic distortion	0-10000	0.01%	UINT32	R	
+2,3	0x1C01	H02 Harmonic distortion	0-10000	0.01%	UINT32	R	
		…					
+98,99	0x1C31	H50 Harmonic distortion	0-10000	0.01%	UINT32	R	

Address	Point ID	Description	Options/Range[3]	Units[3]	Type	R/W	Notes
15488-15587		**I2 Harmonic Distortion**					
+0,1	0x1D00	H01 Harmonic distortion	0-10000	0.01%	UINT32	R	
+2,3	0x1D01	H02 Harmonic distortion	0-10000	0.01%	UINT32	R	
		…					
+98,99	0x1D31	H50 Harmonic distortion	0-10000	0.01%	UINT32	R	
15616-15715		**I3 Harmonic Distortion**					
+0,1	0x1E00	H01 Harmonic distortion	0-10000	0.01%	UINT32	R	
+2,3	0x1E01	H02 Harmonic distortion	0-10000	0.01%	UINT32	R	
		…					
+98,99	0x1E31	H50 Harmonic distortion	0-10000	0.01%	UINT32	R	
17024-17059		**Fundamental Phase Values**					5
+0,1	0x2900	V1/V12 Voltage	0-Vmax	U1	UINT32	R	2
+2,3	0x2901	V2/V23 Voltage	0-Vmax	U1	UINT32	R	2
+4,5	0x2902	V3/V31 Voltage	0-Vmax	U1	UINT32	R	2
+6,7	0x2903	I1 Current	0-Imax	U2	UINT32	R	
+8,9	0x2904	I2 Current	0-Imax	U2	UINT32	R	
+10,11	0x2905	I3 Current	0-Imax	U2	UINT32	R	
+12,13	0x2906	kW L1	-Pmax-Pmax	U3	INT32	R	
+14,15	0x2907	kW L2	-Pmax-Pmax	U3	INT32	R	
+16,17	0x2908	kW L3	-Pmax-Pmax	U3	INT32	R	
+18,19	0x2909	kvar L1	-Pmax-Pmax	U3	INT32	R	
+20,21	0x290A	kvar L2	-Pmax-Pmax	U3	INT32	R	
+22,23	0x290B	kvar L3	-Pmax-Pmax	U3	INT32	R	
+24,25	0x290C	kVA L1	0-Pmax	U3	UINT32	R	
+26,27	0x290D	kVA L2	0-Pmax	U3	UINT32	R	
+28,29	0x290E	kVA L3	0-Pmax	U3	UINT32	R	
+30,31	0x290F	Power factor L1	-1.000-1.000	×0.001	INT32	R	
+32,33	0x2910	Power factor L2	-1.000-1.000	×0.001	INT32	R	
+34,35	0x2911	Power factor L3	-1.000-1.000	×0.001	INT32	R	
17088-17099		**Flicker**					2
+0,1	0x2980	V1 Pst	0-10000	×0.01	UINT32	R	
+2,3	0x2981	V2 Pst	0-10000	×0.01	UINT32	R	
+4,5	0x2982	V3 Pst	0-10000	×0.01	UINT32	R	
+6,7	0x2983	V1 Plt	0-10000	×0.01	UINT32	R	
+8,9	0x2984	V2 Plt	0-10000	×0.01	UINT32	R	
+10,11	0x2985	V3 Plt	0-10000	×0.01	UINT32	R	
17152-17159		**Fundamental Total Values**					5
+0,1	0x2A00	Total fundamental kW	-Pmax-Pmax	U3	INT32	R	
+2,3	0x2A01	Total fundamental kvar	-Pmax-Pmax	U3	INT32	R	
+4,5	0x2A02	Total fundamental kVA	0-Pmax	U3	UINT32	R	
+6,7	0x2A03	Total fundamental PF	-1.000-1.000	×0.001	INT32	R	

Address	Point ID	Description	Options/Range[3]	Units[3]	Type	R/W	Notes
17408-17467		**Minimum 1-Cycle Phase Values**					
+0,1	0x2C00	V1/V12 Voltage	0-Vmax	U1	UINT32	R	2
+2,3	0x2C01	V2/V23 Voltage	0-Vmax	U1	UINT32	R	2
+4,5	0x2C02	V3/V31 Voltage	0-Vmax	U1	UINT32	R	2
+6,7	0x2C03	I1 Current	0-Imax	U2	UINT32	R	
+8,9	0x2C04	I2 Current	0-Imax	U2	UINT32	R	
+10,11	0x2C05	I3 Current	0-Imax	U2	UINT32	R	
+12-35	0x2C06-0x2C11	Not used	0		INT32	R	
+36,37	0x2C12	V1/V12 Voltage THD	0-9999	×0.1%	UINT32	R	2, 5
+38,39	0x2C13	V2/V23 Voltage THD	0-9999	×0.1%	UINT32	R	2, 5
+40,41	0x2C14	V3/V31 Voltage THD	0-9999	×0.1%	UINT32	R	2, 5
+42,43	0x2C15	I1 Current THD	0-9999	×0.1%	UINT32	R	5
+44,45	0x2C16	I2 Current THD	0-9999	×0.1%	UINT32	R	5
+46,47	0x2C17	I3 Current THD	0-9999	×0.1%	UINT32	R	5
+48,49	0x2C18	I1 K-Factor	10-9999	×0.1	UINT32	R	5
+50,51	0x2C19	I2 K-Factor	10-9999	×0.1	UINT32	R	5
+52,53	0x2C1A	I3 K-Factor	10-9999	×0.1	UINT32	R	5
+54,55	0x2C1B	I1 Current TDD	0-1000	×0.1%	UINT32	R	5
+56,57	0x2C1C	I2 Current TDD	0-1000	×0.1%	UINT32	R	5
+58,59	0x2C1D	I3 Current TDD	0-1000	×0.1%	UINT32	R	5
17536-17543		**Minimum 1-Cycle Total Values**					
+0,1	0x2D00	Total kW	-Pmax-Pmax	U3	INT32	R	
+2,3	0x2D01	Total kvar	-Pmax-Pmax	U3	INT32	R	
+4,5	0x2D02	Total kVA	0-Pmax	U3	UINT32	R	
+6,7	0x2D03	Total PF	0-1000	×0.001	UINT32	R	Absolute value
17664-17669		**Minimum 1-Cycle Auxiliary Values**					
+0,1	0x2E00	Not used			UINT32	R	
+2,3	0x2E01	In Current	0-Imax	U2	UINT32	R	
+4,5	0x2E02	Frequency	0-Fmax	×0.01Hz	UINT32	R	
18432-18491		**Maximum 1-Cycle Phase Values**					
+0,1	0x3400	V1/V12 Voltage	0-Vmax	U1	UINT32	R	2
+2,3	0x3401	V2/V23 Voltage	0-Vmax	U1	UINT32	R	2
+4,5	0x3402	V3/V31 Voltage	0-Vmax	U1	UINT32	R	2
+6,7	0x3403	I1 Current	0-Imax	U2	UINT32	R	
+8,9	0x3404	I2 Current	0-Imax	U2	UINT32	R	
+10,11	0x3405	I3 Current	0-Imax	U2	UINT32	R	
+12-35	0x3406-0x3411	Not used	0		INT32	R	
+36,37	0x3412	V1/V12 Voltage THD	0-9999	×0.1%	UINT32	R	2, 5
+38,39	0x3413	V2/V23 Voltage THD	0-9999	×0.1%	UINT32	R	2, 5
+40,41	0x3414	V3/V31 Voltage THD	0-9999	×0.1%	UINT32	R	2, 5
+42,43	0x3415	I1 Current THD	0-9999	×0.1%	UINT32	R	5

Address	Point ID	Description	Options/Range[3]	Units[3]	Type	R/W	Notes
+44,45	0x3416	I2 Current THD	0-9999	×0.1%	UINT32	R	[5]
+46,47	0x3417	I3 Current THD	0-9999	×0.1%	UINT32	R	[5]
+48,49	0x3418	I1 K-Factor	10-9999	×0.1	UINT32	R	[5]
+50,51	0x3419	I2 K-Factor	10-9999	×0.1	UINT32	R	[5]
+52,53	0x341A	I3 K-Factor	10-9999	×0.1	UINT32	R	[5]
+54,55	0x341B	I1 Current TDD	0-1000	×0.1%	UINT32	R	[5]
+56,57	0x341C	I2 Current TDD	0-1000	×0.1%	UINT32	R	[5]
+58,59	0x341D	I3 Current TDD	0-1000	×0.1%	UINT32	R	[5]
18560-18567		**Maximum 1-Cycle Total Values**					
+0,1	0x3500	Total kW	-Pmax-Pmax	U3	INT32	R	
+2,3	0x3501	Total kvar	-Pmax-Pmax	U3	INT32	R	
+4,5	0x3502	Total kVA	0-Pmax	U3	UINT32	R	
+6,7	0x3503	Total PF	0-1000	×0.001	UINT32	R	Absolute value
18688-18693		**Maximum 1-Cycle Auxiliary Values**					
+0,1	0x3600	Not used			UINT32	R	
+2,3	0x3601	In Current	0-Imax	U2	UINT32	R	
+4,5	0x3602	Frequency	0-Fmax	×0.01Hz	UINT32	R	
18816-18849		**Maximum Demands**					
+0,1	0x3700	V1/V12 Maximum volt demand	0-Vmax	U1	UINT32	R	[2]
+2,3	0x3701	V2/V23 Maximum volt demand	0-Vmax	U1	UINT32	R	[2]
+4,5	0x3702	V3/V31 Maximum volt demand	0-Vmax	U1	UINT32	R	[2]
+6,7	0x3703	I1 Maximum ampere demand	0-Imax	U2	UINT32	R	
+8,9	0x3704	I2 Maximum ampere demand	0-Imax	U2	UINT32	R	
+10,11	0x3705	I3 Maximum ampere demand	0-Imax	U2	UINT32	R	
+12,13	0x3706	Not used			UINT32	R	
+14,15	0x3707	Not used			UINT32	R	
+16,17	0x3708	Not used			UINT32	R	
+18,19	0x3709	Maximum kW import sliding window demand	0-Pmax	U3	UINT32	R	
+20,21	0x370A	Maximum kvar import sliding window demand	0-Pmax	U3	UINT32	R	
+22,23	0x370B	Maximum kVA sliding window demand	0-Pmax	U3	UINT32	R	
+24,25	0x3737	Not used			UINT32	R	
+26,27	0x370D	Not used			UINT32	R	
+28,29	0x370E	Not used			UINT32	R	
+30,31	0x370F	Maximum kW export sliding window demand	0-Pmax	U3	UINT32	R	
+32,33	0x3710	Maximum kvar export sliding window demand	0-Pmax	U3	UINT32	R	
19008-19031		**Maximum Harmonic Demands**					
+0,1	0x3880	V1/V12 THD demand	0-9999	×0.1%	UINT32	R	[2]
+2,3	0x3881	V2/V23 THD demand	0-9999	×0.1%	UINT32	R	[2]
+4,5	0x3882	V3/V31 THD demand	0-9999	×0.1%	UINT32	R	[2]
+6,7	0x3883	Not used			UINT32	R	
+8,9	0x3884	I1 THD demand	0-9999	×0.1%	UINT32	R	
+10,11	0x3885	I2 THD demand	0-9999	×0.1%	UINT32	R	
+12,13	0x3886	I3 THD demand	0-9999	×0.1%	UINT32	R	

Address	Point ID	Description	Options/Range[3]	Units[3]	Type	R/W	Notes
+14,15	0x3887	Not used			UINT32	R	
+16,17	0x3888	I1 TDD demand	0-1000	×0.1%	UINT32	R	
+18,19	0x3889	I2 TDD demand	0-1000	×0.1%	UINT32	R	
+20,21	0x388A	I3 TDD demand	0-1000	×0.1%	UINT32	R	
+22,23	0x388B	Not used			UINT32	R	
19328-19359		**Scaled Analog Inputs**					
+0,1	0x3B00	Analog input AI1	AI1min-AI1Max		UINT32	R	
+2,3	0x3B01	Analog input AI2	AI2min-AI2Max		UINT32	R	
19392-19393		**Raw Analog Inputs**					
+0,1	0x3B80	Analog input AI1	0-4095		UINT32	R	
+2,3	0x3B81	Analog input AI2	0-4095		UINT32	R	
19456-19459		**TOU Parameters**					
+0,1	0x3C00	Active tariff	0-7		UINT32	R	
+2,3	0x3C01	Active profile	0-15: 1-3 = Season 1 Profile #1-4, 4-7 = Season 2 Profile #1-4, 8-11 = Season 3 Profile #1-4, 12-15 = Season 4 Profile #1-4		UINT32	R	
19520-19524		**Scaled Analog Outputs**					
+0,1	0x3C80	Analog output AO1	0-4095		UINT32	R/W	
+2,3	0x3C81	Analog output AO2	0-4095		UINT32	R/W	
19584-19599		**Billing TOU Energy Register #1**					
+0,1	0x3D00	Tariff #1 register	0-999,999,999	1 kWh	UINT32	R	
+2,3	0x3D01	Tariff #2 register	0-999,999,999	1 kWh	UINT32	R	
		...				R	
+14,15	0x3D07	Tariff #8 register	0-999,999,999	1 kWh	UINT32	R	
19712-19727		**Billing TOU Energy Register #2**					
+0,1	0x3E00	Tariff #1 register	0-999,999,999	1 kWh	UINT32	R	
+2,3	0x3E01	Tariff #2 register	0-999,999,999	1 kWh	UINT32	R	
		...				R	
+14,15	0x3E07	Tariff #8 register	0-999,999,999	1 kWh	UINT32	R	
19840-19855		**Billing TOU Energy Register #3**					
+0,1	0x3F00	Tariff #1 register	0-999,999,999	1 kWh	UINT32	R	
+2,3	0x3F01	Tariff #2 register	0-999,999,999	1 kWh	UINT32	R	
		...				R	
+14,15	0x3F07	Tariff #8 register	0-999,999,999	1 kWh	UINT32	R	
19968-19983		**Billing TOU Energy Register #4**					
+0,1	0x4000	Tariff #1 register	0-999,999,999	1 kWh	UINT32	R	
+2,3	0x4001	Tariff #2 register	0-999,999,999	1 kWh	UINT32	R	
		...				R	
+14,15	0x4007	Tariff #8 register	0-999,999,999	1 kWh	UINT32	R	

Address	Point ID	Description	Options/Range[3]	Units[3]	Type	R/W	Notes
20096-20111		**Billing TOU Energy Register #5**					
+0,1	0x4100	Tariff #1 register	0-999,999,999	1 kWh	UINT32	R	
+2,3	0x4101	Tariff #2 register	0-999,999,999	1 kWh	UINT32	R	
		...				R	
+14,15	0x4107	Tariff #8 register	0-999,999,999	1 kWh	UINT32	R	
20224-20239		**Billing TOU Energy Register #6**					
+0,1	0x4200	Tariff #1 register	0-999,999,999	1 kWh	UINT32	R	
+2,3	0x4201	Tariff #2 register	0-999,999,999	1 kWh	UINT32	R	
		...				R	
+14,15	0x4207	Tariff #8 register	0-999,999,999	1 kWh	UINT32	R	
20352-20367		**Billing TOU Energy Register #7**					
+0,1	0x4300	Tariff #1 register	0-999,999,999	1 kWh	UINT32	R	
+2,3	0x4301	Tariff #2 register	0-999,999,999	1 kWh	UINT32	R	
		...				R	
+14,15	0x4307	Tariff #8 register	0-999,999,999	1 kWh	UINT32	R	
20480-20495		**Billing TOU Energy Register #8**					
+0,1	0x4400	Tariff #1 register	0-999,999,999	1 kWh	UINT32	R	
+2,3	0x4401	Tariff #2 register	0-999,999,999	1 kWh	UINT32	R	
		...				R	
+14,15	0x4407	Tariff #8 register	0-999,999,999	1 kWh	UINT32	R	
20608-20623		**Billing Summary Accumulated Demands**					
+0,1	0x4500	Summary register #1 demand	0-Pmax	U3	UINT32	R	
+2,3	0x4501	Summary register #2 demand	0-Pmax	U3	UINT32	R	
		...					
+14,15	0x4507	Summary register #8 demand	0-Pmax	U3	UINT32	R	
20672-20687		**Billing Summary Block Demands**					
+0,1	0x4580	Summary register #1 demand	0-Pmax	U3	UINT32	R	
+2,3	0x4581	Summary register #2 demand	0-Pmax	U3	UINT32	R	
		...					
+14,15	0x4587	Summary register #8 demand	0-Pmax	U3	UINT32	R	
20736-20751		**Billing Summary Sliding Window Demands**					
+0,1	0x4600	Summary register #1 demand	0-Pmax	U3	UINT32	R	
+2,3	0x4601	Summary register #2 demand	0-Pmax	U3	UINT32	R	
		...					
+14,15	0x4607	Summary register #8 demand	0-Pmax	U3	UINT32	R	
20928-20943		**Billing Summary Maximum Demands**					
+0,1	0x4780	Summary register #1 maximum demand	0-Pmax	U3	UINT32	R	
+2,3	0x4781	Summary register #2 maximum demand	0-Pmax	U3	UINT32	R	
		...					
+14,15	0x4787	Summary register #8 maximum demand	0-Pmax	U3	UINT32	R	

Address	Point ID	Description	Options/Range[3]	Units[3]	Type	R/W	Notes
20992-21023		**Billing TOU Maximum Demand Register #1**					
+0,1	0x4800	Tariff #1 maximum demand	0-Pmax	U3	UINT32	R	
+2,3	0x4801	Tariff #2 maximum demand	0-Pmax	U3	UINT32	R	
		...				R	
+14,15	0x4807	Tariff #8 maximum demand	0-Pmax	U3	UINT32	R	
21120-21135		**Billing TOU Maximum Demand Register #2**					
+0,1	0x4900	Tariff #1 maximum demand	0-Pmax	U3	UINT32	R	
+2,3	0x4901	Tariff #2 maximum demand	0-Pmax	U3	UINT32	R	
		...				R	
+14,15	0x4907	Tariff #8 maximum demand	0-Pmax	U3	UINT32	R	
21248-21263		**Billing TOU Maximum Demand Register #3**					
+0,1	0x4A00	Tariff #1 maximum demand	0-Pmax	U3	UINT32	R	
+2,3	0x4A01	Tariff #2 maximum demand	0-Pmax	U3	UINT32	R	
		...				R	
+14,15	0x4A07	Tariff #8 maximum demand	0-Pmax	U3	UINT32	R	
21056-21071		**Billing TOU Maximum Demand Register #4**					
+0,1	0x4880	Tariff #1 maximum demand	0-Pmax	U3	UINT32	R	
+2,3	0x4881	Tariff #2 maximum demand	0-Pmax	U3	UINT32	R	
		...				R	
+14,15	0x4887	Tariff #8 maximum demand	0-Pmax	U3	UINT32	R	
21184-21199		**Billing TOU Maximum Demand Register #5**					
+0,1	0x4980	Tariff #1 maximum demand	0-Pmax	U3	UINT32	R	
+2,3	0x4981	Tariff #2 maximum demand	0-Pmax	U3	UINT32	R	
		...				R	
+14,15	0x4987	Tariff #8 maximum demand	0-Pmax	U3	UINT32	R	
21312-21325		**Billing TOU Maximum Demand Register #6**					
+0,1	0x4A80	Tariff #1 maximum demand	0-Pmax	U3	UINT32	R	
+2,3	0x4A81	Tariff #2 maximum demand	0-Pmax	U3	UINT32	R	
		...				R	
+14,15	0x4A87	Tariff #8 maximum demand	0-Pmax	U3	UINT32	R	
22400-22415		**Billing TOU Maximum Demand Register #7**					
+0,1	0x5300	Tariff #1 maximum demand	0-Pmax	U3	UINT32	R	
+2,3	0x5301	Tariff #2 maximum demand	0-Pmax	U3	UINT32	R	
		...				R	
+14,15	0x5307	Tariff #8 maximum demand	0-Pmax	U3	UINT32	R	
22464-22479		**Billing TOU Maximum Demand Register #8**					
+0,1	0x5380	Tariff #1 maximum demand	0-Pmax	U3	UINT32	R	
+2,3	0x5381	Tariff #2 maximum demand	0-Pmax	U3	UINT32	R	
		...				R	
+14,15	0x5387	Tariff #8 maximum demand	0-Pmax	U3	UINT32	R	

Address	Point ID	Description	Options/Range[3]	Units[3]	Type	R/W	Notes
24576-24675		**V1/V12 Harmonic Angles**					2, 4
+0,1	0x6400	H01 Harmonic angle	-1800-1800	×0.1°	INT32	R	
+2,3	0x6401	H02 Harmonic angle	-1800-1800	×0.1°	INT32	R	
		...					
+98,99	0x6431	H50 Harmonic angle	-1800-1800	×0.1°	INT32	R	
24704-24803		**V2/V23 Harmonic Angles**					2, 4
+0,1	0x6500	H01 Harmonic angle	-1800-1800	×0.1°	INT32	R	
+2,3	0x6501	H02 Harmonic angle	-1800-1800	×0.1°	INT32	R	
		...					
+98,99	0x6531	H50 Harmonic angle	-1800-1800	×0.1°	INT32	R	
24832-24931		**V3/V31 Harmonic Angles**					2, 4
+0,1	0x6600	H01 Harmonic angle	-1800-1800	×0.1°	INT32	R	
+2,3	0x6601	H02 Harmonic angle	-1800-1800	×0.1°	INT32	R	
		...					
+98,99	0x6631	H50 Harmonic angle	-1800-1800	×0.1°	INT32	R	
25088-25187		**I1 Harmonic Angles**					4
+0,1	0x6800	H01 Harmonic angle	-1800-1800	×0.1°	INT32	R	
+2,3	0x6801	H02 Harmonic angle	-1800-1800	×0.1°	INT32	R	
		...					
+98,99	0x6831	H50 Harmonic angle	-1800-1800	×0.1°	INT32	R	
25216-25315		**I2 Harmonic Angles**					4
+0,1	0x6900	H01 Harmonic angle	-1800-1800	×0.1°	INT32	R	
+2,3	0x6901	H02 Harmonic angle	-1800-1800	×0.1°	INT32	R	
		...					
+98,99	0x6931	H50 Harmonic angle	-1800-1800	×0.1°	INT32	R	
25344-25443		**I3 Harmonic Angles**					4
+0,1	0x6A00	H01 Harmonic angle	-1800-1800	×0.1°	INT32	R	
+2,3	0x6A01	H02 Harmonic angle	-1800-1800	×0.1°	INT32	R	
		...					
+98,99	0x6A31	H50 Harmonic angle	-1800-1800	×0.1°	INT32	R	
25728-25771		**10-Minute Volts and Symmetrical Components**					
+0, 1	0x6D00	V1 Voltage	0-Vmax	U1	UINT32	R	2
+2, 3	0x6D01	V2 Voltage	0-Vmax	U1	UINT32	R	2
+4, 5	0x6D02	V3 Voltage	0-Vmax	U1	UINT32	R	2
+6-33		Reserved	0		UINT32	R	
+34, 35	0x6D11	Zero-sequence voltage	0-Vmax	U1	UINT32	R	
+36, 37	0x6D12	Zero-sequence current	0-Imax	U2	UINT32	R	
+38, 39	0x6D13	Reserved	0		UINT32	R	
+40, 41	0x6D14	Negative-sequence voltage unbalance	0-3000	×0.1%	UINT32	R	
+42, 43	0x6D15	Negative-sequence current unbalance	0-3000	×0.1%	UINT32	R	

Address	Point ID	Description	Options/Range[3]	Units[3]	Type	R/W	Notes
25984-26021		**10-Minute Total Harmonics**					
+0, 1	0x6F00	V1 THD	0-9999	×0.1%	UINT32	R	[2]
+2, 3	0x6F01	V2 THD	0-9999	×0.1%	UINT32	R	[2]
+4, 5	0x6F02	V3 THD	0-9999	×0.1%	UINT32	R	[2]
+6, 7	0x6F03	Reserved	0		UINT32	R	
+8, 9	0x6F04	I1 THD	0-9999	×0.1%	UINT32	R	
+10, 11	0x6F05	I2 THD	0-9999	×0.1%	UINT32	R	
+12, 13	0x6F06	I3 THD	0-9999	×0.1%	UINT32	R	
+14, 15	0x6F07	Reserved	0		UINT32	R	
+16, 17	0x6F08	V1 Inter-harmonics THD	0-9999	×0.1%	UINT32	R	[2]
+18, 19	0x6F09	V2 Inter-harmonics THD	0-9999	×0.1%	UINT32	R	[2]
+20, 21	0x6F0A	V3 Inter-harmonics THD	0-9999	×0.1%	UINT32	R	[2]
+22, 23	0x6F0B	Reserved	0		UINT32	R	
+24, 25	0x6F0C	I1 Inter-harmonics THD	0-9999	×0.1%	UINT32	R	
+26, 27	0x6F0D	I2 Inter-harmonics THD	0-9999	×0.1%	UINT32	R	
+28, 29	0x6F0E	I3 Inter-harmonics THD	0-9999	×0.1%	UINT32	R	
+30, 31	0x6F0F	Reserved	0		UINT32	R	
+32, 33	0x6F10	I1 TDD	0-1000	×0.1%	UINT32	R	
+34, 35	0x6F11	I2 TDD	0-1000	×0.1%	UINT32	R	
+36, 37	0x6F12	I3 TDD	0-1000	×0.1%	UINT32	R	
		Generic TOU Season Energy Registers					Point references
	0x7000	Tariff #1 register	0-999,999,999	1 kWh	UINT32		
	0x7001	Tariff #2 register	0-999,999,999	1 kWh	UINT32		
		...					
	0x7007	Tariff #8 register	0-999,999,999	1 kWh	UINT32		
		Generic TOU Season Maximum Demand Registers					Point references
	0x7100	Tariff #1 register	0-Pmax	U3	UINT32		
	0x7101	Tariff #2 register	0-Pmax	U3	UINT32		
		...					
	0x7107	Tariff #8 register	0-Pmax	U3	UINT32		
		Generic Data					Point references
	0x7400	V1 voltage	0-Vmax	U1	UINT32		
	0x7401	V2 voltage	0-Vmax	U1	UINT32		
	0x7402	V3 voltage	0-Vmax	U1	UINT32		
	0x7404	V12 voltage	0-Vmax	U1	UINT32		
	0x7405	V23 voltage	0-Vmax	U1	UINT32		
	0x7406	V31 voltage	0-Vmax	U1	UINT32		
	0x7407	I1 current	0-Imax	U2	UINT32		
	0x7408	I2 current	0-Imax	U2	UINT32		
	0x7409	I3 current	0-Imax	U2	UINT32		
	0x7414	Voltage unbalance	0-3000	×0.1%	UINT32		

Address	Point ID	Description	Options/Range[3]	Units[3]	Type	R/W	Notes
	0x7418	Frequency	0-10000	×0.01Hz	UINT32		
	0x7419	V1 THD	0-9999	×0.1%	UINT32		2
	0x741A	V2 THD	0-9999	×0.1%	UINT32		2
	0x741B	V3 THD	0-9999	×0.1%	UINT32		2
	0x7421	V1 interharmonics THD	0-9999	×0.1%	UINT32		2
	0x7422	V2 interharmonics THD	0-9999	×0.1%	UINT32		2
	0x7423	V3 interharmonics THD	0-9999	×0.1%	UINT32		2
	0x2980	V1 Pst	0-10000	×0.01	UINT32		2
	0x2981	V2 Pst	0-10000	×0.01	UINT32		2
	0x2982	V3 Pst	0-10000	×0.01	UINT32		2
	0x2983	V1 Plt	0-10000	×0.01	UINT32		2
	0x2984	V2 Plt	0-10000	×0.01	UINT32		2
	0x2985	V3 Plt	0-10000	×0.01	UINT32		2

NOTES:

[1] When the 4LN3, 4LL3, 3LN3, 3LL3, 3BLN3 or 3BLL3 wiring mode is selected, the voltages will be line-to-neutral; for any other wiring mode, they will be line-to-line.

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

[3] For volts, amps, power and frequency scales and units, refer to Section 4 "Data Scales and Units".

[4] Harmonic angles are referenced to the fundamental voltage harmonic H01 on phase L1.

[5] On a 0.2-s interval.

[6] On a 3-s interval.

3.5 Minimum/Maximum Log Registers

Address	Point ID	Description	Options/Range/Format[2]	Units[2]	Type	R/W	Notes
35840-35959		**Minimum Phase Values**					
+0,1	0x2C00	Min. V1/V12 Voltage	0-Vmax	U1	UINT32	R	[1]
+2,3		Timestamp	F1	sec	UINT32	R	
+4,5	0x2C01	Min. V2/V23 Voltage	0-Vmax	U1	UINT32	R	[1]
+6,7		Timestamp	F1	sec	UINT32	R	
+8,9	0x2C02	Min. V3/V31 Voltage	0-Vmax	U1	UINT32	R	[1]
+10,11		Timestamp	F1	sec	UINT32	R	
+12,13	0x2C03	Min. I1 Current	0-Imax	U2	UINT32	R	
+14,15		Timestamp	F1	sec	UINT32	R	
+16,17	0x2C04	Min. I2 Current	0-Imax	U2	UINT32	R	
+18,19		Timestamp		sec	UINT32	R	
+20,21	0x2C05	Min. I3 Current	0-Imax	U2	UINT32	R	
+22,23		Timestamp		sec	UINT32	R	
+24-71	0x2C06-0x2C11	Not used	0		INT32	R	
+72,73	0x2C12	Min. V1/V12 Voltage THD	0-9999	×0.1%	UINT32	R	[1, 3]
+74,75		Timestamp		sec	UINT32	R	
+76,77	0x2C13	Min. V2/V23 Voltage THD	0-9999	×0.1%	UINT32	R	[1, 3]
+78,79		Timestamp		sec	UINT32	R	
+80,81	0x2C14	Min. V3/V31 Voltage THD	0-9999	×0.1%	UINT32	R	[1, 3]
+82,83		Timestamp		sec	UINT32	R	
+84,85	0x2C15	Min. I1 Current THD	0-9999	×0.1%	UINT32	R	[3]
+86,87		Timestamp		sec	UINT32	R	
+88,89	0x2C16	Min. I2 Current THD	0-9999	×0.1%	UINT32	R	[3]
+90,91		Timestamp		sec	UINT32	R	
+92,93	0x2C17	Min. I3 Current THD	0-9999	×0.1%	UINT32	R	[3]
+94,95		Timestamp		sec	UINT32	R	
+96,97	0x2C18	Min. I1 K-Factor	10-9999	×0.1	UINT32	R	[3]
+98,99		Timestamp		sec	UINT32	R	
+100,101	0x2C19	Min. I2 K-Factor	10-9999	×0.1	UINT32	R	[3]
+102,103		Timestamp		sec	UINT32	R	
+104,105	0x2C1A	Min. I3 K-Factor	10-9999	×0.1	UINT32	R	[3]
+106,107		Timestamp		sec	UINT32	R	
+108,109	0x2C1B	Min. I1 Current TDD	0-1000	×0.1%	UINT32	R	[3]
+110,111		Timestamp		sec	UINT32	R	
+112,113	0x2C1C	Min. I2 Current TDD	0-1000	×0.1%	UINT32	R	[3]
+114,115		Timestamp		sec	UINT32	R	
+116,117	0x2C1D	Min. I3 Current TDD	0-1000	x0.1%	UINT32	R	[3]
+118,119		Timestamp		sec	UINT32	R	

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

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

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

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

Address	Point ID	Description	Options/Range/Format[2]	Units[2]	Type	R/W	Notes
+4,5	0x4981	Tariff #2 maximum demand	0-Pmax	U3	UINT32	R	
+6,7		Timestamp		sec	UINT32	R	
		...				R	
+28,29	0x4987	Tariff #8 maximum demand	0-Pmax	U3	UINT32	R	
+30,31		Timestamp		sec	UINT32	R	
38784-38815		**Billing TOU Maximum Demand Register #6**					
+0,1	0x4A80	Tariff #1 maximum demand	0-Pmax	U3	UINT32	R	
+2,3		Timestamp		sec	UINT32	R	
+4,5	0x4A81	Tariff #2 maximum demand	0-Pmax	U3	UINT32	R	
+6,7		Timestamp		sec	UINT32	R	
		...				R	
+28,29	0x4A87	Tariff #8 maximum demand	0-Pmax	U3	UINT32	R	
+30,31		Timestamp		sec	UINT32	R	
38912-38943		**Billing TOU Maximum Demand Register #7**					
+0,1	0x5300	Tariff #1 maximum demand	0-Pmax	U3	UINT32	R	
+2,3		Timestamp		sec	UINT32	R	
+4,5	0x5301	Tariff #2 maximum demand	0-Pmax	U3	UINT32	R	
+6,7		Timestamp		sec	UINT32	R	
		...				R	
+28,29	0x5307	Tariff #8 maximum demand	0-Pmax	U3	UINT32	R	
+30,31		Timestamp		sec	UINT32	R	
39040-39071		**Billing TOU Maximum Demand Register #8**					
+0,1	0x5380	Tariff #1 maximum demand	0-Pmax	U3	UINT32	R	
+2,3		Timestamp		sec	UINT32	R	
+4,5	0x5381	Tariff #2 maximum demand	0-Pmax	U3	UINT32	R	
+6,7		Timestamp		sec	UINT32	R	
		...				R	
+28,29	0x5387	Tariff #8 maximum demand	0-Pmax	U3	UINT32	R	
+30,31		Timestamp		sec	UINT32	R	

NOTES:

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

[2] For volts, amps, power and frequency scales and units, refer to Section 4 "Data Scales and Units".

[3] On a 0.2-s interval.

3.6 Device Control and Status Registers

Address	Point ID	Description	Options/Range	Units	Type	R/W	Notes
Device Restart Register							
2560		Warm restart of the device	0 when read, 0xFFFF when written = restart the device		UINT16	R/W	
Device Identification							
2561-2562		Reserved	0		UINT16	R	
2563		Firmware build number	1-99		UINT16	R	
2564		Reserved	0		UINT16	R	
2565		Firmware version number	2400-2499 (PM174)		UINT16	R	Two higher decimal digits = major version number, two lower decimal digits = minor version number
2566,2567		Instrument options	F28		UINT32	R	
Device Authorization Registers							
2575		Write: 4-digit password. Read: 0 = access permitted, -1 = authorization required.	0-9999 (write) 0/-1 (read)		INT16	R/W	
44378-44379		Write: 8-digit password. Read: 0 = access permitted, -1 = authorization required.	0 - 99999999 (write) 0/-1 (read)		INT32	R/W	
User Event Flags Registers (bit map)							
44032		Event flags set register (0 = no effect, 1 = set)	0x0000 - 0x00FF		UINT16	W	
44034		Event flags clear register (0=clear, 1 = no effect)	0x0000 - 0x00FF		UINT16	W	
44036		Event flags status (0 = cleared, 1 = set)	0x0000 - 0x00FF		UINT16	R	
Remote Relay Control Registers (bit map)							
44038-44045		Reserved			UINT16		
44046		Force relay operate register (0 = no effect, 1 = operate)	0x0000 - 0x000F		UINT16	W	
44050		Force relay release register (0 = no effect, 1 = release)	0x0000 - 0x000F		UINT16	W	
44054		Locally latched relays status (0 = unlatched, 1 = locally latched)	0x0000 - 0x000F		UINT16	R	
44058		Remote latched relays status (0 = unlatched, 1 = remote latched)	0x0000 - 0x000F		UINT16	R	
44062		Remote relay control disabled status (0 = remote control enabled, 1 = remote control disabled)	0x0000 - 0x000F		UINT16	R	Remote relay control is disabled if the internal pulse source is linked to the relay
44066		Relay status (0 = open, 1 = closed)	0x0000 - 0x000F		UINT16	R	
44070		Latch relays (0 = not latched mode, 1 = latched mode)	0x0000 - 0x000F		UINT16	R	
44074		Pulse relays (0 = not pulse mode, 1 = pulse mode)	0x0000 - 0x000F		UINT16	R	
44078		KYZ relays (0 = not KYZ mode, 1 = KYZ mode)	0x0000 - 0x000F		UINT16	R	
44082		Relay polarity (0 = normal mode, 1 = inverting mode)	0x0000 - 0x000F		UINT16	R	

Address	Point ID	Description	Options/Range	Units	Type	R/W	Notes
44086-44101		Reserved			UINT16		
Reset/Clear Registers							
44102		Clear Energies	0		UINT16	W	
44103		Clear Maximum demands	0 = clear all maximum demands 1 = clear power demands 2 = clear volt, ampere and harmonic demands		UINT16	W	
44104		Clear Billing/TOU energy registers	0		UINT16	W	
44105		Clear Billing/TOU maximum demands	0		UINT16	W	
44106		Clear Counters	0 = clear all counters, 1-4 = clear counter #1-#4		UINT16	W	
44107		Clear Min/Max log	0		UINT16	W	
44108		Clear operation/event counters	6 = clear communication counters		UINT16	W	
44109-44133		Reserved			UINT16		
Device Mode Control Registers							
44134-44135		Reserved			UINT16		
44136		PQ recorder	0 = disabled, 1 = enabled		UINT16	R/W	
44137		Fault recorder	0 = disabled, 1 = enabled		UINT16	R/W	
44138-44165		Reserved			UINT16		
Memory Status Registers							
44262-44263		Memory size, bytes			UINT32	R	
44264-44265		Free memory, bytes			UINT32	R	
44266-44277		Reserved			UINT32	R	
Log Notification Registers (bit map)							
44278-44279		Files 0-31 (0 = no new logs, 1 = new record logged)	0x00000000 - 0xFFFFFFFF		UINT32	R	
44280-44293		Reserved	0		UINT32	R	
Setpoint Status Registers (bit map)							
44294-44295		Setpoints 1-16 status (0 = released, 1 = operated)	0x00000000 - 0x0000FFFF		UINT32	R	
44296-44309		Reserved			UINT32	R	
Setpoint Alarm Latch Registers (bit map)							
44310-44311		Setpoints 1-16 alarm status. When read: 0 = no setpoint operations logged, 1 = setpoint has been operated at least once since the last alarm bit reset. When written: 0 = clear setpoint alarm bit, 1 = no effect.	0x00000000 - 0x0000FFFF		UINT32	R/W	
44312-44325		Reserved					
Device Diagnostics Register (bit map)							
44326-44327		Device self-diagnostics flags. When read: 0 = no faults logged, 1 = a fault bit has been set at least once since the last reset. When written: 0 = clear a fault bit, 1 = no effect.	F23		UINT32	R/W	
44328-44341		Reserved					
Current Port Number							
44342		Active port number	0-1 = serial port COM1-COM2		UINT16	R	

Address	Point ID	Description	Options/Range	Units	Type	R/W	Notes
44343-44345		Reserved					
Current Network Settings							
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					
Communication Status							
44394		RSSI (received signal strength)	0 = not known or not detectable, 51-113 = -51 to -113 dBm		UINT16	R	
44395		GPRS status	0 = not connected, 1 = not registered, 2 = registered		UINT16	R	
44396-44409		Reserved			UINT16	R	65535 = N/A
Communication Counters							
44410		Successful eXpertPower client connections	0-65534		UINT16	R	
44411		Failed eXpertPower client connections	0-65534		UINT16	R	
44412		Successful TCP notification client connections	0-65534		UINT16	R	
44413		Failed TCP notification client connections	0-65534		UINT16	R	
44414-44441		Reserved			UINT16	R	65535 = N/A

3.7 Device Setup Registers

Address	Point ID	Description	Options/Range	Units	Type	R/W	Notes
Device Identification							
46080-46111							
+0,1		Device serial number	0-999999		UINT32	R	
+2,3		Device model ID	17400		UINT32	R	
+4-11		Device model name	"PM174"		CHAR16	R	Null-terminated string
+12-13		Device options (bitmap)	0		UINT32	R	
+14-19		Reserved			UINT16	R	
+20		Device firmware version number	2400-2499		UINT16	R	Two higher decimal digits = major version number, two lower decimal digits = minor version number
+21		Device firmware build number	1-99		UINT16	R	
+22,23		Reserved			UINT16	R	
+24		Boot loader version number			UINT16	R	Two higher decimal digits = major version number, two lower decimal digits = minor version number
+25		Boot loader build number	1-99		UINT16	R	
+26-31		Reserved			UINT16	R	
Factory Device Settings							
46112-46178							
+0		V1-V3 input range	690, 120 (option U)	V	UINT16	R	Does not limit the 690V input range
+1		V1-V3 input overload	120	%	UINT16	R	
+2,3		Reserved			UINT16	R	
+4		I1-I3 input range	1, 5	A	UINT16	R	
+5		I1-I3 input overload	200	%	UINT16	R	
+6-13		Reserved			UINT16	R	
+13-63		Unused			UINT16		
+64		Ethernet MAC address 0-1	0x0500		UINT16	R	
+65		Ethernet MAC address 2-3	0x00F0		UINT16	R	
+66		Ethernet MAC address 4-5	0x0000-0xFFFF		UINT16	R	
Basic Setup							
2304-2324							
+0		Wiring mode	F26		UINT16	R/W	
+1		PT ratio	10 to 65000	×0.1	UINT16	R/W	
+2		CT primary current	1 to 50,000	A	UINT16	R/W	
+3		Power block demand period	1,2,3,5,10,15,20,30,60 min, 255 = external synchronization	min	UINT16	R/W	If the external synchronization is selected, the DI1 input is considered a pulse or KYZ input. The pulse edge restarts the power demand block accumulation interval.

Address	Point ID	Description	Options/Range	Units	Type	R/W	Notes
+4		Volt/ampere/harmonic demand period	0 to 1800	sec	UINT16	R/W	
+5-7		Reserved			UINT16	R	Read as 65535
+8		Number of blocks in a sliding window	1 to 15		UINT16	R/W	
+9-10		Reserved			UINT16	R	Read as 65535
+11		Nominal line frequency	50, 60	Hz	UINT16	R/W	
+12		Maximum demand load current	0 to 50,000 (0 = CT primary current)	A	UINT16	R/W	
+13-17		Reserved			UINT16	R	Read as 65535
+18		Nominal secondary voltage	10 to 690 V		UINT16	R/W	
+19		Reserved			UINT16	R	Read as 65535
+20		PT ratio multiplication factor	×1, ×10		UINT16	R/W	
Communication Ports Setup							
2344-2359							
+0		Communication protocol	COM1: 0=Modbus RTU, 1=Modbus ASCII, 2=DNP3.0, 5=Profibus DP COM2: 0=Modbus RTU, 1=Modbus ASCII, 2=DNP3.0		UINT16	R/W	
+1		Interface	COM1: 0=RS-232, 1=RS-422, 2=RS-485, 4=Dial-up Modem, 6=Ethernet, 7=Profibus, 8=GSM/GPRS COM2: 1=RS-422, 2=RS-485		UINT16	R/W	
+2		Device address	Modbus: 1-247 DNP3.0: 0–65532 Profibus DP: 0-126		UINT16	R/W	
+3		Baud rate	1=300 bps, 2=600 bps, 3=1200 bps, 4=2400 bps, 5=4800 bps, 6=9600 bps, 7=19200 bps, 8=38400 bps, 9=57600 bps, 10=115200 bps		UINT16	R/W	
+4		Data format	0=7 bits/even parity, 1=8 bits/no parity, 2=8 bits/even parity		UINT16	R/W	
+5		Flow control	0=no flow control 1=software (XON/XOFF) 2=hardware (CTS)		UINT16	R/W	N/A for COM2 (read as 65535)
+6		RTS mode	0=not used, 1=RTS is permanently asserted 2=RTS is asserted during the transmission		UINT16	R/W	N/A for COM2 (read as 65535)
2344-2351		**COM1 Setup**					
2352-2359		**COM2 Setup**					
Device Options Setup							
2376-2386							

Address	Point ID	Description	Options/Range	Units	Type	R/W	Notes
+0		Power calculation mode	0=using reactive power: S=f(P,Q), 1=using non-active power: Q=f(S,P)		UINT16	R/W	
+1		Energy roll value	0=1×10^4, 1=1×10^5, 2=1×10^6, 3=1×10^7, 4=1×10^8, 5=1x10^9		UINT16	R/W	
+2		Phase energy calculation mode	0=disabled, 1=enabled		UINT16	R/W	
+3		Reserved			UINT16	R/W	Read as 65535
+4		Analog expander output option	0=none 1=0-20 mA 2=4-20 mA 3=0-1 mA 4=±1 mA		UINT16	R/W	
+5		Battery mode	0 = battery is OFF, 1 = battery is ON		UINT16	R/W	
+6-9		Reserved			UINT16	R/W	Read as 65535
+10		Energy LED test mode	0=disabled, 1=Wh test, 2=varh test		UINT16	R/W	LED pulse rate is 10,000 pulses/kWh
Alarm/Event Setpoints Setup							
352-1055							
+0		Condition #1: Logical operator	0 = OR, 1 = AND		UINT16	R/W	
+1		Condition #1: Trigger parameter ID	F12		UINT16	R/W	
+2		Condition #1: Reserved	0		UINT16	R/W	
+3		Condition #1: Reserved	0		UINT16	R/W	
+4,5		Condition #1: Operate limit	See Section 3.3		UINT32	R/W	Scaled value
+6,7		Condition #1: Release limit	See Section 3.3		UINT32	R/W	Scaled value
+8		Condition #2: Logical operator	0 = OR, 1 = AND		UINT16	R/W	
+9		Condition #2: Trigger parameter ID	F12		UINT16	R/W	
+10		Condition #2: Reserved	0		UINT16	R/W	
+11		Condition #2: Reserved	0		UINT16	R/W	
+12,13		Condition #2: Operate limit	See Section 3.3		UINT32	R/W	Scaled value
+14,15		Condition #2: Release limit	See Section 3.3		UINT32	R/W	Scaled value
+16		Condition #3: Logical operator	0 = OR, 1 = AND		UINT16	R/W	
+17		Condition #3: Trigger parameter ID	F12		UINT16	R/W	
+18		Condition #3: Reserved	0		UINT16	R/W	
+19		Condition #3: Reserved	0		UINT16	R/W	
+20,21		Condition #3: Operate limit	See Section 3.3		UINT32	R/W	Scaled value
+22,23		Condition #3: Release limit	See Section 3.3		UINT32	R/W	Scaled value
+24		Condition #4: Logical operator	0 = OR, 1 = AND		UINT16	R/W	
+25		Condition #4: Trigger parameter ID	F12		UINT16	R/W	
+26		Condition #4: Reserved	0		UINT16	R/W	
+27		Condition #4: Reserved	0		UINT16	R/W	
+28,29		Condition #4: Operate limit	See Section 3.3		UINT32	R/W	Scaled value
+30,31		Condition #4: Release limit	See Section 3.3		UINT32	R/W	Scaled value

Address	Point ID	Description	Options/Range	Units	Type	R/W	Notes
+32		Action #1: Action type	F14		UINT16	R/W	
+33		Action #1: Action target	F14		UINT16	R/W	
+34		Action #2: Action type	F14		UINT16	R/W	
+35		Action #2: Action target	F14		UINT16	R/W	
+36		Action #3: Action type	F14		UINT16	R/W	
+37		Action #3: Action target	F14		UINT16	R/W	
+38		Action #4: Action type	F14		UINT16	R/W	
+39		Action #4: Action target	F14		UINT16	R/W	
+40		Not used	0		UINT16	R/W	
+41		Operate delay	0-9999	×0.1 sec	UINT16	R/W	
+42		Release delay	0-9999	×0.1 sec	UINT16	R/W	
+43		Not used	0		UINT16	R/W	
352-395		**Setpoint #1**					
396-439		**Setpoint #2**					
440-483		**Setpoint #3**					
484-527		**Setpoint #4**					
528-571		**Setpoint #5**					
572-615		**Setpoint #6**					
616-659		**Setpoint #7**					
660-703		**Setpoint #8**					
704-747		**Setpoint #9**					
748-791		**Setpoint #10**					
792-835		**Setpoint #11**					
836-879		**Setpoint #12**					
880-923		**Setpoint #13**					
924-967		**Setpoint #14**					
968-1011		**Setpoint #15**					
1012-1055		**Setpoint #16**					
Pulse Counters Setup							
2940-2947							
+0		Source digital input ID	0=not assigned, 1-4=DI1-DI4		UINT16	R/W	
+1		Multiplier	0-9999		UINT16	R/W	
2940-2941		**Counter #1 Setup**					
2942-2943		**Counter #2 Setup**					
2944-2945		**Counter #3 Setup**					
2946-2947		**Counter #4 Setup**					
Transformer Correction Setup							
47072-47099							
+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		**V1 transformer correction**					
47076-47079		**V2 transformer correction**					

Address	Point ID	Description	Options/Range	Units	Type	R/W	Notes
47080-47083		**V3 transformer correction**					
47084-47087		**Reserved**					
47088-47091		**I1 transformer correction**					
47092-47095		**I2 transformer correction**					
47096-47099		**I3 transformer correction**					
Local Settings							
46400-46415							
+0		Local time offset, min	0-+/-720	min	INT16	R/W	
+1		Daylight savings time (DST) option	0=DST disabled (standard time only), 1=DST enabled		UINT16	R/W	
+2		DST start month	1-12		UINT16	R/W	
+3		DST start week of the month	1=1st, 2=2nd, 3=3rd, 4=4th week, 5=the last week of the month		UINT16	R/W	
+4		DST start weekday	1-7 (1=Sun, 7=Sat)		UINT16	R/W	
+5		DST end month	1-12		UINT16	R/W	
+6		DST end week of the month	1=1st, 2=2nd, 3=3rd, 4=4th week, 5=the last week of the month		UINT16	R/W	
+7		DST end weekday	1-7 (1=Sun, 7=Sat)		UINT16	R/W	
+8		Clock synchronization source	1-4 = DI1-DI4, 32767 = meter clock		UINT16	R/W	A DI input is considered a pulse or KYZ input. The pulse edge adjusts the clock at the nearest whole minute.
+9		Country code	ITU country calling code		UINT16	R/W	
+10		DST start hour	1-6		UINT16	R/W	
+11		DST end hour	1-6		UINT16	R/W	
+12-15		Reserved			UINT16	R/W	
Clock Indication and Setup							
46416-46447							
+0,1		Local time, in seconds, since Jan 1, 1970	F1	sec	UINT32	R/W	
+2,3		Fractional seconds, µsec		µsec	UINT32	R/W	
+4		Fractional seconds, milliseconds	0-999	ms	UINT16	R/W	
+5		Seconds	0-59		UINT16	R/W	
+6		Minutes	0-59		UINT16	R/W	
+7		Hour	0-23		UINT16	R/W	
+8		Day of month	1-31		UINT16	R/W	
+9		Month	1-12		UINT16	R/W	
+10		Year (calendar year minus 2000)	0-99		UINT16	R/W	
+11		Weekday	1-7 (1=Sun, 7=Sat)		UINT16	R	
+12		Daylight savings time status	0=standard time is active, 1=daylight savings time is active		UINT16	R	
+13-31		Reserved			UINT16		

Address	Point ID	Description	Options/Range	Units	Type	R/W	Notes
Network Setup							
46576-46703							
+0,1		Device IP Address	0x01000000-0xFFFFFFFF		UINT32	R/W	Network byte order
+2,3		Network subnet mask	0x00000001-0xFFFFFFFF		UINT32	R/W	Network byte order
+4,5		Network default gateway	0x00000000-0xFFFFFFFF		UINT32	R/W	Network byte order
+6,7		Use DHCP	0 = NO, 1 = YES		UINT32	R/W	
+8,9		TCP service port	502 = Modbus/TCP, 20000 = DNP3.0/TCP		UINT32	R/W	
+10-127		Reserved				R/W	
Password Setup							
46704-46707							
+0,1		Communications password (4 digits)	0-9999		UINT32	R/W	Read as 0
+2		Password protection enabled	0 = disabled, 1 = enabled		UINT16	R/W	
+3		Reserved			UINT16	R/W	
Expert Power Service Setup							
46768-46783							
+0,1		Expert Power server IP Address	0x01000000-0xFFFFFFFF		UINT32	R/W	Default = 207.232.60.18
+2,3		Expert Power server TCP service port	0-65535		UINT32	R/W	Default = 5001
+4,5		Expert Power client enabled	0 = client disabled, 1 = client enabled		UINT32	R/W	
+6,7		Time to next session	1-99999	min	UINT32	R/W	
+8,9		Not used			UINT32	R	
+10,11		Not used			UINT32	R	
+12,13		Connection idle timeout	1-120	min	UINT32	R/W	
+14-15		Reserved			UINT32		
Internet Service Provider (ISP) accounts							
46784-46831							
+0-15		ISP telephone number			CHAR32	R/W	
+16-31		Login name			CHAR32	R/W	
+32-47		Login password			CHAR32	R/W	
GPRS Setup							
46832-46879							
+0-15		Access Point Name (APN)			CHAR32	R/W	
+16-31		User name			CHAR32	R/W	
+32-39		Password			CHAR16	R/W	
+40-47		Reserved			CHAR16	R/W	
TCP Notification Client Setup							
46896-46991							
+0,1		Client enabled	0 = disabled, 1 = enabled		UINT32	R/W	
+2,3		Server address	0x01000000-0xFFFFFFFF		UINT32	R/W	
+4,5		Server port	0-65535		UINT32	R/W	
+6,7		Message exchange address	0-65535		UINT32	R/W	
+8-15		Reserved					

Address	Point ID	Description	Options/Range	Units	Type	R/W	Notes
EGD Producer Exchanges Setup							
50454-50837							
+0-1		Exchange consumer IP Address	0x01000000-0xFFFFFFFF		UINT32	R/W	Network byte order
+2		Production interval	1-60000	×10 ms	UINT16	R/W	
+3		Exchange status	0=disabled, 1=enabled		UINT16	R/W	
+4,5		Reserved	0		UINT16	R/W	
+6		Address range #1: Start point ID	0-65535, 0=end of the range list		UINT16	R/W	
+7		Address range #1: End point ID	1-65535		UINT16	R/W	
+8		Address range #1: Data type	0=Word, 1=DWord, 2= Float		UINT16	R/W	
+9		Address range #2: Start point ID	0-65535, 0=end of the range list		UINT16	R/W	
+10		Address range #2: End point ID	1-65535		UINT16	R/W	
+11		Address range #2: Data type	0=Word, 1=DWord, 2= Float		UINT16	R/W	
		...				R/W	
+93		Address range #30: Start point ID	0-65535, 0=end of the range list		UINT16	R/W	
+94		Address range #30: End point ID	1-65535		UINT16	R/W	
+95		Address range #30: Data type	0=Word, 1=DWord, 2= Float		UINT16	R/W	
50454-50549		**Exchange #1**					
50550-50645		**Exchange #2**					
50646-50741		**Exchange #3**					
50742-50837		**Exchange #4**					
DNP Options Setup							
51158-51183							
+0		Default Binary Input Static object variation	F24 (default 0)		UINT16	R/W	
+1		Default Binary Input Change object variation	F24 (default 1)		UINT16	R/W	
+2		Default Binary Counter object variation	F24 (default 3)		UINT16	R/W	
+3		Default Frozen Binary Counter object variation	F24 (default 4)		UINT16	R/W	
+4		Reserved			UINT16	R/W	
+5		Default Binary Counter Change Event object variation	F24 (default 2)		UINT16	R/W	
+6		Default Analog Input object variation	F24 (default 3)		UINT16	R/W	
+7		Reserved			UINT16	R/W	
+8		Reserved			UINT16	R/W	
+9		Default Analog Input Change Event object variation	F24 (default 2)		UINT16	R/W	
+10		Re-mapping static point indices for event objects	0=disabled (default), 1=enabled		UINT16	R/W	
+11		16-bit BC Scaling	0=×1 (default), 1=×10, 2=×100, 3=×1000		UINT16	R/W	
+12		16-bit AI Scaling	0=disabled, 1=enabled (default)		UINT16	R/W	
+13		Number of points allocated for Analog Input change events	0 to 64 (default 32)		UINT16	R/W	
+14		Number of points allocated for Binary Input change events	0 to 32 (default 0)		UINT16	R/W	
+15		Number of points allocated for Binary Counter change events	0 to 64 (default 0)		UINT16	R/W	
+16		Select/Operate Timeout	2 to 30 seconds (default 10 sec)		UINT16	R/W	

Address	Point ID	Description	Options/Range	Units	Type	R/W	Notes
+17		Multi Fragment Interval	50 to 500 ms (default 50 ms)		UINT16	R/W	
+18-21		Reserved	Read as 65535		UINT16	R/W	
+22,23		Time Sync Period	1 to 86400 seconds (default 86400 sec)		UINT32	R/W	
+24		Voltage scale, volts secondary	60 to 828V (default 144V)	V	UINT16	R/W	
+25		Current scale, amps secondary	100	×0.1A	UINT16	R/W	
51184-51189		Reserved					
DNP Events Setup							
51190-51445							
+0,1		Threshold/Deadband	0 to 4.3×10^9		UINT32	R/W	A hysteresis for the point return threshold is 0.05Hz for frequency and 2% of the operating threshold for other points
+2		DNP point number	DNP point number available for the selected object		UINT16	R/W	

+3		Event scan control field (bitmap)	Bits 0-1 - DNP Object:
			  0 = none, 1=AI, 2=BI, 3=BC
			Bit 2 – Object change event scan:
			  0= event disabled, 1=enabled
			Bits 5-6 - DNP event poll class:
			  0=Class 1, 1=Class 2, 2=Class 3
			Bit 7 - Event log on an event:
			  0= disabled, 1=enabled
			Bits 8-9 – Threshold/Deadband relation:
			  0=Delta, 1= more than (over threshold), 2=less than (under threshold)
					UINT16	R/W	If Event log is enabled, the source of a DNP event will be recorded to the device Event log file as a general Setpoint #17.

51190-51193		**DNP Event #1**					
51194-51197		**DNP Event #2**					
		…					
51442-51445		**DNP Event #64**					
51446-51701		Reserved					
DNP Class 0 Point Assignments							
51702-51797							
+0		DNP object and variation	F25		UINT16	R/W	
+1		Start point number	Point number for the selected object		UINT16	R/W	
+2		Number of points in a range	0-128		UINT16	R/W	
51702-51704		**DNP Class 0 Points Range 1**					
51705-51707		**DNP Class 0 Points Range 2**					

Address	Point ID	Description	Options/Range	Units	Type	R/W	Notes
		...					
51795-51797		**DNP Class 0 Points Range 32**					
51798-51893		Reserved					
PQ Log Triggers Setup (IEEE 1159 disturbance categories)							
52342-52597							
+0		Threshold, %	0-2000	x 0.1%	UINT16	R/W	
+1		Hysteresis, % of threshold	0-500	x 0.1%	UINT16	R/W	
+2		Log options, bitmap	Bit 0 – waveform log on event start: 0 = disabled, 1 = enabled; Bit 1 – waveform log on event end: 0 = disabled, 1 = enabled.		UINT16	R/W	
+3		Waveform log number	0-1 = log #1 - #2		UINT16	R/W	
+4-15		Reserved	0		UINT16	R/W	
52342-52357		**Impulsive transients**					
52358-52373		**Sag**					
52374-52389		**Swell**					
52390-52405		**Interruption**					
52406-52421		**Voltage unbalance**					
52422-52437		**Frequency variation**					
52438-52453		**Harmonics**					
52454-52469		**Inter-harmonics**					
52470-52485		**Flicker**					
52486-52597		Reserved					
Fault Log Triggers Setup							
52150-52277							V24.3.1 and higher
+0		Trigger 1: Threshold, %	0 - 2000	x 0.1%	UINT16	R/W	
+1		Trigger 1: Hysteresis, % of threshold	0 - 500	x 0.1%	UINT16	R/W	
+2		Trigger 1: Trigger enabled	0 = disabled, 1 = enabled		UINT16	R/W	
+3		Trigger 2: Threshold, %	0 - 2000	x 0.1%	UINT16	R/W	
+4		Trigger 2: Hysteresis, % of threshold	0 - 500	x 0.1%	UINT16	R/W	
+5		Trigger 2: Trigger enabled	0 = disabled, 1 = enabled		UINT16	R/W	
+6-7		Not used			UINT16	R/W	
52150-52157		**External trigger**	N/A				
52158-52165		**Zero-sequence current**	N/A				
52166-52173		**Zero-sequence voltage**	N/A				
52174-52181		**Current unbalance**	N/A				
52182-52189		**Voltage unbalance**	N/A				
52190-52197		**Overcurrent and Undervoltage**					
52198-52205		**Undervoltage**					
52206-52213		**I4 (neutral) current**					
52214-52277		Reserved			UINT16	R/W	

Address	Point ID	Description	Options/Range	Units	Type	R/W	Notes
Fault Log Recording Setup							
52278-52341							V24.3.1 and higher
+0		Log options, bitmap	Bit 0 – waveform log on event start: 0 = disabled, 1 = enabled; Bit 1 – waveform log on event end: 0 = disabled, 1 = enabled; Bit 2 – recording to PQ log: 1 = disabled		UINT16	R/W	
+1		Waveform log number	0-1 = log #1-#2		UINT16	R/W	
+2		Data/RMS plot option	0 (N/A)		UINT16	R	
+3		Data log number (factory preset)	0 (N/A)		UINT16	R	
+4		1/2-cycle RMS plot, cycles before event	0 (N/A)	cycle	UINT16	R	
+5		1/2-cycle RMS plot, cycles after event	0 (N/A)	cycle	UINT16	R	
+6		1/2-cycle RMS plot duration, cycles	0 (N/A)	cycle	UINT16	R	
+7-63		Reserved			UINT16	R	
File Setup							
52598-53877							
+0		File type	0		UINT16	R/W	
+1		File attributes (bitmap)	F3		UINT16	R/W	
+2		Number of records in the file	0-65535 (0 = delete file)		UINT16	R/W	
+3		Number of sections/channels in the file	0-32		UINT16	R/W	0 = non-partitioned file
+4		Number of parameters per section record	1-16		UINT16	R/W	
+5		Not used	0		UINT16	R/W	
+6		Section record size, bytes (for info only)			UINT16	R	
+7		File record size, bytes (for info only)			UINT16	R	
+8, 9		Allocated file size, bytes (for info only)			UINT32	R	
52598-52607		**Event Log Setup**					
52608-52617		**Data Log #1 Setup**					
52618-52627		**Data Log #2 Setup**					
52628-52637		**Data Log #3 Setup**					
52638-52647		**Data Log #4 Setup**					
52648-52657		**Data Log #5 Setup**					
52658-52667		**Data Log #6 Setup**					
52668-52677		**Data Log #7 Setup**					
52678-52687		**Data Log #8 Setup**					
52688-52697		**Data Log #9 Setup**					
52698-52707		**Data Log #10 Setup**					
52708-52717		**Data Log #11 Setup**					
52718-52727		**Data Log #12 Setup**					
52728-52737		**Data Log #13 Setup**					
52738-52747		**Data Log #14 Setup**					
52748-52757		**Data Log #15 Setup**					
52758-52767		**Data Log #16 Setup**					

Address	Point ID	Description	Options/Range	Units	Type	R/W	Notes
52768-52777		**Waveform Log #1 Setup**					
52778-52787		**Waveform Log #2 Setup**					
52788-52857		**Reserved**					
52858-52867		**PQ Log Setup**					
52868-53877		Reserved					
Waveform Recorder Setup							
53878-53949							
+0		Sampling rate, samples per cycle	32, 64, 128		UINT16	R/W	
+1		Maximum number of cycles per event series	16-2560 (32 samples/cycle), 8-1280 (64 samples/cycle), 4-640 (128 samples/cycle)		UINT16	R/W	
+3		Recording time mode and number of post-event cycles in event-controlled mode	Bit 15 – mode: 0=fixed time, 1= event-controlled time Bits 0-9 – post-event cycles: 0-2048		UINT16	R/W	Event-controlled mode - V24.3.1 and higher
+4		Number of pre-event cycles	1-20		UINT16	R/W	
+4,5		File channel mask, bitmap	F9, 0x00000033		UINT32	R/W	
+6,7		Not used	0		UINT32	R/W	
53878-53885		**Waveform Log #1 Setup**					
53886-53893		**Waveform Log #2 Setup**					
Data Log Setup							
54006-55541							
+0		Data log parameter #1 ID	0x0000-0xFFFF		UINT16	R/W	
+1		Data log parameter #2 ID	0x0000-0xFFFF		UINT16	R/W	
+2		Data log parameter #3 ID	0x0000-0xFFFF		UINT16	R/W	
+3		Data log parameter #4 ID	0x0000-0xFFFF		UINT16	R/W	
+4		Data log parameter #5 ID	0x0000-0xFFFF		UINT16	R/W	
+5		Data log parameter #6 ID	0x0000-0xFFFF		UINT16	R/W	
+6		Data log parameter #7 ID	0x0000-0xFFFF		UINT16	R/W	
+7		Data log parameter #8 ID	0x0000-0xFFFF		UINT16	R/W	
+8		Data log parameter #9 ID	0x0000-0xFFFF		UINT16	R/W	
+9		Data log parameter #10 ID	0x0000-0xFFFF		UINT16	R/W	
+10		Data log parameter #11 ID	0x0000-0xFFFF		UINT16	R/W	
+11		Data log parameter #12 ID	0x0000-0xFFFF		UINT16	R/W	
+12		Data log parameter #13 ID	0x0000-0xFFFF		UINT16	R/W	
+13		Data log parameter #14 ID	0x0000-0xFFFF		UINT16	R/W	
+14		Data log parameter #15 ID	0x0000-0xFFFF		UINT16	R/W	
+15		Data log parameter #16 ID	0x0000-0xFFFF		UINT16	R/W	
+16-31		Reserved			UINT16	R/W	
54006-54037		**Data log #1 Setup**					
54038-54069		**Data log #2 Setup**					
54070-54101		**Data log #3 Setup**					
54102-54133		**Data log #4 Setup**					
54134-54165		**Data log #5 Setup**					

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Address	Point ID	Description	Options/Range	Units	Type	R/W	Notes
54166-54197		**Data log #6 Setup**					
54198-54229		**Data log #7 Setup**					
54230-54261		**Data log #8 Setup**					
54262-54293		**Data log #9 Setup**					
54294-54325		**Data log #10 Setup**					
54326-54357		**Data log #11 Setup**					
54358-54389		**Data log #12 Setup**					
54390-54421		**Data log #13 Setup**					
54422-54453		**Data log #14 Setup**					
54454-54485		**Data log #15 Setup**					
54486-54517		**Data log #16 Setup**					
TOU Daily Profile Setup							
55574-55701							
+0		1st tariff change	F10		UINT16	R/W	
+1		2nd tariff change	F10		UINT16	R/W	
+2		3rd tariff change	F10		UINT16	R/W	
+3		4th tariff change	F10		UINT16	R/W	
+4		5th tariff change	F10		UINT16	R/W	
+5		6th tariff change	F10		UINT16	R/W	
+6		7th tariff change	F10		UINT16	R/W	
+7		8th tariff change	F10		UINT16	R/W	
55574-55581		**Daily profile #1: Season 1, Day type 1**					
55582-55589		**Daily profile #2: Season 1, Day type 2**					
55590-55597		**Daily profile #3: Season 1, Day type 3**					
55598-55605		**Daily profile #4: Season 1, Day type 4**					
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					
TOU Calendar Setup							
55712-56031							
+0-9		**Calendar entry record**				R/W	
+0		Daily profile	0-3 = Season 1, Day types 0-3 4-7 = Season 2, Day types 0-3		UINT16	R/W	

Address	Point ID	Description	Options/Range	Units	Type	R/W	Notes
			8-11 = Season 3, Day types 0-3 12-15 = Season 4, Day types 0-3				
+1		Week of month	0=all, 1=1st, 2=2nd, 3=3rd, 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	
+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		**Calendar entry #1**					
55722-55731		**Calendar entry #2**					
55732-55741		**Calendar entry #3**					
…							
56022-56031		**Calendar entry #32**					
56032-56191		Reserved					
Billing/TOU Registers Setup							
56672-56703							
+0		Not used			UINT16	R/W	
+1		Units of measurement	0=none, 1=kWh, 2=kvarh, 3=kVAh, 4=m³, 5=CF (cubic feet), 6=CCF (hundred cubic feet)		UINT16	R/W	
+2		Flags (bitmap)	Bit 0=1 - TOU enabled Bit 1=1 - Use profile enabled Bit 2=1 - Max. Demand profile enabled Bit 3=1 - Summary (total) profile enabled		UINT16	R/W	
+3		Not used	0		UINT16	R/W	
56672-56675		**Register #1 Setup**					
56676-56679		**Register #2 Setup**					
56680-56683		**Register #3 Setup**					
56684-56687		**Register #4 Setup**					
56688-56691		**Register #5 Setup**					
56692-56695		**Register #6 Setup**					
56696-56699		**Register #7 Setup**					
56700-56703		**Register #8 Setup**					
Billing/TOU Registers Source Setup							
56928-57183							
+0		Energy source ID	F11		UINT16	R/W	
+1		Target billing register number	0-7 = register #1-#8		UINT16	R/W	
+2,3		Multiplier	0-1000000	×0.001	INT32	R/W	

Address	Point ID	Description	Options/Range	Units	Type	R/W	Notes
56928-56931		**Energy Source #1**					
56932-56935		**Energy Source #2**					
56936-56939		**Energy Source #3**					
56940-56943		**Energy Source #4**					
56944-56947		**Energy Source #5**					
56948-56951		**Energy Source #6**					
56952-56955		**Energy Source #7**					
56956-56959		**Energy Source #8**					
Periodic Timers Setup							
61024-61031							
+0, 1		Time interval, in seconds	0=timer disabled, 1,000-9999,000 ms (1-9999 sec)	0.001 s	UINT32	R/W	
61024-61025		**Timer #1 Setup**		0.001 s	UINT32	R/W	
61026-61027		**Timer #2 Setup**		0.001 s	UINT32	R/W	
61028-61029		**Timer #3 Setup**		0.001 s	UINT32	R/W	
61030-61031		**Timer #4 Setup**		0.001 s	UINT32	R/W	
Digital Inputs Setup							
61728-61743							
+0		Pulse mode	0 = pulse, 1 = KYZ		UINT16	R/W	
+1		Polarity	0 = normal, 1 = inverting		UINT16	R/W	
+2		De-bounce time, ms	1-1000		UINT16	R/W	Debounce time will be the same for both inputs
+3		Reserved			UINT16	R/W	
61728-61731		**DI1 Setup**					
61732-61735		**DI2 Setup**					
61736-61739		**DI3 Setup**					
61740-61743		**DI4 Setup**					
Relay Outputs Setup							
61984-62007							
+0		Operation Mode	0=latched, 1=unlatched, 2=pulse, 3=KYZ		UINT16	R/W	
+1		Polarity	Bit 0 – Polarity: 0=normal, 1=inverting, Bit 1 - Retentive mode: 0=disabled, 1=enabled		UINT16	R/W	
+2		Pulse width, ms	1-1000		UINT16	R/W	
+3		Pulse source ID	F17		UINT16	R/W	
+4		Units per pulse	1-10000	x0.1	UINT16	R/W	
+5		Reserved			UINT16	R/W	
61984-61989		**RO1 Setup**					
61990-61995		**RO2 Setup**					
61996-62001		**RO3 Setup**					
62002-62007		**RO4 Setup**					

Address	Point ID	Description	Options/Range	Units	Type	R/W	Notes
Analog Inputs Setup							
62368-62379							
+0		Input parameter ID	0 = input not assigned		UINT16	R/W	
+1		Not used	0		UINT16	R/W	
+2,3		Zero scale value (0/4 mA)			INT32	R/W	
+4,5		Full scale value (20/1 mA)			INT32	R/W	
62368-62373		**AI1 Setup**					
62374-62379		**AI2 Setup**					
Analog Outputs Setup							
62560-62571							
+0		Output parameter ID	F18		UINT16	R/W	
+1		Not used	0		UINT16	R/W	
+2,3		Zero scale value (0/4 mA)	See Section 3.4		INT32	R/W	
+4,5		Full scale value (20/1 mA)	See Section 3.4		INT32	R/W	
62560-62565		**AO1 Setup**					
62566-62571		**AO2 Setup**					
Analog Expander Setup							
62752-62847							Analog expander outputs settings will not be in effect until the analog expander output is globally enabled through the Device Options setup
+0		Output parameter ID	F18		UINT16	R/W	
+1		Not used	0		UINT16	R/W	
+2,3		Zero scale value (0/4 mA)	See Section 3.4		INT32	R/W	
+4,5		Full scale value (20/1 mA)	See Section 3.4		INT32	R/W	
62752-62757		**AX8 #1 Channel 1 Setup**					
62758-62763		**AX8 #1 Channel 2 Setup**					
…		…					
62794-62799		**AX8 #1 Channel 8 Setup**					
62800-62805		**AX8 #2 Channel 1 Setup**					
62806-62811		**AX8 #2 Channel 2 Setup**					
…		…					
62842-62847		**AX8 #2 Channel 8 Setup**					

3.8 Analog and Digital I/O Configuration

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

3.9 File Transfer Registers

Address	Point ID	Description	Options/Range	Units	Type	R/W	Notes
File Transfer Control Blocks							
63120-63151		**File Request Block**					
+0		File function	1 = ACK - acknowledgement 3 = set file position 5 = reset file position 7 = find 11 = read file 127 = erase file		UINT16	R/W	1 - clears the file transfer block 3 - changes the file position 5 - sets the file position at the first (oldest) record 7 - finds a record matching an event or/and time (see Note 3) 11 - opens the file for reading from the present file position
+1		File ID	F2		UINT16	R/W	
+2		Section number (functions 3, 5, 11)	0-31, 0xFFFF = use channel ID		UINT16	R/W	
+3		Section channel ID (functions 3, 5, 11)	F6, F7		UINT16	R/W	
+4		Record sequence number (functions 3, 11)	0-65535		UINT16	R/W	The record sequence number with function 11 does not change the file position (see Note 2).
+5		Request variation (function 11)	0		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 µsec		µsec	UINT32	R/W	Note 3
+12, 13		Find key: End time, seconds since 1/1/1970	F1	sec	UINT32	R/W	Note 3
+14, 15		Find key: End time, fractional seconds in µsec		µsec	UINT32	R/W	Note 3
+16-31		Reserved			UINT16	R/W	
63152-64943		**File Response Block**					
		Data transfer area [0 – 1791]			UINT16	R	
64944-64951		**File Info Request Block**					
+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		**File Info Response Block**					
		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
File Info Response Block (Variation 0 – File info)							
64952-64959		**Block Heading**					
+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		**File Info**					
+0		File type	0		UINT16	R	
+1		File attributes	F3		UINT16	R	
+2		File (section) status	F4		UNT16	R	
+3		Number of sections in the file	0-32		UINT16	R	0 = non-partitioned file
+4, 5		File channel mask (channels 1-32), bitmap	F8, F9		UINT32	R	
+6, 7		File channel mask (channels 33-64), bitmap	F8, F9		UINT32	R	
+8		Number of records in the file	0-65535		UINT16	R	
+9		Number of records until the end of the file	0-65535		UINT16	R	
+10		Current record (read position) sequence number	0-65535		UINT16	R	
+11		Current write position sequence number	0-65535		UINT16	R	
+12		First (oldest) record sequence number	0-65535		UINT16	R	
+13		Last (newest) record sequence number	0-65535		UINT16	R	
+14, 15		Last record time, seconds since 1/1/1970	F1	sec	UINT32	R	
+16, 17		Last record time, fractional seconds		µsec	UINT32	R	
+18, 19		First record time, seconds since 1/1/1970	F1	sec	UINT32	R	
+20, 21		First record time, fractional seconds		µsec	UINT32	R	
+22, 23		Null	0		UINT32	R	

Address	Point ID	Description	Options/Range	Units	Type	R/W	Notes
+24, 25		Null	0	µsec	UINT32	R	
+26, 27		Null	0	sec	UINT32	R	
+28, 29		Null	0	µsec	UINT32	R	
+30		Maximum number of records	0-65535		UINT16	R	
+31		Number of parameters per data section record	0-16		UINT16	R	
+32		Section record size, bytes		Byte	UINT16	R	
+33		File record size, bytes		Byte	UINT16	R	
+34, 35		Allocated file size, bytes		Byte	UINT32	R	
File Info Response Block (Variation 1 – Current record info)							
64952-64959		**Block Heading**					
+0		File function	9		UINT16	R	
+1		File ID	F2		UINT16	R	
+2		Section number	0-31		UINT16	R	
+3		Section channel ID	F6, F7		UINT16	R	
+4		Number of records in the block	1		UINT16	R	
+5		Record size, words	8		UINT16	R	
+6		Request variation	1		UINT16	R	
+7		Reserved	0		UINT16	R	
64960-64997		**File Info**					
+0		File (section) status	F4		UNT16	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	
File Info Response Block (Variation 2 – Data log record structure)							
64952-64959		**Block Heading**					
+0		File function	9		UINT16	R	
+1		File ID	1-16		UINT16	R	
+2		Section number	0-15		UINT16	R	
+3		Section channel ID	F6, F7		UINT16	R	
+4		Number of records in the block	1		UINT16	R	
+5		Record size, words	18		UINT16	R	
+6		Request variation	2		UINT16	R	
+7		Reserved	0		UINT16	R	
64960-64997		**File Info**					
+0		Not used	0		UINT16	R	
+1		Number of fields in a data record	1-16		UINT16	R	
+2		Field 1 parameter ID	0-0xFFFF		UINT16	R	
+3		Field 2 parameter ID	0-0xFFFF		UINT16	R	
		...					
+17		Field 16 parameter ID	0-0xFFFF		UINT16	R	

Address	Point ID	Description	Options/Range	Units	Type	R/W	Notes
Event Log Response Block							
63152-63159		**Block Heading**					
+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		**Event Log Records**					
+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 μsec		μsec	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		**Record #1**					
		...					
63532-63543		**Record #32**					
Data Log Response Block							
63152-63159		**Block Heading**					
+0		Last file function	1, 3, 5, 11		UINT16	R	
+1		File ID	1-16		UINT16	R	
+2		Section number	0-7		UINT16	R	
+3		Section channel ID	F6		UINT16	R	
+4		Number of records in the block	1-16		UINT16	R	
+5		Record size, words	8 + 2× Number of parameters		UINT16	R	
+6		Request variation	0		UINT16	R	
+7		Reserved	0		UINT16	R	
63160-64439		**Data Log Records**					
+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	

Address	Point ID	Description	Options/Range	Units	Type	R/W	Notes
63160-...		**Record #1** (variable length)					
		...					
		Record #16 (variable length)					
Waveform Log Response Block							
63152-63159		**Block Heading**					
+0		Last file function	1, 3, 5, 11		UINT16	R	
+1		File ID	17-18, 128 (F2)		UINT16	R	
+2		Section number	0-9		UINT16	R	
+3		Section channel ID	F7		UINT16	R	
+4		Number of records in the block	1		UINT16	R	
+5		Record size, words	640		UINT16	R	
+6		Request variation	0		UINT16	R	
+7		Reserved	0		UINT16	R	
63160-63799		**Waveform Log Record**					
+0		Record status	F5		INT16	R	
+1		Record sequence number	0-65535		UINT16	R	
+2, 3		Start time, seconds since 1/1/1970	F1	sec	UINT32	R	
+4, 5		Start time, fractional seconds		µsec	UINT32	R	
+6, 7		Trigger time, seconds since 1/1/1970	F1	sec	UINT32	R	
+8, 9		Trigger time, fractional seconds		µsec	UINT32	R	
+10		Record series number	1-65535		UINT16	R	
+11		Record serial number in a series	0-65535		UINT16	R	
+12		Trigger event type	F22		UINT16	R	
+13		Trigger event number	1-65535		UINT16	R	
+14		Source point ID (generic)	See Generic Data in Section 3.4		UINT16	R	
+15		Trigger reference sample index	0–511		UINT16	R	
+16		Sampling rate, µsec/sample	600-27000	×0.1µsec	UINT16	R	
+17		Sampling rate, samples/cycle	32, 64, 128		UINT16	R	
+18		Sampling frequency	4500 – 6500	×0.01Hz	UINT16	R	
+19		Channel offset, sampling units	0		INT16	R	
+20, 21		Channel multiplier, primary units	See Generic Data in Section 3.4		UINT32	R	
+22		Channel divisor, sampling units	32767		UINT16	R	
+23		Length of a sample series, data points	512		UINT16	R	
+24-127		Not used	0		UINT16	R	
+128		**Sample Series**					
+128-639		Sample data series points [0...511]	-32768 - 32767		INT16	R	[1]
Power Quality (PQ) Log Response Block							
63152-63159		**Block Heading**					
+0		Last file function	1, 3, 5, 11		UINT16	R	
+1		File ID	26		UINT16	R	
+2		Section number	0		UINT16	R	
+3		Section channel ID	0		UINT16	R	
+4		Number of records in the block	1-16		UINT16	R	

Address	Point ID	Description	Options/Range	Units	Type	R/W	Notes
+5		Record size, words	18		UINT16	R	
+6		Request variation	0		UINT16	R	
+7		Reserved	0		UINT16	R	
63160-63799		**PQ Log Records**					
+0		Record status	F5		INT16	R	
+1		Record sequence number	0-65535		UINT16	R	
+2, 3		Start time, seconds since 1/1/1970	F1	sec	UINT32	R	
+4, 5		Start time, fractional seconds in μsec		μsec	UINT32	R	
+6, 7		End time, seconds since 1/1/1970	F1	sec	UINT32	R	
+8, 9		End time, fractional seconds in μsec		μsec	UINT32	R	
+10		PQ event type	F22		UINT16	R	
+11		PQ event number	1-65535		UINT16	R	
+12		Point ID (generic)	See Generic Data in Section 3.4		UINT16	R	
+13		Reserved	0		UINT16	R	
+14, 15		Value reference (base), primary units	See Generic Data in Section 3.4		INT32	R	
+16, 17		Value magnitude, primary units	See Generic Data in Section 3.4		INT32	R	
63160-63179		**Record #1**					
		...					
63430-63447		**Record #16**					
Fault Log Response Block							
63152-63159		**Block Heading**					V24.3.1 and higher
+0		Last file function	1, 3, 5, 11		UINT16	R	
+1		File ID	27		UINT16	R	
+2		Section number	0		UINT16	R	
+3		Section channel ID	0		UINT16	R	
+4		Number of records in the block	1-32		UINT16	R	
+5		Record size, words	22		UINT16	R	
+6		Request variation	0		UINT16	R	
+7		Not used	0		UINT16	R	
63160-64183		**Fault Log Records**					
+0		Record status	F5		INT16	R	
+1		Record sequence number	0-65535		UINT16	R	
+2, 3		Start time, seconds since 1/1/1970	F1	sec	UINT32	R	
+4, 5		Start time, fractional seconds in μsec		μsec	UINT32	R	
+6, 7		End time, seconds since 1/1/1970	F1	sec	UINT32	R	
+8, 9		End time, fractional seconds in μsec		μsec	UINT32	R	
+10		Fault event type	F22		UINT16	R	
+11		Fault event number	1-65535		UINT16	R	
+12		Current phase point ID (generic)	0-65535		UINT16	R	
+13		Volts phase point ID (generic)	0-65535		UINT16	R	
+14, 15		Current reference (base), primary units	See Generic Data in Section 3.4	U4	INT32	R	
+16, 17		Current magnitude, primary units	See Generic Data in Section 3.4	U4	INT32	R	
+18, 19		Volts reference (base), primary units	See Generic Data in Section 3.4	U1	INT32	R	

Address	Point ID	Description	Options/Range	Units	Type	R/W	Notes
+20, 21		Volts magnitude, primary units	See Generic Data in Section 3.4	U1	INT32	R	
63160-63191		**Record #1**					
		...					
64152-64183		**Record #16**					

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

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

NOTES:

1. If a file is read through a TCP connection, your assignments for the transfer will be effective only within the current connection socket. Since the device cannot guarantee that your next connection will be made through the same socket, you should not make any assumptions regarding the present block settings. When you open a new connection, always check the file status and pointers before reading file records.

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

3.10 Billing/TOU Daily Profile Data Log

File Channel/ Section [1]	Record Field No. [2]	Point Label	Point ID	Description	Range	Units [3]	Type	Notes
0/0				**Energy Register #1**				
	1	REG1	0x1780	Summary (total) energy reading	0-999,999,999	1 kWh	UINT32	
	2	TRF1	0x7000	Tariff #1 energy reading	0-999,999,999	1 kWh	UINT32	
	3	TRF2	0x7001	Tariff #2 energy reading	0-999,999,999	1 kWh	UINT32	
	4	TRF3	0x7002	Tariff #3 energy reading	0-999,999,999	1 kWh	UINT32	
	5	TRF4	0x7003	Tariff #4 energy reading	0-999,999,999	1 kWh	UINT32	
	6	TRF5	0x7004	Tariff #5 energy reading	0-999,999,999	1 kWh	UINT32	
	7	TRF6	0x7005	Tariff #6 energy reading	0-999,999,999	1 kWh	UINT32	
	8	TRF7	0x7006	Tariff #7 energy reading	0-999,999,999	1 kWh	UINT32	
	9	TRF8	0x7007	Tariff #8 energy reading	0-999,999,999	1 kWh	UINT32	
...				...				
7/7				**Energy Register #8**				
	1	REG8	0x1787	Summary (total) energy reading	0-999,999,999	1 kWh	UINT32	
	2	TRF1	0x7000	Tariff #1 energy reading	0-999,999,999	1 kWh	UINT32	
	3	TRF2	0x7001	Tariff #2 energy reading	0-999,999,999	1 kWh	UINT32	
	4	TRF3	0x7002	Tariff #3 energy reading	0-999,999,999	1 kWh	UINT32	
	5	TRF4	0x7003	Tariff #4 energy reading	0-999,999,999	1 kWh	UINT32	
	6	TRF5	0x7004	Tariff #5 energy reading	0-999,999,999	1 kWh	UINT32	
	7	TRF6	0x7005	Tariff #6 energy reading	0-999,999,999	1 kWh	UINT32	
	8	TRF7	0x7006	Tariff #7 energy reading	0-999,999,999	1 kWh	UINT32	
	9	TRF8	0x7007	Tariff #8 energy reading	0-999,999,999	1 kWh	UINT32	
16/8				**Daily Maximum Demand Register #1**				
	1	REG1 MD	0x4780	Summary (total) max. demand reading	0-Pmax	U3	UINT32	
	2	TRF1 MD	0x7100	Tariff #1 max. demand reading	0-Pmax	U3	UINT32	
	3	TRF2 MD	0x7101	Tariff #2 max. demand reading	0-Pmax	U3	UINT32	
	4	TRF3 MD	0x7102	Tariff #3 max. demand reading	0-Pmax	U3	UINT32	
	5	TRF4 MD	0x7103	Tariff #4 max. demand reading	0-Pmax	U3	UINT32	
	6	TRF5 MD	0x7104	Tariff #5 max. demand reading	0-Pmax	U3	UINT32	
	7	TRF6 MD	0x7105	Tariff #6 max. demand reading	0-Pmax	U3	UINT32	
	8	TRF7 MD	0x7106	Tariff #7 max. demand reading	0-Pmax	U3	UINT32	
	9	TRF8 MD	0x7107	Tariff #8 max. demand reading	0-Pmax	U3	UINT32	
...				...				
23/15				**Daily Maximum Demand Register #8**				
	1	REG8 MD	0x4787	Summary (total) max. demand reading	0-Pmax	U3	UINT32	
	2	TRF1 MD	0x7100	Tariff #1 max. demand reading	0-Pmax	U3	UINT32	
	3	TRF2 MD	0x7101	Tariff #2 max. demand reading	0-Pmax	U3	UINT32	
	4	TRF3 MD	0x7102	Tariff #3 max. demand reading	0-Pmax	U3	UINT32	
	5	TRF4 MD	0x7103	Tariff #4 max. demand reading	0-Pmax	U3	UINT32	

File Channel/ Section [1]	Record Field No. [2]	Point Label	Point ID	Description	Range	Units [3]	Type	Notes
	6	TRF5 MD	0x7104	Tariff #5 max. demand reading	0-Pmax	U3	UINT32	
	7	TRF6 MD	0x7105	Tariff #6 max. demand reading	0-Pmax	U3	UINT32	
	8	TRF7 MD	0x7106	Tariff #7 max. demand reading	0-Pmax	U3	UINT32	
	9	TRF8 MD	0x7107	Tariff #8 max. demand reading	0-Pmax	U3	UINT32	

[1] 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.

[2] The number of parameters in a section is automatically configured depending on the number of actually used tariffs selected in the TOU Daily Profiles.

[3] For power scale and units, refer to Section 4 ″Data Scales and Units″.

4 Data Scales and Units

Code	Condition	Value/Range	Notes
Data Scales			
Vmax		Voltage scale × PT Ratio, V	2
Imax		Current scale (2A/10A) × CT Ratio = CT Primary current × 2, A	1, 3
Pmax	Wiring 4LN3, 3LN3, 3BLN3	Vmax × Imax × 3, W	4
	Wiring 4LL3, 3LL3, 3BLL3, 3OP2, 3OP3, 3DIR2	Vmax × Imax × 2, W	
Fmax	Nominal frequency 50 or 60 Hz	100 Hz	
AImin AImax	+/-1mA	AImin = -AI full scale × 2 AImax = AI full scale × 2	
	0-20mA	AImin = AI zero scale AImax = AI full scale	
	4-20mA	AImin = AI zero scale AImax = AI full scale	
	0-1mA	AImin = AI zero scale AImax = AI full scale	
Data Units			
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	

[1] CT Ratio = CT primary current/CT secondary current

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

[3] The default Current scale is 2 × CT secondary current (2 × 1A or 2 × 5A depending on the order).

[4] 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.

5 Data Formats

Format Code	Value	Description	Notes
Timestamp			
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.	
File ID			
F2	0	Event log	
	1-16	Data log #1-16	
	17-18	Waveform log #1-2	
	26	Power quality (PQ) log	
	27	Fault event log	V24.3.1 and higher
	128	Real time waveform capture	
File Attributes			
F3	Bit 0 = 0	Non-wrap file (stop when full)	
	Bit 0 = 1	Wrap-around (circular) file	
	Bit 1 = 1	Fixed (non-changeable) file attributes	
	Bits 4:6 =	Multi-section data log file attributes:	
	0	Regular file	
	2	TOU daily profile log	Multi-section file
File Status Word (bitmap)			
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)	
File Record Status Word (bitmap)			
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)	
Billing/TOU Profile Log Channel ID			
F6	0-7	Billing/TOU energy/usage registers #1-#8	
	16-23	Billing/TOU maximum demand registers #1-#8	
Waveform Log Channel ID			
F7	0	V1/V12	Note 1
	1	V2/V23	Note 1
	2	V3/V31	Note 1
	4	I1	
	5	I2	
	6	I3	
Profile Log Sections Mask			
F8	Bit 0:7 = 1	Billing/TOU energy/usage registers #1-#8	
	Bit 16:23 = 1	Billing/TOU maximum demand registers #1-#8	
Waveform Log Channel Mask			
F9	Bit 0 = 1	Channel V1/V12	Note 1
	Bit 1 = 1	Channel V2/V23	
	Bit 2 = 1	Channel V3/V31	
	Bit 3 = 1	N/A	
	Bit 4 = 1	Channel I1	
	Bit 5 = 1	Channel I2	
	Bit 6 = 1	Channel I3	
TOU Tariff Change Time			
F10	Bits 8:15 = 0-7	Tariff number #1-#8	
	Bits 2:7 = 0-23	Tariff start hour	
	Bits 0:1 = 0-3	Tariff start quarter of an hour	

Format Code	Value	Description	Notes
Billing/TOU Energy Register Source ID			
F11	0x0000	None	
	0x0700-0x0703	Pulse input DI1-DI4	
	0x1700	kWh import	
	0x1701	kWh export	
	0x1704	kvarh import	
	0x1705	kvarh export	
	0x1708	kVAh total	
Setpoint Trigger Parameters ID			
F12	0x0000	None (condition is not active)	
		Setpoint Status	
	0x0080	Setpoint #1 ON	
	0x0081	Setpoint #2 ON	
	0x0082	Setpoint #3 ON	
	0x0083	Setpoint #4 ON	
	0x0084	Setpoint #5 ON	
	0x0085	Setpoint #6 ON	
	0x0086	Setpoint #7 ON	
	0x0087	Setpoint #8 ON	
	0x0088	Setpoint #9 ON	
	0x0089	Setpoint #10 ON	
	0x008A	Setpoint #11 ON	
	0x008B	Setpoint #12 ON	
	0x008C	Setpoint #13 ON	
	0x008D	Setpoint #14 ON	
	0x008E	Setpoint #15 ON	
	0x008F	Setpoint #16 ON	
		Event Flags	
	0x0300	Event flag #1 ON	
	0x0301	Event flag #2 ON	
	0x0302	Event flag #3 ON	
	0x0303	Event flag #4 ON	
	0x0304	Event flag #5 ON	
	0x0305	Event flag #6 ON	
	0x0306	Event flag #7 ON	
	0x0307	Event flag #8 ON	
	0x8300	Event flag #1 OFF	
	0x8301	Event flag #2 OFF	
	0x8302	Event flag #3 OFF	
	0x8303	Event flag #4 OFF	
	0x8304	Event flag #5 OFF	
	0x8305	Event flag #6 OFF	
	0x8306	Event flag #7 OFF	
	0x8307	Event flag #8 OFF	
		Internal Events	
	0x0400	kWh import pulse	
	0x0401	kWh export pulse	
	0x0403	kvarh import pulse	
	0x0404	kvarh export pulse	
	0x0405	kvarh total pulse	
	0x0406	kVAh total pulse	
	0x0407	Start new demand interval	
	0x0408	Start new tariff interval	
	0x0409	Start new volt/ampere demand interval	
	0x040A	Start new sliding window demand interval	
		Timers	
	0x0500	Timer #1	
	0x0501	Timer #2	
		Status Inputs	
	0x0600	Status input #1 ON	
	0x0601	Status input #2 ON	
	0x0602	Status input #3 ON	
	0x0603	Status input #4 ON	
	0x8600	Status input #1 OFF	
	0x8601	Status input #2 OFF	
	0x8602	Status input #3 OFF	

Format Code	Value	Description	Notes
	0x8603	Status input #4 OFF	
	Pulse Inputs		
	0x0700	Pulse input #1	
	0x0701	Pulse input #2	
	0x0702	Pulse input #3	
	0x0703	Pulse input #4	
	Relays		
	0x0800	Relay #1 ON	
	0x0801	Relay #2 ON	
	0x0802	Relay #3 ON	
	0x0803	Relay #4 ON	
	0x8800	Relay #1 OFF	
	0x8801	Relay #2 OFF	
	0x8802	Relay #3 OFF	
	0x8803	Relay #4 OFF	
	Static Events		
	0x8901	Positive phase rotation reversal	[3]
	0x8902	Negative phase rotation reversal	[3]
	0x0903	IEEE 1159 PQ event	
	Pulse Counters		
	0x0A00	High pulse counter #1	
	0x0A01	High pulse counter #2	
	0x0A02	High pulse counter #3	
	0x0A03	High pulse counter #4	
	Time and Date Parameters		
	0x0B02	Day of week	
	0x0B03	Year	
	0x0B04	Month	
	0x0B05	Day of month	
	0x0B06	Hour	
	0x0B07	Minutes	
	0x0B08	Seconds	
	0x0B09	Minute interval (1,2,3,4,5,10,15,20,30,60 min)	
	1-Cycle Phase Values		
	0x0C03	High I1 current	
	0x0C04	High I2 current	
	0x0C05	High I3 current	
	0x8C03	Low I1 current	
	0x8C04	Low I2 current	
	0x8C05	Low I3 current	
	1-Cycle Values on any Phase		
	0x0E00	High voltage	[1]
	0x8D00	Low voltage	[1]
	0x0E01	High current	
	0x8D01	Low current	
	0x0E07	High voltage THD	[1]
	0x0E08	High current THD	[1]
	0x0E09	High K-Factor	
	0x0E0A	High current TDD	
	1-Cycle Auxiliary Values		
	0x1001	High neutral current	
	0x1002	High frequency	
	0x9002	Low frequency	
	0x1003	High voltage unbalance	[1]
	0x1004	High current unbalance	
	1-Sec Phase Values		
	0x1103	High I1 current	
	0x1104	High I2 current	
	0x1105	High I3 current	
	0x9103	Low I1 current	
	0x9104	Low I2 current	
	0x9105	Low I3 current	
	1-Sec Values on any Phase		
	0x1300	High voltage	[1]
	0x9200	Low voltage	[1]
	0x1301	High current	
	0x9201	Low current	

Format Code	Value		Description	Notes
			1-Sec Total Values	
	0x1406		High total kW import	
	0x1407		High total kW export	
	0x1408		High total kvar import	
	0x1409		High total kvar export	
	0x1402		High total kVA	
	0x9404		Low total PF Lag	
	0x9405		Low total PF Lead	
			1-Sec Auxiliary Values	
	0x1501		High neutral current	
	0x1502		High frequency	
	0x9502		Low frequency	
	0x1503		High voltage unbalance	[1]
	0x1504		High current unbalance	
			Present Demands	
	0x1600		High V1/V12 Volt demand	[1]
	0x1601		High V2/V23 Volt demand	[1]
	0x1602		High V3/V31 Volt demand	[1]
	0x1603		High I1 Ampere demand	
	0x1604		High I2 Ampere demand	
	0x1605		High I3 Ampere demand	
	0x1606		High block kW import demand	
	0x1607		High block kvar import demand	
	0x1608		High block kVA demand	
	0x1609		High sliding window kW import demand	
	0x160A		High sliding window kvar import demand	
	0x160B		High sliding window kVA demand	
	0x160F		High accumulated kW import demand	
	0x1610		High accumulated kvar import demand	
	0x1611		High accumulated kVA demand	
	0x1612		High predicted kW import demand	
	0x1613		High predicted kvar import demand	
	0x1614		High predicted kVA demand	
	0x1616		High block kW export demand	
	0x1617		High block kvar export demand	
	0x1618		High sliding window kW export demand	
	0x1619		High sliding window kvar export demand	
	0x161A		High accumulated kW export demand	
	0x161B		High accumulated kvar export demand	
	0x161C		High predicted kW export demand	
	0x161D		High predicted kvar export demand	
Setpoint Action ID				
F14	**Action type**	**Target**		
	0x00	0x00	No action	
	0x20	0x00	Set Event flag #1	
	0x20	0x01	Set Event flag #2	
	0x20	0x02	Set Event flag #3	
	0x20	0x03	Set Event flag #4	
	0x21	0x00	Clear Event flag #1	
	0x21	0x01	Clear Event flag #2	
	0x21	0x02	Clear Event flag #3	
	0x21	0x03	Clear Event flag #4	
	0x30	0x00	Operate Relay #1	
	0x30	0x01	Operate Relay #2	
	0x30	0x02	Operate Relay #3	
	0x30	0x03	Operate Relay #4	
	0x31	0x00	Release latched Relay #1	
	0x31	0x01	Release latched Relay #2	
	0x31	0x02	Release latched Relay #3	
	0x31	0x03	Release latched Relay #4	
	0x40	0x00	Increment counter #1	
	0x40	0x01	Increment counter #2	
	0x40	0x02	Increment counter #3	
	0x40	0x03	Increment counter #4	
	0x41	0x00	Clear counter #1	
	0x41	0x01	Clear counter #2	
	0x41	0x02	Clear counter #3	

Format Code	Value		Description	Notes
	0x41	0x03	Clear counter #4	
	0x64	0x00	Clear all counters	
	0x51	0x00	Send event notification	
	0x60	0x00	Reset total energy	
	0x61	0x00	Reset all total maximum demands	
	0x61	0x01	Reset power maximum demands	
	0x61	0x02	Reset volt/ampere/harmonic maximum demands	
	0x62	0x00	Reset TOU energy	
	0x63	0x00	Reset TOU maximum demands	
	0x65	0x00	Clear Min/Max registers	
	0x70	0x00	Event log	
	0x71	0x00	Data log #1	
	0x71	0x01	Data log #2	
	0x71	0x02	Data log #3	
	0x71	0x03	Data log #4	
	0x71	0x04	Data log #5	
	0x71	0x05	Data log #6	
	0x71	0x06	Data log #7	
	0x71	0x07	Data log #8	
	0x71	0x0A	Data log #11	
	0x71	0x0B	Data log #12	
	0x71	0x0C	Data log #13	
	0x71	0x0D	Data log #14	
	0x71	0x0E	Data log #15	
	0x71	0x0F	Data log #16	
	0x72	0x00	Waveform log #1	
	0x73	0x00	Waveform log #2	
Counter Source ID				
F16	0x0000		None	
	0x0001-0x0004		Pulse input DI1-DI4	
Relay Output Pulse Source ID				
F17	0x0000		None	
	0x0400		kWh import pulse	
	0x0401		kWh export pulse	
	0x0403		kvarh import pulse	
	0x0404		kvarh export pulse	
	0x0405		kvarh total pulse	
	0x0406		kVAh pulse	
AO Output Parameters ID				
F18	0x0000		None (output disabled)	Note 2
			1-Cycle Phase Values	
	0x0C00		V1/V12 Voltage	[1]
	0x0C01		V2/V23 Voltage	[1]
	0x0C02		V3/V31 Voltage	[1]
	0x0C03		I1 Current	
	0x0C04		I2 Current	
	0x0C05		I3 Current	
	0x0C1E		V12 Voltage	
	0x0C1F		V23 Voltage	
	0x0C20		V31 Voltage	
			1-Cycle Total Values	
	0x0F00		Total kW	
	0x0F01		Total kvar	
	0x0F02		Total kVA	
	0x0F03		Total PF	
	0x0F04		Total PF Lag	
	0x0F05		Total PF Lead	
	0x0F0A		3-phase average L-N/L-L voltage	[1]
	0x0F0B		3-phase average L-L voltage	
	0x0F0C		3-phase average current	
			1-Cycle Auxiliary Values	
	0x1001		In Current	
	0x1002		Frequency	
			1-Sec Phase Values	
	0x1100		V1/V12 Voltage	
	0x1101		V2/V23 Voltage	
	0x1102		V3/V31 Voltage	

Format Code	Value	Description	Notes
	0x1103	I1 Current	
	0x1104	I2 Current	
	0x1105	I3 Current	
	0x111E	V12 Voltage	
	0x111F	V23 Voltage	
	0x1120	V31 Voltage	
		1-Sec Total Values	
	0x1400	Total kW	
	0x1401	Total kvar	
	0x1402	Total kVA	
	0x1403	Total PF	
	0x1404	Total PF Lag	
	0x1405	Total PF Lead	
	0x140A	3-phase average L-N/L-L voltage	[1]
	0x140B	3-phase average L-L voltage	
	0x140C	3-phase average current	
		1-Sec Auxiliary Values	
	0x1501	In Current	
	0x1502	Frequency	
		Present Demands	
	0x160F	Accumulated kW import demand	
	0x1610	Accumulated kvar import demand	
	0x1611	Accumulated kVA demand	
	0x161A	Accumulated kW export demand	
	0x161B	Accumulated kvar export demand	
Event Cause/Point ID			
F19		**Setpoint Operation Events**	
	0x0000-0x59FF	Trigger parameter ID	
	0x6400-0xFFFF	Trigger parameter ID	
		Setpoint Action Events	
	0x5A00-0x5A0F	Setpoint #1-#16	
		Communications Events	
	0x5B00-0x5BFF	Data point ID (low byte, see F21)	
		Front Panel Operations	
	0x5C00-0x5CFF	Data point ID (low byte, see F21)	
		Self-Check Diagnostics Events	
	0x5D00-0x5DFF	Data point ID (low byte, see F21)	
		Self-Update Events	
	0x5E08	RTC DST/Standard time update	
		Hardware Diagnostics Events	
	0x6202	RAM/Data error	
	0x6203	Hardware watchdog reset	
	0x6204	Sampling fault	
	0x6205	CPU exception	
	0x6206	Reserved	
	0x6207	Software watchdog reset	
	0x620D	Low battery	
	0x620F	EEPROM fault	
		External Events	
	0x6300	Power down	
	0x6308	Power up	
	0x6309	External reset	
Event Effect ID			
F20		**Communications/Self-check/Front Panel Events**	
	0x0000	None	
	0x6000	Total energy registers cleared	
	0x6100	All total maximum demands cleared	
	0x6101	Power maximum demands cleared	
	0x6102	Volt/Ampere/Harmonic maximum demands cleared	
	0x6200	Billing/TOU energy registers cleared	
	0x6300	Billing/TOU maximum demand registers cleared	
	0x6400	All counters cleared	
	0x6401-0x6403	Counter cleared (low byte = counter ID)	
	0x6500	Min/Max log cleared	
	0x6A00-0x6A1A	Log file cleared (low byte = File ID)	
	0xF100-0xF10F	Setpoint cleared (low byte = setpoint ID)	
	0xF200	Setup/Data cleared	

Format Code	Value	Description	Notes
	0xF300	Setup reset (set by default)	
	0xF400	Setup changed	
	0xF500	RTC set	
		Setpoint Operation Events	
	0xE100-0xE10F	Setpoint operated (low byte = setpoint ID)	
	0xE200-0xE20F	Setpoint released (low byte = setpoint ID)	
		Setpoint Action Events	
	See F14	Setpoint action ID	
Data Point ID			
F21		**Data Locations**	
	0x03	Data memory	
	0x04	Factory setup	
	0x05	Access/Password setup	
	0x06	Basic setup	
	0x07	Communications setup	
	0x08	Real-time clock	
	0x09	Digital inputs setup	
	0x0A	Pulse counters setup	
	0x0B	AO setup	
	0x0E	Timers setup	
	0x10	Event/alarm setpoints	
	0x11	Pulsing setup	
	0x12	User assignable register map	
	0x13	Programmable Min/Max log setup	
	0x14	Data log setup	
	0x15	File/Memory setup	
	0x16	TOU energy registers setup	
	0x18	TOU daily profiles	
	0x19	TOU calendar	
	0x1B	RO Setup	
	0x1C	User selectable options	
	0x1F	DNP 3.0 class 0 map	
	0x20	DNP 3.0 options setup	
	0x21	DNP 3.0 events setup	
	0x22	DNP 3.0 event setpoints	
	0x23	Calibration registers	
	0x24	Date/Time Setup	
	0x25	Net setup	
	0x26	AI setup	
	0x27	Waveform log setup	
	0x28	PQ log setup	
	0x29	Fault log setup	
	0x2B-0x3F	Reserved	
Event Type ID			
F22		**Setpoint Events**	
	0x0000	SP: Generic setpoint event	
	0x0001-0x0010	SP1-SP16: Setpoint #1-#16 event	
		PQ Events (IEEE 1159)	
	0x0100	PQE: Generic PQ event	
	0x0102	PQE11: Impulsive transients	
	0x010C	PQE211: Sag, instantaneous	
	0x010D	PQE212: Swell, instantaneous	
	0x010F	PQE221: Interruption, momentary	
	0x0110	PQE222: Sag, momentary	
	0x0111	PQE223: Swell, momentary	
	0x0113	PQE231: Interruption, temporary	
	0x0114	PQE232: Sag, temporary	
	0x0115	PQE233: Swell, temporary	
	0x0117	PQE31: Interruption, sustained	
	0x0118	PQE32: Undervoltage	
	0x0119	PQE33: Overvoltage	
	0x011A	PQE4: Voltage imbalance	
	0x011D	PQE52: Harmonics	
	0x011E	PQE53: Interharmonics	
	0x0121	PQE6: Voltage fluctuations (flicker)	
	0x0122	PQE7: Frequency variation	
		Fault Events	V24.3.1 and higher

Format Code	Value	Description	Notes
	0x0200	FE: Generic fault event	
	0x0201	FE1: Zero-sequence current	
	0x0202	FE2: Zero-sequence voltage	
	0x0203	FE3: Current unbalance	
	0x0204	FE4: Voltage unbalance	
	0x0205	FE5: Overcurrent	
	0x0206	FE6: Undervoltage	
	0x0207	FE7: Neutral current	
Device Diagnostics			
F23	Bit 0	Reserved	
	Bit 1	Reserved	
	Bit 2 = 1	RAM/Data error	
	Bit 3 = 1	CPU watchdog reset	
	Bit 4 = 1	Sampling fault	
	Bit 5 = 1	CPU exception	
	Bit 6	Reserved	
	Bit 7 = 1	Software watchdog reset	
	Bit 8 = 1	Power down	
	Bit 9 = 1	Device reset	
	Bit 10 = 1	Configuration reset	
	Bit 11 = 1	RTC fault	
	Bit 12	Reserved	
	Bit 13 = 1	Low battery	
	Bit 14	Reserved	
	Bit 15 = 1	EEPROM fault	
DNP Object Types			
F24		**Static Binary Input Objects**	
	0	Single-Bit Binary Input	
	1	Binary Input With Status	
		Binary Input Change Event Objects	
	0	Binary Input Change Without Time	
	1	Binary Input Change With Time	
		Static Binary Counters	
	0	32-bit Binary Counter	
	1	32-bit Binary Counter Without Flag	
	2	16-bit Binary Counter	
	3	16-bit Binary Counter Without Flag	
		Binary Counter Change Events	
	0	32-bit Counter Change Event Without Time	
	1	32-bit Counter Change Event With Time	
	2	16-bit Counter Change Event Without Time	
	3	16-bit Counter Change Event With Time	
		Frozen Binary Counters	
	0	32-bit Frozen Counter	
	1	32-bit Frozen Counter Without Flag	
	2	32-bit Frozen Counter With Time of Freeze	
	3	16-bit Frozen Counter	
	4	16-bit Frozen Counter Without Flag	
	5	16-bit Frozen Counter With Time of Freeze	
		Static Analog Input Objects	
	0	32-bit Analog Input	
	1	32-bit Analog Input Without Flag	
	2	16-bit Analog Input	
	3	16-bit Analog Input Without Flag	
		Analog Input Change Events	
	0	32-bit Analog Change Event Without Time	
	1	32-bit Analog Change Event With Time	
	2	16-bit Analog Change Event Without Time	
	3	16-bit Analog Change Event With Time	
DNP Class 0 Objects			
F25	0x1E01	Analog Input 30:01	
	0x1E02	Analog Input 30:02	
	0x1E03	Analog Input 30:03	
	0x1E04	Analog Input 30:04	
	0x2801	Analog Output 40:01	
	0x2802	Analog Output 40:02	
	0x0101	Binary Input 01:01	

Format Code	Value		Description	Notes
	0x0102		Binary Input 01:02	
	0x1401		Binary Counter 20:01	
	0x1402		Binary Counter 20:02	
	0x1405		Binary Counter 20:05	
	0x1406		Binary Counter 20:06	
	0x1501		Frozen Counter 21:01	
	0x1502		Frozen Counter 21:02	
	0x1505		Frozen Counter 21:05	
	0x1506		Frozen Counter 21:06	
	0x1509		Frozen Counter 21:09	
	0x150A		Frozen Counter 21:10	
Wiring Mode				
F26	0		3OP2 - 3-wire open delta using 2 CTs (2 element)	
	1		4LN3 - 4-wire WYE using 3 PTs (3 element), line-to-neutral voltage readings	
	2		3DIR2 - 3-wire direct connection using 2 CTs (2 element)	
	3		4LL3 - 4-wire WYE using 3 PTs (3 element), line-to-line voltage readings	
	4		3OP3 - 3-wire open delta using 3 CTs (2 1/2 element)	
	5		3LN3 - 4-wire WYE using 2 PTs (2 1/2 element), line-to-neutral voltage readings	
	6		3LL3 - 4-wire WYE using 2 PTs (2 1/2 element), line-to-line voltage readings	
	8		3BLN3 - 3-wire broken delta using 2 PTs (2 1/2 element), line-to-neutral voltage readings	
	9		3BLL3 - 3-wire broken delta using 2 PTs (2 1/2 element), line-to-line voltage readings	
Instrument Options				
F28	Bit 0=1		120V Option	
	Bit 1=1		690V Option	
	Bits 2-5		Reserved	
	Bit 6=1		Analog output 0/4 or 4/20mA	
	Bit 7=1		Analog output 0-1mA	
	Bit 8=1		Analog output ±1mA	
	Bit 9=1		RO option	
	Bit 10=1		DI option	
	Bit 11		Reserved	
	Bit 12=1		Setup is secured by a password (authorization required)	
	Bit 13		Reserved	
	Bit 14=1		Analog expander option ±1mA	
	Bit 15		Reserved	
	Bits 16-18		Number of RO - 1	
	Bits 19-22		Number of DI – 1	
	Bits 23-24		Number of AO - 1	
	Bits 25-29		Reserved	
	Bits 30-31=11		Memory module 1MBytes	
I/O Slot Types				
F29	DI	DRY	00000000B	× = Don't care
	RO		00100000B	
	AI	±1 mA	01010000B	
	AI	0-20 mA	01010001B	
	AI	4-20 mA	01010010B	
	AI	0-1 mA	01010011B	
	AO	±1 mA	01100000B	
	AO	0-20 mA	01100001B	
	AO	4-20 mA	01100010B	
	AO	0-1 mA	01100011B	
	Empty slot		1111××××B	

NOTES:

[1] **Voltage**

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

[2] **Analog Outputs**

1) For bi-directional analog output (±1 mA), the zero scale setup corresponds to the center (0 mA) of the scale range, and the direction of the current matches the sign of the output parameter. Unsigned parameters are output within the current range 0 to +1 mA and can be scaled as in the case of single-ended analog output (0-1 mA).

For signed values, such as powers and signed power factor, the scale is always symmetrical with regard to 0 mA, and the full scale corresponds to +1 mA output for positive readings and to -1 mA output for negative readings. The zero scale (0 mA output) is permanently set in the instrument to zero for all parameters except the signed power factor for which it is set to 1.000 (see Note 2). In write requests, the zero scale is ignored.

2) Except for the signed power factor, the setup scale is continuous within the entire value range. For signed power factor, the setup scale is broken at +1.000 in order to provide continuous output current when the power factor changes close to ±1.000. The setup scale is symmetrical in the range of -0 to +0 with a center at 1.000 (-1.000 is assumed to be equal to +1.000). Negative power factor is output as -1.000 minus measured value, and non-negative power factor is output as +1.000 minus measured value. To set the entire range for power factor from -0 to +0, the scales would be specified as -0 to 0. Because of the fact that negative zero may not be transmitted through communications, the value of -0.001 is used to specify the scale of -0, and both +0.001 and 0.000 are used to specify the scale of +0.

[3]   **Phase Reversal Trigger**

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