Series PM130 PLUS Powermeters

Modbus Communications Protocol

Reference Guide

BG0427 Rev. A1

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.

Table of Contents

1 General

This document specifies a subset of the Modbus serial communications protocol used to transfer data between a master computer station and the PM130. The document provides the complete information necessary to develop third-party communications software capable of communication with the Series PM130 instruments. Additional information concerning operating the device, configuring the communication parameters, and communication connections may be found in the "Series PM130 PLUS Powermeters, Installation and Operation Manual".

The document is applicable to the PM130P and PM130EH devices.

IMPORTANT

1. 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 are provided.
2. 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:

EH - available in the PM130EH

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 Website. The following paragraphs outline some issues concerning the implementation of the Modbus protocol in the PM130.

2.1 Transmission Modes

The PM130 can be set up to communicate on a Modbus network using RTU transmission mode. Refer to the "Series PM130 PLUS 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 PM130 are shown in Table 2-1. Function 04 can be used in the same context as function 03.

Table 2-2 Modbus Function Codes

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

[1] The PM130 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 Transaction Timing

The PM130 response time to master requests is indicated in Table 2-2.

Table 2-2 Response Time

Baud Rate, bps	Response Time, ms		
	Min	Max	Typical
9600	13	15	13
19200	11	12	11
57600	9	10	9
115200	9	10	9

2.6 Modbus Register Addresses

The PM130 Modbus registers are numbered in the range of 0 to 65535. From the Modbus applications, the PM130 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 PM130 register address to the range of the Modbus holding registers, add a value of 40001 to the PM130 register address. When a register address exceeds 9999, use a 6-digit addressing scheme by adding 400001 to the PM130 register address.

2.7 Data Formats

The PM130 uses four data formats to pass data between a master application and the instrument: 16-bit short integer, 32-bit long integer, 32-bit floating point 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.

32-bit analog and energy registers and counters can be read either in long integer or in single precision floating point format. The register type can be selected in the meter separately for analog registers, binary counters and energy registers via Modbus register 246 (see Section 3.1, Modbus Setup Registers). Refer to the "PM130 PLUS Powermeters, Installation and Operation Manual, Device Options Setup" for information on how to setup the type of 32-bit registers in your meter.

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

2.7.1 16-bit Scaled Integer Format

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

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

where:

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

The engineering scales are indicated for every scaled 16-bit register. Refer to Section 4 "Data Scales and Units" for applicable data scales and measurement units. The default voltage scale in the device is 144V (120V+20%). It can be changed through register 242 (see Section 3.1, Device Data Scales), or via the supplemental PAS software. The recommended voltage scale is 120V+20% = 144V for using with external PT's, and 690V+20% = 828V for a direct connection to power line.

CONVERSION EXAMPLES

1. Voltage readings

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

Voltage engineering scales (see Section 4):

HI_ENG = Vmax = 828.0 × PT ratio = 828.0 × 1 = 828.0V
LO_ENG = 0V

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

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

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

Voltage engineering scales (see Section 4):

HI_ENG = Vmax = 144.0 × PT ratio = 144 × 120 = 17,280V
LO_ENG = 0V

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

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

2. Current readings

Assume device settings: CT primary current = 200A.

Current engineering scales (see Section 4):

HI_ENG = Imax = CT primary current × 2 = 200.00 × 2 = 400.00A
LO_ENG = 0A

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

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

3. Power readings

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

Active Power engineering scales (see Section 4):

HI_ENG = Pmax = Vmax × Imax × 2 = (828.0 × 1) × (200.00 × 2) × 2 = 662,400W = 662.400kW
LO_ENG = -Pmax = -662.400kW

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

Watts reading = 5500 × (662.400 - (-662.400))/(9999 - 0) + (-662.400) = 66.313kW

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

Watts reading = 500 × (662.400 - (-662.400))/(9999 - 0) + (-662.400) = -596.153kW

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

Active Power engineering scales (see Section 4):

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

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

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

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

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

4. Power Factor readings

Power factor engineering scales (see Section 3.3):

HI_ENG = 1.000.
LO_ENG = -1.000.

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

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

2.7.2 32-bit Long Integer Format

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

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

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

Examples

1. Unsigned 32-bit Values

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

(13952) = 3464
(13953) = 1

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

2. Signed 32-bit Values

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

(14336) = 64747 (unsigned)
(14337) = 65535 (unsigned) or -1(signed value).

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

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

Fractional 32-bit data is transmitted using a decimal pre-multiplier to pass fractional numbers in an integer format. Fractional numbers are pre-multiplied by 10 to the power N, where N is the number of digits in the fractional part. For example, the frequency reading of 50.01 Hz is transmitted as 5001, having been pre-multiplied by 100. Whenever a data register contains a fractional number, the register measurement unit is given with a multiplier ×0.1, ×0.01 or ×0.001, showing the weight of the least significant decimal digit. To get an actual fractional number with specified precision, multiply the register value by the given multiplier. To write a fractional number into the register, divide the number by the given multiplier.

2.7.3 32-bit Floating Point Format

32-bit analog registers, energy registers and binary counters, and 32-bit Min/Max registers (see Sections 3.3-3.5) can be read in IEEE single precision floating point format in two adjacent 16-bit Modbus registers, the low order register first.

The low-order register always starts at an even Modbus address.

2.7.4 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.

2.8 User Assignable Registers

The PM130 provides 120 user assignable registers in the address range of 0 to 119. You can re-map any register available in the meter to any assignable register so that Modbus registers that reside at different locations may be simply accessed using a single request by re-mapping them to adjacent addresses. Refer to Configuring Modbus in the PM130 PLUS Installation and Operation Manual for information on how to configure the assignable registers via PAS.

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

Initially these registers are reserved and none of them points to an actual register address. To build your own register map, write to map registers 120 to 239 the actual addresses you want to read from or write to via the assignable area (registers 0 to 119). 32-bit long registers should always be aligned at

even addresses. For example, 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.

2.9 Password Protection

The PM130 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.

3 Modbus Register Map

3.1 Modbus Setup Registers

Address	Point ID	Description	Options/Range	Units	Type	R/W	Notes
Assignable Modbus Registers							
0-119							
+0		Register 0 contents	0-65535		UINT16	R/W	
+1		Register 1 contents	0-65535		UINT16	R/W	
		...					
+119		Register 119 contents	0-65535		UINT16	R/W	
Assignable Registers Map							
120-239							
+0		Mapped register 0 address	0-65535		UINT16	R/W	
+1		Mapped register 1 address	0-65535		UINT16	R/W	
+119		Mapped register 119 address	0-65535		UINT16	R/W	
Modbus Conversion Scales							
240		Low raw scale	0		UINT16	R	
241		High raw scale	9999		UINT16	R	
Device Data Scales							
242		Voltage scale, secondary volts	60-828	1V	UINT16	R/W	Default 144V
243		Current scale, secondary amps	10-100	×0.1A	UINT16	R/W	Default 2×CT secondary
244-245		Reserved	0		UINT16	R	
32-bit Register Type							
246		Type of 32-bit registers	Bits 0-1 - analog values: 0 = 32-bit integer 1 = 32-bit floating point Bits 2-3 - binary counters: 0 = 32-bit integer 1 = 32-bit floating point Bit 4-5 - energy counters: 0 = 32-bit integer 1 = 32-bit floating point		UINT16	R/W	Default 0

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

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

Address	Point ID	Description	Low and High Scales[2]	Units[2]	Type	R/W	Notes
+38		-kvarh net (high)	0-9999	×10Mvarh	UINT16	R	4, 5
+39	0x1112	V1/V12 Voltage THD	0-999.9	0.1%	UINT16	R	[1] 3-sec value
+40	0x1113	V2/V23 Voltage THD	0-999.9	0.1%	UINT16	R	[1] 3-sec value
+41	0x1114	V3/V31 Voltage THD	0-999.9	0.1%	UINT16	R	[1] 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	5
+46		kVAh (high)	0-9999	10MVAh	UINT16	R	5
+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, power demand and total harmonics readings are only available in the PM130EH meters.

[1] 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.

[2] All analog registers except of harmonics are 1-second average values. For volts, amps and power scales and units, refer to Section 4 ”Data Scales and Units”. For analog data scaling formulas and examples, see Section 2.7.1, “16-bit Scaled Integer Format”.

[3] Positive readings of kvarh net

[4] Negative readings of kvarh net

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

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

Address	Point ID	Description	Low and High Scales[2]	Units[2, 4]	Type	R/W	Notes
6656	0x0000	**None**	0		UINT16	R	
		Special Inputs					
6697	0x0101	Phase rotation order	0=error, 1=positive (ABC), 2=negative (CBA)		UINT16	R	
6896	0x0600	**Digital Inputs (bitmap)**	0x0000-0x000F		UINT16	R	
6976	0x0800	**Relay Outputs (bitmap)**	0x0000-0x0003		UINT16	R	
7056-7063		**Counters**					
+0,1	0x0A00	Counter #1	0-99,999		UINT32	R/W	
+2,3	0x0A01	Counter #2	0-99,999		UINT32	R/W	
+4,5	0x0A02	Counter #3	0-99,999		UINT32	R/W	
+6,7	0x0A03	Counter #4	0-99,999		UINT32	R/W	
7136-7168		**1-Cycle Phase Values**					
+0	0x0C00	V1/V12 Voltage	0-Vmax	U1	UINT16	R	[1]
+1	0x0C01	V2/V23 Voltage	0-Vmax	U1	UINT16	R	[1]
+2	0x0C02	V3/V31 Voltage	0-Vmax	U1	UINT16	R	[1]
+3	0x0C03	I1 Current	0-Imax	U2	UINT16	R	
+4	0x0C04	I2 Current	0-Imax	U2	UINT16	R	
+5	0x0C05	I3 Current	0-Imax	U2	UINT16	R	
+6	0x0C06	kW L1	-Pmax-Pmax	U3	INT16	R	
+7	0x0C07	kW L2	-Pmax-Pmax	U3	INT16	R	
+8	0x0C08	kW L3	-Pmax-Pmax	U3	INT16	R	
+9	0x0C09	kvar L1	-Pmax-Pmax	U3	INT16	R	
+10	0x0C0A	kvar L2	-Pmax-Pmax	U3	INT16	R	
+11	0x0C0B	kvar L3	-Pmax-Pmax	U3	INT16	R	
+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	[1] 2-cycle value
+19	0x0C13	V2/V23 Voltage THD	0-999.9	0.1%	UINT16	R	[1] 2-cycle value
+20	0x0C14	V3/V31 Voltage THD	0-999.9	0.1%	UINT16	R	[1] 2-cycle value
+21	0x0C15	I1 Current THD	0-999.9	0.1%	UINT16	R	2-cycle value
+22	0x0C16	I2 Current THD	0-999.9	0.1%	UINT16	R	2-cycle value
+23	0x0C17	I3 Current THD	0-999.9	0.1%	UINT16	R	2-cycle value
+24	0x0C18	I1 K-Factor	1.0-999.9	0.1	UINT16	R	2-cycle value
+25	0x0C19	I2 K-Factor	1.0-999.9	0.1	UINT16	R	2-cycle value
+26	0x0C1A	I3 K-Factor	1.0-999.9	0.1	UINT16	R	2-cycle value

Address	Point ID	Description	Low and High Scales[2]	Units[2, 4]	Type	R/W	Notes
+27	0x0C1B	I1 Current TDD	0-100.0	0.1%	UINT16	R	2-cycle value
+28	0x0C1C	I2 Current TDD	0-100.0	0.1%	UINT16	R	2-cycle value
+29	0x0C1D	I3 Current TDD	0-100.0	0.1%	UINT16	R	2-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		**1-Cycle Total Values**					
+0	0x0F00	Total kW	-Pmax-Pmax	U3	INT16	R	
+1	0x0F01	Total kvar	-Pmax-Pmax	U3	INT16	R	
+2	0x0F02	Total kVA	0-Pmax	U3	UINT16	R	
+3	0x0F03	Total PF	-1.000-1.000	0.001	INT16	R	
+4	0x0F04	Total PF lag	0-1.000	0.001	UINT16	R	
+5	0x0F05	Total PF lead	0-1.000	0.001	UINT16	R	
+5	0x0F06	Total kW import	0-Pmax	U3	UINT32	R	
+7	0x0F07	Total kW export	0-Pmax	U3	UINT32	R	
+8	0x0F08	Total kvar import	0-Pmax	U3	UINT32	R	
+9	0x0F09	Total kvar export	0-Pmax	U3	UINT32	R	
+10	0x0F0A	3-phase average L-N/L-L voltage	0-Vmax	U1	UINT32	R	1
+11	0x0F0B	3-phase average L-L voltage	0-Vmax	U1	UINT32	R	
+12	0x0F0C	3-phase average current	0-Imax	U2	UINT32	R	
7296-7300		**1-Cycle Auxiliary Values**					
+0	0x1000	Not used			UINT16	R	
+1	0x1001	In (neutral) Current	0-Imax	U2	UINT16	R	
+2	0x1002	Frequency	0-Fmax	0.01Hz	UINT16	R	
+3	0x1003	Voltage unbalance	0-300	%	UINT16	R	
+4	0x1004	Current unbalance	0-300	%	UINT16	R	
7316-7331		**Phasor**					
+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	0.1º	INT16	R	1
+9	0x1089	V2/V23 Voltage angle	-180.0-180.0	0.1º	INT16	R	1
+10	0x108A	V3/V31 Voltage angle	-180.0-180.0	0.1º	INT16	R	1
+11	0x108B	Not used			INT16	R	
+12	0x108C	I1 Current angle	-180.0-180.0	0.1º	INT16	R	
+13	0x108D	I2 Current angle	-180.0-180.0	0.1º	INT16	R	
+14	0x108E	I3 Current angle	-180.0-180.0	0.1º	INT16	R	
+15	0x108F	Not used			INT16	R	

Address	Point ID	Description	Low and High Scales[2]	Units[2, 4]	Type	R/W	Notes
7336-7368		**1-Second Phase Values**					
+0	0x1100	V1/V12 Voltage	0-Vmax	U1	UINT16	R	[1]
+1	0x1101	V2/V23 Voltage	0-Vmax	U1	UINT16	R	[1]
+2	0x1102	V3/V31 Voltage	0-Vmax	U1	UINT16	R	[1]
+3	0x1103	I1 Current	0-Imax	U2	UINT16	R	
+4	0x1104	I2 Current	0-Imax	U2	UINT16	R	
+5	0x1105	I3 Current	0-Imax	U2	UINT16	R	
+6	0x1106	kW L1	-Pmax-Pmax	U3	INT16	R	
+7	0x1107	kW L2	-Pmax-Pmax	U3	INT16	R	
+8	0x1108	kW L3	-Pmax-Pmax	U3	INT16	R	
+9	0x1109	kvar L1	-Pmax-Pmax	U3	INT16	R	
+10	0x110A	kvar L2	-Pmax-Pmax	U3	INT16	R	
+11	0x110B	kvar L3	-Pmax-Pmax	U3	INT16	R	
+12	0x110C	kVA L1	0-Pmax	U3	UINT16	R	
+13	0x110D	kVA L2	0-Pmax	U3	UINT16	R	
+14	0x110E	kVA L3	0-Pmax	U3	UINT16	R	
+15	0x110F	Power factor L1	-1.000-1.000	0.001	INT16	R	
+16	0x1110	Power factor L2	-1.000-1.000	0.001	INT16	R	
+17	0x1111	Power factor L3	-1.000-1.000	0.001	INT16	R	
+18	0x1112	V1/V12 Voltage THD	0-999.9	0.1%	UINT16	R	[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		**1-Second Total Values**					
+0	0x1400	Total kW	-Pmax-Pmax	U3	INT16	R	
+1	0x1401	Total kvar	-Pmax-Pmax	U3	INT16	R	
+2	0x1402	Total kVA	0-Pmax	U3	UINT16	R	
+3	0x1403	Total PF	-1.000-1.000	0.001	INT16	R	
+4	0x1404	Total PF lag	0-1.000	0.001	UINT16	R	
+5	0x1405	Total PF lead	0-1.000	0.001	UINT16	R	
+5	0x1406	Total kW import	0-Pmax	U3	UINT32	R	
+7	0x1407	Total kW export	0-Pmax	U3	UINT32	R	

Address	Point ID	Description	Low and High Scales[2]	Units[2, 4]	Type	R/W	Notes
+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		**1-Second Auxiliary Values**					
+0	0x1500	Not used			UINT16	R	
+1	0x1501	In (neutral) Current	0-Imax	U2	UINT16	R	
+2	0x1502	Frequency	0-Fmax	0.01Hz	UINT16	R	
+3	0x1503	Voltage unbalance	0-300	%	UINT16	R	
+4	0x1504	Current unbalance	0-300	%	UINT16	R	
7536-7565		**Present Volt, Ampere and Power Demands**					
+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	
+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		**Total Energies** [EH]					

Address	Point ID	Description	Low and High Scales[2]	Units[2, 4]	Type	R/W	Notes
+0,1	0x1700	kWh import	0-10^9-1	1 kWh	UINT32	R	
+2,3	0x1701	kWh export	0-10^9-1	1 kWh	UINT32	R	
+4,5		Not used			INT32	R	
+6,7		Not used			UINT32	R	
+8,9	0x1704	kvarh import	0-10^9-1	1 kvarh	UINT32	R	
+10,11	0x1705	kvarh export	0-10^9-1	1 kvarh	UINT32	R	
+12,13		Not used			INT32	R	
+14,15		Not used			UINT32	R	
+16,17	0x1708	kVAh total	0-10^9-1	1 kVAh	UINT32	R	
7616-7633		**Phase Energies EH**					
+0,1	0x1800	kWh import L1	0-10^9-1	1 kWh	UINT32	R	
+2,3	0x1801	kWh import L2	0-10^9-1	1 kWh	UINT32	R	
+4,5	0x1802	kWh import L3	0-10^9-1	1 kWh	UINT32	R	
+6,7	0x1803	kvarh import L1	0-10^9-1	1 kvarh	UINT32	R	
+8,9	0x1804	kvarh import L2	0-10^9-1	1 kvarh	UINT32	R	
+10,11	0x1805	kvarh import L3	0-10^9-1	1 kvarh	UINT32	R	
+12,13	0x1806	kVAh total L1	0-10^9-1	1 kVAh	UINT32	R	
+14,15	0x1807	kVAh total L2	0-10^9-1	1 kVAh	UINT32	R	
+16,17	0x1808	kVAh total L3	0-10^9-1	1 kVAh	UINT32	R	
7656-7695		**V1/V12 Harmonic Distortion EH**					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	
		...					
+39	0x1927	H40 Harmonic distortion	0-100.00	0.01%	UINT16	R	
7696-7735		**V2/V23 Harmonic Distortion EH**					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		**V3/V31 Harmonic Distortion EH**					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		**I1 Harmonic Distortion EH**					
+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		**I2 Harmonic Distortion EH**					

Address	Point ID	Description	Low and High Scales[2]	Units[2, 4]	Type	R/W	Notes
+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		**I3 Harmonic Distortion EH**					
+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		**Fundamental Phase Values EH**					2-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	
+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		**Fundamental Total Values EH**					2-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	
8416-8445		**Minimum 1-Cycle Phase Values**					
+0	0x2C00	V1/V12 Voltage	0-Vmax	U1	UINT16	R	1
+1	0x2C01	V2/V23 Voltage	0-Vmax	U1	UINT16	R	1
+2	0x2C02	V3/V31 Voltage	0-Vmax	U1	UINT16	R	1
+3	0x2C03	I1 Current	0-Imax	U2	UINT16	R	
+4	0x2C04	I2 Current	0-Imax	U2	UINT16	R	
+5	0x2C05	I3 Current	0-Imax	U2	UINT16	R	
8456-8459		**Minimum 1-Cycle Total Values**					
+0	0x2D00	Total kW	-Pmax-Pmax	U3	INT16	R	

Address	Point ID	Description	Low and High Scales[2]	Units[2, 4]	Type	R/W	Notes
+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		**Minimum 1-Cycle Auxiliary Values**					
+0	0x2E00	Not used		U2	UINT16	R	
+1	0x2E01	In Current	0-Imax	U2	UINT16	R	
+2	0x2E02	Frequency	0-Fmax	0.01Hz	UINT16	R	
8736-8765		**Maximum 1-Cycle Phase Values**					
+0	0x3400	V1/V12 Voltage	0-Vmax	U1	UINT16	R	1
+1	0x3401	V2/V23 Voltage	0-Vmax	U1	UINT16	R	1
+2	0x3402	V3/V31 Voltage	0-Vmax	U1	UINT16	R	1
+3	0x3403	I1 Current	0-Imax	U2	UINT16	R	
+4	0x3404	I2 Current	0-Imax	U2	UINT16	R	
+5	0x3405	I3 Current	0-Imax	U2	UINT16	R	
8776-8779		**Maximum 1-Cycle Total Values**					
+0	0x3500	Total kW	-Pmax-Pmax	U3	INT16	R	
+1	0x3501	Total kvar	-Pmax-Pmax	U3	INT16	R	
+2	0x3502	Total kVA	0-Pmax	U3	UINT16	R	
+3	0x3503	Total PF	0-1.000	0.001	UINT16	R	Absolute value
881608818		**Maximum 1-Cycle Auxiliary Values**					
+0	0x3600	Not used		U2	UINT16	R	
+1	0x3601	In Current	0-Imax	U2	UINT16	R	
+2	0x3602	Frequency	0-Fmax	0.01Hz	UINT16	R	
8856-8872		**Maximum Demands**					
+0	0x3700	V1/V12 Maximum volt demand	0-Vmax	U1	UINT16	R	1
+1	0x3701	V2/V23 Maximum volt demand	0-Vmax	U1	UINT16	R	1
+2	0x3702	V3/V31 Maximum volt demand	0-Vmax	U1	UINT16	R	1
+3	0x3703	I1 Maximum ampere demand	0-Imax	U2	UINT16	R	
+4	0x3704	I2 Maximum ampere demand	0-Imax	U2	UINT16	R	
+5	0x3705	I3 Maximum ampere demand	0-Imax	U2	UINT16	R	
+6	0x3706	Not used			UINT16	R	
+7	0x3707	Not used			UINT16	R	
+8	0x3708	Not used			UINT16	R	
+9	0x3709	Maximum kW import sliding window demand	0-Pmax	U3	UINT16	R	
+10	0x370A	Maximum kvar import sliding window demand	0-Pmax	U3	UINT16	R	
+11	0x370B	Maximum kVA sliding window demand	0-Pmax	U3	UINT16	R	
+12	0x370C	Not used			UINT16	R	
+13	0x370D	Not used			UINT16	R	
+14	0x370E	Not used			UINT16	R	
+15	0x370F	Maximum kW export sliding window demand	0-Pmax	U3	UINT16	R	
+16	0x3710	Maximum kvar export sliding window demand	0-Pmax	U3	UINT16	R	
9056-9057		**TOU Parameters** [EH]					
+0	0x3C00	Active tariff	0-7		UINT16	R/W	

Address	Point ID	Description	Low and High Scales[2]	Units[2, 4]	Type	R/W	Notes
+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	
9076-9079		**Scaled Analog Outputs**					
+0	0x3C80	Analog output AO1	0-4095		UINT16	R/W	
+1	0x3C81	Analog output AO2	0-4095		UINT16	R/W	
+2	0x3C82	Analog output AO3	0-4095		UINT16	R/W	
+3	0x3C83	Analog output AO4	0-4095		UINT16	R/W	
9096-9103		**TOU Energy Register #1** EH					
+0,1	0x3D00	Tariff #1 register	$0\text{-}10^9\text{-}1$	1 kWh	UINT32	R	
+2,3	0x3D01	Tariff #2 register	$0\text{-}10^9\text{-}1$	1 kWh	UINT32	R	
+4,5	0x3D02	Tariff #3 register	$0\text{-}10^9\text{-}1$	1 kWh	UINT32	R	
+6,7	0x3D03	Tariff #4 register	$0\text{-}10^9\text{-}1$	1 kWh	UINT32	R	
9136-9143		**TOU Energy Register #2** EH					
+0,1	0x3E00	Tariff #1 register	$0\text{-}10^9\text{-}1$	1 kWh	UINT32	R	
+2,3	0x3E01	Tariff #2 register	$0\text{-}10^9\text{-}1$	1 kWh	UINT32	R	
+4,5	0x3E02	Tariff #3 register	$0\text{-}10^9\text{-}1$	1 kWh	UINT32	R	
+6,7	0x3E03	Tariff #4 register	$0\text{-}10^9\text{-}1$	1 kWh	UINT32	R	
9176-9183		**TOU Energy Register #3** EH					
+0,1	0x3F00	Tariff #1 register	$0\text{-}10^9\text{-}1$	1 kWh	UINT32	R	
+2,3	0x3F01	Tariff #2 register	$0\text{-}10^9\text{-}1$	1 kWh	UINT32	R	
+4,5	0x3F02	Tariff #3 register	$0\text{-}10^9\text{-}1$	1 kWh	UINT32	R	
+6,7	0x3F03	Tariff #4 register	$0\text{-}10^9\text{-}1$	1 kWh	UINT32	R	
9216-9223		**TOU Energy Register #4** EH					
+0,1	0x4000	Tariff #1 register	$0\text{-}10^9\text{-}1$	1 kWh	UINT32	R	
+2,3	0x4001	Tariff #2 register	$0\text{-}10^9\text{-}1$	1 kWh	UINT32	R	
+4,5	0x4002	Tariff #3 register	$0\text{-}10^9\text{-}1$	1 kWh	UINT32	R	
+6,7	0x4003	Tariff #4 register	$0\text{-}10^9\text{-}1$	1 kWh	UINT32	R	
9416-9419		**Summary Energy Accumulated Demands** EH					
+0	0x4500	Summary register #1 demand	0-Pmax	U3	UINT16	R	
+1	0x4501	Summary register #2 demand	0-Pmax	U3	UINT16	R	
+2	0x4502	Summary register #3 demand	0-Pmax	U3	UINT16	R	
+3	0x4503	Summary register #4 demand	0-Pmax	U3	UINT16	R	
9436-9439		**Summary Energy Block Demands** EH					
+0	0x4580	Summary register #1 demand	0-Pmax	U3	UINT16	R	
+1	0x4581	Summary register #2 demand	0-Pmax	U3	UINT16	R	
+2	0x4582	Summary register #3 demand	0-Pmax	U3	UINT16	R	
+3	0x4583	Summary register #4 demand	0-Pmax	U3	UINT16	R	
9456-9459		**Summary Energy Sliding Window Demands** EH					

Address	Point ID	Description	Low and High Scales[2]	Units[2, 4]	Type	R/W	Notes
+0	0x4600	Summary register #1 demand	0-Pmax	U3	UINT16	R	
+1	0x4601	Summary register #2 demand	0-Pmax	U3	UINT16	R	
+2	0x4602	Summary register #3 demand	0-Pmax	U3	UINT16	R	
+3	0x4603	Summary register #4 demand	0-Pmax	U3	UINT16	R	
9516-9519		**Summary Energy Maximum Demands EH**					
+0	0x4780	Summary register #1 maximum demand	0-Pmax	U3	UINT16	R	
+1	0x4781	Summary register #2 maximum demand	0-Pmax	U3	UINT16	R	
+2	0x4782	Summary register #3 maximum demand	0-Pmax	U3	UINT16	R	
+3	0x4783	Summary register #4 maximum demand	0-Pmax	U3	UINT16	R	
9536-9539		**TOU Maximum Demand Register #1 EH**					
+0	0x4800	Tariff #1 maximum demand	0-Pmax	U3	UINT16	R	
+1	0x4801	Tariff #2 maximum demand	0-Pmax	U3	UINT16	R	
+2	0x4802	Tariff #3 maximum demand	0-Pmax	U3	UINT16	R	
+3	0x4803	Tariff #4 maximum demand	0-Pmax	U3	UINT16	R	
9576-9579		**TOU Maximum Demand Register #2 EH**					
+0	0x4900	Tariff #1 maximum demand	0-Pmax	U3	UINT16	R	
+1	0x4901	Tariff #2 maximum demand	0-Pmax	U3	UINT16	R	
+2	0x4902	Tariff #3 maximum demand	0-Pmax	U3	UINT16	R	
+3	0x4903	Tariff #4 maximum demand	0-Pmax	U3	UINT16	R	
9616-9619		**TOU Maximum Demand Register #3 EH**					
+0	0x4A00	Tariff #1 maximum demand	0-Pmax	U3	UINT16	R	
+1	0x4A01	Tariff #2 maximum demand	0-Pmax	U3	UINT16	R	
+2	0x4A02	Tariff #3 maximum demand	0-Pmax	U3	UINT16	R	
+3	0x4A03	Tariff #4 maximum demand	0-Pmax	U3	UINT16	R	
9556-9559		**TOU Maximum Demand Register #4 EH**					
+0	0x4880	Tariff #1 maximum demand	0-Pmax	U3	UINT16	R	
+1	0x4881	Tariff #2 maximum demand	0-Pmax	U3	UINT16	R	
+2	0x4882	Tariff #3 maximum demand	0-Pmax	U3	UINT16	R	
+3	0x4883	Tariff #4 maximum demand	0-Pmax	U3	UINT16	R	
10656-10695		**V1/V12 Harmonic Angles EH**					1, 3
+0	0x6400	H01 Harmonic angle	-180.0-180.0	0.1º	INT16	R	
+1	0x6400	H02 Harmonic angle	-180.0-180.0	0.1º	INT16	R	
		…					
+39	0x6427	H40 Harmonic angle	-180.0-180.0	0.1º	INT16	R	
10696-10735		**V2/V23 Harmonic Angles EH**					1, 3
+0	0x6500	H01 Harmonic angle	-180.0-180.0	0.1º	INT16	R	
+1	0x6500	H02 Harmonic angle	-180.0-180.0	0.1º	INT16	R	
		…					
+39	0x6527	H40 Harmonic angle	-180.0-180.0	0.1º	INT16	R	

Address	Point ID	Description	Low and High Scales[2]	Units[2, 4]	Type	R/W	Notes
10736-10775		**V1/V31 Harmonic Angles EH**					1, 3
+0	0x6600	H01 Harmonic angle	-180.0-180.0	0.1º	INT16	R	
+1	0x6600	H02 Harmonic angle	-180.0-180.0	0.1º	INT16	R	
		…					
+39	0x6627	H40 Harmonic angle	-180.0-180.0	0.1º	INT16	R	
10816-10855		**I1 Harmonic Angles EH**					3
+0	0x6700	H01 Harmonic angle	-180.0-180.0	0.1º	INT16	R	
+1	0x6700	H02 Harmonic angle	-180.0-180.0	0.1º	INT16	R	
		…					
+39	0x6727	H40 Harmonic angle	-180.0-180.0	0.1º	INT16	R	
10856-10895		**I2 Harmonic Angles EH**					3
+0	0x6800	H01 Harmonic angle	-180.0-180.0	0.1º	INT16	R	
+1	0x6800	H02 Harmonic angle	-180.0-180.0	0.1º	INT16	R	
		…					
+39	0x6827	H40 Harmonic angle	-180.0-180.0	0.1º	INT16	R	
10896-10935		**I3 Harmonic Angles EH**					3
+0	0x6900	H01 Harmonic angle	-180.0-180.0	0.1º	INT16	R	
+1	0x6900	H02 Harmonic angle	-180.0-180.0	0.1º	INT16	R	
		…					
+39	0x6927	H40 Harmonic angle	-180.0-180.0	0.1º	INT16	R	
11616	0x7C00	**Setpoint Status (bitmap)**	0x0000-0xFFFF		UINT16	R	

NOTES:

Energy, power demand and harmonics readings are only available in the PM130EH meters.

1 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.

2 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 2.7.1, “16-bit Scaled Integer Format”.

3 Harmonic angles are referenced to the fundamental voltage harmonic H01 on phase L1.

4 The binary counters and energy registers can be read either as 32-bit integer, or 32-bit floating-point values. Refer to Section 2.7 for details.

3.4 32-bit Analog Registers, Binary Registers and Counters

Address	Point ID	Description	Options/Range[2]	Units[2, 4]	Type[2]	R/W	Notes
11776-11777	0x0000	**None**	0		UINT32	R	
		Special Inputs					
11904-11905	0x0101	Phase rotation order	0=error, 1=positive (ABC), 2=negative (CBA)		UINT32	R	
12544-12545	0x0600	**Digital Inputs DI1-DI4 (bitmap)**	0x00000000-0x0000000F		UINT32	R	
12800-12801	0x0800	**Relay Outputs RO1-RO2 (bitmap)**	0x00000000-0x00000003		UINT32	R	
13056-13063		**Counters**					
+0,1	0x0A00	Counter #1	0-99,999		UINT32	R/W	
+2,3	0x0A01	Counter #2	0-99,999		UINT32	R/W	
+4,5	0x0A02	Counter #3	0-99,999		UINT32	R/W	
+6,7	0x0A03	Counter #4	0-99,999		UINT32	R/W	
13312-13377		**1-Cycle Phase Values**					
+0,1	0x0C00	V1/V12 Voltage	0-Vmax	U1	UINT32	R	[1]
+2,3	0x0C01	V2/V23 Voltage	0-Vmax	U1	UINT32	R	[1]
+4,5	0x0C02	V3/V31 Voltage	0-Vmax	U1	UINT32	R	[1]
+6,7	0x0C03	I1 Current	0-Imax	U2	UINT32	R	
+8,9	0x0C04	I2 Current	0-Imax	U2	UINT32	R	
+10,11	0x0C05	I3 Current	0-Imax	U2	UINT32	R	
+12,13	0x0C06	kW L1	-Pmax-Pmax	U3	INT32	R	
+14,15	0x0C07	kW L2	-Pmax-Pmax	U3	INT32	R	
+16,17	0x0C08	kW L3	-Pmax-Pmax	U3	INT32	R	
+18,19	0x0C09	kvar L1	-Pmax-Pmax	U3	INT32	R	
+20,21	0x0C0A	kvar L2	-Pmax-Pmax	U3	INT32	R	
+22,23	0x0C0B	kvar L3	-Pmax-Pmax	U3	INT32	R	
+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	[1] 2-cycle value
+38,39	0x0C13	V2/V23 Voltage THD	0-9999	×0.1%	UINT32	R	[1] 2-cycle value
+40,41	0x0C14	V3/V31 Voltage THD	0-9999	×0.1%	UINT32	R	[1] 2-cycle value
+42,43	0x0C15	I1 Current THD	0-9999	×0.1%	UINT32	R	2-cycle value
+44,45	0x0C16	I2 Current THD	0-9999	×0.1%	UINT32	R	2-cycle value
+46,47	0x0C17	I3 Current THD	0-9999	×0.1%	UINT32	R	2-cycle value
+48,49	0x0C18	I1 K-Factor	10-9999	×0.1	UINT32	R	2-cycle value
+50,51	0x0C19	I2 K-Factor	10-9999	×0.1	UINT32	R	2-cycle value
+52,53	0x0C1A	I3 K-Factor	10-9999	×0.1	UINT32	R	2-cycle value

Address	Point ID	Description	Options/Range[2]	Units[2, 4]	Type[2]	R/W	Notes
+54,55	0x0C1B	I1 Current TDD	0-1000	×0.1%	UINT32	R	2-cycle value
+56,57	0x0C1C	I2 Current TDD	0-1000	×0.1%	UINT32	R	2-cycle value
+58,59	0x0C1D	I3 Current TDD	0-1000	×0.1%	UINT32	R	2-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	
13696-13721		**1-Cycle Total Values**					
+0,1	0x0F00	Total kW	-Pmax-Pmax	U3	INT32	R	
+2,3	0x0F01	Total kvar	-Pmax-Pmax	U3	INT32	R	
+4,5	0x0F02	Total kVA	0-Pmax	U3	UINT32	R	
+6,7	0x0F03	Total PF	-1000-1000	×0.001	INT32	R	
+8,9	0x0F04	Total PF lag	0-1000	×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	0x0F0A	3-phase average L-N/L-L voltage	0-Vmax	U1	UINT32	R	1
+22,23	0x0F0B	3-phase average L-L voltage	0-Vmax	U1	UINT32	R	
+24,25	0x0F0C	3-phase average current	0-Imax	U2	UINT32	R	
13824-13833		**1-Cycle Auxiliary Values**					
+0,1	0x1000	Not used			UINT32	R	
+2,3	0x1001	In (neutral) Current	0-Imax	U2	UINT32	R	
+4,5	0x1002	Frequency	0-Fmax	×0.01Hz	UINT32	R	
+6,7	0x1003	Voltage unbalance	0-300	%	UINT32	R	
+8,9	0x1004	Current unbalance	0-300	%	UINT32	R	
13864-13895		**Phasor**					
+0,1	0x1080	V1/V12 Voltage magnitude	0-Vmax	U1	UINT32	R	1
+2,3	0x1081	V2/V23 Voltage magnitude	0-Vmax	U1	UINT32	R	1
+4,5	0x1082	V3/V31 Voltage magnitude	0-Vmax	U1	UINT32	R	1
+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	1
+18,19	0x1089	V2/V23 Voltage angle	-1800-1800	×0.1°	INT32	R	1
+20,21	0x108A	V3/V31 Voltage angle	-1800-1800	×0.1°	INT32	R	1
+22,23	0x108B	Not used			INT32	R	
+24,25	0x108C	I1 Current angle	-1800-1800	×0.1°	INT32	R	
+26,27	0x108D	I2 Current angle	-1800-1800	×0.1°	INT32	R	
+28,29	0x108E	I3 Current angle	-1800-1800	×0.1°	INT32	R	
+30,31	0x108F	Not used			INT32	R	

Address	Point ID	Description	Options/Range[2]	Units[2, 4]	Type[2]	R/W	Notes
13952-14017		**1-Second Phase Values**					
+0,1	0x1100	V1/V12 Voltage	0-Vmax	U1	UINT32	R	[1]
+2,3	0x1101	V2/V23 Voltage	0-Vmax	U1	UINT32	R	[1]
+4,5	0x1102	V3/V31 Voltage	0-Vmax	U1	UINT32	R	[1]
+6,7	0x1103	I1 Current	0-Imax	U2	UINT32	R	
+8,9	0x1104	I2 Current	0-Imax	U2	UINT32	R	
+10,11	0x1105	I3 Current	0-Imax	U2	UINT32	R	
+12,13	0x1106	kW L1	-Pmax-Pmax	U3	INT32	R	
+14,15	0x1107	kW L2	-Pmax-Pmax	U3	INT32	R	
+16,17	0x1108	kW L3	-Pmax-Pmax	U3	INT32	R	
+18,19	0x1109	kvar L1	-Pmax-Pmax	U3	INT32	R	
+20,21	0x110A	kvar L2	-Pmax-Pmax	U3	INT32	R	
+22,23	0x110B	kvar L3	-Pmax-Pmax	U3	INT32	R	
+24,25	0x110C	kVA L1	0-Pmax	U3	UINT32	R	
+26,27	0x110D	kVA L2	0-Pmax	U3	UINT32	R	
+28,29	0x110E	kVA L3	0-Pmax	U3	UINT32	R	
+30,31	0x110F	Power factor L1	-1000-1000	×0.001	INT32	R	
+32,33	0x1110	Power factor L2	-1000-1000	×0.001	INT32	R	
+34,35	0x1111	Power factor L3	-1000-1000	×0.001	INT32	R	
+36,37	0x1112	V1/V12 Voltage THD	0-9999	×0.1%	UINT32	R	[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	
14336-14361		**1-Second Total Values**					
+0,1	0x1400	Total kW	-Pmax-Pmax	U3	INT32	R	
+2,3	0x1401	Total kvar	-Pmax-Pmax	U3	INT32	R	
+4,5	0x1402	Total kVA	0-Pmax	U3	UINT32	R	
+6,7	0x1403	Total PF	-1000-1000	×0.001	INT32	R	
+8,9	0x1404	Total PF lag	0-1000	×0.001	UINT16	R	
+10,11	0x1405	Total PF lead	0-1000	×0.001	UINT16	R	
+12,13	0x1406	Total kW import	0-Pmax	U3	UINT32	R	
+14,15	0x1407	Total kW export	0-Pmax	U3	UINT32	R	

Address	Point ID	Description	Options/Range[2]	Units[2, 4]	Type[2]	R/W	Notes
+16,17	0x1408	Total kvar import	0-Pmax	U3	UINT32	R	
+18,19	0x1409	Total kvar export	0-Pmax	U3	UINT32	R	
+20,21	0x140A	3-phase average L-N/L-L voltage	0-Vmax	U1	UINT32	R	1
+22,23	0x140B	3-phase average L-L voltage	0-Vmax	U1	UINT32	R	
+24,25	0x140C	3-phase average current	0-Imax	U2	UINT32	R	
14464-14473		**1-Second Auxiliary Values**					
+0,1	0x1500	Not used			UINT32	R	
+2,3	0x1501	In (neutral) Current	0-Imax	U2	UINT32	R	
+4,5	0x1502	Frequency	0-Fmax	×0.01Hz	UINT32	R	
+6,7	0x1503	Voltage unbalance	0-300	%	UINT32	R	
+8,9	0x1504	Current unbalance	0-300	%	UINT32	R	
14592-14651		**Present Volt, Ampere and Power Demands**					
+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	
+32,33	0x1610	kvar import accumulated demand	0-Pmax	U3	UINT32	R	
+34,35	0x1611	kVA accumulated demand	0-Pmax	U3	UINT32	R	
+36,37	0x1612	kW import predicted sliding window demand	0-Pmax	U3	UINT32	R	
+38,39	0x1613	kvar import predicted sliding window demand	0-Pmax	U3	UINT32	R	
+40,41	0x1614	kVA predicted sliding window demand	0-Pmax	U3	UINT32	R	
+42,43	0x1615	PF (import) at Max. kVA sliding window demand	0-1000	×0.001	UINT32	R	
+44,45	0x1616	kW export block demand	0-Pmax	U3	UINT32	R	
+46,47	0x1617	kvar export block demand	0-Pmax	U3	UINT32	R	
+48,49	0x1618	kW export sliding window demand	0-Pmax	U3	UINT32	R	
+50,51	0x1619	kvar export sliding window demand	0-Pmax	U3	UINT32	R	
+52,53	0x161A	kW export accumulated demand	0-Pmax	U3	UINT32	R	
+54,55	0x161B	kvar export accumulated demand	0-Pmax	U3	UINT32	R	
+56,57	0x161C	kW export predicted sliding window demand	0-Pmax	U3	UINT32	R	
+58,59	0x161D	kvar export predicted sliding window demand	0-Pmax	U3	UINT32	R	
14720-14755		**Total Energies** [EH]					

Address	Point ID	Description	Options/Range[2]	Units[2, 4]	Type[2]	R/W	Notes
+0,1	0x1700	kWh import	0-10^9-1	1 kWh	UINT32	R	
+2,3	0x1701	kWh export	0-10^9-1	1 kWh	UINT32	R	
+4,5	0x1702	Not used			INT32	R	
+6,7	0x1703	Not used			UINT32	R	
+8,9	0x1704	kvarh import	0-10^9-1	1 kvarh	UINT32	R	
+10,11	0x1705	kvarh export	0-10^9-1	1 kvarh	UINT32	R	
+12,13	0x1706	Not used			INT32	R	
+14,15	0x1707	Not used			UINT32	R	
+16,17	0x1708	kVAh total	0-10^9-1	1 kVAh	UINT32	R	
14760-14767		**Summary Energy Registers EH**					
+0,1	0x1780	Summary energy register #1	0-10^9-1	1 kWh	UINT32	R	
+2,3	0x1781	Summary energy register #2	0-10^9-1	1 kWh	UINT32	R	
+4,5	0x1782	Summary energy register #3	0-10^9-1	1 kWh	UINT32	R	
+6,7	0x1783	Summary energy register #4	0-10^9-1	1 kWh	UINT32	R	
14848-14865		**Phase Energies EH**					
+0,1	0x1800	kWh import L1	0-10^9-1	1 kWh	UINT32	R	
+2,3	0x1801	kWh import L2	0-10^9-1	1 kWh	UINT32	R	
+4,5	0x1802	kWh import L3	0-10^9-1	1 kWh	UINT32	R	
+6,7	0x1803	kvarh import L1	0-10^9-1	1 kvarh	UINT32	R	
+8,9	0x1804	kvarh import L2	0-10^9-1	1 kvarh	UINT32	R	
+10,11	0x1805	kvarh import L3	0-10^9-1	1 kvarh	UINT32	R	
+12,13	0x1806	kVAh total L1	0-10^9-1	1 kVAh	UINT32	R	
+14,15	0x1807	kVAh total L2	0-10^9-1	1 kVAh	UINT32	R	
+16,17	0x1808	kVAh total L3	0-10^9-1	1 kVAh	UINT32	R	
14976-15055		**V1/V12 Harmonic Distortions EH**					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		**V2/V23 Harmonic Distortions EH**					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		**V3/V31 Harmonic Distortions EH**					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		**I1 Harmonic Distortions EH**					

Address	Point ID	Description	Options/Range[2]	Units[2, 4]	Type[2]	R/W	Notes
+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		**I2 Harmonic Distortions EH**					
+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		**I3 Harmonic Distortions EH**					
+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		**Fundamental (H01) Phase Values EH**					2-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	
+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		**Harmonic Total Values EH**					2-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	
17408-17467		**Minimum 1-Cycle Phase Values**					
+0,1	0x2C00	V1/V12 Voltage	0-Vmax	U1	UINT32	R	[1]
+2,3	0x2C01	V2/V23 Voltage	0-Vmax	U1	UINT32	R	[1]
+4,5	0x2C02	V3/V31 Voltage	0-Vmax	U1	UINT32	R	[1]

Address	Point ID	Description	Options/Range[2]	Units[2, 4]	Type[2]	R/W	Notes
+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	
17536-17543		**Minimum 1-Cycle Total Values**					
+0,1	0x2D00	Total kW	-Pmax-Pmax	U3	INT32	R	
+2,3	0x2D01	Total kvar	-Pmax-Pmax	U3	INT32	R	
+4,5	0x2D02	Total kVA	0-Pmax	U3	UINT32	R	
+6,7	0x2D03	Total PF	0-1000	×0.001	UINT32	R	Absolute value
17664-17669		**Minimum 1-Cycle Auxiliary Values**					
+0,1	0x2E00	Not used			UINT32	R	
+2,3	0x2E01	In Current	0-Imax	U2	UINT32	R	
+4,5	0x2E02	Frequency	0-Fmax	×0.01Hz	UINT32	R	
18432-18491		**Maximum 1-Cycle Phase Values**					
+0,1	0x3400	V1/V12 Voltage	0-Vmax	U1	UINT32	R	1
+2,3	0x3401	V2/V23 Voltage	0-Vmax	U1	UINT32	R	1
+4,5	0x3402	V3/V31 Voltage	0-Vmax	U1	UINT32	R	1
+6,7	0x3403	I1 Current	0-Imax	U2	UINT32	R	
+8,9	0x3404	I2 Current	0-Imax	U2	UINT32	R	
+10,11	0x3405	I3 Current	0-Imax	U2	UINT32	R	
18560-18567		**Maximum 1-Cycle Total Values**					
+0,1	0x3500	Total kW	-Pmax-Pmax	U3	INT32	R	
+2,3	0x3501	Total kvar	-Pmax-Pmax	U3	INT32	R	
+4,5	0x3502	Total kVA	0-Pmax	U3	UINT32	R	
+6,7	0x3503	Total PF	0-1000	×0.001	UINT32	R	Absolute value
18688-18693		**Maximum 1-Cycle Auxiliary Values**					
+0,1	0x3600	Not used			UINT32	R	
+2,3	0x3601	In Current	0-Imax	U2	UINT32	R	
+4,5	0x3602	Frequency	0-Fmax	×0.01Hz	UINT32	R	
18816-18849		**Maximum Demands**					
+0,1	0x3700	V1/V12 Maximum volt demand	0-Vmax	U1	UINT32	R	1
+2,3	0x3701	V2/V23 Maximum volt demand	0-Vmax	U1	UINT32	R	1
+4,5	0x3702	V3/V31 Maximum volt demand	0-Vmax	U1	UINT32	R	1
+6,7	0x3703	I1 Maximum ampere demand	0-Imax	U2	UINT32	R	
+8,9	0x3704	I2 Maximum ampere demand	0-Imax	U2	UINT32	R	
+10,11	0x3705	I3 Maximum ampere demand	0-Imax	U2	UINT32	R	
+12,13	0x3706	Not used			UINT32	R	
+14,15	0x3707	Not used			UINT32	R	
+16,17	0x3708	Not used			UINT32	R	
+18,19	0x3709	Maximum kW import sliding window demand	0-Pmax	U3	UINT32	R	
+20,21	0x370A	Maximum kvar import sliding window demand	0-Pmax	U3	UINT32	R	
+22,23	0x370B	Maximum kVA sliding window demand	0-Pmax	U3	UINT32	R	
+24,25	0x3737	Not used			UINT32	R	
+26,27	0x370D	Not used			UINT32	R	

Address	Point ID	Description	Options/Range[2]	Units[2, 4]	Type[2]	R/W	Notes
+28,29	0x370E	Not used			UINT32	R	
+30,31	0x370F	Maximum kW export sliding window demand	0-Pmax	U3	UINT32	R	
+32,33	0x3710	Maximum kvar export sliding window demand	0-Pmax	U3	UINT32	R	
19456-19459		**TOU Parameters** [EH]					
+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	
19496-19503		**Scaled Analog Outputs**					
+0,1	0x3C80	Analog output AO1	0-4095		UINT32	R/W	
+2,3	0x3C81	Analog output AO2	0-4095		UINT32	R/W	
+4,5	0x3C82	Analog output AO3	0-4095		UINT32	R/W	
+6,7	0x3C83	Analog output AO4	0-4095		UINT32	R/W	
19584-19591		**TOU Energy Register #1** [EH]					
+0,1	0x3D00	Tariff #1 register	$0\text{-}10^9\text{-}1$	1 kWh	UINT32	R	
+2,3	0x3D01	Tariff #2 register	$0\text{-}10^9\text{-}1$	1 kWh	UINT32	R	
+4,5	0x3D02	Tariff #3 register	$0\text{-}10^9\text{-}1$	1 kWh	UINT32	R	
+6,7	0x3D03	Tariff #4 register	$0\text{-}10^9\text{-}1$	1 kWh	UINT32	R	
19712-19719		**TOU Energy Register #2** [EH]					
+0,1	0x3E00	Tariff #1 register	$0\text{-}10^9\text{-}1$	1 kWh	UINT32	R	
+2,3	0x3E01	Tariff #2 register	$0\text{-}10^9\text{-}1$	1 kWh	UINT32	R	
+4,5	0x3E02	Tariff #3 register	$0\text{-}10^9\text{-}1$	1 kWh	UINT32	R	
+6,7	0x3E03	Tariff #4 register	$0\text{-}10^9\text{-}1$	1 kWh	UINT32	R	
19840-19847		**TOU Energy Register #3** [EH]					
+0,1	0x3F00	Tariff #1 register	$0\text{-}10^9\text{-}1$	1 kWh	UINT32	R	
+2,3	0x3F01	Tariff #2 register	$0\text{-}10^9\text{-}1$	1 kWh	UINT32	R	
+4,5	0x3F02	Tariff #3 register	$0\text{-}10^9\text{-}1$	1 kWh	UINT32	R	
+6,7	0x3F03	Tariff #4 register	$0\text{-}10^9\text{-}1$	1 kWh	UINT32	R	
19968-19975		**TOU Energy Register #4** [EH]					
+0,1	0x4000	Tariff #1 register	$0\text{-}10^9\text{-}1$	1 kWh	UINT32	R	
+2,3	0x4001	Tariff #2 register	$0\text{-}10^9\text{-}1$	1 kWh	UINT32	R	
+4,5	0x4002	Tariff #3 register	$0\text{-}10^9\text{-}1$	1 kWh	UINT32	R	
+6,7	0x4003	Tariff #4 register	$0\text{-}10^9\text{-}1$	1 kWh	UINT32	R	
20608-20615		**Summary Energy Accumulated Demands** [EH]					
+0,1	0x4500	Summary register #1 demand	0-Pmax	U3	UINT32	R	
+2,3	0x4501	Summary register #2 demand	0-Pmax	U3	UINT32	R	
+4,5	0x4502	Summary register #3 demand	0-Pmax	U3	UINT32	R	
+6,7	0x4503	Summary register #4 demand	0-Pmax	U3	UINT32	R	

Address	Point ID	Description	Options/Range[2]	Units[2, 4]	Type[2]	R/W	Notes
20648-20655		**Summary Energy Block Demands EH**					
+0,1	0x4580	Summary register #1 demand	0-Pmax	U3	UINT32	R	
+2,3	0x4581	Summary register #2 demand	0-Pmax	U3	UINT32	R	
+4,5	0x4582	Summary register #3 demand	0-Pmax	U3	UINT32	R	
+6,7	0x4583	Summary register #4 demand	0-Pmax	U3	UINT32	R	
20736-20743		**Summary Energy Sliding Window Demands EH**					
+0,1	0x4600	Summary register #1 demand	0-Pmax	U3	UINT32	R	
+2,3	0x4601	Summary register #2 demand	0-Pmax	U3	UINT32	R	
+4,5	0x4602	Summary register #3 demand	0-Pmax	U3	UINT32	R	
+6,7	0x4603	Summary register #4 demand	0-Pmax	U3	UINT32	R	
20904-20911		**Summary Energy Maximum Demands EH**					
+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	
+4,5	0x4782	Summary register #3 maximum demand	0-Pmax	U3	UINT32	R	
+6,7	0x4783	Summary register #4 maximum demand	0-Pmax	U3	UINT32	R	
20992-20999		**TOU Maximum Demand Register #1 EH**					
+0,1	0x4800	Tariff #1 maximum demand	0-Pmax	U3	UINT32	R	
+2,3	0x4801	Tariff #2 maximum demand	0-Pmax	U3	UINT32	R	
+4,5	0x4802	Tariff #3 maximum demand	0-Pmax	U3	UINT32	R	
+6,7	0x4803	Tariff #4 maximum demand	0-Pmax	U3	UINT32	R	
21120-21127		**TOU Maximum Demand Register #2 EH**					
+0,1	0x4900	Tariff #1 maximum demand	0-Pmax	U3	UINT32	R	
+2,3	0x4901	Tariff #2 maximum demand	0-Pmax	U3	UINT32	R	
+4,5	0x4902	Tariff #3 maximum demand	0-Pmax	U3	UINT32	R	
+6,7	0x4903	Tariff #4 maximum demand	0-Pmax	U3	UINT32	R	
21248-21255		**TOU Maximum Demand Register #3 EH**					
+0,1	0x4A00	Tariff #1 maximum demand	0-Pmax	U3	UINT32	R	
+2,3	0x4A01	Tariff #2 maximum demand	0-Pmax	U3	UINT32	R	
+4,5	0x4A02	Tariff #3 maximum demand	0-Pmax	U3	UINT32	R	
+6,7	0x4A03	Tariff #4 maximum demand	0-Pmax	U3	UINT32	R	
21032-21039		**TOU Maximum Demand Register #4 EH**					
+0,1	0x4880	Tariff #1 maximum demand	0-Pmax	U3	UINT32	R	
+2,3	0x4881	Tariff #2 maximum demand	0-Pmax	U3	UINT32	R	
+4,5	0x4882	Tariff #3 maximum demand	0-Pmax	U3	UINT32	R	
+6,7	0x4883	Tariff #4 maximum demand	0-Pmax	U3	UINT32	R	
24576-24655		**V1/V12 Harmonic Angles EH**					1, 3
+0,1	0x6400	H01 Harmonic angle	-1800-1800	×0.1º	INT32	R	
+2,3	0x6400	H02 Harmonic angle	-1800-1800	×0.1º	INT32	R	
		…					
+78,79	0x6427	H40 Harmonic angle	-1800-1800	×0.1º	INT32	R	

Address	Point ID	Description	Options/Range[2]	Units[2, 4]	Type[2]	R/W	Notes
24704-24783		**V2/V23 Harmonic Angles EH**					1, 3
+0,1	0x6500	H01 Harmonic angle	-1800-1800	×0.1º	INT32	R	
+2,3	0x6500	H02 Harmonic angle	-1800-1800	×0.1º	INT32	R	
		…					
+78,79	0x6527	H40 Harmonic angle	-1800-1800	×0.1º	INT32	R	
24832-24911		**V1/V31 Harmonic Angles EH**					1, 3
+0,1	0x6600	H01 Harmonic angle	-1800-1800	×0.1º	INT32	R	
+2,3	0x6600	H02 Harmonic angle	-1800-1800	×0.1º	INT32	R	
		…					
+78,79	0x6627	H40 Harmonic angle	-1800-1800	×0.1º	INT32	R	
25088-25167		**I1 Harmonic Angles EH**					3
+0,1	0x6700	H01 Harmonic angle	-1800-1800	×0.1º	INT32	R	
+2,3	0x6700	H02 Harmonic angle	-1800-1800	×0.1º	INT32	R	
		…					
+78,79	0x6727	H40 Harmonic angle	-1800-1800	×0.1º	INT32	R	
25216-25295		**I2 Harmonic Angles EH**					3
+0,1	0x6800	H01 Harmonic angle	-1800-1800	×0.1º	INT32	R	
+2,3	0x6800	H02 Harmonic angle	-1800-1800	×0.1º	INT32	R	
		…					
+78,79	0x6827	H40 Harmonic angle	-1800-1800	×0.1º	INT32	R	
25344-25423		**I3 Harmonic Angles EH**					3
+0,1	0x6900	H01 Harmonic angle	-1800-1800	×0.1º	INT32	R	
+2,3	0x6900	H02 Harmonic angle	-1800-1800	×0.1º	INT32	R	
		…					
+78,79	0x6927	H40 Harmonic angle	-1800-1800	×0.1º	INT32	R	
27648-27649	0x7C00	**Setpoint Status SP1-SP16 (bitmap)**	0x00000000-0x0000FFFF		UINT32	R	

NOTES:

Energy, power demand and harmonics readings are only available in the PM130EH meters.

1 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.

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

3 Harmonic angles are referenced to the fundamental voltage harmonic H01 on phase L1.

4 The registers can be read as 32-bit integer or 32-bit floating-point values. Refer to Section 2.7 for details.

3.5 Minimum/Maximum Log Registers

Address	Point ID	Description	Options/Range/Format[2]	Units[2, 3]	Type	R/W	Notes
35840-35959		**Minimum Phase Values**					
+0,1	0x2C00	Min. V1/V12 Voltage	0-Vmax	U1	UINT32	R	1
+2,3		Timestamp	F1	sec	UINT32	R	
+4,5	0x2C01	Min. V2/V23 Voltage	0-Vmax	U1	UINT32	R	1
+6,7		Timestamp	F1	sec	UINT32	R	
+8,9	0x2C02	Min. V3/V31 Voltage	0-Vmax	U1	UINT32	R	1
+10,11		Timestamp	F1	sec	UINT32	R	
+12,13	0x2C03	Min. I1 Current	0-Imax	U2	UINT32	R	
+14,15		Timestamp	F1	sec	UINT32	R	
+16,17	0x2C04	Min. I2 Current	0-Imax	U2	UINT32	R	
+18,19		Timestamp		sec	UINT32	R	
+20,21	0x2C05	Min. I3 Current	0-Imax	U2	UINT32	R	
+22,23		Timestamp		sec	UINT32	R	
36096-36111		**Minimum Total Values**					
+0,1	0x2D00	Min. Total kW	-Pmax-Pmax	U3	INT32	R	
+2,3		Timestamp		sec	UINT32	R	
+4,5	0x2D01	Min. Total kvar	-Pmax-Pmax	U3	INT32	R	
+6,7		Timestamp		sec	UINT32	R	
+8,9	0x2D02	Min. Total kVA	0-Pmax	U3	UINT32	R	
+10,11		Timestamp		sec	UINT32	R	
+12,13	0x2D03	Min. Total PF	-1000-1000	×0.001	INT32	R	
+14,15		Timestamp		sec	UINT32	R	
36352-36362		**Minimum Auxiliary Values**					
+0,1	0x2E00	Not used			UINT32	R	
+2,3					UINT32	R	
+4,5	0x2E01	Min. In Current	0-Imax	U2	UINT32	R	
+6,7		Timestamp		sec	UINT32	R	
+8,9	0x2E02	Min. Frequency	0-Fmax	×0.01Hz	UINT32	R	
+10,11		Timestamp		sec	UINT32	R	
36864-36983		**Maximum Phase Values**					
+0,1	0x3400	Max. V1/V12 Voltage	0-Vmax	U1	UINT32	R	1
+2,3		Timestamp		sec	UINT32	R	
+4,5	0x3401	Max. V2/V23 Voltage	0-Vmax	U1	UINT32	R	1
+6,7		Timestamp		sec	UINT32	R	
+8,9	0x3402	Max. V3/V31 Voltage	0-Vmax	U1	UINT32	R	1
+10,11		Timestamp		sec	UINT32	R	
+12,13	0x3403	Max. I1 Current	0-Imax	U2	UINT32	R	
+14,15		Timestamp		sec	UINT32	R	
+16,17	0x3404	Max. I2 Current	0-Imax	U2	UINT32	R	
+18,19		Timestamp		sec	UINT32	R	

Address	Point ID	Description	Options/Range/Format[2]	Units[2, 3]	Type	R/W	Notes
+20,21 +22,23	0x3405	Max. I3 Current Timestamp	0-Imax	U2 sec	UINT32 UINT32	R R	
37120-37135		**Maximum Total Values**					
+0,1 +2,3	0x3500	Max. Total kW Timestamp	-Pmax-Pmax	U3 sec	INT32 UINT32	R R	
+4,5 +6,7	0x3501	Max. Total kvar Timestamp	-Pmax-Pmax	U3 sec	INT32 UINT32	R R	
+8,9 +10,11	0x3502	Max. Total kVA Timestamp	0-Pmax	U3 sec	UINT32 UINT32	R R	
+12,13 +14,15	0x3503	Max. Total PF Timestamp	-1000-1000	×0.001 sec	INT32 UINT32	R R	
37376-37387		**Maximum Auxiliary Values**					
+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		**Summary Energy Maximum Demands** EH					
+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	
		...					
+12,13 +14,15	0x4783	Summary register #4 Maximum Demand Timestamp	0-Pmax	U3	UINT32	R	
37632-37695		**Maximum Demands**					
+0,1 +2,3	0x3700	V1/V12 Maximum volt demand Timestamp	0-Vmax	U1 sec	UINT32 UINT32	R R	1
+4,5 +6,7	0x3701	V2/V23 Maximum volt demand Timestamp	0-Vmax	U1 sec	UINT32 UINT32	R R	1
+8,9 +10,11	0x3702	V3/V31 Maximum volt demand Timestamp	0-Vmax	U1 sec	UINT32 UINT32	R R	1
+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	

Address	Point ID	Description	Options/Range/Format[2]	Units[2, 3]	Type	R/W	Notes
+32,33	0x3708	Not used			UINT32	R	
+34,35		Timestamp			UINT32	R	
+36,37	0x3709	Maximum kW import sliding window demand	0-Pmax	U3	UINT32	R	
+38,39		Timestamp		sec	UINT32	R	
+40,41	0x370A	Maximum kvar import sliding window demand	0-Pmax	U3	UINT32	R	
+42,43		Timestamp		sec	UINT32	R	
+44,45	0x370B	Maximum kVA sliding window demand	0-Pmax	U3	UINT32	R	
+46,47		Timestamp		sec	UINT32	R	
+48,49	0x3737	Not used			UINT32	R	
+50,51		Timestamp			UINT32	R	
+52,53	0x370D	Not used			UINT32	R	
+54,55		Timestamp			UINT32	R	
+56,57	0x370E	Not used			UINT32	R	
+58,59		Timestamp			UINT32	R	
+60,61	0x370F	Maximum kW export sliding window demand	0-Pmax	U3	UINT32	R	
+62,63		Timestamp		sec	UINT32	R	
+64,65	0x3710	Maximum kvar export sliding window demand	0-Pmax	U3	UINT32	R	
+66,67		Timestamp		sec	UINT32	R	
38144-38159		**TOU Maximum Demand Register #1** [EH]					
+0,1	0x4800	Tariff #1 maximum demand	0-Pmax	U3	UINT32	R	
+2,3		Timestamp		sec	UINT32	R	
+4,5	0x4801	Tariff #2 maximum demand	0-Pmax	U3	UINT32	R	
+6,7		Timestamp		sec	UINT32	R	
		...				R	
+12,13	0x4803	Tariff #4 maximum demand	0-Pmax	U3	UINT32	R	
+14,15		Timestamp		sec	UINT32	R	
38400-38415		**TOU Maximum Demand Register #2** [EH]					
+0,1	0x4900	Tariff #1 maximum demand	0-Pmax	U3	UINT32	R	
+2,3		Timestamp		sec	UINT32	R	
+4,5	0x4901	Tariff #2 maximum demand	0-Pmax	U3	UINT32	R	
+6,7		Timestamp		sec	UINT32	R	
		...				R	
+12,13	0x4903	Tariff #4 maximum demand	0-Pmax	U3	UINT32	R	
+14,15		Timestamp		sec	UINT32	R	
38656-38671		**TOU Maximum Demand Register #3** [EH]					
+0,1	0x4A00	Tariff #1 maximum demand	0-Pmax	U3	UINT32	R	
+2,3		Timestamp		sec	UINT32	R	
+4,5	0x4A01	Tariff #2 maximum demand	0-Pmax	U3	UINT32	R	
+6,7		Timestamp		sec	UINT32	R	
		...				R	
+12,13	0x4A03	Tariff #4 maximum demand	0-Pmax	U3	UINT32	R	
+14,15		Timestamp		sec	UINT32	R	

Address	Point ID	Description	Options/Range/Format[2]	Units[2, 3]	Type	R/W	Notes
38272-38287		**TOU Maximum Demand Register #4 EH**					
+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	
+12,13 +14,15	0x4883	Tariff #4 maximum demand Timestamp	0-Pmax	U3 sec	UINT32 UINT32	R R	

NOTES:

Power demand readings are only available in the PM130EH meters.

1 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.

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

3 The Min/Max register values can be read as 32-bit integer or 32-bit floating-point values. Refer to Section 2.7 for details.

3.6 Device Control and Status Registers

Address	Point ID	Description	Options/Range	Units	Type	R/W	Notes
Device Restart Register							
2560		Warm restart of the device	0 when read, 0xFFFF when written = restart the device		UINT16	R/W	
Device Authorization Registers							
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	
Remote Relay Control							
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		**RO1 Control**					
3245		**RO2 Control**					
Device Reset/Clear Registers							
3404		Clear total energy registers	0		UINT16	W	
3405		Clear total maximum demand registers	0 = Clear all maximum demands 1 = Clear power demands EH 2 = Clear volt, ampere and harmonic demands		UINT16	W	
3406		Clear TOU energy registers EH	0		UINT16	W	
3407		Clear TOU maximum demand registers EH	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	
Device Identification							
2561-2562		Reserved	0		UINT16	R	
2563		Firmware build number	1-99		UINT16	R	
2564		Reserved	0		UINT16	R	
2565		Firmware version number	1300-1399,1500-1599(PM130P/E), 1400-1499,1600-1699 (PM130EH)		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	
Device Status Registers							
3452		Relay status RO1-RO2 (bitmap)	0x0000-0x0003		UINT16	R	Bits set to 1 indicate closed relay contacts.

Address	Point ID	Description	Options/Range	Units	Type	R/W	Notes
3453		Reserved	0		UINT16	R	
3454		Digital (status) inputs DI1-DI4	0x0000-0x000F		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.
Alarm Notification Registers							
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). Nonvolatile register that keeps the status of the internal device diagnostics.	F23		UINT16	R/W	When read: Bits set to 1 indicate 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.

3.7 Device Setup Registers

Address	Point ID	Description	Options/Range	Units	Type	R/W	Notes
Device Identification							
46080-46111							
+0,1		Device serial number	0-999999		UINT32	R	
+2,3		Device model ID	13010=PM130P, 13030=PM130EH		UINT32	R	
+4-11		Device model name	“PM130P”, “PM130EH”		CHAR16	R	Null-terminated string
+12-13		Device options (bitmap)	0		UINT32	R	
+14-19		Reserved			UINT16	R	
+20		Device firmware version number	1100-1199 (PM130P/EH)		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	0101-0199		UINT16	R	Two higher decimal digits = major version number, two lower decimal digits = minor version number
+25		Boot loader build number	1-99		UINT16	R	
+26-31		Reserved			UINT16	R	
Factory Device Settings							
46112-46125							
+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	
Basic Setup							
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 50,000	A	UINT16	R/W	
+3		Power block demand period EH	1,2,5,10,15,20,30,60 min, 255 = external synchronization	min	UINT16	R/W	If the external synchronization is selected, the DI1 input is considered a pulse or KYZ input. The pulse edge restarts the power demand block accumulation interval. E
+4		Volt/ampere 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 EH	1 to 15		UINT16	R/W	E
+9,10		Reserved			UINT16	R/W	Read as 65535

Address	Point ID	Description	Options/Range	Units	Type	R/W	Notes
+11		Nominal line frequency	25, 50, 60, 400	Hz	UINT16	R/W	
+12		Maximum demand load current	0 to 50,000 (0=CT primary current)	A	UINT16	R/W	
+13-19		Reserved			UINT16	R/W	Read as 65535
+20		PT ratio multiplication factor	×1, ×10		UINT16	R/W	
Communication Ports Setup							
2344-2359							
+0		Communication protocol	COM1: 0=SATEC ASCII, 1=Modbus RTU, 2=DNP3.0 COM2: 0=SATEC ASCII, 1=Modbus RTU, 2=DNP3.0, 5=Profibus DP		UINT16	R/W	
+1		Interface	COM1: 2=RS-485 COM1: 0=RS-232, 1=RS-422, 2=RS-485, 6=Ethernet, 7=Profibus		UINT16	R/W	
+2		Device address	SATEC ASCII: 0-99 Modbus RTU: 1-247 DNP3.0: 0–65532 Profibus DP: 0-126		UINT16	R/W	
+3		Baud rate	1=300 bps, 2=600 bps, 3=1200 bps, 4=2400 bps, 5=4800 bps, 6=9600 bps, 7=19200 bps, 8=38400 bps, 9=57600 bps, 10=115200 bps		UINT16	R/W	
+4		Data format	0=7 bits/even parity, 1=8 bits/no parity, 2=8 bits/even parity		UINT16	R/W	
+5		Flow control	0=no flow control 1=software (XON/XOFF) 2=hardware (CTS)		UINT16	R/W	N/A for COM1 (read as 65535)
+6		RTS mode	0=not used, 1=RTS is permanently asserted 2=RTS is asserted during the transmission		UINT16	R/W	N/A for COM1 (read as 65535)
+7		ASCII compatibility mode	0=disabled, 1=enabled		UINT16	R/W	
2344-2351		**COM1 Setup**					
2352-2359		**COM2 Setup**					
Device Options Setup							
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 EH	$0=1\times10^4$, $1=1\times10^5$, $2=1\times10^6$, $3=1\times10^7$, $4=1\times10^8$, $5=1\times10^9$		UINT16	R/W	Default 1×10^8
+2		Phase energy calculation mode EH	0=disabled, 1=enabled		UINT16	R/W	
+3-9		Reserved			UINT16	R/W	Read as 65535

Address	Point ID	Description	Options/Range	Units	Type	R/W	Notes
+10		Energy LED test mode [EH]	0=disabled, 1=Wh test, 2=varh test		UINT16	R/W	LED pulse rate is 10,000 pulses/kWh
+11		Starting voltage, percent of FS voltage	15-50	×0.1%	UINT16	R/W	Default 1.5%
+12-13		Reserved			UINT16	R/W	Read as 65535
+14		Device resolution (see Section 4 for details)	0 = Low resolution, 1 = High resolution		UINT16	R/W	Default 0
Local Settings							
4320-4328							
+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, 3rd 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	1-4 = DI1-DI4, 32767 = meter clock		UINT16	R/W	A DI input is considered a pulse or KYZ input. The pulse edge adjusts the clock at the nearest whole minute.
+8		Country code	ITU calling number		UINT16	R/W	
Clock Indication and Setup							
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
Alarm/Event Setpoints Setup							
2576-2703							
+0		Trigger parameter ID	F12		UINT16	R/W	
+1		Action	F14		UINT16	R/W	
+2		Operate delay	0-9999	×0.1 sec	UINT16	R/W	
+3		Release delay	0-9999	×0.1 sec	UINT16	R/W	
+4,5		Operate limit	See Section 3.3		UINT32	R/W	Scaled value
+6,7		Release limit	See Section 3.3		UINT32	R/W	Scaled value
2576-2583		**Setpoint #1**					
2584-2591		**Setpoint #2**					
2592-2599		**Setpoint #3**					

Address	Point ID	Description	Options/Range	Units	Type	R/W	Notes
2600-2607		**Setpoint #4**					
2608-2615		**Setpoint #5**					
2616-2623		**Setpoint #6**					
2624-2631		**Setpoint #7**					
2632-2639		**Setpoint #8**					
2640-2647		**Setpoint #9**					
2648-2655		**Setpoint #10**					
2656-2663		**Setpoint #11**					
2664-2671		**Setpoint #12**					
2672-2679		**Setpoint #13**					
2680-2687		**Setpoint #14**					
2688-2695		**Setpoint #15**					
2696-2703		**Setpoint #16**					
Pulse Counters Setup							
2940-2947							
+0		Source digital input ID	0=not assigned, 1=DI1, 2=DI2, 3=DI3, 4=DI4		UINT16	R/W	
+1		Multiplier	0-9999		UINT16	R/W	
2940-2941		**Counter #1 Setup**					
2942-2943		**Counter #2 Setup**					
2944-2945		**Counter #3 Setup**					
2946-2947		**Counter #4 Setup**					
Analog Outputs Setup							
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		**AO1 Setup**					
3151-3153		**AO2 Setup**					
Digital Inputs Setup							
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, 0x0004=DI3, 0x0008=DI4		UINT16	R/W	
Network Setup							
46576-46703							
+0,1		Device IP Address	0x01000000-0xFFFFFFFF		UINT32	R/W	Network byte order
+2,3		Network subnet mask	0x00000001-0xFFFFFFFF		UINT32	R/W	Network byte order

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	
Password Setup							
46704-46707							
+0,1		Communications password (4 digits)	0-9999		UINT32	R/W	Read as 0
+2		Password protection enabled	0 = disabled, 1 = enabled		UINT16	R/W	
+3		Reserved			UINT16	R/W	
Expert Power Service Setup							
46768-46783							
+0,1		Expert Power server IP Address	0x01000000-0xFFFFFFFF		UINT32	R/W	Default = 207.232.60.18
+2,3		Expert Power server TCP service port	0-65535		UINT32	R/W	Default = 5001
+4,5		Expert Power client enabled	0 = client disabled, 1 = client enabled		UINT32	R/W	
+6,7		Time to next session	1-99999	min	UINT32	R/W	
+8,9		Time to next session	1-99999	min	UINT32	R	Same as previous
+10-15		Reserved					
Internet Service Provider (ISP) accounts							
46784-46879							
+0-15		ISP telephone number			CHAR32	R/W	
+16-31		Login name			CHAR32	R/W	
+32-47		Login password			CHAR32	R/W	
46784-46831		**Account No.1**					
46832-46879		**Account No.2**					
DNP Options Setup							
51158-51183							
+0		Binary Input Static Objects	F24 (default 0)		UINT16	R/W	
+1		Reserved			UINT16	R/W	
+2		Binary Counter Objects	F24 (default 3)		UINT16	R/W	
+3-5		Reserved			UINT16	R/W	
+6		Analog Input Objects	F24 (default 3)		UINT16	R/W	
+7-10		Reserved			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	
+13-5		Reserved			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	0 to 86400 seconds (default 86400		UINT32	R/W	

Address	Point ID	Description	Options/Range	Units	Type	R/W	Notes
			sec)				
+24		Voltage scale, secondary volts	60-828	V	UINT16	R/W	
+25		Current scale, secondary amps	10-100	×0.1A	UINT16	R/W	
51184-51189		Reserved					
DNP Class 0 Point Assignments							
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	
51702-51704		**DNP Class 0 Points Range 1**					
51705-51707		**DNP Class 0 Points Range 2**					
		...					
51795-51797		**DNP Class 0 Points Range 32**					
51798-51893		Reserved					
TOU Daily Profile Setup [EH]							
55574-55701							
+0		1st tariff change	F10		UINT16	R/W	
+1		2nd tariff change	F10		UINT16	R/W	
+2		3rd tariff change	F10		UINT16	R/W	
+3		4th tariff change	F10		UINT16	R/W	
+4		5th tariff change	F10		UINT16	R/W	
+5		6th tariff change	F10		UINT16	R/W	
+6		7th tariff change	F10		UINT16	R/W	
+7		8th tariff change	F10		UINT16	R/W	
55574-55581		**Daily profile #1: Season 1, Day type 1**					
55582-55589		**Daily profile #2: Season 1, Day type 2**					
55590-55597		**Daily profile #3: Season 1, Day type 3**					
55598-55605		**Daily profile #4: Season 1, Day type 4**					
55606-55613		**Daily profile #5: Season 2, Day type 1**					
55614-55621		**Daily profile #6: Season 2, Day type 2**					
55622-55629		**Daily profile #7: Season 2, Day type 3**					
55630-55637		**Daily profile #8: Season 2, Day type 4**					
55638-55645		**Daily profile #9: Season 3, Day type 1**					
55646-55653		**Daily profile #10: Season 3, Day type 2**					
55654-55661		**Daily profile #11: Season 3, Day type 3**					
55662-55669		**Daily profile #12: Season 3, Day type 4**					
55670-55677		**Daily profile #13: Season 4, Day type 1**					
55678-55685		**Daily profile #14: Season 4, Day type 2**					
55686-55693		**Daily profile #15: Season 4, Day type 3**					
55694-55701		**Daily profile #16: Season 4, Day type 4**					
55702-55711		Reserved					

Address	Point ID	Description	Options/Range	Units	Type	R/W	Notes
TOU Calendar Setup [EH]							
55712-56031							
+0-9		**Calendar entry record**				R/W	
+0		Daily profile	0-3 = Season 1, Day types 0-3 4-7 = Season 2, Day types 0-3 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=3rd, 4=4th, 5=last week of the month		UINT16	R/W	
+2		Weekday	0=all, 1-7 (Sun=1, Sat=7)		UINT16	R/W	
+3		Till Weekday	0=all, 1-7 (Sun=1, Sat=7)		UINT16	R/W	
+4		Month	0=all, 1-12=January - December		UINT16	R/W	
+5		Day of month	0=all, 1-31=day 1-31		UINT16	R/W	
+6		Till Month	0=all, 1-12=January - December		UINT16	R/W	
+7		Till Day of month	0=all, 1-31=day 1-31		UINT16	R/W	
+8-9		Reserved			UINT16	R/W	
55712-55721		**Calendar entry #1**					
55722-55731		**Calendar entry #2**					
55732-55741		**Calendar entry #3**					
...							
56022-56031		**Calendar entry #32**					
56032-56191		Reserved					
Summary Energy/TOU Registers Setup [EH]							
56672-56703							
+0		Not used			UINT16	R/W	
+1		Units of measurement	0=none, 1=kWh, 2=kvarh, 3=kVAh, 4=m^3, 5=CF (cubic feet), 6=CCF (hundred cubic feet)		UINT16	R/W	
+2		Flags (bitmap)	Bit 0=1 - TOU enabled		UINT16	R/W	
+3		Not used	0		UINT16	R/W	
56672-56675		**Register #1 Setup**					
56676-56679		**Register #2 Setup**					
56680-56683		**Register #3 Setup**					
56684-56687		**Register #4 Setup**					
Summary Energy/TOU Registers Source Setup [EH]							
56928-57183							
+0		Energy source ID	F11		UINT16	R/W	
+1		Target summary register number	0-7 = register #1-#8		UINT16	R/W	
+2,3		Multiplier	0-1000000	×0.001	INT32	R/W	
56928-56931		**Energy Source #1**					
56932-56935		**Energy Source #2**					
56936-56939		**Energy Source #3**					
56940-56943		**Energy Source #4**					

Address	Point ID	Description	Options/Range	Units	Type	R/W	Notes
Digital Inputs Setup							
61728-61743							
+0		Pulse mode	0 = pulse, 1 = KYZ		UINT16	R/W	
+1		Polarity	0 = normal, 1 = inverting		UINT16	R/W	
+2		De-bounce time, ms	1-100		UINT16	R/W	Debounce time will be the same for both inputs
+3		Reserved			UINT16	R/W	
61728-61731		**DI1 Setup**					
61732-61735		**DI2 Setup**					
61736-61739		**DI3 Setup**					
61740-61743		**DI4 Setup**					
Relay Outputs Setup							
61984-61995							
+0		Operation Mode	0=unlatched, 1=latched, 2=pulse, 3=KYZ		UINT16	R/W	
+1		Polarity	Bit 0 – Polarity: 0=normal, 1=inverting		UINT16	R/W	
+2		Pulse width, ms	1-1000		UINT16	R/W	
+3		Pulse source ID [EH]	F17		UINT16	R/W	
+4		Units per pulse	1-10000	x0.1	UINT16	R/W	
+5		Reserved			UINT16	R/W	
61984-61989		**RO1 Setup**					
61990-61995		**RO2 Setup**					
Analog Outputs Setup							
62560-62571							
+0		Output parameter ID	F18		UINT16	R/W	
+1		Not used	0		UINT16	R/W	
+2,3		Zero scale value (0/4 mA)	See Section 3.4		INT32	R/W	
+4,5		Full scale value (20/1 mA)	See Section 3.4		INT32	R/W	
62560-62565		**AO1 Setup**					
62566-62571		**AO2 Setup**					

3.8 Analog and Digital I/O Configuration

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

4 Data Scales and Units

Code	Condition	Value/Range	Notes
Data Scales			
Vmax		Voltage scale × PT Ratio, V	2
Imax		Current scale × CT Ratio, A	1, 3
Pmax	Wiring 4LN3, 3LN3, 3BLN3	Vmax × Imax × 3, W	4
	Wiring 4LL3, 3LL3, 3BLL3, 3OP2, 3OP3, 3DIR2	Vmax × Imax × 2, W	
Fmax	Nominal frequency 25, 50 or 60 Hz	100 Hz	
	Nominal frequency 400Hz	500 Hz	
Data Units – Low Resolution Option			
U1		1V	
U2		1A	
U3		1kW/kvar/kVA	
Data Units – High Resolution Option			
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	

See Device Options Setup for information on selecting the device resolution option.

1 CT Ratio = CT primary current/CT secondary current

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

3 The default Current scale is 2 × CT secondary current (2.0A with 1A secondaries, 10.A with 5A secondaries). You can change it via the Device Data Scale setup (see Section 3.1) or via the Device Options setup in PAS.

4 Pmax is rounded to whole kilowatts. With PT=1.0, if Pmax is greater than 9,999,000 W, it is truncated to 9,999,000 W.

5 Data Formats

Format Code	Value	Description	Notes
Timestamp			
F1		Local time in a UNIX-style format. Represents the number of seconds since midnight (00:00:00), January 1, 1970. The time is valid after January 1, 2000.	
Wiring Mode			
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	
TOU Tariff Change Time			
F10	Bits 8:15 = 0-3	Tariff number #1-#4	
	Bits 2:7 = 0-23	Tariff start hour	
	Bits 0:1 = 0-3	Tariff start quarter of an hour	
Summary/TOU Energy Register Source ID			
F11	0x0000	None	
	0x0700-0x0703	Pulse input DI1-DI4	
	0x1700	kWh import	
	0x1701	kWh export	
	0x1704	kvarh import	
	0x1705	kvarh export	
	0x1708	kVAh total	
Setpoint Trigger Parameters ID			
F12	0x0000	None (condition is not active)	
		Status Inputs	
	0x0600	Status input #1 ON	
	0x0601	Status input #2 ON	
	0x0602	Status input #3 ON	
	0x0603	Status input #4 ON	
	0x8600	Status input #1 OFF	
	0x8601	Status input #2 OFF	
	0x8602	Status input #3 OFF	
	0x8603	Status input #4 OFF	
		Relays	
	0x0800	Relay #1 ON	
	0x0801	Relay #2 ON	
	0x8800	Relay #1 OFF	
	0x8801	Relay #2 OFF	
		Phase Reversal	[2]
	0x8901	Positive phase rotation reversal	2-cycle response
	0x8902	Negative phase rotation reversal	2-cycle response
		1-Cycle Values on any Phase	
	0x0E00	High voltage	
	0x8D00	Low voltage	
	0x0E01	High current	
	0x8D01	Low current	
	0x0E07	High voltage THD [EH]	2-cycle values
	0x0E08	High current THD [EH]	2-cycle values
	0x0E09	High K-Factor [EH]	2-cycle values
	0x0E0A	High current TDD [EH]	2-cycle values
		1-Cycle Auxiliary Values	
	0x1002	High frequency	
	0x9002	Low frequency	
	0x1003	High voltage unbalance	

Format Code	Value		Description	Notes
	0x1004		High current balance	
			1-Sec Phase Values	
	0x1103		High I1 current	
	0x1104		High I2 current	
	0x1105		High I3 current	
	0x9103		Low I1 current	
	0x9104		Low I2 current	
	0x9105		Low I3 current	
			1-Sec Values on any Phase	
	0x1300		High voltage	
	0x9200		Low voltage	
	0x1301		High current	
	0x9201		Low current	
			1-Sec Total Values	
	0x1406		High total kW import	
	0x1407		High total kW export	
	0x1408		High total kvar import	
	0x1409		High total kvar export	
	0x1402		High total kVA	
	0x9404		Low total PF Lag	
	0x9405		Low total PF Lead	
			1-Sec Auxiliary Values	
	0x1501		High neutral current	
	0x1502		High frequency	
	0x9502		Low frequency	
			Present Demands	
	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 EH	
	0x1608		High block kVA demand EH	
	0x1609		High sliding window kW import demand EH	
	0x160B		High sliding window kVA demand EH	
	0x160F		High accumulated kW import demand EH	
	0x1611		High accumulated kVA demand EH	
	0x1612		High predicted kW import demand EH	
	0x1614		High predicted kVA demand EH	
Setpoint Action ID				
F14	**Action type**	**Target**		
	0x00	0x00	No action	
	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	
	0x44	0x00	Count operating time using counter #1	
	0x44	0x01	Count operating time using counter #2	
	0x44	0x02	Count operating time using counter #3	
	0x44	0x03	Count operating time using counter #4	
Counter Source ID				
F16	0x0000		None	
	0x0001-0x0004		Pulse input DI1-DI4	
Relay Output Pulse Source ID				
F17	0x0000		None	
	0x0400		kWh import pulse EH	
	0x0401		kWh export pulse EH	
	0x0403		kvarh import pulse EH	
	0x0404		kvarh export pulse EH	
	0x0405		kvarh total pulse EH	
	0x0406		kVAh pulse EH	

Format Code	Value	Description	Notes
AO Parameters ID			
F18	0x0000	None (output disabled)	[2]
		1-Cycle Phase Values	
	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	
		1-Cycle Total Values	
	0x0F00	Total kW	
	0x0F01	Total kvar	
	0x0F02	Total kVA	
	0x0F03	Total PF	
	0x0F04	Total PF Lag	
	0x0F05	Total PF Lead	
		1-Cycle Auxiliary Values	
	0x1001	In Current	
	0x1002	Frequency	
		1-Sec Phase Values	
	0x1100	V1/V12 Voltage	
	0x1101	V2/V23 Voltage	
	0x1102	V3/V31 Voltage	
	0x1103	I1 Current	
	0x1104	I2 Current	
	0x1105	I3 Current	
	0x111E	V12 Voltage	
	0x111F	V23 Voltage	
	0x1120	V31 Voltage	
		1-Sec Total Values	
	0x1400	Total kW	
	0x1401	Total kvar	
	0x1402	Total kVA	
	0x1403	Total PF	
	0x1404	Total PF Lag	
	0x1405	Total PF Lead	
		1-Sec Auxiliary Values	
	0x1501	In Current	
	0x1502	Frequency	
		Present Demands EH	
	0x160F	Accumulated kW import demand	
	0x1610	Accumulated kvar import demand	
	0x1611	Accumulated kVA demand	
	0x161A	Accumulated kW export demand	
	0x161B	Accumulated kvar export demand	
Device Diagnostics			
F23	Bit 0	Reserved	
	Bit 1	Reserved	
	Bit 2 = 1	RAM/Data error	
	Bit 3 = 1	CPU watchdog reset	
	Bit 4 = 1	Sampling fault	
	Bit 5 = 1	CPU exception	
	Bit 6	Reserved	
	Bit 7 = 1	Software watchdog reset	
	Bit 8 = 1	Power down	
	Bit 9 = 1	Device reset	
	Bit 10 = 1	Configuration reset	
	Bit 11 = 1	RTC fault	
	Bit 12	Reserved	
	Bit 13 = 1	Low battery	
	Bit 14	Reserved	
	Bit 15 = 1	EEPROM fault	
DNP Object Types			
F24		**Static Binary Input Objects**	

Format Code	Value		Description	Notes
	0		Single-Bit Binary Input	
	1		Binary Input With Status	
			Static Binary Counters	
	0		32-bit Binary Counter	
	1		32-bit Binary Counter Without Flag	
	2		16-bit Binary Counter	
	3		16-bit Binary Counter Without Flag	
			Static Analog Input Objects	
	0		32-bit Analog Input	
	1		32-bit Analog Input Without Flag	
	2		16-bit Analog Input	
	3		16-bit Analog Input Without Flag	
DNP Class 0 Objects				
F25	0x1E01		Analog Input 30:01	
	0x1E02		Analog Input 30:02	
	0x1E03		Analog Input 30:03	
	0x1E04		Analog Input 30:04	
	0x2801		Analog Output 40:01	
	0x2802		Analog Output 40:02	
	0x0101		Binary Input 01:01	
	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	
Instrument Options				
F28	Bit 0=1		120V Option	
	Bit 1=1		690V Option	
	Bits 2-5		Reserved	
	Bit 6=1		Analog output 0/4 or 4/20mA	
	Bit 7=1		Analog output 0-1mA	
	Bit 8=1		Analog output ±1mA	
	Bit 9=1		RO option	
	Bit 10=1		DI option	
	Bit 11=1		Reserved	
	Bit 12=1		Setup is secured by a password (authorization required)	
	Bits 13-15		Reserved	
	Bits 16-18		Number of RO - 1	
	Bits 19-22		Number of DI – 1	
	Bits 23-24		Number of AO - 1	
	Bits 25-31		Reserved	
I/O Slot Types				
F29	DI	DRY	00000000B	
	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		11111111B	

NOTES:

[1] **Analog Outputs**

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

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

2) Except for the signed power factor, the setup scale is continuous within the entire value range. For signed power factor, the setup scale is broken at +1.000 in order to provide continuous output current when the power factor changes close to ±1.000.

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

2 **Phase Reversal Trigger**

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