



EM630-EM640

Modbus

**MODBUS COMMUNICATION
PROTOCOL**

Public version

Version 1.1

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Index

1.	RS485	4
1.1	Introduction	4
1.2	RS485 Modbus functions	4
1.2.1	Function 03h (Read Holding Registers)	5
1.2.2	Function 04h (Read Input Registers)	6
1.2.3	Function 06h (Write Single Holding Register)	7
1.2.4	Function 10h (Write multiple registers)	8
1.3	Broadcast mode	9
1.4	Application notes, RS485 general considerations	9
1.5	Modbus timing	9
2.	Modbus TCP/IP	10
2.1	Introduction	10
2.2	Modbus TCP/IP functions	10
2.2.1	Function 03h (Read Holding Registers) and 04h (Read Input Registers)	11
2.2.2	Functions 06h (Write Single Holding Register)	11
2.2.3	Function 10h (Write multiple registers)	11
3.	Data Format, Variables and param	12
3.1	Data format representation In Carlo Gavazzi instruments	12
3.2	Geometric representation	12
3.3	Out-of-range conditions	12
3.4	Part number available	13
4.	Measurement parameters	15
4.1	Instantaneous variables and meters (grouped by variable type)	15
4.1.1	Instantaneous variables and meters (grouped by variable type)	15
4.1.2	Instantaneous variables and meters (grouped by phase)	19
4.1.3	Other Instantaneous variables (read only)	21
4.1.4	High resolution variables (read only)	22
4.1.5	Active energy 0.1 Wh resolution (read only)	23
4.1.6	Firmware revision menu	23
4.1.7	Gavazzi code	23
4.2	SunSpec Map (RTU and TCP)	24
4.2.1	Common model	24
4.1.8	211 - single phase (AN or AB) meter (1P Load Type)	25

4.1.9	212 - split single phase (ABN) meter (3P Load Type)	25
4.1.10	213 - wye-connect three phase (abcn) meter (3PN Load Type)	27
4.1.11	214 - Delta-connect three phase (abc) meter (3P Load Type).....	29
5.	Configuration parameters.....	31
5.1.1	Password configuration menu	31
5.1.2	System configuration	31
5.1.3	CT / Primary current configuration	31
5.1.4	DMD calculation.....	32
5.1.5	Measure mode configuration.....	32
5.1.6	Reactive power calculation method.....	32
5.1.7	Digital input functionality.....	33
5.1.8	Tariff section	33
5.1.9	Alarms configuration.....	35
5.1.10	Tariff enabling.....	38
5.1.11	Wrong connection	38
5.1.12	Wizard display configuration	38
5.1.13	Hour counter configuration.....	39
5.1.14	Phase – terminal block configuration	39
5.1.15	Page filter, screen saver and homepage configuration	40
5.1.16	Serial port configuration S1 models	41
5.1.17	Serial port configuration M1 models.....	41
5.1.18	Stored Ethernet configuration.....	42
5.1.19	Current Ethernet configuration	43
5.1.20	Stored Wi-Fi LAN configuration	44
5.1.21	Current Wi-Fi LAN configuration.....	45
5.1.22	Stored Wi-Fi 1 to 1 configuration	46
5.1.23	Current Wi-Fi 1 to 1 configuration.....	46
5.1.24	mDNS configuration.....	46
5.1.25	NTP service configuration.....	48
5.1.26	REST API get configuration	48
5.1.27	Modbus configuration	49
5.1.28	Webserver configuration.....	50
5.1.29	Reset command.....	51

5.1.30	Serial number	51
5.1.31	Configurable name	52
5.1.32	Device state	52
5.1.33	Firmware CRC	53
6.	Datalogger	54
6.1	Configuration and energy variables.....	54
6.2	Logged values	54
6.3	Delta values	55
7.	Parameters affected by reset command.....	58
8.	Annex A – Timezone table index.....	60
9.	Revisions	1

1. RS485

1.1 Introduction

The RS485 serial interface supports the Modbus (RTU) protocol. In this document only the information necessary to read/write from/to EM600 has been reported (not all the parts of the protocol have been implemented).

For a complete description of the Modbus protocol, please refer to the latest revision of the “Modbus_Application_Protocol” document that is downloadable from the www.modbus.org web site.

1.2 RS485 Modbus functions

These functions are available on EM600 SERIES:

- Reading of n “Holding Registers” (code 03h),
- Reading of n “Input Register” (code 04h),
- Writing of one “Holding Registers” (code 06h),
- Writing of one “Holding Registers” (code 10h),
- Broadcast mode (writing instruction on address 00h).

IMPORTANT:

- In this document the “Modbus address” field is indicated in two modes:
 - **“Modicon address”**: it is the “6-digit Modicon” representation with Modbus function code 04 (Read Input Registers). It is possible to read the same values with function code 03 (Read Holding Registers) replacing the first digit (“3”) with the number “4”.
 - **“Physical address”**: it is the “word address” value to be included in the communication frame.
- The functions 03h and 04h have exactly the same effect and can be used indifferently.
- The communication parameters are to be set according to the configuration of the instrument.

1.2.1 Function 03h (Read Holding Registers)

This function is used to read the contents of a contiguous block of holding registers (word). The Request frame specifies the starting register address and the number of registers to be read. It is possible to read maximum 125 registers (words) [250 bytes] with a single request.

The register data in the response message are packed as two bytes per register (word), with the binary contents right justified within each byte. For each register, the first byte contains the high order bits (MSB) and the second contains the low order bits (LSB).

Table - 1.1 - Request frame Function 03h

Description	Length	Value	Note
Physical address	1 byte	1 to F7h (1 to 247)	-
Function code	1 byte	03h	-
Starting address	2 bytes	0000h to FFFFh	Byte order: MSB, LSB
Quantity of registers (N word)	2 bytes	1 to 7Dh (1 to 125)	Byte order: MSB, LSB
CRC	2 bytes	-	-

Table - 1.2 - Response frame (correct action) Function 03h

Description	Length	Value	Note
Physical address	1 byte	1 to F7h (1 to 247)	-
Function code	1 byte	03h	-
Quantity of requested bytes	1 byte	N word * 2	-
Register value	N *2 bytes	-	Byte order: MSB, LSB
CRC	2 bytes	-	-

Table - 1.3 - Response frame (incorrect action) Function 03h

Description	Length	Value	Note
Physical address	1 byte	1 to F7h (1 to 247)	Possible exception : 01h: illegal function 02h: illegal data address 03h: illegal data value 04h: slave device failure
Function code	1 byte	83h	
Exception code	1 byte	01h, 02h, 03h, 04h (see note)	
CRC	2 bytes	-	

1.2.2 Function 04h (Read Input Registers)

This function code is used to read the contents of a contiguous block of input registers (word). The Request frame specifies the starting register address and the number of registers to be read. It is possible to read maximum 125 register (word) [250 bytes] with a single request.

The register data in the response message are packed as two bytes per register (word), with the binary contents right justified within each byte. For each register, the first byte contains the high order bits (MSB) and the second contains the low order bits (LSB).

Table - 1.4 - Request frame Function 04h

Description	Length	Value	Note
Physical address	1 byte	1 to F7h (1 to 247)	-
Function code	1 byte	04h	-
Starting address	2 bytes	0000h to FFFFh	Byte order: MSB, LSB
Quantity of registers (N word)	2 bytes	1 to 7Dh (1 to 125)	Byte order: MSB, LSB
CRC	2 bytes	-	-

Table - 1.5 - Response frame (correct action) Function 04h

Description	Length	Value	Note
Physical address	1 byte	1 to F7h (1 to 247)	-
Function code	1 byte	04h	-
Quantity of requested bytes	1 byte	N word * 2	-
Register value	N *2 bytes	-	Byte order: MSB, LSB
CRC	2 bytes	-	-

Table - 1.6 - Response frame (incorrect action) Function 04h

Description	Length	Value	Note
Physical address	1 byte	1 to F7h (1 to 247)	Possible exception : 01h: illegal function 02h: illegal data address 03h: illegal data value 04h: slave device failure
Function code	1 byte	84h	
Exception code	1 byte	01h, 02h, 03h, 04h	
CRC	2 bytes	-	

1.2.3 Function 06h (Write Single Holding Register)

This function code is used to write a single holding register. The Request frame specifies the address of the register (word) to be written and its content.

The correct response is an echo of the request, returned after the register content has been written.

Table - 1.7 - Request frame Function 06h

Description	Length	Value	Note
Physical address	1 byte	1 to F7h (1 to 247)	-
Function code	1 byte	06h	-
Starting address	2 bytes	0000h to FFFFh	Byte order: MSB, LSB
Register value	2 bytes	0000h to FFFFh	Byte order: MSB, LSB
CRC	2 bytes	-	-

Table - 1.8 - Response frame (correct action) Function 06h

Description	Length	Value	Note
Physical address	1 byte	1 to F7h (1 to 247)	-
Function code	1 byte	06h	-
Starting address	2 bytes	0000h to FFFFh	Byte order: MSB, LSB
Register value	2 bytes	0000h to FFFFh	Byte order: MSB, LSB
CRC	2 bytes	-	-

Table - 1.9 - Response frame (incorrect action) Function 06h

Description	Length	Value	Note
Physical address	1 byte	1 to F7h (1 to 247)	Possible exception : 01h: illegal function 02h: illegal data address 03h: illegal data value 04h: slave device failure
Function code	1 byte	86h	
Exception code	1 byte	01h, 02h, 03h, 04h	
CRC	2 bytes	-	

1.2.4 Function 10h (Write multiple registers)

This function code is used to write a block of contiguous registers (maximum 123 word [246 bytes]). The requested values to be written are specified in the request data field. Data is packed as two bytes per register. The correct response returns the function code, starting address, and the quantity of written registers.

Table - 1.10 - Request frame Function 10h

Description	Length	Value	Note
Physical Address	1 byte	1 to F7 (1 to 247)	-
Function code	1 byte	10h	-
Starting Address	2 bytes	0000h to FFFFh	Byte order: MSB, LSB
Quantity of Registers (N word)	2 bytes	0001h to - 78h	Byte order: MSB, LSB
Byte count	1 byte	N word * 2	-
Register value	N * 2 bytes	value	Byte order: MSB, LSB
CRC	2 bytes	-	-

Table - 1.11 - Response frame (correct action) Function 10h

Description	Length	Value	Note
Physical Address	1 byte	1 to F7 (1 to 247)	-
Function code	1 byte	10h	-
Starting Address	2 bytes	0000h to FFFFh	Byte order: MSB, LSB
Quantity of Registers (N word)	2 bytes	0001h to 0078h	Byte order: MSB, LSB
CRC	2 bytes	-	-

Table - 1.12 - Response frame (Incorrect action) Function 10h

Description	Length	Value	Note
Physical Address	1 byte	1 to F7 (1 to 247)	Possible exception: 01h: illegal function 02h: illegal data address 03h: illegal data value 04h: slave device failure
Function code	1 byte	90h	
Exception code	1 byte	01h, 02h, 03h, 04h	
CRC	2 bytes	-	

1.3 Broadcast mode

In broadcast mode the master can send a request (command) to all the slaves. No response is returned to broadcast requests sent by the master. It is possible to send the broadcast message only with function code 06h and 10h using address 00h.

1.4 Application notes, RS485 general considerations

- To avoid errors due to the signal reflections or line coupling, it is necessary to terminate the bus at the beginning (master side, if not already embedded, by inserting a 120 ohm 1/2W 5% resistor between line B and A) and at the end (in EM600 interface by connecting the terminal B+ with the terminal T in the last instrument).
- The network termination is necessary even in case of point-to-point connection and/or of short distances.
- For connections longer than 1000m or if in the network there are more than 160 instruments (with 1/5 unit load as used in EM600 interface), a signal repeater is necessary.
- For bus connection it is suggested to use an AWG24 balanced pair cable and to add a third wire for GND connection. If a shielded cable is used, connect the shield to GND.
- The GND should be connected to ground only at the host side.
- If an instrument does not answer within the “max answering time”, it is necessary to repeat the query. If the instrument does not answer after 2 or 3 consecutive queries, it is to be considered as not connected, faulty or reached with a wrong address. The same consideration is valid in case of CRC errors or incomplete response frames.

1.5 Modbus timing

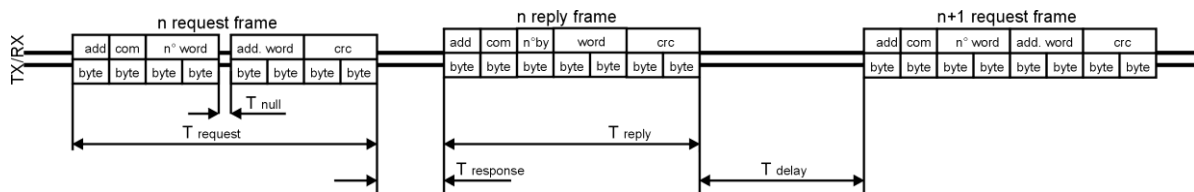


Fig. 1 : 2-wire timing diagram

Table - 1.13 - Timing of reading function

Timing characteristics of reading function:	ms
T response: Max answering time	500 ms
T response: Typical answering time	40 ms
T delay: Minimum time before a new query	3.5 char
T null: Max interruption time during the request frame	2.5 char

2. Modbus TCP/IP

2.1 Introduction

The RJ45 interface supports the Modbus TCP/IP protocol. In this document only the information necessary to read/write from/to EM630/EM640 has been reported (not all the parts of the protocol have been implemented). For a complete description of the Modbus protocol please refer to www.modbus.org web site.

2.2 Modbus TCP/IP functions

These functions are available on EM630/EM640:

- Reading of n “Holding Registers” (code 03h),
- Reading of n “Input Register” (code 04h),
- Writing of one “Holding Registers” (code 06h).

IMPORTANT:

- In this document the “Modbus address” field is indicated in two modes:
 - **“Modicon address”**: it is the “6-digit Modicon” representation with Modbus function code 04 (Read Input Registers). It is possible to read the same values with function code 03 (Read Holding Registers) replacing the first digit (“3”) with the number “4”.
 - **“Physical address”**: it is the “word address” value to be included in the communication frame.
- The functions 03h and 04h have exactly the same effect and can be used indifferently.
- The communication parameters are to be set according to the configuration of the instrument (refer to the instruction manual).

2.2.1 Function 03h (Read Holding Registers) and 04h (Read Input Registers)

These functions are used to read the contents of a contiguous block of holding registers (word). The Request frame specifies the starting register address and the number of registers to be read.

It is possible to read maximum 125 registers (words) with a single request, when not differently specified.

The register data in the response message are packed as two bytes per register (word), with the binary contents right justified within each byte. For each register, the first byte contains the high order bits (MSB) and the second contains the low order bits (LSB).

2.2.2 Functions 06h (Write Single Holding Register)

This function code is used to write a single holding register. The Request frame specifies the address of the register (word) to be written and its content.

The correct response is an echo of the request, returned after the register content has been written.

2.2.3 Function 10h (Write multiple registers)

This function code is used to write a block of contiguous registers (maximum 123 word [246 bytes]).

The requested values to be written are specified in the request data field. Data is packed as two bytes per register. The correct response returns the function code, starting address, and the quantity of written registers.

3. Data Format, Variables and param

3.1 Data format representation In Carlo Gavazzi instruments

The variables are represented by integers or floating numbers, with 2's complement notation in case of "signed" format, using the following:

Table 3.1 - Data format representation

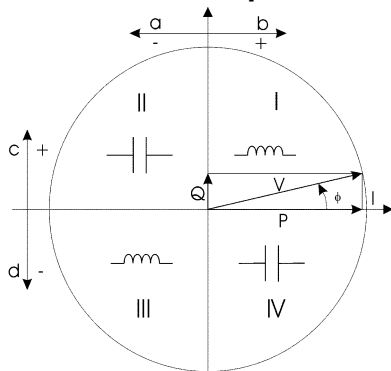
Format	IEC data type	Description	Bits	Range
INT16	INT	Integer	16	- 32768 .. 32767
UINT16	UINT	Unsigned integer	16	0 .. 65535
INT32	DINT	Double integer	32	- 2^{31} .. 2^{31}
UINT32	UDINT	Unsigned double integer	32	0 .. 2^{32-1}
UINT64	ULINT	Unsigned long integer	64	0 .. 2^{64-1}
IEEE754 SP	-	Single-precision floating-point	32	- $(1 + [1 - 2^{-23}]) \times 2^{127}$.. 2^{128}

For all the formats the byte order (inside the single word) is MSB->LSB. In INT32, UINT32 and UINT64 formats, the word order is LSW-> MSW.

3.2 Geometric representation

According to the signs of the power factor, the active power P and the reactive power Q, it is possible to obtain a geometric representation of the power vector, as indicated in the drawing below, according to EN 60253-23:

Table 3.2 - Geometric representation of variables



- a = Exported active power
- b = Imported active power
- c = Imported reactive power
- d = Exported reactive power

According to the measurement mode, the following sign convention is used.

- P < or > 0 (with indication of "-" sign)
- kWh+ increasing only when P > 0
- kWh- increasing only when P < 0
- kvarh+ increasing only when Q > 0
- kvarh- increasing only when Q < 0
- PF with ±C or ±L indication

3.3 Out-of-range conditions

If the input is above the maximum value, the display shows "EEE".

3.4 Part number available

Part Number	Gavazzi Code		FW	Note
	Decimal Format	Hex16 format		
EM630WAV53XXS1X	1872	0750	1.0.0	EM630 – 480 VLL / 5 A by CTV, 5 A CT - Only wireless - S1 Module - standard
EM630WAV53XXS1PFA	1873	0751	1.0.0	EM630 – 400 VLL / 5 A by CTV, 5 A CT - Only wireless - S1 Module - MID PFA
EM630WAV53XXS1PFB	1874	0752	1.0.0	EM630 – 400 VLL / 5 A by CTV, 5 A CT - Only wireless - S1 Module - MID PFB
EM630WAV53XXS1PFC	1875	0753	1.0.0	EM630 – 400 VLL / 5 A by CTV, 5 A CT - Only wireless - S1 Module - MID PFC
EM630WAV53XXM1X	1876	0754	1.0.0	EM630 – 480 VLL / 5 A by CTV, 5 A CT - Only wireless - M1 Module - standard
EM630WAV53XXM1PFA	1877	0755	1.0.0	EM630 – 400 VLL / 5 A by CTV, 5 A CT - Only wireless - M1 Module - MID PFA
EM630WAV53XXM1PFB	1878	0756	1.0.0	EM630 – 400 VLL / 5 A by CTV, 5 A CT - Only wireless - M1 Module - MID PFB
EM630WAV53XXM1PFC	1879	0757	1.0.0	EM630 – 400 VLL / 5 A by CTV, 5 A CT - Only wireless - M1 Module - MID PFC
EM630WAV53XXO1X	1880	0758	1.0.0	EM630 – 480 VLL / 5 A by CTV, 5 A CT - Only wireless - O1 Module - standard
EM630WAV53XXO1PFA	1881	0759	1.0.0	EM630 – 400 VLL / 5 A by CTV, 5 A CT - Only wireless - O1 Module - MID PFA
EM630WAV53XXO1PFB	1882	075A	1.0.0	EM630 – 400 VLL / 5 A by CTV, 5 A CT - Only wireless - O1 Module - MID PFB
EM630WAV53XXO1PFC	1883	075B	1.0.0	EM630 – 400 VLL / 5 A by CTV, 5 A CT - Only wireless - O1 Module - MID PFC
EM640WAV23XXS1X	1888	0760	1.0.0	EM640 – 480 VLL / 65 A Direct - Only wireless - S1 Module - standard
EM640WAV23XXS1PFA	1889	0761	1.0.0	EM640 – 400 VLL / 65 A Direct - Only wireless - S1 Module - MID PFA
EM640WAV23XXS1PFB	1890	0762	1.0.0	EM640 – 400 VLL / 65 A Direct - Only wireless - S1 Module - MID PFB
EM640WAV23XXS1PFC	1891	0763	1.0.0	EM640 – 400 VLL / 65 A Direct - Only wireless - S1 Module - MID PFC
EM640WAV23XXM1X	1892	0764	1.0.0	EM640 – 480 VLL / 6 5A Direct - Only wireless - M1 Module - standard
EM640WAV23XXM1PFA	1893	0765	1.0.0	EM640 – 400 VLL / 65 A Direct - Only wireless - M1 Module - MID PFA
EM640WAV23XXM1PFB	1894	0766	1.0.0	EM640 – 400 VLL / 65 A Direct - Only wireless - M1 Module - MID PFB
EM640WAV23XXM1PFC	1895	0767	1.0.0	EM640 – 400 VLL / 65 A Direct - Only wireless - M1 Module - MID PFC
EM640WAV23XXO1X	1896	0768	1.0.0	EM640 – 480 VLL / 65 A Direct - Only wireless - O1 Module - standard
EM640WAV23XXO1PFA	1897	0769	1.0.0	EM640 – 400 VLL / 65 A Direct - Only wireless - O1 Module - MID PFA
EM640WAV23XXO1PFB	1898	076A	1.0.0	EM640 – 400 VLL / 65 A Direct - Only wireless - O1 Module - MID PFB
EM640WAV23XXO1PFC	1899	076B	1.0.0	EM640 – 400 VLL / 65 A Direct - Only wireless - O1 Module - MID PFC
EM630WMV53XXS1X	1904	0770	1.0.0	EM630 – 480 VLL / 333 mV by Primary - Only wireless - S1 Module - standard
EM630WMV53XXM1X	1905	0771	1.0.0	EM630 – 480 VLL / 333 mV by Primary - Only wireless - M1 Module - standard
EM630WMV53XXO1X	1906	0772	1.0.0	EM630 – 480 VLL / 333 mV by Primary - Only wireless - O1 Module - standard
EM630BAV53XE2XXX	1920	0780	1.0.0	EM630 – 480 VLL / 5 A by CTV, 5 A CT - Only 2 Ethernet - Empty Module - standard
EM640BAV23XE2XXX	1936	0790	1.0.0	EM640 – 480 VLL / 65 A Direct - Only 2 Ethernet - Empty Module - standard
EM630BMV53XE2XXX	1952	07A0	1.0.0	EM630 – 480 VLL / 333 mV by Primary - Only 2 Ethernet - Empty Module - standard

EM630WAV53XE2S1X	1968	07B0	1.0.0	EM630 – 480 VLL / 5 A by CTV, 5 A CT - 2 Ethernet + wireless - S1 Module - standard
EM630WAV53XE2S1PFA	1969	07B1	1.0.0	EM630 – 400 VLL / 5 A by CTV, 5 A CT - 2 Ethernet + wireless - S1 Module - MID PFA
EM630WAV53XE2S1PFB	1970	07B2	1.0.0	EM630 – 400 VLL / 5 A by CTV, 5 A CT - 2 Ethernet + wireless - S1 Module - MID PFB
EM630WAV53XE2S1PFC	1971	07B3	1.0.0	EM630 – 400 VLL / 5 A by CTV, 5 A CT - 2 Ethernet + wireless - S1 Module - MID PFC
EM630WAV53XE2M1X	1972	07B4	1.0.0	EM630 – 480 VLL / 5 A by CTV, 5 A CT - 2 Ethernet + wireless - M1 Module - standard
EM630WAV53XE2M1PFA	1973	07B5	1.0.0	EM630 – 400 VLL / 5 A by CTV, 5 A CT - 2 Ethernet + wireless - M1 Module - MID PFA
EM630WAV53XE2M1PFB	1974	07B6	1.0.0	EM630 – 400 VLL / 5 A by CTV, 5 A CT - 2 Ethernet + wireless - M1 Module - MID PFB
EM630WAV53XE2M1PFC	1975	07B7	1.0.0	EM630 – 400 VLL / 5 A by CTV, 5 A CT - 2 Ethernet + wireless - M1 Module - MID PFC
EM630WAV53XE2O1X	1976	07B8	1.0.0	EM630 – 480 VLL / 5 A by CTV, 5 A CT - 2 Ethernet + wireless - O1 Module - standard
EM630WAV53XE2O1PFA	1977	07B9	1.0.0	EM630 – 400 VLL / 5 A by CTV, 5 A CT - 2 Ethernet + wireless - O1 Module - MID PFA
EM630WAV53XE2O1PFB	1978	07BA	1.0.0	EM630 – 400 VLL / 5 A by CTV, 5 A CT - 2 Ethernet + wireless - O1 Module - MID PFB
EM630WAV53XE2O1PFC	1979	07BB	1.0.0	EM630 – 400 VLL / 5 A by CTV, 5 A CT - 2 Ethernet + wireless - O1 Module - MID PFC
EM640WAV23XE2S1X	1984	07C0	1.0.0	EM640 – 480 VLL / 65 A Direct - 2 Ethernet + wireless - S1 Module - standard
EM640WAV23XE2S1PFA	1985	07C1	1.0.0	EM640 – 400 VLL / 65 A Direct - 2 Ethernet + wireless - S1 Module - MID PFA
EM640WAV23XE2S1PFB	1986	07C2	1.0.0	EM640 – 400 VLL / 65 A Direct - 2 Ethernet + wireless - S1 Module - MID PFB
EM640WAV23XE2S1PFC	1987	07C3	1.0.0	EM640 – 400 VLL / 65 A Direct - 2 Ethernet + wireless - S1 Module - MID PFC
EM640WAV23XE2M1X	1988	07C4	1.0.0	EM640 – 480 VLL / 65 A Direct - 2 Ethernet + wireless - M1 Module - standard
EM640WAV23XE2M1PFA	1989	07C5	1.0.0	EM640 – 400 VLL / 65 A Direct - 2 Ethernet + wireless - M1 Module - MID PFA
EM640WAV23XE2M1PFB	1990	07C6	1.0.0	EM640 – 400 VLL / 65 A Direct - 2 Ethernet + wireless - M1 Module - MID PFB
EM640WAV23XE2M1PFC	1991	07C7	1.0.0	EM640 – 400 VLL / 65 A Direct - 2 Ethernet + wireless - M1 Module - MID PFC
EM640WAV23XE2O1X	1992	07C8	1.0.0	EM640 – 480 VLL / 65 A Direct - 2 Ethernet + wireless - O1 Module - standard
EM640WAV23XE2O1PFA	1993	07C9	1.0.0	EM640 – 400 VLL / 65 A Direct - 2 Ethernet + wireless - O1 Module - MID PFA
EM640WAV23XE2O1PFB	1994	07CA	1.0.0	EM640 – 400 VLL / 65 A Direct - 2 Ethernet + wireless - O1 Module - MID PFB
EM640WAV23XE2O1PFC	1995	07CB	1.0.0	EM640 – 400 VLL / 65 A Direct - 2 Ethernet + wireless - O1 Module - MID PFC
EM630WMV53XE2S1X	2000	07D0	1.0.0	EM630 – 480 VLL / 333 mV by Primary - 2 Ethernet + wireless - S1 Module - standard
EM630WMV53XE2M1X	2001	07D1	1.0.0	EM630 – 480 VLL / 333 mV by Primary - 2 Ethernet + wireless - M1 Module - standard
M630WMV53XE2O1X	2002	07D2	1.0.0	EM630 – 480 VLL / 333 mV by Primary - 2 Ethernet + wireless - O1 Module - standard

Protocol ID shall be used into Modbus map to distinguish the differences between models.

IMPORTANT:

- Reading values in addresses not specified in the below tables returns an illegal data address exception;
- writing is inhibited while user interface is inside a menu, so the last command takes place (display save or serial communication).

4. Measurement parameters

4.1 Instantaneous variables and meters (grouped by variable type)

4.1.1 Instantaneous variables and meters (grouped by variable type)

Table - 4.1 - Modbus: read only mode with functions code 03 and 04

Modicon address	Physical address	Length (words)	VARIABLE ENG. UNIT	Data Format	Notes
300012	000Bh	1	Gavazzi code	INT16	See chapter 3.4
300001	0000h	2	V L1-N	INT32	Value weight: Volt*10
300003	0002h	2	V L2-N	INT32	
300005	0004h	2	V L3-N	INT32	
300007	0006h	2	V L1-L2	INT32	
300009	0008h	2	V L2-L3	INT32	
300011	000Ah	2	V L3-L1	INT32	
300013	000Ch	2	A L1	INT32	Value weight: Ampere*1000
300015	000Eh	2	A L2	INT32	
300017	0010h	2	A L3	INT32	
300019	0012h	2	W L1	INT32	Value weight: Watt*10
300021	0014h	2	W L2	INT32	
300023	0016h	2	W L3	INT32	
300025	0018h	2	VA L1	INT32	Value weight: VA*10
300027	001Ah	2	VA L2	INT32	
300029	001Ch	2	VA L3	INT32	
300031	001Eh	2	var L1	INT32	Value weight: var*10
300033	0020h	2	var L2	INT32	
300035	0022h	2	var L3	INT32	
300037	0024h	2	V L-N sys	INT32	Value weight: Volt*10
300039	0026h	2	V L-L sys	INT32	
300041	0028h	2	W sys	INT32	Value weight: Watt*10
300043	002Ah	2	VA sys	INT32	Value weight: VA*10
300045	002Ch	2	var sys	INT32	Value weight: var*10
300047	002Eh	1	PF L1	INT16	Negative values correspond to exported active power, positive values correspond to imported active power. For L (inductive) / C (capacitive) load indications, see 76h to 79h registers)
300048	002Fh	1	PF L2	INT16	Value weight: PF*1000

Energy Management

300049	0030h	1	PF L3	INT16	-
300050	0031h	1	PF sys	INT16	-
300051	0032h	1	Phase sequence	INT16	The value -1 corresponds to L1-L3-L2 sequence, the value 1 corresponds to L1-L2-L3 sequence. The phase sequence value is meaningful only in a 3-phase system
300052	0033h	1	Hz	INT16	Value weight: Hz*10
300053	0034h	2	kWh (+) TOT	INT32	Value weight: kWh*10
300055	0036h	2	kvarh (+) TOT	INT32	Value weight: kvarh*10
300057	0038h	2	W sys DMD	INT32	Value weight: Watt*10
300059	003Ah	2	W sys DMD MAX	INT32	Value weight: Watt*10
300061	003Ch	2	kWh (+) PARTIAL	INT32	Value weight: kWh*10
300063	003Eh	2	kvarh (+) PARTIAL	INT32	Value weight: kvarh*10
300065	0040h	2	kWh (+) L1	INT32	Value weight: kWh*10
300067	0042h	2	kWh (+) L2	INT32	Value weight: kWh*10
300069	0044h	2	kWh (+) L3	INT32	Value weight: kWh*10
300071	0046h	2	kWh (+) t1	INT32	Value weight: kWh*10
300073	0048h	2	kWh (+) t2	INT32	Value weight: kWh*10
300075	004Ah	2	kWh (+) t3	INT32	Value weight: kWh*10
300077	004Ch	2	kWh (+) t4	INT32	Value weight: kWh*10
300079	004Eh	2	kWh (-) TOT	INT32	Value weight: kWh*10
300081	0050h	2	kvarh (-) TOT	INT32	Value weight: kvarh*10
300083	0052h	2	kWh (-) PARTIAL	INT32	Value weight: kWh*10
300085	0054h	2	kvarh (-) PARTIAL	INT32	Value weight: kvarh*10
300087	0056h	2	kVAh TOT	INT32	Value weight: kVAh*10
300089	0058h	2	kVAh PARTIAL	INT32	Value weight: kVAh*10
300091	005Ah	2	Run hour meter	INT32	Value weight: hours*100
300093	005Ch	2	Run hour meter kWh (-)	INT32	Value weight: hours*100
300095	005Eh	2	n.a.	INT32	Not available, value =0
300097	0060h	2	n.a.	INT32	Not available, value =0
300099	0062h	2	n.a.	INT32	Not available, value =0
300101	0064h	2	n.a.	INT32	Not available, value =0
300103	0066h	2	n.a.	INT32	Not available, value =0
300105	0068h	2	n.a.	INT32	Not available, value =0
300107	006Ah	2	n.a.	INT32	Not available, value =0
300109	006Ch	2	n.a.	INT32	Not available, value =0
300111	006Eh	2	Run hour meter PARTIAL	INT32	Value weight: hours*100
300113	0070h	2	Run hour meter kWh (-) PARTIAL	INT32	Value weight: hours*100
300115	0072h	1	PF L1**	INT16	** Negative values correspond to lead (C), positive values correspond to lag (L).
300116	0073h	1	PF L2**	INT16	Value weight: PF*1000
300117	0074h	1	PF L3**	INT16	-

Energy Management

300118	0075h	1	PF sys**	INT16	-
300119	0076h	1	Inductive/Capacitive Load phase 1	INT16	L=+1, C = -1
300120	0077h	1	Inductive/Capacitive Load phase 2	INT16	L=+1, C = -1
300121	0078h	1	Inductive/Capacitive Load phase 3	INT16	L=+1, C = -1
300122	0079h	1	Inductive/Capacitive Load sys	INT16	L=+1, C = -1
300123	007Ah	2	n.a.	INT32	Not available, value =0
300125	007Ch	2	n.a.	INT32	Not available, value =0
300127	007Eh	2	n.a.	INT32	Not available, value =0
300129	0080h	2	n.a.	INT32	Not available, value =0
300131	0082h	2	THD A L1	INT32	Value weight: %*100
300133	0084h	2	THD A L2	INT32	Value weight: %*100
300135	0086h	2	THD A L3	INT32	Value weight: %*100
300137	0088h	2	n.a.	INT32	Not available, value =0
300139	008Ah	2	THD V L1-N	INT32	Value weight: %*100
300141	008Ch	2	THD V L2-N	INT32	Value weight: %*100
300143	008Eh	2	THD V L3-N	INT32	Value weight: %*100
300145	0090h	2	n.a.	INT32	Not available, value =0
300147	0092h	2	THD V L1-L2	INT32	Value weight: %*100
300149	0094h	2	THD V L2-L3	INT32	Value weight: %*100
300151	0096h	2	THD V L3-L1	INT32	Value weight: %*100
300153	0098h	2	An	INT32	Value weight: Ampere*1000
300155	009Ah	2	I1 DMD	INT32	Value weight: Ampere*1000
300157	009Ch	2	I2 DMD	INT32	Value weight: Ampere*1000
300159	009Eh	2	I3 DMD	INT32	Value weight: Ampere*1000
300161	00A0h	2	I1 DMDMAX	INT32	Value weight: Ampere*1000
300163	00A2h	2	I2 DMDMAX	INT32	Value weight: Ampere*1000
300165	00A4h	2	I3 DMDMAX	INT32	Value weight: Ampere*1000
300167	00A6h	2	n.a.	INT32	Not available, value =0
300169	00A8h	2	n.a.	INT32	Not available, value =0
300171	00AAh	2	n.a.	INT32	Not available, value =0
300173	00ACh	2	W1 DMD	INT32	Value weight: Watt*10
300175	00AEh	2	W2 DMD	INT32	Value weight: Watt*10
300177	00B0h	2	W3 DMD	INT32	Value weight: Watt*10
300179	00B2h	2	W1 DMDMAX	INT32	Value weight: Watt*10
300181	00B4h	2	W2 DMDMAX	INT32	Value weight: Watt*10
300183	00B6h	2	W3 DMDMAX	INT32	Value weight: Watt*10
300185	00B8h	2	n.a.	INT32	Not available, value =0
300187	00BAh	2	n.a.	INT32	Not available, value =0
300189	00BCh	2	n.a.	INT32	Not available, value =0
300191	00BEh	2	W sys DMD	INT32	Value weight: Watt*10
300193	00C0h	2	W sys DMD MAX	INT32	Value weight: Watt*10
300195	00C2h	2	n.a.	INT32	Not available, value =0
300197	00C4h	2	n.a.	INT32	Not available, value =0

Energy Management

300199	00C6h	2	n.a.	INT32	Not available, value =0
300201	00C8h	2	n.a.	INT32	Not available, value =0
300203	00CAh	2	n.a.	INT32	Not available, value =0
300205	00CCh	2	n.a.	INT32	Not available, value =0
300207	00CEh	2	n.a.	INT32	Not available, value =0
300209	00D0h	2	n.a.	INT32	Not available, value =0
300211	00D2h	2	n.a.	INT32	Not available, value =0
300213	00D4h	2	n.a.	INT32	Not available, value =0
300215	00D6h	2	VA DMD	INT32	Value weight: VA*10
300217	00D8h	2	VA DMD MAX	INT32	Value weight: VA*10
300219	00DAh	2	n.a.	INT32	Not available, value =0

4.1.2 Instantaneous variables and meters (grouped by phase)

Table - 4.2 - Modbus: read only mode with functions code 03 and 04

Modicon address	Physical address	Length (words)	VARIABLE ENG. UNIT	Data Format	Notes
System variables					
300247	00F6h	2	Run hour meter kWh (-)	INT32	Value weight: hours*100
300249	00F8h	2	An	INT32	Value weight: Ampere*1000
300251	00FAh	2	n.a.	INT32	Not available, value =0
300253	00FCh	2	n.a.	INT32	Not available, value =0
300255	00FEh	2	Run hour meter	INT32	Value weight: hours*100
300257	0100h	2	n.a.	INT32	Not available, value =0
300259	0102h	2	V L-N sys	INT32	Value weight: Volt*10
300261	0104h	2	V L-L sys	INT32	Value weight: Volt*10
300263	0106h	2	W sys	INT32	Value weight: Watt*10
300265	0108h	2	VA sys	INT32	Value weight: VA*10
300267	010Ah	2	var sys	INT32	Value weight: var*10
300269	010Ch	2	PF sys	INT32	(See 31h register note). Value weight: PF*1000
300271	010Eh	2	Phase sequence	INT32	The value -1 corresponds to L1-L3-L2 sequence, the value 1 corresponds to L1-L2-L3 sequence. The phase sequence value is meaningful only in a 3-phase system
300273	0110h	2	Hz	INT32	Value weight: Hz*10
Total energies and DMD power					
300275	0112h	2	kWh (+) TOT	INT32	Value weight: kWh*10
300277	0114h	2	kvarh (+) TOT	INT32	Value weight: kvarh*10
300279	0116h	2	kWh (-) TOT	INT32	Value weight: kWh*10
300281	0118h	2	kvarh (-) TOT	INT32	Value weight: kvarh*10
300283	011Ah	2	W sys DMD	INT32	Value weight: Watt*10
300285	011Ch	2	W sys DMD MAX	INT32	Value weight: Watt*10
Phase 1 variables					
300287	011Eh	2	V L1-L2	INT32	Value weight: Volt*10
300289	0120h	2	V L1-N	INT32	Value weight: Volt*10
300291	0122h	2	A L1	INT32	Value weight: Ampere*1000
300293	0124h	2	W L1	INT32	Value weight: Watt*10
300295	0126h	2	VA L1	INT32	Value weight: VA*10
300297	0128h	2	var L1	INT32	Value weight: var*10
300299	012Ah	2	PF L1	INT32	(See 2Eh register note). Value weight: PF*1000
Phase 2 variables					
300301	012Ch	2	V L2-L3	INT32	Value weight: Volt*10
300303	012Eh	2	V L2-N	INT32	Value weight: Volt*10
300305	0130h	2	A L2	INT32	Value weight: Ampere*1000
300307	0132h	2	W L2	INT32	Value weight: Watt*10
300309	0134h	2	VA L2	INT32	Value weight: VA*10
300311	0136h	2	var L2	INT32	Value weight: var*10
300313	0138h	2	PF L2	INT32	(See 2Fh register note). Value weight: PF*1000
Phase 3 variables					



300315	013Ah	2	V L3-L1	INT32	Value weight: Volt*10
300317	013Ch	2	V L3-N	INT32	Value weight: Volt*10
300319	013Eh	2	A L3	INT32	Value weight: Ampere*1000
300321	0140h	2	W L3	INT32	Value weight: Watt*10
300323	0142h	2	VA L3	INT32	Value weight: VA*10
300325	0144h	2	var L3	INT32	Value weight: var*10
300327	0146h	2	PF L3	INT32	(See 30h register note). Value weight: PF*1000
Other energies					
300329	0148h	2	kWh (+) PARTIAL	INT32	Value weight: kWh*10
300331	014Ah	2	kvarh (+) PARTIAL	INT32	Value weight: kvarh*10
300333	014Ch	2	kWh (+) L1	INT32	Value weight: kWh*10
300335	014Eh	2	kWh (+) L2	INT32	Value weight: kWh*10
300337	0150h	2	kWh (+) L3	INT32	Value weight: kWh*10
300339	0152h	2	kWh (+) t1	INT32	Value weight: kWh*10
300341	0154h	2	kWh (+) t2	INT32	Value weight: kWh*10
300343	0156h	2	kWh (+) t3	INT32	Value weight: kWh*10
300345	0158h	2	kWh (+) t4	INT32	Value weight: kWh*10
300347	015Ah	2	kWh (-) PARTIAL	INT32	Value weight: kWh*10
300349	015Ch	2	kvarh (-) PARTIAL	INT32	Value weight: kvarh*10
300351	015Eh	2	kVAh TOT	INT32	Value weight: kVAh*10
300353	0160h	2	kVAh PARTIAL	INT32	Value weight: kVAh*10
300355	0162h	2	n.a.	INT32	Not available, value =0
300357	0164h	2	n.a.	INT32	Not available, value =0
300359	0166h	2	n.a.	INT32	Not available, value =0
300361	0168h	2	n.a.	INT32	Not available, value =0
300363	016Ah	2	n.a.	INT32	Not available, value =0
300365	016Ch	2	n.a.	INT32	Not available, value =0
300367	016Eh	2	n.a.	INT32	Not available, value =0
300369	0170h	2	n.a.	INT32	Not available, value =0
300371	0172h	2	n.a.	INT32	Not available, value =0
300373	0174h	2	n.a.	INT32	Not available, value =0
300375	0176h	2	n.a.	INT32	Not available, value =0
300377	0178h	2	n.a.	INT32	Not available, value =0
300379	017Ah	2	n.a.	INT32	Not available, value =0
300381	017Ch	2	n.a.	INT32	Not available, value =0
300383	017Eh	2	n.a.	INT32	Not available, value =0
Other Phase 1 variables					
300385	0180h	2	THD A L1	INT32	Value weight: %*100
300387	0182h	2	THD V L1-N	INT32	Value weight: %*100
300389	0184h	2	THD V L1-L2	INT32	Value weight: %*100
300391	0186h	2	I1 DMD	INT32	Value weight: Ampere*1000
300393	0188h	2	I1 DMDMAX	INT32	Value weight: Ampere*1000
300395	018Ah	2	n.a.	INT32	Not available, value =0
300397	018Ch	2	W1 DMD	INT32	Value weight: Watt*10
300399	018Eh	2	W1 DMDMAX	INT32	Value weight: Watt*10
300401	0190h	2	n.a.	INT32	Not available, value =0
Other Phase 2 variables					

300403	0192h	2	THD A L2	INT32	Value weight: %*100
300405	0194h	2	THD V L2-N	INT32	Value weight: %*100
300407	0196h	2	THD V L2-L3	INT32	Value weight: %*100
300409	0198h	2	I2 DMD	INT32	Value weight: Ampere*1000
300411	019Ah	2	I2 DMDMAX	INT32	Value weight: Ampere*1000
300413	019Ch	2	n.a.	INT32	Not available, value =0
300415	019Eh	2	W2 DMD	INT32	Value weight: Watt*10
300417	01A0h	2	W2 DMDMAX	INT32	Value weight: Watt*10
300419	01A2h	2	n.a.	INT32	Not available, value =0
Other Phase 3 variables					
300421	01A4h	2	THD A L3	INT32	Value weight: %*100
300423	01A6h	2	THD V L3-N	INT32	Value weight: %*100
300425	01A8h	2	THD V L3-L1	INT32	Value weight: %*100
300427	01AAh	2	I3 DMD	INT32	Value weight: Ampere*1000
300429	01ACh	2	I3 DMDMAX	INT32	Value weight: Ampere*1000
300431	01AEh	2	n.a.	INT32	Not available, value =0
300433	01B0h	2	W3 DMD	INT32	Value weight: Watt*10
300435	01B2h	2	W3 DMDMAX	INT32	Value weight: Watt*10
300437	01B4h	2	n.a.	INT32	Not available, value =0

4.1.3 Other Instantaneous variables (read only)

Table - 4.3 - Modbus: read only mode with functions code 03 and 04

Modicon address	Physical address	Length (words)	VARIABLE ENG. UNIT	Data Format	Notes
300769	0300h	1	Digital input status	INT16	0 = input open 1 = input closed
300770	0301h	1	Active tariff	INT16	0 = no-one 1 = tariff 1 2 = tariff 2
300774	0305h	1	Global alarm status	UINT 16	0 = not active (including waiting for delay to elapse) 1 = active
300775	0306h	1	Alarms status	UINT16	bit0 = alarm 1 status bit1 = alarm 2 status bit2 = alarm 3 status bit3 = alarm 4 status
300776	0307h	1	Internal Temperature	INT16	Value weight: Temperature *10 [°C]
300777	0308h	1	Digital output status	UINT16	0 = output open 1 = output closed

4.1.4 High resolution variables (read only)

Table - 4.4 - Modbus: read only mode with functions code 03 and 04

Modicon address	Physical address	Length (words)	VARIABLE ENG. UNIT	Data Format	Notes
301281	0500h	4	kWh (+) TOT	INT64	Value weight: Wh
301285	0504h	4	kvarh (+) TOT	INT64	Value weight: varh
301289	0508h	4	kWh (+) PARTIAL	INT64	Value weight: Wh
301293	050Ch	4	kvarh (+) PARTIAL	INT64	Value weight: varh
301297	0510h	4	kWh (+) L1	INT64	Value weight: Wh
301301	0514h	4	kWh (+) L2	INT64	Value weight: Wh
301305	0518h	4	kWh (+) L3	INT64	Value weight: Wh
301309	051Ch	4	kWh (-) TOT	INT64	Value weight: Wh
301313	0520h	4	kWh (-) PARTIAL	INT64	Value weight: Wh
301317	0524h	4	kvarh (-) TOT	INT64	Value weight: varh
301321	0528h	4	kvarh (-) Partial	INT64	Value weight: varh
301325	052Ch	4	kVAh TOT	INT64	Value weight: VAh
301329	0530h	4	kVAh PARTIAL	INT64	Value weight: VAh
301333	0534h	2	Run hour meter	INT32	Value weight: hours*100
301335	0536h	2	Run hour meter kWh (-)	INT32	Value weight: hours*100
301337	0538h	2	Run hour meter PARTIAL	INT32	Value weight: hours*100
301339	053Ah	2	Run hour meter kWh (-) PARTIAL	INT32	Value weight: hours*100
301341	053Ch	2	Hz	INT32	Value weight: Hz*1000
301343	053Eh	2	Run hour Life Counter	INT32	Value weight: hours*100
301345	0540h	4	kWh (-) L1	INT64	Value weight: Wh * 1
301349	0544h	4	kWh (-) L2	INT64	Value weight: Wh * 1
301353	0548h	4	kWh (-) L3	INT64	Value weight: Wh * 1
301357	054Ch	4	kWh Q1	INT64	Value weight: Wh * 1
301361	0550h	4	kWh Q2	INT64	Value weight: Wh * 1
301365	0554h	4	kWh Q3	INT64	Value weight: Wh * 1
301369	0558h	4	kWh Q4	INT64	Value weight: Wh * 1
301373	055Ch	4	kvarh Q1	INT64	Value weight: varh * 1
301377	0560h	4	kvarh Q2	INT64	Value weight: varh * 1
301381	0564h	4	kvarh Q3	INT64	Value weight: varh * 1
301385	0568h	4	kvarh Q4	INT64	Value weight: varh * 1
301389	056Ch	4	kVAh Q1	INT64	Value weight: VAh * 1
301393	0570h	4	kVAh Q2	INT64	Value weight: VAh * 1
301397	0574h	4	kVAh Q3	INT64	Value weight: VAh * 1
301401	0578h	4	kVAh Q4	INT64	Value weight: VAh * 1
301405	057Ch	4	kWh+ T1	INT64	Value weight: Wh * 1
301409	0580h	4	kWh+ T2	INT64	Value weight: Wh * 1

IMPORTANT:

- Tables above are equivalent and include a copy of the same variable values.
- For meters that support also 1-phase and 2-phase systems, the values relevant to phase 2 and 3 can still be read with a valid value, equal to 0.

4.1.5 Active energy 0.1 Wh resolution (read only)

Table - 4.5 - Modbus: read only mode with functions code 03 and 04

Modicon address	Physical address	Length (words)	VARIABLE ENG. UNIT	Data Format	Notes
301281	0600h	4	kWh (+) TOT	INT64	Value weight: Wh*10
301285	0604h	4	kWh (-) TOT	INT64	Value weight: Wh*10

IMPORTANT: in 3-phase and 1-phase systems 0.1 resolution counters are not available.

4.1.6 Firmware revision menu

Table - 4.6 - Modbus: read only mode with functions code 03 and 04

Modicon address	Physical address	Length (words)	VARIABLE ENG. UNIT	Data Format	Notes	Default
300771	0302h	1	Major, Minor and Revision Measure Module	UINT 16	MSB: Bit 0..3 = Minor Bit 4..7 = Major (e.g. 01000011b / 43h / 67d = 4.3) LSB: Revision	-
300772	0303h	1	1 Major, Minor and Revision Communication Module	UINT 16	MSB: Bit 0..3 = Minor Bit 4..7 = Major (e.g. 01000011b / 43h / 67d = 4.3) LSB: Revision	-
300773	0304h	1	Major, Minor and Revision Additional module (1)	UINT 16	MSB: Bit 0..3 = Minor Bit 4..7 = Major (e.g. 01000011b / 43h / 67d = 4.3) LSB: Revision	-

4.1.7 Gavazzi code

Table - 4.7 - Modbus: read only mode with functions code 03 and 04 limited to a word at a time

Modicon address	Physical address	Length (words)	VARIABLE ENG. UNIT	Data Format	Notes	Default
300012	000Bh	1	Carlo Gavazzi Controls identification code	UINT 16	See chapter 3.4	-

4.2 SunSpec Map (RTU and TCP)

EM630/EM640 supports the following SunSpec model types, according to the Load Type:

Table - 4.1 - Modbus: read only mode with functions code 03 and 04

Model	Description	Starting address	Applies to Meters with Load Type
1	Common	0x9C40	All
211	Single phase (AN or AB) meter	0x9C82	1P
212	Split single phase (ABN) meter	0x9C82	2P
213	Wye-connect three phase (abcn) meter	0x9C82	3PN
214	Delta-connect three phase (abc) meter	0x9C82	3P

IMPORTANT: In models 211, 212, 213 and 214:

- not implemented values are represented with a value 0x7FC00000 (quiet NaN or qNaN).
- implemented value that can't be provided for any reason (device internal problem, value not measurable because out of range, missing measuring sensor, etc.), is represented with a value 0x7FA00000 (signaling NaN or sNaN).

Evt field is always 0.

Only implemented values are reported in the maps in the next paragraphs.

4.2.1 Common model

Table - 4.2 - Modbus: read only mode with functions code 03 and 04

Modbus Address	Address Offset	Name	Value	Type	Size	Mandatory (M)	Static (S)	Label	Description
9C40h	0	ID	1	UINT16	-	M	S	Model ID	Model identifier
9C41h	1	L	64	UINT16	-	M	S	Model Length	Model length
9C42h	2	Mn	"CARLO-GAVAZZI-CONTROLS"	STRING	16	M	S	Manufacturer	Well known value registered with SunSpec for compliance
9C52h	18	Md	See Description	STRING	16	M	S	Model	E630/EM640 part number: See table in par. 3.4
9C62h	34	Opt	-	STRING	8	-	S	Options	Not used
9C6Ah	42	Vr	See Description	STRING	8	-	S	Version	-
9C72h	50	SN	See Description	STRING	16	M	S	Serial Number	Serial number (13 characters)

4.1.8 211 - single phase (AN or AB) meter (1P Load Type)

Table - 4.3 - Modbus: read only mode with functions code 03 and 04

Modbus Address	Address Offset	Name	Value	Type	Units	Mandatory (M)	Static (S)	Label	Description
9C82h	0	ID	211	UINT16		M	S	Model ID	Model identifier
9C83h	1	L	124	UINT16		M	S	Model Length	Model length
9C84h	2	A	-	FLOAT32	A	M	-	Amps	Total AC Current
9C86h	4	AphA	-	FLOAT32	A	M	-	Amps PhaseA	Phase A Current
9C8Ch	10	PhV	-	FLOAT32	V	-	-	Voltage LN	Line to Neutral AC Voltage (average of active phases)
9C9Ch	26	Hz	-	FLOAT32	Hz	M	-	Hz	Frequency
9C9Eh	28	W	-	FLOAT32	W	M	-	Watts	Total Real Power
9CA6h	36	VA	-	FLOAT32	VA	-	-	VA	AC Apparent Power
9CB6h	52	PF	-	FLOAT32	PF	-	-	PF	Power Factor
9CBEh	60	TotWhExp	-	FLOAT32	Wh	M	-	Total Watt-hours Exported	Total Real Energy Exported
9CC6h	68	TotWhImp	-	FLOAT32	Wh	M	-	Total Watt-hours Imported	Total Real Energy Imported
9CDEh	92	TotVARhImpQ1	-	FLOAT32	varh	-	-	Total VAR-hours Imported Q1	Total Reactive Energy Imported Quadrant 1
9CE6h	100	TotVARhImpQ2	-	FLOAT32	varh	-	-	Total VAR-hours Imported Q2	Total Reactive Power Imported Quadrant 2
9CEEh	108	TotVARhExpQ3	-	FLOAT32	varh	-	-	Total VAR-hours Exported Q3	Total Reactive Power Exported Quadrant 3
9CF6h	116	TotVARhExpQ4	-	FLOAT32	varh	-	-	Total VAR-hours Exported Q4	Total Reactive Power Exported Quadrant 4
9CFEh	124	Evt		BITFIELD32		M	-	Events	Meter Event Flags

4.1.9 212 - split single phase (ABN) meter (3P Load Type)

Table - 4.4 - Modbus: read only mode with functions code 03 and 04

Modbus Address	Address Offset	Name	Value	Type	Units	Mandatory (M)	Static (S)	Label	Description
9C82h	0	ID	212	UINT16	-	M	S	Model ID	Model identifier
9C83h	1	L	124	UINT16	-	M	S	Model Length	Model length
9C84h	2	A	-	FLOAT32	A	M	-	Amps	Total AC Current

Energy Management

9C86h	4	AphA	-	FLOAT32	A	M	-	Amps PhaseA	Phase A Current
9C88h	6	AphB	-	FLOAT32	A	M	-	Amps PhaseB	Phase B Current
9C8Ch	10	PhV	-	FLOAT32	V	M	-	Voltage LN	Line to Neutral AC Voltage (average of active phases)
9C8Eh	12	PhVphA	-	FLOAT32	V	M	-	Phase Voltage AN	Phase Voltage AN
9C90h	14	PhVphB	-	FLOAT32	V	M	-	Phase Voltage BN	Phase Voltage BN
9C94h	18	PPV	-	FLOAT32	V	M	-	Voltage LL	Line to Line AC Voltage (average of active phases)
9C96h	20	PPVphAB	-	FLOAT32	V	M	-	Phase Voltage AB	Phase Voltage AB
9C9Ch	26	Hz	-	FLOAT32	Hz	M	-	Hz	Frequency
9C9Eh	28	W	-	FLOAT32	W	M	-	Watts	Total Real Power
9CA0h	30	WphA	-	FLOAT32	W	-	-	Watts phase A	-
9CA2h	32	WphB	-	FLOAT32	W	-	-	Watts phase B	-
9CA6h	36	VA	-	FLOAT32	VA	-	-	VA	AC Apparent Power
9CA8h	38	VAphA	-	FLOAT32	VA	-	-	VA phase A	-
9CAAh	40	VAphB	-	FLOAT32	VA	-	-	VA phase B	-
9CAEh	44	VAR	-	FLOAT32	var	-	-	VAR	Reactive Power
9CB0h	46	VARphA	-	FLOAT32	var	-	-	VAR phase A	-
9CB2h	48	VARphB	-	FLOAT32	var	-	-	VAR phase B	-
9CB6h	52	PF	-	FLOAT32	PF	-	-	PF	Power Factor
9CB8h	54	PFphA	-	FLOAT32	PF	-	-	PF phase A	-
9CBAh	56	PFphB	-	FLOAT32	PF	-	-	PF phase B	--
9CBEh	60	TotWhExp	-	FLOAT32	Wh	M	-	Total Watt-hours Exported	Total Real Energy Exported
9CC0h	62	TotWhExpPhA	-	FLOAT32	Wh	-	-	Total Watt-hours Exported phase A	-
9CC2h	64	TotWhExpPhB	-	FLOAT32	Wh	-	-	Total Watt-hours Exported phase B	-
9CC6h	68	TotWhImp	-	FLOAT32	Wh	M	-	Total Watt-hours Imported	Total Real Energy Imported
9CC8h	70	TotWhImpPhA	-	FLOAT32	Wh	-	-	Total Watt-hours Imported phase A	-

9CCAh	72	TotWhImpPhB	-	FLOAT32	Wh	-	-	Total Watt-hours Imported phase B	-
9CDEh	92	TotVARhImpQ1	-	FLOAT32	varh	-	-	Total VAR-hours Imported Q1	Total Reactive Energy Imported Quadrant 1
9CE6h	100	TotVARhImpQ2	-	FLOAT32	varh	-	-	Total VAR-hours Imported Q2	Total Reactive Power Imported Quadrant 2
9CEEh	108	TotVARhExpQ3	-	FLOAT32	varh	-	-	Total VAR-hours Exported Q3	Total Reactive Power Exported Quadrant 3
9CF6h	116	TotVARhExpQ4	-	FLOAT32	varh	-	-	Total VAR-hours Exported Q4	Total Reactive Power Exported Quadrant 4
9CFEh	124	Evt	-	BITFIELD32		M	-	Events	Meter Event Flags

4.1.10 213 - wye-connect three phase (abcn) meter (3PN Load Type)

Table - 4.5 - Modbus: read only mode with functions code 03 and 04

Modbus Address	Address Offset	Name	Value	Type	Units	Mandatory (M)	Static (S)	Label	Description
9C82h	0	ID	213	UINT16		M	S	Model ID	Model identifier
9C83h	1	L	124	UINT16		M	S	Model Length	Model length
9C84h	2	A	-	FLOAT32	A	M	-	Amps	Total AC Current (nota: I1+I2+I3)
9C86h	4	AphA	-	FLOAT32	A	M	-	Amps PhaseA	Phase A Current
9C88h	6	AphB	-	FLOAT32	A	M	-	Amps PhaseB	Phase B Current
9C8Ah	8	AphC	-	FLOAT32	A	M	-	Amps PhaseC	Phase C Current
9C8Ch	10	PhV	-	FLOAT32	V	M	-	Voltage LN	Line to Neutral AC Voltage (average of active phases)
9C8Eh	12	PhVphA	-	FLOAT32	V	M	-	Phase Voltage AN	Phase Voltage AN
9C90h	14	PhVphB	-	FLOAT32	V	M	-	Phase Voltage BN	Phase Voltage BN
9C92h	16	PhVphC	-	FLOAT32	V	M	-	Phase Voltage CN	Phase Voltage CN
9C94h	18	PPV	-	FLOAT32	V	M	-	Voltage LL	Line to Line AC Voltage (average of active phases)
9C96h	20	PPVphAB	-	FLOAT32	V	M	-	Phase Voltage AB	Phase Voltage AB

Energy Management

9C98h	22	PPVphBC	-	FLOAT32	V	M	-	Phase Voltage BC	Phase Voltage BC
9C9Ah	24	PPVphCA	-	FLOAT32	V	M	-	Phase Voltage CA	Phase Voltage CA
9C9Ch	26	Hz	-	FLOAT32	Hz	M	-	Hz	Frequency
9C9Eh	28	W	-	FLOAT32	W	M	-	Watts	Total Real Power
9CA0h	30	WphA	-	FLOAT32	W	-	-	Watts phase A	-
9CA2h	32	WphB	-	FLOAT32	W	-	-	Watts phase B	-
9CA4h	34	WphC	-	FLOAT32	W	-	-	Watts phase C	-
9CA6h	36	VA	-	FLOAT32	VA	-	-	VA	AC Apparent Power
9CA8h	38	VaphA	-	FLOAT32	VA	-	-	VA phase A	-
9CAAh	40	VaphB	-	FLOAT32	VA	-	-	VA phase B	-
9CACh	42	VaphC	-	FLOAT32	VA	-	-	VA phase C	-
9CAEh	44	VAR	-	FLOAT32	var	-	-	VAR	Reactive Power
9CB0h	46	VARphA	-	FLOAT32	var	-	-	VAR phase A	-
9CB2h	48	VARphB	-	FLOAT32	var	-	-	VAR phase B	-
9CB4h	50	VARphC	-	FLOAT32	var	-	-	VAR phase C	-
9CB6h	52	PF	-	FLOAT32	PF	-	-	PF	Power Factor
9CB8h	54	PFphA	-	FLOAT32	PF	-	-	PF phase A	-
9CBAh	56	PFphB	-	FLOAT32	PF	-	-	PF phase B	-
9CBCh	58	PFphC	-	FLOAT32	PF	-	-	PF phase C	-
9CBEh	60	TotWhExp	-	FLOAT32	Wh	M	-	Total Watt-hours Exported	Total Real Energy Exported
9CC0h	62	TotWhExpPhA	-	FLOAT32	Wh	-	-	Total Watt-hours Exported phase A	-
9CC2h	64	TotWhExpPhB	-	FLOAT32	Wh	-	-	Total Watt-hours Exported phase B	-
9CC4h	66	TotWhExpPhC	-	FLOAT32	Wh	-	-	Total Watt-hours Exported phase C	-
9CC6h	68	TotWhImp	-	FLOAT32	Wh	M	-	Total Watt-hours Imported	Total Real Energy Imported
9CC8h	70	TotWhImpPhA	-	FLOAT32	Wh	-	-	Total Watt-hours Imported phase A	-
9CCAh	72	TotWhImpPhB	-	FLOAT32	Wh	-	-	Total Watt-	-



								hours Imported phase B	
9CCCh	74	TotWhImpPhC	-	FLOAT32	Wh	-	-	Total Watt-hours Imported phase C	-
9CDEh	92	TotVARhImpQ1	-	FLOAT32	varh	-	-	Total VAR-hours Imported Q1	Total Reactive Energy Imported Quadrant 1
9CE6h	100	TotVARhImpQ2	-	FLOAT32	varh	-	-	Total VAR-hours Imported Q2	Total Reactive Power Imported Quadrant 2
9CEEh	108	TotVARhExpQ3	-	FLOAT32	varh	-	-	Total VAR-hours Exported Q3	Total Reactive Power Exported Quadrant 3
9CF6h	116	TotVARhExpQ4	-	FLOAT32	varh	-	-	Total VAR-hours Exported Q4	Total Reactive Power Exported Quadrant 4
9CFEh	124	Evt	-	BITFIELD32		M	-	Events	Meter Event Flags

4.1.11 214 - Delta-connect three phase (abc) meter (3P Load Type)

Table - 4.6 - Modbus: read only mode with functions code 03 and 04

Modbus Address		Address Offset	Name	Value	Type	Units	Mandatory (M)	Static (S)	Label	Description
9C82	40066	0	ID	214	UINT16		M	S	Model ID	Model identifier
9C83	40067	1	L	124	UINT16		M	S	Model Length	Model length
9C84	40068	2	A	-	FLOAT32	A	M	-	Amps	Total AC Current (nota: I1+I2+I3)
9C86	40070	4	AphA	-	FLOAT32	A	M	-	Amps PhaseA	Phase A Current
9C88	40072	6	AphB	-	FLOAT32	A	M	-	Amps PhaseB	Phase B Current
9C8A	40074	8	AphC	-	FLOAT32	A	M	-	Amps PhaseC	Phase C Current
9C94	40084	18	PPV	-	FLOAT32	V	M	-	Voltage LL	Line to Line AC Voltage (average of active phases)
9C96	40086	20	PPVphAB	-	FLOAT32	V	M	-	Phase Voltage AB	Phase Voltage AB
9C98	40088	22	PPVphBC	-	FLOAT32	V	M	-	Phase Voltage BC	Phase Voltage BC
9C9A	40090	24	PPVphCA	-	FLOAT32	V	M	-	Phase Voltage CA	Phase Voltage CA
9C9C	40092	26	Hz	-	FLOAT32	Hz	M	-	Hz	Frequency
9C9E	40094	28	W	-	FLOAT32	W	M	-	Watts	Total Real Power
9CA6	40102	36	VA	-	FLOAT32	VA	-	-	VA	AC Apparent Power



Energy Management

9CAE	40110	44	VAR	-	FLOAT32	var	-	-	VAR	Reactive Power
9CB6	40118	52	PF	-	FLOAT32	PF	-	-	PF	Power Factor
9CBE	40126	60	TotWhExp	-	FLOAT32	Wh	M	-	Total Watt-hours Exported	Total Real Energy Exported
9CC6	40134	68	TotWhImp	-	FLOAT32	Wh	M	-	Total Watt-hours Imported	Total Real Energy Imported
9CDE	40158	92	TotVARhImpQ1	-	FLOAT32	varh	-	-	Total VAR-hours Imported Q1	Total Reactive Energy Imported Quadrant 1
9CE6	40166	100	TotVARhImpQ2	-	FLOAT32	varh	-	-	Total VAR-hours Imported Q2	Total Reactive Power Imported Quadrant 2
9CEE	40174	108	TotVARhExpQ3	-	FLOAT32	varh	-	-	Total VAR-hours Exported Q3	Total Reactive Power Exported Quadrant 3
9CF6	40182	116	TotVARhExpQ4	-	FLOAT32	varh	-	-	Total VAR-hours Exported Q4	Total Reactive Power Exported Quadrant 4
9CFE	40190	124	Evt	-	BITFIELD32		M	-	Events	Meter Event Flags

5. Configuration parameters

5.1.1 System configuration

Table - 5.2 - Modbus functions: 0x03, 0x04, 0x06 and 0x10

Modicon address	Physical address	Length (words)	VARIABLE ENG. UNIT	Data Format	Notes	Default	FW
304099	1002h	1	Measuring system	UINT 16	Value 0 = "3Pn" (3-phase with neutral) Value 1 = "3P" (3-phase without neutral) Value 2 = "2P" (2-phase with neutral) Value 3 = "1P" (1-phase with neutral) Value 4 = "3-1P" (1-phase with three load)	0 (3Pn)	X 1.0 PFx ⁽¹⁾ 1.0

IMPORTANT: PFX⁽¹⁾ = for MID models, only the following values are available:

AV2 models = 0,1

AV5 models = 0,1,3

other values cause an exception.

5.1.2 CT / Primary current configuration

Table - 5.3 - Modbus functions: 0x03, 0x04, 0x06 and 0x10

Modicon address	Physical address	Length (words)	VARIABLE ENG. UNIT	Data Format	Notes	Default	FW
304100	1003h	2	Current transformer ratio ⁽¹⁾	UINT 32	Value min = 10 (CT=1,0) Value max = 20000 (CT=2000.0)	10 (CT = 1.0)	AV5 models
304100	1003h	2	Primary current ⁽²⁾	UINT32	Value min = 100 (Primary=10) Value max = 100000 (Primary =10000.0)	100 (Primary=10)	MV5 models

IMPORTANT:

⁽¹⁾ = only AV5 models,

⁽²⁾ = only MV5 models.

5.1.3 DMD calculation

Table - 5.4 - Modbus functions: 0x03, 0x04, 0x06 and 0x10

Modicon address	Physical address	Length (words)	VARIABLE ENG. UNIT	Data Format	Notes	Default
304112	100Fh	1	RTC synchronization for DMD ⁽¹⁾	UINT 16	Value 0 = Power ON Value 1 = Clock	0 (Power ON)
304113	1010h	2	Integration time for DMD power calculation	UINT 32	Value 0 = 1 min Value 1 = 5 min Value 2 = 10 min Value 3 = 15 min Value 4 = 20 min Value 5 = 30 min Value 6 = 60 min	3 (15 min)

IMPORTANT : ⁽¹⁾= only for W and E2-W models.

5.1.4 Measure mode configuration

Table - 5.5 - Modbus functions: 0x03, 0x04, 0x06 and 0x10

Modicon address	Physical address	Length (words)	VARIABLE ENG. UNIT	Data Format	Notes	Default
304356	1103h	1	Measure mode selection	UINT 16	Value 0 = A (absolute) Value 1 = B kWh+ and kWh- accumulated evaluating every single phase) Value 2 = C kWh+ and kWh- accumulated evaluating the active power system	0 (Not synchronized)
304367	110Eh	1	Apparent power and reactive power calculation method (System variables VA sys and var sys only)	UINT16	Value 0 = Algebraic Method : $VA = VA1 + VA2 + VA3$ $var = \sqrt{VA^2 - W^2}$ Value 1 = Vectorial Method: $VA = \sqrt{var^2 + W^2}$ $var = var1 + var2 + var3$	0

5.1.5 Reactive power calculation method

Table - 5.6 - Modbus functions: 0x03, 0x04, 0x06 and 0x10

Modicon address	Physical address	Length (words)	VARIABLE ENG. UNIT	Data Format	Notes	Default
304361	1108h	1	Reactive power calculation method (phase variables var L1, var L2 and var L3 only)	UINT 16	Value 0 = Calculated directly on samples Value 1 = $var = \sqrt{VA^2 - W^2}$	0

5.1.6 Digital input functionality

Table - 5.7 - Modbus functions: 0x03, 0x04, 0x06 and 0x10

Modicon address	Physical address	Length (words)	VARIABLE ENG. UNIT	Data Format	Notes	Default
304609	1200h	1	Digital inputs selector	UINT 16	Value 0 = tariff management via digital Value 1 = only remote status input Value 2 = Partial Meter enabled Value 3 = Reset partial counter	0 (Dig. input)

IMPORTANT :

- Remote status always available by protocol or display,
- If 1200h register is set to 0, the value of configuration at registers 1201h and 1101h are ignored.

5.1.7 Tariff section

Table - 5.8 - Modbus functions: 0x03, 0x04

Modicon address	Physical address	Length (words)	VARIABLE ENG. UNIT	Data Format	Notes	Default
300770	0301h	1	Active tariff	INT16	0 = no-one 1 = tariff 1 2 = tariff 2	-

Table - 5.9 - Modbus functions: 0x03, 0x04, 0x06 and 0x10

Modicon address	Physical address	Length (words)	VARIABLE ENG. UNIT	Data Format	Notes	Default
304129	1300h	1	Outout functionality	UINT 16	Value 0 = Remote Value 1 = Pulse Output kWh+ Value 2 = Pulse Output kWh- Value 3 = Alarm	0 (Remote)
304130	1301h	1	Output Normal Status	UINT 16	Value = 0 (NO normally open) Value = 1 (NC normally close) (used with register Output functionality = 3 "Alarm")	0 (N.O.)
304131	1302h	1	Pulse per kWh	UINT 16	Value = 0 (0.1 pulse per kWh) Value = 1 (1 pulse per kWh) Value = 2 (10 pulse per kWh) Value = 3 (100 pulse per kWh) Value = 4 (500 pulse per kWh) Value = 5 (1000 pulse per kWh) (used when register Output functionality is set as 1 "Pulse kWh Output" or 2 "Pulse kWh- Output")	1 (1 pulse per kWh)
304132	1303h	1	Ton (Ton time for pulse output square wave)	UINT 16	Value = 0 (30ms) Value = 1 (100ms) (used with register Output functionality = 1 pulse Output)	1 (100ms)
304133	1304h	1	Alarm linked	UINT 16	Value = 0 (all alarm status in OR condition) Value = 1 Output linked to Alarm status 1 Value = 2 Output linked to Alarm status 2 Value = 3 Output linked to Alarm status 3 Value = 4 Output linked to Alarm status 4 (used with register Output functionality = 3 "Alarm")	

5.1.8 Alarms configuration

Table - 5.10 - Modbus functions: 0x03, 0x04, 0x06 and 0x10

Modicon address	Physical address	Length (words)	VARIABLE ENG. UNIT	Data Format	Notes	Default
304145	1030h	1	Alarm 1 Enable	UINT16	Value 0 = Disabled Value 1 = Enabled	0 (Disabled)
304146	1031h	1	Alarm 1 linked	UINT16	Value 1 = System active power [kW] Value 2 = System apparent power [kVA] Value 3 = System reactive power [kvar] Value 4 = System power factor Value 5 = Phase currents OR condition[A] Value 6 = Phase voltages OR condition [V] Value 7 = Concatenated voltages OR condition [V] Value 8 = Frequency Value 9 = Active power L1 Value 10 = Active power L2 Value 11 = Active power L3 Value 12 = Current L1 Value 13 = Current L2 Value 14 = Current L3	1 (Active power)
304147	1032h	2	Alarm 1 SetPoint1 (on)	INT32	Value min -1500000 = -15000,00 Value max +1500000 = +15000.00 Example: value 123 = 1.23	0 (0,00)
304149	1034h	2	Alarm 1 SetPoint2 (off)	INT32	Value min -1500000 = -15000,00 Value max +1500000 = +15000.00 Example: value 123 = 1.23	0 (0,00)
304151	1036h	1	Alarm 1 Delay	UINT16	Value min 0 = 0 [s] Value max 3600 = 3600 [s]	0[s]
304152	1037h	1	Alarm 1 status	UINT16	0 = alarm OFF 1 = alarm ON	
304153	1038h	1	Alarm 2 Enable	UINT16	Value 0 = Disabled Value 1 = Enabled	0 (Disabled)
304154	1039h	1	Alarm 2 linked	UINT16	Value 1 = System active power [kW] Value 2 = System apparent power [kVA] Value 3 = System reactive power [kvar] Value 4 = System power factor Value 5 = Phase currents OR condition[A] Value 6 = Phase voltages OR condition [V]	1 (Active power)



					Value 7 = Concatenated voltages OR condition [V] Value 8 = Frequency Value 9 = Active power L1 Value 10 = Active power L2 Value 11 = Active power L3 Value 12 = Current L1 Value 13 = Current L2 Value 14 = Current L3	
304155	103Ah	2	Alarm 2 SetPoint1 (on)	INT32	Value min -1500000 = -15000,00 Value max +1500000 = +15000.00 Example: value 123 = 1.23	0 (0,00)
304157	103Ch	2	Alarm 2 SetPoint2 (off)	INT32	Value min -1500000 = -15000,00 Value max +1500000 = +15000.00 Example: value 123 = 1.23	0 (0,00)
304159	103Eh	1	Alarm 2 Delay	UINT16	Value min 0 = 0 [s] Value max 3600 = 3600 [s]	0[s]
304160	103Fh	1	Alarm 2 status	UINT16	0 = alarm OFF 1 = alarm ON	
304161	1040h	1	Alarm 3 Enable	UINT16	Value 0 = Disabled Value 1 = Enabled	0 (Disabled)
304162	1041h	1	Alarm 3 linked	UINT16	Value 1 = System active power [kW] Value 2 = System apparent power [kVA] Value 3 = System reactive power [kvar] Value 4 = System power factor Value 5 = Phase currents OR condition[A] Value 6 = Phase voltages OR condition [V] Value 7 = Concatenated voltages OR condition [V] Value 8 = Frequency Value 9 = Active power L1 Value 10 = Active power L2 Value 11 = Active power L3 Value 12 = Current L1 Value 13 = Current L2 Value 14 = Current L3	1 (Active power)
304163	1042h	2	Alarm 3 SetPoint1 (on)	INT32	Value min -1500000 = -15000,00 Value max +1500000 = +15000.00 Example: value 123 = 1.23	0 (0,00)
304165	1044h	2	Alarm 3 SetPoint2 (off)	INT32	Value min -1500000 = -15000,00 Value max +1500000 = +15000.00	0 (0,00)

					Example: value 123 = 1.23	
304167	1046h	1	Alarm 3 Delay	UINT16	Value min 0 = 0 [s] Value max 3600 = 3600 [s]	0[s]
304168	1047h	1	Alarm 3 status	UINT16	0 = alarm OFF 1 = alarm ON	
304169	1048h	1	Alarm 4 Enable	UINT16	Value 0 = Disabled Value 1 = Enabled	0 (Disabled)
304170	1049h	1	Alarm 4 linked	UINT16	Value 1 = System active power [kW] Value 2 = System apparent power [kVA] Value 3 = System reactive power [kvar] Value 4 = System power factor Value 5 = Phase currents OR condition[A] Value 6 = Phase voltages OR condition [V] Value 7 = Concatenated voltages OR condition [V] Value 8 = Frequency Value 9 = Active power L1 Value 10 = Active power L2 Value 11 = Active power L3 Value 12 = Current L1 Value 13 = Current L2 Value 14 = Current L3	1 (Active power)
304171	104Ah	2	Alarm 4 SetPoint1 (on)	INT32	Value min -1500000 = -15000,00 Value max +1500000 = +15000.00 Example: value 123 = 1.23	0 (0,00)
304173	104Ch	2	Alarm 4 SetPoint2 (off)	INT32	Value min -1500000 = -15000,00 Value max +1500000 = +15000.00 Example: value 123 = 1.23	0 (0,00)
304175	104Eh	1	Alarm 4 Delay	UINT16	Value min 0 = 0 [s] Value max 3600 = 3600 [s]	0[s]

5.1.9 Tariff enabling

Table - 5.11 - Modbus functions: 0x03, 0x04, 0x06 and 0x10

Modicon address	Physical address	Length (words)	VARIABLE ENG. UNIT	Data Format	Notes	Default
304354	1101h	1	Enable/Disable tariff management via modbus	UINT 16	Value 0 = OFF Value 1 = ON	1 (ON)
304610	1201h	1	Tariff number selection via serial communication	UINT 16	Value 1 = Tariff1 selected Value 2 = Tariff2 selected	Value 1 = Tariff1 selected

IMPORTANT:

- Tariff configuration at “Active Tariff Selection”,
- If 1200h register is set to 0, the value of configuration at register 1101h is ignored.

5.1.10 Wrong connection

Table - 5.12 - Modbus functions: 0x03, 0x04, 0x06 and 0x10

Modicon address	Physical address	Length (words)	VARIABLE ENG. UNIT	Data Format	Notes	Default
304357	1104h	1	Wrong selection enables	UINT 16	Value min = 0 (Disabled) Value max = 1 (Enabled) Modbus functions: 0x03, 0x04, 0x06 and 0x10	1 (Enabled)
304358	1105h	1	Wrong selection status	UINT16	Value min = 0 (correct) Value max = 1 (connection error) Modbus functions: 0x03, 0x04	(real time calculation)
304359	1106h	1	PF zone cosine	UINT16	Value min = 5001 Value max = 1000	707
304360	1107h	1	PF zone sine	UINT16	Value min = 0 Value max = 8671	707

5.1.11 Wizard display configuration

Table - 5.13 - Modbus functions: 0x03, 0x04, 0x06 and 0x10

Modicon address	Physical address	Length (words)	VARIABLE ENG. UNIT	Data Format	Notes	Default
304362	1109h	1	Quick set up at next power on	UINT 16	Value min = 0 (Disabled menu) Value max = 1 (Enabled menu)	1 (Enabled)
304363	110Ah	1	Check connection at next power on	UINT 16	Value min = 0 (Disabled menu) Value max = 1 (Enabled menu)	1 (Enabled)

5.1.12 Hour counter configuration

Table - 5.14 - Modbus functions: 0x03, 0x04, 0x06 and 0x10

Modicon address	Physical address	Length (words)	VARIABLE ENG. UNIT	Data Format	Notes	Default
304364	110Bh	2	Primary start-up current of run hour counter (I_st_CountH)	UINT 32	Value weight: Ampere*1000 Value min = 10 [10 mA] Value max = 12000000 [12000 A]	10 (10 mA)

5.1.13 Phase – terminal block configuration

Table - 5.15 - Modbus functions: 0x03, 0x04, 0x06 and 0x10

Modicon address	Physical address	Length (words)	VARIABLE ENG. UNIT	Data Format	Notes	Default
304433	1150h	1	Input 1 Voltage configuration	UINT 16	Value 0 = Terminal Block 1 (default) Value 1 = Terminal Block 1 Value 2 = Terminal Block 2 Value 3 = Terminal Block 3	0 (TB 1)
304434	1151h	1	Input 2 Voltage configuration	UINT 16	Value 0 = Terminal Block 2 (default) Value 1 = Terminal Block 1 Value 2 = Terminal Block 2 Value 3 = Terminal Block 3	0 (TB 2)
304435	1152h	1	Input 3 Voltage configuration	UINT 16	Value 0 = Terminal Block 3 (default) Value 1 = Terminal Block 1 Value 2 = Terminal Block 2 Value 3 = Terminal Block 3	0 (TB 3)
304436	1153h	1	Input 1 Current configuration	UINT 16	Value 0 = Terminal Blocks 1-4 (AV2) or 13-14 (AV5) (default) Value 1 = Terminal Blocks 1-4 (AV2) or 13-14 (AV5) Value 2 = Terminal Blocks 2-5 (AV2) or 15-16 (AV5) Value 3 = Terminal Blocks 3-6 (AV2) or 17-18 (AV5)	0 (TBs 1-4 (AV2) or 13-14 (AV5))
304437	1154h	1	Input 2 Current configuration	UINT 16	Value 0 = Terminal Blocks 2-5 (AV2) or 15-16 (AV5) (default) Value 1 = Terminal Blocks 1-4 (AV2) or 13-14 (AV5) Value 2 = Terminal Blocks 2-5 (AV2) or 15-16 (AV5) Value 3 = Terminal Blocks 3-6 (AV2) or 17-18 (AV5)	0 (TBs 2-5 (AV2) or 15-16 (AV5))
304438	1155h	1	Input 3 Current configuration	UINT 16	Value 0 = Terminal Blocks 3-6 (AV2) or 17-18 (AV5) (default) Value 1 = Terminal Blocks 1-4 (AV2) or 13-14 (AV5) Value 2 = Terminal Blocks 2-5 (AV2) or 15-16 (AV5) Value 3 = Terminal Blocks 3-6 (AV2) or 17-18 (AV5)	0 (TBs 3-6 (AV2) or 17-18 (AV5))
304439	1156h	1	Input 1 Current direction	UINT 16	Value 0 = Direct Value 1 = Inverse	0 (Direct)

304440	1157h	1	Input 2 Current direction	UINT 16	Value 0 = Direct Value 1 = Inverse	0 (Direct)
304441	1158h	1	Input 3 Current direction	UINT 16	Value 0 = Direct Value 1 = Inverse	0 (Direct)

5.1.14 Page filter, screen saver and homepage configuration

Table - 5.16 - Modbus functions: 0x03, 0x04, 0x06 and 0x10

Modicon address	Physical address	Length (words)	VARIABLE ENG. UNIT	Data Format	Notes	Default
305633	1600h	1	Pages filter Enable	UINT 16	Value 0 = Disabled Value 1 = Enabled	0 (Disabled)
305634	1601h	1	Inactivity Time enable	UINT 16	Value 0 = Disabled Value 1 = Enabled	1 (Enabled)
305635	1602h	1	Screen Saver time	UINT 16	Value min = 0 (Disabled) Value max = 20 (Seconds)	0 (Disabled)
305636	1603h	1	Home page	UINT 16	Value min = 1 (Page 1) Value max = 26 (Page 26)	1 (Page 1)
305637	1604h	1	Backlight Time	UINT 16	Value 0 = Always ON Value 1 = 1 min Value 2 = 2 min Value 3 = 5 min Value 4 = 10 min Value 5 = 20 min Value 6 = 30 min Value 7 = 60 min Value 8 = Always OFF Restart timing on button press	0 (Always ON)
305649	1610h	1	Page 1	UINT 16	0 = no filter 1 = Filter 2 = Screen Saver	2 (Screensaver)
3056xx	16xxh	1	Page xx	UINT 16	0 = no filter 1 = Filter 2 = Screen Saver	0 (no filter)
305677	162Ch	1	Page 29	UINT 16	0 = no filter 1 = Filter 2 = Screen Saver	0 (no filter)

5.1.15 Serial port configuration S1 models

Table - 5.17 - Modbus functions: 0x03, 0x04, 0x06 and 0x10

Modicon address	Physical address	Length (words)	VARIABLE ENG. UNIT	Data Format	Notes	Default
308193	2000h	1	RS485 instrument address	UINT 16	Value min = 1 Value max = 247	1
308194	2001h	1	RS485 baud rate	UINT 16	Value 1 = 9.6 kbps Value 2 = 19.2 kbps Value 3 = 38.4 kbps Value 4 = 57.6 kbps Value 5 = 115.2 kbps	1 (9.6 kbps)
308195	2002h	1	RS485 parity	UINT 16	Value 1= no parity Value 2 = even parity	1 (None)
308196	2003h	1	RS485 Stop bit	UINT 16	Value 0 = 1 stop bit (default) Value 1 = 2 stop bit	0 (1 stop bit)
308197	2004h	1	RS485 delay on replay (ms)	UINT 16	Value min = 0 (default) Value max = 1000	-
308198	2005h	1	Update S1 communication settings	UINT 16	Value 1 update port communication setting Value ≠ 1 no effect	1

IMPORTANT: for register 2005h the write operation triggers the relative function. Read value is always 0.

5.1.16 Serial port configuration M1 models

Table - 5.18 - Modbus functions: 0x03, 0x04, 0x06 and 0x10

Modicon address	Physical address	Length (words)	VARIABLE ENG. UNIT	Data Format	Notes	Default
308209	2010h	1	M-Bus primary address	UINT 16	Value min = 1 Value max = 250	0
308210	2011h	1	M-Bus baud rate	UINT 16	Value 0 = 300 bps Value 1 = 2.4 kbps Value 2 = 9.6 kbps Value 3 = 19.2 kbps Value 4 = 38.4 kbps Value 5 = 57.6 kbps Value 6 = 115.2 kbps	1 (2.4 kbps)
308211	2012h	1	Update M-Bus communication settings	UINT16	Value 1. Update port communication setting.	1

IMPORTANT: for register 2012h the write operation triggers the relative function. Read value is always 0.

5.1.17 Stored Ethernet configuration

Table - 5.19 - Modbus functions: 0x03, 0x04, 0x06 and 0x10

Modicon address	Physical address	Length (words)	VARIABLE ENG. UNIT	Data Format	Notes	Default
308449	2100h	1	Stored IP address - A (A.B.C.D)	UINT 16	Min. value = 0, max. value = 255	192
308450	2101h	1	Stored IP address - B (A.B.C.D)	UINT 16	Min. value = 0, max. value = 255	168
308451	2102h	1	Stored IP address - C (A.B.C.D)	UINT 16	Min. value = 0, max. value = 255	1
308452	2103h	1	Stored IP address - D (A.B.C.D)	UINT 16	Min. value = 0, max. value = 255	10
308453	2104h	1	Stored subnet mask - A (A.B.C.D)	UINT 16	Min. value = 0, max. value = 255	255
308454	2105h	1	Stored subnet mask - B (A.B.C.D)	UINT 16	Min. value = 0, max. value = 255	255
308455	2106h	1	Stored subnet mask - C (A.B.C.D)	UINT 16	Min. value = 0, max. value = 255	255
308456	2107h	1	Stored subnet mask - D (A.B.C.D)	UINT 16	Min. value = 0, max. value = 255	0
308457	2108h	1	Stored default gateway - A (A.B.C.D)	UINT 16	Min. value = 0, max. value = 255	192
308458	2109h	1	Stored default gateway - B (A.B.C.D)	UINT 16	Min. value = 0, max. value = 255	168
308459	210Ah	1	Stored default gateway - C (A.B.C.D)	UINT 16	Min. value = 0, max. value = 255	1
308460	210Bh	1	Stored default gateway - D (A.B.C.D)	UINT 16	Min. value = 0, max. value = 255	1
308461	210Ch	1	Enable/Disable Ethernet port	UINT16	Value = 0 (OFF), Value = 1 (ON). Any other value has no effect.	?
308462	210Dh	1	DHCP enable	UINT 16	Value = 0 (OFF), Value = 1 (ON). Any other value has no effect	0
308463	210Eh	1	Apply TCP/IP stored configuration command	UINT 16	1 = apply stored configuration	1

IMPORTANT:

- when the DHCP service is enabled, the programmed (stored) IP-Subnet-Gateway parameters are not used to establish the Ethernet communication. These parameters take effect only after that the DHCP service has been disabled.
- in order that the programmed (stored) parameters take effect, a specific writing command to the physical address 210Eh must be sent.

5.1.18 Current Ethernet configuration

Table - 5.20 - Modbus functions: 0x03 and 0x04

Modicon address	Physical address	Length [word]	VARIABLE ENG. UNIT	Data Format	Notes	Default
308465	2110h	1	MAC address - a (a:b:c:d:e:f)	UINT 16	Min. value = 0, max. value = 255.	-
308466	2111h	1	MAC address - b (a:b:c:d:e:f)	UINT 16	Min. value = 0, max. value = 255.	-
308467	2112h	1	MAC address - c (a:b:c:d:e:f)	UINT 16	Min. value = 0, max. value = 255.	-
308468	2113h	1	MAC address - d (a:b:c:d:e:f)	UINT 16	Min. value = 0, max. value = 255.	-
308469	2114h	1	MAC address - e (a:b:c:d:e:f)	UINT 16	Min. value = 0, max. value = 255.	-
308470	2115h	1	MAC address - f (a:b:c:d:e:f)	UINT 16	Min. value = 0, max. value = 255.	-
308481	2120h	1	Actual IP address - A (A.B.C.D)	UINT 16	Min. value = 0, max. value = 255. 0xFFFF if Ethernet disabled	-
308482	2121h	1	Actual IP address - B (A.B.C.D)	UINT 16	Min. value = 0, max. value = 255. 0xFFFF if Ethernet disabled	-
308483	2122h	1	Actual IP address - C (A.B.C.D)	UINT 16	Min. value = 0, max. value = 255. 0xFFFF if Ethernet disabled	-
308484	2123h	1	Actual IP address - D (A.B.C.D)	UINT 16	Min. value = 0, max. value = 255. 0xFFFF if Ethernet disabled	-
308485	2124h	1	Actual subnet mask - A (A.B.C.D)	UINT 16	Min. value = 0, max. value = 255. 0xFFFF if Ethernet disabled	-
308486	2125h	1	Actual subnet mask - B (A.B.C.D)	UINT 16	Min. value = 0, max. value = 255. 0xFFFF if Ethernet disabled	-
308487	2126h	1	Actual subnet mask - C (A.B.C.D)	UINT 16	Min. value = 0, max. value = 255. 0xFFFF if Ethernet disabled	-
308488	2127h	1	Actual subnet mask - D (A.B.C.D)	UINT 16	Min. value = 0, max. value = 255. 0xFFFF if Ethernet disabled	-
308489	2128h	1	Actual default gateway - A (A.B.C.D)	UINT 16	Min. value = 0, max. value = 255. 0xFFFF if Ethernet disabled	-
308490	2129h	1	Actual default gateway - B (A.B.C.D)	UINT 16	Min. value = 0, max. value = 255. 0xFFFF if Ethernet disabled	-
308491	212Ah	1	Actual default gateway - C (A.B.C.D)	UINT 16	Min. value = 0, max. value = 255. 0xFFFF if Ethernet disabled	-
308492	212Bh	1	Actual default gateway - D (A.B.C.D)	UINT 16	Min. value = 0, max. value = 255. 0xFFFF if Ethernet disabled	-

IMPORTANT: The configuration read on this table is the configuration applied to the ethernet port.

5.1.19 Stored Wi-Fi LAN configuration

Table - 5.21 - Modbus functions: 0x03, 0x04, 0x06 and 0x10

Modicon address	Physical address	Length [word]	VARIABLE ENG. UNIT	Data Format	Notes	Default
308497	2130h	1	Stored Wi-Fi LAN IP address - A (A.B.C.D)	UINT 16	Min. value = 0, max. value = 255.	192
308498	2131h	1	Stored Wi-Fi LAN IP address - B (A.B.C.D)	UINT 16	Min. value = 0, max. value = 255.	168
308499	2132h	1	Stored Wi-Fi LAN IP address - C (A.B.C.D)	UINT 16	Min. value = 0, max. value = 255.	1
308500	2133h	1	Stored Wi-Fi LAN IP address - D (A.B.C.D)	UINT 16	Min. value = 0, max. value = 255.	10
308501	2134h	1	Stored Wi-Fi LAN subnet mask - A (A.B.C.D)	UINT 16	Min. value = 0, max. value = 255.	255
308502	2135h	1	Stored Wi-Fi LAN subnet mask - B (A.B.C.D)	UINT 16	Min. value = 0, max. value = 255.	255
308503	2136h	1	Stored Wi-Fi LAN subnet mask - C (A.B.C.D)	UINT 16	Min. value = 0, max. value = 255.	255
308504	2137h	1	Stored Wi-Fi LAN subnet mask - D (A.B.C.D)	UINT 16	Min. value = 0, max. value = 255.	0
308505	2138h	1	Stored Wi-Fi LAN default gateway - A (A.B.C.D)	UINT 16	Min. value = 0, max. value = 255.	192
308506	2139h	1	Stored Wi-Fi LAN default gateway - B (A.B.C.D)	UINT 16	Min. value = 0, max. value = 255.	168
308507	213Ah	1	Stored Wi-Fi LAN default gateway - C (A.B.C.D)	UINT 16	Min. value = 0, max. value = 255.	1
308508	213Bh	1	Stored Wi-Fi LAN default gateway - D (A.B.C.D)	UINT 16	Min. value = 0, max. value = 255.	1
308510	213Dh	1	Wi-Fi LAN DHCP enable	UINT 16	Value = 0 (OFF), Value = 1 (ON). Any other value has no effect.	0
308512	213Fh	1	Enable/Disable Wi-Fi LAN port	UINT 16	Value = 0 (OFF), Value = 1 (ON). Any other value has no effect	0
308513	2140h	16	Wi-Fi LAN SSID connection	ARRAY 32	Last byte must be 0x00 that means EOS	-
308529	2150h	17	Wi-Fi LAN connection password	ARRAY 34	Write only	-
308547	2162h	1	Apply Wi-Fi LAN configuration command	UINT 16	1 = apply configuration	-

IMPORTANT:

- when the DHCP service is enabled, the programmed (stored) IP-Subnet-Gateway parameters are not used to establish the Ethernet communication. These parameters take effect only after that the DHCP service has been disabled.
- in order that the programmed (stored) parameters take effect, a specific writing command to the physical address 2162h must be sent.

5.1.20 Current Wi-Fi LAN configuration

Table - 5.22 - Modbus functions: 0x03, 0x04

Modicon address	Physical address	Length [word]	VARIABLE ENG. UNIT	Data Format	Notes	Default
308561	2170h	1	MAC address - a (a.b.c.d.e.f)	UINT 16	Min. value = 0, max. value = 255.	-
308562	2171h	1	MAC address - b (a.b.c.d.e.f)	UINT 16	Min. value = 0, max. value = 255.	-
308563	2172h	1	MAC address - c (a.b.c.d.e.f)	UINT 16	Min. value = 0, max. value = 255.	-
308564	2173h	1	MAC address - d (a.b.c.d.e.f)	UINT 16	Min. value = 0, max. value = 255.	-
308565	2174h	1	MAC address - e (a.b.c.d.e.f)	UINT 16	Min. value = 0, max. value = 255.	-
308566	2175h	1	MAC address - f (a.b.c.d.e.f)	UINT 16	Min. value = 0, max. value = 255.	-
308567	2176h	1	Actual IP address - A (A.B.C.D)	UINT 16	Min. value = 0, max. value = 255. 0xFFFF if Wi-Fi LAN is disabled	-
308568	2177h	1	Actual IP address - B (A.B.C.D)	UINT 16	Min. value = 0, max. value = 255. 0xFFFF if Wi-Fi LAN is disabled	-
308569	2178h	1	Actual IP address - C (A.B.C.D)	UINT 16	Min. value = 0, max. value = 255. 0xFFFF if Wi-Fi LAN is disabled	-
308570	2179h	1	Actual IP address - D (A.B.C.D)	UINT 16	Min. value = 0, max. value = 255. 0xFFFF if Wi-Fi LAN is disabled	-
308571	217Ah	1	Actual subnet mask - A (A.B.C.D)	UINT 16	Min. value = 0, max. value = 255. 0xFFFF if Wi-Fi LAN is disabled	-
308572	217Bh	1	Actual subnet mask - B (A.B.C.D)	UINT 16	Min. value = 0, max. value = 255. 0xFFFF if Wi-Fi LAN is disabled	-
308573	217Ch	1	Actual subnet mask - C (A.B.C.D)	UINT 16	Min. value = 0, max. value = 255. 0xFFFF if Wi-Fi LAN is disabled	-
308574	217Dh	1	Actual subnet mask - D (A.B.C.D)	UINT 16	Min. value = 0, max. value = 255. 0xFFFF if Wi-Fi LAN is disabled	-
308575	217Eh	1	Actual default gateway - A (A.B.C.D)	UINT 16	Min. value = 0, max. value = 255. 0xFFFF if Wi-Fi LAN is disabled	-
308576	217Fh	1	Actual default gateway - B (A.B.C.D)	UINT 16	Min. value = 0, max. value = 255. 0xFFFF if Wi-Fi LAN is disabled	-
308577	2280h	1	Actual default gateway - C (A.B.C.D)	UINT 16	Min. value = 0, max. value = 255. 0xFFFF if Wi-Fi LAN is disabled	-
308578	2181h	1	Actual default gateway - D (A.B.C.D)	UINT 16	Min. value = 0, max. value = 255. 0xFFFF if Wi-Fi LAN is disabled	-
308579	2182h	16	Wi-Fi current SSID connection	ARRAY 32	Empty string if not connected	-
308580	2183h	1	Wi-Fi channel	UINT 16	1 to 11	-
308581	2184h	1	Wi-Fi bandwidth	UINT 16	Value = 1: bandwidth = 20 MHz Value = 2: bandwidth = 40 MHz	-

5.1.21 Stored Wi-Fi 1 to 1 configuration

Table - 5.23 - Modbus functions: 0x03, 0x04, 0x06 and 0x10

Modicon address	Physical address	Length [word]	VARIABLE ENG. UNIT	Data Format	Notes	Default
308753	2230h	16	Wi-Fi 1 to 1 SSID connection	CHAR32	Last byte must be 0x00 that means EOS	192
308769	2240h	16	Wi-Fi 1 to 1 connection password	CHAR32	Write only	-
308785	2250h	1	Enable/Disable Wi-Fi 1 to 1 port	UINT 16	Value = 0 (OFF), Value = 1 (ON). Any other value has no effect.	-
308786	2251h	1	Stored Wi-Fi channel	UINT16	1 to 11*	-
308787	2252h	1	Stored Wi-Fi bandwidth	UINT16	Value = 1: bandwidth = 20 MHz* Value = 2: bandwidth = 40 MHz*	-
308788	2253h	1	Apply Wi-Fi 1 to 1 configuration command	UINT 16	1 = apply configuration	-

IMPORTANT:

* Check that Wi-Fi LAN is disabled, otherwise it is not possible to change Wi-Fi channel.

5.1.22 Current Wi-Fi 1 to 1 configuration

Table - 5.24 - Modbus functions: 0x03, 0x04, 0x06 and 0x10

Modicon address	Physical address	Length [word]	VARIABLE ENG. UNIT	Data Format	Notes	Default
308789	2254h	1	Wi-Fi 1 to 1: external device is connected to EM600	UINT 16	Value = 0: no external device connected to EM600 in Wi-Fi 1 to 1 mode Value = 1: external device is connected to EM600 in Wi-Fi 1 to 1 mode	-
308790	2255h	1	Enable/Disable Wi-Fi 1 to 1 port status	UINT 16	Value = 0 (OFF), Value = 1 (ON).	-
308791	2256h	1	Actual Wi-Fi channel	UINT 16	-	-
308792	2257h	1	Actual Wi-Fi bandwidth	UINT 16	Value = 1: bandwidth = 20 MHz Value = 2: bandwidth = 40 MHz	-

5.1.23 mDNS configuration

Table - 5.25 - Modbus functions: 0x03, 0x04, 0x06 and 0x10

Modicon address	Physical address	Length [word]	VARIABLE ENG. UNIT	Data Format	Notes	Default
308817	2270h	1	mDns Enable/disable	UINT16	0 = disabled 1 = enabled	0
308818	2271h	32	mDNS name	CHAR32	Last Byte must be 0x00 that means EOS	-
308834	2281h	1	Apply mDNS configuration command	UINT16	1 = apply configuration	-

5.1.24 Modbus configuration

Table - 5.29 - Modbus functions: 0x03, 0x04, 0x06 and 0x10

Modicon address	Physical address	Length [word]	VARIABLE ENG. UNIT	Data Format	Notes	Default
308961	2300h	1	Modbus TCP port on Ethernet side	UINT16	0-65535	?
308962	2301h	1	Modbus TCP port on Wifi LAN side	UINT16	0-65535	?
308963	2302h	1	Modbus TCP port on Wifi 1 to 1 side	UINT16	0-65535	?
308964	2303h	1	Modbus TCP mode on ethernet	UINT16	0 = Disabled 1= only Read 2 = Read - Write	?
308965	2304h	1	Modbus TCP mode on WiFi LAN	UINT16	0 = Disabled 1= only Read 2 = Read - Write	?
308966	2305h	1	Modbus TCP mode on WiFi 1 to 1	UINT16	0 = Disabled 1= only Read 2 = Read - Write	?
308967	2306h	1	Modbus RTU mode on S1 modules	UINT16	0 = Disabled 1= only Read 2 = Read - Write	?

5.1.25 Webserver configuration

Table - 5.30 - Modbus functions: 0x03, 0x04, 0x06 and 0x10

Modicon address	Physical address	Length [word]	VARIABLE ENG. UNIT	Data Format	Notes	Default
320632	2310h	1	Enable/Disable Webserver	UINT16	0 = disabled 1 = enabled	?
320634	2311h	1	Basic/Advanced Dashboard visualization	UINT16	0 = advanced 1 = basic	-
320635	2312h	1	Bidirectional visualization	UINT16	0 = disabled 1 = enabled	-
308980	2313h	16	Web Server login username	CHAR[32]	31 available and Last Byte must be 0x00 that means EOS	-
308996	2323h	1	Free Access enable	UINT16	0 = disabled 1 = enabled	-
308997	2324h	1	Language	UINT16	0 = English 1 = Second language	-
308998	2325h	1	Web Server inactivity timeout	UINT16	0 = 5 min 1 = 10 min 2 = 15 min 3 = 20 min 4 = 30 min	-
349187	C022h	1	Web Server sign in done	UINT16	Read only	-
349188	C023h	1	Web Server: next settings on Quick Setup	UINT16	Read only	-
349189	C024h	1	Web Server: Quick Setup is done	UINT16	Read only	-

5.1.26 Reset command

Table - 5.31 - Modbus functions: 0x03, 0x04, 0x06 and 0x10

Modicon address	Physical address	Length [word]	VARIABLE ENG. UNIT	Data Format	Notes	Default
316388	4003h	1	Reset of total energy meters and run hour meter (no MID)	UINT 16	Value = 1: command executed Value ≠ 1: no effect	0 (fixed)
316389	4004h	1	Reset of partial energy meters and run hour meter	UINT 16	Value = 1: command executed Value ≠ 1: no effect	0 (fixed)
316390	4005h	1	Reset of DMD, DMD max and max value	UINT 16	Value = 1: command executed Value ≠ 1: no effect	0 (fixed)
316391	4006h	1	Reset tariff	UINT 16	Value = 1: command executed Value ≠ 1: no effect	0 (fixed)

5.1.27 Serial number

Table - 5.32 - Modbus functions: 0x03, 0x04, 0x06 and 0x10

Modicon address	Physical address	Length [word]	VARIABLE ENG. UNIT	Data Format	Notes	Default
320481	5000h	7	Part number	CHAR[14]	MSB: ASCII code LSB: ASCII code	-
320488	5007h	1	Production year	UINT 16	-	-

5.1.28 Configurable name

Table - 5.33 - Modbus functions: 0x03, 0x04, 0x06 and 0x10

Modicon address	Physical address	Length [word]	VARIABLE ENG. UNIT	Data Format	Notes	Default
320489	5008h	8	Configurable name	CHAR[16]	MSB: ASCII code LSB: ASCII code	-

5.1.29 Device state

Table - 5.34 - Modbus functions: 0x03, 0x04

Modicon address	Physical address	Length [word]	VARIABLE ENG. UNIT	Data Format	Notes	Default
320499	5012h	1	Device state	UINT 16 BITFIELD	See table below (*)	-

Table - 5.35 - Device state bit field (*)

Bit of Word	INFO
Bit 0	0 = Within the measurement range (V1N) 1 = Over maximum range
Bit 1	0 = Within the measurement range (V2N) 1 = Over maximum range
Bit 2	0 = Within the measurement range (V3N) 1 = Over maximum range
Bit 3	0 = Within the measurement range (V12) 1 = Over maximum range
Bit 4	0 = Within the measurement range (V23) 1 = Over maximum range
Bit 5	0 = Within the measurement range (V31) 1 = Over maximum range
Bit 6	0 = Within the measurement range (I1) 1 = Over maximum range
Bit 7	0 = Within the measurement range (I2) 1 = Over maximum range
Bit 8	0 = Within the measurement range (I3) 1 = Over maximum range
Bit 9	0 = Frequency within the validity range 1 = Frequency outside the validity range
Bit 10	Reserved
Bit 11	Reserved
Bit 12	0 = Communication module OK 1 = Communication module internal fault
Bit 13	0 = Measure module OK 1 = Measure module internal fault
Bit 14	Reserved
Bit 15	Reserved

5.1.30 Firmware CRC

Table - 5.36 - Modbus functions: 0x03, 0x04

Modicon address	Physical address	Length [word]	VARIABLE ENG. UNIT	Data Format	Notes	Default
320513	5020h	2	Firmware CRC32 value Measure module	UINT 32	-	-
320515	5022h	2	Firmware CRC32 value Communication module	UINT 32	-	-

6. Datalogger

6.1 Configuration and energy variables

Table - 6.1 - Modbus functions: 0x03, 0x04, configuration command

Modicon address	Physical address	Length [word]	VARIABLE ENG. UNIT	Data Format	Notes	Default
309537	2540h	1	Enable/Disable Minimal Datalogger	UINT16	0 = Disable Minimal Datalogger 1 = Enable Minimal Datalogger	-

Table - 6.2 - Modbus functions: 0x03, 0x04, energy variables

Modicon address	Physical address	Length [word]	VARIABLE ENG. UNIT	Data Format	Notes	Default
309538	2541h	1	Minimal Datalogger variable 1	UINT16	0 = kWh(+)TOT 1 = kWh(-)TOT	-
309539	2542h	1	Minimal Datalogger variable 2	UINT16	2 = kWh(+)T1 3 = kWh(+)T2	-
309540	2543h	1	Minimal Datalogger variable 3	UINT16	4 = kWh(+)L1 5 = kWh(+)L2	-
309541	2544h	1	Minimal Datalogger variable 4	UINT16	6 = kWh(+)L3 7 = kWh(-)L1 8 = kWh(-)L2 9 = kWh(-)L3	-

6.2 Logged values

Table - 6.3 - Modbus functions: 0x03, 0x04

Modicon address	Physical address	Length [word]	VARIABLE ENG. UNIT	Data Format	Notes	Default
332769	8000h	4	Minimal Datalogger instantaneous value: Previous Day - Var1 - 00:00	UINT64	-	-
...
334909	885Ch	4	Minimal Datalogger instantaneous value: Current Year - Var4 - December	UINT64	-	-

Table - 6.4 - Modbus functions: 0x03, 0x04

Modicon address	Physical address	Length [word]	VARIABLE ENG. UNIT	Data Format	Notes	Default
334913	8860h	4	Minimal Datalogger instantaneous value VAR1	UINT64	-	-
334917	8864h	4	Minimal Datalogger instantaneous value VAR2	UINT64	-	-
334921	8868h	4	Minimal Datalogger instantaneous value VAR3	UINT64	-	-
334925	886Ch	4	Minimal Datalogger instantaneous value VAR4	UINT64	-	-

6.3 Delta values

Table - 6.5 - Modbus functions: 0x03, 0x04, delta values

Modicon address	Physical address	Length [word]	VARIABLE ENG. UNIT	Data Format	Notes	Default
334929	8870h	4	Minimal Datalogger delta value: Previous Day - Var1 - 00:00 / 01:00	UINT64	-	-
...
337069	90CCh	4	Minimal Datalogger delta value: Current Year - Var4 - November / December	UINT64	-	-

Table - 6.6 - Modbus functions: 0x03, 0x04, total delta values

Modicon address	Physical address	Length [word]	VARIABLE ENG. UNIT	Data Format	Notes	Default
337073	90D0h	4	Minimal Datalogger Total delta value: Previous Day - Var1	UINT64	-	-
337077	90D4h	4	Minimal Datalogger Total delta value: Previous Day - Var2	UINT64	-	-
337081	90D8h	4	Minimal Datalogger Total delta value: Previous Day - Var3	UINT64	-	-
337085	90DCh	4	Minimal Datalogger Total delta value: Previous Day - Var4	UINT64	-	-
337089	90E0h	4	Minimal Datalogger Total delta value: Current Day - Var1	UINT64	-	-
337093	90E4h	4	Minimal Datalogger Total delta value: Current Day - Var2	UINT64	-	-
337097	90E8h	4	Minimal Datalogger Total delta value: Current Day - Var3	UINT64	-	-
337101	90ECh	4	Minimal Datalogger Total delta value: Current Day - Var4	UINT64	-	-
337105	90F0h	4	Minimal Datalogger Total delta value:	UINT64	-	-

			Previous Month - Var1			
337109	90F4h	4	Minimal Datalogger Total delta value: Previous Month - Var2	UINT64	-	-
337113	90F8h	4	Minimal Datalogger Total delta value: Previous Month - Var3	UINT64	-	-
337117	90FCh	4	Minimal Datalogger Total delta value: Previous Month - Var4	UINT64	-	-
337121	9100h	4	Minimal Datalogger Total delta value: Current Month - Var1	UINT64	-	-
337125	9104h	4	Minimal Datalogger Total delta value: Current Month - Var2	UINT64	-	-
337129	9108h	4	Minimal Datalogger Total delta value: Current Month - Var3	UINT64	-	-
337133	910Ch	4	Minimal Datalogger Total delta value: Current Month - Var4	UINT64	-	-
337137	9110h	4	Minimal Datalogger Total delta value: Previous Year - Var1	UINT64	-	-
337141	9114h	4	Minimal Datalogger Total delta value: Previous Year - Var2	UINT64	-	-
337145	9118h	4	Minimal Datalogger Total delta value: Previous Year - Var3	UINT64	-	-
337149	911Ch	4	Minimal Datalogger Total delta value: Previous Year - Var4	UINT64	-	-
337153	9120h	4	Minimal Datalogger Total delta value: Current Year - Var1	UINT64	-	-
337157	9124h	4	Minimal Datalogger Total delta value: Current Year - Var2	UINT64	-	-
337161	9128h	4	Minimal Datalogger Total delta value: Current Year - Var3	UINT64	-	-
337165	912Ch	4	Minimal Datalogger Total delta value: Current Year - Var4	UINT64	-	-
349190	C025h	4	Reset Minimal Datalogger at next power on	UINT64	-	-
349214	C03Dh	4	Minimal Datalogger in product	UINT64	-	-
337073	90D0h	4	Minimal Datalogger Total delta value: Previous Day - Var1	UINT64	-	-
337077	90D4h	4	Minimal Datalogger Total delta value: Previous Day - Var2	UINT64	-	-
337081	90D8h	4	Minimal Datalogger Total delta value: Previous Day - Var3	UINT64	-	-
337085	90DCh	4	Minimal Datalogger Total delta value: Previous Day - Var4	UINT64	-	-



337089	90E0h	4	Minimal Datalogger Total delta value: Current Day - Var1	UINT64	-	-
337093	90E4h	4	Minimal Datalogger Total delta value: Current Day - Var2	UINT64	-	-
337097	90E8h	4	Minimal Datalogger Total delta value: Current Day - Var3	UINT64	-	-
337101	90ECh	4	Minimal Datalogger Total delta value: Current Day - Var4	UINT64	-	-
337105	90F0h	1	Minimal Datalogger Total delta value: Previous Month - Var1	UINT64	-	-
337109	90F4h	1	Minimal Datalogger Total delta value: Previous Month - Var2	UINT64	-	-

7. Parameters affected by reset command

The table below shows what parameters are affected by the Reset commands.

- X = available,
- - = not available.

Table - 7.1 - Modbus functions: 0x03, 0x04

	Description	Reset total (non MID models only)	Reset partial	Reset of DMD, DMD max and max value	Tariff reset	Factory reset
kWh+ TOT	Imported active energy (TOTAL)	X	-	-	-	X
kWh- TOT	Exported active energy (TOTAL)	X	-	-	-	X
h+ TOT	Total run hour counters imported active energy (TOTAL)	X	-	-	-	X
h- TOT	Total run hour counters exported active energy (TOTAL)	X	-	-	-	X
kWh+ PAR	Imported active energy (PARTIAL)	-	X	-	-	X
kWh- PAR	Exported active energy (PARTIAL)	-	X	-	-	X
h+ PAR	Partial run hour counters imported active energy (PARTIAL)	-	X	-	-	X
h- PAR	Partial run hour counters exported active energy (PARTIAL)	-	X	-	-	X
A L1 DMD	Peak demand System Current phase 1	-	-	X	-	X
A L2 DMD	Peak demand System Current phase 2	-	-	X	-	X
A L3 DMD	Peak demand System Current phase 3	-	-	X	-	X
kW DMD	Peak demand System active power	-	-	X	-	X
kW DMD max.	Max. Peak demand System active power	-	-	X	-	X
kW + T1	Imported active power of the current day, Tariff 1	-	-	-	X	-
kW - T2	Exported active power of the current day, Tariff 2	-	-	-	X	-
kW + T1	Imported active power of the previous day, Tariff 1	-	-	-	X	-
kW - T2	Exported active power of the previous day, Tariff 2	-	-	-	X	-
kW + T1	Imported active power of the current month, Tariff 1	-	-	-	X	-
kW - T2	Exported active power of the current month, Tariff 2	-	-	-	X	-
kW + T1	Imported active power of the previous month, Tariff 1	-	-	-	X	-

Energy Management

kW - T2	Exported active power of the previous month, Tariff 2				X	
kW + T1	Imported active power of the current year, Tariff 1	-	-	-	X	-
kW - T2	Exported active power of the current year, Tariff 2	-	-	-	X	-
kW + T1	Imported active power of the previous year, Tariff 1	-	-	-	X	-
kW - T2	Exported active power of the previous year, Tariff 2	-	-	-	X	-

8. Annex A – Timezone table index

Timezone	Table index
Africa/Abidjan	0
Africa/Accra	1
Africa/Addis_Ababa	2
Africa/Algiers	3
Africa/Asmara	4
Africa/Bamako	5
Africa/Bangui	6
Africa/Banjul	7
Africa/Bissau	8
Africa/Blantyre	9
Africa/Brazzaville	10
Africa/Bujumbura	11
Africa/Cairo	12
Africa/Casablanca	13
Africa/Ceuta	14
Africa/Conakry	15
Africa/Dakar	16
Africa/Dar_es_Salaam	17
Africa/Djibouti	18
Africa/Douala	19
Africa/El_Aaiun	20
Africa/Freetown	21
Africa/Gaborone	22
Africa/Harare	23
Africa/Johannesburg	24
Africa/Juba	25
Africa/Kampala	26
Africa/Khartoum	27
Africa/Kigali	28
Africa/Kinshasa	29
Africa/Lagos	30
Africa/Libreville	31
Africa/Lome	32
Africa/Luanda	33
Africa/Lubumbashi	34
Africa/Lusaka	35
Africa/Malabo	36
Africa/Maputo	37
Africa/Maseru	38
Africa/Mbabane	39
Africa/Mogadishu	40
Africa/Monrovia	41
Africa/Nairobi	42

Africa/Ndjamena	43
Africa/Niamey	44
Africa/Nouakchott	45
Africa/Ouagadougou	46
Africa/Porto	47
Africa/Sao_Tome	48
Africa/Tripoli	49
Africa/Tunis	50
Africa/Windhoek	51
America/Adak	52
America/Anchorage	53
America/Anguilla	54
America/Antigua	55
America/Araguaina	56
America/Argentina	57
America/Argentina	58
America/Argentina	59
America/Argentina	60
America/Argentina	61
America/Argentina	62
America/Argentina	63
America/Argentina	64
America/Argentina	65
America/Argentina	66
America/Argentina	67
America/Argentina	68
America/Aruba	69
America/Asuncion	70
America/Atikokan	71
America/Bahia	72
America/Bahia_Banderas	73
America/Barbados	74
America/Belem	75
America/Belize	76
America/Blanc	77
America/Boa_Vista	78
America/Bogota	79
America/Boise	80
America/Cambridge_Bay	81
America/Campo_Grande	82
America/Cancun	83
America/Caracas	84
America/Cayenne	85
America/Cayman	86

America/Chicago	87
America/Chihuahua	88
America/Costa_Rica	89
America/Creston	90
America/Cuiaba	91
America/Curacao	92
America/Danmarkshavn	93
America/Dawson	94
America/Dawson_Creek	95
America/Denver	96
America/Detroit	97
America/Dominica	98
America/Edmonton	99
America/Eirunepe	100
America/El_Salvador	101
America/Fortaleza	102
America/Fort_Nelson	103
America/Glace_Bay	104
America/Godthab	105
America/Goose_Bay	106
America/Grand_Turk	107
America/Grenada	108
America/Guadeloupe	109
America/Guatemala	110
America/Guayaquil	111
America/Guyana	112
America/Halifax	113
America/Havana	114
America/Hermosillo	115
America/Indiana	116
America/Indiana	117
America/Indiana	118
America/Indiana	119
America/Indiana	120
America/Indiana	121
America/Indiana	122
America/Indiana	123
America/Inuvik	124
America/Iqaluit	125
America/Jamaica	126
America/Juneau	127
America/Kentucky	128
America/Kentucky	129
America/Kralendijk	130
America/La_Paz	131

America/Lima	132
America/Los_Angeles	133
America/Lower_Princes	134
America/Maceio	135
America/Managua	136
America/Manaus	137
America/Marigot	138
America/Martinique	139
America/Matamoros	140
America/Mazatlan	141
America/Menominee	142
America/Merida	143
America/Metlakatla	144
America/Mexico_City	145
America/Miquelon	146
America/Moncton	147
America/Monterrey	148
America/Montevideo	149
America/Montreal	150
America/Montserrat	151
America/Nassau	152
America/New_York	153
America/Nipigon	154
America/Nome	155
America/Noronha	156
America/North_Dakota	157
America/North_Dakota	158
America/North_Dakota	159
America/Ojinaga	160
America/Panama	161
America/Pangnirtung	162
America/Paramaribo	163
America/Phoenix	164
America/Port	165
America/Port_of_Spain	166
America/Porto_Velho	167
America/Puerto_Rico	168
America/Punta_Arenas	169
America/Rainy_River	170
America/Rankin_Inlet	171
America/Recife	172
America/Regina	173
America/Resolute	174
America/Rio_Branco	175
America/Santarem	176

America/Santiago	177
America/Santo_Domingo	178
America/Sao_Paulo	179
America/Scoresbysund	180
America/Sitka	181
America/St_Barthelemy	182
America/St_Johns	183
America/St_Kitts	184
America/St_Lucia	185
America/St_Thomas	186
America/St_Vincent	187
America/Swift_Current	188
America/Tegucigalpa	189
America/Thule	190
America/Thunder_Bay	191
America/Tijuana	192
America/Toronto	193
America/Tortola	194
America/Vancouver	195
America/Whitehorse	196
America/Winnipeg	197
America/Yakutat	198
America/Yellowknife	199
Antarctica/Casey	200
Antarctica/Davis	201
Antarctica/DumontDUrville	202
Antarctica/Macquarie	203
Antarctica/Mawson	204
Antarctica/McMurdo	205
Antarctica/Palmer	206
Antarctica/Rothera	207
Antarctica/Syowa	208
Antarctica/Troll	209
Antarctica/Vostok	210
Arctic/Longyearbyen	211
Asia/Aden	212
Asia/Almaty	213
Asia/Amman	214
Asia/Anadyr	215
Asia/Aqttau	216
Asia/Aqtobe	217
Asia/Ashgabat	218
Asia/Atyrau	219
Asia/Baghdad	220
Asia/Bahrain	221

Asia/Baku	222
Asia/Bangkok	223
Asia/Barnaul	224
Asia/Beirut	225
Asia/Bishkek	226
Asia/Brunei	227
Asia/Chita	228
Asia/Choibalsan	229
Asia/Colombo	230
Asia/Damascus	231
Asia/Dhaka	232
Asia/Dili	233
Asia/Dubai	234
Asia/Dushanbe	235
Asia/Famagusta	236
Asia/Gaza	237
Asia/Hebron	238
Asia/Ho_Chi_Minh	239
Asia/Hong_Kong	240
Asia/Hovd	241
Asia/Irkutsk	242
Asia/Jakarta	243
Asia/Jayapura	244
Asia/Jerusalem	245
Asia/Kabul	246
Asia/Kamchatka	247
Asia/Karachi	248
Asia/Kathmandu	249
Asia/Khandyga	250
Asia/Kolkata	251
Asia/Krasnoyarsk	252
Asia/Kuala_Lumpur	253
Asia/Kuching	254
Asia/Kuwait	255
Asia/Macau	256
Asia/Magadan	257
Asia/Makassar	258
Asia/Manila	259
Asia/Muscat	260
Asia/Nicosia	261
Asia/Novokuznetsk	262
Asia/Novosibirsk	263
Asia/Omsk	264
Asia/Oral	265
Asia/Phnom_Penh	266

Asia/Pontianak	267
Asia/Pyongyang	268
Asia/Qatar	269
Asia/Qyzylorda	270
Asia/Riyadh	271
Asia/Sakhalin	272
Asia/Samarkand	273
Asia/Seoul	274
Asia/Shanghai	275
Asia/Singapore	276
Asia/Srednekolymensk	277
Asia/Taipei	278
Asia/Tashkent	279
Asia/Tbilisi	280
Asia/Tehran	281
Asia/Thimphu	282
Asia/Tokyo	283
Asia/Tomsk	284
Asia/Ulaanbaatar	285
Asia/Urumqi	286
Asia/Ust	287
Asia/Vientiane	288
Asia/Vladivostok	289
Asia/Yakutsk	290
Asia/Yangon	291
Asia/Yekaterinburg	292
Asia/Yerevan	293
Atlantic/Azores	294
Atlantic/Bermuda	295
Atlantic/Canary	296
Atlantic/Cape_Verde	297
Atlantic/Faroe	298
Atlantic/Madeira	299
Atlantic/Reykjavik	300
Atlantic/South_Georgia	301
Atlantic/Stanley	302
Atlantic/St_Helena	303
Australia/Adelaide	304
Australia/Brisbane	305
Australia/Broken_Hill	306
Australia/Currie	307
Australia/Darwin	308
Australia/Eucla	309
Australia/Hobart	310
Australia/Lindeman	311

Australia/Lord_Howe	312
Australia/Melbourne	313
Australia/Perth	314
Australia/Sydney	315
Europe/Amsterdam	316
Europe/Andorra	317
Europe/Astrakhan	318
Europe/Athens	319
Europe/Belgrade	320
Europe/Berlin	321
Europe/Bratislava	322
Europe/Brussels	323
Europe/Bucharest	324
Europe/Budapest	325
Europe/Busingen	326
Europe/Chisinau	327
Europe/Copenhagen	328
Europe/Dublin	329
Europe/Gibraltar	330
Europe/Guernsey	331
Europe/Helsinki	332
Europe/Isle_of_Man	333
Europe/Istanbul	334
Europe/Jersey	335
Europe/Kaliningrad	336
Europe/Kiev	337
Europe/Kirov	338
Europe/Lisbon	339
Europe/Ljubljana	340
Europe/London	341
Europe/Luxembourg	342
Europe/Madrid	343
Europe/Malta	344
Europe/Mariehamn	345
Europe/Minsk	346
Europe/Monaco	347
Europe/Moscow	348
Europe/Oslo	349
Europe/Paris	350
Europe/Podgorica	351
Europe/Prague	352
Europe/Riga	353
Europe/Rome	354
Europe/Samara	355
Europe/San_Marino	356

Europe/Sarajevo	357
Europe/Saratov	358
Europe/Simferopol	359
Europe/Skopje	360
Europe/Sofia	361
Europe/Stockholm	362
Europe/Tallinn	363
Europe/Tirane	364
Europe/Ulyanovsk	365
Europe/Uzhgorod	366
Europe/Vaduz	367
Europe/Vatican	368
Europe/Vienna	369
Europe/Vilnius	370
Europe/Volgograd	371
Europe/Warsaw	372
Europe/Zagreb	373
Europe/Zaporozhye	374
Europe/Zurich	375
Indian/Antananarivo	376
Indian/Chagos	377
Indian/Christmas	378
Indian/Cocos	379
Indian/Comoro	380
Indian/Kerguelen	381
Indian/Mahe	382
Indian/Maldives	383
Indian/Mauritius	384
Indian/Mayotte	385
Indian/Reunion	386
Pacific/Apia	387
Pacific/Auckland	388
Pacific/Bougainville	389
Pacific/Chatham	390

Pacific/Chuuk	391
Pacific/Easter	392
Pacific/Efate	393
Pacific/Enderbury	394
Pacific/Fakaofu	395
Pacific/Fiji	396
Pacific/Funafuti	397
Pacific/Galapagos	398
Pacific/Gambier	399
Pacific/Guadalcanal	400
Pacific/Guam	401
Pacific/Honolulu	402
Pacific/Kiritimati	403
Pacific/Kosrae	404
Pacific/Kwajalein	405
Pacific/Majuro	406
Pacific/Marquesas	407
Pacific/Midway	408
Pacific/Nauru	409
Pacific/Niue	410
Pacific/Norfolk	411
Pacific/Noumea	412
Pacific/Pago_Pago	413
Pacific/Palau	414
Pacific/Pitcairn	415
Pacific/Pohnpei	416
Pacific/Port_Moresby	417
Pacific/Rarotonga	418
Pacific/Saipan	419
Pacific/Tahiti	420
Pacific/Tarawa	421
Pacific/Tongatapu	422
Pacific/Wake	423
Pacific/Wallis	424

9. Revisions

Revision	Date	Authors	Note
Rev. 1.0	12/02/2026	-	First release
Rev. 1.1	13/04/2026	-	Removed password (1000h) according to new FW revision 1.4.3 Fixed length of Configurable name (5008h)