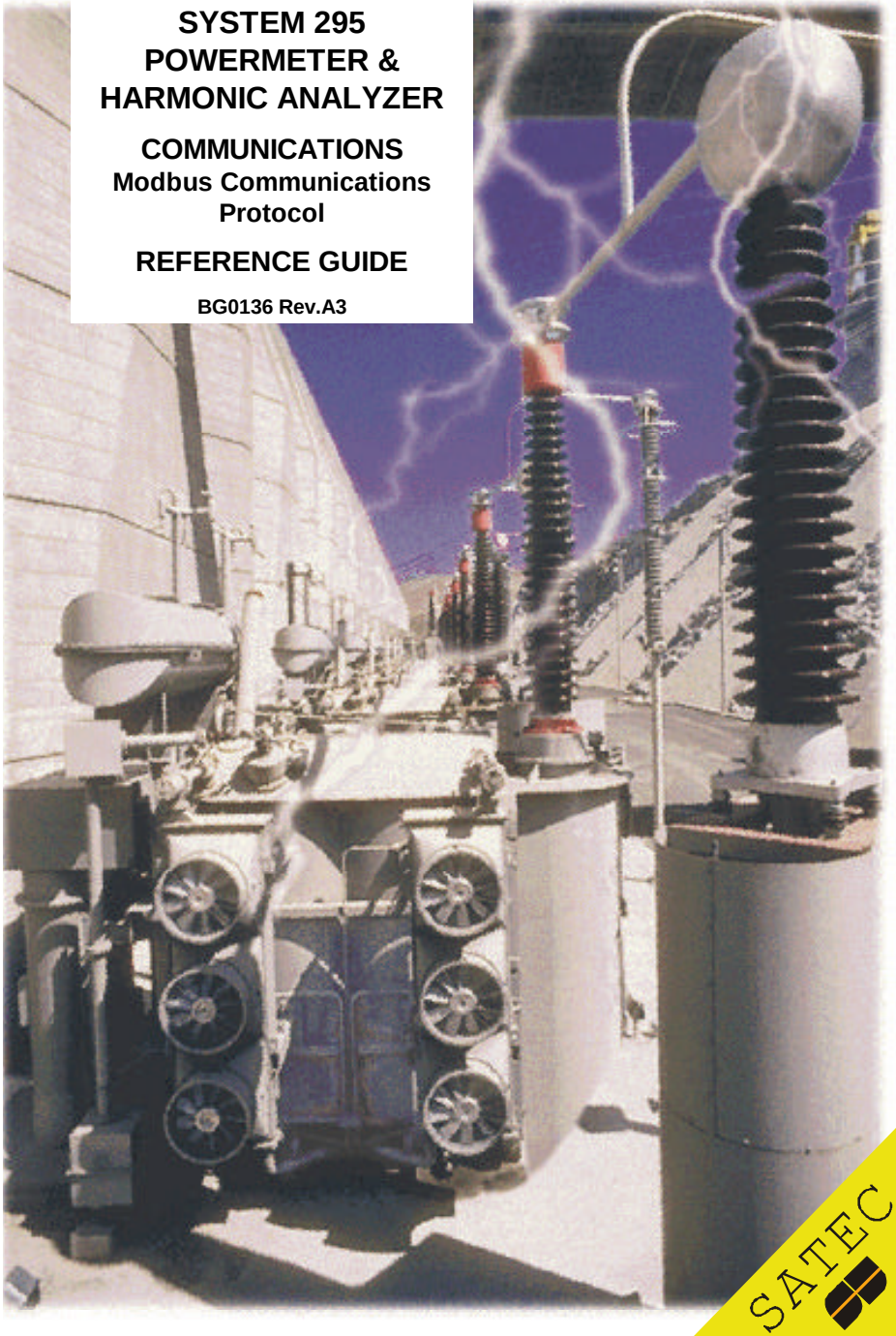
SYSTEM 295
POWERMETER & HARMONIC ANALYZER

COMMUNICATIONS
Modbus Communications Protocol

REFERENCE GUIDE

BG0136 Rev.A3



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SYSTEM 295 POWERMETER and

HARMONIC ANALYZER

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Chapter 1 GENERAL

This document specifies a subset of the Modbus serial communications protocol used to transfer data between a master computer station and the *PM295*. The document provides the complete information necessary to develop a third-party communications software capable to communicate with the Series 295 Powermeters. Additional information concerning communications operation, configuring the communications parameters, and communications connections is found in publication "System 295 Powermeter and Harmonic Analyzer. Installation and Operation Manual".

Specification changes

The following indicates specification changes which apply to the PM295 instruments with firmware version 2.03 or later.

1. Long energy net registers (kWh net and kvarh net) are now read in signed long integer format (Section 2.7 and Table 5-19).
2. Added kVAh and present kW and kVA demand readings to the basic data table (Table 5-1).
3. Added 120 user assignable registers allowing the user to access multiple data that reside in different locations with a single request by re-mapping them to adjacent addresses in the user assignable registers area (Sections 2.9, 5.29).
4. Added instrument options registers (Section 5.4).
5. Added alarm and self-check status registers (Section 5.5).

IMPORTANT

1. The voltage parameters throughout the protocol can represent line-to-neutral or line-to-line voltages depending on the wiring mode selected in the instrument. When the 4LN3 or 3LN3 wiring mode is selected, the voltages will be line-to-neutral; for any other wiring mode, they will be line-to-line voltages. In 4LN3, 4LL3, 3LN3 and 3LL3 wiring modes, harmonic voltages will represent line-to-neutral voltages. In a 3-wire direct connection, harmonic voltages will represent line-to-neutral voltages as they appear on the instrument's input transformers. In a 3-wire open delta connection, harmonic voltages will comprise L12 and L23 line-to-line voltages.
2. 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 can be used.
3. Most of the instrument advanced features are configured using multiple setup parameters that can be accessed in some 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.

Chapter 2 MODBUS FRAMING

2.1 Transmission Mode

The protocol uses the Modbus Remote Terminal Unit (RTU) transmission mode. In RTU mode, data is sent in 8-bit binary characters. The 8 bit even parity or 8 bit no parity data format must be selected when configuring the instrument communications. The data format is shown in the following table.

Table 2-1 RTU Data Format

Field	No. of bits
Start bit	1
Data bits **À**	8
Parity (optional)	1
Stop bit	1

À Least significant bit first

2.2 The RTU Frame Format

Frame synchronization is maintained in RTU transmission mode by simulating a synchronization message. The receiving device monitors the elapsed time between reception of characters. If three and one-half character times elapse without a new character or completion of the frame, then the device flushes the frame and assumes that the next byte received will be an address. Frame format is defined below.

The maximum query and response message length is 256 bytes including check characters.

RTU Message Frame Format

T1 T2 T3	Address	Function	Data	CRC Check	T1 T2 T3
	8 bits	8 bits	N * 8 bits	16 bits	

2.3 Address Field

The address field contains a user assigned address (1-247) of the instrument that is to receive message. Address 0 is used in broadcast mode to transmit to all instruments (broadcast mode is available only for functions 06 and 16). In this case all instruments receive message and take action on the request, but don't issue a response. In the PM295, the broadcast mode is supported only for register addresses 287-294 and 301-302 (reset energies and maximum demands), 3404-3418 (reset/clear registers), and 4352-4358 (real-time clock registers).

2.4 Function Field

The function field contains function code that tells the instrument what action to perform. Function codes used in the protocol are shown below in Table 2-2.

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	Loop-back test	Communications test

NOTE
Broadcast mode available only for functions code 06 and 16.

2.5 Data Field

Data field contains information for instrument to perform specific function or data collected by instrument in response to a query.

IMPORTANT Fields composed of two bytes are sent in the order high byte first, low byte second.

2.6 Error Check Field

The error check field contains the Cyclical Redundancy Check (CRC) word. The start of the message is ignored in calculating the CRC. The CRC-16 error check sequence is implemented as described in the following paragraphs.

The message (data bits only, disregarding start/stop and optional parity bits) is considered one continuous binary number whose most significant bit (MSB) is transmitted first. The message is pre-multiplied by x^{16} (shifted left 16 bits), and then divided by $x^{16} + x^{15} + x^2 + 1$ expressed as a binary number (11000000000000101). The integer quotient digits are ignored and the 16-bit remainder (initialized to all ones at the start to avoid the case of all zeros being an accepted message) is appended to the message (MSB first) as the two CRC check bytes. The resulting message including CRC, when divided by the same polynomial ($x^{16} + x^{15} + x^2 + 1$) at the receiver will give a zero remainder if no errors have occurred. (The receiving unit recalculates the CRC and compares it to the transmitted CRC). All arithmetic is performed modulo two (no carries).

The device used to serialize the data for transmission will send the conventional LSB or right-most bit of each character first. In generating the CRC, the first bit transmitted is defined as the MSB of the dividend. For convenience then, and since there are no carries used in arithmetic, let's assume while computing the CRC that the MSB is on the right. To be consistent, the bit order of the generating polynomial must be reversed. The MSB of the polynomial is dropped since it affects only the quotient and not the remainder. This yields 1010 0000 0000 0001 (Hex A001). Note that this reversal of the bit order will have no effect whatever on the interpretation or bit order of characters external to the CRC calculations.

The step by step procedure to form the CRC-16 check bytes is as follows:

1. Load a 16-bit register with all 1's.
2. Exclusive OR the first 8-bit byte with the low order byte of the 16-bit register, putting the result in the 16-bit register.
3. Shift the 16-bit register one bit to the right.

4a. If the bit shifted out to the right (flag) is one, exclusive OR the generating polynomial 1010 000 000 0001 with the 16-bit register.

4b. If the bit shifted out to the right is zero, return to step 3.

5. Repeat steps 3 and 4 until 8 shifts have been performed.
6. Exclusive OR the next 8-bit byte with the 16-bit register.
7. Repeat step 3 through 6 until all bytes of the message have been exclusive ORed with the 16-bit register and shifted 8 times.
8. When the 16-bit CRC is transmitted in the message, the low order byte will be transmitted first, followed by the high order byte.

For detailed information about CRC calculation, refer to the Modbus Protocol Reference Guide.

2.7 Data Conversion

In the instrument's subset of Modbus communications protocol, the following data conversion methods are used to convert the raw data received from the instrument into engineering units:

NOTE

The data will be presented exactly as retrieved by the communications program from the instrument.

LIN3 (Linear)

This conversion maps the raw data received by the communications program in the range of 0 - 9999 onto the user-defined LO scale/HI scale range. The conversion is carried out according to the formula:

$$Y = (X / 9999) \times (HI - LO) + LO$$

where:

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

When data conversion is necessary, the HI and LO scales, and data conversion method are indicated for the corresponding registers.

EXAMPLE

Suppose, you have read a value of 5000 from register 256 that contains a voltage reading (see *Table 5-1*). If you have the instrument with the 144V input option, and use potential transformers with the ratings of 22,000V : 110V = 200, then the voltage high scale is HI = 144×200 = 28,800, and in accordance with the above formula, the voltage reading in engineering units will be as follows:

$$5000 \times (28800 - 0)/9999 + 0 = 14401V$$

When a value is written to the instrument, the conversion is carried out in reverse to produce the written value in the range of 0 - 9999:

$$X = 9999 \times (Y - LO) / (HI - LO)$$

Transmitting fractional numbers

When no conversion is used, to represent numbers between 0 and 1, a modulus method is applied. Such numbers are kept in the instrument being divided by a modulus that depends on the number of decimal digits in the fractional part, i.e., on the value precision. The modulus is given in the form ×0.1, or ×0.01. To process the value received from the instrument in this

format, the value must be multiplied by the modulus. To write such a number into the instrument, the number should be divided by the modulus.

Transmitting long numbers

Some data as pulse counters and long energy registers are read and written in signed or unsigned long integer format in two contiguous registers, the first containing a low order word and the second a high order word.

The short energy registers 287-294, and 301-302 are transmitted in two contiguous registers in 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 Modbus Register Addresses

Throughout this document, the PM295 Modbus registers are referred to by the absolute register address. In the instrument, the data registers are organized into tables and, in some applications, you may need to access them by specifying the table number and the register offset within the table. The table number can be calculated as register address/256. The register offset in the table is calculated as register address mod 256.

From within the Modbus applications, the PM295 Modbus registers can be accessed by simulating input or holding registers of the Modicon 584, 884 or 984 Programmable Controller. To map the RPT091 register address to the range of the Modicon PLC input or holding registers, add to the register address a value of 30001 or 40001, respectively.

2.9 User Assignable Registers

The PM295 contains the 120 user assignable registers in the address range of 0 to 119 (see Section 5.29), any of which you can map to either register address accessible in the instrument. Registers that reside in different locations may be accessed by a single request by re-mapping them to adjacent addresses in the user assignable registers area.

The actual addresses of the assignable registers which are accessed via addresses 0 to 119 are specified in the user assignable register map. This map occupies addresses from 120 to 239, where map register 120 should contain the actual address of the register accessed via assignable register 0, register

121 should contain the actual address of the register accessed via assignable register 1, and so on. Note that the assignable register addresses and the map register addresses may not be re-mapped.

To build your own register map, write to map registers (120 to 239) the actual addresses you want to read from or write to via the assignable area (0 to 119). Note that long word registers should always be aligned at even addresses. For example, if you want to read registers 7136 (real-time voltage of phase A, word) and 7576/7577 (kWh import, long word) via registers 0-2, then do the following:

- write 7576 to register 120
- write 7577 to register 121
- write 7136 to register 122

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

Chapter 3 MODBUS MESSAGE FORMATS

3.1 Function 03 - Read Multiple Registers

This command allows the user to obtain contents of up to 125 *contiguous* registers from a single data table.

Request

Instrument Address	Function (03)	Starting Address	Word Count	Error Check
1 byte	1 byte	2 bytes	2 bytes	2 bytes

Starting Address Address of the first register to be read
Word Count The number of contiguous words to be read

Response

Instrument Address	Function (03)	Byte Count	Data Word 1	...	Data Word N	Error Check
1 byte	1 byte	1 byte	2 bytes	...	2 bytes	2 bytes

The byte count field contains quantity of bytes to be returned.

3.2 Function 04 - Read Multiple Registers

This command allows the user to obtain contents of up to 125 *contiguous* registers from a single data table. It can be used instead of function 03.

Request

Instrument Address	Function (04)	Starting Address	Word Count	Error Check
1 byte	1 byte	2 bytes	2 bytes	2 bytes

Starting Address Address of the first register to be read
Word Count The number of contiguous words to be read

Response

Instrument Address	Function (04)	Byte Count	Data Word 1	...	Data Word N	Error Check
1 byte	1 byte	1 byte	2 bytes	...	2 bytes	2 bytes

The byte count field contains quantity of bytes to be returned.

3.3 Function 06 - Write Single Register

This command allows the user to write the contents of a data register in any data table where a register can be written.

Request

Instrument Address	Function (06)	Starting Address	Data Word	Error check
1 byte	1 byte	2 bytes	2 bytes	2 bytes

Starting Address Address of the register to be written
Data Value Data to be written to the register

Response

The normal response is the retransmission of the write request.

3.4 Function 16 - Write Multiple Registers

This request allows the user to write the contents of multiple *contiguous* registers to a single data table where registers can be written.

Request

Instrument Address	Function (16)	Starting Address	Word Count	Byte Count
1 byte	1 byte	2 bytes	2 bytes	1 byte

Data Word 1	...	...	...	Data Word N	Error Check
2 bytes	...	...	...	2 bytes	2 bytes

Starting Address Address of the first register to be written
Word Count The number of contiguous words to be written
Byte Count The number of bytes to be written

Response

Instrument Address	Function (16)	Starting Address	Word Count	Error Check
1 byte	1 byte	2 bytes	1 word	2 bytes

3.5 Function 08 - Loop-back Communications Test

The purpose of this request is to check communications link between the specified instrument and PC.

Request

Instrument Address	Function (08)	Diagnostic Code (0)	Data	Error Check
1 byte	1 byte	2 bytes	2 bytes	2 bytes

Diagnostic Code Designate action to be taken in Loop-back test. The protocol supports only Diagnostic Code 0 - return query data.

Data Query data. The data passed in this field will be returned to the master through the instrument. The entire message returned will be identical to the message transmitted by the master, field-per-field.

Response

Instrument Address	Function (08)	Diagnostic Code (0)	Data	Error Check
1 byte	1 byte	2 bytes	2 bytes	2 bytes

The normal response is the retransmission of a test message.

Chapter 4 EXCEPTION RESPONSES

The instrument sends an exception response when errors are 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.

Exception response

Instrument Address	Function (high order bit is set to 1)	Exception Code	Error Check
1 byte	1 byte	1 byte	2 byte

Exception response codes:

01 - Illegal function
02 - Illegal data address
03 - Illegal data value
06 - Busy, rejected message. The message was received without error, but the instrument is being programmed from the keypad (only for requests accessing setup registers).

NOTE

When the character framing, parity, or redundancy check detect a communication error, processing of the master's request stops. The instrument will not act on or respond to the message.

Chapter 5 POWERMETER REGISTERS DESCRIPTION

5.1 Basic Data Registers

Table 5-1 Basic Data Registers

Parameter	Add-ress	Size, byte	Direc-tion	Unit	Scale	À	Con-version
					Low	High	
Voltage L1/L12	256	2	R	V	0	Vmax	LIN3
Voltage L2/L23	257	2	R	V	0	Vmax	LIN3
Voltage L3/L31	258	2	R	V	0	Vmax	LIN3
Current L1	259	2	R	A	0	Imax	LIN3
Current L2	260	2	R	A	0	Imax	LIN3
Current L3	261	2	R	A	0	Imax	LIN3
kW L1	262	2	R	kW	-Pmax	Pmax	LIN3
kW L2	263	2	R	kW	-Pmax	Pmax	LIN3
kW L3	264	2	R	kW	-Pmax	Pmax	LIN3
kvar L1	265	2	R	kvar	-Pmax	Pmax	LIN3
kvar L2	266	2	R	kvar	-Pmax	Pmax	LIN3
kvar L3	267	2	R	kvar	-Pmax	Pmax	LIN3
kVA L1	268	2	R	kVA	-Pmax	Pmax	LIN3
kVA L2	269	2	R	kVA	-Pmax	Pmax	LIN3
kVA L3	270	2	R	kVA	-Pmax	Pmax	LIN3
Power factor L1	271	2	R		-1.00	1.00	LIN3
Power factor L2	272	2	R		-1.00	1.00	LIN3
Power factor L3	273	2	R		-1.00	1.00	LIN3
Total power factor	274	2	R		-1.00	1.00	LIN3
Total kW	275	2	R	kW	-Pmax	Pmax	LIN3
Total kvar	276	2	R	kvar	-Pmax	Pmax	LIN3
Total kVA	277	2	R	kVA	-Pmax	Pmax	LIN3
Neutral current	278	2	R	A	0	Imax	LIN3
Frequency	279	2	R	Hz	45.0	65.0	LIN3
Maximum kW demand	280	2	R/W	kW	-Pmax	Pmax	LIN3
Accumulated kW demand	281	2	R/W	kW	-Pmax	Pmax	LIN3
Maximum kVA demand	282	2	R/W	kW	-Pmax	Pmax	LIN3
Accumulated kVA demand	283	2	R/W	kVA	-Pmax	Pmax	LIN3
Maximum ampere demand L1	284	2	R/W	kVA	0	Imax	LIN3
Maximum ampere demand L2	285	2	R/W	A	0	Imax	LIN3
Maximum ampere demand L3	286	2	R/W	A	0	Imax	LIN3

Parameter	Add-ress	Size, byte	Direc-tion	Unit	Scale À		Con-version
					Low	High	
kWh import (low)	287	2	R/W	kWh	0	9999	NONE
kWh import (high)	288	2	R/W	kWh	0	999	x10^4
kWh export (low)	289	2	R/W	kWh	0	9999	NONE
kWh export (high)	290	2	R/W	kWh	0	999	x10^4
+kvarh net (low) **Á**	291	2	R/W	kvarh	0	9999	NONE
+kvarh net (high) **Á**	292	2	R/W	kvarh	0	999	x10^4
-kvarh net (low) **Â**	293	2	R/W	kvarh	0	9999	NONE
-kvarh net (high) **Â**	294	2	R/W	kvarh	0	999	x10^4
Voltage THD L1/L12	295	2	R	%	0	100	LIN3
Voltage THD L2/L23	296	2	R	%	0	100	LIN3
Voltage THD L3	297	2	R	%	0	100	LIN3
Current THD L1	298	2	R	%	0	100	LIN3
Current THD L2	299	2	R	%	0	100	LIN3
Current THD L3	300	2	R	%	0	100	LIN3
kVAh (low)	301	2	R/W	kVAh	0	9999	NONE
kVAh (high)	302	2	R/W	kVAh	0	9999	x10^4
Present kW demand	303	2	R	kW	-Pmax	Pmax	LIN3
Present kVA demand	304	2	R	kVA	-Pmax	Pmax	LIN3

À The parameter limits are as follows:

Vmax (660 V input option) = 660V @ PT Ratio = 1
Vmax (660 V input option) = 144 × PT Ratio [V] @ PT Ratio > 1
Vmax (120 V input option) =144 × PT Ratio [V]
Imax (20% over-range) = 1.2 × CT primary current [A]
Iaux max (20% over-range) = 1.2 × Auxiliary CT primary current [mA/A]
Pmax = (Imax × Vmax × 3)/1000 [kW] if wiring mode is 4LN3 or 3LN3
Pmax = (Imax × Vmax × 2)/1000 [kW] if wiring mode is 4LL3, 3OP2, 3DIR2, 3OP3 or 3LL3

Á Positive readings of kvarh net

Â Negative readings of kvarh net

NOTE

Writing a zero to one of registers 280-286 causes reset of all maximum demands. Writing a zero to one of registers 287-294 and 301-302 causes reset of all accumulated energies. Those are not applied to the TOU system registers.

5.2 Basic Setup

Table 5-2 Basic Setup Registers

Parameter	Address	Size, byte	Direction	Range
Wiring mode **À**	2304	2	R/W	0 = 3OP2, 1 = 4LN3, 2 = 3DIR2, 3 = 4LL3, 4 = 3OP3, 5 = 3LN3, 6 = 3LL3
PT ratio	2305	2	R/W	10 to 65000 × 0.1
CT primary current	2306	2	R/W	1 to 50000 A
Demand period	2307	2	R/W	1,2,5,10,15,20,30,60 min, 255 = external synchronization
Volt/ampere demand period	2308	2	R/W	0 to 1800 sec
Averaging buffer size	2309	2	R/W	8, 16, 32
Reset enable/disable	2310	2	R/W	0 = disable, 1 = enable
Auxiliary CT primary current	2311	2	R/W	1 to 50000 A/mA
The number of demand periods	2312	2	R/W	1 to 15
Thermal demand time constant	2313	2	R/W	10 to 36000 × 0.1
The number of pre-event cycles	2314	2	R/W	1 to 8

À The wiring mode options are as follows:

3OP2 - 3-wire open delta using 2 CTs (2 element)
4LN3 - 4-wire WYE using 3 PTs (3 element), line to neutral voltage readings
3DIR2 - 3-wire direct connection using 2 CTs (2 element)
4LL3 - 4-wire WYE using 3 PTs (3 element), line to line voltage readings
3OP3 - 3-wire open delta using 3 CTs (2 1/2 element)
3LN3 - 4-wire WYE using 2 PTs (2 1/2 element), line to neutral voltage readings
3LL3 - 4-wire WYE using 2 PTs (2 1/2 element), line to line voltage readings

5.3 Reset/Clear

Table 5-3 Reset/Clear Registers

Register function	Add-ress	Size, byte	Direc-tion	Reset value
Clear total energy registers	3404	2	W	0
Clear total extreme demand registers	3405	2	W	0
Clear TOU energy registers	3406	2	W	0
Clear TOU demand registers	3407	2	W	0
Clear pulse counters	3408	2	W	0
Clear Min/Max log	3409	2	W	0
Clear event log	3410	2	W	0
Clear data log	3411	2	W	0-15 = log number 16 = all
Clear high-speed (32/16) waveform log	3412	2	W	0
Clear high-resolution (128/4) waveform log	3413	2	W	0
Reserved (no actions will be made)	3414	2	W	0
Restore event log queue	3415	2	W	0
Restore data log queue	3416	2	W	0-15 = log number 16 = all
Restore high-speed waveform log queue	3417	2	W	0
Restore high-resolution waveform log queue	3418	2	W	0

5.4 Instrument Status

Table 5-4 Instrument Status Registers

Parameter	Address	Size, byte	Direc-tion	Unit	Range
Instrument reset register **À**	2560	2	R/W		0 (when read) 65535 (when written) = reset instrument
Keypad status	2561	2	R		see Table 5-5
Relay status	2562	2	R		see Table 5-6
Not used	2563	2	R		permanently set to 0
Status inputs	2564	2	R		see Table 5-11
Firmware version number	2565	2	R		0-65535
Instrument options 1	2566	2	R		see Table 5-7
Instrument options 2	2567	2	R		see Table 5-7

À Writing a value of 65535 into register 2560 will cause the instrument to perform a warm restart.

Table 5-5 Keypad Status

Bit number	Description
0	Up key status
1	Enter key status
2	Select key status
3	Down key status
4-15	Not used (permanently set to 0)

Bit meaning: 0 = key released, 1 = key pressed

Table 5-6 Relay Status

Bit number	Description
0-3	Not used (permanently set to 1)
4	Relay #4 status
5	Relay #3 status
6	Relay #2 status
7	Relay #1 status
8-15	Not used (permanently set to 0)

Bit meaning: 0 = relay operated, 1 = relay released

Table 5-7 Instrument Options

Options register	Bit	Description
Options1	0	120V options
	1-5	Reserved
	6	Analog output 0/4-20 mA
	7-8	Reserved
	9	Relays option
	10	Digital inputs option
	11	Auxiliary current option
	12-15	Reserved
Options 2	0-2	The number of relays - 1
	3-6	The number of digital inputs - 1
	7-8	The number of analog outputs - 1
	9-13	Reserved
	14-15	Memory module size (00 = 128 Kbyte, 01= 256 Kbyte, 10 = 512 Kbyte)

5.5 Extended Status

Table 5-8 Extended Status Registers

Register description	Address	Size, byte	Direction	Value range
Relay status	3452	2	R	see Table 5-9
User event flags status	3453	2	R	see Table 5-10
Status inputs	3454	2	R	see Table 5-11
Setpoints status	3455	2	R	see Table 5-12
Log status	3456	2	R	see Table 5-13
Data log status	3457	2	R	see Table 5-14
Setpoint #1 conditions status	3458	2	R	see Table 5-15
Setpoint #2 conditions status	3459	2	R	see Table 5-15
Setpoint #3 conditions status	3460	2	R	see Table 5-15
Setpoint #4 conditions status	3461	2	R	see Table 5-15
Setpoint #5 conditions status	3462	2	R	see Table 5-15
Setpoint #6 conditions status	3463	2	R	see Table 5-15
Setpoint #7 conditions status	3464	2	R	see Table 5-15
Setpoint #8 conditions status	3465	2	R	see Table 5-15
Setpoint #9 conditions status	3466	2	R	see Table 5-15
Setpoint #10 conditions status	3467	2	R	see Table 5-15
Setpoint #11 conditions status	3468	2	R	see Table 5-15
Setpoint #12 conditions status	3469	2	R	see Table 5-15
Setpoint #13 conditions status	3470	2	R	see Table 5-15
Setpoint #14 conditions status	3471	2	R	see Table 5-15
Setpoint #15 conditions status	3472	2	R	see Table 5-15
Setpoint #16 conditions status	3473	2	R	see Table 5-15
Setpoint alarm status	3474	2	R/W	see Table 5-16
Self-check alarm status	3475	2	R/W	see Table 5-17

Table 5-9 Relay Status

Bit	Description
0	Relay #1 status
1	Relay #2 status
2	Relay #3 status
3	Relay #4 status
4-15	Not used (permanently set to 0)

Bit meaning: 0 = relay released, 1 = relay operated

Table 5-10 User Event Flags Status

Bit	Description
0	Event flag #1 status
1	Event flag #2 status
2	Event flag #3 status
3	Event flag #4 status
4	Event flag #5 status
5	Event flag #6 status
6	Event flag #7 status
7	Event flag #8 status
8-15	Not used (permanently set to 0)

Bit meaning: 0 = flag is OFF, 1 = flag is ON

Table 5-11 Status Inputs

Bit	Description
0	Status input #1
1	Status input #2
2	Status input #3
3	Status input #4
4	Status input #5
5	Status input #6
6	Status input #7
7	Status input #8
8-15	Not used (permanently set to 0)

Bit meaning: 0 = contact open, 1 = contact closed

Table 5-12 Setpoints Status

Bit	Description
0	Setpoint # 1 status
1	Setpoint # 2 status
2	Setpoint # 3 status
3	Setpoint # 4 status
4	Setpoint # 5 status
5	Setpoint # 6 status
6	Setpoint # 7 status
7	Setpoint # 8 status
8	Setpoint # 9 status
9	Setpoint # 10 status
10	Setpoint # 11 status
11	Setpoint # 12 status
12	Setpoint # 13 status
13	Setpoint # 14 status
14	Setpoint # 15 status
15	Setpoint # 16 status

Bit meaning: 0 = setpoint is released, 1 = setpoint is operated

Table 5-13 Log Status

Bit	Description
0	Reserved
1	New Min/Max Log
2	New event log
3	New data log (any)
4	New high-speed (32/16) waveform log
5	New high-resolution (128/4) waveform log
6-15	Not used (permanently set to 0)

Bit meaning: 0 = no new logs, 1 = new log recorded (the new log flag is reset when the user reads the first log record after the flag has been set)

Table 5-14 Data Log Status

Bit	Description
0	New data log #1
1	New data log #2
2	New data log #3
3	New data log #4
4	New data log #5
5	New data log #6
6	New data log #7
7	New data log #8
8	New data log #9
9	New data log #10
10	New data log #11
11	New data log #12
12	New data log #13
13	New data log #14
14	New data log #15
15	New data log #16

Bit meaning: 0 = no new logs, 1 = new log recorded (the new log flag is reset when the user reads the first log record after the flag has been set)

Table 5-15 Setpoint Conditions Status

Bit	Description
0	Setpoint condition #1 status
1	Setpoint condition #2 status
2	Setpoint condition #3 status
3	Setpoint condition #4 status
4-7	Not used (permanently set to 0)

Bit meaning:

a) when a setpoint is operated: 0 = condition is false, 1 = condition is true

b) when a setpoint is released: 0 = condition is true, 1 = condition is false

Table 5-16 Setpoint Alarm Status

Bit	Description
0	Alarm #1
1	Alarm #2
2	Alarm #3
3	Alarm #4
4	Alarm #5
5	Alarm #6
6	Alarm #7
7	Alarm #8
8	Alarm #9
9	Alarm #10
10	Alarm #11
11	Alarm #12
12	Alarm #13
13	Alarm #14
14	Alarm #15
15	Alarm #16

Bit meaning: 1 = setpoint has been operated

Table 5-17 Self-check Alarm Status

Bit	Description
0	Reserved
1	ROM error
2	RAM error
3	Watchdog timer reset
4	Sampling failure
5	Out of control trap
6	Reserved
7	Timing failure
8	Loss of power (power up) or warm restart
9	Reserved
10	Configuration corrupted
11-15	Reserved

The setpoint alarm register stores the status of the operated setpoints by setting the appropriate bits to 1. The alarm status bits can be reset all together by writing zero to the setpoint alarm register. It is possible to reset each alarm status bit separately by writing back the contents of the alarm register with a corresponding alarm bit set to 0.

The self-check alarm register indicates possible problems with the instrument hardware or setup configuration. The hardware problems are indicated by the appropriate bits which are set whenever the instrument fails self-test diagnostics and in the event of loss of power. The setup configuration problems are indicated by the dedicated bit which is set when either configuration register is corrupted. In this event, the instrument will use

the default configuration. Hardware fault bits can be reset by writing zero to the self-check alarm register. The configuration corrupt status bit is also reset automatically when you change setup either via the front panel or through communications.

5.6 Extended Memory Status

Table 5-18 Extended Memory Status Registers

Register contents	Address	Size, byte	Direction
Total memory size, Byte	3506 3507	4	R
Free memory size, Byte	3508 3509	4	R
The total number of event log records	3510	2	R
The total number of data log #1 records	3511	2	R
The total number of data log #2 records	3512	2	R
The total number of data log #3 records	3513	2	R
The total number of data log #4 records	3514	2	R
The total number of data log #5 records	3515	2	R
The total number of data log #6 records	3516	2	R
The total number of data log #7 records	3517	2	R
The total number of data log #8 records	3518	2	R
The total number of data log #9 records	3519	2	R
The total number of data log #10 records	3520	2	R
The total number of data log #11 records	3521	2	R
The total number of data log #12 records	3522	2	R
The total number of data log #13 records	3523	2	R
The total number of data log #14 records	3524	2	R
The total number of data log #15 records	3525	2	R
The total number of data log #16 records	3526	2	R
The total number of high-speed (32/16) waveform log records	3527	2	R
The total number of high-resolution (128/4) waveform log records	3528	2	R
The number of new event log records	3529	2	R
The number of new data log #1 records	3530	2	R
The number of new data log #2 records	3531	2	R
The number of new data log #3 records	3532	2	R
The number of new data log #4 records	3533	2	R
The number of new data log #5 records	3534	2	R
The number of new data log #6 records	3535	2	R
The number of new data log #7 records	3536	2	R
The number of new data log #8 records	3537	2	R
The number of new data log #9 records	3538	2	R
The number of new data log #10 records	3539	2	R

Register contents	Address	Size, byte	Direction
The number of new data log #11 records	3540	2	R
The number of new data log #12 records	3541	2	R
The number of new data log #13 records	3542	2	R
The number of new data log #14 records	3543	2	R
The number of new data log #15 records	3544	2	R
The number of new data log #16 records	3545	2	R
The number of new high-speed (32/16) waveform log records	3546	2	R
The number of new high-resolution (128/4) waveform log records	3547	2	R

The total number of records includes all the records contained in the memory partition. The number of new records includes the number of records that are logged after the last read request has been issued for the memory partition.

5.7 Extended Data Registers

The following table lists all registers containing the data measured by the instrument. Notice that these registers are arranged into groups which are not located at adjacent addresses. You can re-map these registers into adjacent addresses to access multiple data from different data groups by using a single request. Refer to Section 2.9 for information on the user assignable registers.

Along with the register address, the table shows for each data item its data identifier (ID). This is a one word containing a data group ID in the high byte and the parameter offset in a group in the low byte. Data IDs are used to specify input or output parameters whenever a data parameter specification is needed, for example, when setting analog output or data log parameters.

Table 5-19 Extended Data Registers

Parameter	Add-ress	Size, byte	Data ID	Direc-tion	Unit	Range/ Scale À		Con-vers.
						Low	High	
None (A, P)								
None	6656	2	0	R		0	0	NONE
User flags								
User event flags (see Table 5-9)	6776	2	768	R		0	255	NONE
Status inputs								
Status inputs (see Table 5-10)	6896	2	1536	R		0	255	NONE

Parameter	Add-ress	Size, byte	Data ID	Direc-tion	Unit	Range/ Scale À		Con-vers.
						Low	High	
Relays								
Relay status (see Table 5-8)	6976	2	2048	R		0	15	NONE
Pulse counters								
Pulse counter #1	7056 7057	4	2560	R/W		0	10^9-1	NONE
Pulse counter #2	7058 7059	4	2561	R/W		0	10^9-1	NONE
Pulse counter #3	7060 7061	4	2562	R/W		0	10^9-1	NONE
Pulse counter #4	7062 7063	4	2563	R/W		0	10^9-1	NONE
Pulse counter #5	7064 7065	4	2564	R/W		0	10^9-1	NONE
Pulse counter #6	7066 7067	4	2565	R/W		0	10^9-1	NONE
Pulse counter #7	7068 7069	4	2566	R/W		0	10^9-1	NONE
Pulse counter #8	7070 7071	4	2567	R/W		0	10^9-1	NONE
Real-time values per phase (A)								
Voltage L1/L12	7136	2	3072	R	V	0	Vmax	LIN3
Voltage L2/L23	7137	2	3073	R	V	0	Vmax	LIN3
Voltage L3/L31	7138	2	3074	R	V	0	Vmax	LIN3
Current L1	7139	2	3075	R	A	0	Imax	LIN3
Current L2	7140	2	3076	R	A	0	Imax	LIN3
Current L3	7141	2	3077	R	A	0	Imax	LIN3
kW L1	7142	2	3078	R	kW	-Pmax	Pmax	LIN3
kW L2	7143	2	3079	R	kW	-Pmax	Pmax	LIN3
kW L3	7144	2	3080	R	kW	-Pmax	Pmax	LIN3
kvar L1	7145	2	3081	R	kvar	-Pmax	Pmax	LIN3
kvar L2	7146	2	3082	R	kvar	-Pmax	Pmax	LIN3
kvar L3	7147	2	3083	R	kvar	-Pmax	Pmax	LIN3
kVA L1	7148	2	3084	R	kVA	0	Pmax	LIN3
kVA L2	7149	2	3085	R	kVA	0	Pmax	LIN3
kVA L3	7150	2	3086	R	kVA	0	Pmax	LIN3
Power factor L1	7151	2	3087	R		-1.00	1.00	LIN3
Power factor L2	7152	2	3088	R		-1.00	1.00	LIN3
Power factor L3	7153	2	3089	R		-1.00	1.00	LIN3
Voltage THD L1/L12	7154	2	3090	R	%	0	100.0	LIN3
Voltage THD L2/L23	7155	2	3091	R	%	0	100.0	LIN3
Voltage THD L3	7156	2	3092	R	%	0	100.0	LIN3
Current THD L1	7157	2	3093	R	%	0	100.0	LIN3
Current THD L2	7158	2	3094	R	%	0	100.0	LIN3
Current THD L3	7159	2	3095	R	%	0	100.0	LIN3

Parameter	Add-ress	Size, byte	Data ID	Direc-tion	Unit	Range/ Scale À		Con-vers.
						Low	High	
K-Factor L1	7160	2	3096	R		1.0	999.9	LIN3
K-Factor L2	7161	2	3097	R		1.0	999.9	LIN3
K-Factor L3	7162	2	3098	R		1.0	999.9	LIN3
Real-time low values on any phase								
Low voltage	7176	2	3328	R	V	0	Vmax	LIN3
Low current	7177	2	3329	R	A	0	Imax	LIN3
Low kW	7178	2	3330	R	kW	-Pmax	Pmax	LIN3
Low kvar	7179	2	3331	R	kvar	-Pmax	Pmax	LIN3
Low kVA	7180	2	3332	R	kVA	0	Pmax	LIN3
Low PF Lag	7181	2	3333	R		0	1.00	LIN3
Low PF Lead	7182	2	3334	R		0	1.00	LIN3
Low voltage THD	7183	2	3335	R	%	0	100.0	LIN3
Low current THD	7184	2	3336	R	%	0	100.0	LIN3
Low K-Factor	7185	2	3337	R		1.0	999.9	LIN3
Real-time high values on any phase								
High voltage	7216	2	3584	R	V	0	Vmax	LIN3
High current	7217	2	3585	R	A	0	Imax	LIN3
High kW	7218	2	3586	R	kW	-Pmax	Pmax	LIN3
High kvar	7219	2	3587	R	kvar	-Pmax	Pmax	LIN3
High kVA	7220	2	3588	R	kVA	0	Pmax	LIN3
High PF Lag	7221	2	3589	R		0	1.00	LIN3
High PF Lead	7222	2	3590	R		0	1.00	LIN3
High voltage THD	7223	2	3591	R	%	0	100.0	LIN3
High current THD	7224	2	3592	R	%	0	100.0	LIN3
High K-Factor	7225	2	3593	R		1.0	999.9	LIN3
Real-time total values (A)								
Total kW	7256	2	3840	R	kW	-Pmax	Pmax	LIN3
Total kvar	7257	2	3841	R	kvar	-Pmax	Pmax	LIN3
Total kVA	7258	2	3842	R	kVA	0	Pmax	LIN3
Total PF	7259	2	3843	R		-1.00	1.00	LIN3
Total PF Lag	7260	2	3844	R		0	1.00	LIN3
Total PF Lead	7261	2	3845	R		0	1.00	LIN3
Real-time auxiliary values (A)								
Auxiliary current	7296	2	4096	R	mA/A	0	Iaux max	LIN3
Neutral current	7297	2	4097	R	A	0	Imax	LIN3
Frequency **Ä**	7298	2	4098	R	Hz	0	100.0	LIN3
Voltage unbalance	7299	2	4098	R	%	0	300	LIN3
Current unbalance	7300	2	4099	R	%	0	300	LIN3
Average values per phase (A)								
Voltage L1/L12	7336	2	4352	R	V	0	Vmax	LIN3
Voltage L2/L23	7337	2	4353	R	V	0	Vmax	LIN3
Voltage L3/L31	7338	2	4354	R	V	0	Vmax	LIN3
Current L1	7339	2	4355	R	A	0	Imax	LIN3
Current L2	7340	2	4356	R	A	0	Imax	LIN3
Current L3	7341	2	4357	R	A	0	Imax	LIN3

Parameter	Add-ress	Size, byte	Data ID	Direc-tion	Unit	Range/ Scale À		Con-vers.
						Low	High	
kW L1	7342	2	4358	R	kW	-Pmax	Pmax	LIN3
kW L2	7343	2	4359	R	kW	-Pmax	Pmax	LIN3
kW L3	7344	2	4360	R	kW	-Pmax	Pmax	LIN3
kvar L1	7345	2	4361	R	kvar	-Pmax	Pmax	LIN3
kvar L2	7346	2	4362	R	kvar	-Pmax	Pmax	LIN3
kvar L3	7347	2	4363	R	kvar	-Pmax	Pmax	LIN3
kVA L1	7348	2	4364	R	kVA	0	Pmax	LIN3
kVA L2	7349	2	4365	R	kVA	0	Pmax	LIN3
kVA L3	7350	2	4366	R	kVA	0	Pmax	LIN3
Power factor L1	7351	2	4367	R		-1.00	1.00	LIN3
Power factor L2	7352	2	4368	R		-1.00	1.00	LIN3
Power factor L3	7353	2	4369	R		-1.00	1.00	LIN3
Voltage THD L1/L12	7354	2	4370	R	%	0	100.0	LIN3
Voltage THD L2/L23	7355	2	4371	R	%	0	100.0	LIN3
Voltage THD L3	7356	2	4372	R	%	0	100.0	LIN3
Current THD L1	7357	2	4373	R	%	0	100.0	LIN3
Current THD L2	7358	2	4374	R	%	0	100.0	LIN3
Current THD L3	7359	2	4375	R	%	0	100.0	LIN3
K-Factor L1	7360	2	4376	R		1.0	999.9	LIN3
K-Factor L2	7361	2	4377	R		1.0	999.9	LIN3
K-Factor L3	7362	2	4378	R		1.0	999.9	LIN3
Average low values on any phase								
Low voltage	7376	2	4608	R	V	0	Vmax	LIN3
Low current	7377	2	4609	R	A	0	Imax	LIN3
Low kW	7378	2	4610	R	kW	-Pmax	Pmax	LIN3
Low kvar	7379	2	4611	R	kvar	-Pmax	Pmax	LIN3
Low kVA	7380	2	4612	R	kVA	0	Pmax	LIN3
Low PF Lag	7381	2	4613	R		0	1.00	LIN3
Low PF Lead	7382	2	4614	R		0	1.00	LIN3
Low voltage THD	7383	2	4615	R	%	0	100.0	LIN3
Low current THD	7384	2	4616	R	%	0	100.0	LIN3
Low K-Factor	7385	2	4617	R		1.0	999.9	LIN3
Average high values on any phase								
High voltage	7416	2	4864	R	V	0	Vmax	LIN3
High current	7417	2	4865	R	A	0	Imax	LIN3
High kW	7418	2	4866	R	kW	-Pmax	Pmax	LIN3
High kvar	7419	2	4867	R	kvar	-Pmax	Pmax	LIN3
High kVA	7420	2	4868	R	kVA	0	Pmax	LIN3
High PF Lag	7421	2	4869	R		0	1.00	LIN3
High PF Lead	7422	2	4870	R		0	1.00	LIN3
High voltage THD	7423	2	4871	R	%	0	100.0	LIN3
High current THD	7424	2	4872	R	%	0	100.0	LIN3
High K-Factor	7425	2	4873	R		1.0	999.9	LIN3
Average total values (A)								
Total kW	7456	2	5120	R	kW	-Pmax	Pmax	LIN3

Parameter	Add-ress	Size, byte	Data ID	Direc-tion	Unit	Range/ Scale À		Con-vers.
						Low	High	
Total kvar	7457	2	5121	R	kvar	-Pmax	Pmax	LIN3
Total kVA	7458	2	5122	R	kVA	0	Pmax	LIN3
Total PF	7459	2	5123	R		-1.00	1.00	LIN3
Total PF Lag	7460	2	5124	R		0	1.00	LIN3
Total PF Lead	7461	2	5125	R		0	1.00	LIN3
Average auxiliary values (A)								
Auxiliary current	7496	2	5376	R	mA/A	0	Iaux max	LIN3
Neutral current	7497	2	5377	R	A	0	Imax	LIN3
Frequency **Ä**	7498	2	5378	R	Hz	0	100.0	LIN3
Voltage unbalance	7499	2	5379	R	%	0	300	LIN3
Current unbalance	7500	2	5380	R	%	0	300	LIN3
Present demands (A)								
Volt demand L1/L12	7536	2	5632	R	V	0	Vmax	LIN3
Volt demand L2/L23	7537	2	5633	R	V	0	Vmax	LIN3
Volt demand L3/L31	7538	2	5634	R	V	0	Vmax	LIN3
Amp. demand L1	7539	2	5635	R	A	0	Imax	LIN3
Amp. demand L2	7540	2	5636	R	A	0	Imax	LIN3
Amp. demand L3	7541	2	5637	R	A	0	Imax	LIN3
Block kW demand (import)	7542	2	5638	R	kW	0	Pmax	LIN3
Block kvar demand (total)	7543	2	5639	R	kvar	0	Pmax	LIN3
Block kVA demand	7544	2	5640	R	kVA	0	Pmax	LIN3
Sliding window kW demand (import)	7545	2	5641	R	kW	0	Pmax	LIN3
Sliding window kvar demand (total)	7546	2	5642	R	kvar	0	Pmax	LIN3
Sliding window kVA demand	7547	2	5643	R	kVA	0	Pmax	LIN3
Thermal kW demand (import)	7548	2	5644	R	kW	0	Pmax	LIN3
Thermal kvar demand (total)	7549	2	5645	R	kvar	0	Pmax	LIN3
Thermal kVA demand	7550	2	5646	R	kVA	0	Pmax	LIN3
Accumulated kW demand (import)	7551	2	5647	R	kW	0	Pmax	LIN3
Accumulated kvar demand (total)	7552	2	5648	R	kvar	0	Pmax	LIN3
Accumulated kVA demand	7553	2	5649	R	kVA	0	Pmax	LIN3
Predicted kW demand (import)	7554	2	5650	R	kW	0	Pmax	LIN3
Predicted kvar demand (total)	7555	2	5651	R	kvar	0	Pmax	LIN3
Predicted kVA demand	7556	2	5652	R	kVA	0	Pmax	LIN3

Parameter	Add-ress	Size, byte	Data ID	Direc-tion	Unit	Range/ Scale À		Con-vers.
						Low	High	
Accumulated energies								
kWh import	7576 7577	4	5888	R	kWh	0	10^9-1	NONE
kWh export **Å**	7578 7579	4	5889	R	kWh	0	10^9-1	NONE
kWh net **Å**	7580 7581	4	5890	R	kWh	-10^9+1	10^9-1	NONE
kWh total	7582 7583	4	5891	R	kWh	0	10^9-1	NONE
kvarh import	7584 7585	4	5892	R	kvarh	0	10^9-1	NONE
kvarh export **Å**	7586 7587	4	5893	R	kvarh	0	10^9-1	NONE
kvarh net **Å**	7588 7589	4	5894	R	kvarh	-10^9+1	10^9-1	NONE
kvarh total	7590 7591	4	5895	R	kvarh	0	10^9-1	NONE
kVAh total	7592 7593	4	5896	R	kVAh	0	10^9-1	NONE
L1/L12 phase voltage harmonics (P)								
Harmonic H01	7656	2	6400	R	%	100.00	100.00	LIN3
Harmonic H02	7657	2	6401	R	%	0	100.00	LIN3
Harmonic H03	7658	2	6402	R	%	0	100.00	LIN3
...	...		...					
Harmonic H40	7695	2	6439	R	%	0	100.00	LIN3
L2/L23 phase voltage harmonics (P)								
Harmonic H01	7696	2	6656	R	%	100.00	100.00	LIN3
Harmonic H02	7697	2	6657	R	%	0	100.00	LIN3
Harmonic H03	7698	2	6658	R	%	0	100.00	LIN3
...			...					
Harmonic H40	7735	2	6695	R	%	0	100.00	LIN3
L3 phase voltage harmonics (P)								
Harmonic H01	7736	2	6912	R	%	100.00	100.00	LIN3
Harmonic H02	7737	2	6913	R	%	0	100.00	LIN3
Harmonic H03	7738	2	6914	R	%	0	100.00	LIN3
...	...							
Harmonic H40	7775	2	6951	R	%	0	100.00	LIN3
L1 phase current harmonics (P)								
Harmonic H01	7776	2	7168	R	%	100.00	100.00	LIN3
Harmonic H02	7777	2	7169	R	%	0	100.00	LIN3
Harmonic H03	7778	2	7170	R	%	0	100.00	LIN3
...	...							
Harmonic H40	7815	2	7207	R	%	0	100.00	LIN3
L2 phase current harmonics (P)								
Harmonic H01	7816	2	7424	R	%	100.00	100.00	LIN3

Parameter	Address	Size, byte	Data ID	Direction	Unit	Range/ Scale À		Convers.
						Low	High	
Harmonic H02	7817	2	7425	R	%	0	100.00	LIN3
Harmonic H03	7818	2	7426	R	%	0	100.00	LIN3
...	...		...					
Harmonic H40	7855	2	7463	R	%	0	100.00	LIN3
L3 phase current harmonics (P)								
Harmonic H01	7856	2	7680	R	%	100.00	100.00	LIN3
Harmonic H02	7857	2	7681	R	%	0	100.00	LIN3
Harmonic H03	7858	2	7682	R	%	0	100.00	LIN3
...	...		...					
Harmonic H40	7895	2	7719	R	%	0	100.00	LIN3
L1/L12 phase harmonic voltages (odd harmonics) (A, P)								
Harmonic H01	7896	2	7936	R	V	0	Vmax	LIN3
Harmonic H03	7897	2	7937	R	V	0	Vmax	LIN3
Harmonic H05	7898	2	7939	R	V	0	Vmax	LIN3
Harmonic H07	7899	2	7940	R	V	0	Vmax	LIN3
Harmonic H09	7900	2	7941	R	V	0	Vmax	LIN3
Harmonic H11	7901	2	7942	R	V	0	Vmax	LIN3
Harmonic H13	7902	2	7943	R	V	0	Vmax	LIN3
Harmonic H15	7903	2	7944	R	V	0	Vmax	LIN3
Harmonic H17	7904	2	7945	R	V	0	Vmax	LIN3
Harmonic H19	7905	2	7946	R	V	0	Vmax	LIN3
Harmonic H21	7906	2	7947	R	V	0	Vmax	LIN3
Harmonic H23	7907	2	7948	R	V	0	Vmax	LIN3
Harmonic H25	7908	2	7949	R	V	0	Vmax	LIN3
Harmonic H27	7909	2	7950	R	V	0	Vmax	LIN3
Harmonic H29	7910	2	7951	R	V	0	Vmax	LIN3
Harmonic H31	7911	2	7952	R	V	0	Vmax	LIN3
Harmonic H33	7912	2	7953	R	V	0	Vmax	LIN3
Harmonic H35	7913	2	7954	R	V	0	Vmax	LIN3
Harmonic H37	7914	2	7955	R	V	0	Vmax	LIN3
Harmonic H39	7915	2	7956	R	V	0	Vmax	LIN3
L2/L23 phase harmonic voltages (odd harmonics) (A, P)								
Harmonic H01	7936	2	8192	R	V	0	Vmax	LIN3
Harmonic H03	7937	2	8193	R	V	0	Vmax	LIN3
Harmonic H05	7938	2	8194	R	V	0	Vmax	LIN3
Harmonic H07	7939	2	8195	R	V	0	Vmax	LIN3
Harmonic H09	7940	2	8196	R	V	0	Vmax	LIN3
Harmonic H11	7941	2	8197	R	V	0	Vmax	LIN3
Harmonic H13	7942	2	8198	R	V	0	Vmax	LIN3
Harmonic H15	7943	2	8199	R	V	0	Vmax	LIN3
Harmonic H17	7944	2	8200	R	V	0	Vmax	LIN3
Harmonic H19	7945	2	8201	R	V	0	Vmax	LIN3
Harmonic H21	7946	2	8202	R	V	0	Vmax	LIN3
Harmonic H23	7947	2	8203	R	V	0	Vmax	LIN3
Harmonic H25	7948	2	8204	R	V	0	Vmax	LIN3

Parameter	Add-ress	Size, byte	Data ID	Direc-tion	Unit	Range/ Scale À		Con-vers.
						Low	High	
Harmonic H27	7949	2	8205	R	V	0	Vmax	LIN3
Harmonic H29	7950	2	8206	R	V	0	Vmax	LIN3
Harmonic H31	7951	2	8207	R	V	0	Vmax	LIN3
Harmonic H33	7952	2	8208	R	V	0	Vmax	LIN3
Harmonic H35	7953	2	8209	R	V	0	Vmax	LIN3
Harmonic H37	7954	2	8210	R	V	0	Vmax	LIN3
Harmonic H39	7955	2	8211	R	V	0	Vmax	LIN3
L3 phase harmonic voltages (odd harmonics) (A, P)								
Harmonic H01	7976	2	8448	R	V	0	Vmax	LIN3
Harmonic H03	7977	2	8449	R	V	0	Vmax	LIN3
Harmonic H05	7978	2	8450	R	V	0	Vmax	LIN3
Harmonic H07	7979	2	8451	R	V	0	Vmax	LIN3
Harmonic H09	7980	2	8452	R	V	0	Vmax	LIN3
Harmonic H11	7981	2	8453	R	V	0	Vmax	LIN3
Harmonic H13	7982	2	8454	R	V	0	Vmax	LIN3
Harmonic H15	7983	2	8455	R	V	0	Vmax	LIN3
Harmonic H17	7984	2	8456	R	V	0	Vmax	LIN3
Harmonic H19	7985	2	8457	R	V	0	Vmax	LIN3
Harmonic H21	7986	2	8458	R	V	0	Vmax	LIN3
Harmonic H23	7987	2	8459	R	V	0	Vmax	LIN3
Harmonic H25	7988	2	8460	R	V	0	Vmax	LIN3
Harmonic H27	7989	2	8461	R	V	0	Vmax	LIN3
Harmonic H29	7990	2	8462	R	V	0	Vmax	LIN3
Harmonic H31	7991	2	8463	R	V	0	Vmax	LIN3
Harmonic H33	7993	2	8464	R	V	0	Vmax	LIN3
Harmonic H35	7994	2	8465	R	V	0	Vmax	LIN3
Harmonic H37	7995	2	8466	R	V	0	Vmax	LIN3
Harmonic H39	7996	2	8467	R	V	0	Vmax	LIN3
L1 phase harmonic currents (odd harmonics) (A, P)								
Harmonic H01	8016	2	8704	R	A	0	Imax	LIN3
Harmonic H03	8017	2	8705	R	A	0	Imax	LIN3
Harmonic H05	8018	2	8706	R	A	0	Imax	LIN3
Harmonic H07	8019	2	8707	R	A	0	Imax	LIN3
Harmonic H09	8020	2	8708	R	A	0	Imax	LIN3
Harmonic H11	8021	2	8709	R	A	0	Imax	LIN3
Harmonic H13	8022	2	8710	R	A	0	Imax	LIN3
Harmonic H15	8023	2	8711	R	A	0	Imax	LIN3
Harmonic H17	8024	2	8712	R	A	0	Imax	LIN3
Harmonic H19	8025	2	8713	R	A	0	Imax	LIN3
Harmonic H21	8026	2	8714	R	A	0	Imax	LIN3
Harmonic H23	8027	2	8715	R	A	0	Imax	LIN3
Harmonic H25	8028	2	8716	R	A	0	Imax	LIN3
Harmonic H27	8029	2	8717	R	A	0	Imax	LIN3
Harmonic H29	8030	2	8718	R	A	0	Imax	LIN3
Harmonic H31	8031	2	8719	R	A	0	Imax	LIN3
Harmonic H33	8032	2	8720	R	A	0	Imax	LIN3

Parameter	Add-ress	Size, byte	Data ID	Direc-tion	Unit	Range/ Scale À		Con-vers.
						Low	High	
Harmonic H35	8033	2	8721	R	A	0	Imax	LIN3
Harmonic H37	8034	2	8722	R	A	0	Imax	LIN3
Harmonic H39	8035	2	8723	R	A	0	Imax	LIN3
L2 phase harmonic currents (odd harmonics) (A, P)								
Harmonic H01	8056	2	8960	R	A	0	Imax	LIN3
Harmonic H03	8057	2	8961	R	A	0	Imax	LIN3
Harmonic H05	8058	2	8962	R	A	0	Imax	LIN3
Harmonic H07	8059	2	8963	R	A	0	Imax	LIN3
Harmonic H09	8060	2	8964	R	A	0	Imax	LIN3
Harmonic H11	8061	2	8965	R	A	0	Imax	LIN3
Harmonic H13	8062	2	8966	R	A	0	Imax	LIN3
Harmonic H15	8063	2	8967	R	A	0	Imax	LIN3
Harmonic H17	8064	2	8968	R	A	0	Imax	LIN3
Harmonic H19	8065	2	8969	R	A	0	Imax	LIN3
Harmonic H21	8066	2	8970	R	A	0	Imax	LIN3
Harmonic H23	8067	2	8971	R	A	0	Imax	LIN3
Harmonic H25	8068	2	8972	R	A	0	Imax	LIN3
Harmonic H27	8069	2	8973	R	A	0	Imax	LIN3
Harmonic H29	8070	2	8974	R	A	0	Imax	LIN3
Harmonic H31	8072	2	8975	R	A	0	Imax	LIN3
Harmonic H33	8073	2	8976	R	A	0	Imax	LIN3
Harmonic H35	8074	2	8977	R	A	0	Imax	LIN3
Harmonic H37	8075	2	8978	R	A	0	Imax	LIN3
Harmonic H39	8076	2	8979	R	A	0	Imax	LIN3
L3 phase harmonic currents (odd harmonics) (A, P)								
Harmonic H01	8096	2	9216	R	A	0	Imax	LIN3
Harmonic H03	8097	2	9217	R	A	0	Imax	LIN3
Harmonic H05	8098	2	9218	R	A	0	Imax	LIN3
Harmonic H07	8099	2	9219	R	A	0	Imax	LIN3
Harmonic H09	8100	2	9220	R	A	0	Imax	LIN3
Harmonic H11	8101	2	9221	R	A	0	Imax	LIN3
Harmonic H13	8102	2	9222	R	A	0	Imax	LIN3
Harmonic H15	8103	2	9223	R	A	0	Imax	LIN3
Harmonic H17	8104	2	9224	R	A	0	Imax	LIN3
Harmonic H19	8105	2	9225	R	A	0	Imax	LIN3
Harmonic H21	8106	2	9226	R	A	0	Imax	LIN3
Harmonic H23	8107	2	9227	R	A	0	Imax	LIN3
Harmonic H25	8108	2	9228	R	A	0	Imax	LIN3
Harmonic H27	8109	2	9229	R	A	0	Imax	LIN3
Harmonic H29	8110	2	9230	R	A	0	Imax	LIN3
Harmonic H31	8111	2	9231	R	A	0	Imax	LIN3
Harmonic H33	8112	2	9232	R	A	0	Imax	LIN3
Harmonic H35	8113	2	9233	R	A	0	Imax	LIN3
Harmonic H37	8114	2	9234	R	A	0	Imax	LIN3
Harmonic H39	8115	2	9235	R	A	0	Imax	LIN3

Parameter	Add-ress	Size, byte	Data ID	Direc-tion	Unit	Range/ Scale À		Con-vers.
						Low	High	
Harmonic total kW (odd harmonics) (A, P)								
Harmonic H01	8136	2	9472	R	kW	-Pmax	Pmax	LIN3
Harmonic H03	8137	2	9473	R	kW	-Pmax	Pmax	LIN3
Harmonic H05	8138	2	9474	R	kW	-Pmax	Pmax	LIN3
Harmonic H07	8139	2	9475	R	kW	-Pmax	Pmax	LIN3
Harmonic H09	8141	2	9476	R	kW	-Pmax	Pmax	LIN3
Harmonic H11	8142	2	9477	R	kW	-Pmax	Pmax	LIN3
Harmonic H13	8143	2	9478	R	kW	-Pmax	Pmax	LIN3
Harmonic H15	8144	2	9479	R	kW	-Pmax	Pmax	LIN3
Harmonic H17	8145	2	9480	R	kW	-Pmax	Pmax	LIN3
Harmonic H19	8146	2	9481	R	kW	-Pmax	Pmax	LIN3
Harmonic H21	8147	2	9482	R	kW	-Pmax	Pmax	LIN3
Harmonic H23	8148	2	9483	R	kW	-Pmax	Pmax	LIN3
Harmonic H25	8149	2	9484	R	kW	-Pmax	Pmax	LIN3
Harmonic H27	8150	2	9485	R	kW	-Pmax	Pmax	LIN3
Harmonic H29	8151	2	9486	R	kW	-Pmax	Pmax	LIN3
Harmonic H31	8152	2	9487	R	kW	-Pmax	Pmax	LIN3
Harmonic H33	8153	2	9488	R	kW	-Pmax	Pmax	LIN3
Harmonic H35	8154	2	9489	R	kW	-Pmax	Pmax	LIN3
Harmonic H37	8155	2	9490	R	kW	-Pmax	Pmax	LIN3
Harmonic H39	8156	2	9491	R	kW	-Pmax	Pmax	LIN3
Harmonic total kvar (odd harmonics) (A, P)								
Harmonic H01	8176	2	9728	R	kvar	-Pmax	Pmax	LIN3
Harmonic H03	8177	2	9729	R	kvar	-Pmax	Pmax	LIN3
Harmonic H05	8178	2	9730	R	kvar	-Pmax	Pmax	LIN3
Harmonic H07	8179	2	9731	R	kvar	-Pmax	Pmax	LIN3
Harmonic H09	8180	2	9732	R	kvar	-Pmax	Pmax	LIN3
Harmonic H11	8181	2	9733	R	kvar	-Pmax	Pmax	LIN3
Harmonic H13	8182	2	9734	R	kvar	-Pmax	Pmax	LIN3
Harmonic H15	8183	2	9735	R	kvar	-Pmax	Pmax	LIN3
Harmonic H17	8184	2	9736	R	kvar	-Pmax	Pmax	LIN3
Harmonic H19	8185	2	9737	R	kvar	-Pmax	Pmax	LIN3
Harmonic H21	8186	2	9738	R	kvar	-Pmax	Pmax	LIN3
Harmonic H23	8187	2	9739	R	kvar	-Pmax	Pmax	LIN3
Harmonic H25	8188	2	9740	R	kvar	-Pmax	Pmax	LIN3
Harmonic H27	8189	2	9741	R	kvar	-Pmax	Pmax	LIN3
Harmonic H29	8190	2	9742	R	kvar	-Pmax	Pmax	LIN3
Harmonic H31	8191	2	9743	R	kvar	-Pmax	Pmax	LIN3
Harmonic H33	8192	2	9744	R	kvar	-Pmax	Pmax	LIN3
Harmonic H35	8193	2	9745	R	kvar	-Pmax	Pmax	LIN3
Harmonic H37	8194	2	9746	R	kvar	-Pmax	Pmax	LIN3
Harmonic H39	8195	2	9747	R	kvar	-Pmax	Pmax	LIN3
Harmonic total power factors (odd harmonics) (A, P)								
Harmonic H01	8216	2	9984	R	N/A	-1.00	1.00	LIN3
Harmonic H03	8217	2	9985	R	N/A	-1.00	1.00	LIN3
Harmonic H05	8218	2	9986	R	N/A	-1.00	1.00	LIN3

Parameter	Address	Size, byte	Data ID	Direction	Unit	Range/ Scale À		Convers.
						Low	High	
Harmonic H07	8219	2	9987	R	N/A	-1.00	1.00	LIN3
Harmonic H09	8220	2	9988	R	N/A	-1.00	1.00	LIN3
Harmonic H11	8221	2	9989	R	N/A	-1.00	1.00	LIN3
Harmonic H13	8222	2	9990	R	N/A	-1.00	1.00	LIN3
Harmonic H15	8223	2	9991	R	N/A	-1.00	1.00	LIN3
Harmonic H17	8224	2	9992	R	N/A	-1.00	1.00	LIN3
Harmonic H19	8225	2	9993	R	N/A	-1.00	1.00	LIN3
Harmonic H21	8226	2	9994	R	N/A	-1.00	1.00	LIN3
Harmonic H23	8227	2	9995	R	N/A	-1.00	1.00	LIN3
Harmonic H25	8228	2	9996	R	N/A	-1.00	1.00	LIN3
Harmonic H27	8229	2	9997	R	N/A	-1.00	1.00	LIN3
Harmonic H29	8230	2	9998	R	N/A	-1.00	1.00	LIN3
Harmonic H31	8231	2	9999	R	N/A	-1.00	1.00	LIN3
Harmonic H33	8232	2	10000	R	N/A	-1.00	1.00	LIN3
Harmonic H35	8233	2	10001	R	N/A	-1.00	1.00	LIN3
Harmonic H37	8234	2	10002	R	N/A	-1.00	1.00	LIN3
Harmonic H39	8235	2	10003	R	N/A	-1.00	1.00	LIN3
Minimum real-time values per phase (M)								
Voltage L1/L12	8416	2	11264	R	V	0	Vmax	LIN3
Voltage L2/L23	8417	2	11265	R	V	0	Vmax	LIN3
Voltage L3/L31	8418	2	11266	R	V	0	Vmax	LIN3
Current L1	8419	2	11267	R	A	0	Imax	LIN3
Current L2	8420	2	11268	R	A	0	Imax	LIN3
Current L3	8421	2	11269	R	A	0	Imax	LIN3
kW L1	8422	2	11270	R	kW	-Pmax	Pmax	LIN3
kW L2	8423	2	11271	R	kW	-Pmax	Pmax	LIN3
kW L3	8424	2	11272	R	kW	-Pmax	Pmax	LIN3
kvar L1	8425	2	11273	R	kvar	-Pmax	Pmax	LIN3
kvar L2	8426	2	11274	R	kvar	-Pmax	Pmax	LIN3
kvar L3	8427	2	11275	R	kvar	-Pmax	Pmax	LIN3
kVA L1	8428	2	11276	R	kVA	0	Pmax	LIN3
kVA L2	8429	2	11277	R	kVA	0	Pmax	LIN3
kVA L3	8430	2	11278	R	kVA	0	Pmax	LIN3
Power factor L1 **Á**	8431	2	11279	R		0	1.00	LIN3
Power factor L2 **Á**	8432	2	11280	R		0	1.00	LIN3
Power factor L3 **Á**	8433	2	11281	R		0	1.00	LIN3
Voltage THD L1/L12	8434	2	11282	R	%	0	100.0	LIN3
Voltage THD L2/L23	8435	2	11283	R	%	0	100.0	LIN3
Voltage THD L3	8436	2	11284	R	%	0	100.0	LIN3
Current THD L1	8437	2	11285	R	%	0	100.0	LIN3
Current THD L2	8438	2	11286	R	%	0	100.0	LIN3
Current THD L3	8439	2	11287	R	%	0	100.0	LIN3
K-Factor L1	8440	2	11288	R		1.0	999.9	LIN3
K-Factor L2	8441	2	11289	R		1.0	999.9	LIN3
K-Factor L3	8442	2	11290	R		1.0	999.9	LIN3

Parameter	Add-ress	Size, byte	Data ID	Direc-tion	Unit	Range/ Scale À		Con-vers.
						Low	High	
Minimum real-time total values (M)								
Total kW	8456	2	11520	R	kW	-Pmax	Pmax	LIN3
Total kvar	8457	2	11521	R	kvar	-Pmax	Pmax	LIN3
Total kVA	8458	2	11522	R	kVA	0	Pmax	LIN3
Total PF Á	8459	2	11523	R		0	1.00	LIN3
Total PF Lag	8460	2	11524	R		0	1.00	LIN3
Total PF Lead	8461	2	11525	R		0	1.00	LIN3
Minimum real-time auxiliary values (M)								
Auxiliary current	8496	2	11776	R	mA/A	0	Iaux max	LIN3
Neutral current	8497	2	11777	R	A	0	Imax	LIN3
Frequency Ä	8498	2	11778	R	Hz	0	100.0	LIN3
Voltage unbalance	8499	2	11779	R	%	0	300	LIN3
Current unbalance	8500	2	11780	R	%	0	300	LIN3
Minimum demands (M)								
Volt demand L1/L12	8536	2	12032	R	V	0	Vmax	LIN3
Volt demand L2/L23	8537	2	12033	R	V	0	Vmax	LIN3
Volt demand L3/L31	8538	2	12034	R	V	0	Vmax	LIN3
Amp. demand L1	8539	2	12035	R	V	0	Vmax	LIN3
Amp. demand L2	8540	2	12036	R	A	0	Imax	LIN3
Amp. demand L3	8541	2	12037	R	A	0	Imax	LIN3
Block kW demand (import)	8542	2	12038	R	kW	0	Pmax	LIN3
Block kvar demand (total)	8543	2	12039	R	kvar	0	Pmax	LIN3
Block kVA demand	8544	2	12040	R	kVA	0	Pmax	LIN3
Sliding window kW demand (import)	8545	2	12041	R	kW	0	Pmax	LIN3
Sliding window kvar demand (total)	8546	2	12042	R	kvar	0	Pmax	LIN3
Sliding window kVA demand	8547	2	12043	R	kVA	0	Pmax	LIN3
Thermal kW demand (import)	8548	2	12044	R	kW	0	Pmax	LIN3
Thermal kvar demand (total)	8549	2	12045	R	kvar	0	Pmax	LIN3
Thermal kVA demand	8550	2	12046	R	kVA	0	Pmax	LIN3
Programmable Min/Max minimum registers (M)								
Register #1	8576	2	12288	R	Â	Â	Â	Â
Register #2	8577	2	12289	R	Â	Â	Â	Â
Register #3	8578	2	12290	R	Â	Â	Â	Â
Register #4	8579	2	12291	R	Â	Â	Â	Â
Register #5	8580	2	12292	R	Â	Â	Â	Â
Register #6	8581	2	12293	R	Â	Â	Â	Â
Register #7	8582	2	12294	R	Â	Â	Â	Â
Register #8	8583	2	12295	R	Â	Â	Â	Â

Parameter	Add-ress	Size, byte	Data ID	Direc-tion	Unit	Range/ Scale À		Con-vers.
						Low	High	
Register #9	8584	2	12296	R	Â	Â	Â	Â
Register #10	8585	2	12297	R	Â	Â	Â	Â
Register #11	8586	2	12298	R	Â	Â	Â	Â
Register #12	8587	2	12299	R	Â	Â	Â	Â
Register #13	8588	2	12300	R	Â	Â	Â	Â
Register #14	8589	2	12301	R	Â	Â	Â	Â
Register #15	8580	2	12302	R	Â	Â	Â	Â
Register #16	8590	2	12303	R	Â	Â	Â	Â
Maximum real-time values per phase (M)								
Voltage L1/L12	8736	2	13312	R	V	0	Vmax	LIN3
Voltage L2/L23	8737	2	13313	R	V	0	Vmax	LIN3
Voltage L3/L31	8738	2	13314	R	V	0	Vmax	LIN3
Current L1	8739	2	13315	R	A	0	Imax	LIN3
Current L2	8740	2	13316	R	A	0	Imax	LIN3
Current L3	8741	2	13317	R	A	0	Imax	LIN3
kW L1	8742	2	13318	R	kW	-Pmax	Pmax	LIN3
kW L2	8743	2	13319	R	kW	-Pmax	Pmax	LIN3
kW L3	8744	2	13320	R	kW	-Pmax	Pmax	LIN3
kvar L1	8745	2	13321	R	kvar	-Pmax	Pmax	LIN3
kvar L2	8746	2	13322	R	kvar	-Pmax	Pmax	LIN3
kvar L3	8747	2	13323	R	kvar	-Pmax	Pmax	LIN3
kVA L1	8748	2	13324	R	kVA	0	Pmax	LIN3
kVA L2	8749	2	13325	R	kVA	0	Pmax	LIN3
kVA L3	8750	2	13326	R	kVA	0	Pmax	LIN3
Power factor L1 Á	8751	2	13327	R		0	1.00	LIN3
Power factor L2 Á	8752	2	13328	R		0	1.00	LIN3
Power factor L3 Á	8753	2	13329	R		0	1.00	LIN3
Voltage THD L1/L12	8754	2	13330	R	%	0	100.0	LIN3
Voltage THD L2/L23	8755	2	13331	R	%	0	100.0	LIN3
Voltage THD L3	8756	2	13332	R	%	0	100.0	LIN3
Current THD L1	8757	2	13333	R	%	0	100.0	LIN3
Current THD L2	8758	2	13334	R	%	0	100.0	LIN3
Current THD L3	8759	2	13335	R	%	0	100.0	LIN3
K-Factor L1	8760	2	13336	R		1.0	999.9	LIN3
K-Factor L2	8761	2	13337	R		1.0	999.9	LIN3
K-Factor L3	8762	2	13338	R		1.0	999.9	LIN3
Maximum real-time total values (M)								
Total kW	8776	2	13568	R	kW	-Pmax	Pmax	LIN3
Total kvar	8777	2	13569	R	kvar	-Pmax	Pmax	LIN3
Total kVA	8778	2	13570	R	kVA	0	Pmax	LIN3
Total PF Á	8779	2	13571	R		0	1.00	LIN3
Total PF Lag	8780	2	13572	R		0	1.00	LIN3
Total PF Lead	8781	2	13573	R		0	1.00	LIN3
Maximum real-time auxiliary values (M)								
Auxiliary current	8816	2	13824	R	mA/A	0	Iaux max	LIN3

Parameter	Address	Size, byte	Data ID	Direction	Unit	Range/ Scale À		Convers.
						Low	High	
Neutral current	8817	2	13825	R	A	0	Imax	LIN3
Frequency **Ä**	8818	2	13826	R	Hz	0	100.0	LIN3
Voltage unbalance	8819	2	13827	R	%	0	300	LIN3
Current unbalance	8820	2	13828	R	%	0	300	LIN3
Maximum demands (M)								
Volt demand L1/L12	8856	2	14080	R	V	0	Vmax	LIN3
Volt demand L2/L23	8857	2	14081	R	V	0	Vmax	LIN3
Volt demand L3/L31	8858	2	14082	R	V	0	Vmax	LIN3
Amp. demand L1	8859	2	14083	R	A	0	Imax	LIN3
Amp. demand L2	8860	2	14084	R	A	0	Imax	LIN3
Amp. demand L3	8861	2	14085	R	A	0	Imax	LIN3
Block kW demand (import)	8862	2	14086	R	kW	0	Pmax	LIN3
Block kvar demand (total)	8863	2	14087	R	kvar	0	Pmax	LIN3
Block kVA demand	8864	2	14088	R	kVA	0	Pmax	LIN3
Sliding window kW demand (import)	8865	2	14089	R	kW	0	Pmax	LIN3
Sliding window kvar demand (total)	8866	2	14090	R	kvar	0	Pmax	LIN3
Sliding window kVA demand	8867	2	14091	R	kVA	0	Pmax	LIN3
Thermal kW demand (import)	8868	2	14092	R	kW	0	Pmax	LIN3
Thermal kvar demand (total)	8869	2	14093	R	kvar	0	Pmax	LIN3
Thermal kVA demand	8870	2	14094	R	kVA	0	Pmax	LIN3
Programmable Min/Max maximum registers (M)								
Register #1	8896	2	14336	R	**Â**	**Â**	**Â**	**Â**
Register #2	8897	2	14337	R	**Â**	**Â**	**Â**	**Â**
Register #3	8898	2	14338	R	**Â**	**Â**	**Â**	**Â**
Register #4	8899	2	14339	R	**Â**	**Â**	**Â**	**Â**
Register #5	8900	2	14340	R	**Â**	**Â**	**Â**	**Â**
Register #6	8901	2	14341	R	**Â**	**Â**	**Â**	**Â**
Register #7	8902	2	14342	R	**Â**	**Â**	**Â**	**Â**
Register #8	8903	2	14343	R	**Â**	**Â**	**Â**	**Â**
Register #9	8904	2	14344	R	**Â**	**Â**	**Â**	**Â**
Register #10	8905	2	14345	R	**Â**	**Â**	**Â**	**Â**
Register #11	8906	2	14346	R	**Â**	**Â**	**Â**	**Â**
Register #12	8907	2	14347	R	**Â**	**Â**	**Â**	**Â**
Register #13	8908	2	14348	R	**Â**	**Â**	**Â**	**Â**
Register #14	8909	2	14349	R	**Â**	**Â**	**Â**	**Â**
Register #15	8910	2	14350	R	**Â**	**Â**	**Â**	**Â**
Register #16	8911	2	14351	R	**Â**	**Â**	**Â**	**Â**

Parameter	Address	Size, byte	Data ID	Direction	Unit	Range/ Scale À		Convers.
						Low	High	
TOU system parameters								
Active tariff	9056	2	15360	R		0	15	NONE
Active profile	9057	2	15361	R		0	15	NONE
TOU energy register #1								
Tariff #1 register	9096 9097	4	15616	R	Ã	0	10^9-1	NONE
Tariff #2 register	9098 9099	4	15617	R	Ã	0	10^9-1	NONE
Tariff #3 register	9100 9101	4	15618	R	Ã	0	10^9-1	NONE
...	...		...					
Tariff #16 register	9126 9127	4	15631	R	Ã	0	10^9-1	NONE
TOU energy register #2								
Tariff #1 register	9136 9137	4	15872	R	Ã	0	10^9-1	NONE
Tariff #2 register	9138 9139	4	15873	R	Ã	0	10^9-1	NONE
Tariff #3 register	9140 9141	4	15874	R	Ã	0	10^9-1	NONE
...	...		...					
Tariff #16 register	9166 9167	4	15887	R	Ã	0	10^9-1	NONE
TOU energy register #3								
Tariff #1 register	9176 9177	4	16128	R	Ã	0	10^9-1	NONE
Tariff #2 register	9178 9179	4	16129	R	Ã	0	10^9-1	NONE
Tariff #3 register	9180 9181	4	16130	R	Ã	0	10^9-1	NONE
...	...		...					
Tariff #16 register	9206 9207	4	16143	R	Ã	0	10^9-1	NONE
TOU energy register #4								
Tariff #1 register	9216 9217	4	16384	R	Ã	0	10^9-1	NONE
Tariff #2 register	9218 9219	4	16385	R	Ã	0	10^9-1	NONE
Tariff #3 register	9220 9221	4	16386	R	Ã	0	10^9-1	NONE
...	...		...					
Tariff #16 register	9246 9247	4	16399	R	Ã	0	10^9-1	NONE

Parameter	Add-ress	Size, byte	Data ID	Direc-tion	Unit	Range/ Scale À		Con-vers.
						Low	High	
TOU energy register #5								
Tariff #1 register	9256 9257	4	16640	R	**Ã**	0	10^9-1	NONE
Tariff #2 register	9258 9259	4	16641	R	**Ã**	0	10^9-1	NONE
Tariff #3 register	9260 9261	4	16642	R	**Ã**	0	10^9-1	NONE
...	...		...					
Tariff #16 register	9286 9287	4	16655	R	**Ã**	0	10^9-1	NONE
TOU energy register #6								
Tariff #1 register	9296 9297	4	16896	R	**Ã**	0	10^9-1	NONE
Tariff #2 register	9298 9299	4	16897	R	**Ã**	0	10^9-1	NONE
Tariff #3 register	9300 9301	4	16898	R	**Ã**	0	10^9-1	NONE
...	...		...					
Tariff #16 register	9326 9327	4	16911	R	**Ã**	0	10^9-1	NONE
TOU energy register #7								
Tariff #1 register	9336 9337	4	17152	R	**Ã**	0	10^9-1	NONE
Tariff #2 register	9338 9339	4	17153	R	**Ã**	0	10^9-1	NONE
Tariff #3 register	9340 9341	4	17154	R	**Ã**	0	10^9-1	NONE
...	...		...					
Tariff #16 register	9366 9367	4	17167	R	**Ã**	0	10^9-1	NONE
TOU energy register #8								
Tariff #1 register	9376 9377	4	17408	R	**Ã**	0	10^9-1	NONE
Tariff #2 register	9378 9379	4	17409	R	**Ã**	0	10^9-1	NONE
Tariff #3 register	9380 9381	4	17410	R	**Ã**	0	10^9-1	NONE
...	...		...					
Tariff #16 register	9406 9407	4	17423	R	**Ã**	0	10^9-1	NONE
TOU minimum kW demands (M)								
Tariff #1 register	9416	2	17644	R	kW	0	Pmax	LIN3
Tariff #2 register	9417	2	17645	R	kW	0	Pmax	LIN3
Tariff #3 register	9418	2	17646	R	kW	0	Pmax	LIN3
...	...		...					

Parameter	Address	Size, byte	Data ID	Direction	Unit	Range/ Scale À		Convers.
						Low	High	
Tariff #16 register	9431	2	17659	R	kW	0	Pmax	LIN3
TOU minimum kvar demands (M)								
Tariff #1 register	9456	2	17920	R	kvar	0	Pmax	LIN3
Tariff #2 register	9457	2	17921	R	kvar	0	Pmax	LIN3
Tariff #3 register	9458	2	17922	R	kvar	0	Pmax	LIN3
...	...		...					
Tariff #16 register	9471	2	17935	R	kvar	0	Pmax	LIN3
TOU minimum kVA demands (M)								
Tariff #1 register	9496	2	18176	R	kVA	0	Pmax	LIN3
Tariff #2 register	9497	2	18177	R	kVA	0	Pmax	LIN3
Tariff #3 register	9498	2	18178	R	kVA	0	Pmax	LIN3
...	...		...					
Tariff #16 register	9511	2	18191	R	kVA	0	Pmax	LIN3
TOU maximum kW demands (M)								
Tariff #1 register	9536	2	18432	R	kW	0	Pmax	LIN3
Tariff #2 register	9537	2	18433	R	kW	0	Pmax	LIN3
Tariff #3 register	9538	2	18434	R	kW	0	Pmax	LIN3
...	...		...					
Tariff #16 register	9551	2	18447	R	kW	0	Pmax	LIN3
TOU maximum kvar demands (M)								
Tariff #1 register	9576	2	18688	R	kvar	0	Pmax	LIN3
Tariff #2 register	9577	2	18689	R	kvar	0	Pmax	LIN3
Tariff #3 register	9578	2	18690	R	kvar	0	Pmax	LIN3
...	...		...					
Tariff #16 register	9591	2	18703	R	kvar	0	Pmax	LIN3
TOU maximum kVA demands (M)								
Tariff #1 register	9616	2	18944	R	kVA	0	Pmax	LIN3
Tariff #2 register	9617	2	18945	R	kVA	0	Pmax	LIN3
Tariff #3 register	9618	2	18946	R	kVA	0	Pmax	LIN3
...	...		...					
Tariff #16 register	9631	2	18959	R	kVA	0	Pmax	LIN3

À For the parameter limits, see note **À** to Table 5-1.

Á Absolute min/max value (lag or lead).

Â The programmable Min/Max register attributes depend on the parameter for which the register is allocated. Parameters which can be directed to programmable Min/Max log are signed by a **(P)** mark.

Ã The TOU energy register unit will depend on the input parameter for which the register is allocated. See also note **Å**.

Ä The actual frequency range is 45.0 - 65.0 Hz.

Å The exported energy registers are read as unsigned long integers. The net energy registers are read as signed long integers

(A) These parameters can be assigned to analog output.

(M) These parameters are logged to the Min/Max log.

(P) These parameters can be assigned to programmable Min/Max log.

5.8 Multiplexed Analog Output Setup

Table 5-20 Analog Output Allocation Registers

Channel	Registers (see Table 5-21)
Channel #1	3148-3150
Channel #2	3151-3153
Channel #3	3154-3156
Channel #4	3157-3159
Channel #5	3160-3162
Channel #6	3163-3165
Channel #7	3166-3168
Channel #8	3169-3171
Channel #9	3172-3174
Channel #10	3175-3177
Channel #11	3178-3180
Channel #12	3181-3183
Channel #13	3184-3186
Channel #14	3187-3189
Channel #15	3190-3192
Channel #16	3193-3195

Table 5-21 Analog Channel Allocation Registers

Parameter	Address	Size, byte	Direction	Range/scale
Output parameter ID	+0	2	R/W	see Table 5-19
Zero scale (0-4 mA)	+1	2	R/W	see Table 5-19
Full scale (20 mA)	+2	2	R/W	see Table 5-19

1. The full scale value may not be less than the zero scale.
2. For signed (bi-directional) power factor, the conversion scales are permanently set in the instrument to the range of -0.00 to 0.00 and may not be changed. Through communications, these are transmitted as -1.00/1.00. In the write request, fields 2 and 3 for signed power factor will be ignored. No error will occur.

5.9 Analog Expander Channels Setup

Table 5-22 Analog Expander Allocation Registers

Channel	Registers (see Table 5-23)
Channel #1	3196-3198
Channel #2	3199-3201
Channel #3	3202-3204
Channel #4	3205-3207
Channel #5	3208-3210
Channel #6	3211-3213

Channel #7	3214-3216
Channel #8	3217-3219
Channel #9	3220-3222
Channel #10	3223-3225
Channel #11	3226-3228
Channel #12	3229-3231
Channel #13	3232-3234
Channel #14	3235-3237

Table 5-23 Analog Channel Allocation Registers

Parameter	Offset	Size, byte	Direction	Range/scale
Output parameter ID	+0	2	R/W	see Table 5-19
Zero scale (0-4 mA)	+1	2	R/W	see Table 5-19
Full scale (20 mA)	+2	2	R/W	see Table 5-19

1. The full scale value may not be less than the zero scale.
2. For signed (bi-directional) power factor, the conversion scales are permanently set in the instrument to the range of -0.00 to 0.00 and may not be changed. Through communications, these are transmitted as -1.00/1.00. In the write request, fields 2 and 3 for signed power factor will be ignored. No error will occur.

5.10 Discrete Inputs Allocation

Table 5-24 Discrete Inputs Allocation Registers

Parameter	Address	Size, byte	Direction	Range
Status inputs allocation	3292	2	R/W	see Table 5-25
Pulse inputs allocation	3293	2	R/W	see Table 5-25
Analog output multiplexer allocation	3294	2	R/W	see Table 5-25
External synchronization pulse input allocation	3295	2	R/W	see Table 5-25

Table 5-25 Discrete Inputs Allocation Mask

Bit	Description
0	Discrete input # 1 allocation status
1	Discrete input # 2 allocation status
2	Discrete input # 3 allocation status
3	Discrete input # 4 allocation status
4	Discrete input # 5 allocation status
5	Discrete input # 6 allocation status
6	Discrete input # 7 allocation status
7	Discrete input # 8 allocation status

Bit meaning: 0 = input is not allocated, 1 = input is allocated to the group

NOTES

1. Before allocating inputs for the selector of the internal multiplexed analog output, they should be allocated as status inputs. From one to four contiguous discrete inputs beginning from input #1 can be used for the analog multiplexer selector.
2. Before allocating input for the external synchronization pulse, it should be allocated as pulse input.
3. In the event that the discrete input has just been allocated for any source, you should disable it before trying to reallocate it.

5.11 Timers Setup

Table 5-26 Timers Setup Registers

Parameter	Address	Size, byte	Direction	Range
Timer #1 time interval	3300	2	R/W	1-9999 sec, 0 = timer disabled
Timer #2 time interval	3301	2	R/W	1-9999 sec, 0 = timer disabled
Timer #3 time interval	3302	2	R/W	1-9999 sec, 0 = timer disabled
Timer #4 time interval	3303	2	R/W	1-9999 sec, 0 = timer disabled

5.12 Alarm/Event Setpoints

Table 5-27 Alarm/Event Setpoints Registers

Setpoint	Setup registers (see Table 5-28)
Setpoint #1	352-395
Setpoint #2	396-439
Setpoint #3	440-483
Setpoint #4	484-527
Setpoint #5	528-571
Setpoint #6	572-615
Setpoint #7	616-659
Setpoint #8	660-703
Setpoint #9	704-747
Setpoint #10	748-791
Setpoint #11	792-835
Setpoint #12	836-879
Setpoint #13	880-923
Setpoint #14	924-967
Setpoint #15	968-1011
Setpoint #16	1012-1055

Table 5-28 Setpoint Setup Registers

Parameter		Offset	Size, byte	Range
Condition #1	Conjunction operation	+0	2	0 = OR, 1 = AND
	Trigger parameter ID	+1	2	see Table 5-29
	Operate condition	+2	2	see Table 5-30
	Reserved	+3	2	write as zero
	Operate limit	+4	4	see Table 5-29
		+5		
	Release limit	+6	4	see Table 5-29
		+7		
Condition #2	Conjunction operation	+8	2	0 = OR, 1 = AND
	Trigger parameter ID	+9	2	see Table 5-29
	Operate condition	+10	2	see Table 5-30
	Reserved	+11	2	write as zero
	Operate limit	+12	4	see Table 5-29
		+13		
	Release limit	+14	4	see Table 5-29
		+15		
Condition #3	Conjunction operation	+16	2	0 = OR, 1 = AND
	Trigger parameter ID	+17	2	see Table 5-29
	Operate condition	+18	2	see Table 5-30
	Reserved	+19	2	write as zero
	Operate limit	+20	4	see Table 5-29
		+21		
	Release limit	+22	4	see Table 5-29
		+23		
Condition #4	Conjunction operation	+24	2	0 = OR, 1 = AND
	Trigger parameter ID	+25	2	see Table 5-29
	Operate condition	+26	2	see Table 5-30
	Reserved	+27	2	write as zero
	Operate limit	+28	4	see Table 5-29
		+29		
	Release limit	+30	4	see Table 5-29
		+31		
Action #1	Action type	+32	2	see Table 5-31
	Action target	+33	2	see Table 5-31
Action #2	Action type	+34	2	see Table 5-31
	Action target	+35	2	see Table 5-31
Action #3	Action type	+36	2	see Table 5-31
	Action target	+37	2	see Table 5-31
Action #4	Action type	+38	2	see Table 5-31
	Action target	+39	2	see Table 5-31
Delays	Time unit	+40	2	0 = 1s, 1 = 0.1s
	Operate delay	+41	2	0-9999
	Release delay	+42	2	0-9999
	Reserved	+43	2	write as zero

1. The setpoint is disabled when the first trigger parameter (at offset +1) is set to NONE. To disable the setpoint, write zero into this register.
2. When writing the setpoint registers (except the event when the setpoint is to be disabled), it is recommended to write all the registers using a single request, or disable the setpoint before writing into separate registers. Each value is checked for compatibility with the other setpoint parameters, so if the new value doesn't conform to the rest of parameters, the request will be rejected.
3. Operate and release limits for the trigger parameters and their conversion scales are indicated in Table 5-29. The values of a 2-byte length must be read and written in one register, and values of a 4-byte length must be read and written in two contiguous registers.
4. Limits indicated in Table 5-29 by a N/A mark are read as zeros, and are not checked when written. Write them as zeros.

Table 5-29 Alarm/Event Setpoint Trigger Parameters

Trigger parameter	Data ID	Size, byte	Unit	Limits/Scale Ã		Con-version	Conditions (Table 5-31)
				Low	High		
None							
None		2		N/A	N/A	NONE	N/A
Special inputs À							
Voltage disturbance	256	2	%	0 Æ	100 Æ	NONE	GE/LE/EQ/NE
Phase rotation	257	2		0 Ç	2 Ç	NONE	GE/LE/EQ/NE
User event flags/manual control							
Event flag #1	768	2		N/A	N/A	NONE	ON/OFF
Event flag #2	769	2		N/A	N/A	NONE	ON/OFF
Event flag #3	770	2		N/A	N/A	NONE	ON/OFF
Event flag #4	771	2		N/A	N/A	NONE	ON/OFF
Event flag #5	772	2		N/A	N/A	NONE	ON/OFF
Event flag #6	773	2		N/A	N/A	NONE	ON/OFF
Event flag #7	774	2		N/A	N/A	NONE	ON/OFF
Event flag #8	775	2		N/A	N/A	NONE	ON/OFF
Internal events							
kWh import pulse	1024	2		N/A	N/A	NONE	ON/OFF
kWh export pulse	1025	2		N/A	N/A	NONE	ON/OFF
kWh total pulse	1026	2		N/A	N/A	NONE	ON/OFF
kvarh import pulse	1027	2		N/A	N/A	NONE	ON/OFF
kvarh export pulse	1028	2		N/A	N/A	NONE	ON/OFF
kvarh total pulse	1029	2		N/A	N/A	NONE	ON/OFF
kVAh total pulse	1030	2		N/A	N/A	NONE	ON/OFF
Start new demand interval	1031	2		N/A	N/A	NONE	ON/OFF
Start new tariff	1032	2		N/A	N/A	NONE	ON/OFF
Timers							
Timer #1	1280	2		N/A	N/A	NONE	ON/OFF

Trigger parameter	Data ID	Size, byte	Unit	Limits/Scale Ã		Con-version	Conditions (Table 5-31)
				Low	High		
Timer #2	1281	2		N/A	N/A	NONE	ON/OFF
Timer #3	1282	2		N/A	N/A	NONE	ON/OFF
Timer #4	1283	2		N/A	N/A	NONE	ON/OFF
Status inputs							
Status input #1	1536	2		N/A	N/A	NONE	ON/OFF
Status input #2	1537	2		N/A	N/A	NONE	ON/OFF
Status input #3	1538	2		N/A	N/A	NONE	ON/OFF
Status input #4	1539	2		N/A	N/A	NONE	ON/OFF
Status input #5	1540	2		N/A	N/A	NONE	ON/OFF
Status input #6	1541	2		N/A	N/A	NONE	ON/OFF
Status input #7	1542	2		N/A	N/A	NONE	ON/OFF
Status input #8	1543	2		N/A	N/A	NONE	ON/OFF
Pulse inputs							
Pulse input #1	1792	2		N/A	N/A	NONE	ON/OFF
Pulse input #2	1793	2		N/A	N/A	NONE	ON/OFF
Pulse input #3	1794	2		N/A	N/A	NONE	ON/OFF
Pulse input #4	1795	2		N/A	N/A	NONE	ON/OFF
Pulse input #5	1796	2		N/A	N/A	NONE	ON/OFF
Pulse input #6	1797	2		N/A	N/A	NONE	ON/OFF
Pulse input #7	1798	2		N/A	N/A	NONE	ON/OFF
Pulse input #8	1799	2		N/A	N/A	NONE	ON/OFF
Relay status							
Relay #1 status	2048	2		N/A	N/A	NONE	ON/OFF
Relay #2 status	2049	2		N/A	N/A	NONE	ON/OFF
Relay #3 status	2050	2		N/A	N/A	NONE	ON/OFF
Relay #4 status	2051	2		N/A	N/A	NONE	ON/OFF
Pulse counters							
Pulse counter #1	2560	4		0	10^9-1	NONE	GE/LE/EQ/NE
Pulse counter #2	2561	4		0	10^9-1	NONE	GE/LE/EQ/NE
Pulse counter #3	2562	4		0	10^9-1	NONE	GE/LE/EQ/NE
Pulse counter #4	2563	4		0	10^9-1	NONE	GE/LE/EQ/NE
Pulse counter #5	2564	4		0	10^9-1	NONE	GE/LE/EQ/NE
Pulse counter #6	2565	4		0	10^9-1	NONE	GE/LE/EQ/NE
Pulse counter #7	2566	4		0	10^9-1	NONE	GE/LE/EQ/NE
Pulse counter #8	2567	4		0	10^9-1	NONE	GE/LE/EQ/NE
Time/date À							
Packed date **Á**	2816	4		000101	991231	NONE	GE/LE/EQ/NE
Packed time **Â**	2817	4		000000	235959	NONE	GE/LE/EQ/NE
Day of week	2818	2		1= Sun	7= Sat	NONE	GE/LE/EQ/NE
Year	2819	2		0	99	NONE	GE/LE/EQ/NE
Month	2820	2		1	12	NONE	GE/LE/EQ/NE
Day of month	2821	2		1	31	NONE	GE/LE/EQ/NE
Hour	2822	2		0	23	NONE	GE/LE/EQ/NE
Minute	2823	2		0	59	NONE	GE/LE/EQ/NE
Second	2824	2		0	59	NONE	GE/LE/EQ/NE

Trigger parameter	Data ID	Size, byte	Unit	Limits/Scale Ã		Con-version	Conditions (Table 5-31)
				Low	High		
Real-time values per phase							
Voltage L1/L12	3072	2	V	0	Vmax	LIN3	GE/LE/EQ/NE
Voltage L2/L23	3073	2	V	0	Vmax	LIN3	GE/LE/EQ/NE
Voltage L3/L31	3074	2	V	0	Vmax	LIN3	GE/LE/EQ/NE
Current L1	3075	2	A	0	Imax	LIN3	GE/LE/EQ/NE
Current L2	3076	2	A	0	Imax	LIN3	GE/LE/EQ/NE
Current L3	3077	2	A	0	Imax	LIN3	GE/LE/EQ/NE
kW L1	3078	2	kW	-Pmax	Pmax	LIN3	GE/LE/EQ/NE
kW L2	3079	2	kW	-Pmax	Pmax	LIN3	GE/LE/EQ/NE
kW L3	3080	2	kW	-Pmax	Pmax	LIN3	GE/LE/EQ/NE
kvar L1	3081	2	kvar	-Pmax	Pmax	LIN3	GE/LE/EQ/NE
kvar L2	3082	2	kvar	-Pmax	Pmax	LIN3	GE/LE/EQ/NE
kvar L3	3083	2	kvar	-Pmax	Pmax	LIN3	GE/LE/EQ/NE
kVA L1	3084	2	kVA	0	Pmax	LIN3	GE/LE/EQ/NE
kVA L2	3085	2	kVA	0	Pmax	LIN3	GE/LE/EQ/NE
kVA L3	3086	2	kVA	0	Pmax	LIN3	GE/LE/EQ/NE
Power factor L1	3087	2		-1.00	1.00	LIN3	GE/LE/EQ/NE
Power factor L2	3088	2		-1.00	1.00	LIN3	GE/LE/EQ/NE
Power factor L3	3089	2		-1.00	1.00	LIN3	GE/LE/EQ/NE
Voltage THD L1/L12	3090	2	%	0	100.0	LIN3	GE/LE/EQ/NE
Voltage THD L2/L23	3091	2	%	0	100.0	LIN3	GE/LE/EQ/NE
Voltage THD L3	3092	2	%	0	100.0	LIN3	GE/LE/EQ/NE
Current THD L1	3093	2	%	0	100.0	LIN3	GE/LE/EQ/NE
Current THD L2	3094	2	%	0	100.0	LIN3	GE/LE/EQ/NE
Current THD L3	3095	2	%	0	100.0	LIN3	GE/LE/EQ/NE
K-Factor L1	3096	2		1.0	999.9	LIN3	GE/LE/EQ/NE
K-Factor L2	3097	2		1.0	999.9	LIN3	GE/LE/EQ/NE
K-Factor L3	3098	2		1.0	999.9	LIN3	GE/LE/EQ/NE
Real-time low values on any phase							
Low voltage	3328	2		0	Vmax	LIN3	GE/LE/EQ/NE
Low current	3329	2		0	Imax	LIN3	GE/LE/EQ/NE
Low kW	3330	2	kW	-Pmax	Pmax	LIN3	GE/LE/EQ/NE
Low kvar	3331	2	kvar	-Pmax	Pmax	LIN3	GE/LE/EQ/NE
Low kVA	3332	2	kVA	0	Pmax	LIN3	GE/LE/EQ/NE
Low PF Lag	3333	2		0	1.00	LIN3	GE/LE/EQ/NE
Low PF Lead	3334	2		0	1.00	LIN3	GE/LE/EQ/NE
Low voltage THD	3335	2	%	0	100.0	LIN3	GE/LE/EQ/NE
Low current THD	3336	2	%	0	100.0	LIN3	GE/LE/EQ/NE
Low K-Factor	3337	2		1.0	999.9	LIN3	GE/LE/EQ/NE
Real-time high values on any phase							
High voltage	3584	2	V	0	Vmax	LIN3	GE/LE/EQ/NE
High current	3585	2	A	0	Imax	LIN3	GE/LE/EQ/NE
High kW	3586	2	kW	-Pmax	Pmax	LIN3	GE/LE/EQ/NE
High kvar	3587	2	kvar	-Pmax	Pmax	LIN3	GE/LE/EQ/NE
High kVA	3588	2	kVA	0	Pmax	LIN3	GE/LE/EQ/NE
High PF Lag	3589	2		0	1.00	LIN3	GE/LE/EQ/NE

Trigger parameter	Data ID	Size, byte	Unit	Limits/Scale Ã		Con-version	Conditions (Table 5-31)
				Low	High		
High PF Lead	3590	2		0	1.00	LIN3	GE/LE/EQ/NE
High voltage THD	3591	2	%	0	100.0	LIN3	GE/LE/EQ/NE
High current THD	3592	2	%	0	100.0	LIN3	GE/LE/EQ/NE
High K-Factor	3593	2		1.0	999.9	LIN3	GE/LE/EQ/NE
Real-time total values							
Total kW	3840	2	kW	-Pmax	Pmax	LIN3	GE/LE/EQ/NE
Total kvar	3841	2	kvar	-Pmax	Pmax	LIN3	GE/LE/EQ/NE
Total kVA	3842	2	kVA	0	Pmax	LIN3	GE/LE/EQ/NE
Total PF	3843	2		-1.00	1.00	LIN3	GE/LE/EQ/NE
Total PF Lag	3844	2		0	1.00	LIN3	GE/LE/EQ/NE
Total PF Lead	3845	2		0	1.00	LIN3	GE/LE/EQ/NE
Real-time auxiliary values							
Auxiliary current	4096	2	mA/ A	0	Iaux max	LIN3	GE/LE/EQ/NE
Neutral current	4097	2	A	0	Imax	LIN3	GE/LE/EQ/NE
Frequency **Å**	4098	2	Hz	0	100.0	LIN3	GE/LE/EQ/NE
Voltage unbalance	4098	2	%	0	300	LIN3	GE/LE/EQ/NE
Current unbalance	4099	2	%	0	300	LIN3	GE/LE/EQ/NE
Average values per phase							
Voltage L1/L12	4352	2	V	0	Vmax	LIN3	GE/LE/EQ/NE
Voltage L2/L23	4353	2	V	0	Vmax	LIN3	GE/LE/EQ/NE
Voltage L3/L31	4354	2	V	0	Vmax	LIN3	GE/LE/EQ/NE
Current L1	4355	2	A	0	Imax	LIN3	GE/LE/EQ/NE
Current L2	4356	2	A	0	Imax	LIN3	GE/LE/EQ/NE
Current L3	4357	2	A	0	Imax	LIN3	GE/LE/EQ/NE
kW L1	4358	2	kW	-Pmax	Pmax	LIN3	GE/LE/EQ/NE
kW L2	4359	2	kW	-Pmax	Pmax	LIN3	GE/LE/EQ/NE
kW L3	4360	2	kW	-Pmax	Pmax	LIN3	GE/LE/EQ/NE
kvar L1	4361	2	kvar	-Pmax	Pmax	LIN3	GE/LE/EQ/NE
kvar L2	4362	2	kvar	-Pmax	Pmax	LIN3	GE/LE/EQ/NE
kvar L3	4363	2	kvar	-Pmax	Pmax	LIN3	GE/LE/EQ/NE
kVA L1	4364	2	kVA	0	Pmax	LIN3	GE/LE/EQ/NE
kVA L2	4365	2	kVA	0	Pmax	LIN3	GE/LE/EQ/NE
kVA L3	4366	2	kVA	0	Pmax	LIN3	GE/LE/EQ/NE
Power factor L1	4367	2		-1.00	1.00	LIN3	GE/LE/EQ/NE
Power factor L2	4368	2		-1.00	1.00	LIN3	GE/LE/EQ/NE
Power factor L3	4369	2		-1.00	1.00	LIN3	GE/LE/EQ/NE
Voltage THD L1/L12	4370	2	%	0	100.0	LIN3	GE/LE/EQ/NE
Voltage THD L2/L23	4371	2	%	0	100.0	LIN3	GE/LE/EQ/NE
Voltage THD L3	4372	2	%	0	100.0	LIN3	GE/LE/EQ/NE
Current THD L1	4373	2	%	0	100.0	LIN3	GE/LE/EQ/NE
Current THD L2	4374	2	%	0	100.0	LIN3	GE/LE/EQ/NE
Current THD L3	4375	2	%	0	100.0	LIN3	GE/LE/EQ/NE
K-Factor L1	4376	2		1.0	999.9	LIN3	GE/LE/EQ/NE
K-Factor L2	4377	2		1.0	999.9	LIN3	GE/LE/EQ/NE

Trigger parameter	Data ID	Size, byte	Unit	Limits/Scale Ã		Con-version	Conditions (Table 5-31)
				Low	High		
K-Factor L3	4378	2		1.0	999.9	LIN3	GE/LE/EQ/NE
Average low values on any phase							
Low voltage	4608	2	V	0	Vmax	LIN3	GE/LE/EQ/NE
Low current	4609	2	A	0	Imax	LIN3	GE/LE/EQ/NE
Low kW	4610	2	kW	-Pmax	Pmax	LIN3	GE/LE/EQ/NE
Low kvar	4611	2	kvar	-Pmax	Pmax	LIN3	GE/LE/EQ/NE
Low kVA	4612	2	kVA	0	Pmax	LIN3	GE/LE/EQ/NE
Low PF Lag	4613	2		0	1.00	LIN3	GE/LE/EQ/NE
Low PF Lead	4614	2		0	1.00	LIN3	GE/LE/EQ/NE
Low voltage THD	4615	2	%	0	100.0	LIN3	GE/LE/EQ/NE
Low current THD	4616	2	%	0	100.0	LIN3	GE/LE/EQ/NE
Low K-Factor	4617	2		1.0	999.9	LIN3	GE/LE/EQ/NE
Average high values on any phase							
High voltage	4864	2	V	0	Vmax	LIN3	GE/LE/EQ/NE
High current	4865	2	A	0	Imax	LIN3	GE/LE/EQ/NE
High kW	4866	2	kW	-Pmax	Pmax	LIN3	GE/LE/EQ/NE
High kvar	4867	2	kvar	-Pmax	Pmax	LIN3	GE/LE/EQ/NE
High kVA	4868	2	kVA	0	Pmax	LIN3	GE/LE/EQ/NE
High PF Lag	4869	2		0	1.00	LIN3	GE/LE/EQ/NE
High PF Lead	4870	2		0	1.00	LIN3	GE/LE/EQ/NE
High voltage THD	4871	2	%	0	100.0	LIN3	GE/LE/EQ/NE
High current THD	4872	2	%	0	100.0	LIN3	GE/LE/EQ/NE
High K-Factor	4873	2		1.0	999.9	LIN3	GE/LE/EQ/NE
Average total values							
Total kW	5120	2	kW	-Pmax	Pmax	LIN3	GE/LE/EQ/NE
Total kvar	5121	2	kvar	-Pmax	Pmax	LIN3	GE/LE/EQ/NE
Total kVA	5122	2	kVA	0	Pmax	LIN3	GE/LE/EQ/NE
Total PF	5123	2		-1.00	1.00	LIN3	GE/LE/EQ/NE
Total PF Lag	5124	2		0	1.00	LIN3	GE/LE/EQ/NE
Total PF Lead	5125	2		0	1.00	LIN3	GE/LE/EQ/NE
Average auxiliary values							
Auxiliary current	5376	2	mA/ A	0	Iaux max	LIN3	GE/LE/EQ/NE
Neutral current	5377	2	A	0	Imax	LIN3	GE/LE/EQ/NE
Frequency **Å**	5378	2	Hz	0	100.0	LIN3	GE/LE/EQ/NE
Voltage unbalance	5379	2	%	0	300	LIN3	GE/LE/EQ/NE
Current unbalance	5380	2	%	0	300	LIN3	GE/LE/EQ/NE
Present demands							
Volt demand L1/L12	5632	2	V	0	Vmax	LIN3	GE/LE/EQ/NE
Volt demand L2/L23	5633	2	V	0	Vmax	LIN3	GE/LE/EQ/NE
Volt demand L3/L31	5634	2	V	0	Vmax	LIN3	GE/LE/EQ/NE
Amp. demand L1	5635	2	A	0	Imax	LIN3	GE/LE/EQ/NE
Amp. demand L2	5636	2	A	0	Imax	LIN3	GE/LE/EQ/NE
Amp. demand L3	5637	2	A	0	Imax	LIN3	GE/LE/EQ/NE

Trigger parameter	Data ID	Size, byte	Unit	Limits/Scale Ã		Con-version	Conditions (Table 5-31)
				Low	High		
Block kW demand (import)	5638	2	kW	0	Pmax	LIN3	GE/LE/EQ/NE
Block kvar demand (total)	5639	2	kvar	0	Pmax	LIN3	GE/LE/EQ/NE
Block kVA demand	5640	2	kVA	0	Pmax	LIN3	GE/LE/EQ/NE
Sliding window kW demand (import)	5641	2	kW	0	Pmax	LIN3	GE/LE/EQ/NE
Sliding window kvar demand (total)	5642	2	kvar	0	Pmax	LIN3	GE/LE/EQ/NE
Sliding window kVA demand	5643	2	kVA	0	Pmax	LIN3	GE/LE/EQ/NE
Thermal kW demand (import)	5644	2	kW	0	Pmax	LIN3	GE/LE/EQ/NE
Thermal kvar demand (total)	5645	2	kvar	0	Pmax	LIN3	GE/LE/EQ/NE
Thermal kVA demand	5646	2	kVA	0	Pmax	LIN3	GE/LE/EQ/NE
Accumulated kW demand (import)	5647	2	kW	0	Pmax	LIN3	GE/LE/EQ/NE
Accumulated kvar demand (total)	5648	2	kvar	0	Pmax	LIN3	GE/LE/EQ/NE
Accumulated kVA demand	5649	2	kVA	0	Pmax	LIN3	GE/LE/EQ/NE
Predicted kW demand (import)	5650	2	kW	0	Pmax	LIN3	GE/LE/EQ/NE
Predicted kvar demand (total)	5651	2	kvar	0	Pmax	LIN3	GE/LE/EQ/NE
Predicted kVA demand	5652	2	kVA	0	Pmax	LIN3	GE/LE/EQ/NE
L1/L12 phase voltage harmonics							
Harmonic H01	6400	2	%	100.00	100.00	LIN3	GE/LE/EQ/NE
Harmonic H02	6401	2	%	0	100.00	LIN3	GE/LE/EQ/NE
Harmonic H03	6402	2	%	0	100.00	LIN3	GE/LE/EQ/NE
...	...						
Harmonic H40	6439	2	%	0	100.00	LIN3	GE/LE/EQ/NE
L2/L23 phase voltage harmonics							
Harmonic H01	6656	2	%	100.00	100.00	LIN3	GE/LE/EQ/NE
Harmonic H02	6657	2	%	0	100.00	LIN3	GE/LE/EQ/NE
Harmonic H03	6658	2	%	0	100.00	LIN3	GE/LE/EQ/NE
...	...						
Harmonic H40	6695	2	%	0	100.00	LIN3	GE/LE/EQ/NE
L3 phase voltage harmonics							
Harmonic H01	6912	2	%	100.00	100.00	LIN3	GE/LE/EQ/NE
Harmonic H02	6913	2	%	0	100.00	LIN3	GE/LE/EQ/NE
Harmonic H03	6914	2	%	0	100.00	LIN3	GE/LE/EQ/NE
...	...						

Trigger parameter	Data ID	Size, byte	Unit	Limits/Scale Ã		Con-version	Conditions (Table 5-31)
				Low	High		
Harmonic H40	6951	2	%	0	100.00	LIN3	GE/LE/EQ/NE
L1 phase current harmonics							
Harmonic H01	7168	2	%	100.00	100.00	LIN3	GE/LE/EQ/NE
Harmonic H02	7169	2	%	0	100.00	LIN3	GE/LE/EQ/NE
Harmonic H03	7170	2	%	0	100.00	LIN3	GE/LE/EQ/NE
...	...						
Harmonic H40	7207	2	%	0	100.00	LIN3	GE/LE/EQ/NE
L2 phase current harmonics							
Harmonic H01	7424	2	%	100.00	100.00	LIN3	GE/LE/EQ/NE
Harmonic H02	7425	2	%	0	100.00	LIN3	GE/LE/EQ/NE
Harmonic H03	7426	2	%	0	100.00	LIN3	GE/LE/EQ/NE
...	...						
Harmonic H40	7463	2	%	0	100.00	LIN3	GE/LE/EQ/NE
L3 phase current harmonics							
Harmonic H01	7680	2	%	100.00	100.00	LIN3	GE/LE/EQ/NE
Harmonic H02	7681	2	%	0	100.00	LIN3	GE/LE/EQ/NE
Harmonic H03	7682	2	%	0	100.00	LIN3	GE/LE/EQ/NE
...	...						
Harmonic H40	7719	2	%	0	100.00	LIN3	GE/LE/EQ/NE
L1/L12 phase harmonic voltages (odd harmonics)							
Harmonic H01	7936	2	V	0	Vmax	LIN3	GE/LE/EQ/NE
Harmonic H03	7937	2	V	0	Vmax	LIN3	GE/LE/EQ/NE
Harmonic H05	7939	2	V	0	Vmax	LIN3	GE/LE/EQ/NE
Harmonic H07	7940	2	V	0	Vmax	LIN3	GE/LE/EQ/NE
Harmonic H09	7941	2	V	0	Vmax	LIN3	GE/LE/EQ/NE
Harmonic H11	7942	2	V	0	Vmax	LIN3	GE/LE/EQ/NE
Harmonic H13	7943	2	V	0	Vmax	LIN3	GE/LE/EQ/NE
Harmonic H15	7944	2	V	0	Vmax	LIN3	GE/LE/EQ/NE
Harmonic H17	7945	2	V	0	Vmax	LIN3	GE/LE/EQ/NE
Harmonic H19	7946	2	V	0	Vmax	LIN3	GE/LE/EQ/NE
Harmonic H21	7947	2	V	0	Vmax	LIN3	GE/LE/EQ/NE
Harmonic H23	7948	2	V	0	Vmax	LIN3	GE/LE/EQ/NE
Harmonic H25	7949	2	V	0	Vmax	LIN3	GE/LE/EQ/NE
Harmonic H27	7950	2	V	0	Vmax	LIN3	GE/LE/EQ/NE
Harmonic H29	7951	2	V	0	Vmax	LIN3	GE/LE/EQ/NE
Harmonic H31	7952	2	V	0	Vmax	LIN3	GE/LE/EQ/NE
Harmonic H33	7953	2	V	0	Vmax	LIN3	GE/LE/EQ/NE
Harmonic H35	7954	2	V	0	Vmax	LIN3	GE/LE/EQ/NE
Harmonic H37	7955	2	V	0	Vmax	LIN3	GE/LE/EQ/NE
Harmonic H39	7956	2	V	0	Vmax	LIN3	GE/LE/EQ/NE
L2/L23 phase harmonic voltages (odd harmonics)							
Harmonic H01	8192	2	V	0	Vmax	LIN3	GE/LE/EQ/NE
Harmonic H03	8193	2	V	0	Vmax	LIN3	GE/LE/EQ/NE
Harmonic H05	8194	2	V	0	Vmax	LIN3	GE/LE/EQ/NE
Harmonic H07	8195	2	V	0	Vmax	LIN3	GE/LE/EQ/NE

Trigger parameter	Data ID	Size, byte	Unit	Limits/Scale Ã		Con-version	Conditions (Table 5-31)
				Low	High		
Harmonic H09	8196	2	V	0	Vmax	LIN3	GE/LE/EQ/NE
Harmonic H11	8197	2	V	0	Vmax	LIN3	GE/LE/EQ/NE
Harmonic H13	8198	2	V	0	Vmax	LIN3	GE/LE/EQ/NE
Harmonic H15	8199	2	V	0	Vmax	LIN3	GE/LE/EQ/NE
Harmonic H17	8200	2	V	0	Vmax	LIN3	GE/LE/EQ/NE
Harmonic H19	8201	2	V	0	Vmax	LIN3	GE/LE/EQ/NE
Harmonic H21	8202	2	V	0	Vmax	LIN3	GE/LE/EQ/NE
Harmonic H23	8203	2	V	0	Vmax	LIN3	GE/LE/EQ/NE
Harmonic H25	8204	2	V	0	Vmax	LIN3	GE/LE/EQ/NE
Harmonic H27	8205	2	V	0	Vmax	LIN3	GE/LE/EQ/NE
Harmonic H29	8206	2	V	0	Vmax	LIN3	GE/LE/EQ/NE
Harmonic H31	8207	2	V	0	Vmax	LIN3	GE/LE/EQ/NE
Harmonic H33	8208	2	V	0	Vmax	LIN3	GE/LE/EQ/NE
Harmonic H35	8209	2	V	0	Vmax	LIN3	GE/LE/EQ/NE
Harmonic H37	8210	2	V	0	Vmax	LIN3	GE/LE/EQ/NE
Harmonic H39	8211	2	V	0	Vmax	LIN3	GE/LE/EQ/NE
L3 phase harmonic voltages (odd harmonics)							
Harmonic H01	8448	2	V	0	Vmax	LIN3	GE/LE/EQ/NE
Harmonic H03	8449	2	V	0	Vmax	LIN3	GE/LE/EQ/NE
Harmonic H05	8450	2	V	0	Vmax	LIN3	GE/LE/EQ/NE
Harmonic H07	8451	2	V	0	Vmax	LIN3	GE/LE/EQ/NE
Harmonic H09	8452	2	V	0	Vmax	LIN3	GE/LE/EQ/NE
Harmonic H11	8453	2	V	0	Vmax	LIN3	GE/LE/EQ/NE
Harmonic H13	8454	2	V	0	Vmax	LIN3	GE/LE/EQ/NE
Harmonic H15	8455	2	V	0	Vmax	LIN3	GE/LE/EQ/NE
Harmonic H17	8456	2	V	0	Vmax	LIN3	GE/LE/EQ/NE
Harmonic H19	8457	2	V	0	Vmax	LIN3	GE/LE/EQ/NE
Harmonic H21	8458	2	V	0	Vmax	LIN3	GE/LE/EQ/NE
Harmonic H23	8459	2	V	0	Vmax	LIN3	GE/LE/EQ/NE
Harmonic H25	8460	2	V	0	Vmax	LIN3	GE/LE/EQ/NE
Harmonic H27	8461	2	V	0	Vmax	LIN3	GE/LE/EQ/NE
Harmonic H29	8462	2	V	0	Vmax	LIN3	GE/LE/EQ/NE
Harmonic H31	8463	2	V	0	Vmax	LIN3	GE/LE/EQ/NE
Harmonic H33	8464	2	V	0	Vmax	LIN3	GE/LE/EQ/NE
Harmonic H35	8465	2	V	0	Vmax	LIN3	GE/LE/EQ/NE
Harmonic H37	8466	2	V	0	Vmax	LIN3	GE/LE/EQ/NE
Harmonic H39	8467	2	V	0	Vmax	LIN3	GE/LE/EQ/NE
L1 phase harmonic currents (odd harmonics)							
Harmonic H01	8704	2	A	0	Imax	LIN3	GE/LE/EQ/NE
Harmonic H03	8705	2	A	0	Imax	LIN3	GE/LE/EQ/NE
Harmonic H05	8706	2	A	0	Imax	LIN3	GE/LE/EQ/NE
Harmonic H07	8707	2	A	0	Imax	LIN3	GE/LE/EQ/NE
Harmonic H09	8708	2	A	0	Imax	LIN3	GE/LE/EQ/NE
Harmonic H11	8709	2	A	0	Imax	LIN3	GE/LE/EQ/NE
Harmonic H13	8710	2	A	0	Imax	LIN3	GE/LE/EQ/NE
Harmonic H15	8711	2	A	0	Imax	LIN3	GE/LE/EQ/NE

Trigger parameter	Data ID	Size, byte	Unit	Limits/Scale Ã		Con-version	Conditions (Table 5-31)
				Low	High		
Harmonic H17	8712	2	A	0	Imax	LIN3	GE/LE/EQ/NE
Harmonic H19	8713	2	A	0	Imax	LIN3	GE/LE/EQ/NE
Harmonic H21	8714	2	A	0	Imax	LIN3	GE/LE/EQ/NE
Harmonic H23	8715	2	A	0	Imax	LIN3	GE/LE/EQ/NE
Harmonic H25	8716	2	A	0	Imax	LIN3	GE/LE/EQ/NE
Harmonic H27	8717	2	A	0	Imax	LIN3	GE/LE/EQ/NE
Harmonic H29	8718	2	A	0	Imax	LIN3	GE/LE/EQ/NE
Harmonic H31	8719	2	A	0	Imax	LIN3	GE/LE/EQ/NE
Harmonic H33	8720	2	A	0	Imax	LIN3	GE/LE/EQ/NE
Harmonic H35	8721	2	A	0	Imax	LIN3	GE/LE/EQ/NE
Harmonic H37	8722	2	A	0	Imax	LIN3	GE/LE/EQ/NE
Harmonic H39	8723	2	A	0	Imax	LIN3	GE/LE/EQ/NE
L2 phase harmonic currents (odd harmonics)							
Harmonic H01	8960	2	A	0	Imax	LIN3	GE/LE/EQ/NE
Harmonic H03	8961	2	A	0	Imax	LIN3	GE/LE/EQ/NE
Harmonic H05	8962	2	A	0	Imax	LIN3	GE/LE/EQ/NE
Harmonic H07	8963	2	A	0	Imax	LIN3	GE/LE/EQ/NE
Harmonic H09	8964	2	A	0	Imax	LIN3	GE/LE/EQ/NE
Harmonic H11	8965	2	A	0	Imax	LIN3	GE/LE/EQ/NE
Harmonic H13	8966	2	A	0	Imax	LIN3	GE/LE/EQ/NE
Harmonic H15	8967	2	A	0	Imax	LIN3	GE/LE/EQ/NE
Harmonic H17	8968	2	A	0	Imax	LIN3	GE/LE/EQ/NE
Harmonic H19	8969	2	A	0	Imax	LIN3	GE/LE/EQ/NE
Harmonic H21	8970	2	A	0	Imax	LIN3	GE/LE/EQ/NE
Harmonic H23	8971	2	A	0	Imax	LIN3	GE/LE/EQ/NE
Harmonic H25	8972	2	A	0	Imax	LIN3	GE/LE/EQ/NE
Harmonic H27	8973	2	A	0	Imax	LIN3	GE/LE/EQ/NE
Harmonic H29	8974	2	A	0	Imax	LIN3	GE/LE/EQ/NE
Harmonic H31	8975	2	A	0	Imax	LIN3	GE/LE/EQ/NE
Harmonic H33	8976	2	A	0	Imax	LIN3	GE/LE/EQ/NE
Harmonic H35	8977	2	A	0	Imax	LIN3	GE/LE/EQ/NE
Harmonic H37	8978	2	A	0	Imax	LIN3	GE/LE/EQ/NE
Harmonic H39	8979	2	A	0	Imax	LIN3	GE/LE/EQ/NE
L3 phase harmonic currents (odd harmonics)							
Harmonic H01	9216	2	A	0	Imax	LIN3	GE/LE/EQ/NE
Harmonic H03	9217	2	A	0	Imax	LIN3	GE/LE/EQ/NE
Harmonic H05	9218	2	A	0	Imax	LIN3	GE/LE/EQ/NE
Harmonic H07	9219	2	A	0	Imax	LIN3	GE/LE/EQ/NE
Harmonic H09	9220	2	A	0	Imax	LIN3	GE/LE/EQ/NE
Harmonic H11	9221	2	A	0	Imax	LIN3	GE/LE/EQ/NE
Harmonic H13	9222	2	A	0	Imax	LIN3	GE/LE/EQ/NE
Harmonic H15	9223	2	A	0	Imax	LIN3	GE/LE/EQ/NE
Harmonic H17	9224	2	A	0	Imax	LIN3	GE/LE/EQ/NE
Harmonic H19	9225	2	A	0	Imax	LIN3	GE/LE/EQ/NE
Harmonic H21	9226	2	A	0	Imax	LIN3	GE/LE/EQ/NE
Harmonic H23	9227	2	A	0	Imax	LIN3	GE/LE/EQ/NE

Trigger parameter	Data ID	Size, byte	Unit	Limits/Scale Ã		Con-version	Conditions (Table 5-31)
				Low	High		
Harmonic H25	9228	2	A	0	Imax	LIN3	GE/LE/EQ/NE
Harmonic H27	9229	2	A	0	Imax	LIN3	GE/LE/EQ/NE
Harmonic H29	9230	2	A	0	Imax	LIN3	GE/LE/EQ/NE
Harmonic H31	9231	2	A	0	Imax	LIN3	GE/LE/EQ/NE
Harmonic H33	9232	2	A	0	Imax	LIN3	GE/LE/EQ/NE
Harmonic H35	9233	2	A	0	Imax	LIN3	GE/LE/EQ/NE
Harmonic H37	9234	2	A	0	Imax	LIN3	GE/LE/EQ/NE
Harmonic H39	9235	2	A	0	Imax	LIN3	GE/LE/EQ/NE
Harmonic total kW (odd harmonics)							
Harmonic H01	9472	2	kW	-Pmax	Pmax	LIN3	GE/LE/EQ/NE
Harmonic H03	9473	2	kW	-Pmax	Pmax	LIN3	GE/LE/EQ/NE
Harmonic H05	9474	2	kW	-Pmax	Pmax	LIN3	GE/LE/EQ/NE
Harmonic H07	9475	2	kW	-Pmax	Pmax	LIN3	GE/LE/EQ/NE
Harmonic H09	9476	2	kW	-Pmax	Pmax	LIN3	GE/LE/EQ/NE
Harmonic H11	9477	2	kW	-Pmax	Pmax	LIN3	GE/LE/EQ/NE
Harmonic H13	9478	2	kW	-Pmax	Pmax	LIN3	GE/LE/EQ/NE
Harmonic H15	9479	2	kW	-Pmax	Pmax	LIN3	GE/LE/EQ/NE
Harmonic H17	9480	2	kW	-Pmax	Pmax	LIN3	GE/LE/EQ/NE
Harmonic H19	9481	2	kW	-Pmax	Pmax	LIN3	GE/LE/EQ/NE
Harmonic H21	9482	2	kW	-Pmax	Pmax	LIN3	GE/LE/EQ/NE
Harmonic H23	9483	2	kW	-Pmax	Pmax	LIN3	GE/LE/EQ/NE
Harmonic H25	9484	2	kW	-Pmax	Pmax	LIN3	GE/LE/EQ/NE
Harmonic H27	9485	2	kW	-Pmax	Pmax	LIN3	GE/LE/EQ/NE
Harmonic H29	9486	2	kW	-Pmax	Pmax	LIN3	GE/LE/EQ/NE
Harmonic H31	9487	2	kW	-Pmax	Pmax	LIN3	GE/LE/EQ/NE
Harmonic H33	9488	2	kW	-Pmax	Pmax	LIN3	GE/LE/EQ/NE
Harmonic H35	9489	2	kW	-Pmax	Pmax	LIN3	GE/LE/EQ/NE
Harmonic H37	9490	2	kW	-Pmax	Pmax	LIN3	GE/LE/EQ/NE
Harmonic H39	9491	2	kW	-Pmax	Pmax	LIN3	GE/LE/EQ/NE
Harmonic total kvar (odd harmonics)							
Harmonic H01	9728	2	kvar	-Pmax	Pmax	LIN3	GE/LE/EQ/NE
Harmonic H03	9729	2	kvar	-Pmax	Pmax	LIN3	GE/LE/EQ/NE
Harmonic H05	9730	2	kvar	-Pmax	Pmax	LIN3	GE/LE/EQ/NE
Harmonic H07	9731	2	kvar	-Pmax	Pmax	LIN3	GE/LE/EQ/NE
Harmonic H09	9732	2	kvar	-Pmax	Pmax	LIN3	GE/LE/EQ/NE
Harmonic H11	9733	2	kvar	-Pmax	Pmax	LIN3	GE/LE/EQ/NE
Harmonic H13	9734	2	kvar	-Pmax	Pmax	LIN3	GE/LE/EQ/NE
Harmonic H15	9735	2	kvar	-Pmax	Pmax	LIN3	GE/LE/EQ/NE
Harmonic H17	9736	2	kvar	-Pmax	Pmax	LIN3	GE/LE/EQ/NE
Harmonic H19	9737	2	kvar	-Pmax	Pmax	LIN3	GE/LE/EQ/NE
Harmonic H21	9738	2	kvar	-Pmax	Pmax	LIN3	GE/LE/EQ/NE
Harmonic H23	9739	2	kvar	-Pmax	Pmax	LIN3	GE/LE/EQ/NE
Harmonic H25	9740	2	kvar	-Pmax	Pmax	LIN3	GE/LE/EQ/NE
Harmonic H27	9741	2	kvar	-Pmax	Pmax	LIN3	GE/LE/EQ/NE
Harmonic H29	9742	2	kvar	-Pmax	Pmax	LIN3	GE/LE/EQ/NE
Harmonic H31	9743	2	kvar	-Pmax	Pmax	LIN3	GE/LE/EQ/NE

Trigger parameter	Data ID	Size, byte	Unit	Limits/Scale Ã		Con-version	Conditions (Table 5-31)
				Low	High		
Harmonic H33	9744	2	kvar	-Pmax	Pmax	LIN3	GE/LE/EQ/NE
Harmonic H35	9745	2	kvar	-Pmax	Pmax	LIN3	GE/LE/EQ/NE
Harmonic H37	9746	2	kvar	-Pmax	Pmax	LIN3	GE/LE/EQ/NE
Harmonic H39	9747	2	kvar	-Pmax	Pmax	LIN3	GE/LE/EQ/NE
Harmonic total power factors (odd harmonics)							
Harmonic H01	9984	2		-1.00	1.00	LIN3	GE/LE/EQ/NE
Harmonic H03	9985	2		-1.00	1.00	LIN3	GE/LE/EQ/NE
Harmonic H05	9986	2		-1.00	1.00	LIN3	GE/LE/EQ/NE
Harmonic H07	9987	2		-1.00	1.00	LIN3	GE/LE/EQ/NE
Harmonic H09	9988	2		-1.00	1.00	LIN3	GE/LE/EQ/NE
Harmonic H11	9989	2		-1.00	1.00	LIN3	GE/LE/EQ/NE
Harmonic H13	9990	2		-1.00	1.00	LIN3	GE/LE/EQ/NE
Harmonic H15	9991	2		-1.00	1.00	LIN3	GE/LE/EQ/NE
Harmonic H17	9992	2		-1.00	1.00	LIN3	GE/LE/EQ/NE
Harmonic H19	9993	2		-1.00	1.00	LIN3	GE/LE/EQ/NE
Harmonic H21	9994	2		-1.00	1.00	LIN3	GE/LE/EQ/NE
Harmonic H23	9995	2		-1.00	1.00	LIN3	GE/LE/EQ/NE
Harmonic H25	9996	2		-1.00	1.00	LIN3	GE/LE/EQ/NE
Harmonic H27	9997	2		-1.00	1.00	LIN3	GE/LE/EQ/NE
Harmonic H29	9998	2		-1.00	1.00	LIN3	GE/LE/EQ/NE
Harmonic H31	9999	2		-1.00	1.00	LIN3	GE/LE/EQ/NE
Harmonic H33	10000	2		-1.00	1.00	LIN3	GE/LE/EQ/NE
Harmonic H35	10001	2		-1.00	1.00	LIN3	GE/LE/EQ/NE
Harmonic H37	10002	2		-1.00	1.00	LIN3	GE/LE/EQ/NE
Harmonic H39	10003	2		-1.00	1.00	LIN3	GE/LE/EQ/NE
Minimum real-time values per phase							
Voltage L1/L12	11264	2		N/A	N/A	N/A	NEW
Voltage L2/L23	11265	2		N/A	N/A	N/A	NEW
Voltage L3/L31	11266	2		N/A	N/A	N/A	NEW
Current L1	11267	2		N/A	N/A	N/A	NEW
Current L2	11268	2		N/A	N/A	N/A	NEW
Current L3	11269	2		N/A	N/A	N/A	NEW
kW L1	11270	2		N/A	N/A	N/A	NEW
kW L2	11271	2		N/A	N/A	N/A	NEW
kW L3	11272	2		N/A	N/A	N/A	NEW
kvar L1	11273	2		N/A	N/A	N/A	NEW
kvar L2	11274	2		N/A	N/A	N/A	NEW
kvar L3	11275	2		N/A	N/A	N/A	NEW
kVA L1	11276	2		N/A	N/A	N/A	NEW
kVA L2	11277	2		N/A	N/A	N/A	NEW
kVA L3	11278	2		N/A	N/A	N/A	NEW
Power factor L1 **Ä**	11279	2		N/A	N/A	N/A	NEW
Power factor L2 **Ä**	11280	2		N/A	N/A	N/A	NEW
Power factor L3 **Ä**	11281	2		N/A	N/A	N/A	NEW
Voltage THD L1/L12	11282	2		N/A	N/A	N/A	NEW
Voltage THD L2/L23	11283	2		N/A	N/A	N/A	NEW

Trigger parameter	Data ID	Size, byte	Unit	Limits/Scale Ã		Con-version	Conditions (Table 5-31)
				Low	High		
Voltage THD L3	11284	2		N/A	N/A	N/A	NEW
Current THD L1	11285	2		N/A	N/A	N/A	NEW
Current THD L2	11286	2		N/A	N/A	N/A	NEW
Current THD L3	11287	2		N/A	N/A	N/A	NEW
K-Factor L1	11288	2		N/A	N/A	N/A	NEW
K-Factor L2	11289	2		N/A	N/A	N/A	NEW
K-Factor L3	11290	2		N/A	N/A	N/A	NEW
Minimum real-time total values							
Total kW	11520	2		N/A	N/A	N/A	NEW
Total kvar	11521	2		N/A	N/A	N/A	NEW
Total kVA	11522	2		N/A	N/A	N/A	NEW
Total PF **Ä**	11523	2		N/A	N/A	N/A	NEW
Total PF Lag	11524	2		N/A	N/A	N/A	NEW
Total PF Lead	11525	2		N/A	N/A	N/A	NEW
Minimum real-time auxiliary values							
Auxiliary current	11776	2		N/A	N/A	N/A	NEW
Neutral current	11777	2		N/A	N/A	N/A	NEW
Frequency	11778	2		N/A	N/A	N/A	NEW
Voltage unbalance	11779	2		N/A	N/A	N/A	NEW
Current unbalance	11780	2		N/A	N/A	N/A	NEW
Minimum demands							
Volt demand L1/L12	12032	2		N/A	N/A	N/A	NEW
Volt demand L2/L23	12033	2		N/A	N/A	N/A	NEW
Volt demand L3/L31	12034	2		N/A	N/A	N/A	NEW
Ampere demand L1	12035	2		N/A	N/A	N/A	NEW
Ampere demand L2	12036	2		N/A	N/A	N/A	NEW
Ampere demand L3	12037	2		N/A	N/A	N/A	NEW
Block kW demand (import)	12038	2		N/A	N/A	N/A	NEW
Block kvar demand (total)	12039	2		N/A	N/A	N/A	NEW
Block kVA demand	12040	2		N/A	N/A	N/A	NEW
Sliding window kW demand (import)	12041	2		N/A	N/A	N/A	NEW
Sliding window kvar demand (total)	12042	2		N/A	N/A	N/A	NEW
Sliding window kVA demand	12043	2		N/A	N/A	N/A	NEW
Thermal kW demand (import)	12044	2		N/A	N/A	N/A	NEW
Thermal kvar demand (total)	12045	2		N/A	N/A	N/A	NEW
Thermal kVA demand	12046	2		N/A	N/A	N/A	NEW
Programmable Min/Max minimum registers							
Register #1	12288	2		N/A	N/A	N/A	NEW

Trigger parameter	Data ID	Size, byte	Unit	Limits/Scale Ã		Con-version	Conditions (Table 5-31)
				Low	High		
Register #2	12289	2		N/A	N/A	N/A	NEW
Register #3	12290	2		N/A	N/A	N/A	NEW
Register #4	12291	2		N/A	N/A	N/A	NEW
Register #5	12292	2		N/A	N/A	N/A	NEW
Register #6	12293	2		N/A	N/A	N/A	NEW
Register #7	12294	2		N/A	N/A	N/A	NEW
Register #8	12295	2		N/A	N/A	N/A	NEW
Register #9	12296	2		N/A	N/A	N/A	NEW
Register #10	12297	2		N/A	N/A	N/A	NEW
Register #11	12298	2		N/A	N/A	N/A	NEW
Register #12	12299	2		N/A	N/A	N/A	NEW
Register #13	12300	2		N/A	N/A	N/A	NEW
Register #14	12301	2		N/A	N/A	N/A	NEW
Register #15	12302	2		N/A	N/A	N/A	NEW
Register #16	12303	2		N/A	N/A	N/A	NEW
Maximum real-time values per phase							
Voltage L1/L12	13312	2		N/A	N/A	N/A	NEW
Voltage L2/L23	13313	2		N/A	N/A	N/A	NEW
Voltage L3/L31	13314	2		N/A	N/A	N/A	NEW
Current L1	13315	2		N/A	N/A	N/A	NEW
Current L2	13316	2		N/A	N/A	N/A	NEW
Current L3	13317	2		N/A	N/A	N/A	NEW
kW L1	13318	2		N/A	N/A	N/A	NEW
kW L2	13319	2		N/A	N/A	N/A	NEW
kW L3	13320	2		N/A	N/A	N/A	NEW
kvar L1	13321	2		N/A	N/A	N/A	NEW
kvar L2	13322	2		N/A	N/A	N/A	NEW
kvar L3	13323	2		N/A	N/A	N/A	NEW
kVA L1	13324	2		N/A	N/A	N/A	NEW
kVA L2	13325	2		N/A	N/A	N/A	NEW
kVA L3	13326	2		N/A	N/A	N/A	NEW
Power factor L1 **Ä**	13327	2		N/A	N/A	N/A	NEW
Power factor L2 **Ä**	13328	2		N/A	N/A	N/A	NEW
Power factor L3 **Ä**	13329	2		N/A	N/A	N/A	NEW
Voltage THD L1/L12	13330	2		N/A	N/A	N/A	NEW
Voltage THD L2/L23	13331	2		N/A	N/A	N/A	NEW
Voltage THD L3	13332	2		N/A	N/A	N/A	NEW
Current THD L1	13333	2		N/A	N/A	N/A	NEW
Current THD L2	13334	2		N/A	N/A	N/A	NEW
Current THD L3	13335	2		N/A	N/A	N/A	NEW
K-Factor L1	13336	2		N/A	N/A	N/A	NEW
K-Factor L2	13337	2		N/A	N/A	N/A	NEW
K-Factor L3	13338	2		N/A	N/A	N/A	NEW
Maximum real-time total values							
Total kW	13568	2		N/A	N/A	N/A	NEW
Total kvar	13569	2		N/A	N/A	N/A	NEW

Trigger parameter	Data ID	Size, byte	Unit	Limits/Scale Ã		Con-version	Conditions (Table 5-31)
				Low	High		
Total kVA	13570	2		N/A	N/A	N/A	NEW
Total PF **Ä**	13571	2		N/A	N/A	N/A	NEW
Total PF Lag	13572	2		N/A	N/A	N/A	NEW
Total PF Lead	13573	2		N/A	N/A	N/A	NEW
Maximum real-time auxiliary values							
Auxiliary current	13824	2		N/A	N/A	N/A	NEW
Neutral current	13825	2		N/A	N/A	N/A	NEW
Frequency	13826	2		N/A	N/A	N/A	NEW
Voltage unbalance	13827	2		N/A	N/A	N/A	NEW
Current unbalance	13828	2		N/A	N/A	N/A	NEW
Maximum demands							
Volt demand L1/L12	14080	2		N/A	N/A	N/A	NEW
Volt demand L2/L23	14081	2		N/A	N/A	N/A	NEW
Volt demand L3/L31	14082	2		N/A	N/A	N/A	NEW
Ampere demand L1	14083	2		N/A	N/A	N/A	NEW
Ampere demand L2	14084	2		N/A	N/A	N/A	NEW
Ampere demand L3	14085	2		N/A	N/A	N/A	NEW
Block kW demand (import)	14086	2		N/A	N/A	N/A	NEW
Block kvar demand (total)	14087	2		N/A	N/A	N/A	NEW
Block kVA demand	14088	2		N/A	N/A	N/A	NEW
Sliding window kW demand (import)	14089	2		N/A	N/A	N/A	NEW
Sliding window kvar demand (total)	14090	2		N/A	N/A	N/A	NEW
Sliding window kVA demand	14091	2		N/A	N/A	N/A	NEW
Thermal kW demand (import)	14092	2		N/A	N/A	N/A	NEW
Thermal kvar demand (total)	14093	2		N/A	N/A	N/A	NEW
Thermal kVA demand	14094	2		N/A	N/A	N/A	NEW
Programmable Min/Max maximum registers							
Register #1	14336	2		N/A	N/A	N/A	NEW
Register #2	14337	2		N/A	N/A	N/A	NEW
Register #3	14338	2		N/A	N/A	N/A	NEW
Register #4	14339	2		N/A	N/A	N/A	NEW
Register #5	14340	2		N/A	N/A	N/A	NEW
Register #6	14341	2		N/A	N/A	N/A	NEW
Register #7	14342	2		N/A	N/A	N/A	NEW
Register #8	14343	2		N/A	N/A	N/A	NEW
Register #9	14344	2		N/A	N/A	N/A	NEW
Register #10	14345	2		N/A	N/A	N/A	NEW
Register #11	14346	2		N/A	N/A	N/A	NEW

Trigger parameter	Data ID	Size, byte	Unit	Limits/Scale Ã		Con-version	Conditions (Table 5-31)
				Low	High		
Register #12	14347	2		N/A	N/A	N/A	NEW
Register #13	14348	2		N/A	N/A	N/A	NEW
Register #14	14349	2		N/A	N/A	N/A	NEW
Register #15	14350	2		N/A	N/A	N/A	NEW
Register #16	14351	2		N/A	N/A	N/A	NEW
TOU system parameters ①							
Active tariff	15360	2		0	15	NONE	GE/LE/EQ/NE
Active profile	15361	2		0	15	NONE	GE/LE/EQ/NE
TOU minimum kW demands							
Tariff #1 register	17644	2		N/A	N/A	N/A	NEW
Tariff #2 register	17645	2		N/A	N/A	N/A	NEW
Tariff #3 register	17646	2		N/A	N/A	N/A	NEW
…	…						
Tariff #16 register	17659	2		N/A	N/A	N/A	NEW
TOU minimum kvar demands							
Tariff #1 register	17920	2		N/A	N/A	N/A	NEW
Tariff #2 register	17921	2		N/A	N/A	N/A	NEW
Tariff #3 register	17922	2		N/A	N/A	N/A	NEW
…	…						
Tariff #16 register	17931	2		N/A	N/A	N/A	NEW
TOU minimum kVA demands							
Tariff #1 register	18176	2		N/A	N/A	N/A	NEW
Tariff #2 register	18177	2		N/A	N/A	N/A	NEW
Tariff #3 register	18178	2		N/A	N/A	N/A	NEW
…	…						
Tariff #16 register	18191	2		N/A	N/A	N/A	NEW
TOU maximum kW demands							
Tariff #1 register	18432	2		N/A	N/A	N/A	NEW
Tariff #2 register	18433	2		N/A	N/A	N/A	NEW
Tariff #3 register	18434	2		N/A	N/A	N/A	NEW
…	…						
Tariff #16 register	18447	2		N/A	N/A	N/A	NEW
TOU maximum kvar demands							
Tariff #1 register	18688	2		N/A	N/A	N/A	NEW
Tariff #2 register	18689	2		N/A	N/A	N/A	NEW
Tariff #3 register	18690	2		N/A	N/A	N/A	NEW
…	…						
Tariff #16 register	18703	2		N/A	N/A	N/A	NEW
TOU maximum kVA demands							
Tariff #1 register	18944	2		N/A	N/A	N/A	NEW
Tariff #2 register	18945	2		N/A	N/A	N/A	NEW
Tariff #3 register	18946	2		N/A	N/A	N/A	NEW
…	…						
Tariff #16 register	18959	2		N/A	N/A	N/A	NEW

À Release limit isn't used

Á Packed date format: year ∗ 10000 + month ∗ 100 + day of month

Â Packed time format: hour ∗ 10000 + minute ∗ 100 + second

Ã For the parameter limits, see note **À** to Table 5-1.

Ä New absolute value (lag or lead).

Å The actual frequency range is 45.0 - 65.0 Hz.

Æ Operate limit for the voltage disturbance trigger specifies the voltage deviation allowed in percentage of nominal (full scale) voltage, which refers to line-to-line voltage in 3OP2 and 3OP3 wiring modes, and to line-to-neutral voltage in other modes. The nominal voltage is 120 × PT Ratio VRMS for instruments with the 120V input option, and 380 × PT Ratio VRMS for instruments with the 660V input option.

Ç The phase rotation limits: 0 = error, 1 = positive rotation, 2 = negative rotation

Table 5-30 Setpoint Conditions

Label	ID	Operate condition	Release condition	Limits
NONE	0	NONE	N/A	Both limits not used
GE	1	GREATER OR EQUAL (over operate limit)	LESS OR EQUAL (under release limit)	Both limits active
LE	2	LESS OR EQUAL (under operate limit)	GREATER OR EQUAL (over release limit)	Both limits active
EQ	3	EQUAL	NOT EQUAL	Release limit not used
NE	4	NOT EQUAL	EQUAL	Release limit not used
ON	5	ON	OFF	Both limits not used
OFF	6	OFF	ON	Both limits not used
NEW	7	NEW Min/Max value	N/A	Both limits not used

Table 5-31 Setpoint Actions

Action type		Action target	
Description	ID	Description	Range
No action	0	N/A	0
Set user event flag	32	Flag number	0-7
Reset user event flag	33	Flag number	0-7
Operate relay	48	Relay number	0-3
Increment counter	64	Counter number	0-7
Decrement counter	65	Counter number	0-7
Clear counter	66	Counter number	0-7
Reset total energy registers	96	N/A	0
Reset total extreme demand registers	97	N/A	0
Reset TOU energy	98	N/A	0
Reset TOU demands	99	N/A	0
Clear counters	100	N/A	0
Clear Min/Max registers	101	N/A	0

Event logging	112	Setpoint transition mode - events that trigger logging	0 = operate setpoint 1 = release setpoint 2 = either transition (both operate and release)
Data logging	113	Log number	0-15
High-speed (32/16) waveform logging	114	N/A	0
High-resolution (128/4) waveform logging	115	N/A	0

5.13 Pulsing Setpoints

Table 5-32 Pulsing Registers

Relay	Setup registers (see Table 5-33)
Relay #1	2892-2893
Relay #2	2894-2895
Relay #3	2896-2897
Relay #4	2898-2899

Table 5-33 Pulsing Setup Registers

Parameter	Offset	Size, byte	Direction	Range
Output parameter ID	+0	2	R/W	0-9 (see Table 5-34)
For energy pulsing = number of unit-hours per pulse, otherwise set to 0.	+1	2	R/W	0-9999

Table 5-34 Pulsing Output Parameters

Pulsing parameter	ID
None	0
kWh import	1
kWh export	2
kWh total	3
kvarh import	4
kvarh export	5
kvarh total	6
kVAh total	7
Start demand interval pulse	8
Start tariff interval pulse	9

5.14 User Event Flags

Table 5-35 User Event Flags Registers

Parameter	Address	Size, byte	Direction À	Range
Event flag #1	2916	2	W	0-1
Event flag #2	2917	2	W	0-1
Event flag #3	2918	2	W	0-1
Event flag #4	2919	2	W	0-1
Event flag #5	2920	2	W	0-1
Event flag #6	2921	2	W	0-1
Event flag #7	2922	2	W	0-1
Event flag #8	2923	2	W	0-1

À Through these registers, event flags can be only written. To read event flags all together, use register 3453 (Table 5-8) or 6776 (Table 5-19).

5.15 Pulse Counters Setup

Table 5-36 Pulse Counters Registers

Counter	Setup registers (see Table 5-37)
Counter #1	2940-2941
Counter #2	2942-2943
Counter #3	2944-2945
Counter #4	2946-2947
Counter #5	2948-2949
Counter #6	2950-2951
Counter #7	2952-2953
Counter #8	2954-2955

Table 5-37 Pulse Counter Setup Registers

Parameter	Offset	Size, byte	Direction	Range
Associated discrete input ID	+0	2	R/W	0-8 (see Table 5-38)
Scale factor (number of units per input pulse)	+1	2	R/W	1-9999

Table 5-38 Discrete Inputs Identifiers

Discrete input	ID
Not allocated	0
Discrete input # 1	1
Discrete input # 2	2
Discrete input # 3	3
Discrete input # 4	4

Discrete input # 5	5
Discrete input # 6	6
Discrete input # 7	7
Discrete input # 8	8

5.16 Log Memory Partitions Setup

Table 5-39 Memory Partitions Setup Registers

Memory partition	Setup registers (see Table 5-40)
Event log	3660-3665
Data log #1	3668-3673
Data log #2	3676-3681
Data log #3	3684-3689
Data log #4	3692-3697
Data log #5	3700-3705
Data log #6	3708-3713
Data log #7	3716-3721
Data log #8	3724-3729
Data log #9	3732-3737
Data log #10	3740-3745
Data log #11	3748-3753
Data log #12	3756-3761
Data log #13	3764-3769
Data log #14	3772-3777
Data log #15	3780-3785
Data log #16	3788-3793
High-speed (32/16) waveform log	3796-3801
High-resolution (128/4) waveform log	3804-3809

Table 5-40 Partition Setup Registers

Parameter	Offset	Size, byte	Direction	Range
The number of records in the partition	+0	2	R/W	0-65535, 0 = delete partition
The number of log parameters in the record (for a data log partition)	+1	2	R/W	0-16
Partition type	+2	2	R/W	0 = no wrap 1 = wrap around
Record size, byte	+3	2	R	
Partition size, byte	+4 +5	4	R	0-516096

These registers allow you to allocate a memory partition for logging and to specify the partition size and type. Before allocating a partition, it is recommended to check the available memory by reading the extended memory status registers. To help you in planning memory, Table 5-41 shows the record size for each partition.

Note that existing partition may not be resized. To change the partition properties, you should first delete a partition and then reallocate it with the desirable properties. To delete a partition, write zero into the first partition's register.

When allocating a memory partition, all partition's registers must be written at once using a single request. After reallocation of memory, the instrument performs the memory optimization and will not respond to the host requests for approximately 1 minute per 128 Kbyte of memory.

Writing into registers at offsets +3, +4 and +5 doesn't affect the registers' contents. No error will occur.

Table 5-41 Partitions' Record Size

Partition	Record size, byte
Event log	14
Data log	8 + 4 ∗ (NUMBER OF PARAMETERS)
Waveform log	6240

5.17 Programmable Min/Max Log Setup

Table 5-42 Programmable Min/Max Log Setup Registers

Parameter	Address	Size, byte	Direction	Range
Data ID for Min/Max log register #1	2972	2	R/W	see Table 5-19
Data ID for Min/Max log register #2	2973	2	R/W	see Table 5-19
Data ID for Min/Max log register #3	2974	2	R/W	see Table 5-19
Data ID for Min/Max log register #4	2975	2	R/W	see Table 5-19
Data ID for Min/Max log register #5	2976	2	R/W	see Table 5-19
Data ID for Min/Max log register #6	2977	2	R/W	see Table 5-19
Data ID for Min/Max log register #7	2978	2	R/W	see Table 5-19
Data ID for Min/Max log register #8	2979	2	R/W	see Table 5-19
Data ID for Min/Max log register #9	2980	2	R/W	see Table 5-19
Data ID for Min/Max log register #10	2981	2	R/W	see Table 5-19
Data ID for Min/Max log register #11	2982	2	R/W	see Table 5-19
Data ID for Min/Max log register #12	2983	2	R/W	see Table 5-19
Data ID for Min/Max log register #13	2984	2	R/W	see Table 5-19
Data ID for Min/Max log register #14	2985	2	R/W	see Table 5-19
Data ID for Min/Max log register #15	2986	2	R/W	see Table 5-19
Data ID for Min/Max log register #16	2987	2	R/W	see Table 5-19

These registers allow you to associate any of the 16 programmable Min/Max log registers with either harmonic parameter listed in Table 5-19.

5.18 Data Log Setup

Table 5-43 Data Log Setup Registers

Partition	Registers (see Table 5-43)
Data log #1	1792-1807
Data log #2	1808-1823
Data log #3	1824-1839
Data log #4	1840-1855
Data log #5	1856-1871
Data log #6	1872-1887
Data log #7	1888-1903
Data log #8	1904-1919
Data log #9	1920-1935
Data log #10	1936-1951
Data log #11	1952-1967
Data log #12	1968-1983
Data log #13	1984-1999
Data log #14	2000-2015
Data log #15	2016-2031
Data log #16	2032-2047

Table 5-44 Data Log Setup

Parameter	Offset	Size, byte	Direction	Range
Log parameter #1 ID	+0	2	R/W	see Table 5-19
Log parameter #2 ID	+1	2	R/W	see Table 5-19
Log parameter #3 ID	+2	2	R/W	see Table 5-19
Log parameter #4 ID	+3	2	R/W	see Table 5-19
Log parameter #5 ID	+4	2	R/W	see Table 5-19
Log parameter #6 ID	+5	2	R/W	see Table 5-19
Log parameter #7 ID	+6	2	R/W	see Table 5-19
Log parameter #8 ID	+7	2	R/W	see Table 5-19
Log parameter #9 ID	+8	2	R/W	see Table 5-19
Log parameter #10 ID	+9	2	R/W	see Table 5-19
Log parameter #11 ID	+10	2	R/W	see Table 5-19
Log parameter #12 ID	+11	2	R/W	see Table 5-19
Log parameter #13 ID	+12	2	R/W	see Table 5-19
Log parameter #14 ID	+13	2	R/W	see Table 5-19
Log parameter #15 ID	+14	2	R/W	see Table 5-19
Log parameter #16 ID	+15	2	R/W	see Table 5-19

Parameters that can be selected for data log are listed in Table 5-19. Before setting up the parameters for any data log, the memory partition must be allocated for the log (see Section 5.16). When writing the data log setup registers, the only parameters that specified in the partition record setup will be written. When reading registers, those that are not defined in the data log setup will be read as zeros.

5.19 Event Log

Table 5-45 Event Log Windows Registers

Event log window	Registers (see Table 5-46)
Event log window #1	3916-3927
Event log window #2	3928-3939
Event log window #3	3940-3951
Event log window #4	3952-3963
Event log window #5	3964-3975
Event log window #6	3976-3987
Event log window #7	3988-3999
Event log window #8	4000-4011
Event log window #9	4012-4023
Event log window #10	4024-4035

Table 5-46 Event Log Window Registers

Parameter	Offset	Size, byte	Direction	Range
Second	+0	2	R	0-59, 97 = record corrupted 98 = no more events 99 = no events logged
Minute	+1	2	R	0-59
Hour	+2	2	R	0-23
Day	+3	2	R	1-31
Month	+4	2	R	1-12
Year	+5	2	R	0-99
Event cause	+6	2	R	see Table 5-47
Event origin	+7	2	R	see Table 5-47
Log value **À**	+8 +9	4	R	see Table 5-47
Effect	+10	2	R	see Table 5-47
Target	+11	2	R	see Table 5-47

À The log value can be read in one or two registers depending on the value type. For the value length and conversion scales, refer to Table 5-29. For the Min/Max parameter ranges, refer to Table 5-17.

These registers allow you to read the packet of consequent records from the event log partition. From 1 to 10 event log records can be read at a time via the event log windows, which comprise registers 3916 through 4035. Reading from either event log window always returns the next logged event. All registers within one window must be read at once using a single request. After reading each record, the partition queue pointer is shifted forward until the last logged record has been read. After that, the exception code 98 is returned in the window register at offset +0. It should be checked before accepting the record. To restore the queue to the origin, a zero must be written to the event log queue reset register (see Section 5.3).

Table 5-47 Event Log Parameters

Event cause	Event cause code	Event origin (location)	Log value	Event effect	Event target
Setpoint event	Trigger parameter group (ID high byte) (Table 5-29)	Trigger parameter offset (ID low byte) (Table 5-29)	Trigger parameter value (Table 5-29)	225 = setpoint operated 226 = setpoint released (Table 5-50)	Setpoint number = 0-15
Setpoint activity	90	Setpoint number = 0-15	N/A	Setpoint action type **À** (Table 5-31)	Setpoint action target (Table 5-31)
Communi-cations activity	91	Data location code (Table 5-48)	N/A	Table 5-50	Table 5-50
Front panel activity	92	Data location code (Table 5-48)	N/A	Table 5-50	Table 5-50
Self-check	93	Data location code (Table 5-48)	N/A	Table 5-50	Table 5-50
Hardware failure	98	Diagnostic code (Table 5-49)	N/A	N/A	N/A
External event	99	0 = power down 8 = power up	N/A	N/A	N/A

À Data logging actions are not logged to the event log.

Table 5-48 Data Location Codes

Location code	Description
0-2	Reserved
3	Data keeping memory
4	Factory setup
5	Access setup
6	Basic setup
7	Communications setup
8	Real-time clock setup
9	Discrete inputs allocation setup
10	Pulse counters allocation setup
11	Multiplexed analog outputs setup
12	External analog outputs setup
13	Reserved
14	Timers setup
15	Display options setup

Location code	Description
16	Event/alarm setpoints setup
17	Pulsing setpoints setup
18	User assignable register map
19	Programmable Min/Max log setup
20	Data log setup
21	Extended memory partitions setup
22	TOU energy registers setup
23	TOU demand registers setup
24	TOU daily profiles setup
25	TOU calendar setup
26	TOU calendar years setup

Table 5-49 Diagnostic Codes

Diagnostic code	Description
0	Power down
1	ROM error
2	RAM error
3	Watch dog timer reset
4	Sampling failure
5	Out of control trap
6	Reserved
7	Timing failure
8	Power up

Table 5-50 Event Effect Codes

Effect code	Description	Target
96	Clear energy registers	N/A
97	Clear demand registers	N/A
98	Clear TOU energy registers	N/A
99	Clear TOU demand registers	N/A
100	Clear pulse counters	N/A
101	Clear Min/Max log registers	N/A
102	Clear event log	N/A
103	Clear data log	0-15=log number,16 = all
104	Clear 32/16 waveform log	N/A
105	Clear 128/4 waveform log	N/A
225	Setpoint operated	0-15 = setpoint number
226	Setpoint released	0-15 = setpoint number
240	Setpoint set	0-15 = setpoint number
241	Setpoint disabled	0-15 = setpoint number
242	Setup cleared	N/A
243	Setup set by default	N/A
244	Setup change	N/A
245	RTC set	N/A

5.20 Data Log

Table 5-51 Data Logs Window Registers

Data log window	Registers (see Table 5-52)
Data log #1 window	1120-1161
Data log #2 window	1162-1203
Data log #3 window	1204-1245
Data log #4 window	1246-1287
Data log #5 window	1288-1329
Data log #6 window	1330-1371
Data log #7 window	1372-1413
Data log #8 window	1414-1455
Data log #9 window	1456-1497
Data log #10 window	1498-1539
Data log #11 window	1540-1581
Data log #12 window	1582-1623
Data log #13 window	1624-1665
Data log #14 window	1666-1707
Data log #15 window	1708-1749
Data log #16 window	1750-1791

Table 5-52 Data Log Window Registers

Parameter	Offset	Size, byte	Direction	Range
Trigger setpoint number	+0	2	R	0-15, 97 = record corrupted 98 = no more records 99 = no records logged
Hundredths of second	+1	2	R	0-99
Second	+2	2	R	0-59
Minute	+3	2	R	0-59
Hour	+4	2	R	0-23
Day	+5	2	R	1-31
Month	+6	2	R	1-12
Year	+7	2	R	0-99
Reserved	+8	2	R	0
The number of parameters in the record	+10	2	R	1-16
Log parameter #1 value **À**	+11 +12	4	R	see Table 5-19
Log parameter #2 value **À**	+13 +14	4		see Table 5-19
...				
Log parameter #16 value **À**	+40 +41	4		see Table 5-19

À The log parameter value can be read in one or two registers depending on the value type. For the value length and conversion scales, refer to Table 5-19.

Data log records are read via a data log window, one for each data log partition. Reading from this window always returns the next record logged in the partition. All registers within one window must be read at once using a single request. After reading each record, the partition queue pointer is shifted forward until the last logged record has been read. After that, the exception code 98 is returned in the record's first register. It should be checked before accepting the record. To restore the queue to the origin, a zero must be written to the partition queue reset register (see Section 5.3).

When reading the data log window registers, those that reside outside of the specified partition record size will be read as zeros. The actual number of parameters in the record is indicated in the log window register at offset +10.

5.21 Min/Max Log

Table 5-53 Min/Max Log Windows Registers

Min/Max log window	Registers (see Table 5-54)
Min/Max log window #1	4174-4181
Min/Max log window #2	4182-4189
Min/Max log window #3	4190-4197
Min/Max log window #4	4198-4205
Min/Max log window #5	4206-4213
Min/Max log window #6	4214-4221
Min/Max log window #7	4222-4229
Min/Max log window #8	4230-4237
Min/Max log window #9	4238-4245
Min/Max log window #10	4246-4253
Min/Max log window #11	4254-4261
Min/Max log window #12	4262-4269

Table 5-54 Min/Max Log Window Registers

Parameter	Offset	Size, byte	Direction	Range
Second	+0	2	R	0-59
Minute	+1	2	R	0-59
Hour	+2	2	R	0-23
Day	+3	2	R	1-31
Month	+4	2	R	1-12
Year	+5	2	R	0-99
Parameter value **À**	+6 +7	4	R	see Table 5-19

À The Min/Max parameter value can be read in one or two registers depending on the value type. For the value length and conversion scales, refer to Table 5-19.

Table 5-55 Min/Max Log Mapping Register

Parameter	Address	Size, byte	Direction	Range
Min/Max log start parameter ID for window #1	4172	2	R/W	see Table 5-19

From 1 to 12 adjacent Min/Max log records along with time stamps can be read at a time via the Min/Max log windows. The starting window #1 can be mapped to any Min/Max log parameter listed in Table 5-19 by writing the parameter ID to the Min/Max log mapping register. It must be written before reading the Min/Max log windows. Note that through Min/Max log windows, you can read only adjacent parameters within the same Min/Max log data group. Reading parameters outside of the selected Min/Max log data group will return zero.

5.22 Waveform Log/Capture

Table 5-56 Waveform Log/Capture Windows Registers

Waveform window	Window registers (see Tables 5-57- 5-60)
Real-time waveform capture V L1/L12 window	4608-4617
Real-time waveform capture V L2/L23 window	4864-4873
Real-time waveform capture V L3 window	5120-5129
Real-time waveform capture I L1 window	5376-5385
Real-time waveform capture I L2 window	5632-5641
Real-time waveform capture I L3 window	5888-5897
High-resolution (128/4) waveform log V L1/L12 window	4624-4633
High-resolution (128/4) waveform log V L2/L23 window	4880-4889
High-resolution (128/4) waveform log V L3 window	5136-5145
High-resolution (128/4) waveform log I L1 window	5392-5401
High-resolution (128/4) waveform log I L2 window	5648-5657
High-resolution (128/4) waveform log I L3 window	5904-5913
High-speed (128/4) waveform log V L1/L12 window	4640-4650
High-speed (128/4) waveform log V L2/L23 window	4896-4906
High-speed (128/4) waveform log V L3 window	5152-5162
High-speed (128/4) waveform log I L1 window	5408-5418
High-speed (128/4) waveform log I L2 window	5664-5674
High-speed (128/4) waveform log I L3 window	5920-5930
Waveform samples window	6144-6655

Table 5-57 Real-time Waveform Capture Window Registers

Parameter	Offset	Size, byte	Direction	Range/Scale	Con-vers.
Capture code	+0	2	R	0	NONE
Second	+1	2	R	0 to 59	NONE
Minute	+2	2	R	0 to 59	NONE
Hour	+3	2	R	0 to 23	NONE
Day of month	+4	2	R	1 to 31	NONE
Month	+5	2	R	1 to 12	NONE
Year	+6	2	R	0 to 99	NONE
Channel RMS value	+7	2	R	0 to Vmax①/Imax V/A	LIN3
Fundamental frequency	+8	2	R	0 to 100.0 Hz	LIN3
THD	+9	2	R	0 to 100.0 %	LIN3

Table 5-58 High-resolution (128/4) Waveform Log Window Registers

Parameter	Offset	Size, byte	Direction	Range/Scale	Con-vers.
Capture code: trigger setpoint number	+0	2	R	1-16, 98 = no more waveforms, 99 = no waveforms logged	NONE
Second	+1	2	R	0 to 59	NONE
Minute	+2	2	R	0 to 59	NONE
Hour	+3	2	R	0 to 23	NONE
Day of month	+4	2	R	1 to 31	NONE
Month	+5	2	R	1 to 12	NONE
Year	+6	2	R	0 to 99	NONE
Channel RMS value	+7	2	R	0 to Vmax **À**/Imax V/A	LIN3
Fundamental frequency	+8	2	R	0 to 100.0 Hz	LIN3
THD	+9	2	R	0 to 100.0 %	LIN3

À Phase voltage will be line-to-line voltage in 3OP2 and 3OP3 wiring modes, and line-to-neutral voltage in other configurations.

Table 5-59 High-speed (32/16) Waveform Log Window Registers

Parameter	Offset	Size, byte	Direction	Range/Scale	Con-vers.
Capture code: trigger setpoint number	+0	2	R	1-16, 98 = no more waveforms, 99 = no waveforms logged	NONE
Hundredth of second	+1	2	R	0 to 99	NONE
Second	+2	2	R	0 to 59	NONE
Minute	+3	2	R	0 to 59	NONE
Hour	+4	2	R	0 to 23	NONE

Day of month	+5	2	R	1 to 31	NONE
Month	+6	2	R	1 to 12	NONE
Year	+7	2	R	0 to 99	NONE
Reserved	+8	2	R	0	LIN3
Sampling frequency	+9	2	R	0 to 100.0 Hz	LIN3
Reserved	+10	2	R	0	LIN3

Table 5-60 Waveform Samples Registers

Parameter	Address	Size, byte	Direction	Range
Waveform sample point #1	6144	2	R	0-1023
Waveform sample point #2	6145	2	R	0-1023
Waveform sample point #3	6146	2	R	0-1023
...	...			
Waveform sample point #512	6655	2	R	0-1023

These registers allow you to read all types of waveforms sampled by the instrument: the real-time high-resolution waveforms (4 cycles x 128 samples per cycle), and the recorded waveforms - the high-resolution (4 cycles x 128 samples per cycle), and the low-resolution (high-speed) logged waveforms (16 cycles x 32 samples per cycle).

Each waveform consists of 512 samples. A waveform record contains six waveforms: 2 inputs (voltage and current) x 3 phases. Both the voltage and current waveforms on any phase are always sampled and recorded simultaneously.

To access the real-time or recorded waveforms, **a particular order of requests is needed**. The waveform data is transmitted to a master PC via the special large scale communications buffer. Before reading the waveform samples, the waveform record containing two waveforms for the selected phase should be locked to the communications buffer. It is made by reading a capture code register at offset +0 through the corresponding window for the selected phase voltage input (see Tables 5-57 - 5-59). Before reading the current waveform samples, the capture code register should be accessed via the current waveform window for the corresponding phase to prepare a current waveform for reading.

Once a waveform is locked in the communications buffer, you can read the waveform sample points by accessing the waveform samples registers (see Table 5-60). Data in the communications buffer doesn't change until a capture code register in the voltage channel window is accessed.

Each waveform sample is represented by a value in the range of 0 to 1023. A value of 0 corresponds to the highest negative amplitude of the measured signal, and a value of 1023 corresponds to the highest positive amplitude.

IMPORTANT

When accessing the recorded waveforms, you should be informed of the logging memory organization. The memory partitions for recording waveforms are allocated separately for each waveform type. Also, for each partition, a separate queue is used to

access logged records. It's controlled by the dedicated queue pointer. The queue pointer is shifted to the next record automatically after accessing a capture code register in the Voltage L3 channel window until the last logged record has been read. After that, the exception code 98 is returned in a capture code register. It should be checked before accepting the record. To restore the queue pointer to the origin, a zero must be written to the partition queue reset register (see Section 5.3).

Even if you do not intend to read all data from the present waveform record, you must certainly access the capture code register at offset +0 in the **Voltage L3** waveform window to advance to the following record. A special precaution should be taken if you are using the wrap around logging partition. To prevent possible overlapping of the accessed waveform record by a new one, the instrument temporarily locks the record until the user read the last phase waveforms. If you will forget to unlock the record by reading the capture register for the **Voltage L3 channel,** new logging over the locked record will be impossible.

5.23 Phase Harmonics

These registers are preserved for compatibility with Series 290HD instruments. All the harmonics parameters can be read through extended data registers (see Table 5-19).

Table 5-61 Phase Harmonics Registers

Harmonics channel	Registers (see Table 5-62)
V L1/L12 harmonics	2816-2858
V L2/L23 harmonics	3072-3114
V L3 harmonics	3328-3370
I L1 harmonics	3584-3626
I L2 harmonics	3840-3882
I L3 harmonics	4096-4138

Table 5-62 Phase Harmonics

Parameter	Offset	Size, byte	Direction	Range/Scale	Con-vers.
Channel RMS value	+0	2	R	0 to Vmax **À**/Imax V/A	LIN3
Fundamental frequency	+1	2	R	0 to 100.00 Hz	LIN3
THD	+2	2	R	0 to 100.00 %	LIN3
Harmonic H01 (reference)	+3	2	R	0 to 100.00 %	LIN3
Harmonic H02	+4	2	R	0 to 100.00 %	LIN3
Harmonic H03	+5	2	R	0 to 100.00 %	LIN3
...	...				
Harmonic H40	+42	2	R	0 to 100.00 %	LIN3

À Phase voltage will be line-to-line voltage in 3OP2 and 3OP3 wiring modes, and line-to-neutral voltage in other configurations.

5.24 Real Time Clock

Table 5-63 RTC Registers

Parameter	Address	Size, byte	Direction	Range
Second	4352	2	R/W	0-59
Minute	4353	2	R/W	0-59
Hour	4354	2	R/W	0-23
Day of month	4355	2	R/W	1-31
Month	4356	2	R/W	1-12
Year	4357	2	R/W	0-99
Day of week	4358	2	R/W	1-7 (1=Sunday)

5.25 TOU System Registers Setup

Table 5-64 TOU System Setup Registers

TOU system register	Setup registers (see Table 5-65)
TOU energy register #1	4564-4565
TOU energy register #2	4566-4567
TOU energy register #3	4568-4569
TOU energy register #4	4570-4571
TOU energy register #5	4572-4573
TOU energy register #6	4574-4575
TOU energy register #7	4576-4577
TOU energy register #8	4578-4579
TOU Min/Max kW demand register	4580-4581
TOU Min/Max kvar demand register	4582-4583
TOU Min/Max kVA demand register	4584-4585

Table 5-65 TOU Register Setup

Parameter	Offset	Size, byte	Direction	Range
TOU register input identifier	+0	2	R/W	see Tables 5-66, 5-67
For a pulse input = number of unit-hours per pulse. Otherwise, set to 0.	+1	2	R/W	1-9999

1. Each TOU register consists of 10 tariff registers.
2. If a pulse input is assigned to an energy register, the register's input ID must be written first.

Table 5-66 TOU Energy Registers Inputs

Register input	Input ID
None	0
kWh import	1
kWh export	2
kWh net **À**	3
kWh total	4
kvarh import	5
kvarh export	6
kvarh net **À**	7
kvarh total	8
kVAh total	9
Pulse input #1	10
Pulse input #2	11
Pulse input #3	12
Pulse input #4	13
Pulse input #5	14
Pulse input #6	15
Pulse input #7	16
Pulse input #8	17

À The net energy register is read as a signed long integer.

Table 5-67 TOU Demand Registers Inputs

Register input	Input ID
None	0
Min/Max block demand	1
Min/Max sliding window demand	2
Min/Max thermal demand	3

5.26 TOU Daily Profiles

Table 5-68 TOU Daily Profiles Registers

TOU daily profile	Setup registers (see Table 5-69)
TOU daily profile #1	2048-2063
TOU daily profile #2	2064-2079
TOU daily profile #3	2080-2095
TOU daily profile #4	2096-2111
TOU daily profile #5	2112-2127
TOU daily profile #6	2128-2143
TOU daily profile #7	2144-2159
TOU daily profile #8	2160-2175
TOU daily profile #9	2176-2191

TOU daily profile #10	2192-2207
TOU daily profile #11	2208-2223
TOU daily profile #12	2224-2239
TOU daily profile #13	2240-2255
TOU daily profile #14	2256-2271
TOU daily profile #15	2272-2287
TOU daily profile #16	2288-2303

Table 5-69 TOU Profile Setup Registers

Parameter		Offset	Size, byte	Direction	Range
1st tariff change	Tariff start time	+0	2	R/W	0
	Active tariff number	+1	2	R/W	0-15
2nd tariff change	Tariff start time	+2	2	R/W	see Table 5-70
	Active tariff number	+3	2	R/W	0-15
3rd tariff change	Tariff start time	+4	2	R/W	see Table 5-70
	Active tariff number	+5	2	R/W	0-15
4th tariff change	Tariff start time	+6	2	R/W	see Table 5-70
	Active tariff number	+7	2	R/W	0-15
5th tariff change	Tariff start time	+8	2	R/W	see Table 5-70
	Active tariff number	+9	2	R/W	0-15
6th tariff change	Tariff start time	+10	2	R/W	see Table 5-70
	Active tariff number	+11	2	R/W	0-15
7th tariff change	Tariff start time	+12	2	R/W	see Table 5-70
	Active tariff number	+13	2	R/W	0-15
8th tariff change	Tariff start time	+14	2	R/W	see Table 5-70
	Active tariff number	+15	2	R/W	0-15

Table 5-70 Tariff Start Time Register

Parameter	Bits	Range
Tariff start minute	0-7	0-45
Tariff start hour	8-15	0-23

The daily start time for each tariff is specified with a resolution of 15 minute. If another value specified, it will be truncated to the lower value divisible by 15 minute. No error will occur. The first daily tariff change time is always 00:00. It is preserved internally and cannot be changed.

5.27 TOU Calendars

Table 5-71 TOU Calendars Registers

TOU calendar	Calendar month	Setup registers (see Table 5-72)
TOU calendar #1	January	4368-4375
	February	4376-4383
	March	4384-4391
	April	4392-4399
	May	4400-4407
	June	4408-4415
	July	4416-4423
	August	4424-4431
	September	4432-4439
	October	4440-4447
	November	4448-4455
	December	4456-4463
TOU calendar #2	January	4464-4471
	February	4472-4479
	March	4480-4487
	April	4488-4495
	May	4496-4503
	June	4504-4511
	July	4512-4519
	August	4520-4527
	September	4528-4535
	October	4536-4543
	November	4544-4551
	December	4552-4559

Table 5-72 TOU Calendar Setup Registers

Parameter	Offset	Size, byte	Direction	Range
1-4 day profiles	+0	2	R/W	see Table 5-73
5-8 day profiles	+1	2	R/W	see Table 5-73
9-12 day profiles	+2	2	R/W	see Table 5-73
13-16 day profiles	+3	2	R/W	see Table 5-73
17-20 day profiles	+4	2	R/W	see Table 5-73
21-24 day profiles	+5	2	R/W	see Table 5-73
25-28 day profiles	+6	2	R/W	see Table 5-73
29-31 day profiles	+7	2	R/W	see Table 5-73

Table 5-73 TOU Calendar Profile Format

Parameter	Bits	Range
1st day profile number	0-3	0-15
2nd day profile number	4-7	0-15
3rd day profile number	8-11	0-15
4th day profile number	12-15	0-15

Each profile register defines daily profiles for four days of month.

5.28 TOU Calendar Years

These registers allow to associate calendar years with two TOU annual calendars.

Table 5-74 TOU Calendar Year Registers

Parameter	Address	Size, byte	Direction	Range
1st annual calendar year	4560	2	R/W	0-99
2nd annual calendar year	4561	2	R/W	0-99

5.29 User Assignable Registers

These registers allow the user to re-map either register address accessible in the instrument to the user assignable register area in the address range of 0 to 119 (for more information, see Section 2.9).

Table 5-75 User Assignable Registers

Register contents	Address	Size, byte	Direction	Range
User definable data 0	0	**À**	**À**	**À**
User definable data 1	1	**À**	**À**	**À**
User definable data 2	2	**À**	**À**	**À**
...	...	...	...	...
User definable data 119	119	**À**	**À**	**À**

À - depends on the mapped register

Table 5-76 User Assignable Register Map

Register contents	Address	Size, byte	Direction	Range
Register address for user data 0	120	2	R/W	240 to 9999
Register address for user data 1	121	2	R/W	240 to 9999
Register address for user data 2	122	2	R/W	240 to 9999
...	...	...	...	...
Register address for user data 119	239	2	R/W	240 to 9999