DCM1 Modbus

MODBUS COMMUNICATION PROTOCOL

Public version

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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 DCM1 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 DCM1 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:
  - "**Modicom address**": it is the "6-digit Modicom" 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 14h (1 to 20)	Byte order: MSB, LSB
CRC	2 bytes	-	-

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

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 Function 03h (incorrect action)

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 14h (1 to 20)	Byte order: MSB, LSB
CRC	2 bytes	-	-

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

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 Function 04h (incorrect action)

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 Function 06h (correct action)

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 Function 06h (incorrect action)

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	3 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 0078h	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 Function 10h (correct action)

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 Function 10h (incorrect action)

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 Ω, ½ W, 5% resistor between line B and A) and at the end, in DCM1 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 1000 m or if in the network there are more than 160 instruments (with 1/5 unit load as used in DCM1 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 RS485 Modbus timing

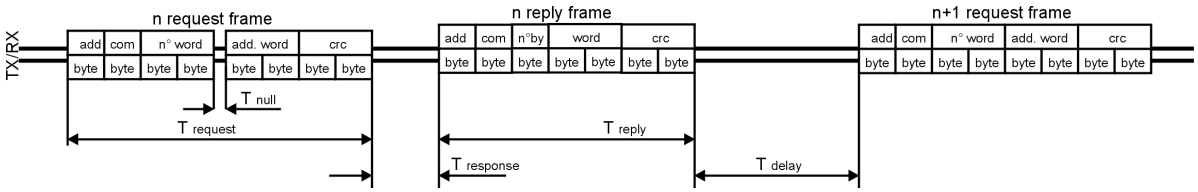


***Fig. 1** : 2-wire timing diagram.*

Table 1.13 - Timing of reading functions

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 DCM1 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 DCM1:

- 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:
  - “**Modicom address**”: it is the “6-digit Modicom” 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 parameters

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} ... 23^{1}
UINT32	UDINT	Unsigned double integer	32	0 ... 2^{32-1}
UINT64	ULINT	Unsigned long integer	64	0 ... 264-1
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 Maximum electrical values

If the input is above the maximum value, the value is still readable, but the Device state will set a proper flag to indicate the overrange.

3.3 Other error conditions

When the DCM1-T is disconnected from the display, the variables associated with it are set to 0x7FFF or 0x7FFFFFFF. The Device state is updated with proper flags.

3.4 Part number available

Part Number	Family	SubFamily	Gavazzi Code		FW	Note
			Decimal Format	Hex16 format		
DCM1A60V10L20S1PFA	DCM1	PFA	1824	0x0720	X	DC Meter, 1000 V 600 A, Ethernet, RS485, MID
DCM1A60V10L20S1PFB	DCM1	PFB	1825	0x0721	X	DC Meter, 1000 V 600 A, Ethernet, RS485, MID Bidirectional
DCM1A60V10L20S2DEB	DCM1	DEB	1826	0x0722	X	DC Meter, 1000 V 600 A, Ethernet, RS485, MID + Eichrecht Bidirectional
DCM1A60V10L20S3DEB	DCM1	DEB	1827	0x0723	X	DC Meter, 1000 V 600 A, Ethernet, RS485, MID + Eichrecht, Bidirectional
DCM1A60V10L20S2DEBF	DCM1	DEB	1826	0x0722	X	DC Meter, 1000 V 600 A, Ethernet, RS485, MID + Eichrecht + LNE, Bidirectional
DCM1A60V10L20S3DEBF	DCM1	DEB	1827	0x0723	X	DC Meter, 1000 V 600 A, Ethernet, RS485, MID + Eichrecht + LNE, Bidirectional
DCM1A30V10L20S1PFA	DCM1	PFA	1828	0x0724	X	DC Meter, 1000 V 300 A, Ethernet, RS485, MID
DCM1A30V10L20S1PFB	DCM1	PFB	1829	0x0725	X	DC Meter, 1000 V 300 A, Ethernet, RS485, MID Bidirectional
DCM1A30V10L20S2DEB	DCM1	DEB	1830	0x0726	X	DC Meter, 1000 V 300 A, Ethernet, RS485, MID + Eichrecht Bidirectional
DCM1A30V10L20S3DEB	DCM1	DEB	1831	0x0727	X	DC Meter, 1000 V 300 A, Ethernet, RS485, MID + Eichrecht Bidirectional
DCM1A30V10L20S2DEBF	DCM1	DEB	1830	0x0726	X	DC Meter, 1000 V 300 A, Ethernet, RS485, MID + Eichrecht + LNE, Bidirectional
DCM1A30V10L20S3DEBF	DCM1	DEB	1831	0x0727	X	DC Meter, 1000 V 300 A, Ethernet, RS485, MID + Eichrecht + LNE, Bidirectional
DCM1A60V10L20S1ULB	DCM1	ULB	1832	0x0728	X	DC Meter, 1000 V 600 A, Ethernet, RS485, Bidirectional
DCM1A30V10L20S1ULB	DCM1	ULB	1832	0x0729	X	DC Meter, 1000 V 300 A, Ethernet, RS485, Bidirectional

Protocol ID shall be used into Modbus map to distinguish the differences between models. If registers are available for every model the FW code shall be substituted with ALL.

IMPORTANT:

- Reading values in addresses not specified in the below tables returns an illegal data address exception;
- writing is inhibited when in menu Settings or Reset and during the charging session.

4 Map

4.1 Real time values

4.1.1 Instantaneous variables and meters (INT)

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

Modicom address	Physical address	Length (words)	VARIABLE ENG. UNIT	Data Format	Notes
300001	0000h	2	V	INT32	Value weight: Volt*10
300003	0002h	2	A	INT32	Value weight: Ampere*1000
300005	0004h	2	W	INT32	Value weight: Watt*10
…	…	…	…	…	…
300017	0010h	2	kWh (+) TOT	INT32	Value weight: kWh*10
300019	0012h	2	Ah (+) TOT	INT32	Value weight: Ah*10
300021	0014h	2	kWh (+) PAR	INT32	Value weight: kWh*10
300023	0016h	2	Ah (+) PAR	INT32	Value weight: Ah*10
…	…	…	…	…	…
300033	0020h	2	kWh (-) TOT	INT32	Value weight: kWh*10
300035	0022h	2	Ah (-) TOT	INT32	Value weight: Ah*10
300037	0024h	2	kWh (-) PAR	INT32	Value weight: kWh*10
300039	0026h	2	Ah (-) PAR	INT32	Value weight: Ah*10
…	…	…	…	…	…
300045	002Ch	2	Run hour meter	INT32	Value weight: h*100
300047	002Eh	2	Run hour meter kWh-	INT32	Value weight: h*100
300049	0030h	2	Run hour meter ON time	INT32	Value weight: h*100
300051	0032h	2	Run hour meter PAR	INT32	Value weight: h*100
300053	0034h	2	Run hour meter kWh- PAR	INT32	Value weight: h*100
300055	0036h	2	Run hour meter ON time PAR	INT32	Value weight: h*100
…	…	…	…	…	…
300081	0050h	2	T1	INT32	Value weight: °C *10
300083	0052h	2	T2	INT32	Value weight: °C * 10

4.1.2 Instantaneous variables and meters (INT)

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

Modicom address	Physical address	Length (words)	VARIABLE ENG. UNIT	Data Format	Notes
300257	0100h	2	V	INT32	Value weight: Volt*10
300259	0102h	2	A	INT32	Value weight: Ampere*1000
300261	0104h	2	W	INT32	Value weight: Watt*10
300263	0106h	2	kWh (+) TOT	INT32	Value weight: kWh*10
300265	0108h	2	Ah (+) TOT	INT32	Value weight: Ah*10
300267	010Ah	2	kWh (+) PAR	INT32	Value weight: kWh*10
300269	010Ch	2	Ah (+) PAR	INT32	Value weight: Ah*10
300271	010Eh	2	kWh (-) TOT	INT32	Value weight: kWh*10
300273	0110h	2	Ah (-) TOT	INT32	Value weight: Ah*10
300275	0112h	2	kWh (-) PAR	INT32	Value weight: kWh*10
300277	0114h	2	Ah (-) PAR	INT32	Value weight: Ah*10
300279	0116h	2	Run hour meter	INT32	Value weight: h*100
300281	0118h	2	Run hour meter kWh-	INT32	Value weight: h*100
300283	011Ah	2	Run hour meter ON time	INT32	Value weight: h*100
300285	011Ch	2	Run hour meter PAR	INT32	Value weight: h*100
300287	011Eh	2	Run hour meter kWh-PAR	INT32	Value weight: h*100
300289	0120h	2	Run hour meter ON time PAR	INT32	Value weight: h*100
300291	0122h	2	T1	INT32	Value weight: °C *10
300293	0124h	2	T2	INT32	Value weight: °C * 10

4.1.3 Instantaneous variables and meters (FLOAT)

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

Modicom address	Physical address	Length (words)	VARIABLE ENG. UNIT	Data Format	Notes
300513	0200h	2	V	FLOAT	Value weight: Volt
300515	0202h	2	A	FLOAT	Value weight: Ampere
300517	0204h	2	W	FLOAT	Value weight: Watt
300519	0206h	2	kWh (+) TOT	INT32	Value weight: kWh*10
300521	0208h	2	Ah (+) TOT	INT32	Value weight: Ah*10
300523	020Ah	2	kWh (+) PAR	INT32	Value weight: kWh*10
300525	020Ch	2	Ah (+) PAR	INT32	Value weight: Ah*10
300527	020Eh	2	kWh (-) TOT	INT32	Value weight: kWh*10
300529	0210h	2	Ah (-) TOT	INT32	Value weight: Ah*10
300531	0212h	2	kWh (-) PAR	INT32	Value weight: kWh*10
300533	0214h	2	Ah (-) PAR	INT32	Value weight: Ah*10
300535	0216h	2	Run hour meter	INT32	Value weight: h*100
300537	0218h	2	Run hour meter kWh-	INT32	Value weight: h*100
300539	021Ah	2	Run hour meter ON time	INT32	Value weight: h*100
300541	021Ch	2	Run hour meter PAR	INT32	Value weight: h*100
300543	021Eh	2	Run hour meter kWh-PAR	INT32	Value weight: h*100
300545	0220h	2	Run hour meter ON time PAR	INT32	Value weight: h*100
300547	0222h	2	T1	Float	Value weight: °C
300549	0224h	2	T2	Float	Value weight: °C

4.1.4 High resolution meters

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

Modicom address	Physical address	Length (words)	VARIABLE ENG. UNIT	Data Format	Notes
301281	0500h	4	kWh (+) TOT	INT64	Value weight: Wh
301285	0504h	4	Ah (+) TOT	INT64	Value weight: mAh
301289	0508h	4	kWh (+) PAR	INT64	Value weight: Wh
301293	050Ch	4	Ah (+) PAR	INT64	Value weight: mAh
301297	0510h	4	kWh (-) TOT	INT64	Value weight: Wh
301301	0514h	4	Ah (-) TOT	INT64	Value weight: mAh
301305	0518h	4	kWh (-) PAR	INT64	Value weight: Wh
301309	051Ch	4	Ah (-) PAR	INT64	Value weight: mAh
301313	0520h	2	Run hour meter	INT32	Value weight: seconds
301315	0522h	2	Run hour meter kWh-	INT32	Value weight: seconds
301317	0524h	2	Run hour meter ON time	INT32	Value weight: seconds
301319	0526h	2	Run hour meter PAR	INT32	Value weight: seconds
301321	0528h	2	Run hour meter kWh- PAR	INT32	Value weight: seconds
301323	052Ah	2	Run hour meter ON time PAR	INT32	Value weight: seconds
301325	052Ch	2	T1	INT32	Value weight: °C *10
301327	052Eh	2	T2	INT32	Value weight: °C *10

4.1.5 High resolution meters (resolution 0.1 Wh)

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

Modicom address	Physical address	Length (words)	VARIABLE ENG. UNIT	Data Format	Notes
301537	0600h	4	kWh (+) TOT	INT64	Value weight: Wh *10
301541	0604h	4	kWh (-) TOT	INT64	Value weight: Wh *10

4.1.6 Signed map (energy and temperature, available only in models with signature)

Table 4.6 - Modbus: read only mode with functions code 03 and 04 (mandatory to read whole block)

Modicom address	Physical address	Length (words)	VARIABLE ENG. UNIT	Data Format	Notes
301793	0700h	4	kWh (+) TOT OBIS code	CHAR[8]	Fixed value 0100010800FF0000h which is the representation in byte of OBIS code “1-0:1.8.0*255”
301797	0704h	1	kWh (+) TOT engineering unit	UINT16	engineering unit 30 (Wh)
301798	0705h	1	kWh (+) TOT multiplier	INT16	Multiplier = 0 (100 = 1 Wh)
301799	0706h	4	kWh (+) TOT	INT64	-
301803	070Ah	4	kWh (-) TOT OBIS code	CHAR[8]	Fixed value 0100020800FF0000h which is the representation in byte of OBIS code “1-0:2.8.0*255”
301807	070Eh	1	kWh (-) TOT engineering unit	UINT16	engineering unit 30 (Wh)
301808	070Fh	1	kWh (-) TOT multiplier	INT16	Multiplier = 0 (100 = 1 Wh)
301809	0710h	4	kWh (-) TOT	INT64	-
301813	0714h	4	Temperature on shunt 1 Manufacturer OBIS code	CHAR[8]	Fixed value 01008007FFFF0000h which is the representation in byte of Manufacturer OBIS code “1-0:128.7.255*255”
301817	0718h	1	Temperature engineering unit	UINT16	engineering unit 9 (°C)
301818	0719h	1	Temperature multiplier	INT16	Multiplier = -1 (10-1 = 0.1 °C)
301819	071Ah	2	Temperature on shunt 1	INT32	-
301821	071Ch	4	Temperature on shunt 2 Manufacturer OBIS code	CHAR[8]	Fixed value 01008107FFFF0000h which is the representation in byte of Manufacturer OBIS code “1-0:129.7.255*255”
301825	0720h	1	Temperature engineering unit	UINT16	engineering unit 9 (°C)
301826	0721h	1	Temperature multiplier	INT16	Multiplier = -1 (10-1 = 0.1 °C)
301827	0722h	2	Temperature on shunt 2	INT32	-
301829	0724h	4	Cable loss OBIS code	CHAR[8]	Fixed value 0100000A02FF0000h which is the representation in byte of OBIS code “1-0:0.10.2*255”
301833	0728h	1	Cable loss engineering unit	UINT16	engineering unit 38 (Ω)
301834	0729h	1	Cable loss multiplier	INT16	Multiplier = -3 (10-3 = 0.001 Ω)
301835	072Ah	2	Cable loss	INT32	-
301837	072Ch	4	Device status OBIS code	CHAR[8]	Fixed value 0000600A01FF0000h which is the representation in byte of OBIS code “0-0:96.10.1*255”
301841	0730h	1	Device status engineering unit	UINT16	engineering unit 255 (no unit)
301842	0731h	1	Device status multiplier	INT16	Multiplier = 0 (100 = 1)
301843	0732h	1	Device status	UINT16	See meaning @ register 5012h
301844	0733h	10	Model	CHAR[20]	Device Model
301854	073Dh	7	Device Serial Number	CHAR[14]	Device Serial Number with the formatting shown in the relevant table
301861	0744h	8	Device Tag	CHAR[16]	Defined by customer during configuration with the formatting shown in the relevant table
301869	074Ch	(*)	Signature	CHAR[(*)]	Signature of data starting from kWh (+) TOT Obis code to end of Device Tag

(*) depend on signature type, 256 or 384 bits, see following tables.

Table 4.7 - 256-bit signature

Modicom address	Physical address	Length (words)	VARIABLE ENG. UNIT	Data Format	Notes
301869	074Ch	1	-	UINT16	MSB: most significative byte of signature LSB: 2nd byte of signature
301870	074Dh	1	-	UINT16	MSB: 3rd byte of signature LSB: 4th byte of signature
…	…	…	…	…	…
301900	076Bh	1	-	UINT16	MSB: 63rd byte of signature LSB: 64th byte of signature

IMPORTANT: 256-bit signature is 32 word long, therefore CHAR[64].

Table 4.8 - 384-bit signature

Modicom address	Physical address	Length (words)	VARIABLE ENG. UNIT	Data Format	Notes
301869	074Ch	1	-	UINT16	MSB: most significative byte of signature LSB: 2nd byte of signature
301870	074Dh	1	-	UINT16	MSB: 3rd byte of signature LSB: 4th byte of signature
…	…	…	…	…	…
301916	077Bh	1	-	UINT16	MSB: 97th byte of signature LSB: 98th byte of signature

IMPORTANT: 384-bit signature is 48 word long, therefore CHAR[96].

4.1.7 Signed map (energy and instantaneous variables, available only in models with signature)

Table 4.9 - Modbus: read only mode with functions code 03 and 04 (mandatory to read whole block)

Modicom address	Physical address	Length (words)	VARIABLE ENG. UNIT	Data Format	Notes
302049	0800h	4	kWh (+) TOT OBIS code	CHAR[8]	Fixed value 0100010800FF0000h which is the representation in byte of OBIS code “1-0:1.8.0*255”
302053	0804h	1	kWh (+) TOT engineering unit	UINT16	engineering unit 30 (Wh)
302054	0805h	1	kWh (+) TOT multiplier	INT16	Multiplier = 0 (100 = 1 Wh)
302055	0806h	4	kWh (+) TOT	INT64	-
302059	080Ah	4	kWh (-) TOT OBIS code	CHAR[8]	Fixed value 0100020800FF0000h which is the representation in byte of OBIS code “1-0:2.8.0*255”
302063	080Eh	1	kWh (-) TOT engineering unit	UINT16	engineering unit 30 (Wh)
302064	080Fh	1	kWh (-) TOT multiplier	INT16	Multiplier = 0 (100 = 1 Wh)
302065	0810h	4	kWh (-) TOT	INT64	-
302069	0814h	4	Power OBIS code	CHAR[8]	Fixed value 0100010700FF0000h which is the representation in byte of OBIS code “1-0:1.7.0*255”
302073	0818h	1	Power engineering unit	UINT16	engineering unit 27 (W)
302074	0819h	1	Power multiplier	INT16	Multiplier = -1 (10-1 = 0.1 W)
302075	081Ah	2	Power	INT32	-
302077	081Ch	4	Voltage OBIS code	CHAR[8]	Fixed value 01000C0700FF0000h which is the representation in byte of OBIS code “1-0:12.7.0*255”
302081	0820h	1	Voltage engineering unit	UINT16	engineering unit 35 (V)
302082	0821h	1	Voltage multiplier	INT16	Multiplier = -1 (10-1 = 0.1 V)
302083	0822h	2	Voltage	INT32	-
302085	0824h	4	Current OBIS code	CHAR[8]	Fixed value 01000B0700FF0000h which is the representation in byte of OBIS code “1-0:11.7.0*255”
302089	0828h	1	Current engineering unit	UINT16	engineering unit 33 (A)
302090	0829h	1	Current multiplier	INT16	Multiplier = -3 (10-3 = 0.001 A)
302091	082Ah	2	Current	INT32	-
302093	082Ch	4	Cable loss OBIS code	CHAR[8]	Fixed value 0100000A02FF0000h which is the representation in byte of OBIS code “1-0:0.10.2*255”
302097	0830h	1	Cable loss engineering unit	UINT16	engineering unit 38 (Ω)
302098	0831h	1	Cable loss multiplier	INT16	Multiplier = -3 (10-3 = 0.001 Ω)
302099	0832h	2	Cable loss	INT32	-
302101	0834h	10	Model	CHAR[20]	Device Model
302111	083Eh	7	Device Serial Number	CHAR[14]	Device Serial Number with the formatting shown in the relevant table
302118	0845h	8	Device Tag	CHAR[16]	Defined by customer during configuration with the formatting shown in the relevant table
302126	084Dh	(*)	Signature	CHAR[(*)]	Signature of data starting from kWh (+) TOT Obis code to end of Device Tag

(*) depend on signature type, 256 or 384 bits, see following tables.

Table 4.10 - 256-bit signature

Modicom address	Physical address	Length (words)	VARIABLE ENG. UNIT	Data Format	Notes
302126	084Dh	1	-	UINT16	MSB: most significative byte of signature LSB: 2nd byte of signature
302127	084Eh	1	-	UINT16	MSB: 3rd byte of signature LSB: 4th byte of signature
…	…	…	…	…	…
302157	086Ch	1	-	UINT16	MSB: 31st byte of signature LSB: 32nd byte of signature

IMPORTANT: 256-bit signature is 32 word long, therefore CHAR[64].

Table 4.11 - 384-bit signature

Modicom address	Physical address	Length (words)	VARIABLE ENG. UNIT	Data Format	Notes
302126	084Dh	1	-	UINT16	MSB: most significative byte of signature LSB: 2nd byte of signature
302127	084Eh	1	-	UINT16	MSB: 3rd byte of signature LSB: 4th byte of signature
…	…	…	…	…	…
302173	087Ch	1	-	UINT16	MSB: 47th byte of signature LSB: 48th byte of signature

IMPORTANT: 384-bit signature is 48 word long, therefore CHAR[96].

4.1.8 Firmware version and revision code

Table 4.12 - Modbus: read only mode with functions code 03 and 04 limited to a word at a time

Modicom address	Physical address	Length (words)	VARIABLE ENG. UNIT	Data Format	Notes
300771	0302h	1	Major, Minor and Revision DCM-D (meter)	UINT16	MSB: Bit 0..3=Minor Bit 4..7=Major LSB: Revision
300772	0303h	1	Major, Minor and Revision DCM-D (cryptography)	UINT16	MSB: Bit 0..3=Minor Bit 4..7=Major LSB: Revision
300773	0304h	1	Major, Minor and Revision DCM-T	UINT16	MSB: Bit 0..3=Minor Bit 4..7=Major LSB: Revision When DCM-T is disconnected, value is 0x7FFF

4.1.9 Carlo Gavazzi Controls identification code

Table 4.13 - Modbus: read only mode with functions code 03 and 04 limited to a word at a time

Modicom address	Physical address	Length (words)	VARIABLE ENG. UNIT	Data Format	Notes
300012	000Bh	1	Carlo Gavazzi Controls identification code	UINT16	-

4.2 Programming parameter tables

4.2.1 Password configuration menu

Table 4.14 - Modbus: read and write mode

Modicom address	Physical address	Length (words)	VARIABLE ENG. UNIT	Data Format	Notes
304097	1000h	1	Password	UINT16	Min value: 0d (no password, default) Max valid value: 9999d

4.2.2 Easy connection

Table 4.15 - Modbus: read only

Modicom address	Physical address	Length (words)	VARIABLE ENG. UNIT	Data Format	Notes
304356	1103h	1	Easy connection	UINT16	Value 0 = disabled (default) Value 1 = enabled

IMPORTANT: fixed value for each product.

4.2.3 Wizard display configuration

Table 4.16 - Modbus: read and write mode

Modicom address	Physical address	Length (words)	VARIABLE ENG. UNIT	Data Format	Notes
304362	1109h	1	Quick set up at next power on	UINT16	Value = 0 Disabled menu Value = 1 Enabled menu (default)

4.2.4 Run hour meter configuration

Table 4.17 - Modbus: read and write mode

Modicom address	Physical address	Length (words)	VARIABLE ENG. UNIT	Data Format	Notes
304364	110Bh	2	Start-up current of run hour counter (mA)	UINT 32	Value weight: Ampere*1000 Value min = 480 (equivalent to 480 mA) (default); 160 for A30 Value max = 600000 (equivalent to 600A); 300000 for A30

4.2.5 Display settings

Table 4.18 - Modbus: read and write mode

Modicom address	Physical address	Length (words)	VARIABLE ENG. UNIT	Data Format	Notes
305633	1600h	1	Page Filter	UINT16	Value 0 = Disabled (default) Value 1 = Enabled
Reserved	*Reserved*	*Reserved*	*Reserved*	*Reserved*	*Reserved*
305636	1603h	1	Home page	UINT16	Value min = 1 (Page 1) (default) Value max = 2 (Page 2)
305637	1604h	1	Backlight Time	UINT16	Value 0 = Always ON (default) Value 1 = Always OFF Value 2 = 1 min Value 3 = 2 min Value 4 = 3 min Value 5 = 5 min Value 6 = 10 min Value 7 = 15 min Value 8 = 30 min Value 9 = 60 min Restart timing on button press
Reserved	*Reserved*	*Reserved*	*Reserved*	*Reserved*	*Reserved*
305649	1610h	1	Page 1*	UINT16	0 = no filter 1 = Filter (default)
305650	1611h	1	Page 2*	UINT16	0 = no filter 1 = Filter (default)
305651	1612h	1	Page 3	UINT16	0 = no filter 1 = Filter (default)
305652	1613h	1	Page 4	UINT16	0 = no filter 1 = Filter (default)
305653	1614h	1	Page 5	UINT16	0 = no filter 1 = Filter (default)
305654	1615h	1	Page 6	UINT16	0 = no filter 1 = Filter (default)

(*) = These pages cannot be filtered, registers are Read Only.

4.2.6 Serial port configuration menu

Table 4.19 - Modbus: read and write mode

Modicom address	Physical address	Length (words)	VARIABLE ENG. UNIT	Data Format	Notes
308193	2000h	1	RS485 instrument address	UINT16	Value min = 1 (default) Value max = 247
308194	2001h	1	RS485 baud rate	UINT16	Value 1 = 9.6 kbps (default) Value 2 = 19.2 kbps Value 3 = 38.4 kbps Value 4 = 57.6 kbps Value 5 = 115.2 kbps
308195	2002h	1	RS485 parity	UINT16	Value 1= no parity (default) Value 2 = even parity
308196	2003h	1	Stop bit	UINT16	Value 1= 1 (default) Value 2 =2
308197	2004h	1	RS485 Delay on replay (ms)	UINT16	Value min = 0 (default) Value max =1000

IMPORTANT: the values are updated only after sending the “update serial communication setting” command or switching off and on the instrument.

4.2.7 Update serial communication setting command

Table 4.20 - Modbus: read and write

Modicom address	Physical address	Length (words)	VARIABLE ENG. UNIT	Data Format	Notes
308209	2010h	1	Update serial communication settings	UINT16	Value = 1: command executed Value ≠ 1: no effect

IMPORTANT: for this register the write operation triggers the relative function but the register value does not change. Read value is always 0.

4.2.8 Ethernet configuration menu

Table 4.21 - Modbus: read and write

Modicom address	Physical address	Length (words)	VARIABLE ENG. UNIT	Data Format	Notes
308449	2100h	1	Stored IP address (A.B.C.D)	UINT16	Value min = 1 Value max = 255 Default IP address = 192.168.1.10 Default subnet = 255.255.255.0 Default Gateway = 192.168.1.1 TCP/IP parameters that apply when DHCP is OFF. Notes 1 and 2 apply.
308450	2101h	1	Stored IP address (A.B.C.D)	UINT16	
308451	2102h	1	Stored IP address (A.B.C.D)	UINT16	
308452	2103h	1	Stored IP address (A.B.C.D)	UINT16	
308453	2104h	1	Stored subnet mask (A.B.C.D)	UINT16	
308454	2105h	1	Stored subnet mask (A.B.C.D)	UINT16	
308455	2106h	1	Stored subnet mask (A.B.C.D)	UINT16	
308456	2107h	1	Stored subnet mask (A.B.C.D)	UINT16	
308457	2108h	1	Stored default gateway (A.B.C.D)	UINT16	
308458	2109h	1	Stored default gateway (A.B.C.D)	UINT16	
308459	210Ah	1	Stored default gateway (A.B.C.D)	UINT16	
308460	210Bh	1	Stored default gateway (A.B.C.D)	UINT16	
308461	210Ch	1	Modbus TCP/IP port	UINT16	Value min = 1 Value max = 9999 Value default = 502 Note 2 applies.
308462	210Dh	1	DHCP enabled	UINT16	Value 0 = DHCP off (default) Value 1 = DHCP on Notes 1 and 2 apply

IMPORTANT:

- 1: 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.
- 2: the values are updated only after sending the “update TCP/IP communication setting” command or switching off and on the instrument.

4.2.9 Update Ethernet communication setting command

Table 4.22 - Modbus: read and write

Modicom address	Physical address	Length (words)	VARIABLE ENG. UNIT	Data Format	Notes
308463	210Eh	1	Update TCP/IP communication settings	UINT16	Value = 1: command executed Value ≠ 1: no effect

IMPORTANT: for this register the write operation triggers the relative function but the register value does not change. Read value is always 0.

4.2.10 Ethernet current communication configuration

Table 4.23 - Modbus: read only

Modicom address	Physical address	Length (words)	VARIABLE ENG. UNIT	Data Format	Notes
308465	2110h	1	MAC address (a:b:c:d:e:f)	UINT16	Value min = 0 Value max = 255
308466	2111h	1	MAC address (a:b:c:d:e:f)	UINT16	
308467	2112h	1	MAC address (a:b:c:d:e:f)	UINT16	
308468	2113h	1	MAC address (a:b:c:d:e:f)	UINT16	
308469	2114h	1	MAC address (a:b:c:d:e:f)	UINT16	
308470	2115h	1	MAC address (a:b:c:d:e:f)	UINT16	
308481	2120h	1	Actual IP address (A.B.C.D)	UINT16	Value min = 0 Value max = 255 Each value is managed in real-time by DHCP when it is on. When the DHCP is on but the address is not yet assigned, the read value is 0xFFFF
308482	2121h	1	Actual IP address (A.B.C.D)	UINT16	
308483	2122h	1	Actual IP address (A.B.C.D)	UINT16	
308484	2123h	1	Actual IP address (A.B.C.D)	UINT16	
308485	2124h	1	Actual subnet mask (A.B.C.D)	UINT16	
308486	2125h	1	Actual subnet mask (A.B.C.D)	UINT16	
308487	2126h	1	Actual subnet mask (A.B.C.D)	UINT16	
308488	2127h	1	Actual subnet mask (A.B.C.D)	UINT16	
308489	2128h	1	Actual default gateway (A.B.C.D)	UINT16	
308490	2129h	1	Actual default gateway (A.B.C.D)	UINT16	
308491	212Ah	1	Actual default gateway (A.B.C.D)	UINT16	
308492	212Bh	1	Actual default gateway (A.B.C.D)	UINT16	

IMPORTANT: parameters from 0x2120 to 0x212B are the actual TCP/IP parameters, whether DHCP is off or on.

4.2.11 Signature type

Table 4.24 - Modbus: read only mode

Modicom address	Physical address	Length (words)	VARIABLE ENG. UNIT	Data Format	Notes
309472	24FFh	1	Signature type	UINT16	0: 256-bit signature 1: 384-bit signature 2: no signature

4.2.12 Public key for 256-bit signature (if available)

Table 4.25 - Modbus: read only mode (mandatory to read whole block with starting address 2500h)

Modicom address	Physical address	Length (words)	VARIABLE ENG. UNIT	Data Format	Notes
309473	2500h	1	-	UINT16	MSB: 04h (constant prefix) LSB: most significative byte of public key
309474	2501h	1	-	UINT16	MSB: 2nd byte of public key LSB: 3rd byte of public key
309475	2502h	1	-	UINT16	MSB: 4th byte of public key LSB: 5th byte of public key
…	…	…	…	…	…
309504	251Fh	1	-	UINT16	MSB: 62nd byte of public key LSB: 63rd byte of public key
309505	2520h	1	-	UINT16	MSB: 64th byte of public key LSB: not used (always read as 00h)

4.2.13 Public key for 384-bit signature (if available)

Table 4.26 - Modbus: read only mode (mandatory to read whole block with starting address 2500h)

Modicom address	Physical address	Length (words)	VARIABLE ENG. UNIT	Data Format	Notes
309473	2500h	1	-	UINT16	MSB: 04h (constant prefix) LSB: most significative byte of public key
309474	2501h	1	-	UINT16	MSB: 2nd byte of public key LSB: 3rd byte of public key
309475	2502h	1	-	UINT16	MSB: 4th byte of public key LSB: 5th byte of public key
…	…	…	…	…	…
309520	252Fh	1	-	UINT16	MSB: 96th byte of public key LSB: 97th byte of public key
309521	2530h	1	-	UINT16	MSB: 98th byte of public key LSB: not used (always read as 00h)

4.2.14 Public key for 256-bit signature in DER format (if available)

Table 4.27 - Modbus: read only mode (mandatory to read whole block with starting address 2600h)

Modicom address	Physical address	Length (words)	VARIABLE ENG. UNIT	Data Format	Notes
309729	2600h	1	-	UINT16	MSB: 30h (constant) LSB: 5Ah (number of bytes in DER object)
309730	2601h	1	-	UINT16	MSB: 30h (constant) LSB: 14h (header bytes from this point)
309731	2602h	1	-	UINT16	MSB: 06h (constant) LSB: 07h (sub-header bytes representing ECC standard code)
309732	2603h	1	-	UINT16	2A86h (ECC standard code)
309733	2604h	1	-	UINT16	48CEh (ECC standard code)
309734	2605h	1	-	UINT16	3D02h (ECC standard code)
309735	2606h	1	-	UINT16	MSB: 01h (ECC standard code) LSB: 06h (constant)
309736	2607h	1	-	UINT16	MSB: 09h (sub-header bytes representing curve algorithm code, brainpoolP256r1) LSB: 2Bh (curve standard code)
309737	2608h	1	-	UINT16	2403h (curve standard code)
309738	2609h	1	-	UINT16	0302h (curve standard code)
309739	260Ah	1	-	UINT16	0801h (curve standard code)
309740	260Bh	1	-	UINT16	0107h (curve standard code)
309741	260Ch	1	-	UINT16	MSB: 03h (constant) LSB: 42h (number of bytes from this point)
309742	260Dh	1	-	UINT16	0004h (uncompressed key code)
309743	260Eh	1	-	UINT16	MSB: 1st byte of public key LSB: 2nd byte of public key
309744	260Fh	1	-	UINT16	MSB: 3rt byte of public key LSB: 4th byte of public key
…	…	…	…	…	…
309789	263Ch	1	-	UINT16	MSB: 61st byte of public key LSB: 62nd byte of public key
309790	263Dh	1	-	UINT16	MSB: 63rd byte of public key LSB: 64th byte of public key

4.2.15 Public key for 384-bit signature in DER format (if available)

Table 4.28 - Modbus: read only mode (mandatory to read whole block with starting address 2600h)

Modicom address	Physical address	Length (words)	VARIABLE ENG. UNIT	Data Format	Notes
309729	2600h	1	-	UINT16	MSB: 30h (constant) LSB: 7Ah (number of bytes in DER object)
309730	2601h	1	-	UINT16	MSB: 30h (constant) LSB: 14h (header bytes from this point)
309731	2602h	1	-	UINT16	MSB: 06h (constant) LSB: 07h (sub-header bytes representing ECC standard code)
309732	2603h	1	-	UINT16	2A86h (ECC standard code)
309733	2604h	1	-	UINT16	48CEh (ECC standard code)
309734	2605h	1	-	UINT16	3D02h (ECC standard code)
309735	2606h	1	-	UINT16	MSB: 01h (ECC standard code) LSB: 06h (constant)
309736	2607h	1	-	UINT16	MSB: 09h (sub-header bytes representing curve algorithm code, brainpoolP384r1) LSB: 2Bh (curve standard code)
309737	2608h	1	-	UINT16	2403h (curve standard code)
309738	2609h	1	-	UINT16	0302h (curve standard code)
309739	260Ah	1	-	UINT16	0801h (curve standard code)
309740	260Bh	1	-	UINT16	010Bh (curve standard code)
309741	260Ch	1	-	UINT16	MSB: 03h (constant) LSB: 62h (number of bytes from this point)
309742	260Dh	1	-	UINT16	0004h (uncompressed key code)
309743	260Eh	1	-	UINT16	MSB: 1st byte of public key LSB: 2nd byte of public key
309744	260Fh	1	-	UINT16	MSB: 3rt byte of public key LSB: 4th byte of public key
…	…	…	…	…	…
309821	265Ch	1	-	UINT16	MSB: 93th byte of public key LSB: 94th byte of public key
309822	265Dh	1	-	UINT16	MSB: 95th byte of public key LSB: 96th byte of public key

4.2.16 Reset commands

Table 4.29 - Modbus: read and write

Modicom address	Physical address	Length [word]	VARIABLE ENG. UNIT	Data Format	Notes
316388	4003h	1	In not certified version: reset of total energy counters, total Ah counters, total run hour counters and total lifetime In certified version: reset of total Ah counters, total run hour counters and total lifetime	UINT16	Value = 1: command executed Value ≠ 1: no effect
316389	4004h	1	Reset of partial energy counters, partial Ah counters, partial run hour counters and partial lifetime	UINT16	Value = 1: command executed Value ≠ 1: no effect
…	…	…	…	…	…
316417	4020h	1	Factory setting (Restore default)	UINT16	Write 0x0A0A; after this, there are 5 seconds to write 0xC1A0 (into this register) to trigger a “Restore Default”. Restores all parameters to their default and restores wizard (no counter)

IMPORTANT: for these registers the write operation triggers the relative function but the register value does not change. Read value is always 0.

4.2.17 Serial number

Table 4.30 - Modbus: read only mode

Modicom address	Physical address	Length (words)	VARIABLE ENG. UNIT	Data Format	Notes
320481	5000h	1	Letter 1 (from SX) Letter 2 (from SX)	UINT16	MSB: ASCII code LSB: ASCII code
320482	5001h	1	Letter 3 (from SX) Letter 4 (from SX)	UINT16	MSB: ASCII code LSB: ASCII code
320483	5002h	1	Letter 5 (from SX) Letter 6 (from SX)	UINT16	MSB: ASCII code LSB: ASCII code
320484	5003h	1	Letter 7 (from SX) Letter 8 (from SX)	UINT16	MSB: ASCII code LSB: ASCII code
320485	5004h	1	Letter 9 (from SX) Letter 10 (from SX)	UINT16	MSB: ASCII code LSB: ASCII code
320486	5005h	1	Letter 11 (from SX) Letter 12 (from SX)	UINT16	MSB: ASCII code LSB: ASCII code
320487	5006h	1	Letter 13 (from SX)	UINT16	MSB: ASCII code LSB: not used
320488	5007h	1	Production year	UINT16	4 digits

4.2.18 Device tag

Table 4.31 - Modbus: read and write

Modicom address	Physical address	Length [word]	VARIABLE ENG. UNIT	Data Format	Notes
320489	5008h	1	Letter 1 (from SX) Letter 2 (from SX)	UINT16	MSB: ASCII code LSB: ASCII code
320490	5009h	1	Letter 3 (from SX) Letter 4 (from SX)	UINT16	MSB: ASCII code LSB: ASCII code
320491	500Ah	1	Letter 5 (from SX) Letter 6 (from SX)	UINT16	MSB: ASCII code LSB: ASCII code
320492	500Bh	1	Letter 7 (from SX) Letter 8 (from SX)	UINT16	MSB: ASCII code LSB: ASCII code
320493	500Ch	1	Letter 9 (from SX) Letter 10 (from SX)	UINT16	MSB: ASCII code LSB: ASCII code
320494	500Dh	1	Letter 11 (from SX) Letter 12 (from SX)	UINT16	MSB: ASCII code LSB: ASCII code
320495	500Eh	1	Letter 13 (from SX) Letter 14 (from SX)	UINT16	MSB: ASCII code LSB: ASCII code
320496	500Fh	1	Letter 15 (from SX) Letter 16 (from SX)	UINT16	MSB: ASCII code LSB: ASCII code

4.3 Cable loss

4.3.1 Cable loss value

Table 4.32 - Modbus: read only mode

Modicom address	Physical address	Length [word]	VARIABLE ENG. UNIT	Data Format	Notes
320737	5100h	2	Cable loss value	INT32	Cable Loss value in [mΩ] Max value 500 mΩ

4.3.2 Cable loss occurrences used

Table 4.33 - Modbus: read only mode

Modicom address	Physical address	Length [word]	VARIABLE ENG. UNIT	Data Format	Notes
324561	5FF0h	1	Number of row already used	INT16	Number of rows of cable Loss datalogger already used

IMPORTANT: valid only for certified devices.

4.3.3 Total Cable loss occurrences

Table 4.34 - Modbus: read only mode

Modicom address	Physical address	Length [word]	VARIABLE ENG. UNIT	Data Format	Notes
324562	5FF1h	1	Max entry of cable loss datalogger	UINT16	Max entry of cable loss datalogger for whole device life

IMPORTANT:

- valid only for certified devices,
- once “Cable loss occurrences used” = “Total Cable loss occurrences” the cable loss procedure is inhibited.

4.3.4 Cable Loss Datalogger

Table 4.35 - Modbus: read only mode

Modicom address	Physical address	Length [word]	VARIABLE ENG. UNIT	Data Format	Notes
324577	6000h	18	Datalogger row 1	Cable Loss Row Struct	First row of cable loss datalogger struct
324595	6012h	18	Datalogger row 2	Cable Loss Row Struct	Second row of cable loss datalogger struct
..	…	…	…	…	…
325459	6372h	18	Datalogger row 49	Cable Loss Row Struct	Last row of cable loss datalogger struct

IMPORTANT: valid only for certified devices.

Table 4.36 - Cable Loss Row Struct

Modicom address	Physical address	Length [word]	VARIABLE ENG. UNIT	Data Format	Notes
-	Base +0	1	Record id	UINT16	From 0 to 49
-	Base +1	1	Datalogger field	UNIT16	Cable Loss = 99
-	Base + 2	4	Timestamp	UINT64	Timestamp, 32 bit and 64 bit format
-	Base +6	4	Wh positive	UINT64	Wh positive stored still now with the cable loss in this Datalogger row
-	Base + 10	4	Wh negative	UINT64	Wh negative stored still now with the cable loss in this Datalogger row
-	Base + 14	2	Cable loss value	INT32	Cable loss Value used to calculate the energy value staring from previous datalogger row timestamp to current row timestamp
-	Base +16	2	CRC value	UINT32	CRC value of current datalogger row

4.3.5 Device state

Table 4.37 - Modbus: read only mode

Modicom address	Physical address	Length [word]	VARIABLE ENG. UNIT	Data Format	Notes
320499	5012h	1	Device state	UINT16	Bit field(*)
320500	5013h	1	Shunt temperature position 1	UINT16	Value weight: °C *10 e.g 255=25.5 °C
320501	5014h	1	Shunt temperature position 2	UINT16	Value weight: °C *10 e.g 307=30.7 °C

(*)Device state bitfield

Bit fields	
Bit 0	0 = Below absolute maximum voltage value 1 = Over maximum range (-1150.1 V > Voltage or Voltage > +1150.1 V)
Bit 1	0 = Below absolute maximum current value 1 = Over maximum range (-600.1 A > Current or Current > +600.1 A)
Bit 2	0 = Temperature terminal 1 >= Tmin (-25.1 °C) 1 = Temperature terminal 1 < Tmin (-25.1 °C)
Bit 3	0 = Temperature terminal 1 <= Tmax (120.1 °C) 1 = Temperature terminal 1 > Tmax (120.1 °C)
Bit 4	0 = Temperature terminal 2 >= Tmin (-25.1 °C) 1 = Temperature terminal 2 < Tmin (-25.1 °C)
Bit 5	0 = Temperature terminal 2 <= Tmax (120.1 °C) 1 = Temperature terminal 2 > Tmax (120.1 °C)
Bit 6 to 10	*Reserved*
Bit 11 – 12	00 = DCM-T ok 01 = DCM-T warning (overrange) 11 = DCM-T failure
Bit 13	0 = Transducer connected 1 = Transducer disconnected
Bit 14	0 = Valid transducer connected 1 = Invalid transducer
Bit 15	0 = all works 1 = Internal Fault device KO

4.3.6 Firmware CRC32

Table 4.38 - Modbus: read only mode

Modicom address	Physical address	Length (words)	VARIABLE ENG. UNIT	Data Format	Notes
320513	5020h	2	Firmware CRC32 value of DCM-D (meter)	UINT 32	-
320515	5022h	2	Firmware CRC32 value of DCM-D (cryptography)	UINT 32	-
320517	5024h	2	Firmware CRC32 value of DCM-T	UINT 32	When DCM-T is disconnected, value is 0xFFFFFFFF

IMPORTANT: valid only for certified devices.

4.3.7 Reserved Registers

Table 4.39 - Modbus: read and write mode

Modicom address	Physical address	Length [word]	VARIABLE ENG. UNIT	Data Format	Notes
320993	5200h	1	*Reserved*	UINT16	-
320994	5201h	1	*Reserved*	UINT16	-
320995	5202h	1	*Reserved*	UINT16	-
320996	5203h	1	*Reserved*	UINT16	-
320997	5204h	1	*Reserved*	UINT16	-
320998	5205h	1	*Reserved*	UINT16	-
320999	5206h	1	*Reserved*	UINT16	-
321000	5207h	1	*Reserved*	UINT16	-
321001	5208h	1	*Reserved*	UINT16	-
321002	5209h	1	*Reserved*	UINT16	-
321003	520Ah	1	*Reserved*	UINT16	-
321004	520Bh	1	*Reserved*	UINT16	-
321005	520Ch	1	*Reserved*	UINT16	-
321006	520Dh	1	*Reserved*	UINT16	-
321008	520Fh	1	*Reserved*	UINT16	-

Table 4.40 - Modbus: read only mode

Modicom address	Physical address	Length [word]	VARIABLE ENG. UNIT	Data Format	Notes
321761	5500h	2	*Reserved*	UINT16	-
321763	5502h	2	*Reserved*	UINT16	-
321765	5504h	2	*Reserved*	UINT16	-
321767	5506h	2	*Reserved*	UINT16	-
321769	5508h	2	*Reserved*	UINT16	-
321771	550Ah	2	*Reserved*	UINT16	-
321773	550Ch	2	*Reserved*	UINT16	-
321775	550Eh	2	*Reserved*	UINT16	-

4.4 Charging session management

The following tables report the sequence of commands to manage the charging session.

Before the charging session		
Step	**Command**	**Registers**
1	Send clock synchronization and timezone command (at least every 24h, suggested every 1h)	7031h and 7032h
2	Write tariff (TT field)** (EXAMPLE: "**0,232 EUR/kWh**")	6900h to 697Dh
3	Write long string for visualization on the screen (EXAMPLE: "**Charger ID F1123654**")	697Eh to 699Eh
4	Send confirmation to update visualization on the screen of tariff and long string	69CCh (tariff) 69CDh (long string)
5	Update the 3 short strings to be shown in the idle page, in the charging session page and in the charging session end pages. (EXAMPLES: "**Status: READY**", "**Max 22 kW**")	699Fh to 69B9
6	Select scrolling time and enable visualization of TT field and custom strings in the different pages	69BAh to 69CBh
7	Select transaction ID method (automatically defined by DCM1, written by controller)	6F00h

Charging session start		
Step	**Command**	**Registers**
1	Write transaction ID (if not automatically defined by DCM1)**	6F01h
2	Write charging session parameters for OCMF file**	From 7000h to 701Ch
3	Send clock synchronization and timezone command (if not already synchronized)	7031h and 7032h
4	Write charging session modality (charging only, vehicle to grid or bidirectional)	7036h
5	Write beginning command "B" (ASCII format)	7040h (As a result 7045h = "1")

Charging session in progress		
Step	**Command**	**Registers**
1	Read kWh+, kWh-, or Duration	7A00h, 7A04h or 7A08h
2	Read real time variables and temperature for diagnostic	See section 4.1 and 4.2.2
3	Update additional strings (EXAMPLES: "**Status: CHARGING**", "**BATTERY: 25%")**	699Fh to 69B9

Charging session end		
Step	**Command**	**Registers**
1	Write "E" (ASCII format)	7040h (As a result 7045h = "2")
2	Read OCMF state to check it's ready	7100h
3	Read OCMF length	7101h
4	Read the OCMF file	From 7110h to 7xxxh (depending on length)
5	Write "0" in OCMF state to confirm the reading of the OCMF file, allow a new charging session and to ensure that no important information is lost.	7100h

****Note**: All and only the standard ASCII (0-127) characters allowed to get OCMF file correctly formatted.

See APPENDIX for details on ASCII management.

IMPORTANT: in case of power failure while the charging session is in progress, follow this procedure to conclude the process and allow a new one:

Charging session completion after power failure		
Step	**Command**	**Registers**
1	Power on	-
2	Read OCMF state to check it's ready	7100h = 2
3	Read OCMF length	7101h
4	Read the OCMF file,	From 7110h to 7xxxh (depending on length)
5	Write "0" in OCMF state to confirm the reading of the OCMF file and allow a new charging session	7100h

4.4.1 Charging session parameters

Table 4.41 - Modbus: read and write mode

Modicom address	Physical address	Length (words)	VARIABLE ENG. UNIT	Data Format	Notes	Default	FW
326881	6900h	126	TT field	ASCII	The first byte after the string shall be put to 0 to identify the EOL (end of line). Writable only outside the charging session	-	1.5.3 onward
327007	697Eh	33	Long custom string	ASCII	The first byte after the string shall be put to 0 to identify the EOL (end of line). Writable only outside the charging session	-	1.5.3 onward
327040	699Fh	9	Custom string 1	ASCII	The first byte after the string shall be put to 0 to identify the EOL (end of line)	-	1.5.3 onward
327049	69A8h	9	Custom string 2	ASCII	The first byte after the string shall be put to 0 to identify the EOL (end of line)	-	1.5.3 onward
327058	69B1h	9	Custom string 3	ASCII	The first byte after the string shall be put to 0 to identify the EOL (end of line)	-	1.5.3 onward
327067	69BAh	1	Time between rotating pages	UINT16	Min. 2, Max. 10 seconds	5 seconds	1.5.3 onward
327068	69BBh	1	Enable long custom string in IDLE	UINT16	0 = Disabled 1 = Enabled	0	1.5.3 onward
327069	69BCh	1	Enable custom string 1 in IDLE	UINT16	0 = Disabled 1 = Enabled	0	1.5.3 onward
327070	69BDh	1	Enable custom string 2 in IDLE	UINT16	0 = Disabled 1 = Enabled	0	1.5.3 onward
327071	69BEh	1	Enable custom string 3 in IDLE	UINT16	0 = Disabled 1 = Enabled	0	1.5.3 onward
327072	69BFh	1	Enable OCMF TT field in IDLE	UINT16	0 = Disabled 1 = Enabled	0	1.5.3 onward
327073	69C0h	1	Enable power page in IDLE	UINT16	0 = Disabled 1 = Enabled	1	1.5.3 onward
327074	69C1h	1	Enable long custom string in CHARGING	UINT16	0 = Disabled 1 = Enabled	0	1.5.3 onward
327075	69C2h	1	Enable custom string 1 in CHARGING	UINT16	0 = Disabled 1 = Enabled	0	1.5.3 onward
327076	69C3h	1	Enable custom string 2 in CHARGING	UINT16	0 = Disabled 1 = Enabled	0	1.5.3 onward
327077	69C4h	1	Enable custom string 3 in CHARGING	UINT16	0 = Disabled 1 = Enabled	0	1.5.3 onward
327078	69C5h	1	Enable OCMF TT field in CHARGING	UINT16	0 = Disabled 1 = Enabled	0	1.5.3 onward
327079	69C6h	1	Enable power page in CHARGING	UINT16	0 = Disabled 1 = Enabled	1	1.5.3 onward
327080	69C7h	1	Enable long custom string in END	UINT16	0 = Disabled 1 = Enabled	0	1.5.3 onward

327081	69C8h	1	Enable custom string 1 in END	UINT16	0 = Disabled 1 = Enabled	0	1.5.3 onward
327082	69C9h	1	Enable custom string 2 in END	UINT16	0 = Disabled 1 = Enabled	0	1.5.3 onward
327083	69CAh	1	Enable custom string 3 in END	UINT16	0 = Disabled 1 = Enabled	0	1.5.3 onward
327084	69CBh	1	Enable OCMF TT field in END	UINT16	0 = Disabled 1 = Enabled	0	1.5.3 onward
3228417	6F00h	1	Transaction ID definition: automatically written by DCM1 (0), written by controller (1)	UINT16	The first byte after the string shall be put to 0 to identify the EOL (end of line)	0	1.5.3 onward
3228418	6F01h	7	External transaction ID, in case 6F00h=1 (writable)	ASCII	The first byte after the string shall be put to 0 to identify the EOL (end of line)	0	1.5.3 onward

Table 4.42 - Modbus: read and write mode

Modicom address	Physical address	Length (words)	VARIABLE ENG. UNIT	Data Format	Notes	Default	FW
327085	69CCh	1	TT field update command	UNIT16	1=Update 0= last update command completed Note: the value automatically return to 0 when update is completed. Writable only outside the charging session	0	1.5.3 onward
327086	69CDh	1	Long string update command	UINT16	1=Update 0= last update command completed Note: the value automatically return to 0 when update is completed. Writable only outside the charging session	0	1.5.3 onward

Table 4.43 - Modbus: read and write mode

Modicom address	Physical address	Length (words)	VARIABLE ENG. UNIT	Data Format	Notes
328673	7000h	1	OCMF Identification Status	UNIT16	0 = False 1 = True
328674	7001h	1	OCMF Identification Level*	UINT16	See table 11 OCMF spec, values: 0 = “NONE” (Default) 1 = “HEARSAY” 2 = “TRUSTED” 3 = “VERIFIED” 4 = “CERTIFIED” 5 = “SECURE” 6 = “MISMATCH” 7 = “INVALID” 8 = “OUTDATED” 9= “UNKNOWN”
328675	7002h	1	OCMF Identification Flags 1*	UINT16	See table 12 OCMF spec, values: 0 = RFID_NONE (Default) 1 = RFID_PLAIN 2 = RFID_RELATED 3 = RFID_PSK
328676	7003h	1	OCMF Identification Flags 2*	UINT16	See table 13 OCMF spec, values: 0 = OCPP_NONE (Default) 1 = OCPP_RS 2 = OCPP_AUTH 3 = OCPP_RS_TLS 4 = OCPP_AUTH_TLS 5 = OCPP_CACHE 6 = OCPP_WHITELIST 7 = OCPP_CERTIFIED
328677	7004h	1	OCMF Identification Flags 3*	UINT16	See table 14 OCMF spec, values: 0 = ISO15118_NONE (Default) 1 = ISO15118_PNC
328678	7005h	1	OCMF Identification Flags 4*	UINT16	See table 15 OCMF spec, values: 0 = PLMN_NONE (Default) 1 = PLMN_RING 2 = PLMN_SMS
328679	7006h	1	OCMF Identification Type*	UINT16	See table16 OCMF spec, values: 0 = NONE (Default) 1 = DENIED 2 = UNDEFINED 10 = ISO14443 11 = ISO15693 20 = EMAID 21 = EVCCID 30 = EVCOID 40 = ISO7812 50 = CARD_TXN_NR 60 = CENTRAL 61 = CENTRAL_1 62 = CENTRAL_2 70 = LOCAL 71 = LOCAL_1 72 = LOCAL_2 80 = PHONE_NUMBER 90 = KEY_CODE
328680	7007h	20	OCMF Identification Data*	CHAR[40]	Default = all byte set with 0x00

328700	701Bh	1	OCMF Charging point identifier type*	UINT16	See table 17 OCMF spec, values: 0 = EVSEID (Default) 1 = CBIDC
328701	701Ch	1	OCMF Charging point identifier	CHAR[40]	Default = all byte set with 0x00
Reserved	*Reserved*	*Reserved*	*Reserved*	*Reserved*	*Reserved*
328722	7031h	1	Local time delta in minutes	INT16	Value in minutes. Max = 1440 Min = -1440
328723	7032h	4	UTC Timestamp for synchronization**	INT64	UTC Timestamp INT64 format – Default = 0
328727	7036h	1	Display Charging Direction information	UINT16	0 = Charging Vehicle 1 = Vehicle to Grid 2 = Bidirectional

(*) if not set the default value is a correct value and allows to start the charging session.
(**) once a new timestamp is written in this register, the device clock is synchronized.

4.4.2 Charging session command

Table 4.44 - Modbus: read and write

Modicom address	Physical address	Length (words)	VARIABLE ENG. UNIT	Data Format	Notes
328737	7040h	1	OCMF Command	UINT16	See table6 @ field TX of OCMF spec, values: “B” = start transaction “E” = End of transaction “A” = Abort transaction

This is a command register (read/write), it contains last command received.

4.4.3 Charging session status

Table 4.45 - Modbus: read only

Modicom address	Physical address	Length (words)	VARIABLE ENG. UNIT	Data Format	Notes
328742	7045h	1	Charging status	UINT16	0 = no charging 1 = charging 2 = end last transaction 3 = end last transaction with error

4.4.4 End Session time

Table 4.46 - Modbus: read and write mode

Modicom address	Physical address	Length (words)	VARIABLE ENG. UNIT	Data Format	Notes
328753	7050h	1	“Charging session end” duration (s)	UINT16	Value min = 60 Value max =300 (default)
328723	7059h	7	Last transaction ID (read only)	ASCII	-

4.4.5 Time synchronization status

Table 4.47 - Modbus: read only

Modicom address	Physical address	Length (words)	VARIABLE ENG. UNIT	Data Format	Notes
328769	7060h	1	Time synchronization status	UINT16	0 = Time not synchronized 1 = Time synchronized

4.4.6 OCMF last transaction

Table 4.48 - Modbus: read only mode with functions code 03 and 04

Modicom address	Physical address	Length (words)	VARIABLE ENG. UNIT	Data Format	Notes
328929	7100h	1	OCMF state (***)	UINT16	0 = ready for new transaction 1 = running 2 = Session completed, OCMF file ready 3 = Session completed due to internal error, saved OCMF file corrupted
328930	7101h	1	OCMF file length	UINT16	Number of word to read
328931	7102h	2	OCMF last transition id	UINT32	Last finalized transaction id
328945	7110h	1	OCMF buff[0] and buff[1]	UINT16	First available word of OCMF file
…	…	…	…	….	…
330992	790Fh	1	OCMF buf[2046] and buff[2047]	UINT16	Last available word of OCMF file

(***) = this register is used to confirm the OCMF reading by the controller. It can be set only to 0 only when the OCMF has been completely read.

4.4.7 Charging real time values

Table 4.49 - Modbus: read only mode with functions code 03 and 04

Modicom address	Physical address	Length (words)	VARIABLE ENG. UNIT	Data Format	Notes
331233	7A00h	4	Delta kWh+	UINT64	Value weight: Wh
331237	7A04h	4	Delta kWh-	UINT64	Value weight: Wh
331241	7A08h	4	Duration	UINT64	Value weight: s

4.5 Maintenance Mode: Cable Loss Set Procedure

During the maintenance mode the following maps are the ones active:

- Maintenance Mode: Cable Loss Set Procedure,
- Maintenance Mode: Datalogger,
- Maintenance Mode: Additional Information.

During the 5 seconds after power on is possible sent a Modbus command to put device in maintenance mode.
The following three registers are necessary to set the cable loss.

4.5.1 Maintenance Mode Command

Table 4.50 - Modbus: write only mode

Modicom address	Physical address	Length [word]	VARIABLE ENG. UNIT	Data Format	Notes
312545	3100h	1	Active maintenance mode	UINT16	Every value permitted After this command the "Maintenance mode" is maintained up to 10 seconds

4.5.2 Timestamp Synchronization Command

Table 4.51 - Modbus: read and write mode

Modicom address	Physical address	Length [word]	VARIABLE ENG. UNIT	Data Format	Notes
312546	3101h	4	Timestamp value	UINT64	After this command the “Maintenance mode” is refreshed and maintained up to other 10 seconds

4.5.3 Cable loss value

Table 4.52 - Modbus: read and write mode

Modicom address	Physical address	Length [word]	VARIABLE ENG. UNIT	Data Format	Notes
312550	3105h	2	New cable Loss value	UINT32	After this command the “Maintenance mode” is considered complete and the device shall move in “Runtime mode”

4.6 Maintenance Mode: Datalog

These registers are always available, from power on of instrument until the end of maintenance mode.

4.6.1 Cable loss occurrences used

Table 4.53 - Modbus: read only mode

Modicom address	Physical address	Length [word]	VARIABLE ENG. UNIT	Data Format	Notes
312561	3110h	1	Number of row already used	INT16	Number of row of cable Loss datalog already used

IMPORTANT: valid only for certified devices

4.6.2 Total Cable loss occurrences

Table 4.54 - Modbus: read only mode

Modicom address	Physical address	Length [word]	VARIABLE ENG. UNIT	Data Format	Notes
312562	3111h	1	Max entry of cable lose datalog	UINT16	Max entry of cable loss datalog for whole device life

IMPORTANT:

- valid only for certified devices,
- once “Cable loss occurrences used” = “Total Cable loss occurrences” the cable loss procedure is inhibited.

4.6.3 Cable Loss Datalogger

Table 4.55 - Modbus: read only mode

Modicom address	Physical address	Length [word]	VARIABLE ENG. UNIT	Data Format	Notes
324577	6000h	18	Datalog row 0	Cable Loss Row Structure	First row of cable loss datalog structure
324595	6012h	18	Datalog row 1	Cable Loss Row Structure	Second row of cable loss datalog structure
..	…	…	…	…	…
325459	6372h	18	Datalog row 49	Cable Loss Row Structure	Last row of cable loss datalog structure

IMPORTANT: valid only for certified devices.

Table 4.56 - Cable Loss Row Structure

Modicom address	Physical address	Length [word]	VARIABLE ENG. UNIT	Data Format	Notes
-	Base +0	1	Record id	UINT16	From 0 to 49
-	Base +1	1	Datalog field	UNIT16	Cable Loss = 99
-	Base + 2	4	Timestamp	UINT64	Timestamp, 32 bit and 64 bit format
-	Base +6	4	Wh positive	UINT64	Last value of Wh (+) TOT counter calculated using the cable loss value that appears in this Datalog row
-	Base + 10	4	Wh negative	UINT64	Last value of Wh (-) TOT counter calculated using the cable loss value that appears in this Datalog row
-	Base + 14	2	Cable loss value	INT32	Cable loss value used to calculate the energy values staring from previous datalog row timestamp up to current datalogger row timestamp
-	Base +16	2	CRC value	UINT32	CRC value of current datalog row

4.7 Maintenance Mode: Additional Information

These registers are always available, from power on of instrument until the end of maintenance mode.

4.7.1 Firmware version and revision code

Table 4.57 - Modbus: read only mode

Modicom address	Physical address	Length (words)	VARIABLE ENG. UNIT	Data Format	Notes
300771	0302h	1	Major, Minor and Revision DCM-D (meter)	UINT16	MSB: Bit 0..3=Minor Bit 4..7=Major LSB: Revision
300772	0303h	1	Major, Minor and Revision DCM-D (cryptography)	UINT16	MSB: Bit 0..3=Minor Bit 4..7=Major LSB: Revision
300773	0304h	1	Major, Minor and Revision DCM-T	UINT16	MSB: Bit 0..3=Minor Bit 4..7=Major LSB: Revision When DCM-T is disconected, value is 0x7FFF

4.7.2 Carlo Gavazzi Controls identification code

Table 4.58 - Modbus: read only mode with functions code 03 and 04 limited to a word at a time

Modicom address	Physical address	Length (words)	VARIABLE ENG. UNIT	Data Format	Notes
300012	000Bh	1	Carlo Gavazzi Controls identification code	UINT16	-

4.7.3 Serial port configuration menu

Table 4.59 - Modbus: read and write mode

Modicom address	Physical address	Length (words)	VARIABLE ENG. UNIT	Data Format	Notes
308193	2000h	1	RS485 instrument address	UINT16	Value min = 1 (default) Value max = 247
308194	2001h	1	RS485 baud rate	UINT16	Value 1 = 9.6 kbps (default) Value 2 = 19.2 kbps Value 3 = 38.4 kbps Value 4 = 57.6 kbps Value 5 = 115.2 kbps
308195	2002h	1	RS485 parity	UINT16	Value 1= no parity (default) Value 2 = even parity
308196	2003h	1	Stop bit	UINT16	Value 1= 1 (default) Value 2 = 2

IMPORTANT: the values are automatically updated after exiting maintenance mode.

4.7.4 Ethernet configuration menu

Table 4.60 - Modbus: read and write mode

Modicom address	Physical address	Length (words)	VARIABLE ENG. UNIT	Data Format	Notes
308449	2100h	1	Stored IP address (A.B.C.D)	UINT16	
308450	2101h	1	Stored IP address (A.B.C.D)	UINT16	
308451	2102h	1	Stored IP address (A.B.C.D)	UINT16	
308452	2103h	1	Stored IP address (A.B.C.D)	UINT16	Value min = 1 Value max = 255 Default IP address = 192.168.1.10 Default subnet = 255.255.255.0 Default Gateway = 192.168.1.1 TCP/IP parameters that apply when DHCP is OFF *Notes 1 and 2 apply*
308453	2104h	1	Stored subnet mask (A.B.C.D)	UINT16	
308454	2105h	1	Stored subnet mask (A.B.C.D)	UINT16	
308455	2106h	1	Stored subnet mask (A.B.C.D)	UINT16	
308456	2107h	1	Stored subnet mask (A.B.C.D)	UINT16	
308457	2108h	1	Stored default gateway (A.B.C.D)	UINT16	
308458	2109h	1	Stored default gateway (A.B.C.D)	UINT16	
308459	210Ah	1	Stored default gateway (A.B.C.D)	UINT16	
308460	210Bh	1	Stored default gateway (A.B.C.D)	UINT16	
308461	210Ch	1	Modbus TCP/IP port	UINT16	Value min = 1 Value max = 9999 Value default = 502 *Note 2 applies*
308462	210Dh	1	DHCP enabled	UINT16	Value 0 = DHCP off (default) Value 1 = DHCP on *Notes 1 and 2 apply*

IMPORTANT:

- 1: 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.
- 2: settings are applied after exiting maintenance mode.

Appendix

The following table reports all the ASCII characters, along with their decimal and hexadecimal value, that are available on the screen.

DEC	HEX	Symbol
33	21	!
36	24	$
37	25	%
39	27	'
40	28	(
41	29	)
42	2A	*
43	2B	+
44	2C	,
45	2D	-
46	2E	.
47	2F	/
48	30	0
49	31	1
50	32	2
51	33	3
52	34	4
53	35	5
54	36	6
55	37	7
56	38	8
57	39	9
58	3A	:
60	3C	<
61	3D	=
62	3E	>
63	3F	?
65	41	A
66	42	B
67	43	C
68	44	D
69	45	E
70	46	F
71	47	G
72	48	H
73	49	I
74	4A	J
75	4B	K
76	4C	L
77	4D	M
78	4E	N
79	4F	O

80	50	P
81	51	Q
82	52	R
83	53	S
84	54	T
85	55	U
86	56	V
87	57	W
88	58	X
89	59	Y
90	5A	Z
97	61	a
98	62	b
99	63	c
100	64	d
101	65	e
102	66	f
103	67	g
104	68	h
105	69	i
106	6A	j
107	6B	k
108	6C	l
109	6D	m
110	6E	n
111	6F	o
112	70	p
113	71	q
114	72	r
115	73	s
116	74	t
117	75	u
118	76	v
119	77	w
120	78	x
121	79	y
122	7A	z
128	80	€
156	7D	**£**
157	7E	¥

5 Revisions

Revisions	Date	Note
1.3	7/05/2024	First release
1.4	28/05/2024	Added Modbus TCP/IP description (chapter 2) and charging session management (paragraph 4.4)
1.5	05/06/2024	P. 10, added Funuction 10, subparagraph 2.2.3; P. 13, added " during the charging session." in section "***IMPORTANT***"; Changed default values in Ethernet configuration parameters; Updated paragraph 4.4.
1.6	24/10/2024	P. 17, 19, 27, 28, 29: "mandatory to read the whole block…" repositioned in the title of the tables. P. 32, par. 4.3.1, tab. 4.32: the max value of the cable loss has been specified. P. 36, last row of the table "Charging session end": addition of some important information. P. 32, Modicom addresses have been corrected at: par. 4.3.2, tab. 4.33, par. 4.3.3, tab. 4.34, par. 4.3.4, tab. 4.35.
1.7	30/10/2024	Correction of some modicum addresses.
1.8	05/12/2024	Elimination of "Geometrical representation of variables".
1.9	27/02/2025	New Information about charging session procedure: pag. 35, added information and tables; pag. 37, par. 4.4.1, added new tables, named Table 4.41 and Table 4.42. From those tables on, the numeration has changed, arriving up to Table 4.60. Added APPENDIX section. Pag. 40, par. 4.4.3, tab. 4.46: added Modicom address 7059h. Tab. 4.7, 4.8, 4.26: corrections in column "Notes".
1.10	11/04/2025	P. 28-29, par. 4.2.14 - 4.2.15, tab. 4.27-4.28 Correction of table header.
1.11	30/07/2025	P. 14 , par 3.4, added reference to LNE models.