



# **Series PM172 Powermeters PM172P/PM172E/PM172EH**

## **Modbus Communications Protocol**

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### **Reference Guide**

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

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

#### REVISION HISTORY

A1	May 2006	Release
A2	May 2006	F/W versions 13.1.7, 14.1.7, 15.1.8, 16.1.9 or higher Added GE EGD protocol setup Added 16-bit BC scaling option in the DNP Options setup
A3	Apr 2007	F/W versions 13.1.11, 14.1.11 or higher CT primary current extended to 20,000A.
A4	Nov 2007	PM172P/E, F/W version 13.1.16 or higher Added DST start/end hour setup. Added the current unbalance trigger. Added 16-bit and 32-bit frozen analog inputs and Time and Date object to the Class 0 point list. Added 3-min power demand interval.
A5	June 2008	PM172P/E, F/W versions 13.1.19 and later, 13.71.12 or higher. Added programmable starting current. Added instrument transformer correction.
A6	Sep 2009	F/W versions 13.2.2, 13.72.2, 14.2.2, 14.72.2 or higher. Added TCP event notification client. Added GPRS setup and communication counters.

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# 1 General

This document specifies a subset of the Modbus serial communications protocol used to transfer data between a master computer station and the PM172. The document provides the complete information necessary to develop third-party communications software capable of communication with the Series PM172 instruments. Additional information concerning communications operation, configuring the communications parameters, and communications connections is found in "Series PM172 Powermeters, Installation and Operation Manual".

## **IMPORTANT**

In 3-wire connection schemes, the unbalanced current and phase readings for power factor, active power, and reactive power will be zeros, because they have no meaning. Only the total three-phase power values will be shown.

Most of the advanced features are configured using multiple setup parameters that can be accessed in a number of contiguous registers. When writing the setup registers, it is recommended to write all the registers at once using a single request, or to clear (zero) the setup before writing into separate registers.

### **Designations used in the guide:**

- E - available in the meters with the E and EH suffixes
- EH - available in the meters with the EH suffix



## 2 Modbus Protocol Implementation

For detailed information about Modbus protocol, Modbus message framing and error checking, refer to the "Modicon Modbus Protocol Reference Guide". It can be downloaded from the [www.modbus.org](http://www.modbus.org) Website. The following paragraphs outline some issues concerning the implementation of the Modbus protocol in the PM172.

### 2.1 Transmission Modes

The PM172 can be set up to communicate on a Modbus network using RTU transmission mode. Refer to the "Series PM172 Powermeters, Installation and Operation Manual" on how to select 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.

### 2.3 Function Field

The Modbus functions implemented in the PM172 are shown in Table 2-1. Function 04 can be used in the same context as function 03.

**Table 2-1 Modbus Function Codes**

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

<sup>1</sup> The PM172 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 PM172 Modbus registers are numbered in the range of 0 to 65535. From the Modbus applications, the PM172 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 PM172 register address to the range of the Modbus holding registers, add a value of 40001 to the PM172 register address. When a register address exceeds 9999, use a 6-digit addressing scheme by adding 400001 to the PM172 register address.

## 2.6 Data Formats

The PM172 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):

$$HI\_ENG = V_{max} = 828.0 \times PT \text{ ratio} = 828.0 \times 1 = 828.0V$$

$$LO\_ENG = 0V$$

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

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

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

Voltage engineering scales (see Section 4):

$$HI\_ENG = V_{max} = 144.0 \times PT \text{ ratio} = 144 \times 120 = 17,280V$$

$$LO\_ENG = 0V$$

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

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

#### 2. Current readings

Assume device settings: CT primary current = 200A.

Current engineering scales (see Section 4):

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

$$LO\_ENG = 0A$$

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

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

### 3. Power readings

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

Active Power engineering scales (see Section 4):

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

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

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

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

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

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

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

Active Power engineering scales (see Section 4):

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

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

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

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

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

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

### 4. Power Factor readings

Power factor engineering scales (see Section 3.3):

$$\text{HI\_ENG} = 1.000.$$

$$\text{LO\_ENG} = -1.000.$$

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

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

## 2.6.2 32-bit Long Integer Format

32-bit long integer data is transmitted in two adjacent 16-bit Modbus registers as unsigned (UINT32) or signed (INT32) whole numbers.

The first register contains the low-order word (lower 16 bits) and the second register contains the high order word (higher 16 bits). The low-order word always starts at an even Modbus address. The value range for unsigned data is 0 to 4,294,967,295; for signed data the range is -2,147,483,648 to 2,147,483,647.

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

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

#### EXAMPLES

##### 1. Unsigned 32-bit Values

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

$$(13952) = 3464$$

$$(13953) = 1$$

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

## 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  $(-1 \times 65536 + 64747) = -789\text{kW}$ .

Fractional 32-bit data is transmitted using a decimal pre-multiplier to pass fractional numbers in an integer format. Fractional numbers are pre-multiplied by 10 to the power N, where N is the number of digits in the fractional part.

For example, the frequency reading of 50.01 Hz is transmitted as 5001, having been pre-multiplied by 100. Whenever a data register contains a fractional number, the register measurement unit is given with a multiplier  $\times 0.1$ ,  $\times 0.01$  or  $\times 0.001$ , showing the weight of the least significant decimal digit. To get an actual fractional number with specified precision, multiply the register value by the given multiplier. To write a fractional number into the register, divide the number by the given multiplier.

### 2.6.3 32-bit Modulo-10000 Format

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

## 2.7 User Assignable Registers

The PM172 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 PM172 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 PM172 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 PM172 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 through a particular register window related to the section.

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 #8 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 Summary/TOU register. See Section 3.10 for information on the file record structure.

The number of sections is taken automatically from the Summary/TOU Registers setup. Since each Summary/TOU energy register has a shadow maximum demand register, the number of sections in the file can be twice the number of the allocated Summary/TOU registers. Always configure the Summary/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 that are recorded to the file through the Data log #8 setup. It is preset automatically by the meter and shows the recorded data 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 6 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 PM172 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 blocks of registers separate for each file and file section. File transfer control registers allow changing the file or section position in order to point to the desired record.

The information service uses separate status/control registers for each file. The extended file information is available including current file pointers' positions, the number of records in the file, allocated file size, 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 request fills the corresponding register 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 writing the desired sequence number into the file transfer control register. If you want to read a file from the beginning, you can simply write a corresponding command to the file command

register 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 a sequence after you have uploaded the current record. Instead, continue reading the file through the file transfer block.

For the event log files, the file transfer block can contain up to 12 records that can be read at once: the file position automatically moves to the record following the last one you have just read in the file transfer block.

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 1 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 read 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, check bit 0 in the record status word. Bit 0 is set to 1 only once when you read the last record of the file.

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

1. If you want to begin reading a file from a particular record or from the first record, either set the file position to the desired record sequence number, or preset the file position to point to oldest record.
2. Read the record data through the corresponding file transfer block. The file pointer will be automatically moved to the next file record.
3. Repeat steps 1-2 until all the file records are read, i.e., until either bit 0 or bit 1 is set in the record status word.

### **Reading a Profile Log File**

Reading a multi-section profile log file does not differ from reading ordinal files with the only exception that each file section is accessed through a separate transfer block.

If you want to know which registers are recorded to the file sections before reading them, check the daily profile log sections map through registers 3504-3505 (see Section 3.9, File Transfer Registers). This is a bitmap that contains one in a bit position if a designated register is recorded to the file, and contains zero if it is not.

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

1. If you want to begin reading a file section from a particular record or from the first record, either set the file section position to the desired record sequence number, or preset the file section position to point to oldest record.
2. Read the record data through the corresponding file section transfer block. The file pointer automatically moves to the next file record.
3. Repeat steps 1-2 until all the file section records are read, i.e., until either bit 0 or bit 1 is set in the record status word.

### **Reading Waveform Files**

Each waveform record consists of 6 channel records that are read in sequence always starting with channel V1. Each channel's data is read in two stages. The channel header record is read first through a separate transfer block followed by reading the channel sample series. When the channel V1 header is first accessed, the meter stores the waveform records for all channels together into a communication buffer so you can then read them through the dedicated transfer blocks without the risk of losing data. The following gives a summary of steps for a waveform file:

1. If you want to begin reading a file from a particular record or from the first record, either set the file position to the desired record sequence number, or preset the file position to point to oldest record.

2. Read the V1 channel header data through the corresponding waveform header transfer block. The record data is moved to the port's communication buffer, and then the file pointer automatically moves to the next record.
3. Read the V1 channel sample series through the waveform series transfer block.
4. Read the next channel's header data through the corresponding waveform header transfer block.
5. Read the sample series for the selected channel through the waveform series transfer block.
6. Repeat steps 4, 5 until all channels' records are read.
7. Repeat steps 2-6 until all the file records are read.

### Reading Real-time Waveforms

Real-time waveforms are accessed through the separate transfer blocks just like the waveform log data. The meter provides a large waveform buffer that can simultaneously store 6 waveform records – three voltage and three current waveforms. Each time you read the V1 channel header record, the meter captures new waveforms to the buffer so that you can then read all of them through the waveform transfer blocks. The following gives a summary of steps for reading real-time waveforms:

1. Read the V1 channel header data through the corresponding real-time waveform header transfer block. The captured waveform's data is moved to the port's communication buffer.
2. Read the V1 channel sample series through the waveform series transfer block.
3. Read the next channel's header data through the corresponding waveform header transfer block.
4. Read the sample series for the selected channel through the waveform series transfer block.
5. Repeat steps 3, 4 until all channels' records are read.

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

Modbus Register	Description	Type	Comment
+0-1	Device serial number	UINT32	
+2-4	Device MAC address	CHAR6	
+5	Device address	UINT16	Device port address
+6-7	Device IP address	UINT32	Network byte order
+8	Event type	UINT16	See F22 in Section 5
+9	Event sequence number	UINT16	
+10-11	Event timestamp, seconds	UINT32	Local time since Jan 1, 1970
+12-13	Event timestamp, seconds fraction, in microseconds	UINT32	
+14-15	Reserved	UINT32	Written as 0

After receiving a write acknowledgement from a server, a TCP connection is still open for 10 seconds (20 seconds via GPRS) to give the server an opportunity to access meter registers through an open socket. It may help you access the meter from outside your local network when the server is located on another network, or when using wireless GPRS communications. The notification client will respond to all server requests as if it were a regular incoming connection.



If the server does not close a connection, it will be closed in 20 seconds if there is no activity on the socket. In the event a connection attempt was unsuccessful, the notification client retries two more times before announcing a connection failure.

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

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

# 3 Modbus Register Map

## 3.1 Modbus Setup Registers

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

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

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

Address	Point ID	Description	Low and High Scales <sup>2</sup>	Units <sup>2</sup>	Type	R/W	Notes
+39	0x1112	V1/V12 Voltage THD	0-999.9	0.1%	UINT16	R	<sup>1</sup> 3-sec value
+40	0x1113	V2/V23 Voltage THD	0-999.9	0.1%	UINT16	R	<sup>1</sup> 3-sec value
+41	0x1114	V3/V31 Voltage THD	0-999.9	0.1%	UINT16	R	<sup>1</sup> 3-sec value
+42	0x1115	I1 Current THD	0-999.9	0.1%	UINT16	R	3-sec value
+43	0x1116	I2 Current THD	0-999.9	0.1%	UINT16	R	3-sec value
+44	0x1117	I3 Current THD	0-999.9	0.1%	UINT16	R	3-sec value
+45		kVAh (low)	0-9999	1kVAh	UINT16	R	<sup>5</sup>
+46		kVAh (high)	0-9999	10MVAh	UINT16	R	<sup>5</sup>
+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-sec value
+51	0x111C	I2 Current TDD	0-100.0	0.1%	UINT16	R	3-sec value
+52	0x111D	I3 Current TDD	0-100.0	0.1%	UINT16	R	3-sec value

**NOTES:**

Energy and Power demand readings are only available in the meters with suffixes E and EH.

<sup>1</sup> Voltage and Voltage Harmonics Readings:

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.

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

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

<sup>3</sup> Positive readings of kvarh net

<sup>4</sup> Negative readings of kvarh net

<sup>5</sup> If you use these energy registers instead of 32-bit registers, limit the energy roll value to 8 digits (see Device Options Setup) to avoid overflow.

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

Address	Point ID	Description	Low and High Scales <sup>2</sup>	Units <sup>2</sup>	Type	R/W	Notes
6656	0x0000	None	0		UINT16	R	
6696-6697		<b>Special Inputs</b>					
+0	0x0100	Voltage disturbance <sup>EH</sup>	0-100	%	UINT16	R	
+1	0x0101	Phase rotation order	0=error, 1=positive (ABC), 2=negative (CBA)		UINT16	R	
6776	0x0300	<b>Event Flags (bitmap)<sup>EH</sup></b>	0x0000-0x00FF		UINT16	R	
6896	0x0600	<b>Digital Inputs (bitmap)</b>	0x0000-0x0003		UINT16	R	
6976	0x0800	<b>Relay Outputs (bitmap)</b>	0x0000-0x0003		UINT16	R	
7056-7063		<b>Counters</b>					
+0,1	0x0A00	Counter #1	0-999,999		UINT32	R/W	
+2,3	0x0A01	Counter #2	0-999,999		UINT32	R/W	
+4,5	0x0A02	Counter #3	0-999,999		UINT32	R/W	
+6,7	0x0A03	Counter #4	0-999,999		UINT32	R/W	
7136-7168		<b>1-Cycle Phase Values</b>					
+0	0x0C00	V1/V12 Voltage	0-Vmax	U1	UINT16	R	<sup>1</sup>
+1	0x0C01	V2/V23 Voltage	0-Vmax	U1	UINT16	R	<sup>1</sup>
+2	0x0C02	V3/V31 Voltage	0-Vmax	U1	UINT16	R	<sup>1</sup>
+3	0x0C03	I1 Current	0-Imax	U2	UINT16	R	
+4	0x0C04	I2 Current	0-Imax	U2	UINT16	R	
+5	0x0C05	I3 Current	0-Imax	U2	UINT16	R	
+6	0x0C06	kW L1	-Pmax-Pmax	U3	INT16	R	
+7	0x0C07	kW L2	-Pmax-Pmax	U3	INT16	R	
+8	0x0C08	kW L3	-Pmax-Pmax	U3	INT16	R	
+9	0x0C09	kvar L1	-Pmax-Pmax	U3	INT16	R	
+10	0x0C0A	kvar L2	-Pmax-Pmax	U3	INT16	R	
+11	0x0C0B	kvar L3	-Pmax-Pmax	U3	INT16	R	
+12	0x0C0C	kVA L1	0-Pmax	U3	UINT16	R	
+13	0x0C0D	kVA L2	0-Pmax	U3	UINT16	R	
+14	0x0C0E	kVA L3	0-Pmax	U3	UINT16	R	
+15	0x0C0F	Power factor L1	-1.000-1.000	0.001	INT16	R	
+16	0x0C10	Power factor L2	-1.000-1.000	0.001	INT16	R	
+17	0x0C11	Power factor L3	-1.000-1.000	0.001	INT16	R	
+18	0x0C12	V1/V12 Voltage THD	0-999.9	0.1%	UINT16	R	<sup>1</sup> 4-cycle value
+19	0x0C13	V2/V23 Voltage THD	0-999.9	0.1%	UINT16	R	<sup>1</sup> 4-cycle value
+20	0x0C14	V3/V31 Voltage THD	0-999.9	0.1%	UINT16	R	<sup>1</sup> 4-cycle value
+21	0x0C15	I1 Current THD	0-999.9	0.1%	UINT16	R	4-cycle value
+22	0x0C16	I2 Current THD	0-999.9	0.1%	UINT16	R	4-cycle value
+23	0x0C17	I3 Current THD	0-999.9	0.1%	UINT16	R	4-cycle value
+24	0x0C18	I1 K-Factor	1.0-999.9	0.1	UINT16	R	4-cycle value
+25	0x0C19	I2 K-Factor	1.0-999.9	0.1	UINT16	R	4-cycle value

Address	Point ID	Description	Low and High Scales <sup>2</sup>	Units <sup>2</sup>	Type	R/W	Notes
+26	0x0C1A	I3 K-Factor	1.0-999.9	0.1	UINT16	R	4-cycle value
+27	0x0C1B	I1 Current TDD	0-100.0	0.1%	UINT16	R	4-cycle value
+28	0x0C1C	I2 Current TDD	0-100.0	0.1%	UINT16	R	4-cycle value
+29	0x0C1D	I3 Current TDD	0-100.0	0.1%	UINT16	R	4-cycle value
+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	
7256-7359		<b>1-Cycle Total Values</b>					
+0	0x0F00	Total kW	-Pmax-Pmax	U3	INT16	R	
+1	0x0F01	Total kvar	-Pmax-Pmax	U3	INT16	R	
+2	0x0F02	Total kVA	0-Pmax	U3	UINT16	R	
+3	0x0F03	Total PF	-1.000-1.000	0.001	INT16	R	
+4	0x0F04	Total PF lag	0-1.000	0.001	UINT16	R	
+5	0x0F05	Total PF lead	0-1.000	0.001	UINT16	R	
+5	0x0F06	Total kW import	0-Pmax	U3	UINT32	R	
+7	0x0F07	Total kW export	0-Pmax	U3	UINT32	R	
+8	0x0F08	Total kvar import	0-Pmax	U3	UINT32	R	
+9	0x0F09	Total kvar export	0-Pmax	U3	UINT32	R	
+10	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	
7296-7300		<b>1-Cycle Auxiliary Values</b>					
+0	0x1000	Not used			UINT16	R	
+1	0x1001	In (neutral) Current	0-Imax	U2	UINT16	R	
+2	0x1002	Frequency	0-Fmax	0.01Hz	UINT16	R	
+3	0x1003	Voltage unbalance	0-300	%	UINT16	R	
+4	0x1004	Current unbalance	0-300	%	UINT16	R	
7316-7331		<b>Phasor</b>					
+0	0x1080	V1/V12 Voltage magnitude	0-Vmax	U1	UINT16	R	1
+1	0x1081	V2/V23 Voltage magnitude	0-Vmax	U1	UINT16	R	1
+2	0x1082	V3/V31 Voltage magnitude	0-Vmax	U1	UINT16	R	1
+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	1
+9	0x1089	V2/V23 Voltage angle	-180.0-180.0	0.1°	INT16	R	1
+10	0x108A	V3/V31 Voltage angle	-180.0-180.0	0.1°	INT16	R	1
+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	

Address	Point ID	Description	Low and High Scales <sup>2</sup>	Units <sup>2</sup>	Type	R/W	Notes
+15	0x108F	Not used			INT16	R	
7336-7368		<b>1-Second Phase Values</b>					
+0	0x1100	V1/V12 Voltage	0-Vmax	U1	UINT16	R	1
+1	0x1101	V2/V23 Voltage	0-Vmax	U1	UINT16	R	1
+2	0x1102	V3/V31 Voltage	0-Vmax	U1	UINT16	R	1
+3	0x1103	I1 Current	0-Imax	U2	UINT16	R	
+4	0x1104	I2 Current	0-Imax	U2	UINT16	R	
+5	0x1105	I3 Current	0-Imax	U2	UINT16	R	
+6	0x1106	kW L1	-Pmax-Pmax	U3	INT16	R	
+7	0x1107	kW L2	-Pmax-Pmax	U3	INT16	R	
+8	0x1108	kW L3	-Pmax-Pmax	U3	INT16	R	
+9	0x1109	kvar L1	-Pmax-Pmax	U3	INT16	R	
+10	0x110A	kvar L2	-Pmax-Pmax	U3	INT16	R	
+11	0x110B	kvar L3	-Pmax-Pmax	U3	INT16	R	
+12	0x110C	kVA L1	0-Pmax	U3	UINT16	R	
+13	0x110D	kVA L2	0-Pmax	U3	UINT16	R	
+14	0x110E	kVA L3	0-Pmax	U3	UINT16	R	
+15	0x110F	Power factor L1	-1.000-1.000	0.001	INT16	R	
+16	0x1110	Power factor L2	-1.000-1.000	0.001	INT16	R	
+17	0x1111	Power factor L3	-1.000-1.000	0.001	INT16	R	
+18	0x1112	V1/V12 Voltage THD	0-999.9	0.1%	UINT16	R	1 3-sec value
+19	0x1113	V2/V23 Voltage THD	0-999.9	0.1%	UINT16	R	1 3-sec value
+20	0x1114	V3/V31 Voltage THD	0-999.9	0.1%	UINT16	R	1 3-sec value
+21	0x1115	I1 Current THD	0-999.9	0.1%	UINT16	R	3-sec value
+22	0x1116	I2 Current THD	0-999.9	0.1%	UINT16	R	3-sec value
+23	0x1117	I3 Current THD	0-999.9	0.1%	UINT16	R	3-sec value
+24	0x1118	I1 K-Factor	1.0-999.9	0.1	UINT16	R	3-sec value
+25	0x1119	I2 K-Factor	1.0-999.9	0.1	UINT16	R	3-sec value
+26	0x111A	I3 K-Factor	1.0-999.9	0.1	UINT16	R	3-sec value
+27	0x111B	I1 Current TDD	0-100.0	0.1%	UINT16	R	3-sec value
+28	0x111C	I2 Current TDD	0-100.0	0.1%	UINT16	R	3-sec value
+29	0x111D	I3 Current TDD	0-100.0	0.1%	UINT16	R	3-sec value
+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	
7456-7459		<b>1-Second Total Values</b>					
+0	0x1400	Total kW	-Pmax-Pmax	U3	INT16	R	
+1	0x1401	Total kvar	-Pmax-Pmax	U3	INT16	R	
+2	0x1402	Total kVA	0-Pmax	U3	UINT16	R	
+3	0x1403	Total PF	-1.000-1.000	0.001	INT16	R	
+4	0x1404	Total PF lag	0-1.000	0.001	UINT16	R	
+5	0x1405	Total PF lead	0-1.000	0.001	UINT16	R	
+5	0x1406	Total kW import	0-Pmax	U3	UINT32	R	

Address	Point ID	Description	Low and High Scales <sup>2</sup>	Units <sup>2</sup>	Type	R/W	Notes
+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	
7496-7500		<b>1-Second Auxiliary Values</b>					
+0	0x1500	Not used			UINT16	R	
+1	0x1501	In (neutral) Current	0-Imax	U2	UINT16	R	
+2	0x1502	Frequency	0-Fmax	0.01Hz	UINT16	R	
+3	0x1503	Voltage unbalance	0-300	%	UINT16	R	
+4	0x1504	Current unbalance	0-300	%	UINT16	R	
7516-7527		<b>Present Harmonic Demands</b>					
+0	0x1580	V1/V12 THD demand	0-999.9	0.1%	UINT16	R	1
+1	0x1581	V2/V23 THD demand	0-999.9	0.1%	UINT16	R	1
+2	0x1582	V3/V31 THD demand	0-999.9	0.1%	UINT16	R	1
+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	
7536-7565		<b>Present Volt, Ampere and Power Demands</b>					
+0	0x1600	V1/V12 Volt demand	0-Vmax	U1	UINT16	R	1
+1	0x1601	V2/V23 Volt demand	0-Vmax	U1	UINT16	R	1
+2	0x1602	V3/V31 Volt demand	0-Vmax	U1	UINT16	R	1
+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	



Address	Point ID	Description	Low and High Scales <sup>2</sup>	Units <sup>2</sup>	Type	R/W	Notes
+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	
7576-7611		<b>Total Energies<sup>E</sup></b>					
+0,1	0x1700	kWh import	0-999,999,999	1 kWh	UINT32	R	
+2,3	0x1701	kWh export	0-999,999,999	1 kWh	UINT32	R	
+4,5		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	
+18-25		Not used			UINT32	R	
+26,27	0x170D	Harmonic kWh import <sup>EH</sup>	0-999,999,999	1 kWh	UINT32	R	
+28,29	0x170E	Harmonic kWh export <sup>EH</sup>	0-999,999,999	1 kWh	UINT32	R	
+30-33		Not used			UINT32	R	
+34,35	0x1711	Harmonic kVAh total <sup>EH</sup>	0-999,999,999	1 kVAh	UINT32	R	
7616-7633		<b>Phase Energies<sup>E</sup></b>					
+0,1	0x1800	kWh import L1	0-999,999,999	1 kWh	UINT32	R	
+2,3	0x1801	kWh import L2	0-999,999,999	1 kWh	UINT32	R	
+4,5	0x1802	kWh import L3	0-999,999,999	1 kWh	UINT32	R	
+6,7	0x1803	kvarh import L1	0-999,999,999	1 kvarh	UINT32	R	
+8,9	0x1804	kvarh import L2	0-999,999,999	1 kvarh	UINT32	R	
+10,11	0x1805	kvarh import L3	0-999,999,999	1 kvarh	UINT32	R	
+12,13	0x1806	kVAh total L1	0-999,999,999	1 kVAh	UINT32	R	
+14,15	0x1807	kVAh total L2	0-999,999,999	1 kVAh	UINT32	R	
+16,17	0x1808	kVAh total L3	0-999,999,999	1 kVAh	UINT32	R	
7656-7695		<b>V1/V12 Harmonic Distortions<sup>EH</sup></b>					1
+0	0x1900	H01 Harmonic distortion	0-100.00	0.01%	UINT16	R	
+1	0x1901	H02 Harmonic distortion	0-100.00	0.01%	UINT16	R	
		...					

Address	Point ID	Description	Low and High Scales <sup>2</sup>	Units <sup>2</sup>	Type	R/W	Notes
+39	0x1927	H40 Harmonic distortion	0-100.00	0.01%	UINT16	R	
7696-7735		<b>V2/V23 Harmonic Distortions</b> <sup>EH</sup>					1
+0	0x1A00	H01 Harmonic distortion	0-100.00	0.01%	UINT16	R	
+1	0x1A01	H02 Harmonic distortion	0-100.00	0.01%	UINT16	R	
		...					
+39	0x1A27	H40 Harmonic distortion	0-100.00	0.01%	UINT16	R	
7736-7775		<b>V3/V31 Harmonic Distortions</b> <sup>EH</sup>					1
+0	0x1B00	H01 Harmonic distortion	0-100.00	0.01%	UINT16	R	
+1	0x1B01	H02 Harmonic distortion	0-100.00	0.01%	UINT16	R	
		...					
+39	0x1B27	H40 Harmonic distortion	0-100.00	0.01%	UINT16	R	
7776-7815		<b>I1 Harmonic Distortions</b> <sup>EH</sup>					
+0	0x1C00	H01 Harmonic distortion	0-100.00	0.01%	UINT16	R	
+1	0x1C01	H02 Harmonic distortion	0-100.00	0.01%	UINT16	R	
		...					
+39	0x1C27	H40 Harmonic distortion	0-100.00	0.01%	UINT16	R	
7816-7855		<b>I2 Harmonic Distortions</b> <sup>EH</sup>					
+0	0x1D00	H01 Harmonic distortion	0-100.00	0.01%	UINT16	R	
+1	0x1D01	H02 Harmonic distortion	0-100.00	0.01%	UINT16	R	
		...					
+39	0x1D27	H40 Harmonic distortion	0-100.00	0.01%	UINT16	R	
7856-7895		<b>I3 Harmonic Distortions</b> <sup>EH</sup>					
+0	0x1E00	H01 Harmonic distortion	0-100.00	0.01%	UINT16	R	
+1	0x1E01	H02 Harmonic distortion	0-100.00	0.01%	UINT16	R	
		...					
+39	0x1E27	H40 Harmonic distortion	0-100.00	0.01%	UINT16	R	
8296-8313		<b>Fundamental (H01) Phase Values</b>					4-cycle values
+0	0x2900	V1/V12 Voltage	0-Vmax	U1	UINT16	R	1
+1	0x2901	V2/V23 Voltage	0-Vmax	U1	UINT16	R	1
+2	0x2902	V3/V31 Voltage	0-Vmax	U1	UINT16	R	1
+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	

Address	Point ID	Description	Low and High Scales <sup>2</sup>	Units <sup>2</sup>	Type	R/W	Notes
+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	
8336-8343		<b>Harmonic Total Values</b>					4-cycle values
+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	
+4	0x2A04	Total harmonic kW <sup>EH</sup>	-Pmax-Pmax	U3	INT16	R	
+5	0x2A05	Not used			INT16	R	
+6	0x2A06	Total harmonic kVA <sup>EH</sup>	0-Pmax	U3	UINT16	R	
+7	0x2A07	Not used			INT16	R	
8416-8445		<b>Minimum 1-Cycle Phase Values</b>					
+0	0x2C00	V1/V12 Voltage	0-Vmax	U1	UINT16	R	<sup>1</sup>
+1	0x2C01	V2/V23 Voltage	0-Vmax	U1	UINT16	R	<sup>1</sup>
+2	0x2C02	V3/V31 Voltage	0-Vmax	U1	UINT16	R	<sup>1</sup>
+3	0x2C03	I1 Current	0-Imax	U2	UINT16	R	
+4	0x2C04	I2 Current	0-Imax	U2	UINT16	R	
+5	0x2C05	I3 Current	0-Imax	U2	UINT16	R	
+6-17	0x2C06- 0x2C11	Not used	0		INT16	R	
+18	0x2C12	V1/V12 Voltage THD	0-9999	0.1%	UINT16	R	<sup>1</sup> 4-cycle value
+19	0x2C13	V2/V23 Voltage THD	0-9999	0.1%	UINT16	R	<sup>1</sup> 4-cycle value
+20	0x2C14	V3/V31 Voltage THD	0-999.9	0.1%	UINT16	R	<sup>1</sup> 4-cycle value
+21	0x2C15	I1 Current THD	0-999.9	0.1%	UINT16	R	4-cycle value
+22	0x2C16	I2 Current THD	0-999.9	0.1%	UINT16	R	4-cycle value
+23	0x2C17	I3 Current THD	0-999.9	0.1%	UINT16	R	4-cycle value
+24	0x2C18	I1 K-Factor	1.0-999.9	0.1	UINT16	R	4-cycle value
+25	0x2C19	I2 K-Factor	1.0-999.9	0.1	UINT16	R	4-cycle value
+26	0x2C1A	I3 K-Factor	1.0-999.9	0.1	UINT16	R	4-cycle value
+27	0x2C1B	I1 Current TDD	0-100.0	0.1%	UINT16	R	4-cycle value
+28	0x2C1C	I2 Current TDD	0-100.0	0.1%	UINT16	R	4-cycle value
+29	0x2C1D	I3 Current TDD	0-100.0	0.1%	UINT16	R	4-cycle value
8456-8459		<b>Minimum 1-Cycle Total Values</b>					
+0	0x2D00	Total kW	-Pmax-Pmax	U3	INT16	R	
+1	0x2D01	Total kvar	-Pmax-Pmax	U3	INT16	R	
+2	0x2D02	Total kVA	0-Pmax	U3	UINT16	R	
+3	0x2D03	Total PF	0-1.000	0.001	UINT16	R	Absolute value
8496-8498		<b>Minimum 1-Cycle Auxiliary Values</b>					
+0	0x2E00	Not used		U2	UINT16	R	
+1	0x2E01	In Current	0-Imax	U2	UINT16	R	
+2	0x2E02	Frequency	0-Fmax	0.01Hz	UINT16	R	

Address	Point ID	Description	Low and High Scales <sup>2</sup>	Units <sup>2</sup>	Type	R/W	Notes
8736-8765		<b>Maximum 1-Cycle Phase Values</b>					
+0	0x3400	V1/V12 Voltage	0-Vmax	U1	UINT16	R	<sup>1</sup>
+1	0x3401	V2/V23 Voltage	0-Vmax	U1	UINT16	R	<sup>1</sup>
+2	0x3402	V3/V31 Voltage	0-Vmax	U1	UINT16	R	<sup>1</sup>
+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	<sup>1</sup> 4-cycle value
+19	0x3413	V2 Voltage THD	0-999.9	0.1%	UINT16	R	<sup>1</sup> 4-cycle value
+20	0x3414	V3 Voltage THD	0-999.9	0.1%	UINT16	R	<sup>1</sup> 4-cycle value
+21	0x3415	I1 Current THD	0-999.9	0.1%	UINT16	R	4-cycle value
+22	0x3416	I2 Current THD	0-999.9	0.1%	UINT16	R	4-cycle value
+23	0x3417	I3 Current THD	0-999.9	0.1%	UINT16	R	4-cycle value
+24	0x3418	I1 K-Factor	1.0-999.9	0.1	UINT16	R	4-cycle value
+25	0x3419	I2 K-Factor	1.0-999.9	0.1	UINT16	R	4-cycle value
+26	0x341A	I3 K-Factor	1.0-999.9	0.1	UINT16	R	4-cycle value
+27	0x341B	I1 Current TDD	0-100.0	0.1%	UINT16	R	4-cycle value
+28	0x341C	I2 Current TDD	0-100.0	0.1%	UINT16	R	4-cycle value
+29	0x341D	I3 Current TDD	0-100.0	0.1%	UINT16	R	4-cycle value
8776-8779		<b>Maximum 1-Cycle Total Values</b>					
+0	0x3500	Total kW	-Pmax-Pmax	U3	INT16	R	
+1	0x3501	Total kvar	-Pmax-Pmax	U3	INT16	R	
+2	0x3502	Total kVA	0-Pmax	U3	UINT16	R	
+3	0x3503	Total PF	0-1.000	0.001	UINT16	R	Absolute value
881608818		<b>Maximum 1-Cycle Auxiliary Values</b>					
+0	0x3600	Not used		U2	UINT16	R	
+1	0x3601	In Current	0-Imax	U2	UINT16	R	
+2	0x3602	Frequency	0-Fmax	0.01Hz	UINT16	R	
8856-8872		<b>Maximum Demands</b>					
+0	0x3700	V1/V12 Maximum volt demand	0-Vmax	U1	UINT16	R	<sup>1</sup>
+1	0x3701	V2/V23 Maximum volt demand	0-Vmax	U1	UINT16	R	<sup>1</sup>
+2	0x3702	V3/V31 Maximum volt demand	0-Vmax	U1	UINT16	R	<sup>1</sup>
+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	

Address	Point ID	Description	Low and High Scales <sup>2</sup>	Units <sup>2</sup>	Type	R/W	Notes
+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		<b>Maximum Harmonic Demands</b>					
+0	0x3880	V1/V12 THD demand	0-999.9	0.1%	UINT16	R	<sup>1</sup>
+1	0x3881	V2/V23 THD demand	0-999.9	0.1%	UINT16	R	<sup>1</sup>
+2	0x3882	V3/V31 THD demand	0-999.9	0.1%	UINT16	R	<sup>1</sup>
+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	
9016-9017		<b>Scaled Analog Inputs</b>					
+0	0x3B00	Analog input AI1	AI1min-AI1Max		UINT16	R	
+1	0x3B01	Analog input AI2	AI2min-AI2Max		UINT16	R	
9036-9037		<b>Raw Analog Inputs</b>					
+0	0x3B80	Analog input AI1	0-4095		UINT16	R	
+1	0x3B81	Analog input AI2	0-4095		UINT16	R	
9056-9057		<b>TOU Parameters <sup>E</sup></b>					
+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	
9076-9077		<b>Scaled Analog Outputs</b>					
+0	0x3C80	Analog output AO1	0-4095		UINT16	R/W	
+1	0x3C81	Analog output AO2	0-4095		UINT16	R/W	
9096-9111		<b>TOU Energy Register #1 <sup>E</sup></b>					
+0,1	0x3D00	Tariff #1 register	0-999,999,999	1 kWh	UINT32	R	
+2,3	0x3D01	Tariff #2 register	0-999,999,999	1 kWh	UINT32	R	
		...				R	
+14,15	0x3D07	Tariff #8 register	0-999,999,999	1 kWh	UINT32	R	
9136-9151		<b>TOU Energy Register #2 <sup>E</sup></b>					
+0,1	0x3E00	Tariff #1 register	0-999,999,999	1 kWh	UINT32	R	
+2,3	0x3E01	Tariff #2 register	0-999,999,999	1 kWh	UINT32	R	
		...				R	

Address	Point ID	Description	Low and High Scales <sup>2</sup>	Units <sup>2</sup>	Type	R/W	Notes
+14,15	0x3E07	Tariff #8 register	0-999,999,999	1 kWh	UINT32	R	
9176-9191		<b>TOU Energy Register #3<sup>E</sup></b>					
+0,1	0x3F00	Tariff #1 register	0-999,999,999	1 kWh	UINT32	R	
+2,3	0x3F01	Tariff #2 register	0-999,999,999	1 kWh	UINT32	R	
		...				R	
+14,15	0x3F07	Tariff #8 register	0-999,999,999	1 kWh	UINT32	R	
9216-9231		<b>TOU Energy Register #4<sup>E</sup></b>					
+0,1	0x4000	Tariff #1 register	0-999,999,999	1 kWh	UINT32	R	
+2,3	0x4001	Tariff #2 register	0-999,999,999	1 kWh	UINT32	R	
		...				R	
+14,15	0x4007	Tariff #8 register	0-999,999,999	1 kWh	UINT32	R	
9256-9271		<b>TOU Energy Register #5<sup>E</sup></b>					
+0,1	0x4100	Tariff #1 register	0-999,999,999	1 kWh	UINT32	R	
+2,3	0x4101	Tariff #2 register	0-999,999,999	1 kWh	UINT32	R	
		...				R	
+14,15	0x4107	Tariff #8 register	0-999,999,999	1 kWh	UINT32	R	
9296-9311		<b>TOU Energy Register #6<sup>E</sup></b>					
+0,1	0x4200	Tariff #1 register	0-999,999,999	1 kWh	UINT32	R	
+2,3	0x4201	Tariff #2 register	0-999,999,999	1 kWh	UINT32	R	
		...				R	
+14,15	0x4207	Tariff #8 register	0-999,999,999	1 kWh	UINT32	R	
9336-9351		<b>TOU Energy Register #7<sup>E</sup></b>					
+0,1	0x4300	Tariff #1 register	0-999,999,999	1 kWh	UINT32	R	
+2,3	0x4301	Tariff #2 register	0-999,999,999	1 kWh	UINT32	R	
		...				R	
+14,15	0x4307	Tariff #8 register	0-999,999,999	1 kWh	UINT32	R	
9376-9391		<b>TOU Energy Register #8<sup>E</sup></b>					
+0,1	0x4400	Tariff #1 register	0-999,999,999	1 kWh	UINT32	R	
+2,3	0x4401	Tariff #2 register	0-999,999,999	1 kWh	UINT32	R	
		...				R	
+14,15	0x4407	Tariff #8 register	0-999,999,999	1 kWh	UINT32	R	
9416-9423		<b>Summary Energy Accumulated Demands<sup>E</sup></b>					
+0	0x4500	Summary register #1 demand	0-Pmax	U3	UINT16	R	
+1	0x4501	Summary register #2 demand	0-Pmax	U3	UINT16	R	
		...				R	
+7	0x4507	Summary register #8 demand	0-Pmax	U3	UINT16	R	
9436-9443		<b>Summary Energy Block Demands<sup>E</sup></b>					
+0	0x4580	Summary register #1 demand	0-Pmax	U3	UINT16	R	
+1	0x4581	Summary register #2 demand	0-Pmax	U3	UINT16	R	
		...				R	
+7	0x4587	Summary register #8 demand	0-Pmax	U3	UINT16	R	

Address	Point ID	Description	Low and High Scales <sup>2</sup>	Units <sup>2</sup>	Type	R/W	Notes
9456-9463		<b>Summary Energy Sliding Window Demands<sup>E</sup></b>					
+0	0x4600	Summary register #1 demand	0-Pmax	U3	UINT16	R	
+1	0x4601	Summary register #2 demand	0-Pmax	U3	UINT16	R	
		...				R	
+7	0x4607	Summary register #8 demand	0-Pmax	U3	UINT16	R	
9516-9523		<b>Summary Energy Maximum Demands<sup>E</sup></b>					
+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	
9536-9543		<b>TOU Maximum Demand Register #1<sup>E</sup></b>					
+0	0x4800	Tariff #1 maximum demand	0-Pmax	U3	UINT16	R	
+1	0x4801	Tariff #2 maximum demand	0-Pmax	U3	UINT16	R	
		...				R	
+7	0x4807	Tariff #8 maximum demand	0-Pmax	U3	UINT16	R	
9576-9583		<b>TOU Maximum Demand Register #2<sup>E</sup></b>					
+0	0x4900	Tariff #1 maximum demand	0-Pmax	U3	UINT16	R	
+1	0x4901	Tariff #2 maximum demand	0-Pmax	U3	UINT16	R	
		...				R	
+7	0x4907	Tariff #8 maximum demand	0-Pmax	U3	UINT16	R	
9616-9623		<b>TOU Maximum Demand Register #3<sup>E</sup></b>					
+0	0x4A00	Tariff #1 maximum demand	0-Pmax	U3	UINT16	R	
+1	0x4A01	Tariff #2 maximum demand	0-Pmax	U3	UINT16	R	
		...				R	
+7	0x4A07	Tariff #8 maximum demand	0-Pmax	U3	UINT16	R	
9556-9563		<b>TOU Maximum Demand Register #4<sup>E</sup></b>					
+0	0x4880	Tariff #1 maximum demand	0-Pmax	U3	UINT16	R	
+1	0x4881	Tariff #2 maximum demand	0-Pmax	U3	UINT16	R	
		...				R	
+7	0x4887	Tariff #8 maximum demand	0-Pmax	U3	UINT16	R	
9596-9603		<b>TOU Maximum Demand Register #5<sup>E</sup></b>					
+0	0x4980	Tariff #1 maximum demand	0-Pmax	U3	UINT16	R	
+1	0x4981	Tariff #2 maximum demand	0-Pmax	U3	UINT16	R	
		...				R	
+7	0x4987	Tariff #8 maximum demand	0-Pmax	U3	UINT16	R	
9636-9643		<b>TOU Maximum Demand Register #6<sup>E</sup></b>					
+0	0x4A80	Tariff #1 maximum demand	0-Pmax	U3	UINT16	R	
+1	0x4A81	Tariff #2 maximum demand	0-Pmax	U3	UINT16	R	
		...				R	
+7	0x4A87	Tariff #8 maximum demand	0-Pmax	U3	UINT16	R	

Address	Point ID	Description	Low and High Scales <sup>2</sup>	Units <sup>2</sup>	Type	R/W	Notes
9656-9663		<b>TOU Maximum Demand Register #7<sup>E</sup></b>					
+0	0x5300	Tariff #1 maximum demand	0-Pmax	U3	UINT16	R	
+1	0x5301	Tariff #2 maximum demand	0-Pmax	U3	UINT16	R	
		...				R	
+7	0x5307	Tariff #8 maximum demand	0-Pmax	U3	UINT16	R	
9676-9683		<b>TOU Maximum Demand Register #8<sup>E</sup></b>					
+0	0x5380	Tariff #1 maximum demand	0-Pmax	U3	UINT16	R	
+1	0x5381	Tariff #2 maximum demand	0-Pmax	U3	UINT16	R	
		...				R	
+7	0x5387	Tariff #8 maximum demand	0-Pmax	U3	UINT16	R	
10656-10695		<b>V1/V12 Harmonic Angles<sup>EH</sup></b>					1, 3
+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	
		...					
+39	0x6427	H40 Harmonic angle	-180.0-180.0	0.1°	INT16	R	
10696-10735		<b>V2/V23 Harmonic Angles<sup>EH</sup></b>					1, 3
+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	
		...					
+39	0x6527	H40 Harmonic angle	-180.0-180.0	0.1°	INT16	R	
10736-10775		<b>V1/V31 Harmonic Angles<sup>EH</sup></b>					1, 3
+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	
		...					
+39	0x6627	H40 Harmonic angle	-180.0-180.0	0.1°	INT16	R	
10816-10855		<b>I1 Harmonic Angles<sup>EH</sup></b>					3
+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	
		...					
+39	0x6827	H40 Harmonic angle	-180.0-180.0	0.1°	INT16	R	
10856-10895		<b>I2 Harmonic Angles<sup>EH</sup></b>					3
+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	
		...					
+39	0x6927	H40 Harmonic angle	-180.0-180.0	0.1°	INT16	R	
10896-10935		<b>I3 Harmonic Angles<sup>EH</sup></b>					3
+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	
		...					
+39	0x6A27	H40 Harmonic angle	-180.0-180.0	0.1°	INT16	R	



Address	Point ID	Description	Low and High Scales <sup>2</sup>	Units <sup>2</sup>	Type	R/W	Notes
11616	0x7C00	<b>Setpoint Status (bitmap)</b>	0x0000-0xFFFF		UINT16	R	

**NOTES:**

Energy and Power demand readings are only available in the meters with suffixes E and EH.

<sup>1</sup> Voltage and Voltage Harmonics Readings:

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.

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

<sup>2</sup> For volts, amps, power and frequency scales and units refer to Section 4 "Data Scales and Units". For analog data scaling formulas and examples, see Section 2.6.1, "16-bit Scaled Integer Format".

<sup>3</sup> Harmonic angles are referenced to the fundamental voltage harmonic H01 on phase L1.

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

Address	Point ID	Description	Options/Range <sup>2</sup>	Units <sup>2</sup>	Type	R/W	Notes
11776-11777	0x0000	None	0		UINT32	R	
11904-11907		<b>Special Inputs</b>					
+0,1	0x0100	Voltage disturbance <sup>EH</sup>	0-100	%	UINT32	R	
+2,3	0x0101	Phase rotation order	0=error, 1=positive (ABC), 2=negative (CBA)		UINT32	R	
12160-12161	0x0300	<b>Event Flags (bitmap) <sup>EH</sup></b>	0x00000000-0x000000FF		UINT32	R	
12544-12545	0x0600	<b>Digital Inputs DI1-DI2 (bitmap)</b>	0x00000000-0x00000003		UINT32	R	
12800-12801	0x0800	<b>Relay Outputs RO1-RO2 (bitmap)</b>	0x00000000-0x00000003		UINT32	R	
13056-13063		<b>Counters</b>					
+0,1	0x0A00	Counter #1	0-999,999		UINT32	R/W	
+2,3	0x0A01	Counter #2	0-999,999		UINT32	R/W	
+4,5	0x0A02	Counter #3	0-999,999		UINT32	R/W	
+6,7	0x0A03	Counter #4	0-999,999		UINT32	R/W	
13312-13377		<b>1-Cycle Phase Values</b>					
+0,1	0x0C00	V1/V12 Voltage	0-Vmax	U1	UINT32	R	<sup>1</sup>
+2,3	0x0C01	V2/V23 Voltage	0-Vmax	U1	UINT32	R	<sup>1</sup>
+4,5	0x0C02	V3/V31 Voltage	0-Vmax	U1	UINT32	R	<sup>1</sup>
+6,7	0x0C03	I1 Current	0-Imax	U2	UINT32	R	
+8,9	0x0C04	I2 Current	0-Imax	U2	UINT32	R	
+10,11	0x0C05	I3 Current	0-Imax	U2	UINT32	R	
+12,13	0x0C06	kW L1	-Pmax-Pmax	U3	INT32	R	
+14,15	0x0C07	kW L2	-Pmax-Pmax	U3	INT32	R	
+16,17	0x0C08	kW L3	-Pmax-Pmax	U3	INT32	R	
+18,19	0x0C09	kvar L1	-Pmax-Pmax	U3	INT32	R	
+20,21	0x0C0A	kvar L2	-Pmax-Pmax	U3	INT32	R	
+22,23	0x0C0B	kvar L3	-Pmax-Pmax	U3	INT32	R	
+24,25	0x0C0C	kVA L1	0-Pmax	U3	UINT32	R	
+26,27	0x0C0D	kVA L2	0-Pmax	U3	UINT32	R	
+28,29	0x0C0E	kVA L3	0-Pmax	U3	UINT32	R	
+30,31	0x0C0F	Power factor L1	-1000-1000	×0.001	INT32	R	
+32,33	0x0C10	Power factor L2	-1000-1000	×0.001	INT32	R	
+34,35	0x0C11	Power factor L3	-1000-1000	×0.001	INT32	R	
+36,37	0x0C12	V1/V12 Voltage THD	0-9999	×0.1%	UINT32	R	<sup>1</sup> 4-cycle value
+38,39	0x0C13	V2/V23 Voltage THD	0-9999	×0.1%	UINT32	R	<sup>1</sup> 4-cycle value
+40,41	0x0C14	V3/V31 Voltage THD	0-9999	×0.1%	UINT32	R	<sup>1</sup> 4-cycle value
+42,43	0x0C15	I1 Current THD	0-9999	×0.1%	UINT32	R	4-cycle value
+44,45	0x0C16	I2 Current THD	0-9999	×0.1%	UINT32	R	4-cycle value
+46,47	0x0C17	I3 Current THD	0-9999	×0.1%	UINT32	R	4-cycle value
+48,49	0x0C18	I1 K-Factor	10-9999	×0.1	UINT32	R	4-cycle value

Address	Point ID	Description	Options/Range <sup>2</sup>	Units <sup>2</sup>	Type	R/W	Notes
+50,51	0x0C19	I2 K-Factor	10-9999	×0.1	UINT32	R	4-cycle value
+52,53	0x0C1A	I3 K-Factor	10-9999	×0.1	UINT32	R	4-cycle value
+54,55	0x0C1B	I1 Current TDD	0-1000	×0.1%	UINT32	R	4-cycle value
+56,57	0x0C1C	I2 Current TDD	0-1000	×0.1%	UINT32	R	4-cycle value
+58,59	0x0C1D	I3 Current TDD	0-1000	×0.1%	UINT32	R	4-cycle value
+60,61	0x0C1E	V12 Voltage	0-Vmax	U1	UINT32	R	
+62,63	0x0C1F	V23 Voltage	0-Vmax	U1	UINT32	R	
+64,65	0x0C20	V31 Voltage	0-Vmax	U1	UINT32	R	
13696-13703		<b>1-Cycle Total Values</b>					
+0,1	0x0F00	Total kW	-Pmax-Pmax	U3	INT32	R	
+2,3	0x0F01	Total kvar	-Pmax-Pmax	U3	INT32	R	
+4,5	0x0F02	Total kVA	0-Pmax	U3	UINT32	R	
+6,7	0x0F03	Total PF	-1000-1000	×0.001	INT32	R	
+8,9	0x0F04	Total PF lag	0-1000	×0.001	UINT16	R	
+10,11	0x0F05	Total PF lead	0-1000	×0.001	UINT16	R	
+12,13	0x0F06	Total kW import	0-Pmax	U3	UINT32	R	
+14,15	0x0F07	Total kW export	0-Pmax	U3	UINT32	R	
+16,17	0x0F08	Total kvar import	0-Pmax	U3	UINT32	R	
+18,19	0x0F09	Total kvar export	0-Pmax	U3	UINT32	R	
+20,21	0x0FOA	3-phase average L-N/L-L voltage	0-Vmax	U1	UINT32	R	<sup>1</sup>
+22,23	0x0FOB	3-phase average L-L voltage	0-Vmax	U1	UINT32	R	
+24,25	0x0FOC	3-phase average current	0-Imax	U2	UINT32	R	
13824-13833		<b>1-Cycle Auxiliary Values</b>					
+0,1	0x1000	Not used			UINT32	R	
+2,3	0x1001	In (neutral) Current	0-Imax	U2	UINT32	R	
+4,5	0x1002	Frequency	0-Fmax	×0.01Hz	UINT32	R	
+6,7	0x1003	Voltage unbalance	0-300	%	UINT32	R	
+8,9	0x1004	Current unbalance	0-300	%	UINT32	R	
13864-13895		<b>Phasor</b>					
+0,1	0x1080	V1/V12 Voltage magnitude	0-Vmax	U1	UINT32	R	<sup>1</sup>
+2,3	0x1081	V2/V23 Voltage magnitude	0-Vmax	U1	UINT32	R	<sup>1</sup>
+4,5	0x1082	V3/V31 Voltage magnitude	0-Vmax	U1	UINT32	R	<sup>1</sup>
+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	<sup>1</sup>
+18,19	0x1089	V2/V23 Voltage angle	-1800-1800	×0.1°	INT32	R	<sup>1</sup>
+20,21	0x108A	V3/V31 Voltage angle	-1800-1800	×0.1°	INT32	R	<sup>1</sup>
+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	

Address	Point ID	Description	Options/Range <sup>2</sup>	Units <sup>2</sup>	Type	R/W	Notes
+28,29	0x108E	I3 Current angle	-1800-1800	×0.1°	INT32	R	
+30,31	0x108F	Not used			INT32	R	
13952-14017		<b>1-Second Phase Values</b>					
+0,1	0x1100	V1/V12 Voltage	0-Vmax	U1	UINT32	R	1
+2,3	0x1101	V2/V23 Voltage	0-Vmax	U1	UINT32	R	1
+4,5	0x1102	V3/V31 Voltage	0-Vmax	U1	UINT32	R	1
+6,7	0x1103	I1 Current	0-Imax	U2	UINT32	R	
+8,9	0x1104	I2 Current	0-Imax	U2	UINT32	R	
+10,11	0x1105	I3 Current	0-Imax	U2	UINT32	R	
+12,13	0x1106	kW L1	-Pmax-Pmax	U3	INT32	R	
+14,15	0x1107	kW L2	-Pmax-Pmax	U3	INT32	R	
+16,17	0x1108	kW L3	-Pmax-Pmax	U3	INT32	R	
+18,19	0x1109	kvar L1	-Pmax-Pmax	U3	INT32	R	
+20,21	0x110A	kvar L2	-Pmax-Pmax	U3	INT32	R	
+22,23	0x110B	kvar L3	-Pmax-Pmax	U3	INT32	R	
+24,25	0x110C	kVA L1	0-Pmax	U3	UINT32	R	
+26,27	0x110D	kVA L2	0-Pmax	U3	UINT32	R	
+28,29	0x110E	kVA L3	0-Pmax	U3	UINT32	R	
+30,31	0x110F	Power factor L1	-1000-1000	×0.001	INT32	R	
+32,33	0x1110	Power factor L2	-1000-1000	×0.001	INT32	R	
+34,35	0x1111	Power factor L3	-1000-1000	×0.001	INT32	R	
+36,37	0x1112	V1/V12 Voltage THD	0-9999	×0.1%	UINT32	R	1 3-sec value
+38,39	0x1113	V2/V23 Voltage THD	0-9999	×0.1%	UINT32	R	1 3-sec value
+40,41	0x1114	V3/V31 Voltage THD	0-9999	×0.1%	UINT32	R	1 3-sec value
+42,43	0x1115	I1 Current THD	0-9999	×0.1%	UINT32	R	3-sec value
+44,45	0x1116	I2 Current THD	0-9999	×0.1%	UINT32	R	3-sec value
+46,47	0x1117	I3 Current THD	0-9999	×0.1%	UINT32	R	3-sec value
+48,49	0x1118	I1 K-Factor	10-9999	×0.1	UINT32	R	3-sec value
+50,51	0x1119	I2 K-Factor	10-9999	×0.1	UINT32	R	3-sec value
+52,53	0x111A	I3 K-Factor	10-9999	×0.1	UINT32	R	3-sec value
+54,55	0x111B	I1 Current TDD	0-1000	×0.1%	UINT32	R	3-sec value
+56,57	0x111C	I2 Current TDD	0-1000	×0.1%	UINT32	R	3-sec value
+58,59	0x111D	I3 Current TDD	0-1000	×0.1%	UINT32	R	3-sec value
+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		<b>1-Second Total Values</b>					
+0,1	0x1400	Total kW	-Pmax-Pmax	U3	INT32	R	
+2,3	0x1401	Total kvar	-Pmax-Pmax	U3	INT32	R	
+4,5	0x1402	Total kVA	0-Pmax	U3	UINT32	R	
+6,7	0x1403	Total PF	-1000-1000	×0.001	INT32	R	
+8,9	0x1404	Total PF lag	0-1000	×0.001	UINT16	R	
+10,11	0x1405	Total PF lead	0-1000	×0.001	UINT16	R	

Address	Point ID	Description	Options/Range <sup>2</sup>	Units <sup>2</sup>	Type	R/W	Notes
+12,13	0x1406	Total kW import	0-Pmax	U3	UINT32	R	
+14,15	0x1407	Total kW export	0-Pmax	U3	UINT32	R	
+16,17	0x1408	Total kvar import	0-Pmax	U3	UINT32	R	
+18,19	0x1409	Total kvar export	0-Pmax	U3	UINT32	R	
+20,21	0x140A	3-phase average L-N/L-L voltage	0-Vmax	U1	UINT32	R	1
+22,23	0x140B	3-phase average L-L voltage	0-Vmax	U1	UINT32	R	
+24,25	0x140C	3-phase average current	0-Imax	U2	UINT32	R	
14464-14473		<b>1-Second Auxiliary Values</b>					
+0,1	0x1500	Not used			UINT32	R	
+2,3	0x1501	In (neutral) Current	0-Imax	U2	UINT32	R	
+4,5	0x1502	Frequency	0-Fmax	×0.01Hz	UINT32	R	
+6,7	0x1503	Voltage unbalance	0-300	%	UINT32	R	
+8,9	0x1504	Current unbalance	0-300	%	UINT32	R	
14504-14527		<b>Present Harmonic Demands</b>					
+0,1	0x1580	V1/V12 THD demand	0-9999	×0.1%	UINT32	R	1
+2,3	0x1581	V2/V23 THD demand	0-9999	×0.1%	UINT32	R	1
+4,5	0x1582	V3/V31 THD demand	0-9999	×0.1%	UINT32	R	1
+6,7	0x1583	Not used			UINT32	R	
+8,9	0x1584	I1 THD demand	0-9999	×0.1%	UINT32	R	
+10,11	0x1585	I2 THD demand	0-9999	×0.1%	UINT32	R	
+12,13	0x1586	I3 THD demand	0-9999	×0.1%	UINT32	R	
+14,15	0x1587	Not used			UINT32	R	
+16,17	0x1588	I1 TDD demand	0-1000	×0.1%	UINT32	R	
+18,19	0x1589	I2 TDD demand	0-1000	×0.1%	UINT32	R	
+20,21	0x158A	I3 TDD demand	0-1000	×0.1%	UINT32	R	
+22,23	0x158B	Not used			UINT32	R	
14592-14651		<b>Present Volt, Ampere and Power Demands</b>					
+0,1	0x1600	V1/V12 Volt demand	0-Vmax	U1	UINT32	R	1
+2,3	0x1601	V2/V23 Volt demand	0-Vmax	U1	UINT32	R	1
+4,5	0x1602	V3/V31 Volt demand	0-Vmax	U1	UINT32	R	1
+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	

Address	Point ID	Description	Options/Range <sup>2</sup>	Units <sup>2</sup>	Type	R/W	Notes
+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	kVA 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	
14720-14755		<b>Total Energies<sup>E</sup></b>					
+0,1	0x1700	kWh import	0-999,999,999	1 kWh	UINT32	R	
+2,3	0x1701	kWh export	0-999,999,999	1 kWh	UINT32	R	
+4,5	0x1702	Not used			INT32	R	
+6,7	0x1703	Not used			UINT32	R	
+8,9	0x1704	kvarh import	0-999,999,999	1 kvarh	UINT32	R	
+10,11	0x1705	kvarh export	0-999,999,999	1 kvarh	UINT32	R	
+12,13	0x1706	Not used			INT32	R	
+14,15	0x1707	Not used			UINT32	R	
+16,17	0x1708	kVAh total	0-999,999,999	1 kVAh	UINT32	R	
+18-25		Not used			UINT32	R	
+26,27	0x170D	Harmonic kWh import <sup>EH</sup>	0-999,999,999	1 kWh	UINT32	R	
+28,29	0x170E	Harmonic kWh export <sup>EH</sup>	0-999,999,999	1 kWh	UINT32	R	
+30-33		Not used			UINT32	R	
+34,35	0x1711	Harmonic kVAh total <sup>EH</sup>	0-999,999,999	1 kVAh	UINT32	R	
14760-14775		<b>Summary Energy Registers<sup>E</sup></b>					
+0,1	0x1780	Summary energy register #1	0-999,999,999	1 kWh	UINT32	R	
+2,3	0x1781	Summary energy register #2	0-999,999,999	1 kWh	UINT32	R	
		...					
+14,15	0x1787	Summary energy register #16	0-999,999,999	1 kWh	UINT32	R	
14848-14865		<b>Phase Energies<sup>E</sup></b>					
+0,1	0x1800	kWh import L1	0-999,999,999	1 kWh	UINT32	R	
+2,3	0x1801	kWh import L2	0-999,999,999	1 kWh	UINT32	R	
+4,5	0x1802	kWh import L3	0-999,999,999	1 kWh	UINT32	R	
+6,7	0x1803	kvarh import L1	0-999,999,999	1 kvarh	UINT32	R	
+8,9	0x1804	kvarh import L2	0-999,999,999	1 kvarh	UINT32	R	
+10,11	0x1805	kvarh import L3	0-999,999,999	1 kvarh	UINT32	R	
+12,13	0x1806	kVAh total L1	0-999,999,999	1 kVAh	UINT32	R	

Address	Point ID	Description	Options/Range <sup>2</sup>	Units <sup>2</sup>	Type	R/W	Notes
+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	
14976-15055		<b>V1/V12 Harmonic Distortions</b> <sup>EH</sup>					1
+0,1	0x1900	H01 Harmonic distortion	0-10000	0.01%	UINT32	R	
+2,3	0x1901	H02 Harmonic distortion	0-10000	0.01%	UINT32	R	
		...					
+78,79	0x1927	H40 Harmonic distortion	0-10000	0.01%	UINT32	R	
15104-15183		<b>V2/V23 Harmonic Distortions</b> <sup>EH</sup>					1
+0,1	0x1A00	H01 Harmonic distortion	0-10000	0.01%	UINT32	R	
+2,3	0x1A01	H02 Harmonic distortion	0-10000	0.01%	UINT32	R	
		...					
+78,79	0x1A27	H40 Harmonic distortion	0-10000	0.01%	UINT32	R	
15232-15311		<b>V3/V31 Harmonic Distortions</b> <sup>EH</sup>					1
+0,1	0x1B00	H01 Harmonic distortion	0-10000	0.01%	UINT32	R	
+2,3	0x1B01	H02 Harmonic distortion	0-10000	0.01%	UINT32	R	
		...					
+78,79	0x1B27	H40 Harmonic distortion	0-10000	0.01%	UINT32	R	
15360-15439		<b>I1 Harmonic Distortions</b> <sup>EH</sup>					
+0,1	0x1C00	H01 Harmonic distortion	0-10000	0.01%	UINT32	R	
+2,3	0x1C01	H02 Harmonic distortion	0-10000	0.01%	UINT32	R	
		...					
+78,79	0x1C27	H40 Harmonic distortion	0-10000	0.01%	UINT32	R	
15488-15567		<b>I2 Harmonic Distortions</b> <sup>EH</sup>					
+0,1	0x1D00	H01 Harmonic distortion	0-10000	0.01%	UINT32	R	
+2,3	0x1D01	H02 Harmonic distortion	0-10000	0.01%	UINT32	R	
		...					
+78,79	0x1D27	H40 Harmonic distortion	0-10000	0.01%	UINT32	R	
15616-15695		<b>I3 Harmonic Distortions</b> <sup>EH</sup>					
+0,1	0x1E00	H01 Harmonic distortion	0-10000	0.01%	UINT32	R	
+2,3	0x1E01	H02 Harmonic distortion	0-10000	0.01%	UINT32	R	
		...					
+78,79	0x1E27	H40 Harmonic distortion	0-10000	0.01%	UINT32	R	
17024-17059		<b>Fundamental (H01) Phase Values</b>					4-cycle values
+0,1	0x2900	V1/V12 Voltage	0-Vmax	U1	UINT32	R	1
+2,3	0x2901	V2/V23 Voltage	0-Vmax	U1	UINT32	R	1
+4,5	0x2902	V3/V31 Voltage	0-Vmax	U1	UINT32	R	1
+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	

Address	Point ID	Description	Options/Range <sup>2</sup>	Units <sup>2</sup>	Type	R/W	Notes
+16,17	0x2908	kW L3	-Pmax-Pmax	U3	INT32	R	
+18,19	0x2909	kvar L1	-Pmax-Pmax	U3	INT32	R	
+20,21	0x290A	kvar L2	-Pmax-Pmax	U3	INT32	R	
+22,23	0x290B	kvar L3	-Pmax-Pmax	U3	INT32	R	
+24,25	0x290C	kVA L1	0-Pmax	U3	UINT32	R	
+26,27	0x290D	kVA L2	0-Pmax	U3	UINT32	R	
+28,29	0x290E	kVA L3	0-Pmax	U3	UINT32	R	
+30,31	0x290F	Power factor L1	-1000-1000	×0.001	INT32	R	
+32,33	0x2910	Power factor L2	-1000-1000	×0.001	INT32	R	
+34,35	0x2911	Power factor L3	-1000-1000	×0.001	INT32	R	
17152-17164		<b>Harmonic Total Values</b>					4-cycle values
+0,1	0x2A00	Total fundamental kW	-Pmax-Pmax	U3	INT32	R	
+2,3	0x2A01	Total fundamental kvar	-Pmax-Pmax	U3	INT32	R	
+4,5	0x2A02	Total fundamental kVA	0-Pmax	U3	UINT32	R	
+6,7	0x2A03	Total fundamental PF	-1000-1000	×0.001	INT32	R	
+8,9	0x2A04	Total harmonic kW <sup>EH</sup>	-Pmax-Pmax	U3	INT32	R	
+10,11	0x2A05	Not used			INT32	R	
+12,13	0x2A06	Total harmonic kVA <sup>EH</sup>	0-Pmax	U3	UINT32	R	
+14,15	0x2A07	Not used			INT32	R	
17408-17467		<b>Minimum 1-Cycle Phase Values</b>					
+0,1	0x2C00	V1/V12 Voltage	0-Vmax	U1	UINT32	R	<sup>1</sup>
+2,3	0x2C01	V2/V23 Voltage	0-Vmax	U1	UINT32	R	<sup>1</sup>
+4,5	0x2C02	V3/V31 Voltage	0-Vmax	U1	UINT32	R	<sup>1</sup>
+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	<sup>1</sup> 4-cycle value
+38,39	0x2C13	V2/V23 Voltage THD	0-9999	×0.1%	UINT32	R	<sup>1</sup> 4-cycle value
+40,41	0x2C14	V3/V31 Voltage THD	0-9999	×0.1%	UINT32	R	<sup>1</sup> 4-cycle value
+42,43	0x2C15	I1 Current THD	0-9999	×0.1%	UINT32	R	4-cycle value
+44,45	0x2C16	I2 Current THD	0-9999	×0.1%	UINT32	R	4-cycle value
+46,47	0x2C17	I3 Current THD	0-9999	×0.1%	UINT32	R	4-cycle value
+48,49	0x2C18	I1 K-Factor	10-9999	×0.1	UINT32	R	4-cycle value
+50,51	0x2C19	I2 K-Factor	10-9999	×0.1	UINT32	R	4-cycle value
+52,53	0x2C1A	I3 K-Factor	10-9999	×0.1	UINT32	R	4-cycle value
+54,55	0x2C1B	I1 Current TDD	0-1000	×0.1%	UINT32	R	4-cycle value
+56,57	0x2C1C	I2 Current TDD	0-1000	×0.1%	UINT32	R	4-cycle value
+58,59	0x2C1D	I3 Current TDD	0-1000	×0.1%	UINT32	R	4-cycle value
17536-17543		<b>Minimum 1-Cycle Total Values</b>					
+0,1	0x2D00	Total kW	-Pmax-Pmax	U3	INT32	R	
+2,3	0x2D01	Total kvar	-Pmax-Pmax	U3	INT32	R	



Address	Point ID	Description	Options/Range <sup>2</sup>	Units <sup>2</sup>	Type	R/W	Notes
+4,5	0x2D02	Total kVA	0-Pmax	U3	UINT32	R	
+6,7	0x2D03	Total PF	0-1000	×0.001	UINT32	R	Absolute value
17664-17669		<b>Minimum 1-Cycle Auxiliary Values</b>					
+0,1	0x2E00	Not used			UINT32	R	
+2,3	0x2E01	In Current	0-Imax	U2	UINT32	R	
+4,5	0x2E02	Frequency	0-Fmax	×0.01Hz	UINT32	R	
18432-18491		<b>Maximum 1-Cycle Phase Values</b>					
+0,1	0x3400	V1/V12 Voltage	0-Vmax	U1	UINT32	R	<sup>1</sup>
+2,3	0x3401	V2/V23 Voltage	0-Vmax	U1	UINT32	R	<sup>1</sup>
+4,5	0x3402	V3/V31 Voltage	0-Vmax	U1	UINT32	R	<sup>1</sup>
+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	<sup>1</sup> 4-cycle value
+38,39	0x3413	V2/V23 Voltage THD	0-9999	×0.1%	UINT32	R	<sup>1</sup> 4-cycle value
+40,41	0x3414	V3/V31 Voltage THD	0-9999	×0.1%	UINT32	R	<sup>1</sup> 4-cycle value
+42,43	0x3415	I1 Current THD	0-9999	×0.1%	UINT32	R	4-cycle value
+44,45	0x3416	I2 Current THD	0-9999	×0.1%	UINT32	R	4-cycle value
+46,47	0x3417	I3 Current THD	0-9999	×0.1%	UINT32	R	4-cycle value
+48,49	0x3418	I1 K-Factor	10-9999	×0.1	UINT32	R	4-cycle value
+50,51	0x3419	I2 K-Factor	10-9999	×0.1	UINT32	R	4-cycle value
+52,53	0x341A	I3 K-Factor	10-9999	×0.1	UINT32	R	4-cycle value
+54,55	0x341B	I1 Current TDD	0-1000	×0.1%	UINT32	R	4-cycle value
+56,57	0x341C	I2 Current TDD	0-1000	×0.1%	UINT32	R	4-cycle value
+58,59	0x341D	I3 Current TDD	0-1000	×0.1%	UINT32	R	4-cycle value
18560-18567		<b>Maximum 1-Cycle Total Values</b>					
+0,1	0x3500	Total kW	-Pmax-Pmax	U3	INT32	R	
+2,3	0x3501	Total kvar	-Pmax-Pmax	U3	INT32	R	
+4,5	0x3502	Total kVA	0-Pmax	U3	UINT32	R	
+6,7	0x3503	Total PF	0-1000	×0.001	UINT32	R	Absolute value
18688-18693		<b>Maximum 1-Cycle Auxiliary Values</b>					
+0,1	0x3600	Not used			UINT32	R	
+2,3	0x3601	In Current	0-Imax	U2	UINT32	R	
+4,5	0x3602	Frequency	0-Fmax	×0.01Hz	UINT32	R	
18816-18849		<b>Maximum Demands</b>					
+0,1	0x3700	V1/V12 Maximum volt demand	0-Vmax	U1	UINT32	R	<sup>1</sup>
+2,3	0x3701	V2/V23 Maximum volt demand	0-Vmax	U1	UINT32	R	<sup>1</sup>
+4,5	0x3702	V3/V31 Maximum volt demand	0-Vmax	U1	UINT32	R	<sup>1</sup>
+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	

Address	Point ID	Description	Options/Range <sup>2</sup>	Units <sup>2</sup>	Type	R/W	Notes
+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	
18984-19007		<b>Maximum Harmonic Demands</b>					
+0,1	0x3880	V1/V12 THD demand	0-9999	×0.1%	UINT32	R	1
+2,3	0x3881	V2/V23 THD demand	0-9999	×0.1%	UINT32	R	1
+4,5	0x3882	V3/V31 THD demand	0-9999	×0.1%	UINT32	R	1
+6,7	0x3883	Not used			UINT32	R	
+8,9	0x3884	I1 THD demand	0-9999	×0.1%	UINT32	R	
+10,11	0x3885	I2 THD demand	0-9999	×0.1%	UINT32	R	
+12,13	0x3886	I3 THD demand	0-9999	×0.1%	UINT32	R	
+14,15	0x3887	Not used			UINT32	R	
+16,17	0x3888	I1 TDD demand	0-1000	×0.1%	UINT32	R	
+18,19	0x3889	I2 TDD demand	0-1000	×0.1%	UINT32	R	
+20,21	0x388A	I3 TDD demand	0-1000	×0.1%	UINT32	R	
+22,23	0x388B	Not used			UINT32	R	
19328-19359		<b>Scaled Analog Inputs</b>					
+0,1	0x3B00	Analog input AI1	AI1min-AI1Max		UINT32	R	
+2,3	0x3B01	Analog input AI2	AI2min-AI2Max		UINT32	R	
19368-19371		<b>Raw Analog Inputs</b>					
+0,1	0x3B80	Analog input AI1	0-4095		UINT32	R	
+2,3	0x3B81	Analog input AI2	0-4095		UINT32	R	
19456-19459		<b>TOU Parameters<sup>E</sup></b>					
+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	
19496-19499		<b>Scaled Analog Outputs</b>					
+0,1	0x3C80	Analog output AO1	0-4095		UINT32	R/W	
+2,3	0x3C81	Analog output AO2	0-4095		UINT32	R/W	
19584-19599		<b>TOU Energy Register #1<sup>E</sup></b>					
+0,1	0x3D00	Tariff #1 register	0-999,999,999	1 kWh	UINT32	R	
+2,3	0x3D01	Tariff #2 register	0-999,999,999	1 kWh	UINT32	R	

Address	Point ID	Description	Options/Range <sup>2</sup>	Units <sup>2</sup>	Type	R/W	Notes
		...				R	
+14,15	0x3D07	Tariff #8 register	0-999,999,999	1 kWh	UINT32	R	
19712-19727		<b>TOU Energy Register #2</b> <sup>E</sup>					
+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		<b>TOU Energy Register #3</b> <sup>E</sup>					
+0,1	0x3F00	Tariff #1 register	0-999,999,999	1 kWh	UINT32	R	
+2,3	0x3F01	Tariff #2 register	0-999,999,999	1 kWh	UINT32	R	
		...				R	
+14,15	0x3F07	Tariff #8 register	0-999,999,999	1 kWh	UINT32	R	
19968-19983		<b>TOU Energy Register #4</b> <sup>E</sup>					
+0,1	0x4000	Tariff #1 register	0-999,999,999	1 kWh	UINT32	R	
+2,3	0x4001	Tariff #2 register	0-999,999,999	1 kWh	UINT32	R	
		...				R	
+14,15	0x4007	Tariff #8 register	0-999,999,999	1 kWh	UINT32	R	
20096-20111		<b>TOU Energy Register #5</b> <sup>E</sup>					
+0,1	0x4100	Tariff #1 register	0-999,999,999	1 kWh	UINT32	R	
+2,3	0x4101	Tariff #2 register	0-999,999,999	1 kWh	UINT32	R	
		...				R	
+14,15	0x4107	Tariff #8 register	0-999,999,999	1 kWh	UINT32	R	
20224-20239		<b>TOU Energy Register #6</b> <sup>E</sup>					
+0,1	0x4200	Tariff #1 register	0-999,999,999	1 kWh	UINT32	R	
+2,3	0x4201	Tariff #2 register	0-999,999,999	1 kWh	UINT32	R	
		...				R	
+14,15	0x4207	Tariff #8 register	0-999,999,999	1 kWh	UINT32	R	
20352-20367		<b>TOU Energy Register #7</b> <sup>E</sup>					
+0,1	0x4300	Tariff #1 register	0-999,999,999	1 kWh	UINT32	R	
+2,3	0x4301	Tariff #2 register	0-999,999,999	1 kWh	UINT32	R	
		...				R	
+14,15	0x4307	Tariff #8 register	0-999,999,999	1 kWh	UINT32	R	
20480-20495		<b>TOU Energy Register #8</b> <sup>E</sup>					
+0,1	0x4400	Tariff #1 register	0-999,999,999	1 kWh	UINT32	R	
+2,3	0x4401	Tariff #2 register	0-999,999,999	1 kWh	UINT32	R	
		...				R	
+14,15	0x4407	Tariff #8 register	0-999,999,999	1 kWh	UINT32	R	
20608-20623		<b>Summary Energy Accumulated Demands</b> <sup>E</sup>					
+0,1	0x4500	Summary register #1 demand	0-Pmax	U3	UINT32	R	
+2,3	0x4501	Summary register #2 demand	0-Pmax	U3	UINT32	R	
		...					

Address	Point ID	Description	Options/Range <sup>2</sup>	Units <sup>2</sup>	Type	R/W	Notes
+14,15	0x4507	Summary register #8 demand	0-Pmax	U3	UINT32	R	
20648-20663		<b>Summary Energy Block Demands<sup>E</sup></b>					
+0,1	0x4580	Summary register #1 demand	0-Pmax	U3	UINT32	R	
+2,3	0x4581	Summary register #2 demand	0-Pmax	U3	UINT32	R	
		...					
+14,15	0x4587	Summary register #8 demand	0-Pmax	U3	UINT32	R	
20736-20751		<b>Summary Energy Sliding Window Demands<sup>E</sup></b>					
+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	
20904-20919		<b>Summary Energy Maximum Demands<sup>E</sup></b>					
+0,1	0x4780	Summary register #1 maximum demand	0-Pmax	U3	UINT32	R	
+2,3	0x4781	Summary register #2 maximum demand	0-Pmax	U3	UINT32	R	
		...					
+14,15	0x4787	Summary register #8 maximum demand	0-Pmax	U3	UINT32	R	
20992-21023		<b>TOU Maximum Demand Register #1<sup>E</sup></b>					
+0,1	0x4800	Tariff #1 maximum demand	0-Pmax	U3	UINT32	R	
+2,3	0x4801	Tariff #2 maximum demand	0-Pmax	U3	UINT32	R	
		...				R	
+14,15	0x4807	Tariff #8 maximum demand	0-Pmax	U3	UINT32	R	
21120-21135		<b>TOU Maximum Demand Register #2<sup>E</sup></b>					
+0,1	0x4900	Tariff #1 maximum demand	0-Pmax	U3	UINT32	R	
+2,3	0x4901	Tariff #2 maximum demand	0-Pmax	U3	UINT32	R	
		...				R	
+14,15	0x4907	Tariff #8 maximum demand	0-Pmax	U3	UINT32	R	
21248-21263		<b>TOU Maximum Demand Register #3<sup>E</sup></b>					
+0,1	0x4A00	Tariff #1 maximum demand	0-Pmax	U3	UINT32	R	
+2,3	0x4A01	Tariff #2 maximum demand	0-Pmax	U3	UINT32	R	
		...				R	
+14,15	0x4A07	Tariff #8 maximum demand	0-Pmax	U3	UINT32	R	
21032-21047		<b>TOU Maximum Demand Register #4<sup>E</sup></b>					
+0,1	0x4880	Tariff #1 maximum demand	0-Pmax	U3	UINT32	R	
+2,3	0x4881	Tariff #2 maximum demand	0-Pmax	U3	UINT32	R	
		...				R	
+14,15	0x4887	Tariff #8 maximum demand	0-Pmax	U3	UINT32	R	
21160-21175		<b>TOU Maximum Demand Register #5<sup>E</sup></b>					
+0,1	0x4980	Tariff #1 maximum demand	0-Pmax	U3	UINT32	R	
+2,3	0x4981	Tariff #2 maximum demand	0-Pmax	U3	UINT32	R	
		...				R	
+14,15	0x4987	Tariff #8 maximum demand	0-Pmax	U3	UINT32	R	

Address	Point ID	Description	Options/Range <sup>2</sup>	Units <sup>2</sup>	Type	R/W	Notes
21288-21303		<b>TOU Maximum Demand Register #6<sup>E</sup></b>					
+0,1	0x4A80	Tariff #1 maximum demand	0-Pmax	U3	UINT32	R	
+2,3	0x4A81	Tariff #2 maximum demand	0-Pmax	U3	UINT32	R	
		...				R	
+14,15	0x4A87	Tariff #8 maximum demand	0-Pmax	U3	UINT32	R	
22400-22415		<b>TOU Maximum Demand Register #7<sup>E</sup></b>					
+0,1	0x5300	Tariff #1 maximum demand	0-Pmax	U3	UINT32	R	
+2,3	0x5301	Tariff #2 maximum demand	0-Pmax	U3	UINT32	R	
		...				R	
+14,15	0x5307	Tariff #8 maximum demand	0-Pmax	U3	UINT32	R	
22440-22455		<b>TOU Maximum Demand Register #8<sup>E</sup></b>					
+0,1	0x5380	Tariff #1 maximum demand	0-Pmax	U3	UINT32	R	
+2,3	0x5381	Tariff #2 maximum demand	0-Pmax	U3	UINT32	R	
		...				R	
+14,15	0x5387	Tariff #8 maximum demand	0-Pmax	U3	UINT32	R	
24576-24655		<b>V1/V12 Harmonic Angles<sup>EH</sup></b>					1, 3
+0,1	0x6400	H01 Harmonic angle	-1800-1800	×0.1°	INT32	R	
+2,3	0x6401	H02 Harmonic angle	-1800-1800	×0.1°	INT32	R	
		...					
+78,79	0x6427	H40 Harmonic angle	-1800-1800	×0.1°	INT32	R	
24704-24783		<b>V2/V23 Harmonic Angles<sup>EH</sup></b>					1, 3
+0,1	0x6500	H01 Harmonic angle	-1800-1800	×0.1°	INT32	R	
+2,3	0x6501	H02 Harmonic angle	-1800-1800	×0.1°	INT32	R	
		...					
+78,79	0x6527	H40 Harmonic angle	-1800-1800	×0.1°	INT32	R	
24832-24911		<b>V1/V31 Harmonic Angles<sup>EH</sup></b>					1, 3
+0,1	0x6600	H01 Harmonic angle	-1800-1800	×0.1°	INT32	R	
+2,3	0x6601	H02 Harmonic angle	-1800-1800	×0.1°	INT32	R	
		...					
+78,79	0x6627	H40 Harmonic angle	-1800-1800	×0.1°	INT32	R	
25088-25167		<b>I1 Harmonic Angles<sup>EH</sup></b>					3
+0,1	0x6800	H01 Harmonic angle	-1800-1800	×0.1°	INT32	R	
+2,3	0x6801	H02 Harmonic angle	-1800-1800	×0.1°	INT32	R	
		...					
+78,79	0x6827	H40 Harmonic angle	-1800-1800	×0.1°	INT32	R	
25216-25295		<b>I2 Harmonic Angles<sup>EH</sup></b>					3
+0,1	0x6900	H01 Harmonic angle	-1800-1800	×0.1°	INT32	R	
+2,3	0x6901	H02 Harmonic angle	-1800-1800	×0.1°	INT32	R	
		...					
+78,79	0x6927	H40 Harmonic angle	-1800-1800	×0.1°	INT32	R	
25344-25423		<b>I3 Harmonic Angles<sup>EH</sup></b>					3

Address	Point ID	Description	Options/Range <sup>2</sup>	Units <sup>2</sup>	Type	R/W	Notes
+0,1	0x6A00	H01 Harmonic angle	-1800-1800	×0.1°	INT32	R	
+2,3	0x6A01	H02 Harmonic angle	-1800-1800	×0.1°	INT32	R	
		...					
+78,79	0x6A27	H40 Harmonic angle	-1800-1800	×0.1°	INT32	R	
		<b>Generic TOU Season Energy Registers ID's<sup>E</sup></b>					Point references only
	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		
		<b>Generic TOU Season Maximum Demand Registers ID's<sup>E</sup></b>					Point references only
	0x7100	Tariff #1 register	0-Pmax	U3	UINT32		
	0x7101	Tariff #2 register	0-Pmax	U3	UINT32		
		...					
	0x7107	Tariff #8 register	0-Pmax	U3	UINT32		
27648-27649	0x7C00	<b>Setpoint Status SP1-SP16 (bitmap)</b>	0x00000000-0x0000FFFF		UINT32	R	

**NOTES:**

Energy and Power demand readings are only available in the meters with suffixes E and EH.

<sup>1</sup> Voltage and Voltage Harmonics Readings:

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.

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

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

<sup>3</sup> Harmonic angles are referenced to the fundamental voltage harmonic H01 on phase L1.

### 3.5 Minimum/Maximum Log Registers

Address	Point ID	Description	Options/Range/Format <sup>2</sup>	Units <sup>2</sup>	Type	R/W	Notes
35840-35959		<b>Minimum Phase Values</b>					
+0,1	0x2C00	Min. V1/V12 Voltage	0-Vmax	U1	UINT32	R	<sup>1</sup>
+2,3		Timestamp	F1	sec	UINT32	R	
+4,5	0x2C01	Min. V2/V23 Voltage	0-Vmax	U1	UINT32	R	<sup>1</sup>
+6,7		Timestamp	F1	sec	UINT32	R	
+8,9	0x2C02	Min. V3/V31 Voltage	0-Vmax	U1	UINT32	R	<sup>1</sup>
+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	

Address	Point ID	Description	Options/Range/Format <sup>2</sup>	Units <sup>2</sup>	Type	R/W	Notes
+22,23		Timestamp		sec	UINT32	R	
+24,71	0x2C06-0x2C11	Not used	0		INT32	R	
+72,73 +74,75	0x2C12	Min. V1/V12 Voltage THD Timestamp	0-9999	×0.1% sec	UINT32 UINT32	R R	<sup>1</sup> 4-cycle value
+76,77 +78,79	0x2C13	Min. V2/V23 Voltage THD Timestamp	0-9999	×0.1% sec	UINT32 UINT32	R R	<sup>1</sup> 4-cycle value
+80,81 +82,83	0x2C14	Min. V3/V31 Voltage THD Timestamp	0-9999	×0.1% sec	UINT32 UINT32	R R	<sup>1</sup> 4-cycle value
+84,85 +86,87	0x2C15	Min. I1 Current THD Timestamp	0-9999	×0.1% sec	UINT32 UINT32	R R	<sup>1</sup> 4-cycle value
+88,89 +90,91	0x2C16	Min. I2 Current THD Timestamp	0-9999	×0.1% sec	UINT32 UINT32	R R	4-cycle value
+92,93 +94,95	0x2C17	Min. I3 Current THD Timestamp	0-9999	×0.1% sec	UINT32 UINT32	R R	4-cycle value
+96,97 +98,99	0x2C18	Min. I1 K-Factor Timestamp	10-9999	×0.1 sec	UINT32 UINT32	R R	4-cycle value
+100,101 +102,103	0x2C19	Min. I2 K-Factor Timestamp	10-9999	×0.1 sec	UINT32 UINT32	R R	4-cycle value
+104,105 +106,107	0x2C1A	Min. I3 K-Factor Timestamp	10-9999	×0.1 sec	UINT32 UINT32	R R	4-cycle value
+108,109 +110,111	0x2C1B	Min. I1 Current TDD Timestamp	0-1000	×0.1% sec	UINT32 UINT32	R R	4-cycle value
+112,113 +114,115	0x2C1C	Min. I2 Current TDD Timestamp	0-1000	×0.1% sec	UINT32 UINT32	R R	4-cycle value
+116,117 +118,119	0x2C1D	Min. I3 Current TDD Timestamp	0-1000	×0.1% sec	UINT32 UINT32	R R	4-cycle value
36096-36111		<b>Minimum Total Values</b>					
+0,1 +2,3	0x2D00	Min. Total kW Timestamp	-Pmax-Pmax	U3 sec	INT32 UINT32	R R	
+4,5 +6,7	0x2D01	Min. Total kvar Timestamp	-Pmax-Pmax	U3 sec	INT32 UINT32	R R	
+8,9 +10,11	0x2D02	Min. Total kVA Timestamp	0-Pmax	U3 sec	UINT32 UINT32	R R	
+12,13 +14,15	0x2D03	Min. Total PF Timestamp	-1000-1000	×0.001 sec	INT32 UINT32	R R	
36352-36362		<b>Minimum Auxiliary Values</b>					
+0,1 +2,3	0x2E00	Not used			UINT32 UINT32	R R	
+4,5 +6,7	0x2E01	Min. In Current Timestamp	0-Imax	U2 sec	UINT32 UINT32	R R	
+8,9 +10,11	0x2E02	Min. Frequency Timestamp	0-Fmax	×0.01Hz sec	UINT32 UINT32	R R	

Address	Point ID	Description	Options/Range/Format <sup>2</sup>	Units <sup>2</sup>	Type	R/W	Notes
36864-36983		<b>Maximum Phase Values</b>					
+0,1 +2,3	0x3400	Max. V1/V12 Voltage Timestamp	0-Vmax	U1 sec	UINT32 UINT32	R R	<sup>1</sup>
+4,5 +6,7	0x3401	Max. V2/V23 Voltage Timestamp	0-Vmax	U1 sec	UINT32 UINT32	R R	<sup>1</sup>
+8,9 +10,11	0x3402	Max. V3/V31 Voltage Timestamp	0-Vmax	U1 sec	UINT32 UINT32	R R	<sup>1</sup>
+12,13 +14,15	0x3403	Max. I1 Current Timestamp	0-Imax	U2 sec	UINT32 UINT32	R R	
+16,17 +18,19	0x3404	Max. I2 Current Timestamp	0-Imax	U2 sec	UINT32 UINT32	R R	
+20,21 +22,23	0x3405	Max. I3 Current Timestamp	0-Imax	U2 sec	UINT32 UINT32	R R	
+24-71	0x3406- 0x3411	Not used	0		INT32	R	
+72,73 +74,75	0x3412	Max. V1/V12 Voltage THD Timestamp	0-9999	×0.1% sec	UINT32 UINT32	R R	<sup>1</sup> 4-cycle value
+76,77 +78,79	0x3413	Max. V2/V23 Voltage THD Timestamp	0-9999	×0.1% sec	UINT32 UINT32	R R	<sup>1</sup> 4-cycle value
+80,81 +82,83	0x3414	Max. V3/V31 Voltage THD Timestamp	0-9999	×0.1% sec	UINT32 UINT32	R R	<sup>1</sup> 4-cycle value
+84,85 +86,87	0x3415	Max. I1 Current THD Timestamp	0-9999	×0.1% sec	UINT32 UINT32	R R	4-cycle value
+88,89 +90,91	0x3416	Max. I2 Current THD Timestamp	0-9999	×0.1% sec	UINT32 UINT32	R R	4-cycle value
+92,93 +94,95	0x3417	Max. I3 Current THD Timestamp	0-9999	×0.1% sec	UINT32 UINT32	R R	4-cycle value
+96,97 +98,99	0x3418	Max. I1 K-Factor Timestamp	10-9999	×0.1 sec	UINT32 UINT32	R R	4-cycle value
+100,101 +102,103	0x3419	Max. I2 K-Factor Timestamp	10-9999	×0.1 sec	UINT32 UINT32	R R	4-cycle value
+104,105 +106,107	0x341A	Max. I3 K-Factor Timestamp	10-9999	×0.1 sec	UINT32 UINT32	R R	4-cycle value
+108,109 +110,111	0x341B	Max. I1 Current TDD Timestamp	0-1000	×0.1% sec	UINT32 UINT32	R R	4-cycle value
+112,113 +114,115	0x341C	Max. I2 Current TDD Timestamp	0-1000	×0.1% sec	UINT32 UINT32	R R	4-cycle value
+116,117 +118,119	0x341D	Max. I3 Current TDD Timestamp	0-1000	×0.1% sec	UINT32 UINT32	R R	4-cycle value
37120-37135		<b>Maximum Total Values</b>					
+0,1 +2,3	0x3500	Max. Total kW Timestamp	-Pmax-Pmax	U3 sec	INT32 UINT32	R R	
+4,5 +6,7	0x3501	Max. Total kvar Timestamp	-Pmax-Pmax	U3 sec	INT32 UINT32	R R	



Address	Point ID	Description	Options/Range/Format <sup>2</sup>	Units <sup>2</sup>	Type	R/W	Notes
+8,9 +10,11	0x3502	Max. Total kVA Timestamp	0-Pmax	U3 sec	UINT32 UINT32	R R	
+12,13 +14,15	0x3503	Max. Total PF Timestamp	-1000-1000	×0.001 sec	INT32 UINT32	R R	
37376-37387		<b>Maximum Auxiliary Values</b>					
+0,1 +2,3	0x3600	Not used			UINT32 UINT32	R R	
+4,5 +6,7	0x3601	Max. In Current Timestamp	0-Imax	U2 sec	UINT32 UINT32	R R	
+8,9 +10,11	0x3602	Max. Frequency Timestamp	0-Fmax	×0.01Hz sec	UINT32 UINT32	R R	
37504-37535		<b>Summary Energy Maximum Demands<sup>E</sup></b>					
+0,1 +2,3	0x4780	Summary register #1 Maximum Demand Timestamp	0-Pmax	U3	UINT32	R	
+4,5 +6,7	0x4781	Summary register #2 Maximum Demand Timestamp	0-Pmax	U3	UINT32	R	
		...					
+28,29 +30,31	0x4783	Summary register #8 Maximum Demand Timestamp	0-Pmax	U3	UINT32	R	
37632-37695		<b>Maximum Demands</b>					
+0,1 +2,3	0x3700	V1/V12 Maximum volt demand Timestamp	0-Vmax	U1 sec	UINT32 UINT32	R R	<sup>1</sup>
+4,5 +6,7	0x3701	V2/V23 Maximum volt demand Timestamp	0-Vmax	U1 sec	UINT32 UINT32	R R	<sup>1</sup>
+8,9 +10,11	0x3702	V3/V31 Maximum volt demand Timestamp	0-Vmax	U1 sec	UINT32 UINT32	R R	<sup>1</sup>
+12,13 +14,15	0x3703	I1 Maximum ampere demand Timestamp	0-Imax	U2 sec	UINT32 UINT32	R R	
+16,17 +18,19	0x3704	I2 Maximum ampere demand Timestamp	0-Imax	U2 sec	UINT32 UINT32	R R	
+20,21 +22,23	0x3705	I3 Maximum ampere demand Timestamp	0-Imax	U2 sec	UINT32 UINT32	R R	
+24,25 +26,27	0x3706	Not used Timestamp			UINT32 UINT32	R R	
+28,29 +30,31	0x3707	Not used Timestamp			UINT32 UINT32	R R	
+32,33 +34,35	0x3708	Not used Timestamp			UINT32 UINT32	R R	
+36,37 +38,39	0x3709	Maximum kW import sliding window demand Timestamp	0-Pmax	U3 sec	UINT32 UINT32	R R	
+40,41 +42,43	0x370A	Maximum kvar import sliding window demand Timestamp	0-Pmax	U3 sec	UINT32 UINT32	R R	
+44,45 +46,47	0x370B	Maximum kVA sliding window demand Timestamp	0-Pmax	U3 sec	UINT32 UINT32	R R	

Address	Point ID	Description	Options/Range/Format <sup>2</sup>	Units <sup>2</sup>	Type	R/W	Notes
+48,49 +50,51	0x3737	Not used Timestamp			UINT32 UINT32	R R	
+52,53 +54,55	0x370D	Not used Timestamp			UINT32 UINT32	R R	
+56,57 +58,59	0x370E	Not used Timestamp			UINT32 UINT32	R R	
+60,61 +62,63	0x370F	Maximum kW export sliding window demand Timestamp	0-Pmax	U3 sec	UINT32 UINT32	R R	
+64,65 +66,67	0x3710	Maximum kvar export sliding window demand Timestamp	0-Pmax	U3 sec	UINT32 UINT32	R R	
38016-38063		<b>Maximum Harmonic Demands</b>					
+0,1 +2,3	0x3880	V1/V12 THD demand Timestamp	0-9999	×0.1% sec	UINT32 UINT32	R R	<sup>1</sup>
+4,5 +6,7	0x3881	V2/V23 THD demand Timestamp	0-9999	×0.1% sec	UINT32 UINT32	R R	<sup>1</sup>
+8,9 +10,11	0x3882	V3/V31 THD demand Timestamp	0-9999	×0.1% sec	UINT32 UINT32	R R	<sup>1</sup>
+12,13 +14,15	0x3883	Not used			UINT32 UINT32	R R	
+16,17 +18,19	0x3884	I1 THD demand Timestamp	0-9999	×0.1% sec	UINT32 UINT32	R R	
+20,21 +22,23	0x3885	I2 THD demand Timestamp	0-9999	×0.1% sec	UINT32 UINT32	R R	
+24,25 +26,27	0x3886	I3 THD demand Timestamp	0-9999	×0.1% sec	UINT32 UINT32	R R	
+28,29 +30,31	0x3887	Not used			UINT32 UINT32	R R	
+32,33 +34,35	0x3888	I1 TDD demand Timestamp	0-1000	×0.1% sec	UINT32 UINT32	R R	
+36,37 +38,39	0x3889	I2 TDD demand Timestamp	0-1000	×0.1% sec	UINT32 UINT32	R R	
+40,41 +42,43	0x388A	I3 TDD demand Timestamp	0-1000	×0.1% sec	UINT32 UINT32	R R	
+44,45 +46,47	0x388B	Not used			UINT32 UINT32	R R	
38144-38175		<b>TOU Maximum Demand Register #1<sup>E</sup></b>					
+0,1 +2,3	0x4800	Tariff #1 maximum demand Timestamp	0-Pmax	U3 sec	UINT32 UINT32	R R	
+4,5 +6,7	0x4801	Tariff #2 maximum demand Timestamp	0-Pmax	U3 sec	UINT32 UINT32	R R	
		...				R	
+28,29 +30,31	0x4807	Tariff #8 maximum demand Timestamp	0-Pmax	U3 sec	UINT32 UINT32	R R	
38400-38431		<b>TOU Maximum Demand Register #2<sup>E</sup></b>					

Address	Point ID	Description	Options/Range/Format <sup>2</sup>	Units <sup>2</sup>	Type	R/W	Notes
+0,1 +2,3	0x4900	Tariff #1 maximum demand Timestamp	0-Pmax	U3 sec	UINT32 UINT32	R R	
+4,5 +6,7	0x4901	Tariff #2 maximum demand Timestamp	0-Pmax	U3 sec	UINT32 UINT32	R R	
		...				R	
+28,29 +30,31	0x4907	Tariff #8 maximum demand Timestamp	0-Pmax	U3 sec	UINT32 UINT32	R R	
38656-38687		<b>TOU Maximum Demand Register #3<sup>E</sup></b>					
+0,1 +2,3	0x4A00	Tariff #1 maximum demand Timestamp	0-Pmax	U3 sec	UINT32 UINT32	R R	
+4,5 +6,7	0x4A01	Tariff #2 maximum demand Timestamp	0-Pmax	U3 sec	UINT32 UINT32	R R	
		...				R	
+28,29 +30,31	0x4A07	Tariff #8 maximum demand Timestamp	0-Pmax	U3 sec	UINT32 UINT32	R R	
38272-38313		<b>TOU Maximum Demand Register #4<sup>E</sup></b>					
+0,1 +2,3	0x4880	Tariff #1 maximum demand Timestamp	0-Pmax	U3 sec	UINT32 UINT32	R R	
+4,5 +6,7	0x4881	Tariff #2 maximum demand Timestamp	0-Pmax	U3 sec	UINT32 UINT32	R R	
		...				R	
+28,29 +30,31	0x4887	Tariff #8 maximum demand Timestamp	0-Pmax	U3 sec	UINT32 UINT32	R R	
38528-38559		<b>TOU Maximum Demand Register #5<sup>E</sup></b>					
+0,1 +2,3	0x4980	Tariff #1 maximum demand Timestamp	0-Pmax	U3 sec	UINT32 UINT32	R R	
+4,5 +6,7	0x4981	Tariff #2 maximum demand Timestamp	0-Pmax	U3 sec	UINT32 UINT32	R R	
		...				R	
+28,29 +30,31	0x4987	Tariff #8 maximum demand Timestamp	0-Pmax	U3 sec	UINT32 UINT32	R R	
38784-38815		<b>TOU Maximum Demand Register #6<sup>E</sup></b>					
+0,1 +2,3	0x4A80	Tariff #1 maximum demand Timestamp	0-Pmax	U3 sec	UINT32 UINT32	R R	
+4,5 +6,7	0x4A81	Tariff #2 maximum demand Timestamp	0-Pmax	U3 sec	UINT32 UINT32	R R	
		...				R	
+28,29 +30,31	0x4A87	Tariff #8 maximum demand Timestamp	0-Pmax	U3 sec	UINT32 UINT32	R R	
38912-38943		<b>TOU Maximum Demand Register #7<sup>E</sup></b>					
+0,1 +2,3	0x5300	Tariff #1 maximum demand Timestamp	0-Pmax	U3 sec	UINT32 UINT32	R R	

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

**NOTES:**

Power demand readings are only available in the meters with suffixes E and EH.

<sup>1</sup> Voltage and Voltage Harmonics Readings:

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.

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

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

### 3.6 Device Control and Status Registers

Address	Point ID	Description	Options/Range	Units	Type	R/W	Notes
<b>Device Restart Register</b>							
2560		Warm restart of the device	0 when read, 0xFFFF when written = restart the device		UINT16	R/W	
<b>Device Authorization Registers</b>							
2575		When write: 4-digit password. When read: 0 = access permitted, -1 = authorization required.	0-9999 (write) 0/-1 (read)		INT16	R/W	
44378-44379		When write: 8-digit password. When read: 0 = access permitted, -1 = authorization required.	0 - 99999999 (write) 0/-1 (read)		INT32	R/W	
<b>Event Flags Control <sup>EH</sup></b>							
2916-2923							
2916		<b>Event Flag #1 Status</b>	0-1		UINT16	R/W	
2917		<b>Event Flag #2 Status</b>	0-1		UINT16	R/W	
2918		<b>Event Flag #3 Status</b>	0-1		UINT16	R/W	
2919		<b>Event Flag #4 Status</b>	0-1		UINT16	R/W	
2920		<b>Event Flag #5 Status</b>	0-1		UINT16	R/W	
2921		<b>Event Flag #6 Status</b>	0-1		UINT16	R/W	
2922		<b>Event Flag #7 Status</b>	0-1		UINT16	R/W	
2923		<b>Event Flag #8 Status</b>	0-1		UINT16	R/W	
<b>Remote Relay Control</b>							
3244-3245							
+0		Remote relay command	0 = remove a remote command 1 = operate relay 2 = remove a remote command and release a locally latched relay		UINT16	W	
3244		<b>RO1 Control</b>					
3245		<b>RO2 Control</b>					
<b>Device Reset/Clear Registers</b>							
3404		Clear total energy registers	0		UINT16	W	
3405		Clear total maximum demand registers	0 = Clear all maximum demands 1 = Clear power demands <sup>E</sup> 2 = Clear volt, ampere and harmonic demands		UINT16	W	
3406		Clear TOU energy registers <sup>E</sup>	0		UINT16	W	
3407		Clear TOU maximum demand registers <sup>E</sup>	0		UINT16	W	
3408		Clear pulse counters	0 = Clear all counters 1-4 = Clear counter #1-#4		UINT16	W	
3409		Clear Min/Max log	0		UINT16	W	
3410		Clear event log <sup>E</sup>	0		UINT16	W	
3411		Clear data log <sup>E</sup>	0-7 = Clear Data log #1-#8		UINT16	W	

Address	Point ID	Description	Options/Range	Units	Type	R/W	Notes
			16 = Clear all data logs				
3412		Clear waveform log #1 <sup>EH</sup>	0		UINT16	W	
3413		Clear waveform log #2 <sup>EH</sup>	0		UINT16	W	
3414		Clear operation/event counters	6=clear communication counters		UINT16	W	
3415		Restore event log read pointer	0		UINT16	W	
3416		Restore data log read pointer	0-7 = Data log #1-#8 48-55, 64-66 = Daily profile data log #8 (same as 7)		UINT16	W	
3417		Restore waveform log #1 read pointer <sup>EH</sup>	0		UINT16	W	
3418		Restore waveform log #2 read pointer <sup>EH</sup>	0		UINT16	W	
<b>Device Identification</b>							
2561-2562		Reserved	0		UINT16	R	
2563		Firmware build number	1-99		UINT16	R	
2564		Reserved	0		UINT16	R	
2565		Firmware version number	1300-1399,1500-1599(PM172P/E), 1400-1499,1600-1699 (PM172EH)		UINT16	R	Two higher decimal digits = major version number, two lower decimal digits = minor version number
2566,2567		Instrument options	F28		UINT32	R	
3484		Current serial port number	0=COM1, 1=COM2		UINT16	R	
<b>Device Status Registers</b>							
3452		Relay status RO1-RO2 (bitmap)	0x0000-0x0003		UINT16	R	Bits set to 1 indicate closed relay contacts.
3453		Event flags (bitmap) <sup>EH</sup>	0x0000-0x00FF		UINT16	R	
3454		Digital (status) inputs DI1-DI2	0x0000-0x0003		UINT16	R	Bits set to 1 indicate closed input contacts.
3455		Present setpoint status SP1-SP16 (bitmap)	0x0000-0xFFFF		UINT16	R	Bits set to 1 indicate operated (activated) setpoints.
<b>Log Notification Registers <sup>E</sup></b>							
3456		Log status (bitmap)	F26		UINT16	R	Bits set to 1 indicate that at least one new record is present in the designated files.
3457		Data log status (bitmap)	F27		UINT16	R	Bits set to 1 indicate that at least one new record is present in the designated files.
3458-3473		Reserved	0		UINT16	R	
<b>Alarm Notification Registers</b>							
3474		Setpoint alarm status SP1-SP16 (bitmap). Nonvolatile register that keeps the status of the operated setpoints.	0x0000-0xFFFF		UINT16	R/W	When read: Bits set to 1 indicate that the designated setpoint have been operated at least once since the alarm bits were reset. When written: Bits preset to 0 clear corresponding alarms, Bits set to 1 have no effect.
3475		Self-check alarm status (device diagnostics).	F23		UINT16	R/W	When read: Bits set to 1 indicate

Address	Point ID	Description	Options/Range	Units	Type	R/W	Notes
		Nonvolatile register that keeps the status of the internal device diagnostics.					that the designated diagnostics failed at least once since the alarm bits were reset. When written: Bits preset to 0 clear corresponding alarms; bits set to 1 have no effect.
3476-3483		Reserved	0		UINT16	R	
3485		Battery status	0 = low battery, 1 = normal		UINT16	R	
<b>Communication Status</b>							
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
<b>Communication Counters</b>							
44410		Successful eXpertPower client connections	0-65534		UINT16	R	
44411		Failed eXpertPower client connections	0-65534		UINT16	R	
44412		Successful TCP notification client connections	0-65534		UINT16	R	
44413		Failed TCP notification client connections	0-65534		UINT16	R	
44414-44441		Reserved			UINT16	R	65535 = N/A

### 3.7 Device Setup Registers

Address	Point ID	Description	Options/Range	Units	Type	R/W	Notes
<b>Device Identification</b>							
46080-46111							
+0,1		Device serial number	0-999999		UINT32	R	
+2,3		Device model ID	17210=PM172P, 17220=PM172E, 17230=PM172EH		UINT32	R	
+4-11		Device model name	"PM172P", "PM172E", "PM172EH"		CHAR16	R	Null-terminated string
+12-13		Device options (bitmap)	0		UINT32	R	
+14-19		Reserved			UINT16	R	
+20		Device firmware version number	1300-1399,1500-1599(PM172P/E), 1400-1499,1600-1699 (PM172EH)		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	
<b>Factory Device Settings</b>							
46112-46125							
+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	
+14-63		Unused			UINT16	R	
+64		Ethernet MAC address 0-1	0x0500		UINT16	R	
+65		Ethernet MAC address 2-3	0x00F0		UINT16	R	
+66		Ethernet MAC address 4-5	0x0000-0xFFFF		UINT16	R	
<b>Basic Setup</b>							
2304-2324							
+0		Wiring mode	F2		UINT16	R/W	
+1		PT ratio	10 to 65000	×0.1	UINT16	R/W	
+2		CT primary current	1 to 20,000	A	UINT16	R/W	
+3		Power block demand period <sup>E</sup>	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



Address	Point ID	Description	Options/Range	Units	Type	R/W	Notes
							interval. <sup>E</sup>
+4		Volt/ampere/harmonic demand period	0 to 1800	sec	UINT16	R/W	
+5-7		Reserved			UINT16	R/W	Read as 65535
+8		Number of blocks in a sliding window <sup>E</sup>	1 to 15		UINT16	R/W	<sup>E</sup>
+9		Reserved			UINT16	R/W	Read as 65535
+10		Number of cycles before trigger for the Waveform log #1 <sup>EH</sup>	1 to 8		UINT16	R/W	Obsolete register. Refer to the Waveform Log setup registers. <sup>EH</sup>
+11		Nominal line frequency	25, 50, 60, 400	Hz	UINT16	R/W	
+12		Maximum demand load current	0 to 20,000 (0 = CT primary current)	A	UINT16	R/W	
+13-15		Reserved			UINT16	R/W	Read as 65535
+16		Number of cycles per series for the Waveform log #1 <sup>EH</sup>	16 to 2560		UINT16	R/W	Obsolete register. Refer to the Waveform Log setup registers. <sup>EH</sup>
+17		Reserved			UINT16	R/W	Read as 65535
+18		Nominal secondary voltage <sup>EH</sup>	10 to 690 V		UINT16	R/W	<sup>EH</sup>
+19		Reserved			UINT16	R/W	Read as 65535
+20		PT ratio multiplication factor	×1, ×10		UINT16	R/W	
<b>Communication Ports Setup</b>							
2344-2359							
+0		Communication protocol	COM1: 0=SATEC ASCII, 1=Modbus RTU, 2=DNP3.0, 4=DTE, 5=Profibus DP COM2: 0=SATEC ASCII, 1=Modbus RTU, 2=DNP3.0, 4=DTE		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	SATEC ASCII: 0-99 Modbus RTU: 1-247 DNP3.0: 0-65532 DTE: 1-65532 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)		UINT16	R/W	N/A for COM2 (read as 65535)

Address	Point ID	Description	Options/Range	Units	Type	R/W	Notes
			2=hardware (CTS)				
+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)
+7		ASCII compatibility mode	0=disabled, 1=enabled		UINT16	R/W	
2344-2351		<b>COM1 Setup</b>					
2352-2359		<b>COM2 Setup</b>					
<b>Device Options Setup</b>							
2376-2386							
+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 <sup>E</sup>	0= $1 \times 10^4$ , 1= $1 \times 10^5$ , 2= $1 \times 10^6$ , 3= $1 \times 10^7$ , 4= $1 \times 10^8$ , 5= $1 \times 10^9$		UINT16	R/W	<sup>E</sup>
+2		Phase energy calculation mode <sup>E</sup>	0=disabled, 1=enabled		UINT16	R/W	<sup>E</sup>
+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= $\pm 1$ mA		UINT16	R/W	
+5		Battery mode	0 = battery is OFF, 1 = battery is ON		UINT16	R/W	
+6-8		Reserved			UINT16	R/W	Read as 65535
+9		Harmonic power/energy calculation mode <sup>EH</sup>	0=disabled, 1=enabled		UINT16	R/W	<sup>EH</sup>
+10		Energy LED test mode <sup>E</sup>	0=disabled, 1=Wh test, 2=varh test		UINT16	R/W	LED pulse rate is 10,000 pulses/kWh
+11		Reserved			UINT16	R/W	Read as 65535
+12		Starting current, percent of full scale	1-20	$\times 0.1\%$	UINT16	R/W	
<b>Local Settings</b>							
4320-4330							
+0		Daylight savings time (DST) option	0 = DST disabled (standard time only), 1 = DST enabled		UINT16	R/W	
+1		DST start month	1-12		UINT16	R/W	
+2		DST start week of the month	1-4 = 1st, 2nd, 3rd and 4th week, 5=the last week of the month		UINT16	R/W	
+3		DST start weekday	1-7 (1=Sun, 7=Sat)		UINT16	R/W	
+4		DST end month	1-12		UINT16	R/W	
+5		DST end week of the month	1-4=1st, 2nd, 3 <sup>rd</sup> and 4th week, 5=the last week of the month		UINT16	R/W	
+6		DST end weekday	1-7 (1=Sun, 7=Sat)		UINT16	R/W	
+7		Clock synchronization source	1-2 = DI1-DI2, 32767 = meter clock		UINT16	R/W	A DI input is considered a pulse or KYZ input. The pulse edge adjusts

Address	Point ID	Description	Options/Range	Units	Type	R/W	Notes
							the clock at the nearest whole minute.
+8		Country code	ITU calling number		UINT16	R/W	
+9		DST start hour	1-6		UINT16	R/W	
+10		DST end hour	1-6		UINT16	R/W	
<b>Clock Indication and Setup</b>							
4352-4358							
+0		Seconds	0-59		UINT16	R/W	
+1		Minutes	0-59		UINT16	R/W	
+2		Hour	0-23		UINT16	R/W	
+3		Day of month	1-31		UINT16	R/W	
+4		Month	1-12		UINT16	R/W	
+5		Year (calendar year minus 2000)	0-99		UINT16	R/W	
+6		Weekday	1-7 (1=Sun, 7=Sat)		UINT16	R/W	Ignored when written
<b>Alarm/Event Setpoints Setup</b>							
352-1055							
+0		Condition #1: Logical operator	0 = OR, 1 = AND		UINT16	R/W	
+1		Condition #1: Trigger parameter ID	F12		UINT16	R/W	
+2		Condition #1: 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
+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	

Address	Point ID	Description	Options/Range	Units	Type	R/W	Notes
+35		Action #2: Action target	F14		UINT16	R/W	
+36		Action #3: Action type	F14		UINT16	R/W	
+37		Action #3: Action target	F14		UINT16	R/W	
+38		Action #4: Action type	F14		UINT16	R/W	
+39		Action #4: Action target	F14		UINT16	R/W	
+40		Not used	0		UINT16	R/W	
+41		Operate delay	0-9999	×0.1 sec	UINT16	R/W	
+42		Release delay	0-9999	×0.1 sec	UINT16	R/W	
+43		Not used	0		UINT16	R/W	
352-395		<b>Setpoint #1</b>					
396-439		<b>Setpoint #2</b>					
440-483		<b>Setpoint #3</b>					
484-527		<b>Setpoint #4</b>					
528-571		<b>Setpoint #5</b>					
572-615		<b>Setpoint #6</b>					
616-659		<b>Setpoint #7</b>					
660-703		<b>Setpoint #8</b>					
704-747		<b>Setpoint #9</b>					
748-791		<b>Setpoint #10</b>					
792-835		<b>Setpoint #11</b>					
836-879		<b>Setpoint #12</b>					
880-923		<b>Setpoint #13</b>					
924-967		<b>Setpoint #14</b>					
968-1011		<b>Setpoint #15</b>					
1012-1055		<b>Setpoint #16</b>					
<b>Data Log Setup <sup>E</sup></b>							
1792-1919							
+0		Data log parameter #1 ID	See Section 3.4		UINT16	R/W	
+1		Data log parameter #2 ID			UINT16	R/W	
+2		Data log parameter #3 ID			UINT16	R/W	
+3		Data log parameter #4 ID			UINT16	R/W	
+4		Data log parameter #5 ID			UINT16	R/W	
+5		Data log parameter #6 ID			UINT16	R/W	
+6		Data log parameter #7 ID			UINT16	R/W	
+7		Data log parameter #8 ID			UINT16	R/W	
+8		Data log parameter #9 ID			UINT16	R/W	
+9		Data log parameter #10 ID			UINT16	R/W	
+10		Data log parameter #11 ID			UINT16	R/W	
+11		Data log parameter #12 ID			UINT16	R/W	
+12		Data log parameter #13 ID			UINT16	R/W	
+13		Data log parameter #14 ID			UINT16	R/W	
+14		Data log parameter #15 ID			UINT16	R/W	
+15		Data log parameter #16 ID			UINT16	R/W	

Address	Point ID	Description	Options/Range	Units	Type	R/W	Notes
1792-1807		<b>Data log #1 Setup</b>					
1808-1823		<b>Data log #2 Setup</b>					
1824-1839		<b>Data log #3 Setup</b>					
1840-1855		<b>Data log #4 Setup</b>					
1856-1871		<b>Data log #5 Setup</b>					
1872-1887		<b>Data log #6 Setup</b>					
1888-1903		<b>Data log #7 Setup</b>					
1904-1919		<b>Data log #8 Setup</b>					
<b>Pulse Counters Setup</b>							
2940-2947							
+0		Source digital input ID	0=not assigned, 1=D11, 2=D12		UINT16	R/W	
+1		Multiplier	0-9999		UINT16	R/W	
2940-2941		<b>Counter #1 Setup</b>					
2942-2943		<b>Counter #2 Setup</b>					
2944-2945		<b>Counter #3 Setup</b>					
2946-2947		<b>Counter #4 Setup</b>					
<b>Analog Outputs Setup</b>							
3148-3153							
+0		Output parameter ID	F18		UINT16	R/W	
+1		Zero scale value (0/4 mA)	See Section 3.3		UINT16	R/W	Scaled value
+2		Full scale value (1/20 mA)	See Section 3.3		UINT16	R/W	Scaled value
3148-3150		<b>AO1 Setup</b>					
3151-3153		<b>AO2 Setup</b>					
<b>Analog Expander Setup</b>							
3196-3243							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		Zero scale value (0/4 mA)	See Section 3.3		UINT16	R/W	Scaled value
+2		Full scale value (1/20 mA)	See Section 3.3		UINT16	R/W	Scaled value
3196-3198		<b>AX8 #1 Channel 1 Setup</b>					
3199-3201		<b>AX8 #1 Channel 2 Setup</b>					
3202-3204		<b>AX8 #1 Channel 3 Setup</b>					
3205-3207		<b>AX8 #1 Channel 4 Setup</b>					
3208-3210		<b>AX8 #1 Channel 5 Setup</b>					
3211-3213		<b>AX8 #1 Channel 6 Setup</b>					
3214-3216		<b>AX8 #1 Channel 7 Setup</b>					
3217-3219		<b>AX8 #1 Channel 8 Setup</b>					
3220-3222		<b>AX8 #2 Channel 1 Setup</b>					
3223-3225		<b>AX8 #2 Channel 2 Setup</b>					
3226-3228		<b>AX8 #2 Channel 3 Setup</b>					
3229-3231		<b>AX8 #2 Channel 4 Setup</b>					

Address	Point ID	Description	Options/Range	Units	Type	R/W	Notes
3232-3234		<b>AX8 #2 Channel 5 Setup</b>					
3235-3237		<b>AX8 #2 Channel 6 Setup</b>					
3238-3240		<b>AX8 #2 Channel 7 Setup</b>					
3241-3243		<b>AX8 #2 Channel 8 Setup</b>					
<b>Digital Inputs Setup</b>							
3292-3296							Obsolete registers. Refer to Digital Inputs setup registers 61728-61735
+0		Status inputs (bitmap)	0x0003		UINT16	R/W	Ignored when written
+1		Pulse inputs (bitmap)	0x0003		UINT16	R/W	Ignored when written
+2		Not used	0		UINT16	R/W	
+3		External demand synchronization input (bitmap)	0x0001=DI1		UINT16	R/W	Ignored when written
+4		Time synchronization input (bitmap)	0x0001=DI1, 0x0002=DI2		UINT16	R/W	
<b>Periodic Timers Setup <sup>E</sup></b>							
3300-3301							
+0		Time interval	0=timer disabled, 1-9999 sec	sec	UINT16	R/W	
3300		<b>Timer #1 Setup</b>			UINT16	R/W	
3301		<b>Timer #2 Setup</b>			UINT16	R/W	
<b>File Setup <sup>E</sup></b>							
3660-3811							
+0		Number of records in the file	0=delete a file, 1-65535		UINT16	R/W	
+1		Number of parameters per record	1-16		UINT16	R/W	Write 0 for event and waveform log files
+2		File attributes (bitmap)	F3		UINT16	R/W	
+3		File record size, bytes (for info only)			UINT16	R	
+4,5		Allocated file size, bytes (for info only)			UINT32	R	
+6,7		Reserved			UINT16	R	
3660-3667		<b>Event Log Setup</b>					
3668-3675		<b>Data Log #1 Setup</b>					
3676-3683		<b>Data Log #2 Setup</b>					
3684-3691		<b>Data Log #3 Setup</b>					
3692-3699		<b>Data Log #4 Setup</b>					
3700-3707		<b>Data Log #5 Setup</b>					
3708-3715		<b>Data Log #6 Setup</b>					
3716-3723		<b>Data Log #7 Setup</b>					
3724-3729		<b>Data Log #8 Setup</b>					
3730-3795		Reserved					
3796-3803		<b>Waveform Log #1 Setup</b>					
3804-3811		<b>Waveform Log #2 Setup</b>					
<b>Network Setup</b>							
46576-46703							
+0,1		Device IP Address	0x01000000-0xFFFFFFFF		UINT32	R/W	Network byte order
+2,3		Network subnet mask	0x00000001-0xFFFFFFFF		UINT32	R/W	Network byte order

Address	Point ID	Description	Options/Range	Units	Type	R/W	Notes
+4,5		Network default gateway	0x00000000-0xFFFFFFFF		UINT32	R/W	Network byte order
+6,7		Use DHCP	0 = NO, 1 = YES		UINT32	R/W	
+8,9		TCP service port	502 = Modbus/TCP, 20000 = DNP3.0/TCP		UINT32	R/W	
+10-127		Reserved				R/W	
<b>Password Setup</b>							
46704-46707							
+0,1		Communications password (4 digits)	0-9999		UINT32	R/W	Read as 0
+2		Password protection enabled	0 = disabled, 1 = enabled		UINT16	R/W	
+3		Reserved			UINT16	R/W	
<b>Expert Power Service Setup</b>							
46768-46783							
+0,1		Expert Power server IP Address	0x01000000-0xFFFFFFFF		UINT32	R/W	Default = 207.232.60.18
+2,3		Expert Power server TCP service port	0-65535		UINT32	R/W	Default = 5001
+4,5		Expert Power client enabled	0 = client disabled, 1 = client enabled		UINT32	R/W	
+6,7		Time to next session	1-99999	min	UINT32	R/W	
+8,9		Time to next session	1-99999	min	UINT32	R	Same as previous
+10-15		Reserved					
<b>Internet Service Provider (ISP) accounts</b>							
46784-46831							
+0-15		ISP telephone number			CHAR32	R/W	
+16-31		Login name			CHAR32	R/W	
+32-47		Login password			CHAR32	R/W	
<b>GPRS Setup</b>							
46832-46879							
+0-15		Access Point Name (APN)			CHAR32	R/W	
+16-31		User name			CHAR32	R/W	
+32-39		Password			CHAR16	R/W	
+40-47		Reserved			CHAR16	R/W	
<b>TCP Notification Client Setup</b>							
46896-46991							
+0,1		Client enabled	0 = disabled, 1 = enabled		UINT32	R/W	
+2,3		Server address	0x01000000-0xFFFFFFFF		UINT32	R/W	
+4,5		Server port	0-65535		UINT32	R/W	
+6,7		Message exchange address	0-65535		UINT32	R/W	
+8-15		Reserved					
<b>Transformer Correction Setup</b>							
47072-47099							
+0		Ratio correction factor	900-1100	×0.001	UINT16	R/W	
+1		Phase angle error	-600 to 600	minutes	INT16	R/W	-2700 to 2700 in V13.71.12
+2, 3		Reserved			INT16	R/W	

Address	Point ID	Description	Options/Range	Units	Type	R/W	Notes
47072-47075		<b>V1 transformer correction</b>					
47076-47079		<b>V2 transformer correction</b>					
47080-47083		<b>V3 transformer correction</b>					
47084-47087		<b>Reserved</b>					
47088-47091		<b>I1 transformer correction</b>					
47092-47095		<b>I2 transformer correction</b>					
47096-47099		<b>I3 transformer correction</b>					
<b>EGD Producer Exchanges Setup</b>							
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		<b>Exchange #1</b>					
50550-50645		<b>Exchange #2</b>					
50646-50741		<b>Exchange #3</b>					
50742-50837		<b>Exchange #4</b>					
<b>DNP Options Setup</b>							
51158-51183							
+0		Binary Input Static Objects	F24 (default 0)		UINT16	R/W	
+1		Binary Input Change Objects	F24 (default 1)		UINT16	R/W	
+2		Binary Counter Objects	F24 (default 3)		UINT16	R/W	
+3		Frozen Binary Counter Objects	F24 (default 4)		UINT16	R/W	
+4		Reserved			UINT16	R/W	
+5		Binary Counter Change Event Objects	F24 (default 2)		UINT16	R/W	
+6		Analog Input Objects	F24 (default 3)		UINT16	R/W	
+7		Reserved			UINT16	R/W	
+8		Reserved			UINT16	R/W	
+9		Analog Input Change Event Objects	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 – scaling OFF, 1-scaling ON		UINT16	R/W	



Address	Point ID	Description	Options/Range	Units	Type	R/W	Notes
+13		Number of mapped points of the Analog Input object	0 to 43 (default 43)		UINT16	R/W	
+14		Number of mapped points of the Binary Input object	0 to 32 (default 21)		UINT16	R/W	
+15		Number of mapped points of the Binary Counter object	0 to 16 (default 0)		UINT16	R/W	
+16		Select/Operate Timeout	2 to 30 seconds (default 10 sec)		UINT16	R/W	
+17		Multi Fragment Interval	50 to 500 ms (default 50 ms)		UINT16	R/W	
+18-21		Reserved	Read as 65535		UINT16	R/W	
+22,23		Time Sync Period	1 to 86400 seconds (default 86400 sec)		UINT32	R/W	
+24		Voltage scale, volts secondary	60 to 828V (default 144V)	V	UINT16	R/W	
+25		Current scale, amps secondary	100	×0.1A	UINT16	R/W	
51184-51189		Reserved					
<b>DNP Events Setup</b>							
51190-51445							
+0,1		Threshold/Deadband	0 to $4.3 \times 10^9$		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		<b>DNP Event #1</b>					
51194-51197		<b>DNP Event #2</b>					
		...					
51442-51445		<b>DNP Event #64</b>					
51446-51701		Reserved					
<b>DNP Class 0 Point Assignments</b>							
51702-51797							
+0		DNP object and variation	F25		UINT16	R/W	
+1		DNP point number	Point number for the selected object		UINT16	R/W	
+2		Number of points	0-128		UINT16	R/W	

Address	Point ID	Description	Options/Range	Units	Type	R/W	Notes
51702-51704		<b>DNP Class 0 Points Group 1</b>					
51705-51707		<b>DNP Class 0 Points Group 2</b>					
		...					
51795-51797		<b>DNP Class 0 Points Group 32</b>					
51798-51893		Reserved					
<b>Waveform Recorder Setup</b> <sup>EH</sup>							
53878-53949							
+0		Sampling rate, samples per cycle	32 (Waveform log #1), 128 (Waveform log #2)		UINT16	R/W	Ignored when written
+1		Number of cycles per series	16-2560 (32 samples/cycle), 4-640 (128 samples/cycle)		UINT16	R/W	
+3		Not used	0		UINT16	R/W	
+4		Number of cycles before a trigger	1-20		UINT16	R/W	
+4,5		File channel mask, bitmap	F9, 0x00000033		UINT32	R/W	Ignored when written
+6,7		Not used	0		UINT32	R/W	
53878-53885		<b>Waveform Log #1 Setup</b>					
53886-53893		<b>Waveform Log #2 Setup</b>					
<b>TOU Daily Profile Setup</b> <sup>E</sup>							
55574-55701							
+0		1 <sup>st</sup> tariff change	F10		UINT16	R/W	
+1		2 <sup>nd</sup> tariff change	F10		UINT16	R/W	
+2		3 <sup>rd</sup> tariff change	F10		UINT16	R/W	
+3		4 <sup>th</sup> tariff change	F10		UINT16	R/W	
+4		5 <sup>th</sup> tariff change	F10		UINT16	R/W	
+5		6 <sup>th</sup> tariff change	F10		UINT16	R/W	
+6		7 <sup>th</sup> tariff change	F10		UINT16	R/W	
+7		8 <sup>th</sup> tariff change	F10		UINT16	R/W	
55574-55581		<b>Daily profile #1: Season 1, Day type 1</b>					
55582-55589		<b>Daily profile #2: Season 1, Day type 2</b>					
55590-55597		<b>Daily profile #3: Season 1, Day type 3</b>					
55598-55605		<b>Daily profile #4: Season 1, Day type 4</b>					
55606-55613		<b>Daily profile #5: Season 2, Day type 1</b>					
55614-55621		<b>Daily profile #6: Season 2, Day type 2</b>					
55622-55629		<b>Daily profile #7: Season 2, Day type 3</b>					
55630-55637		<b>Daily profile #8: Season 2, Day type 4</b>					
55638-55645		<b>Daily profile #9: Season 3, Day type 1</b>					
55646-55653		<b>Daily profile #10: Season 3, Day type 2</b>					
55654-55661		<b>Daily profile #11: Season 3, Day type 3</b>					
55662-55669		<b>Daily profile #12: Season 3, Day type 4</b>					
55670-55677		<b>Daily profile #13: Season 4, Day type 1</b>					
55678-55685		<b>Daily profile #14: Season 4, Day type 2</b>					
55686-55693		<b>Daily profile #15: Season 4, Day type 3</b>					

Address	Point ID	Description	Options/Range	Units	Type	R/W	Notes
55694-55701		<b>Daily profile #16: Season 4, Day type 4</b>					
55702-55711		Reserved					
<b>TOU Calendar Setup <sup>E</sup></b>							
55712-56031							
+0-9		<b>Calendar entry record</b>				R/W	
+0		Daily profile	0-3 = Season 1, Day types 0-3 4-7 = Season 2, Day types 0-3 8-11 = Season 3, Day types 0-3 12-15 = Season 4, Day types 0-3		UINT16	R/W	
+1		Week of month	0=all, 1=1st, 2=2nd, 3=3 <sup>rd</sup> , 4=4th, 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		<b>Calendar entry #1</b>					
55722-55731		<b>Calendar entry #2</b>					
55732-55741		<b>Calendar entry #3</b>					
...							
56022-56031		<b>Calendar entry #32</b>					
56032-56191		Reserved					
<b>Summary Energy/TOU Registers Setup <sup>E</sup></b>							
56672-56703							
+0		Not used			UINT16	R/W	
+1		Units of measurement	0=none, 1=kWh, 2=kvarh, 3=kVAh, 4=m <sup>3</sup> , 5=CF (cubic feet), 6=CCF (hundred cubic feet)		UINT16	R/W	
+2		Flags (bitmap)	Bit 0=1 - TOU enabled 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		<b>Register #1 Setup</b>					
56676-56679		<b>Register #2 Setup</b>					
56680-56683		<b>Register #3 Setup</b>					
56684-56687		<b>Register #4 Setup</b>					
56688-56691		<b>Register #5 Setup</b>					
56692-56695		<b>Register #6 Setup</b>					

Address	Point ID	Description	Options/Range	Units	Type	R/W	Notes
56696-56699		<b>Register #7 Setup</b>					
56700-56703		<b>Register #8 Setup</b>					
<b>Summary Energy/TOU Registers Source Setup <sup>E</sup></b>							
56928-57183							
+0		Energy source ID	F11		UINT16	R/W	
+1		Target summary register number	0-7 = register #1-#8		UINT16	R/W	
+2,3		Multiplier	0-1000000	x0.001	INT32	R/W	
56928-56931		<b>Energy Source #1</b>					
56932-56935		<b>Energy Source #2</b>					
56936-56939		<b>Energy Source #3</b>					
56940-56943		<b>Energy Source #4</b>					
56944-56947		<b>Energy Source #5</b>					
56948-56951		<b>Energy Source #6</b>					
56952-56955		<b>Energy Source #7</b>					
56956-56959		<b>Energy Source #8</b>					
<b>Digital Inputs Setup</b>							
61728-61735							
+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		<b>DI1 Setup</b>					
61732-61735		<b>DI2 Setup</b>					
<b>Relay Outputs Setup</b>							
61984-61995							
+0		Operation Mode	0=unlatched, 1=latched, 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		<b>RO1 Setup</b>					
61990-61995		<b>RO2 Setup</b>					
<b>Analog Inputs Setup</b>							
62368-62379							
+0		Input parameter ID	0 = input not assigned		UINT16	R/W	
+1		Not used	0		UINT16	R/W	
+2,3		Zero scale value (0/4 mA)			INT32	R/W	

Address	Point ID	Description	Options/Range	Units	Type	R/W	Notes
+4,5		Full scale value (20/1 mA)			INT32	R/W	
62368-62373		<b>A11 Setup</b>					
62374-62379		<b>A12 Setup</b>					
<b>Analog Outputs Setup</b>							
62560-62571							
+0		Output parameter ID	F18		UINT16	R/W	
+1		Not used	0		UINT16	R/W	
+2,3		Zero scale value (0/4 mA)	See Section 3.4		INT32	R/W	
+4,5		Full scale value (20/1 mA)	See Section 3.4		INT32	R/W	
62560-62565		<b>AO1 Setup</b>					
62566-62571		<b>AO2 Setup</b>					

### 3.8 Analog and Digital I/O Configuration

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

### 3.9 File Transfer Registers <sup>E</sup>

Address	Point ID	Description	Options/Range	Units	Type	R/W	Notes
<b>File Allocation Status Registers</b>							
3500,3501		File allocation map (bitmap)	F6		UINT32	R	Bits set to 1 indicate that the memory is allocated to the designated files
3502,3503		Reserved	0		UINT32	R	
3504,3505		Daily profile log sections map (bitmap)	F7		UINT32	R	Bits set to 1 indicate that the corresponding sections are allocated in the Data log #8 file to the designated energy/maximum demand registers
3506,3507		File memory size, Bytes	1040384		UINT32	R	
3508,3509		Free file memory size, Bytes	0-1040384		UINT32	R	
3510		Total number of records in the Event log file	0-65535		UINT16	R	
3511		Total number of records in the Data log #1 file	0-65535		UINT16	R	
3512		Total number of records in the Data log #2 file	0-65535		UINT16	R	
3513		Total number of records in the Data log #3 file	0-65535		UINT16	R	
3514		Total number of records in the Data log #4 file	0-65535		UINT16	R	
3515		Total number of records in the Data log #5 file	0-65535		UINT16	R	
3516		Total number of records in the Data log #6 file	0-65535		UINT16	R	
3517		Total number of records in the Data log #7 file	0-65535		UINT16	R	
3518		Total number of records in the Data log #8 file	0-65535		UINT16	R	
3519-3526		Reserved	0		UINT16	R	
3527		Total number of records in the Waveform log #1 file	0-65535		UINT16	R	
3528		Total number of records in the Waveform log #2 file	0-65535		UINT16	R	
3529		Number of new records in the Event log file	0-65535		UINT16	R	
3530		Number of new records in the Data log #1 file	0-65535		UINT16	R	
3531		Number of new records in the Data log #2 file	0-65535		UINT16	R	
3532		Number of new records in the Data log #3 file	0-65535		UINT16	R	
3533		Number of new records in the Data log #4 file	0-65535		UINT16	R	
3534		Number of new records in the Data log #5 file	0-65535		UINT16	R	
3535		Number of new records in the Data log #6 file	0-65535		UINT16	R	
3536		Number of new records in the Data log #7 file	0-65535		UINT16	R	
3537		Number of new records in the Data log #8 file	0-65535		UINT16	R	
3538-3545		Reserved	0		UINT16	R	
3546		Number of new records in the Waveform log #1 file	0-65535		UINT16	R	
3547		Number of new records in the Waveform log #2 file	0-65535		UINT16	R	
<b>File Transfer Control/Status Registers</b>							
28160-28927							1
+0		File status (bitmap)	F4		UINT16	R	
+1		Number of records logged in the file	0 to 65535		UINT16	R	

Address	Point ID	Description	Options/Range	Units	Type	R/W	Notes
+2		Number of the new records never read before	0 to 65535		UINT16	R	
+3		Sequence number of the last record in a file + 1 (modulo 65536)	0 to 65535 (increments modulo 65536 with each new record)		UINT16	R	Will return zero if the file is empty
+4		Sequence number of the first (oldest) record in a file	0 to 65535		UINT16	R	
+5		Sequence number of the first new record in a file never read before	0 to 65535		UINT16	R	
+6		Sequence number of the current record to be read through the file read window. Can be overwritten to point to the desired record in a file	0 to 65535		UINT16	R/W	If there is no a record in the file that matches the written sequence, the device will respond with the exception code 03 (invalid data)
+7		Command register (write-only)	Write value: 0 = point to the first (oldest) record in a file 1 = point to the first new record never read before. If there are no new records, the file pointer will be set to the oldest record in a file		UINT16	R/W	Read as 0
28160-28167		Event log file control			UINT16	R	
28168-28175		Data log #1 file control			UINT16	R	
28176-28183		Data log #2 file control			UINT16	R	
28184-28191		Data log #3 file control			UINT16	R	
28192-28199		Data log #4 file control			UINT16	R	
28200-28207		Data log #5 file control			UINT16	R	
28208-28215		Data log #6 file control			UINT16	R	
28216-28223		Data log #7 file control			UINT16	R	
28224-28231		Data log #8 file control			UINT16	R	
28232-28295		Reserved			UINT16	R	
28296-28303		Waveform log #1 file control			UINT16	R	
28304-28311		Waveform log #2 file control			UINT16	R	
28312-28671		Reserved			UINT16	R	
28672-28679		Daily Profile Log, Energy/Usage Reg.#1 control			UINT16	R	
28680-28687		Daily Profile Log, Energy/Usage Reg.#2 control			UINT16	R	
28688-28695		Daily Profile Log, Energy/Usage Reg.#3 control			UINT16	R	
28696-28703		Daily Profile Log, Energy/Usage Reg.#4 control			UINT16	R	
28704-28711		Daily Profile Log, Energy/Usage Reg.#5 control			UINT16	R	
28712-28719		Daily Profile Log, Energy/Usage Reg.#6 control			UINT16	R	
28720-28727		Daily Profile Log, Energy/Usage Reg.#7 control			UINT16	R	
28728-28735		Daily Profile Log, Energy/Usage Reg.#8 control			UINT16	R	
28736-28799		Reserved			UINT16	R	
28800-28807		Daily Profile Log, Max. Demand Reg.#1 control			UINT16	R	
28808-28815		Daily Profile Log, Max. Demand Reg.#2 control			UINT16	R	
28816-28823		Daily Profile Log, Max. Demand Reg.#3 control			UINT16	R	
28824-28823		Daily Profile Log, Max. Demand Reg.#4 control			UINT16	R	
28832-28839		Daily Profile Log, Max. Demand Reg.#5 control			UINT16	R	



Address	Point ID	Description	Options/Range	Units	Type	R/W	Notes
28840-28847		Daily Profile Log, Max. Demand Reg.#6 control			UINT16	R	
28848-28855		Daily Profile Log, Max. Demand Reg.#7 control			UINT16	R	
28856-28823		Daily Profile Log, Max. Demand Reg.#8 control			UINT16	R	
28824-28927		Reserved			UINT16	R	
<b>Event Log File Transfer Registers</b>							
29440-29559							
		<b>Event Record Structure</b>					
+0		Record status (bitmap)	F5		UINT16	R	
+1		Record sequence number	0 to 65535 (increments modulo 65536)		UINT16	R	
+2,3		Record time, sec	F1	s	UINT32	R	
+4		Record time, fractional seconds, ms	0-999	ms	UINT16	R	
+5		Event point/cause ID	F19		UINT16	R	
+6,7		Log value			UINT32	R	32-bit non-scaled register
+8		Event effect	F20		UINT16	R	
+9		Reserved	0		UINT16	R	
		<b>Event Log Transfer Blocks</b>					
29440-29449		Event log record #1				R	
29450-29459		Event log record #2				R	
29460-29469		Event log record #3				R	
29470-29479		Event log record #4				R	
29480-29489		Event log record #5				R	
29490-29499		Event log record #6				R	
29500-29509		Event log record #7				R	
29510-29519		Event log record #8				R	
29520-29529		Event log record #9				R	
29530-29539		Event log record #10				R	
29540-29549		Event log record #11				R	
29550-29559		Event log record #12				R	
<b>Data Log File Transfer Registers</b>							
29696-32895							
		<b>Data Log Record Structure</b>					
+0		Record status (bitmap)	F5		UINT16	R	
+1		Record sequence number	0 to 65535 (increments modulo 65536)		UINT16	R	
+2,3		Record time, sec	F1	sec	UINT32	R	
+4		Record time, fractional seconds, ms	0-999	ms	UINT16	R	
+5		Trigger event ID	0=Profile log file, 1-16=SP1-SP16		UINT16	R	
+6,7		Parameter #1 value			INT32	R	32-bit non-scaled register
+8,8		Parameter #2 value			INT32	R	32-bit non-scaled register
+10,11		Parameter #3 value			INT32	R	32-bit non-scaled register
+12,13		Parameter #4 value			INT32	R	32-bit non-scaled register
+14,15		Parameter #5 value			INT32	R	32-bit non-scaled register

Address	Point ID	Description	Options/Range	Units	Type	R/W	Notes
+16,17		Parameter #6 value			INT32	R	32-bit non-scaled register
+18,19		Parameter #7 value			INT32	R	32-bit non-scaled register
+20,21		Parameter #8 value			INT32	R	32-bit non-scaled register
+22,23		Parameter #9 value			INT32	R	32-bit non-scaled register
+24,25		Parameter #10 value			INT32	R	32-bit non-scaled register
+26,27		Parameter #12 value			INT32	R	32-bit non-scaled register
+28,29		Parameter #13 value			INT32	R	32-bit non-scaled register
+30,31		Parameter #13 value			INT32	R	32-bit non-scaled register
+32,33		Parameter #14 value			INT32	R	32-bit non-scaled register
+34,35		Parameter #15 value			INT32	R	32-bit non-scaled register
+36,37		Parameter #16 value			INT32	R	32-bit non-scaled register
+38,39		Reserved			INT32	R	32-bit non-scaled register
		<b>Data Log Transfer Blocks</b>					
29696-29735		Data log #1				R	
29736-29775		Data log #2				R	
29776-29815		Data log #3				R	
29816-29855		Data log #4				R	
29856-29895		Data log #5				R	
29896-29935		Data log #6				R	
29936-29975		Data log #7				R	
29976-30015		Data log #8				R	
30016-31615		Reserved				R	
31616-31655		Daily Profile Log, Energy/Usage Reg.#1 section				R	
31656-31695		Daily Profile Log, Energy/Usage Reg.#2 section				R	
31696-31735		Daily Profile Log, Energy/Usage Reg.#3 section				R	
31736-31775		Daily Profile Log, Energy/Usage Reg.#4 section				R	
31776-31815		Daily Profile Log, Energy/Usage Reg.#5 section				R	
31816-31855		Daily Profile Log, Energy/Usage Reg.#6 section				R	
31856-31895		Daily Profile Log, Energy/Usage Reg.#7 section				R	
31896-31935		Daily Profile Log, Energy/Usage Reg.#8 section				R	
31936-32255		Reserved				R	
32256-32295		Daily Profile Log, Max. Demand Reg.#1 section				R	
32296-32335		Daily Profile Log, Max. Demand Reg.#2 section				R	
32336-32375		Daily Profile Log, Max. Demand Reg.#3 section				R	
32376-32415		Daily Profile Log, Max. Demand Reg.#4 section				R	
32416-32455		Daily Profile Log, Max. Demand Reg.#5 section				R	
32456-32495		Daily Profile Log, Max. Demand Reg.#6 section				R	
32496-32535		Daily Profile Log, Max. Demand Reg.#7 section				R	
32536-32575		Daily Profile Log, Max. Demand Reg.#8 section				R	
32576-32895		Reserved				R	

Address	Point ID	Description	Options/Range	Units	Type	R/W	Notes
<b>Waveform Header Transfer Registers<sup>EH</sup></b>							
29696-32895							
		<b>Waveform Header Structure</b>					
+0		Record status (bitmap)	F5		UINT16	R	
+1		Record sequence number in a file	0 to 65535 (increments modulo 65536)		UINT16	R	
+2,3		Record time, sec	F1	sec	UINT32	R	Indicates the time for the last sample point in the record
+4		Record time, fractional seconds, ms	0-999	ms	UINT16	R	
+5		Trigger event ID	0=real-time waveform, 1-16=SP1-SP16		UINT16	R	
+6		Waveform series (compound waveform) number	1-65535 (rolls over to 1 after 65535)		UINT16	R	Each series can comprise up to 160 contiguous records of a compound waveform
+7		Record sequence number in a waveform series	0-159		UINT16	R	
+8,9		Analog input full scale, engineering units (volts/amperes) (ANALOG_SCALE)	Vmax, Imax		UINT32	R	
+10		Digital full scale for the channel, sample code (DIGITAL_SCALE)	-32768 to 32767		INT16	R	Corresponds to twice the analog input full-scale range.
+11		Zero offset, sample code (ZERO_OFFSET)	0		INT16	R	Corresponds to the center of the digital scale range
+12		Line frequency	0 to 6500	x 0.01Hz	UINT16	R	The sampling frequency is equal to the line frequency multiplied by the sampling rate in samples per cycle (32 for Waveform log #1 and 128 for Waveform log #2)
+13		Trigger sample point offset in the waveform series	0-511		UINT16	R	Corresponds to the first record in the series
+14,15		Reserved	0		UINT16	R	
		<b>Waveform Header Transfer Blocks</b>					
35456-35471		Real-time waveform, channel V1/V12				R	2
35472-35487		Real-time waveform, channel V2/V23				R	2
35488-35503		Real-time waveform, channel V3/V31				R	2
35504-35519		Real-time waveform, channel I1				R	
35520-35535		Real-time waveform, channel I2				R	
35536-35551		Real-time waveform, channel I3				R	
35552-35567		Waveform log #1, channel V1/L12				R	2
35568-35583		Waveform log #1, channel V2/L23				R	2
35584-35599		Waveform log #1, channel V3/V31				R	2
35600-35615		Waveform log #1, channel I1				R	
35616-35631		Waveform log #1, channel I2				R	
35632-35647		Waveform log #1, channel I3				R	
35648-35663		Waveform log #2, channel V1/V12				R	2
35664-35679		Waveform log #2, channel V2/V23				R	2

Address	Point ID	Description	Options/Range	Units	Type	R/W	Notes
35680-35695		Waveform log #2, channel V3/V31				R	2
35696-35711		Waveform log #2, channel I1				R	
35712-35727		Waveform log #2, channel I2				R	
35728-35743		Waveform log #2, channel I3				R	
<b>Waveform Series Transfer Block</b> <sup>EH</sup>							
6144-6655		<b>Waveform Sample Series</b>					<sup>3</sup>
+0		Sample point 1	-32768 to 32767		INT16	R	
+1		Sample point 2	-32768 to 32767		INT16	R	
+2		Sample point 2	-32768 to 32767		INT16	R	
+511		Sample point 512	-32768 to 32767		INT16	R	

**NOTES:**

<sup>1</sup> 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.

<sup>2</sup> When the 4LN3, 4LL3, 3LN3, 3LL3, 3BLN3 or 3BLL3 wiring mode is selected, the voltages will be line-to-neutral; for any other wiring mode, they will be line-to-line.

<sup>3</sup> To convert digital samples to their analog equivalents in input measurement units (volts, amps), the following scaling should be applied:

$$\text{ANALOG\_SAMPLE [Volts/ Amps]} = \frac{(\text{DIGITAL\_SAMPLE} - \text{ZERO\_OFFSET}) \times \text{ANALOG\_SCALE} \times 2}{\text{DIGITAL\_SCALE}}$$

### 3.10 Billing/TOU Daily Profile Data Log <sup>E</sup>

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

File Channel/ Section <sup>1</sup>	Record Field No. <sup>2</sup>	Point Label	Point ID	Description	Range	Units <sup>3</sup>	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	

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

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

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

## 4 Data Scales and Units

Code	Condition	Value/Range	Notes
<b>Data Scales</b>			
Vmax		Voltage scale $\times$ PT Ratio, V	2
I <sub>max</sub>		Current scale $(2A/10A) \times$ CT Ratio = CT Primary current $\times$ 2, A	1, 3
P <sub>max</sub>	Wiring 4LN3, 3LN3, 3BLN3	V <sub>max</sub> $\times$ I <sub>max</sub> $\times$ 3, W	4
	Wiring 4LL3, 3LL3, 3BLL3, 3OP2, 3OP3, 3DIR2	V <sub>max</sub> $\times$ I <sub>max</sub> $\times$ 2, W	
F <sub>max</sub>	Nominal frequency 25, 50 or 60 Hz	100 Hz	
	Nominal frequency 400Hz	500 Hz	
AI <sub>min</sub> AI <sub>max</sub>	+/-1mA	AI <sub>min</sub> = -AI full scale $\times$ 2 AI <sub>max</sub> = AI full scale $\times$ 2	
	0-20mA	AI <sub>min</sub> = AI zero scale AI <sub>max</sub> = AI full scale	
	4-20mA	AI <sub>min</sub> = AI zero scale AI <sub>max</sub> = AI full scale	
	0-1mA	AI <sub>min</sub> = AI zero scale AI <sub>max</sub> = AI full scale	
<b>Data Units</b>			
U1	PT Ratio = 1	0.1V	
	PT Ratio > 1	1V	
U2		0.01A	
U3	PT Ratio = 1	1W/Var/VA	
	PT Ratio > 1	1kW/kvar/kVA	

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

<sup>2</sup> The default Voltage scale is 144V (120V +20%) unless you changed it in your device through the Device Data Scale setup registers (see Section 3.1) or via the supplemental PAS software.

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

<sup>4</sup> P<sub>max</sub> is rounded to whole kilowatts. With PT=1.0, if P<sub>max</sub> is greater than 9,999,000 W, it is truncated to 9,999,000 W.

## 5 Data Formats

Format Code	Value	Description	Notes
<b>Timestamp</b>			
F1		Local time in a UNIX-style format. Represents the number of seconds since midnight (00:00:00), January 1, 1970. The time is valid after January 1, 2000.	
<b>Wiring Mode</b>			
F2	0	3OP2 - 3-wire open delta using 2 CTs (2 element)	
	1	4LN3 - 4-wire WYE using 3 PTs (3 element), line-to-neutral voltage readings	
	2	3DIR2 - 3-wire direct connection using 2 CTs (2 element)	
	3	4LL3 - 4-wire WYE using 3 PTs (3 element), line-to-line voltage readings	
	4	3OP3 - 3-wire open delta using 3 CTs (2 1/2 element)	
	5	3LN3 - 4-wire WYE using 2 PTs (2 1/2 element), line-to-neutral voltage readings	
	6	3LL3 - 4-wire WYE using 2 PTs (2 1/2 element), line-to-line voltage readings	
	8	3BLN3 - 3-wire broken delta using 2 PTs (2 1/2 element), line-to-neutral voltage readings	
	9	3BLL3 - 3-wire broken delta using 2 PTs (2 1/2 element), line-to-line voltage readings	
<b>File Attributes</b>			
F3	Bit 0 = 0	Non-wrap (stop when filled)	
	Bit 0 = 1	Wrap-around (circular file)	
	Bit 5 = 1	TOU daily profile log	
<b>File Status Word</b>			
F4	Bit 0 = 0	Non-wrap (stop when filled)	
	Bit 0 = 1	Wrap-around (circular file)	
	Bit 5 = 1	Daily profile log file	
	Bit 9 = 1	Reading after EOF	
<b>File Record Status Word</b>			
F5	Bit 0 = 1	The last record of the file is being read	
	Bit 1 = 1	Reading after EOF	
	Bit 8 = 1	File is empty	
	Bit 9 = 1	Corrupted record (CRC error)	
	Bit 15 = 1	Generic read error (with one of the bits 8-9)	
<b>File Allocation Map</b>			
F6	Bit 0	Event log file	
	Bit 1	Data log #1 file	
	Bit 2	Data log #2 file	
	Bit 3	Data log #3 file	
	Bit 4	Data log #4 file	
	Bit 5	Data log #5 file	
	Bit 6	Data log #6 file	
	Bit 7	Data log #7 file	
	Bit 8	Data log #8 file	
	Bits 9-16	Reserved	
	Bit 17	Waveform log #1 file	
	Bit 18	Waveform log #2 file	
	Bits 19-31	Reserved	
<b>Profile Log Sections Map</b>			
F7	Bit 0:7 = 1	Summary/TOU energy/usage registers #1-#8	
	Bit 16:23 = 1	Summary/TOU maximum demand registers #1-#8	
<b>Waveform Log Channel Mask</b>			
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	
<b>TOU Tariff Change Time</b>			
F10	Bits 8:15 = 0-7	Tariff number #1-#8	
	Bits 2:7 = 0-23	Tariff start hour	
	Bits 0:1 = 0-3	Tariff start quarter of an hour	



Format Code	Value	Description	Notes
<b>Summary/TOU Energy Register Source ID</b>			
F11	0x0000	None	
	0x0700-0x0701	Pulse input DI1-DI2	
	0x1700	kWh import	
	0x1701	kWh export	
	0x1704	kvarh import	
	0x1705	kvarh export	
	0x1708	kVAh total	
<b>Setpoint Trigger Parameters ID</b>			
F12	0x0000	None (condition is not active)	
		<b>Voltage Disturbance</b> <sup>EH</sup>	
	0x0100	Voltage disturbance	
		<b>Event Flags</b> <sup>EH</sup>	
	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	
		<b>Internal Events</b> <sup>E</sup>	
	0x0400	kWh import pulse	
	0x0401	kWh export pulse	
	0x0403	kvarh import pulse	
	0x0404	kvarh export pulse	
	0x0405	kvarh total pulse	
	0x0406	kVAh total pulse	
	0x0407	Start new demand interval	
	0x0408	Start new tariff interval	
	0x0409	Start new volt/ampere demand interval	
	0x040A	Start new sliding window demand interval	
		<b>Timers</b> <sup>E</sup>	
	0x0500	Timer #1	
	0x0501	Timer #2	
		<b>Status Inputs</b>	
	0x0600	Status input #1 ON	
	0x0601	Status input #2 ON	
	0x8600	Status input #1 OFF	
	0x8601	Status input #2 OFF	
		<b>Pulse Inputs</b>	
	0x0700	Pulse input #1	
	0x0701	Pulse input #2	
		<b>Relays</b>	
	0x0800	Relay #1 ON	
	0x0801	Relay #2 ON	
	0x8800	Relay #1 OFF	
	0x8801	Relay #2 OFF	
		<b>Phase Reversal</b>	
	0x8901	Positive phase rotation reversal	
	0x8902	Negative phase rotation reversal	
		<b>Pulse Counters</b>	
	0x0A00	High pulse counter #1	
	0x0A01	High pulse counter #2	
	0x0A02	High pulse counter #3	
	0x0A03	High pulse counter #4	
		<b>Time and Date Parameters</b> <sup>E</sup>	
	0x0B02	Day of week	

Format Code	Value	Description	Notes
	0x0B03	Year	
	0x0B04	Month	
	0x0B05	Day of month	
	0x0B06	Hour	
	0x0B07	Minutes	
	0x0B08	Seconds	
		<b>1-Cycle Phase Values</b>	
	0x0C03	High I1 current	
	0x0C04	High I2 current	
	0x0C05	High I3 current	
	0x8C03	Low I1 current	
	0x8C04	Low I2 current	
	0x8C05	Low I3 current	
		<b>1-Cycle Values on any Phase</b>	
	0x0E00	High voltage	
	0x8D00	Low voltage	
	0x0E01	High current	
	0x8D01	Low current	
	0x0E07	High voltage THD	
	0x0E08	High current THD	
	0x0E09	High K-Factor	
	0x0E0A	High current TDD	
		<b>1-Cycle Auxiliary Values</b>	
	0x1002	High frequency	
	0x9002	Low frequency	
	0x1003	High voltage unbalance	
	0x1004	High current unbalance	
		<b>1-Sec Phase Values</b>	
	0x1103	High I1 current	
	0x1104	High I2 current	
	0x1105	High I3 current	
	0x9103	Low I1 current	
	0x9104	Low I2 current	
	0x9105	Low I3 current	
		<b>1-Sec Values on any Phase</b>	
	0x1300	High voltage	
	0x9200	Low voltage	
	0x1301	High current	
	0x9201	Low current	
		<b>1-Sec Total Values</b>	
	0x1406	High total kW import	
	0x1407	High total kW export	
	0x1408	High total kvar import	
	0x1409	High total kvar export	
	0x1402	High total kVA	
	0x9404	Low total PF Lag	
	0x9405	Low total PF Lead	
		<b>1-Sec Auxiliary Values</b>	
	0x1501	High neutral current	
	0x1502	High frequency	
	0x9502	Low frequency	
	0x1503	High voltage unbalance	
	0x1504	High current unbalance	
		<b>Present Demands</b>	
	0x1600	High V1/V12 Volt demand	
	0x1601	High V2/V23 Volt demand	
	0x1602	High V3/V31 Volt demand	
	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	

Format Code	Value	Description	Notes
	0x1610	High accumulated kvar import demand	
	0x1611	High accumulated kVA demand	
	0x1612	High predicted kW import demand	
	0x1613	High predicted kvar import demand	
	0x1614	High predicted kVA demand	
	0x1616	High block kW export demand	
	0x1617	High block kvar export demand	
	0x1618	High sliding window kW export demand	
	0x1619	High sliding window kvar export demand	
	0x161A	High accumulated kW export demand	
	0x161B	High accumulated kvar export demand	
	0x161C	High predicted kW export demand	
	0x161D	High predicted kvar export demand	
		<b>Setpoint Status</b>	
	0x7C00	Setpoint #1 ON	
	0x7C01	Setpoint #2 ON	
	0x7C02	Setpoint #3 ON	
	0x7C03	Setpoint #4 ON	
	0x7C04	Setpoint #5 ON	
	0x7C05	Setpoint #6 ON	
	0x7C06	Setpoint #7 ON	
	0x7C07	Setpoint #8 ON	
	0x7C08	Setpoint #9 ON	
	0x7C09	Setpoint #10 ON	
	0x7C0A	Setpoint #11 ON	
	0x7C0B	Setpoint #12 ON	
	0x7C0C	Setpoint #13 ON	
	0x7C0D	Setpoint #14 ON	
	0x7C0E	Setpoint #15 ON	
	0x7C0F	Setpoint #16 ON	
<b>Setpoint Action ID</b>			
F14	<b>Action type</b>	<b>Target</b>	
	0x00	0x00	No action
	0x20	0x00	Set Event flag #1 <sup>EH</sup>
	0x20	0x01	Set Event flag #2 <sup>EH</sup>
	0x20	0x02	Set Event flag #3 <sup>EH</sup>
	0x20	0x03	Set Event flag #4 <sup>EH</sup>
	0x21	0x00	Clear Event flag #1 <sup>EH</sup>
	0x21	0x01	Clear Event flag #2 <sup>EH</sup>
	0x21	0x02	Clear Event flag #3 <sup>EH</sup>
	0x21	0x03	Clear Event flag #4 <sup>EH</sup>
	0x30	0x00	Operate Relay #1
	0x30	0x01	Operate Relay #2
	0x31	0x00	Release latched Relay #1
	0x31	0x01	Release latched Relay #2
	0x40	0x00	Increment counter #1
	0x40	0x01	Increment counter #2
	0x40	0x02	Increment counter #3
	0x40	0x03	Increment counter #4
	0x41	0x00	Clear counter #1
	0x41	0x01	Clear counter #2
	0x41	0x02	Clear counter #3
	0x41	0x03	Clear counter #4
	0x64	0x00	Clear all counters
	0x51	0x00	Send event notification
	0x60	0x00	Reset total energy <sup>E</sup>
	0x61	0x00	Reset all total maximum demands
	0x61	0x01	Reset power maximum demands <sup>E</sup>
	0x61	0x02	Reset volt/ampere/harmonic maximum demands
	0x62	0x00	Reset TOU energy <sup>E</sup>
	0x63	0x00	Reset TOU maximum demands <sup>E</sup>
	0x65	0x00	Clear Min/Max registers
	0x70	0x02	Event log <sup>E</sup>
	0x71	0x00	Data log #1 <sup>E</sup>
	0x71	0x01	Data log #2 <sup>E</sup>
	0x71	0x02	Data log #3 <sup>E</sup>
	0x71	0x03	Data log #4 <sup>E</sup>

Format Code	Value	Description	Notes	
	0x71	0x04	Data log #5 <sup>E</sup>	
	0x71	0x05	Data log #6 <sup>E</sup>	
	0x71	0x06	Data log #7 <sup>E</sup>	
	0x71	0x07	Data log #8 <sup>E</sup>	
	0x72	0x00	Waveform log #1 <sup>EH</sup>	
	0x73	0x00	Waveform log #2 <sup>EH</sup>	
<b>Counter Source ID</b>				
F16	0x0000	None		
	0x0001-0x0002	Pulse input D11-D12		
<b>Relay Output Pulse Source ID <sup>E</sup></b>				
F17	0x0000	None		
	0x0400	kWh import pulse		
	0x0401	kWh export pulse		
	0x0403	kvarh import pulse		
	0x0404	kvarh export pulse		
	0x0405	kvarh total pulse		
	0x0406	kVAh pulse		
<b>AO/Analog Expander Output Parameters ID</b>				
F18	0x0000	None (output disabled)	Note 2	
		<b>1-Cycle Phase Values</b>		
	0x0C00	V1/V12 Voltage		
	0x0C01	V2/V23 Voltage		
	0x0C02	V3/V31 Voltage		
	0x0C03	I1 Current		
	0x0C04	I2 Current		
	0x0C05	I3 Current		
	0x0C1E	V12 Voltage		
	0x0C1F	V23 Voltage		
	0x0C20	V31 Voltage		
		<b>1-Cycle Total Values</b>		
	0x0F00	Total kW		
	0x0F01	Total kvar		
	0x0F02	Total kVA		
	0x0F03	Total PF		
	0x0F04	Total PF Lag		
	0x0F05	Total PF Lead		
		<b>1-Cycle Auxiliary Values</b>		
	0x1001	In Current		
	0x1002	Frequency		
		<b>1-Sec Phase Values</b>		
	0x1100	V1/V12 Voltage		
	0x1101	V2/V23 Voltage		
	0x1102	V3/V31 Voltage		
	0x1103	I1 Current		
	0x1104	I2 Current		
	0x1105	I3 Current		
	0x111E	V12 Voltage		
	0x111F	V23 Voltage		
	0x1120	V31 Voltage		
		<b>1-Sec Total Values</b>		
	0x1400	Total kW		
	0x1401	Total kvar		
	0x1402	Total kVA		
	0x1403	Total PF		
	0x1404	Total PF Lag		
	0x1405	Total PF Lead		
		<b>1-Sec Auxiliary Values</b>		
	0x1501	In Current		
	0x1502	Frequency		
		<b>Present Demands <sup>E</sup></b>		
	0x160F	Accumulated kW import demand		
	0x1610	Accumulated kvar import demand		
	0x1611	Accumulated kVA demand		
	0x161A	Accumulated kW export demand		
	0x161B	Accumulated kvar export demand		
<b>Event Cause/Point ID</b>				
F19		Setpoint Operation Events		

Format Code	Value	Description	Notes
	0x0000-0x59FF	Trigger parameter ID	
	0x6400-0xFFFF	Trigger parameter ID	
		<b>Setpoint Action Events</b>	
	0x5A00-0x5A0F	Setpoint #1-#16	
		<b>Communications Events</b>	
	0x5B00-0x5BFF	Data point ID (low byte, see F21)	
		<b>Front Panel Operations</b>	
	0x5C00-0x5CFF	Data point ID (low byte, see F21)	
		<b>Self-Check Diagnostics Events</b>	
	0x5D00-0x5DFF	Data point ID (low byte, see F21)	
		<b>Self-Update Events</b>	
	0x5E08	RTC DST/Standard time update	
		<b>Hardware Diagnostics Events</b>	
	0x6202	RAM/Data error	
	0x6203	Hardware watchdog reset	
	0x6204	Sampling fault	
	0x6205	CPU exception	
	0x6206	Reserved	
	0x6207	Software watchdog reset	
	0x620D	Low battery	
	0x620F	EEPROM fault	
		<b>External Events</b>	
	0x6300	Power down	
	0x6308	Power up	
	0x6309	External reset	
<b>Event Effect ID</b>			
F20		<b>Communications/Self-check/Front Panel Events</b>	
	0x0000	None	
	0x6000	Total energy registers cleared	
	0x6100	All total maximum demands cleared	
	0x6101	Power maximum demands cleared	
	0x6102	Volt/Ampere/Harmonic maximum demands cleared	
	0x6200	Summary/TOU energy registers cleared	
	0x6300	Summary/TOU maximum demand registers cleared	
	0x6400	All counters cleared	
	0x6401-0x6403	Counter cleared (low byte = counter ID)	
	0x6500	Min/Max log cleared	
	0x6600	Event log file cleared (low byte = File ID)	
	0x6700-0x6707	Data log file cleared (low byte = File ID)	
	0x6710	All data logs cleared	
	0x6800	Waveform log #1 file cleared	
	0x6900	Waveform log #2 file cleared	
	0xF100-0xF10F	Setpoint cleared (low byte = setpoint ID)	
	0xF200	Setup/Data cleared	
	0xF300	Setup reset (set by default)	
	0xF400	Setup changed	
	0xF500	RTC set	
		<b>Setpoint Operation Events</b>	
	0xE100-0xE10F	Setpoint operated (low byte = setpoint ID)	
	0xE200-0xE20F	Setpoint released (low byte = setpoint ID)	
		<b>Setpoint Action Events</b>	
	See F14	Setpoint action ID	
<b>Data Point ID</b>			
F21		<b>Data Locations</b>	
	0x03	Data memory	
	0x04	Factory setup	
	0x05	Access/Password setup	
	0x06	Basic setup	
	0x07	Communications setup	
	0x08	Real-time clock	
	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	

Format Code	Value	Description	Notes
	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	
	0x1D	RO Setup	
	0x1C	User selectable options	
	0x1F	DNP 3.0 Class 0 map	
	0x20	DNP 3.0 options setup	
	0x21	DNP 3.0 events setup	
	0x22	DNP 3.0 event setpoints	
	0x23	Calibration registers	
	0x24	Date/Time Setup	
	0x25	Net setup	
	0x26	AI setup	
	0x27	Waveform log setup	
	0x2B-0x3F	Reserved	
<b>Device Diagnostics</b>			
F23	Bit 0	Reserved	
	Bit 1	Reserved	
	Bit 2 = 1	RAM/Data error	
	Bit 3 = 1	CPU watchdog reset	
	Bit 4 = 1	Sampling fault	
	Bit 5 = 1	CPU exception	
	Bit 6	Reserved	
	Bit 7 = 1	Software watchdog reset	
	Bit 8 = 1	Power down	
	Bit 9 = 1	Device reset	
	Bit 10 = 1	Configuration reset	
	Bit 11 = 1	RTC fault	
	Bit 12	Reserved	
	Bit 13 = 1	Low battery	
	Bit 14	Reserved	
	Bit 15 = 1	EEPROM fault	
<b>DNP Object Types</b>			
F24		<b>Static Binary Input Objects</b>	
	0	Single-Bit Binary Input	
	1	Binary Input With Status	
		<b>Binary Input Change Event Objects</b>	
	0	Binary Input Change Without Time	
	1	Binary Input Change With Time	
		<b>Static Binary Counters</b>	
	0	32-bit Binary Counter	
	1	32-bit Binary Counter Without Flag	
	2	16-bit Binary Counter	
	3	16-bit Binary Counter Without Flag	
		<b>Binary Counter Change Events</b>	
	0	32-bit Counter Change Event Without Time	
	1	32-bit Counter Change Event With Time	
	2	16-bit Counter Change Event Without Time	
	3	16-bit Counter Change Event With Time	
		<b>Frozen Binary Counters</b>	
	0	32-bit Frozen Counter	
	1	32-bit Frozen Counter Without Flag	
	2	32-bit Frozen Counter With Time of Freeze	
	3	16-bit Frozen Counter	
	4	16-bit Frozen Counter Without Flag	
	5	16-bit Frozen Counter With Time of Freeze	
		<b>Static Analog Input Objects</b>	
	0	32-bit Analog Input	
	1	32-bit Analog Input Without Flag	
	2	16-bit Analog Input	
	3	16-bit Analog Input Without Flag	
		<b>Analog Input Change Events</b>	
	0	32-bit Analog Change Event Without Time	
	1	32-bit Analog Change Event With Time	

Format Code	Value	Description	Notes
	2	16-bit Analog Change Event Without Time	
	3	16-bit Analog Change Event With Time	
<b>DNP Class 0 Objects</b>			
F25	0x1E01	Analog Input 30:01	
	0x1E02	Analog Input 30:02	
	0x1E03	Analog Input 30:03	
	0x1E04	Analog Input 30:04	
	0x1F01	Frozen Analog Input 31:01	
	0x1F02	Frozen Analog Input 31:02	
	0x1F03	Frozen Analog Input 31:03	
	0x1F04	Frozen Analog Input 31:04	
	0x1F05	Frozen Analog Input 31:05	
	0x1F06	Frozen Analog Input 31:06	
	0x2801	Analog Output 40:01	
	0x2802	Analog Output 40:02	
	0x0101	Binary Input 01:01	
	0x0102	Binary Input 01:02	
	0x1401	Binary Counter 20:01	
	0x1402	Binary Counter 20:02	
	0x1405	Binary Counter 20:05	
	0x1406	Binary Counter 20:06	
	0x1501	Frozen Counter 21:01	
	0x1502	Frozen Counter 21:02	
	0x1505	Frozen Counter 21:05	
	0x1506	Frozen Counter 21:06	
	0x1509	Frozen Counter 21:09	
	0x150A	Frozen Counter 21:10	
0x3201	Time and Date 50:01		
<b>Log Notification Status</b>			
F26	Bit 0	Reserved	
	Bit 1=1	New Min/Max Log	
	Bit 2=1	New Event log record	
	Bit 3=1	New Data log record	
	Bit 4=1	New Waveform log #1 record	
	Bit 5=1	New Waveform log #2 record	
	Bits 6-15	Reserved	
<b>Data Log Notification Status</b>			
F27	Bit 0=1	New Data log #1 record	
	Bit 1=1	New Data log #2 record	
	Bit 2=1	New Data log #3 record	
	Bit 3=1	New Data log #4 record	
	Bit 4=1	New Data log #5 record	
	Bit 5=1	New Data log #6 record	
	Bit 6=1	New Data log #7 record	
	Bit 7=1	New Data log #8 record	
Bits 8-15	Reserved		
<b>Instrument Options</b>			
F28	Bit 0=1	120V Option	
	Bit 1=1	690V Option	
	Bits 2-5	Reserved	
	Bit 6=1	Analog output 0/4 or 4/20mA	
	Bit 7=1	Analog output 0-1mA	
	Bit 8=1	Analog output $\pm 1$ mA	
	Bit 9=1	RO option	
	Bit 10=1	DI option	
	Bit 11=1	Reserved	
	Bit 12=1	Setup is secured by a password (authorization required)	
	Bit 13=1	Reserved	
	Bit 14=1	Analog expander option $\pm 1$ mA	
	Bit 15	Reserved	
	Bits 16-18	Number of RO - 1	
	Bits 19-22	Number of DI - 1	
	Bits 23-24	Number of AO - 1	
Bits 25-29	Reserved		
Bits 30-31=11	Memory module 1MBytes <sup>E</sup>		
<b>I/O Slot Types</b>			
F29	DI	DRY	0000000B
			x = Don't care

Format Code	Value	Description	Notes
	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:**

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

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

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

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

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

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

<sup>3</sup> **Voltage Disturbance Trigger**

The operate limit specifies the voltage deviation in percent of the nominal secondary voltage.

<sup>4</sup> **Phase Reversal Trigger**

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