EM271

COMMUNICATION PROTOCOL

Version 1 Revision 2

January 29th, 2018

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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 EM271 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 EM271:
- 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 EM271 instruction manual).
4) The Modbus electrical values must be considered valid only if the corresponding variables are present on the display of the meter too (as consequence of the set configuration).

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. <u>It is possible to read maximum 18 registers (words) with a single request</u>, 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 :
Function code	1 byte	83h	01h: illegal function
Exception code	1 byte	01h, 02h, 03h, 04h (see note)	02h: illegal data address
CRC	2 bytes		03h: illegal data value
			04h: slave device failure

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 18 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 :
Function code	1 byte	84h	01h: illegal function
Exception code	1 byte	01h, 02h, 03h, 04h	02h: illegal data address
CRC	2 bytes		03h: illegal data value
			04h: slave device failure

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 :
Function code	1 byte	86h	01h: illegal function
Exception code	1 byte	01h, 02h, 03h, 04h	02h: illegal data address
CRC	2 bytes		03h: illegal data value
			04h: slave device failure

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.
EM271 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 :
Function code	1 byte	88h	01h: illegal function
Exception code	1 byte	01h, 02h, 03h, 04h	02h: illegal data address
CRC	2 bytes		03h: illegal data value
			04h: slave device failure

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 (master side, if not already embedded, by inserting a 120 ohm 1/2W 5% resistor between line B and A) and at the end (by connecting the terminals B+ and T in the last instrument).
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 EM271 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
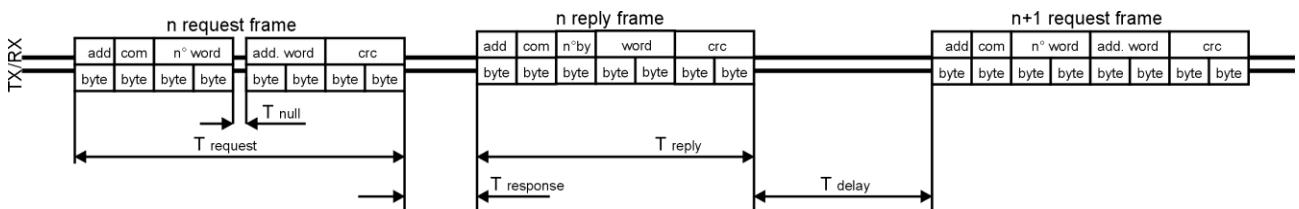
Fig. 1 : 2-wire timing diagram

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	$-(1+[1-2^{-23}])\times2^{127}$ .. 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
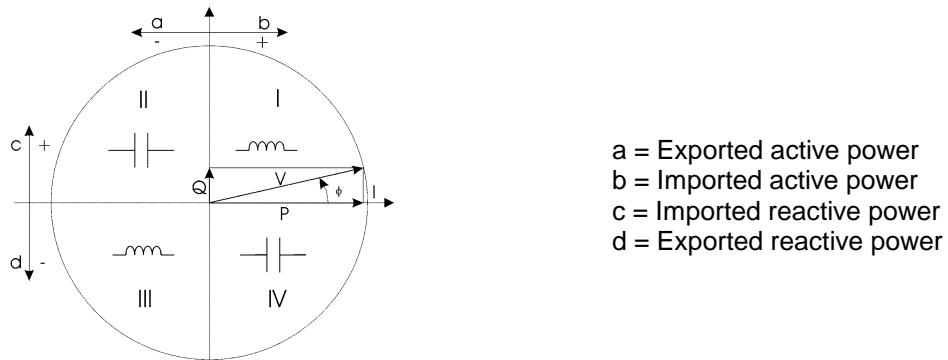
Fig. 2 : Geometric Representation

Modbus representation: negative values correspond to exported active power, positive   values correspond to imported active power

2.2 Maximum and minimum electrical values in EM271

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

MV5 MODELS   Table 2.1-1

	60A		100A		200A		400A	
	Min value	Max value	Min value	Max value	Min value	Max value	Min value	Max value
VL-N	40VAC	276VAC	40VAC	276VAC	40VAC	276VAC	40VAC	276VAC
A	0A	75A	0A	126A	0A	252A	0A	504A

MV6 MODELS

	60A		100A		200A		400A	
	Min value	Max value	Min value	Max value	Min value	Max value	Min value	Max value
VL-N	40VAC	160VAC	40VAC	160VAC	40VAC	160VAC	40VAC	160VAC
A	0A	75A	0A	126A	0A	252A	0A	504A

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

When a variable is not managed by the programmed measuring system, its MSB value is 7FFDh.

When a TCD is missing but the programmed measuring system requires it, the relevant MSB values of variables are 7FFEh. In all these cases, LSB value is FFFFh.

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	3P 1.3P	3P 2.3P	3P 3.1P	3P 6.1P	1P 3.1P	1P 6.1P	Firmware compatibility EM271
300001	0000h	2	V L1-N (*)	INT32		X	X	X	X	X	X	r.d0
300003	0002h	2	V L2-N	INT32		X	X	X	X			r.d0
300005	0004h	2	V L3-N	INT32	Volt*10	X	X	X	X			r.d0
300007	0006h	2	V L1-L2	INT32		X	X					r.d0
300009	0008h	2	V L2-L3	INT32		X	X					r.d0
300011	000Ah	2	V L3-L1	INT32		X	X					r.d0
300013	000Ch	2	A L1 ∑	INT32			S	S	S			r.d0
300015	000Eh	2	A L2 ∑	INT32	Ampere*1000		S	S	S			r.d0
300017	0010h	2	A L3 ∑	INT32			S	S	S			r.d0
300019	0012h	2	W ∑	INT32	Watt*10		S	S	S	S	S	r.d0
300021	0014h	2	VA ∑	INT32	VA*10		S	S	S	S	S	r.d0
300023	0016h	2	VAR ∑	INT32	var*10		S	S	S	S	S	r.d0
300025	0018h	2	KWh(+)TOT ∑	INT32	kWh*10		S	S	S	S	S	r.d0
300027	001Ah	2	Kvarh(+)TOT ∑	INT32	kvarh*10		S	S	S	S	S	r.d0
300029	001Ch	2	W DMD ∑	INT32	Watt*10		S	S	S	S	S	r.d0
300031	001Eh	2	VA DMD ∑	INT32	VA*10		S	S	S	S	S	r.d0
300033	0020h	2	W MAXDMD ∑	INT32	Watt*10		S	S	S	S	S	r.d0
300035	0022h	2	VA MAXDMD ∑	INT32	VA*10		S	S	S	S	S	r.d0
300037	0024h	2	PF ∑	INT32	PF*1000 Sign: refers to 2.1.1		S	S	S	S	S	r.d2
300269	010Ch	2	A L1 TCDA1	INT32		X	X	X	X	X	X	r.d0
300271	010Eh	2	A L2 TCDA1	INT32	Ampere*1000	X	X	X	X	X	X	r.d0
300273	0110h	2	A L3 TCDA1	INT32		X	X	X	X	X	X	r.d0
300275	0112h	2	W L1 TCDA1	INT32				X	X	X	X	r.d0
300277	0114h	2	W L2 TCDA1	INT32	Watt*10			X	X	X	X	r.d0
300279	0116h	2	W L3 TCDA1	INT32				X	X	X	X	r.d0
300281	0118h	2	W TOT TCDA1	INT32	Watt*10	X	X		S		S	r.d0
300283	011Ah	2	VA TOT TCDA1	INT32	VA*10	X	X					r.d0
300285	011Ch	2	VAR TOT TCDA1	INT32	var*10	X	X					r.d0
300287	011Eh	2	KWh(+)TCDA1 TOT	INT32	kWh*10	X	X					r.d0
300289	0120h	2	Kvarh (+)TCDA1 TOT	INT32	kvarh*10	X	X					r.d0
300291	0122h	2	W TOT TCDA1 DMD	INT32	Watt*10	X	X					r.d0
300293	0124h	2	VA TOT TCDA1 DMD	INT32	VA*10	X	X					r.d0
300295	0126h	2	W TOT TCDA1 MAXDMD	INT32	Watt*10	X	X					r.d0
300297	0128h	2	VA TOT TCDA1 MAXDMD	INT32	VA*10	X	X					r.d0
300299	012Ah	2	KWh(+) L1 TCDA1	INT32	kWh*10			X	X	X	X	r.d0
300301	012Ch	2	KWh(+) L2 TCDA1	INT32				X	X	X	X	r.d0
300303	012Eh	2	KWh(+) L3 TCDA1	INT32				X	X	X	X	r.d0
300305	0130h	2	W L1 TCDA1 DMD	INT32				X	X	X	X	r.d0
300307	0132h	2	W L2 TCDA1 DMD	INT32				X	X	X	X	r.d0
300309	0134h	2	W L3 TCDA1 DMD	INT32	Watt*10			X	X	X	X	r.d0
300311	0136h	2	W L1 TCDA1 MAXDMD	INT32				X	X	X	X	r.d0
300313	0138h	2	W L2 TCDA1 MAXDMD	INT32				X	X	X	X	r.d0
300315	013Ah	2	W L3 TCDA1 MAXDMD	INT32				X	X	X	X	r.d0
300317	013Ch	2	VAR L1 TCDA1	INT32				X	X	X	X	r.d2
300319	013Eh	2	VAR L2 TCDA1	INT32	var*10			X	X	X	X	r.d2
300321	0140h	2	VAR L3 TCDA1	INT32				X	X	X	X	r.d2
300323	0142h	2	PF L1 TCDA1	INT32	PF*1000			X	X	X	X	r.d2
300325	0144h	2	PF L2 TCDA1	INT32	Sign: refers			X	X	X	X	r.d2

Modicom address	Physical address	Length	Variable	Data Format	Eng. Unit							Firmware
300327	0146h	2	PF L3 TCDA1	INT32	to 2.1.1			X	X	X	X	r.d2
300329	0148h	2	PF TCDA1	INT32		X	X			X	X	r.d2
300525	020Ch	2	A L1 TCDA2	INT32	Ampere*1000		X		X		X	r.d0
300527	020Eh	2	A L2 TCDA2	INT32			X		X		X	r.d0
300529	0210h	2	A L3 TCDA2	INT32			X		X		X	r.d0
300531	0212h	2	W L1 TCDA2	INT32	Watt*10				X		X	r.d0
300533	0214h	2	W L2 TCDA2	INT32					X		X	r.d0
300535	0216h	2	W L3 TCDA2	INT32					X		X	r.d0
300537	0218h	2	W TOT TCDA2	INT32	Watt*10		X		S		S	r.d0
300539	021Ah	2	VA TOT TCDA2	INT32	VA*10		X					r.d0
300541	021Ch	2	VAR TOT TCDA2	INT32	var*10		X					r.d0
300543	021Eh	2	KWh(+)TCDA2 TOT	INT32	kWh*10		X					r.d0
300545	0220h	2	Kvarh (+)TCDA2 TOT	INT32	kvarh*10		X					r.d0
300547	0222h	2	W TOT TCDA2 DMD	INT32	Watt*10		X					r.d0
300549	0224h	2	VA TOT TCDA2 DMD	INT32	VA*10		X					r.d0
300551	0226h	2	W TOT TCDA2 MAXDMD	INT32	Watt*10		X					r.d0
300553	0228h	2	VA TOT TCDA2 MAXDMD	INT32	VA*10		X					r.d0
300555	022Ah	2	KWh(+) L1 TCDA2	INT32	kWh*10				X		X	r.d0
300557	022Ch	2	KWh(+) L2 TCDA2	INT32					X		X	r.d0
300559	022Eh	2	KWh(+) L3 TCDA2	INT32					X		X	r.d0
300561	0230h	2	W L1 TCDA2 DMD	INT32	Watt*10				X		X	r.d0
300563	0232h	2	W L2 TCDA2 DMD	INT32					X		X	r.d0
300565	0234h	2	W L3 TCDA2 DMD	INT32					X		X	r.d0
300567	0236h	2	W L1 TCDA2 MAXDMD	INT32					X		X	r.d0
300569	0238h	2	W L2 TCDA2 MAXDMD	INT32					X		X	r.d0
300571	023Ah	2	W L3 TCDA2 MAXDMD	INT32					X		X	r.d0
300573	023Ch	2	VAR L1 TCDA2	INT32	var*10				X		X	r.d2
300575	023Eh	2	VAR L2 TCDA2	INT32					X		X	r.d2
300577	0240h	2	VAR L3 TCDA2	INT32					X		X	r.d2
300579	0242h	2	PF L1 TCDA2	INT32	PF*1000 Sign: refers to 2.1.1				X		X	r.d2
300581	0244h	2	PF L2 TCDA2	INT32					X		X	r.d2
300583	0246h	2	PF L3 TCDA2	INT32					X		X	r.d2
300585	0248h	2	PF TCDA2	INT32			X				X	r.d2

(*): this is also the voltage VLN in single-phase system
X: available; S: available only if SUM function is on; Empty: not available.

2.4 Firmware version and revision code

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

Modicom address	Physical address	Length (words)	VARIABLE ENG. UNIT	Data Format	Notes	Firmware compatibility
						EM271
300771	0302h	1	Version code	UINT 16	0= A, 1= B, ...	r.d0
300772	0303h	1	Revision code	UINT 16		r.d0

2.5 Program lock status

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

Modicom address	Physical address	Length (words)	VARIABLE ENG. UNIT	Data Format	Notes	Firmware compatibility
						EM271
300773	0304h	1	Front selector status	UINT 16	Value=1: keypad locked Value=0: keypad unlocked	r.d0

2.6 Carlo Gavazzi Controls identification code

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

Modicom address	Physical address	Length (words)	VARIABLE ENG. UNIT	Data Format	Notes	Firmware compatibility
						EM271
300012	000Bh	1	Carlo Gavazzi Controls identification code	UINT 16	Value=274: EM27172DMV53X2SX Value=275: EM27172DMV53XOSX Value=276: EM27172DMV63X2SX Value=277: EM27172DMV63XOSX	r.d0

2.7 Programming parameter tables

2.7.1 Password configuration menu

MODBUS: read and write mode   Table 2.7-1

Modicom address	Physical address	Length (words)	VARIABLE ENG. UNIT	Data Format	Notes	Firmware compatibility
						EM271
304097	1000h	1	PASSWORD	UINT 16	Minimum valid value: 0d Maximum valid value: 999d Any other value = 0d	r.d0

2.7.2 System configuration menu

MODBUS: read and write mode   Table 2.7-2

Modicom address	Physical address	Length (words)	VARIABLE ENG. UNIT	Data Format	Notes	Firmware compatibility
						EM271
304099	1002h	1	Measuring system	UINT 16	Value=0: "3P 1.3P" system Value=1: "3P 2.3P" system Value=2: "3P 3.1P" system Value=3: "3P 6.1P" system Value=4: "1P 3.1P" system Value=5: "1P 6.1P" system Any other value = "3P 1.3P" system	r.d0

2.7.3 Current transformer primary value

MODBUS: read only mode   Table 2.7-3

Modicom address	Physical address	Length (words)	VARIABLE ENG. UNIT	Data Format	Notes	Firmware compatibility
						EM271
304100	1003h	1	TCDA1 current transformer primary value	UINT 16	The value is in Ampere 65535d means no TCD detected 0d means TCDMM detected	r.d0
304101	1004h	1	TCDA2 current transformer primary value	UINT 16		r.d0

2.7.4 VT menu

MODBUS: read and write mode   Table 2.7-4

Modicom address	Physical address	Length (words)	VARIABLE ENG. UNIT	Data Format	Notes	Firmware compatibility
						EM271
304102	1005h	1	Voltage transformer ratio	UINT 16	Value min = 10 (VT=1.0) Value max = depends on the combinations of the used TCDs (see table below) Any other value = 10 (VT=1.0)	r.d0

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TCDA2 ╲ TCDA1	60		100		200		400		800	
	MV5	MV6	MV5	MV6	MV5	MV6	MV5	MV6	MV5	MV6
60	999.0	999.0	999.0	999.0	764.6	999.0	432.1	744.3	231.1	398.1
100	999.0	999.0	994.0	999.0	662.6	999.0	397.6	684.7	220.8	380.4
200	764.6	999.0	662.6	999.0	497.0	855.9	331.3	570.6	198.8	342.3
400	432.1	744.3	397.6	684.7	331.3	570.6	248.5	427.9	165.6	285.3
800	231.1	398.1	220.8	380.4	198.8	342.3	165.6	285.3	124.2	213.9
2000	96	166	94	163	90	155	82	142	71	122
5000	39	67	38	67	38	65	36	63	34	59
10000 (NO TCD)	19	34	19	33	19	33	19	32	18	31

TCDA2 ╲ TCDA1	2000		5000		10000 (NO TCD)	
	MV5	MV6	MV5	MV6	MV5	MV6
60	96	166	39	67	19	34
100	94	163	38	67	19	33
200	90	155	38	65	19	33
400	82	142	36	63	19	32
800	71	122	34	59	18	31
2000	49	85	28	48	16	28
5000	28	48	19	34	13	22
10000 (NO TCD)	16	28	13	22	9	17

2.7.5 "SUM" menu

MODBUS: read and write mode — Table 2.7-5

Modicom address	Physical address	Length (words)	VARIABLE ENG. UNIT	Data Format	Notes	Firmware compatibility EM271
304104	1007h	1	Sum mode enabling	UINT 16	Value=0: "SUM" disabled Value=1: "SUM" enabled Any other value = "SUM" enabled	r.d0

2.7.6 DMD integration time menu

MODBUS: read and write mode — Table 2.7-6

Modicom address	Physical address	Length (words)	VARIABLE ENG. UNIT	Data Format	Notes	Firmware compatibility EM271
304113	1010h	1	Integration time for DMD power calculation	UINT 16	Minimum valid value: 1d Maximum valid value: 60d Any other value = 15d	r.d0

2.7.7 Pulse output configuration menu

MODBUS: read and write mode — Table 2.7-7

Modicom address	Physical address	Length (words)	VARIABLE ENG. UNIT	Data Format	Notes	Firmware compatibility EM271
304115	1012h	1	Ton time	UINT 16	Value 0: 40ms Value 1: 100ms Any other value = 1 (100ms)	r.d0
304129	1020h	1	KWh per pulse relevant to the OUT1	UINT 16	Min value = 1 (0.01kWh) Max value = 999 (9.99kWh) Any other value = 10 (0.1KWh)	r.d0
304131	1022h	1	KWh per pulse relevant to the OUT2	UINT 16	Min value = 1 (0.01kWh) Max value = 999 (9.99kWh) Any other value = 10 (0.1KWh)	r.d0

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2.7.8   Current transformer primary value TCDMM

MODBUS: read and write mode   Table 2.7-8

Modicom address	Physical address	Length (words)	VARIABLE ENG. UNIT	Data Format	Notes	Firmware compatibility
						EM271
304132	1023h	1	TCDA1 current transformer primary value TCDMM	UINT 16	Min value = 10 (CT=10) Max value = 10000 (CT=10000)	r.d0
304133	1024h	1	TCDA2 current transformer primary value TCDMM	UINT 16	Any other value = 10 (CT=10) Default value = 60 (CT=60)	r.d0

2.7.9   "EC" menu

MODBUS: read and write mode   Table 2.7-9

Modicom address	Physical address	Length (words)	VARIABLE ENG. UNIT	Data Format	Notes	Firmware compatibility
						EM271
304356	1103h	1	Easy connection mode enabling	UINT 16	Value=0: "EC" enabled Value=1: "EC" disabled Any other value = "EC" disabled	r.d0

2.7.10   Serial port configuration menu

MODBUS: read and write mode   Table 2.7-10

Modicom address	Physical address	Length (words)	VARIABLE ENG. UNIT	Data Format	Notes	Firmware compatibility
						EM271
308193	2000h	1	RS485 instrument address	UINT 16	Value min = 1 Value max = 247 Any other value = 1	r.d0
308194	2001h	1	RS485 baud rate	UINT 16	Value 0 = 9.6 kbps Value 1 = 19.2 kbps Value 2 = 38.4 kbps Any other value = 9.6 kbps	r.d0
308195	2002h	1	RS485 parity	UINT 16	Value 0 = no parity Value 1 = even parity Any other value = no parity	r.d0

Note: The number of stop bits is fixed to "1"

2.7.11   Reset commands

MODBUS: write only mode   Table 2.7-11

Modicom address	Physical address	Length (words)	VARIABLE ENG. UNIT	Data Format	Notes	Firmware compatibility
						EM271
316385	4000h	1	Reset of all partial meters, kWdmd and kWdmdm peak.	UINT 16	Value=1: Command is executed All other values produce no effects	r.d0
316386	4001h	1	Reset of total energy meters	UINT 16	Value=1: Command is executed All other values produce no effects	r.d0

2.7.12 Serial number

MODBUS: read only mode   Table 2.7-12

Modicom address	Physical address	Length (words)	VARIABLE ENG. UNIT	Data Format	Notes	Firmware compatibility
						EM271
320481	5000h	1	Instrument serial number Letter 1 (from SX) Letter 2 (from SX)	UINT 16	MSB: ASCII code LSB: ASCII code	r.d0
320482	5001h	1	Letter 3 (from SX) Letter 4 (from SX)	UINT 16	MSB: ASCII code LSB: ASCII code	r.d0
320483	5002h	1	Letter 5 (from SX) Letter 6 (from SX)	UINT 16	MSB: ASCII code LSB: ASCII code	r.d0
320484	5003h	1	Letter 7 (from SX) Letter 8 (from SX)	UINT 16	MSB: ASCII code LSB: ASCII code	r.d0
320485	5004h	1	Letter 9 (from SX) Letter 10 (from SX)	UINT 16	MSB: ASCII code LSB: ASCII code	r.d0
320486	5005h	1	Letter 11 (from SX) Letter 12 (from SX)	UINT 16	MSB: ASCII code LSB: ASCII code	r.d0
320487	5006h	1	Letter 13 (from SX)	UINT 16	MSB: ASCII code	r.d0

2.7.13 Production year

MODBUS: read only mode   Table 2.7-13

Modicom address	Physical address	Length (words)	VARIABLE ENG. UNIT	Data Format	Notes	Firmware compatibility
						EM271
320488	5007h	1	Instrument production year	UINT 16		r.d0

2.7.14 Secondary address

MODBUS: read only mode   Table 2.7-14

Modicom address	Physical address	Length (words)	VARIABLE ENG. UNIT	Data Format	Notes	Firmware compatibility
						EM271
320737	5100h	2	Instrument secondary address	UINT 32	5100h:LSW 5101h:MSW	r.d1

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3   REVISIONS

3.1   Modifications in Version 0 Revision 1

Added note on VLN in single-phase system (table 2.3-1)

3.2   Modifications in Version 0 Revision 2

Added table 2.7-13

3.3   Modifications in Version 1 Revision 0

Added VAR L1, VAR L2, VAR L3 for TCDA1 and TCDA2 (table 2.3-1)
Added PF L1, PF L2, PF L3 for TCDA1 and TCDA2 (table 2.3-1)
Added PF TCDA1 and TCDA2 (table 2.3-1)
Added PF ∑ (table 2.3-1)
Added TCDMM (table 2.6-4)

3.4   Modifications in Version 1 Revision 1

Corrected the table 2.7-8: ``Default value = 60 (CT=10)`` into ``Default value = 60 (CT=60)``

3.5   Modifications in Version 1 Revision 2

Added the reference on selected application in table 2.3
Added column "Firmware compatibility" in all programming parameter tables and instantaneous variable table

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