EM24-DIN

COMMUNICATION PROTOCOL

Version 2 Revision 0

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1.1 Introduction

The RS485 serial interface supports the MODBUS/JBUS (RTU) protocol. In this document only the information necessary to read/write from/to EM24-DIN 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 "Modbus_Application_Protocol_V1_1a.pdf" document that is downloadable from the www.modbus.org web site.

1.2 MODBUS functions

These functions are available on EM24-DIN:

- Reading of n "Holding Registers" (code 03h)
- Reading of n "Input Register" (code 04h)
- Writing of one "Holding Registers" (code 06h)
- Diagnostic (code 08h with sub-function code 00h)
- Broadcast mode (writing instruction on address 00h)

IMPORTANT:

1) In this document the "Modbus address" field is indicated in two modes:
   1.1) "**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".
   1.2) "**Physical address**": it is the "word address" value to be included in the communication frame.
2) The functions 03h and 04h have exactly the same effect and can be used indifferently.
3) The communication parameters are to be set according to the configuration of the instrument (refer to EM24-DIN instruction manual)

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 11 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).

Request frame

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 10h (1 to 11)	Byte order: MSB, LSB
CRC	2 bytes		

Response frame (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		

Response frame (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 11 register (word) 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).

Request frame

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 10h (1 to 11)	Byte order: MSB, LSB
CRC	2 bytes		

Response frame (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		

Response frame (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.

Request frame

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		

Response frame (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		

Response frame (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	2 bytes		

1.2.4 Function 08h (Diagnostic with sub-function code 00h)

MODBUS function 08h provides a series of tests to check the communication system between a client (Master) device and a server (Slave), or to check various internal error conditions in a server.
EM24-DIN supports only 0000h sub-function code (Return Query Data). With this sub-function the data passed in the request data field is to be returned (looped back) in the response. The entire response message should be identical to the request.

Request frame

Description	Length	Value	Note
Physical address	1 byte	1 to F7h (1 to 247)	
Function code	1 byte	08h	
Sub-function	2 bytes	0000h	
Data (**N** word)	**N** *2 bytes	Data	Byte order: MSB, LSB
CRC	2 bytes		

Response frame (correct action)

Description	Length	Value	Note
Physical address	1 byte	1 to F7 (1 to 247)	
Function code	1 byte	08h	
Sub-function	2 bytes	0000h	
Data (**N** word)	**N** *2 bytes	Data	Byte order: MSB, LSB
CRC	2 bytes		

Response frame (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	88h	
Exception code	1 byte	01h, 02h, 03h, 04h	
CRC	2 bytes		

1.2.5 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 using address 00h.

1.3 Application notes

1.3.1 RS485 general considerations

1. To avoid errors due to the signal reflections or line coupling, it is necessary to terminate the bus at the beginning and at the end (inserting a 120 ohm 1/2W 5% resistor between line B and A in the last instrument and in the Host interface).
2. The network termination is necessary even in case of point-to-point connection and/or of short distances.
3. For connections longer than 1000m or if in the network there are more than 160 instruments (with 1/5 unit load as used in EM24-DIN interface), a signal repeater is necessary.
4. For bus connection it is suggested to use an AWG24 balanced pair cable and to add a third wire for GND connection. Connect GND to the shield if a shielded cable is used.
5. The GND is to be connected to ground only at the host side.
6. 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.

1.3.2 MODBUS timing

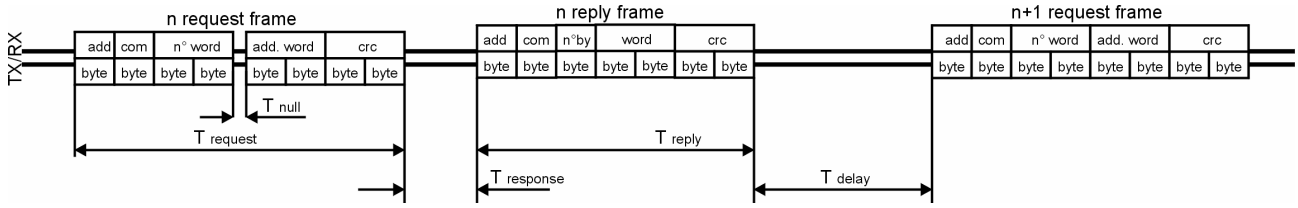


Fig. 1 : 2-wire timing diagram

Timing characteristics of reading function:	msec
T response: Max answering time	500ms
T response: Typical answering time	40ms
T delay: Minimum time before a new query	3,5char
T null: Max interruption time during the request frame	2,5char

2 TABLES

2.1 Data format representation In Carlo Gavazzi instruments

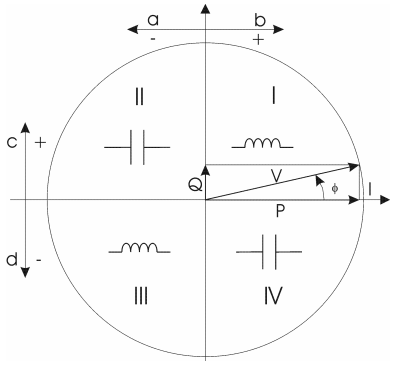
The variables are represented by integers or floating numbers, with 2's complement notation in case of "signed" format, using the following:

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 int	32	0 .. 2^{32}-1
UINT64	ULINT	Unsigned long integer	64	0 .. 2^{64}-1
IEEE754 SP		Single-precision floating-point	32	$-(1+[1-2^{-23}])x2^{127}$ .. 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.

2.1.1 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:



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

Fig. 2 : Geometric Representation

2.2 Maximum and minimum electrical values in EM24-DIN

The maximum electrical input values are reported in the following table. If the input is above the maximum value the display shows "----".

Table 2.1-1

	AV9 input option		AV0 input option		AV5 input option		AV6 input option	
	Max value	Min value	Max value	Min value	Max value	Min value	Max value	Min value
VL-N	280V	0	150V	0	485V	0	150V	0
VL-L	485V	0	260V	0	840V	0	260V	0
A	65A	0	65A	0	11A	0	11A	0
VT							60000	1.0
CT					6000	1.0	6000	1.0

The overflow indication "----" is displayed when the MSB value of the relevant variable is 7FFFh.

2.3 Instantaneous variables and meters

MODBUS: read only mode with functions code 03 and 04 Table 2.3-1

Modicom address	Physical address	Length (words)	VARIABLE ENG. UNIT	Data Format	Notes
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 Σ	INT32	Value weight: Volt*10
300039	0026h	2	V L-L Σ	INT32	
300041	0028h	2	W Σ	INT32	Value weight: Watt*10
300043	002Ah	2	VA Σ	INT32	Value weight: VA*10
300045	002Ch	2	VAR Σ	INT32	Value weight: var*10
300047	002Eh	2	DMD W Σ	INT32	Value weight: Watt*10
300049	0030h	2	DMD VA Σ	INT32	Value weight: VA*10
300051	0032h	1	PF L1	INT16	Negative values correspond to lead(C), positive value correspond to lag(L) Value weight: PF*1000
300052	0033h	1	PF L2	INT16	
300053	0034h	1	PF L3	INT16	
300054	0035h	1	PF Σ	INT16	
300055	0036h	1	Phase sequence	INT16	Value –1 correspond to L1-L3-L2 sequence, value 0 correspond to L1-L2-L3 sequence (la sequenza fase ha senso solo in un sistema trifase!)
300056	0037h	1	Hz	INT16	Value weight: Hz*10
300057	0038h	2	DMD W Σ max	INT32	Value weight: Watt*10
300059	003Ah	2	DMD VA Σ max	INT32	Value weight: VA*10
300061	003Ch	2	DMD A max	INT32	Value weight: Ampere*1000
300063	003Eh	2	KWh(+) TOT	INT32	Value weight: kWh*10
300065	0040h	2	Kvarh(+) TOT	INT32	Value weight: kvarh*10
300067	0042h	2	KWh(+) PAR	INT32	Value weight: kWh*10
300069	0044h	2	Kvarh(+) PAR	INT32	Value weight: kvarh*10
300071	0046h	2	KWh(+) L1	INT32	Value weight: kWh*10
300073	0048h	2	KWh(+) L2	INT32	Value weight: kWh*10
300075	004Ah	2	KWh(+) L3	INT32	Value weight: kWh*10
300077	004Ch	2	KWh(+) T1	INT32	Value weight: kWh*10
300079	004Eh	2	KWh(+) T2	INT32	Value weight: kWh*10
300081	0050h	2	KWh(+) T3	INT32	Value weight: kWh*10
300083	0052h	2	KWh(+) T4	INT32	Value weight: kWh*10
300085	0054h	2	Kvarh(+) T1	INT32	Value weight: kvarh*10
300087	0056h	2	Kvarh(+) T2	INT32	Value weight: kvarh*10
300089	0058h	2	Kvarh(+) T3	INT32	Value weight: kvarh*10
300091	005Ah	2	Kvarh(+) T4	INT32	Value weight: kvarh*10
300093	005Ch	2	KWh(-) TOT	INT32	Value weight: kWh*10
300095	005Eh	2	Kvarh(-) TOT	INT32	Value weight: kvarh*10
300097	0060h	2	Hour	INT32	Value weight: hour*100
300099	0062h	2	Counter 1	INT32	Value weight: Eng.Unit*10
300101	0064h	2	Counter 2	INT32	Value weight: Eng.Unit*10
300103	0066h	2	Counter 3	INT32	Value weight: Eng.Unit*10

2.4 Digital input status

MODBUS: read only mode with functions code 03 and 04 limited to a word at a time Table 2.4-1

Modicom address	Physical address	Length (words)	VARIABLE ENG. UNIT	Data Format	Notes
300769	0300h	1	Digital input status	UINT 16 bit=0 input close bit=1 input open	bit0=input status Ch1 bit1=input status Ch2 bit2=input status Ch3

2.5 Current tariff

MODBUS: read only mode with functions code 03 and 04 limited to a word at a time Table 2.5-1

Modicom address	Physical address	Length (words)	VARIABLE ENG. UNIT	Data Format	Notes
300770	0301h	1	Current tariff	UINT 16	Value=0: tariff 1 Value=1: tariff 2 Value=2: tariff 3 Value=3: tariff 4

2.6 Firmware version and revision code

MODBUS: read only mode with functions code 03 and 04 limited to a word at a time Table 2.6-1

Modicom address	Physical address	Length (words)	VARIABLE ENG. UNIT	Data Format	Notes
300771	0302h	1	Version code	UINT 16	Value=0: EM24DINAV93XO2X Value=1: EM24DINAV93XISX Value=2: EM24DINAV53DO2X Value=3: EM24DINAV53DISX Value=4: EM24DINAV93XR2X Value=5: EM24DINAV53DR2X
300772	0303h	1	Revision code	UINT 16	

2.7 Front selector status

MODBUS: read only mode with functions code 03 and 04 limited to a word at a time Table 2.7-1

Modicom address	Physical address	Length (words)	VARIABLE ENG. UNIT	Data Format	Notes
300773	0304h	1	Front selector status	UINT 16	Value=3: keypad locked Value=2: keypad unlocked Value=1: keypad unlocked Value=0: keypad unlocked

2.8 Carlo Gavazzi Controls identification code

MODBUS: read only mode with functions code 03 and 04 limited to a word at a time Table 2.8-1

Modicom address	Physical address	Length (words)	VARIABLE ENG. UNIT	Data Format	Notes
300012	000Bh	1	Carlo Gavazzi Controls identification code	UINT 16	Value=45: EM24-DIN AV9 input product code Value=46: EM24-DIN AV0 input product code Value=47: EM24-DIN AV5 input product code Value=48: EM24-DIN AV6 input product code

2.9 Digital output status

MODBUS: read only mode with functions code 03 and 04 limited to a word at a time Table 2.9-1

Modicom address	Physical address	Length (words)	VARIABLE ENG. UNIT	Data Format	Notes
n.a.	n.a.	n.a.	n.a.	n.a.	n.a.

Note: in EM24 the digital outputs are not available with serial communication port.

2.10 Programming parameter tables

2.10.1 Password configuration menu

MODBUS: read and write mode

Table 2.10-1

Modicom address	Physical address	Length (words)	VARIABLE ENG. UNIT	Data Format	Notes
304353	1100h	1	PASSWORD	UINT 16	Minimum valid value: 0d Maximum valid value: 9999d If the value is outside the limits the instrument considers that the value is equal to 0.

2.10.2 “Application” menu

MODBUS: read and write mode

Table 2.10-2

Modicom address	Physical address	Length (words)	VARIABLE ENG. UNIT	Data Format	Notes
304354	1101h	1	Type of application	UINT 16	Value=0: “A” application Value=1: “B” application Value=2: “C” application Value=3: “D” application Value=4: “E” application Value=5: “F” application Value=6: “G” application Value=7: “H” application All other values corresponds to “A” application

2.10.3 System configuration menu

MODBUS: read and write mode

Table 2.10-3

Modicom address	Physical address	Length (words)	VARIABLE ENG. UNIT	Data Format	Notes
304355	1102h	1	Measuring system	UINT 16	Value=0: “3Pn” Value=1: “3P1” Value=2: “2P” Value=3: “1P” All the other possible values correspond to “3Pn”

2.10.4 DMD integration time menu

MODBUS: read and write mode

Table 2.10-4

Modicom address	Physical address	Length (words)	VARIABLE ENG. UNIT	Data Format	Notes
304356	1103h	1	Interval time	UINT 16	If lower than 1 or higher than 30, the instrument considers that the value is equal to 1.

2.10.5 Selector menu

MODBUS: read and write mode

Table 2.10-5

Modicom address	Physical address	Length (words)	VARIABLE ENG. UNIT	Data Format	Notes
304357	1104h	1	Position selector: 3	UINT 16	Value=0: Page 1 Value=1: Page 2 Value=2: Page 3 Value=3: Page 4 Value=4: Page 5 Value=5: Page 6 Value=6: Page 7 Value=7: Page 8 Value=8: Page 9 Value=9: Page 10 Value=10: Page 11 Value=11: Page 12 Value=12: Page 13 Value=13: Page 14 Value=14: Page 15 Value=15: Page 16 Value=16: Page 17 Value=17: Page 18 Value=18: Page 19 Value=19: Page 20 Value=20: Page 21 Value=21: Page 22 Value=22: Page 23 Value=23: Page 24 Value=24: Page 25 Value=25: Page 26 Value=26: Page 27 Value=27: Page 28 Value=28: Page 29 Value=29: Page 30 Value=30: Page 31 All the other possible values corresponds to “Page 1”
304358	1105h	1	Position selector: 2	UINT 16	
304359	1106h	1	Position selector: 1	UINT 16	
304360	1107h	1	Position selector: 0	UINT 16	

2.10.6 Filter configuration menu

MODBUS: read and write mode

Table 2.10-6

Modicom address	Physical address	Length (words)	VARIABLE ENG. UNIT	Data Format	Notes
304361	1108h	1	Filter span parameter	UINT 16	Value min = 0 Value max = 100 If the value is outside the limits the instrument considers that the value is equal to 0
304362	1109h	1	Filter coefficient	UINT 16	Value min = 1 Value max = 32 If the value is outside the limits the instrument considers that the value is equal to 1

2.10.7 Serial port configuration menu

MODBUS: read and write mode

Table 2.10-7

Modicom address	Physical address	Length (words)	VARIABLE ENG. UNIT	Data Format	Notes
304363	110Ah	1	RS485 instrument address	UINT 16	Value min = 1 Value max = 247 If the value is outside the limits the instrument considers that the value is equal to 1
304364	110Bh	1	RS485 baud rate	UINT 16	Value=0: 9600 Value=1: 4800 All other values are considered as value=0

Note: The number of stop bits is fixed to “1” and the parity control is fixed to “none”.

2.10.8 User configuration menu

MODBUS: read and write mode

Table 2.10-8

Modicom address	Physical address	Length (words)	VARIABLE ENG. UNIT	Data Format	Notes
304365	110Ch	1	ID code of user 1	UINT 16	Value min = 1 Value max = 9999 If the value is outside the limits the instrument considers that the value is equal to 1
304366	110Dh	1	ID code of user 2	UINT 16	
304367	110Eh	1	ID code of user 3	UINT 16	

2.10.9 Digital output configuration menu

MODBUS: read and write mode

Table 2.10-9

Modicom address	Physical address	Length (words)	VARIABLE ENG. UNIT	Data Format	Notes
304368	110Fh	1	Out1 type	UINT 16	Value=0: Pulse KWh Value=1: Pulse Kvarh Value=2: Alarm VLN sys Value=3: Alarm V1-LN Value=4: Alarm V2-LN Value=5: Alarm V3-LN Value=6: Alarm VLL sys Value=7: Alarm V12 Value=8: Alarm V23 Value=9: Alarm V31 Value=10: Alarm AL1 Value=11: Alarm AL2 Value=12: Alarm AL3 Value=13: Alarm W sys Value=14: Alarm WDMD sys Value=15: Alarm WL1 Value=16: Alarm WL2 Value=17: Alarm WL3 Value=18: Alarm VA sys Value=19: Alarm VADMD sys Value=20: Alarm VAL1 Value=21: Alarm VAL2 Value=22: Alarm VAL3 Value=23: Alarm var sys Value=24: Alarm var1 Value=25: Alarm var2 Value=26: Alarm var3 Value=27: Alarm PF sys Value=28: Alarm PF1 Value=29: Alarm PF2 Value=30: Alarm PF3 Value=31: Alarm Hz Value=32: Alarm Phase Sequence All other values are considered as value=0
	1110h	2	Out1 pulse	UINT 32	Value min = 1 (0,1 pulse/KWh) Value max = 1000000 (pulse/KWh) If the value is outside the limits the instrument considers that the value is equal to 1
304371	1112h	2	Alarm1 set point on	UINT 32	The maximum and minimum limits of the set point value depend on the type of the variable according to paragraph 2.1.2. If the value is outside the limits the instrument considers that the value is equal to the minimum value
304373	1114h	2	Alarm1 set point off	UINT 32	
304375	1116h	1	Alarm1 delay	UINT 16	Value min = 0 (second) Value max = 255 (second) If the value is outside the limits the instrument considers that the value is equal to 0
304376	1117h	1	Alarm1 status	UINT 16	Value=0: nd (normally de-energised) Value=1: nE (normally energised) All other values are considered as value=0
304377	1118h	1	Out2 type	UINT 16	See note on Out1 type
304378	1119h	2	Out2 pulse	UINT 32	See note on Out1 pulse
304380	111Bh	2	Alarm2 set point on	UINT 32	See note on Alarm 1 set point on/off
304382	111Dh	2	Alarm2 set point off	UINT 32	
304384	111Fh	1	Alarm2 delay	UINT 16	See note on Alarm 1 delay
304385	1120h	1	Alarm2 status	UINT 16	See note on Alarm 1 status

2.10.10 Digital input configuration menu *

MODBUS: read and write mode

Table 2.10-10

Modicom address	Physical address	Length (words)	VARIABLE ENG. UNIT	Data Format	Notes
304386	1121h	1	Digital input 1 type	UINT 16	Value=0: Sync mode Value=1: Tariff mode Value=2: Gas counter Value=3: H2O cold counter Value=4: H2O hot counter Value=5: H2O hot KWh counter All other values are considered as value=0
304387	1122h	1	Digital input 2 type	UINT 16	Value=0: Sync mode Value=1: Tariff mode Value=2: Gas counter Value=3: H2O cold counter Value=4: H2O hot counter Value=5: H2O hot KWh counter All other values are considered as value=0
304388	1123h	1	Digital input 3 type	UINT 16	Value=0: Gas counter Value=1: H2O cold counter Value=2: H2O hot counter Value=3: H2O hot KWh counter All other values are considered as value=0
304389	1124h	1	Digital input 1 prescaler	UINT 16	Value min = 1 Value max = 9999 If the value is outside the limits the instrument considers that the value is equal to 1
304390	1125h	1	Digital input 2 prescaler	UINT 16	
304391	1126h	1	Digital input 3 prescaler	UINT 16	
304392	1127h	1	Tariff managed via serial communication	UINT 16	Writing in this cell, the multi-tariff can be managed via serial communication, excluding any influence of the digital inputs. To set a tariff, a frame including the following information is to be sent. LSB: 005Ah always; MSB: tariff (value from 0 to 3).

NOTES:

a) If 2 or more digital inputs are linked to the same meter, it is enabled only the meter of the digital input 1

b) If 2 inputs are set in Sync mode, the switching of any of the inputs is considered as a synchronisation signal.

c) If only one of the inputs is set in Tariff mode, only tariffs 1 and 2 are managed.

2.10.11 PT and CT configuration menu

MODBUS: read and write mode

Table 2.10-11

Modicom address	Physical address	Length (words)	VARIABLE ENG. UNIT	Data Format	Notes
304397	112Ch	2	Current transformer ratio	UINT 32	Value min = 10 (1,0) Value max = 6000000 (60000.1) If the value is outside the limits the instrument considers that the value is equal to 1.0
304399	112Eh	2	Voltage transformer ratio	UINT 32	Value min = 1 Value max = 60000 If the value is outside the limits the instrument considers that the value is equal to 1.0

2.10.12 Reset commands

MODBUS: write only mode

Table 2.10-12

Modicom address	Physical address	Length (words)	VARIABLE ENG. UNIT	Data Format	Notes
312289	3000h	1	Reset of all meters (hour counter excluded)	UINT 16	Value=1: Command is executed All other values produce no effects
312290	3001h	1	Reset of total meters (see note 1)	UINT 16	
312291	3002h	1	Reset of partial meters (see note 2)	UINT 16	
312292	3003h	1	Reset of hour counter	UINT 16	
312293	3004h	1	Reset counter 1, 2 and 3	UINT 16	
312294	3005h	1	Reset dmd max	UINT 16	

Note 1: the total meters are
- total kWh imported
- total kvarh imported
- total kWh exported
- total kvarh exported
- kWh L1
- kWh L2
- kWh L3
- kvarh L1
- kvarh L2
- kvarh L3
- kWh T1
- kWh T2
- kWh T3
- kWh T4
- kvarh T1
- kvarh T2
- kvarh T3
- kvarh T4

Note 2: the partial meters are
- partial kWh
- partial kvarh

3 REVISIONS

3.1 Modifications from Version 1 Revision 0

The maximum number of requested word is 11, not 16 (see par. 1.2.1, 1.2.2)

3.2 Modifications from Version 1 Revision 1

Tables 2.6-1, and 2.9-1 updated