SENSORS

User Manual

Power Meter - Modbus Registers

Model: POM100x01

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Modbus Communication Protocol

This document provides the Modbus Registers for CAA Sensors POM100x01 power meter.

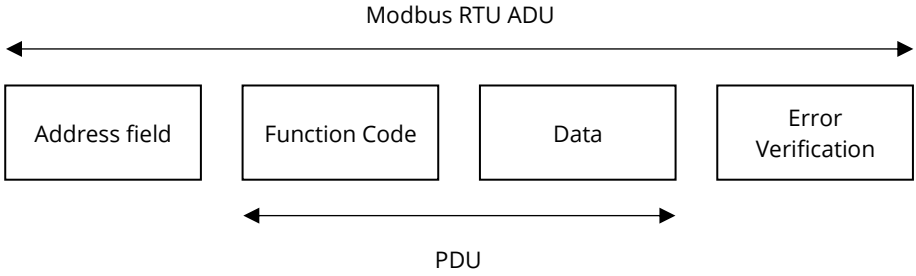
For product specifications and installation information, refer to the POM100x01 user manual, available on www.caassensors.com or from your distributor.

Modbus communications overview

This power meter adopts standard protocol — **Modbus-RTU** with **RS485**.

Error detection: CRC16 (cyclic redundancy check).

The Modbus RTU data frame includes 4 parts: Address field, Function code, Data and Error verification.



Default Modbus communications settings

Before communicating with the device using Modbus-RTU protocol, use the HMI to configure the following settings:

Parameters	Available Values	Default Value
Address	1–247	1
Baud rate	1200 2400 4800 9600 19200 38400	9600
Data bits	8	8
Parity	Odd Even None	None
Stop bits	1 or 2	1

PDU Request Data Format

Function Code	Data
8-Bits	N x 8-Bits

Function code

Function codes are used to indicate how the power meter processes instructions. The following table shows the available function codes and their descriptions.

Function Code		Function Name	Function
Decimal	Hexa-decimal		
3	03H	Read Holding Register	Used to read the meter's parameters
16	10H	Write Multiple Registers	Used to configure the meter's parameters

Register table

Register tables have the following columns:

Register Name	Register Address	Operation R/W	Number of Registers	Type	Unit	Description

Where

- **Register Name**: used to indicate the purpose of the register
- **Register Address**: the address of Modbus register in decimal system (dec)
- **Operation:** used to indicate the operation that the register can perform, ie Read (R) or Write (W)
- **Number of registers:** indicates how many int16 sizes the register has
- **Type**: describes the type of data
- **Units**: indicates the size of the register value unit
- **Description:** a description of the register

Unit Table / Data List Type

The following data types appear in the Modbus register list:

Type	Description	Range
UInt16	16-bit unsigned integer	0 to 65535
Int16	16-bit signed integer	-32768 to +32767
UInt32	32-bit unsigned integer	0 to 4 294 967 295
UInt64	64 bit unsigned integer	0 to 18 446 744 073 709 551 615
UTF8	8-bit field	Multibyte character encoding for Unicode
Float32	32-bit floating point number	Standard representation IEEE for floating number (with single precision)
Date Time	Data and Time types	–
Time	Time type	-

Date Time Format

	Position															
Byte	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1	Year (2000 to 2099)															
2	Month (1–12)								Day (1–31)							
3	Hour (0–23)								Second (0–59)							
4	Millisecond (0–59)															

Time Format

	Position															
Byte	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1	Hour (0–23)															
2	Second (0–59)															
3	Millisecond (0–59)															

Configure Meter via Modbus-RTU

You can use function code 16 to write instructions to the power meter and configure the device parameters.

The device parameter configuration can only be configured by writing the corresponding data to the "configurating instruction register", that is, writing the corresponding data to the **address starting from 300** to configure the corresponding parameters.

Configuration Results

The configuration results can be obtained by reading registers 424 and 425.

The following table describes the command result:

Register Address	Content	Size (Int16)	Data (example)
424	Configuration instruction code	1	1001(set Date Time)
425	Configuration results	1	0 = Configuration Successful 80 = Invalid instruction code 81 = Invalid parameter value 82 = Number of invalid parameters 83 = Instruction not executed

Function code (0x10=16) – Configure Power Meter

Function code (0x10=16) is used to configure the power meter.

Request data format:

No.	Alias	Type	Range (decimal)	Description
1	Device address	UInt8	1-247	
2	Function code	UInt8	16	
3	Register start address	UInt16	-	High byte first (Sending sequence)
4	Number of configuration registers	UInt16	1-123	High byte first (Sending sequence)
5	Data length	UInt8		Number of configuration registers x 2
6	First register configuration data	UInt16	-	High byte first (Sending sequence)
7	...	UInt16	-	High byte first (Sending sequence)
8	nth register configuration data	UInt16	-	High byte first (Sending sequence)
9	CRC-16 parity code	UInt16	-	Low byte first (Sending sequence)

Response data format:

No.	Alias	Type	Range (decimal)	Description
1	Device address	UInt8	1-247	
2	Function code	UInt8	16	
3	Register start address	UInt16	300	High byte first

No.	Alias	Type	Range (decimal)	Description
4	Number of configuration registers	UInt16	1-123	High byte first
5	CRC-16 parity code	UInt16	-	Low byte first

Attention: Function code (0x10=16) can only write data to the "configuration instruction register". That is, it can only write data to the register starting from address 300.

For example: Configure the analyzer time (command =1200, set to: 2022/11/1 12:20:00)

No.	Alias	Type	Range (decimal)	Range (hexadecimal)	Description
1	Device address	UInt8	1	01	
2	Function code	UInt8	16	10	
3	Data byte length	UInt16	300	012C	Configuration register start address
4	Number of read registers	UInt16	7	007	Configure Time Command + parameter (total 7 registers are occupied)
5	Data length	UInt8	14	0E	Number of configuration registers * 2
6	Register 300 write value	UInt16	1200	04B0	Instruction code 1200 to configure time
7	Register 301 write value	UInt16	2022	07E6	Year Configuration = 2022
8	Register 302 write value	UInt16	11	000B	Month Configuration = 11

No.	Alias	Type	Range (decimal)	Range (hexadecimal)	Description
9	Register 303 write value	UInt16	1	0001	Day Configuration = 1
10	Register 304 write value	UInt16	12	000C	Hours Configuration = 12
11	Register 305 write value	UInt16	20	0014	Minutes Configuration =20
12	Register 306 write value	UInt16	0	0000	Seconds Configuration = 0
13	CRC-16 parity code	UInt16	35524	8AC4	Low byte first (Sending sequence)

The order of sending bytes is as follows:

01 10 01 2C 00 07 0E 04 B0 07 E6 00 0B 00 01 00 0C 00 14 00 00 C4 8A

After the configuration is successful the received data packets are as follows:

01 10 01 2C 00 07 41 FE

No.	Alias	Type	Range (hexadecimal)	Range (decimal)
1	Device address	UInt8	01	1
2	Function code	UInt8	10	16
3	Register start address	UInt16	012C	300
4	Number of configuration registers	UInt16	0007	7
7	CRC-16 parity code	UInt16	41FE	

Function code (0x03=3) – Read Parameters

Function code (0x03=3) is used to read parameters of the power meter.

Request data format

No.	Alias	Type	Range (decimal)	Description
1	Device address	UInt8	1-247	
2	Function code	UInt8	3	
3	Register start address	UInt16	-	High byte first (Sending sequence)
4	Number of read registers	UInt16	1-125	High byte first (Sending sequence)
5	CRC-16 parity code	UInt16	-	Low byte first (Sending sequence)

Return data format

No.	Alias	Type	Range (decimal)	Description
1	Device address	UInt8	1-247	
2	Function code	UInt8	3	
3	Data byte length	UInt8	-	Registers Numbers *2
4	Value of register 1		-	High byte first
5	...		-	High byte first
6	Value of register n		-	High byte first
7	CRC-16 parity code	UInt16	-	Low byte first

For **example**: Read the voltage values of L1 , L2 and L3 (the starting address of the voltage register is 1010)

No.	Alias	Type	Range (decimal)	Range (hexadecimal)	Description
1	Device address	UInt8	1	0x01	
2	Function code	UInt8	3	0x03	
3	Register start address	UInt16	1010	0x03F2	
4	Number of read registers	UInt16	6	0x0006	
5	CRC-16 parity code	UInt16	32612	0x7F64	Low byte first

The order of sending hexadecimal bytes is as follows:

01 03 03 F2 00 06 64 7F

The received packets are as follows:

01 03 0C 43 5C 00 00 43 5D 00 00 43 5E 00 00 14 AC

No.	Alias	Type	Range (decimal)	Range (hexadecimal)	Description
1	Device address	UInt8	1	01	
2	Function code	UInt8	3	03	
3	Data byte length	UInt8	12	0C	
4	Address 2147 data (phase a voltage)	float32	220V	435C0000	
5	Address 2148 data (phase B voltage)	float32	221V	435D0000	
6	Address 2149 data (phase C voltage)	float32	222V	435E0000	
7	CRC-16 parity code	UInt16		14AC	

Error response

Error response frame format

No.	Alias	Type	Range (decimal)	Range (hexadecimal)	Description
1	Device address	UInt8	1-247	0x01-0xF7	
2	Function code	UInt8	(128+3) (128+16)	(0x80+0x03) (0x80+0x10)	
3	Error code	UInt8			
4	CRC-16 parity code	UInt16			Low byte first

MODBUS Error code

Code (hexadecimal)	Name	Meaning
0x01	Illegal function code	The function code supported by the analyzer is not used
0x02	Illegal data address	The register data written or read is not a supported address range
0x03	Illegal data value	The data value written to the register does not meet the requirements
0x04	Analyzer error	An unknown error occurred

List of Configuration Instructions

System Parameters

Command Number	Action R/W	Size	Type	Units	Range	Description
1001	Write (W)	1	UInt16	-	0 - 5	Wiring Mode 0 = 3P4W_4CT 1 = 3P4W_3CT 2 = 3P3W_3CT 3 = 3P3W_2CT 4 = 1P3W 5 = 1P2W
	Write (W)	1	UInt16	Hz	50, 60	Grid frequency
	Write (W)	1	UInt16	V	1-65535	Nominal voltage (not including VT ratio)
	Write (W)	2	Uint32	-	1 - 99999999	VT ratio, 10000 times magnification
	Write (W)	2	Uint32	-	1 - 99999999	CT ratio, 10000 times magnification

L1, L2, L3 Current Transformer

Command Number	Action R/W	Size	Type	Units	Range	Description
1002	Write (W)	1	UInt16	-	0, 1	Current access mode 0 = Rogowski coil 1 = VCT

Command Number	Action R/W	Size	Type	Units	Range	Description
	Write (W)	2	Uint32	A	1 - 999999	Phase L1, L2, L3 Rogowski coil input value
	Write (W)	2	Uint32	mV@50Hz mV@60Hz	1 - 99999	Phase L1, L2, L3 Rogowski coil output =Actual value*100 (**Note**: The output should be set according to the set power grid frequency)
	Write (W)	2	Uint32	A	1 - 999999	Nominal current of phase L1, L2, L3 Rogowski coil
	Write (W)	2	Uint32	A	1 - 999999	Phase L1, L2, L3 VCT input value
	Write (W)	2	Uint32	mV	1 - 99999	Phase L1, L2, L3 VCT output =Actual value*100
	Write (W)	2	Uint32	A	1 - 99999	VCT nominal current of phase L1, L2, L3

N-phase Current Transformer

Command Number	Action R/W	Size	Type	Units	Range	Description
1003	Write (W)	1	UInt16	-	0, 1	Phase N current access 0 = Rogowski coil 1 = VCT
	Write (W)	2	Uint32	A	1 - 999999	Phase N Rogowski coil input value

Command Number	Action R/W	Size	Type	Units	Range	Description
	Write (W)	2	Uint32	mV@50Hz mV@60Hz	1 - 99999	Phase N Rogowski coil output =Actual value*100 (**Note**: The output should be set according to the set power grid frequency)
	Write (W)	2	Uint32	A	1 - 999999	Nominal current of phase N Rogowski coil
	Write (W)	2	Uint32	A	1 - 999999	Phase N VCT input value
	Write (W)	2	Uint32	mV	1 - 99999	Phase N VCT output =Actual value*100
	Write (W)	2	Uint32	A	1 - 99999	VCT nominal current of phase N

Zero Drift Suppression

Command Number	Action R/W	Size	Type	Units	Range	Description
1020	Write (W)	1	UInt16	%	0 - 1000	Voltage zero drift suppression Take (nominal voltage * VT variable ratio) as a reference = Actual value * 100 **Default**: 10
	Write (W)	1	Uint16	%	0 - 1000	Current zero drift suppression With (nominal current * CT

Command Number	Action R/W	Size	Type	Units	Range	Description
						change ratio) as a reference = Actual value * 100 **Default**: 10

Demand

Command Number	Action R/W	Size	Type	Units	Range	Description
1060	Write (W)	1	UInt16	-	0, 1	Demand calculation method 0 = Fixed 1 = Sliding type
	Write (W)	1	Uint16	Minute	1 – 60	Demand calculation interval **Default**: 15

Tariff Mode

Command Number	Action R/W	Size	Type	Units	Range	Description
1070	Write (W)	1	UInt16	-	0, 1	Switch mode 0 = Manual 1 - RTC

Manual Tariff

Command Number	Action R/W	Size	Type	Units	Range	Description
1071	Write (W)	1	UInt16	-	0 – 5	Manual tariff setting 0 = Tariff select 1 1 = Tariff select 2

Command Number	Action R/W	Size	Type	Units	Range	Description
						... 5 = Tariff select 6 (Note: This setting is only valid if the tariff mode is manual switching)

RTC tariff period

Command Number	Action R/W	Size	Type	Units	Range	Description
1072	Write (W)	3	Time	-	-	Ta Start
	Write (W)	3	Time	-	-	Tb Start
	Write (W)	3	Time	-	-	Tc Start
	Write (W)	3	Time	-	-	Te Start
	Write (W)	3	Time	-	-	Te Start
	Write (W)	3	Time	-	-	Tf Start

RTC tariff select

Command Number	Action R/W	Size	Type	Units	Range	Description
1073	Write (W)	1	UInt16	-	0 - 5	Ta Tariff select 0 = Tariff 1 1 = Tariff 2 .... 5 = Tariff select 6
	Write (W)	1	UInt16	-	0 - 5	Tb select
	Write (W)	1	UInt16	-	0 - 5	Tc select
	Write (W)	1	UInt16	-	0 - 5	Te select

Command Number	Action R/W	Size	Type	Units	Range	Description
	Write (W)	1	UInt16	-	0 - 5	Te select
	Write (W)	1	UInt16	-	0 - 5	Tf select

Device Date and Time

Command Number	Action R/W	Size	Type	Units	Range	Description
1200	Write (W)	1	UInt16	-	2000-2099	Year
	Write (W)	1	UInt16	-	1-12	Month
	Write (W)	1	UInt16	-	1-31	Day
	Write (W)	1	UInt16	-	0-23	Hour
	Write (W)	1	UInt16	-	0-59	Minute
	Write (W)	1	UInt16	-	0-59	Second

Communication

Command Number	Action R/W	Size	Type	Units	Range	Description
1210	Write (W)	1	UInt16	-	1-247	Slave Address
	Write (W)	1	UInt16	-	0-4	Baud Rate 0=2400 1=4800 2=9600 3=19200 4=38400
	Write (W)	1	UInt16	-	0,1,2	Parity 0 = None 1 = Odd 2 = Even

Command Number	Action R/W	Size	Type	Units	Range	Description
	Write (W)	1	Uint16	-	0, 1	Stop bit 0 = 1 bit 1 = 2 bit

Reset

Command Number	Action R/W	Size	Type	Units	Range	Description
1301	Write (W)	1	UInt16	-	1 – 5	1 = Reset Max. Min. 2 = Reset Demand Max 3 = Reset Tariff Energy 4 = Reset Energy 5 = Reset ALL

Set Harmonic Times

Command Number	Action R/W	Size	Type	Units	Range	Description
1004	Write (W)	1	UInt16	-	2-52	HX harmonic times
	Write (W)	1	UInt16	-	2-52	HY harmonic times
	Write (W)	1	UInt16	-	2-52	HZ harmonic times

Relay Output Control Mode

Command Number	Action R/W	Size	Type	Units	Range	Description
2000	Write (W)	1	UInt16	-	0,1	Control mode 0 = Manual 1 = Alarm

Relay Output Manual Control

Command Number	Action R/W	Size	Type	Units	Range	Description
2001	Write (W)	1	UInt16	-	0, 1	Relay output control 0 = open relay output 1 = closed relay output (Note: This setting is effective only when the relay output control mode is manual control mode)

Alarm

Command Number	Action R/W	Size	Type	Units	Range	Description
3000	Write (W)	1	UInt16	-	-	Alarm ID
	Write (W)	1	UInt16	-	0, 1	Alarm Status 0 = Disable 1 = Enable
	-	1	UInt16	-	-	Reserve
	Write (W)	2	Float32	-	0 -1000000	Alarm activation threshold
	Write (W)	2	Float32	%	-	Percentage error of alarm release point relative to alarm activation threshold **Example**: over current alarm activation threshold =100A alarm release point =5%. When the current value is less than 100-100*5%=95A, the alarm will be released

Command Number	Action R/W	Size	Type	Units	Range	Description
	Write (W)	1	UInt16	-	0, 1	Buzzer 0 = Unlinked 1 = Linked
	Write (W)	1	UInt16	-	0, 1	Relay 0 = Unlinked 1 = Linked

Modbus Register List

Register table

The register list has the following headings::

Register Alias	Register Address	Operation R/W	Size	Type	Unit	Description

Where

- **Register Alias**: used to indicate the purpose of the register
- **Register Address**: the address of Modbus register in decimal system (dec), and the address is the real address without offset.
- **Operation:** used to indicate the operation that the register can perform.
    - Read (**R**) or Write (**W**) operations can be written directly through 16 function code.
    - **WC** registers need to be configured indirectly by writing configuration data to the address starting from the instruction register 300
- **Size:** Indicates how many MODBUS registers are occupied. One MODBUS register is 16bit
- **Type**: describes the type of data (see table below)
- **Units**: indicates the size of the register value unit
- **Description:** a description of the register

Unit Table / Data List Type

The following data types appear in the Modbus register list:

Type	Description	Range
UInt16	16-bit unsigned integer	0 to 65535
Int16	16-bit signed integer	-32768 to +32767
UInt32	32-bit unsigned integer	0 to 4 294 967 295
UInt64	64 bit unsigned integer	0 to 18 446 744 073 709 551 615
UTF8	8-bit field	Multibyte character encoding for Unicode

Type	Description	Range
Float32	32-bit floating point number	Standard representation IEEE for floating number (with single precision)
Date Time	Data and Time types	–
Time	Time type	-

Date Time Format

	Position															
Byte	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1	Year (2000 to 2099)															
2	Month (1–12)								Day (1–31)							
3	Hour (0–23)								Second (0–59)							
4	Millisecond (0–59)															

Equipment

Register Alias	Register Address	Action R/WC	Size	Type	Units	Description
Meter Model	60	R	10	UTF8	-	
Serial Number	70	R	2	UInt32	-	
APP Version	72	R	1	UInt16	-	DLF format: X.Y
Date and Time	75	R/WC	4	Data Time	-	Reg. 75: Year 2000 to 2099 Reg. 746 Month (b15:b8),

Register Alias	Register Address	Action R/WC	Size	Type	Units	Description
						Day (b7:b0) Reg. 77: Hour (b15:b8), Minute (b7:b0) Reg. 78: Millisecond

Communications

Register Alias	Register Address	Action R/WC	Size	Type	Units	Description
Slave address	80	R/WC	1	UInt16	-	1 to 247
Baud Rate	81	R/WC	1	UInt16	-	0 = 2400 1 = 4800 2 = 9600 3 = 19200 4 = 38400
Parity	82	R/WC	1	UInt16	-	0 = None 1 = Odd 2 = Even
Stop Bit	83	R/WC	1	UInt16	-	0 = 1 bit 1 = 2 bit

Relay

Register Alias	Register Address	Action R/WC	Size	Type	Units	Description
Output control mode	200	R/WC	1	UInt16	-	Relay output control mode 0 = Manual control mode 1 = alarm output control mode
Relay output control	201	R/WC	1	UInt16	-	Relay output control 0 = Open 1 = Closed (Note: This setting is effective only when the relay output control mode is manual control mode)
Relay output state	202	R	1	UInt16	-	Relay output status 0 = open 1 = closed

Digital Input

Register Alias	Register Address	Action R/WC	Size	Type	Units	Description
Relay output status	210	R	1	UInt16	-	0 = Open 1 = Closed

Voltage and Current phase sequence

Register Alias	Register Address	Action R/WC	Size	Type	Units	Description
Voltage current phase sequence state	220	R	1	UInt16	-	0 = voltage sequence is correct, current sequence is correct 1 = voltage sequence wrong, current sequence correct 2 = voltage sequence correct, current sequence wrong 3 = voltage sequence wrong, current sequence wrong

Note: Current phase sequence may be errors when the current is less than 1% of the nominal current

Configure Instruction Register

Register Alias	Register Address	Action R/W	Size	Type	Units	Description
Instruction code	300	R/W	1	UInt16	-	
Instruction parameters 001	300	R/W	1	UInt16	-	

Register Alias	Register Address	Action R/W	Size	Type	Units	Description
Instruction parameters 002	300	R/W	1	UInt16	-	
...	...	R/W	1	UInt16	-	
Instruction parameters 123	423	R/W	1	UInt16	-	
Configuration instruction code	424	R	1	UInt16	-	
Configuration results	425	R	1	UInt16	-	0 = valid operation 80 = invalid instruction code 81 = invalid instruction parameter 82 = number of invalid instruction parameters 83 = operation not executed

Power System

Register Alias	Register Address	Action R/WC	Size	Type	Units	Description
Wiring mode	500	R/WC	1	UInt16	-	0 = 3P4W_4CT 1 = 3P4W_3CT 2 = 3P3W_3CT 3 = 3P3W_2CT 4 = 1P3W 5 = 1P2W
Grid Frequency	501	R/WC	1	UInt16	Hz	

Register Alias	Register Address	Action R/WC	Size	Type	Units	Description
Nominal voltage	502	R/WC	2	UInt32	V	The VT ratio is not included
VT Ratio	503	R/WC	2	UInt32	-	Actual value = read value /10000
CT Ratio	505	R/WC	2	UInt32	-	Actual value = read value /10000
Phase L1, L2, L3 current transfer						
Phase L1, L2, L3 Sensor Type	510	R/WC	1	UInt16	-	0 = Rogowski coil 1 = VCT
Phase L1, L2, L3 Rogowski Coil Pri	511	R/WC	2	UInt32	A	
Phase L1, L2, L3 Rogowski Coil Sec	513	R/WC	2	UInt32	mV@50Hz mV@60Hz	Actual value = read value /100
Nominal current of Phase L1, L2, L3 Rogowski Coil	515	R/WC	2	UInt32	A	
Phase L1, L2, L3 VCT Pri	517	R/WC	2	UInt32	A	
Phase L1, L2, L3 VCT Sec	519	R/WC	2	UInt32	mV	Actual value = read value /100
Nominal current of Phase L1, L2, L3 VCT	521	R/WC	2	UInt32	A	
N-phase current transfer						

Register Alias	Register Address	Action R/WC	Size	Type	Units	Description
Phase N Sensor Type	530	R/WC	1	UInt16	-	0 = Rogowski coil 1 = VCT
Phase N Rogowski Coil Pri	531	R/WC	2	UInt32	A	
Phase N Rogowski Coil Sec	533	R/WC	2	UInt32	mV@50Hz mV@60Hz	Actual value = read value /100
Nominal current of Phase N Rogowski Coil	535	R/WC	2	UInt32	A	
Phase N VCT Pri	537	R/WC	2	UInt32	A	
Phase N VCT Sec	539	R/WC	2	UInt32	mV	Actual value = read value /100
Nominal current of Phase N VCT	541	R/WC	2	UInt32	A	

Zero Drift Suppression

Register Alias	Register Address	Action R/WC	Size	Type	Units	Description
Voltage zero drift suppression	600	R/WC	1	UInt16	%	**Voltage** zero drift suppression Take (nominal voltage *VT ratio) as a reference Actual value = Read value /100

Register Alias	Register Address	Action R/WC	Size	Type	Units	Description
Current zero drift suppression	601	R/WC	1	UInt16	%	**Current** zero drift suppression Take (nominal current *CT ratio) as reference Actual value = Read value /100

Tariff

Register Alias	Register Address	Action R/WC	Size	Type	Units	Description
Current Tariff	800	R	1	UInt16	-	Current Tariff 0 = Tariff 1 1 = Tariff 2 2 = Tariff 3 3 = Tariff 4 4 = Tariff 5 5 = Tariff 6
Tariff switching mode	801	R/WC	1	UInt16	-	Tariff switching mode 0 = Manual 1= RTC
Manual Tariff selection	802	R/WC	1	UInt16	-	RTC Ta Start
RTC Ta Start	803	R/WC	3	Time	-	RTC Tb Start
RTC Tb Start	806	R/WC	3	Time	-	RTC Tc Start
RTC Tc Start	809	R/WC	3	Time	-	RTC Te Start
RTC Td Start	812	R/WC	3	Time	-	RTC Te Start
RTC Te Start	815	R/WC	3	Time	-	RTC Tf Start
RTC Tf Start	818	R/WC	1	UInt16	-	Current Tariff

Register Alias	Register Address	Action R/WC	Size	Type	Units	Description
RTC Ta tariff select	821	R/WC	1	UInt16	-	0 = Tariff 1 1 = Tariff 2 2 = Tariff 3 3 = Tariff 4 4 = Tariff 5 5 = Tariff 6
RTC Tb tariff select	822	R/WC	1	UInt16	-	
RTC Tc tariff select	823	R/WC	1	UInt16	-	
RTC Td tariff select	824	R/WC	1	UInt16	-	
RTC Te tariff select	825	R/WC	1	UInt16	-	
RTC Tf tariff select	826	R/WC	1	UInt16	-	

Data – Voltage, Current, Power, Power factor

Register Alias	Register Address	Action R/WC	Size	Type	Units	Description
Current						
I1	1000	R	2	Float32	A	Phase L1 Current
I2	1002	R	2	Float32	A	Phase L2 Current
I3	1004	R	2	Float32	A	Phase L3 Current
Current Avg	1006	R	2	Float32	A	Average of L1, L2, L3 three phase current
IN	1008	R	2	Float32	A	Phase N current
Phase Voltage						
U1	1010	R	2	Float32	V	U1-UN Voltage
U2	1012	R	2	Float32	V	U2-UN Voltage
U3	1014	R	2	Float32	V	U3-UN Voltage

Register Alias	Register Address	Action R/WC	Size	Type	Units	Description
Phase Voltage Avg	1016	R	2	Float32	V	Average of three-phase phase voltage
U0	1018	R	2	Float32	V	Zero sequence voltage
Line Voltage						
U12	1020	R	2	Float32	V	U1-U2 Voltage
U23	1022	R	2	Float32	V	U2-U3 Voltage
U31	1024	R	2	Float32	V	U3-U1 Voltage
Line Voltage Avg	1026	R	2	Float32	V	Average of three-phase line voltage
Active Power						
P1	1028	R	2	Float32	kW	Phase L1 Active power
P2	1030	R	2	Float32	kW	Phase L2 Active power
P3	1032	R	2	Float32	kW	Phase L3 Active power
PTotal	1034	R	2	Float32	kW	Total Active Power
Reactive Power						
Q1	1036	R	2	Float32	kVAR	Phase L1 Reactive power
Q2	1038	R	2	Float32	kVAR	Phase L2 Reactive power
Q3	1040	R	2	Float32	kVAR	Phase L3 Reactive power
QTotal	1042	R	2	Float32	kVAR	Total Reactive Power
Apparent Power						
S1	1044	R	2	Float32	kVA	Phase L1 Apparent power

Register Alias	Register Address	Action R/WC	Size	Type	Units	Description
S2	1046	R	2	Float32	kVA	Phase L2 Apparent power
S3	1048	R	2	Float32	kVA	Phase L3 Apparent power
STotal	1050	R	2	Float32	kVA	Total Apparent Power
Power Factor (PF)						
PF1	1052	R	2	Float32	-	Phase L1 Power factor
PF2	1054	R	2	Float32	-	Phase L2 Power factor
PF3	1056	R	2	Float32	-	Phase L3 Power factor
PF Total	1058	R	2	Float32	-	Total Power factor
Fundamental Harmonic Power Factor						
DPF1	1060	R	2	Float32	-	Phase L1 Fundamental harmonic power factor
DPF2	1062	R	2	Float32	-	Phase L2 Fundamental harmonic power factor
DPF3	1064	R	2	Float32	-	Phase L3 Fundamental harmonic power factor
DPF Total	1066	R	2	Float32	-	Total Fundamental harmonic power factor
Frequency						
Freq1	1068	R	2	Float32	Hz	Phase L1 Frequency
Freq2	1070	R	2	Float32	Hz	Phase L2 Frequency
Freq3	1072	R	2	Float32	Hz	Phase L3 Frequency
FreqTotal	1074	R	2	Float32	Hz	Total Frequency

Energy

There are two types of energy - positive energy and reverse energy.

When the total electric energy reaches 1.0 x 10^9 kwh, 1.0 x 10^9 kvarh, or 1.0 x 10^9 KVAh, the electric energy of each phase will be cleared automatically.

Register Alias	Register Address	Action R/WC	Size	Type	Units	Description
Active Energy - Int64						
EP1Imp	2500	R	4	Int64	kWh	Phase L1 Positive active energy
EP2Imp	2504	R	4	Int64	kWh	Phase L2 Positive active energy
EP3Imp	2508	R	4	Int64	kWh	Phase L3 Positive active energy
EPImp	2512	R	4	Int64	kWh	Total Positive Active Energy
EP1Exp	2516	R	4	Int64	kWh	Phase L1 Reverse active energy
EP2Exp	2520	R	4	Int64	kWh	Phase L2 Reverse active energy
EP3Exp	2524	R	4	Int64	kWh	Phase L3 Reverse active energy
EPExp	2528	R	4	Int64	kWh	Total Reverse Active Energy
Reactive Energy - Int64						
EQ1Imp	2532	R	4	Int64	VARh	Phase L1 Positive reactive energy
EQ2Imp	2536	R	4	Int64	VARh	Phase L2 Positive reactive energy

Register Alias	Register Address	Action R/WC	Size	Type	Units	Description
EQ3Imp	2540	R	4	Int64	VARh	Phase L3 Positive reactive energy
EQImp	2544	R	4	Int64	VARh	Total Positive reactive energy
EQ1Exp	2548	R	4	Int64	VARh	Phase L1 Reverse reactive energy
EQ2Exp	2552	R	4	Int64	VARh	Phase L2 Reverse reactive energy
EQ3Exp	2556	R	4	Int64	VARh	Phase L3 Reverse reactive energy
EQExp	2560	R	4	Int64	VARh	Total Reverse reactive energy
Apparent Energy - Int64						
ES1	2564	R	4	Int64	VAh	Phase L1 Apparent Energy
ES2	2568	R	4	Int64	VAh	Phase L2 Apparent Energy
ES3	2572	R	4	Int64	VAh	Phase L3 Apparent Energy
ES	2576	R	4	Int64	VAh	Total Apparent Energy
Active Energy - Int32						
EP1Imp	2600	R	2	UInt32	kWh	Phase L1 Positive active energy
EP2Imp	2602	R	2	UInt32	kWh	Phase L2 Positive active energy
EP3Imp	2604	R	2	UInt32	kWh	Phase L3 Positive active energy
EPImp	2606	R	2	UInt32	kWh	Total Positive Active Energy

Register Alias	Register Address	Action R/WC	Size	Type	Units	Description
EP1Exp	2608	R	2	UInt32	kWh	Phase L1 Reverse active energy
EP2Exp	2610	R	2	UInt32	kWh	Phase L2 Reverse active energy
EP3Exp	2612	R	2	UInt32	kWh	Phase L3 Reverse active energy
EPExp	2614	R	2	UInt32	kWh	Total Reverse Active Energy
Reactive Energy - Int32						
EQ1Imp	2616	R	2	UInt32	VARh	Phase L1 Positive reactive energy
EQ2Imp	2618	R	2	UInt32	VARh	Phase L2 Positive reactive energy
EQ3Imp	2620	R	2	UInt32	VARh	Phase L3 Positive reactive energy
EQImp	2622	R	2	UInt32	VARh	Total Positive reactive energy
EQ1Exp	2624	R	2	UInt32	VARh	Phase L1 Reverse reactive energy
EQ2Exp	2626	R	2	UInt32	VARh	Phase L2 Reverse reactive energy
EQ3Exp	2628	R	2	UInt32	VARh	Phase L3 Reverse reactive energy
EQExp	2630	R	2	UInt32	VARh	Total Reverse reactive energy
Apparent Energy - Int32						
ES1	2632	R	2	UInt32	VAh	Phase L1 Apparent Energy

Register Alias	Register Address	Action R/WC	Size	Type	Units	Description
ES2	2634	R	2	UInt32	VAh	Phase L2 Apparent Energy
ES3	2636	R	2	UInt32	VAh	Phase L3 Apparent Energy
ES	2638	R	2	UInt32	VAh	Total Apparent Energy

Tariff Energy

Tariff Energy types are Int64 and UInt32, whose unit size is different.

When the rate of electricity reaches 1.0 x 10 9 kWh , 1.0 x 10 9 kVarh or v 1.0 x 10 9 kVah, each Tariff Energy will be automatically cleared to zero.

Register Alias	Register Address	Action R/WC	Size	Type	Units	Description
Tariff Energy – Int64						
ET1	2700	R	4	Int64	kWh	Tariff 1 Active Energy
ET2	2704	R	4	Int64	kWh	Tariff 2 Active Energy
ET3	2708	R	4	Int64	kWh	Tariff 3 Active Energy
ET4	2712	R	4	Int64	kWh	Tariff 4 Active Energy
ET5	2716	R	4	Int64	kWh	Tariff 5 Active Energy
ET6	2720	R	4	Int64	kWh	Tariff 6 Active Energy
Tariff Energy – UInt32						
ET1	2750	R	2	UInt32	kWh	Tariff 1 Active Energy
ET2	2752	R	2	UInt32	kWh	Tariff 2 Active Energy
ET3	2754	R	2	UInt32	kWh	Tariff 3 Active Energy
ET4	2756	R	2	UInt32	kWh	Tariff 4 Active Energy
ET5	2758	R	2	UInt32	kWh	Tariff 5 Active Energy

Register Alias	Register Address	Action R/WC	Size	Type	Units	Description
ET6	2760	R	2	UInt32	kWh	Tariff 6 Active Energy

Demand Register

Register Alias	Register Address	Action R/WC	Size	Type	Units	Description
Basic Parameters of Demand						
DMD Demand	3000	R/WC	2	UInt16	kW	Demand calculation method: 0 = sliding type 1= fixed
DMD Block	3001	R/RC	2	UInt16	Minute	Demand interval
PDMD Reset Time	3002	R	4	Date time	-	Peak demand reset date and time
Power Demand – Active Power						
P1Demand	3020	R	2	Float32	kW	Current active power demand of phase L1
P1PeakDemand	3022	R	2	Float32	kW	Peak demand of phase L1 active power
P1PeakDemand Date	3024	R	4	Date time	-	Occurrence time of peak demand of phase L1 active power
P2Demand	3028	R	2	Float32	kW	Current active power demand of phase 2
P2PeakDemand	3030	R	2	Float32	kW	Peak demand of phase 2 active power

Register Alias	Register Address	Action R/WC	Size	Type	Units	Description
P2PeakDemand Date	3032	R	4	Date time	-	Occurrence time of peak demand of phase 2 active power
P3Demand	3036	R	2	Float32	kW	Current active power demand of phase 3
P3PeakDemand	3038	R	2	Float32	kW	Peak demand of phase 3 active power
P3PeakDemand Date	3040	R	4	Date time	-	Occurrence time of peak demand of phase 3 active power
PSUMDemand	3044	R	2	Float32	kW	Current total active power demand
PSUMPeakDemand	3046	R	2	Float32	kW	Peak demand of total active power
PSUMPeakDemand Date	3048	R	4	Date time	-	Occurrence time of peak demand of total active power
Power Demand – Reactive Power						
Q1Demand	3052	R	2	Float32	kVar	Current reactive power demand of phase L1
Q1PeakDemand	3054	R	2	Float32	kVar	Peak demand of phase L1 reactive power
Q1PeakDemand Date	3056	R	4	Date time	-	Occurrence time of peak demand of phase L1 reactive power
Q2Demand	3060	R	2	Float32	kVar	Current reactive power demand of phase L2

Register Alias	Register Address	Action R/WC	Size	Type	Units	Description
Q2PeakDemand	3062	R	2	Float32	kVar	Peak demand of phase L2 reactive power
Q2PeakDemand Date	3064	R	4	Date time	-	Occurrence time of peak demand of phase L2 reactive power
Q3Demand	3068	R	2	Float32	kVar	Current reactive power demand of phase L3
Q3PeakDemand	3070	R	2	Float32	kVar	Peak demand of phase L3 reactive power
Q3PeakDemand Date	3072	R	4	Date time	-	Occurrence time of peak demand of phase L3 reactive power
QSUMDemand	3076	R	2	Float32	kVar	Current total reactive power demand
QSUMPeakDemand	3078	R	2	Float32	kVar	Peak demand of total reactive power
QSUMPeakDemand Date	3080	R	4	Date time	-	Occurrence time of peak demand of total reactive power
Power Demand – Apparent Power						
S1Demand	3084	R	2	Float32	kVa	Current apparent power demand of phase L1
S1PeakDemand	3086	R	2	Float32	kVa	Peak demand of phase L1 apparent power

Register Alias	Register Address	Action R/WC	Size	Type	Units	Description
S1PeakDemand Date	3088	R	4	Date time	-	Occurrence time of peak demand of phase L1 apparent power
S2Demand	3092	R	2	Float32	kVa	Current apparent power demand of phase L2
S2PeakDemand	3094	R	2	Float32	kVa	Peak demand of phase L2 apparent power
S2PeakDemand Date	3096	R	4	Date time	-	Occurrence time of peak demand of phase L2 apparent power
S3Demand	3100	R	2	Float32	kVa	Current apparent power demand of phase L3
S3PeakDemand	3102	R	2	Float32	kVa	Peak demand of phase L3 apparent power
S3PeakDemand Date	3104	R	4	Date time	-	Occurrence time of peak demand of phase L3 apparent power
SSUMDemand	3108	R	2	Float32	kVa	Current total apparent power demand
SSUMPeakDemand	3110	R	2	Float32	kVa	Peak demand of total apparent power
SSUMPeakDemand Date	3112	R	4	Date time	-	Occurrence time of peak demand of total apparent power

Voltage and current harmonic register

Register Alias	Register Address	Action R/WC	Size	Type	Units	Description
Current Harmonic Percentage						
I1THD	4000	R	2	Float32	%	Phase L1 current total harmonic percentage
I2THD	4002	R	2	Float32	%	Phase L2 current total harmonic percentage
I3THD	4004	R	2	Float32	%	Phase L3 current total harmonic percentage
I1TOHD	4006	R	2	Float32	%	Phase L1 current odd total harmonic percentage
I2TOHD	4008	R	2	Float32	%	Phase L2 current odd total harmonic percentage
I3TOHD	4010	R	2	Float32	%	Phase L3 current odd total harmonic percentage
I1TEHD	4012	R	2	Float32	%	Phase L1 current even total harmonic percentage
I1TEHD	4014	R	2	Float32	%	Phase L2 current even total harmonic percentage
I1TEHD	4016	R	2	Float32	%	Phase L3 current even total harmonic percentage
I1HD1	4018	R	2	Float32	%	1st harmonic percentage of phase L1 current

Register Alias	Register Address	Action R/WC	Size	Type	Units	Description
I2HD1	4020	R	2	Float32	%	1st harmonic percentage of phase L2 current
I3HD1	4022	R	2	Float32	%	1st harmonic percentage of phase L3 current
...	4024-4311	...	...	...	...	The 2nd - 49th harmonic percentage of L1, L2, L3 phase current
I1HD50	4312	R	2	Float32	%	The 50th harmonic percentage of phase L1 current
I2HD50	4314	R	2	Float32	%	The 50th harmonic percentage of phase L2 current
I3HD50	4316	R	2	Float32	V	The 50th harmonic percentage of phase L3 current
Current Harmonic value						
I1HDV1	4400	R	2	Float32	V	Fundamental current value of phase L1 current
I2HDV1	4402	R	2	Float32	V	Fundamental current value of phase L2 current
I3HDV1	4404	R	2	Float32	V	Fundamental current value of phase L3 current
...	4406 - 4693	...	...	...	...	The 2nd - 49th harmonic current value of L1, L2, L3 phase current

Register Alias	Register Address	Action R/WC	Size	Type	Units	Description
I1HDV50	4694	R	2	Float32	V	The 50th harmonic current value of phase L1 current
I2HDV50	4696	R	2	Float32	V	The 50th harmonic current value of phase L2 current
I3HDV50	4698	R	2	Float32	V	The 50th harmonic current value of phase L3 current
Voltage Harmonics						
U1THD	5000	R	2	Float32	%	Phase L1 voltage total harmonic percentage
U2THD	5002	R	2	Float32	%	Phase L2 voltage total harmonic percentage
U3THD	5004	R	2	Float32	%	Phase L3 voltage total harmonic percentage
U1TOHD	5006	R	2	Float32	%	Phase L1 voltage odd total harmonic percentage
U2TOHD	5008	R	2	Float32	%	Phase L2 voltage odd total harmonic percentage
U3TOHD	5010	R	2	Float32	%	Phase L3 voltage odd total harmonic percentage
U1TEHD	5012	R	2	Float32	%	Phase L1 voltage even total harmonic percentage
U1TEHD	5014	R	2	Float32	%	Phase L2 voltage even total harmonic percentage

Register Alias	Register Address	Action R/WC	Size	Type	Units	Description
U1TEHD	5016	R	2	Float32	%	Phase L3 voltage even total harmonic percentage
U1HD1	5018	R	2	Float32	%	1st harmonic percentage of phase L1 voltage
U2HD1	5020	R	2	Float32	%	1st harmonic percentage of phase L2 voltage
U3HD1	5022	R	2	Float32	%	1st harmonic percentage of phase L3 voltage
...	5024-5311	...	...	...	...	The 2nd - 49th harmonic percentage of L1, L2, L3 phase voltage
U1HD50	5312	R	2	Float32	%	The 50th harmonic percentage of phase L1 voltage
U2HD50	5314	R	2	Float32	%	The 50th harmonic percentage of phase L2 voltage
U3HD50	5316	R	2	Float32	V	The 50th harmonic percentage of phase L3 voltage
Voltage harmonic value						
U1HDV1	5400	R	2	Float32	V	Fundamental voltage value of phase L1 voltage
U2HDV1	5402	R	2	Float32	V	Fundamental voltage value of phase L2 voltage

Register Alias	Register Address	Action R/WC	Size	Type	Units	Description
U3HDV1	5404	R	2	Float32	V	Fundamental voltage value of phase L3 voltage
...	5406 - 5693	...	...	...	...	The 2nd - 49th harmonic voltage value of L1, L2, L3 phase voltage
U1HDV50	5694	R	2	Float32	V	The 50th harmonic voltage value of phase L1 voltage
U2HDV50	5696	R	2	Float32	V	The 50th harmonic voltage value of phase L2 voltage
U3HDV50	5698	R	2	Float32	V	The 50th harmonic voltage value of phase L3 voltage

Max. & Min.

Register Alias	Register Address	Action R/WC	Size	Type	Units	Description
Current max / min						
I1Max	6000	R	2	Float32	A	Phase L1 Maximum current
I2Max	6002	R	2	Float32	A	Phase L2 Maximum current
I3Max	6004	R	2	Float32	A	Phase L3 Maximum current
I1VGMax	6006	R	2	Float32	A	Maximum three phase average current

Register Alias	Register Address	Action R/WC	Size	Type	Units	Description
IN Max	6008	R	2	Float32	A	Phase N Maximum current
I1Min	6010	R	2	Float32	A	Phase L1 Minimum current
I2Min	6012	R	2	Float32	A	Phase L2 Minimum current
I3Min	6014	R	2	Float32	A	Phase L3 Minimum current
I1VGMin	6016	R	2	Float32	A	Minimum three phase average current
IN Min	6018	R	2	Float32	A	Phase N Minimum current
Voltage max / min						
U1Max	6020	R	2	Float32	V	U1-UN Maximum phase voltage
U2Max	6022	R	2	Float32	V	U2-UN Maximum phase voltage
U3Max	6024	R	2	Float32	V	U3-UN Maximum phase voltage
Phase UAVGMax	6026	R	2	Float32	V	Maximum value of average value of three-phase phase voltage
U1Min	6030	R	2	Float32	V	U1-UN Minimum phase voltage
U2Min	6032	R	2	Float32	V	U2-UN Minimum phase voltage
U3Min	6034	R	2	Float32	V	U3-UN Minimum phase voltage

Register Alias	Register Address	Action R/WC	Size	Type	Units	Description
Phase U1VGMin	6036	R	2	Float32	V	Minimum value of average value of three-phase phase voltage
U12Max	6040	R	2	Float32	V	U1-U2 Maximum wire voltage
U23Max	6042	R	2	Float32	V	U2-U3 Maximum wire voltage
U31Max	6044	R	2	Float32	V	U3-U1 Maximum wire voltage
Line UAVGMax	6046	R	2	Float32	V	Maximum value of average value of three-phase phase voltage
U12Min	6050	R	2	Float32	V	U1-U2 Minimum phase voltage
U23Min	6052	R	2	Float32	V	U2SS-U3 Minimum phase voltage
U31Min	6054	R	2	Float32	V	U3-U1 Minimum phase voltage
Line UAVGMin	6056	R	2	Float32	V	Minimum value of average value of three-phase phase voltage
Maximum / minimum power						
P1Max	6060	R	2	Float32	kW	Maximum active power of phase L1
P1Max	6062	R	2	Float32	kW	Maximum active power of phase L2
P1Max	6064	R	2	Float32	kW	Maximum active power of phase L3

Register Alias	Register Address	Action R/WC	Size	Type	Units	Description
PSUMMax	6066	R	2	Float32	kW	Maximum value of three-phase total active power
P1Min	6070	R	2	Float32	kW	Minimum active power of phase L1
P1Min	6072	R	2	Float32	kW	Minimum active power of phase L2
P1Min	6074	R	2	Float32	kW	Minimum active power of phase L3
PSUMMin	6076	R	2	Float32	kW	Minimum value of three-phase total active power
Reactive Power Max / min						
Q1Max	6080	R	2	Float32	kVar	Maximum value of phase L1 reactive power
Q2Max	6082	R	2	Float32	kVar	Maximum value of phase L2 reactive power
Q3Max	6084	R	2	Float32	kVar	Maximum value of phase L3 reactive power
QSUMMax	6086	R	2	Float32	kVar	Maximum value of three-phase total reactive power
Q1Min	6090	R	2	Float32	kVar	Minimum value of phase L1 reactive power
Q1Min	6092	R	2	Float32	kVar	Minimum value of phase L2 reactive power

Register Alias	Register Address	Action R/WC	Size	Type	Units	Description
Q1Min	6094	R	2	Float32	kVar	Minimum value of phase L3 reactive power
QSUMMin	6096	R	2	Float32	kVar	Minimum value of three-phase total reactive power
Apparent Power Max / min						
S1Max	6100	R	2	Float32	kVa	Maximum apparent power of phase L1
S1Max	6102	R	2	Float32	kVa	Maximum apparent power of phase L2
S1Max	6104	R	2	Float32	kVa	Maximum apparent power of phase L3
SSUMMax	6108	R	2	Float32	kVa	Maximum three-phase total apparent power
S1Min	6110	R	2	Float32	kVa	Minimum apparent power of phase L1
S2Min	6112	R	2	Float32	kVa	Minimum apparent power of phase L2
S3Min	6114	R	2	Float32	kVa	Minimum apparent power of phase L3
SSUMMin	6116	R	2	Float32	kVa	Minimum three phase total apparent power

Unbalance Degree

Register Alias	Register Address	Action R/WC	Size	Type	Units	Description
Voltage negative sequence unbalance degree	7000	R	2	Float32	%	Voltage negative sequence unbalance degree

Register Alias	Register Address	Action R/WC	Size	Type	Units	Description
Voltage zero sequence unbalance degree	7002	R	2	Float32	%	Voltage zero sequence unbalance degree
Current negative sequence unbalance degree	7004	R	2	Float32	%	Current negative sequence unbalance degree
Current zero sequence unbalance degree	7006	R	2	Float32	%	Current zero sequence unbalance degree

Current K factor and crest factor register

Register Alias	Register Address	Action R/WC	Size	Type	Units	Description
KFI1	8000	R	2	Float32	-	Current K factor of phase L1
KFI2	8002	R	2	Float32	-	Current K factor of phase L2
KFI3	8004	R	2	Float32	-	Current K factor of phase L3

Voltage and current angle register

Register Alias	Register Address	Action R/WC	Size	Type	Units	Description
Angle voltages						
U1	8100	R	2	Float32	°	Angle phase L1 voltage
U2	8102	R	2	Float32	°	Angle phase L2 voltage
U3	8104	R	2	Float32	°	Angle phase L3 voltage
Angle currents						

Register Alias	Register Address	Action R/WC	Size	Type	Units	Description
I1	8106	R	2	Float32	°	Angle phase L1 current
I2	8108	R	2	Float32	°	Angle phase L2 current
I3	8110	R	2	Float32	°	Angle phase L3 current
Angle between voltage and current						
UI1	8112	R	2	Float32	°	Angle between voltage and current of phase L1
UI2	8114	R	2	Float32	°	Angle between voltage and current of phase L2
UI3	8116	R	2	Float32	°	Angle between voltage and current of phase L3

Alarm

Register Alias	Register Address	Action R/WC	Size	Type	Units	Description
Alarm Map						
Enabled alarm - bitmap						
Enabled alarm bitmap1	10000	R	1	bitmap	-	0 = Alarm disabled 1 = Alarm enabled Bit N(0-15) = Alarm ID N(1-16)
Enabled alarm bitmap2	10001	R	1	bitmap	-	0 = Alarm disabled 1 = Alarm enabled Bit N(0-15) = Alarm ID N(17-32)

Register Alias	Register Address	Action R/WC	Size	Type	Units	Description
Actiactive alarm - bitmap						
Actiactive alarm bit map 1	10010	R	1	bitmap	-	0 = Alarm not activated 1 = Alarm activation Bit N(0-15)= Alarm ID N(1-16)
Actiactive alarm bit map 2	10011	R	1	bitmap	-	0 = Alarm not activated 1 = Alarm activation Bit N(0-15)= Alarm ID N(17-32)
Current alarm output - bitmap (Note: Up to 1 alarm output at the same time)						
Current alarm output bitmap 1	10020	R	1	bitmap	-	0 = Alarm not output 1 = Alarm output Bit N(0-15) = Alarm ID N(1-16)
Current alarm output bitmap 2	10021	R	1	bitmap	-	0 = Alarm not output 1 = Alarm output Bit N(0-15) = Alarm ID N(17-32)

Alarm Parameters

Current Over , each phase (Note: One phase above the activation threshold produces an alarm, all phases below the alarm release point, alarm release)						Alarm ID=1
Alarm Status	10100	R/WC	1	UInt16	-	Alarm Status 0 = Disable 1 = Enable
Alarm activation threshold	10102	R/WC	2	Float32	A	Alarm activation threshold

Register Alias	Register Address	Action R/WC	Size	Type	Units	Description
Alarm release point	10104	R/WC	2	Float32	%	Percentage error of alarm release point relative to alarm activation threshold Example: over current alarm activation threshold =100A alarm release point =5%. When the current value is less than 100-100*5%=95A, the alarm will be released
Buzzer	10106	R/WC	1	UInt16	-	Buzzer 0 = Unlinked 1 = Linked
Relay	10107	R/WC	1	UInt16	-	Relay 0 = Unlinked 1 = Linked (Note: Control is valid only valid if the relay output mode is alarm output mode)
Current Under, each phase						Alarm ID=2
Alarm Status	10120	R/WC	1	UInt16	-	Alarm Status 0 = Disable 1 = Enable
Alarm activation threshold	10122	R/WC	2	Float32	A	Alarm activation threshold
Alarm release point	10124	R/WC	2	Float32	%	Percentage error of alarm release point relative to alarm activation threshold

Register Alias	Register Address	Action R/WC	Size	Type	Units	Description
Buzzer	10126	R/WC	1	UInt16	-	Buzzer 0 = Unlinked 1 = Linked
Relay	10127	R/WC	1	UInt16	-	Relay 0 = Unlinked 1 = Linked
Phase Voltage Over, L-N						Alarm ID=3
Alarm Status	10140	R/WC	1	UInt16	-	Alarm Status 0 = Disable 1 = Enable
Alarm activation threshold	10142	R/WC	2	Float32	A	Alarm activation threshold
Alarm release point	10144	R/WC	2	Float32	%	Percentage error of alarm release point relative to alarm activation threshold
Buzzer	10146	R/WC	1	UInt16	-	Buzzer 0 = Unlinked 1 = Linked
Relay	10147	R/WC	1	UInt16	-	Relay 0 = Unlinked 1 = Linked
Phase Voltage Under, L-N						Alarm ID=4
Alarm Status	10160	R/WC	1	UInt16	-	Alarm Status 0 = Disable 1 = Enable
Alarm activation threshold	10162	R/WC	2	Float32	A	Alarm activation threshold
Alarm release point	10164	R/WC	2	Float32	%	Percentage error of alarm release point

Register Alias	Register Address	Action R/WC	Size	Type	Units	Description
						relative to alarm activation threshold
Buzzer	10166	R/WC	1	UInt16	-	Buzzer 0 = Unlinked 1 = Linked
Relay	10167	R/WC	1	UInt16	-	Relay 0 = Unlinked 1 = Linked
Line Voltage Over, L-L						Alarm ID=5
Alarm Status	10180	R/WC	1	UInt16	-	Alarm Status 0 = Disable 1 = Enable
Alarm activation threshold	10182	R/WC	2	Float32	A	Alarm activation threshold
Alarm release point	10184	R/WC	2	Float32	%	Percentage error of alarm release point relative to alarm activation threshold
Buzzer	10186	R/WC	1	UInt16	-	Buzzer 0 = Unlinked 1 = Linked
Relay	10187	R/WC	1	UInt16	-	Relay 0 = Unlinked 1 = Linked
Line Voltage Under, L-L						Alarm ID=6
Alarm Status	10200	R/WC	1	UInt16	-	Alarm Status 0 = Disable 1 = Enable
Alarm activation threshold	10202	R/WC	2	Float32	A	Alarm activation threshold

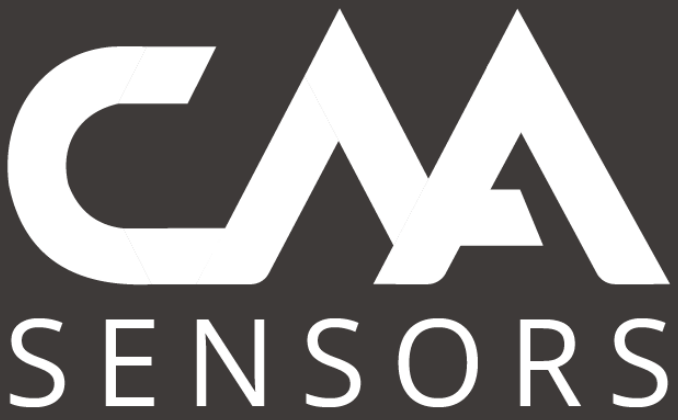
Register Alias	Register Address	Action R/WC	Size	Type	Units	Description
Alarm release point	10204	R/WC	2	Float32	%	Percentage error of alarm release point relative to alarm activation threshold
Buzzer	10206	R/WC	1	UInt16	-	Buzzer 0 = Unlinked 1 = Linked
Relay	10207	R/WC	1	UInt16	-	Relay 0 = Unlinked 1 = Linked
Power P Over, (absolute value)						Alarm ID=10
Alarm Status	10220	R/WC	1	UInt16	-	Alarm Status 0 = Disable 1 = Enable
Alarm activation threshold	10222	R/WC	2	Float32	A	Alarm activation threshold
Alarm release point	10224	R/WC	2	Float32	%	Percentage error of alarm release point relative to alarm activation threshold
Buzzer	10226	R/WC	1	UInt16	-	Buzzer 0 = Unlinked 1 = Linked
Relay	10227	R/WC	1	UInt16	-	Relay 0 = Unlinked 1 = Linked
Power Q Over, (absolute value)						Alarm ID=14
Alarm Status	10240	R/WC	1	UInt16	-	Alarm Status 0 = Disable 1 = Enable

Register Alias	Register Address	Action R/WC	Size	Type	Units	Description
Alarm activation threshold	10242	R/WC	2	Float32	A	Alarm activation threshold
Alarm release point	10244	R/WC	2	Float32	%	Percentage error of alarm release point relative to alarm activation threshold
Buzzer	10246	R/WC	1	UInt16	-	Buzzer 0 = Unlinked 1 = Linked
Relay	10247	R/WC	1	UInt16	-	Relay 0 = Unlinked 1 = Linked
Power S Over						Alarm ID=18
Alarm Status	10260	R/WC	1	UInt16	-	Alarm Status 0 = Disable 1 = Enable
Alarm activation threshold	10262	R/WC	2	Float32	A	Alarm activation threshold
Alarm release point	10264	R/WC	2	Float32	%	Percentage error of alarm release point relative to alarm activation threshold
Buzzer	10266	R/WC	1	UInt16	-	Buzzer 0 = Unlinked 1 = Linked
Relay	10267	R/WC	1	UInt16	-	Relay 0 = Unlinked 1 = Linked
Power P DMD Over, (current)						Alarm ID=20
Alarm Status	10280	R/WC	1	UInt16	-	Alarm Status 0 = Disable

Register Alias	Register Address	Action R/WC	Size	Type	Units	Description
						1 = Enable
Alarm activation threshold	10282	R/WC	2	Float32	A	Alarm activation threshold
Alarm release point	10284	R/WC	2	Float32	%	Percentage error of alarm release point relative to alarm activation threshold
Buzzer	10286	R/WC	1	UInt16	-	Buzzer 0 = Unlinked 1 = Linked
Relay	10287	R/WC	1	UInt16	-	Relay 0 = Unlinked 1 = Linked
Power Q DMD Over, (absolute value) (current)						Alarm ID=21
Alarm Status	10300	R/WC	1	UInt16	-	Alarm Status 0 = Disable 1 = Enable
Alarm activation threshold	10302	R/WC	2	Float32	A	Alarm activation threshold
Alarm release point	10304	R/WC	2	Float32	%	Percentage error of alarm release point relative to alarm activation threshold
Buzzer	10306	R/WC	1	UInt16	-	Buzzer 0 = Unlinked 1 = Linked
Relay	10307	R/WC	1	UInt16	-	Relay 0 = Unlinked 1 = Linked
Power S DMD Over, (current)						Alarm ID=22

Register Alias	Register Address	Action R/WC	Size	Type	Units	Description
Alarm Status	10320	R/WC	1	UInt16	-	Alarm Status 0 = Disable 1 = Enable
Alarm activation threshold	10322	R/WC	2	Float32	A	Alarm activation threshold
Alarm release point	10324	R/WC	2	Float32	%	Percentage error of alarm release point relative to alarm activation threshold
Buzzer	10326	R/WC	1	UInt16	-	Buzzer 0 = Unlinked 1 = Linked
Relay	10327	R/WC	1	UInt16	-	Relay 0 = Unlinked 1 = Linked
THD-U Over, each phase						Alarm ID=30
Alarm Status	10340	R/WC	1	UInt16	-	Alarm Status 0 = Disable 1 = Enable
Alarm activation threshold	10342	R/WC	2	Float32	A	Alarm activation threshold
Alarm release point	10344	R/WC	2	Float32	%	Percentage error of alarm release point relative to alarm activation threshold
Buzzer	10346	R/WC	1	UInt16	-	Buzzer 0 = Unlinked 1 = Linked
Relay	10347	R/WC	1	UInt16	-	Relay 0 = Unlinked 1 = Linked

Register Alias	Register Address	Action R/WC	Size	Type	Units	Description
THD-I Over, each phase						Alarm ID=31
Alarm Status	10360	R/WC	1	UInt16	-	Alarm Status 0 = Disable 1 = Enable
Alarm activation threshold	10362	R/WC	2	Float32	A	Alarm activation threshold
Alarm release point	10364	R/WC	2	Float32	%	Percentage error of alarm release point relative to alarm activation threshold
Buzzer	10366	R/WC	1	UInt16	-	Buzzer 0 = Unlinked 1 = Linked
Relay	10367	R/WC	1	UInt16	-	Relay 0 = Unlinked 1 = Linked



CAA Sensors Pty Ltd

Address: 2/7 Narabang Way, Belrose NSW 2085, Australia

E-mail: sales@caasensors.com

Website: www.caasensors.com