Communication Protocol for Data Concentrator-EML16

MODBUS RTU PROTOCOL

Modbus is a master-slave communication protocol able to support up to 247 slaves organized as a bus or as a star network.

The physical link layer can be RS232 for a point to point connection or RS485 for a network.

The communication is half-duplex. The network messages can be Query-Response or Broadcast type.

The Query-Response command is transmitted from the Master to an established Slave and generally it is followed by an answering message.

The Broadcast command is transmitted from the Master to all Slaves and is never followed by an answer.

GENERIC MESSAGE STRUCTURE:

START OF FRAME	ADDRESS FIELD	FUNCTION CODE	DATA FIELD	ERROR CHECK	END OF FRAME

START OF FRAME = Starting message marker

ADDRESS FIELD = Includes device address in which you need to communicate in Query-Response mode. In case the message is a Broadcast type it includes 00.

FUNCTION CODE = Includes the operation code that you need to perform.

DATA FIELD = Includes the data field.

ERROR CHECK = Field for the error correction code.

END OF FRAME = End message marker.

Mode RTU communication frame structure:

START OF FRAME = silence on line for time >=4 characters

ADDRES FIELD = 1 character

FUNCTION CODE = 1 character

DATA FIELD = N characters

ERROR CHECK = 16 bit CRC

END OF FRAME = silence on line for time >=4 characters

Wait time for response:

Request length	1 Register (2 bytes)	32 Register (64 bytes)
Typical	< 100 mSec	< 250 mSec
Worst case	< 150 mSec	< 400 mSec

Reading of the Registers (Function Code $03)

Reads the binary contents of holding registers (2X references) in the slave. Broadcast is not supported.
The Query message specified the starting register and quantity of register to be read.

QUERY:

	0° Byte	1° Byte	2-3° Byte	4-5° Byte	6-7° Byte	
Start of Frame	Address Field	Function Code	Start Address	Number of Registers	Check Sum	End of Frame

START OF FRAME   = *Starting message marker.*
ADDRESS FIELD   = *EML16 device address (0x01... 0xF7)*   *(1 byte).*
FUNCTION CODE   = *Operation code (0x03)*   *(1 byte).*
START ADDRESS   = *First register address to be read*   *(2 byte).*
No. OF REGISTERS   = *Number of registers (max 64 bytes) to read*   *(4 bytes for 1 measure value).*
CHECK SUM   = *Check sum.*
END OF FRAME   = *End message marker.*

__Warning:__ It is possible to read more than one variable at the same time **(max 64 bytes)** only if their addresses are consecutive and the variables on the same line cannot be divided. The register data in the response message are packet as two bytes per register, with the binary contents right justified within each byte. For each register, the first byte contains the high order bits and the second contains the low order bits.

RESPONSE:

	0° Byte	1° Byte	2° Byte	n° Byte	n+1 - n+2 Byte	
Start of Frame	Address Field	Function Code	Number of Bytes	Data	Check Sum	End of Frame

START OF FRAME   = *Starting message marker.*
ADDRESS FIELD   = *EML16 device address (0x01... 0xF7)*   *(1 byte).*
FUNCTION CODE   = *Operation code (0x03)*   *(1 byte).*
No. OF SEND BYTES   = *Number of data bytes (0x00...??)*   *(1 byte).1 register requires 2 data bytes.*
D0, D1, .., Dn   = *data bytes (0x00...??)*   *(Nr. of register x 2 = n. byte).*
CHECK SUM   = *Check sum.*
END OF FRAME   = *End message marker.*

See the TABLE OF Data Concentrator-EML16 REGISTERS and the EXAMPLE.

Setup of the Data Concentrator-EML16 parameters (Function Code $10)

Write values into a sequence of holding registers (2X references).

Warning: It is possible to write more than one variable at the same time only if their addresses are consecutive and the variables on the same line cannot be divided. (max of 4 consecutive register on the same message).

QUERY:

	0° Byte	1° Byte	2-3° Byte	4-5° Byte	6° Byte	n° Byte	n+1 - n+2 Byte	
Start of Frame	Address Field	Function Code	Start Address	Number of Registers	Number of Bytes	Data	Check Sum	End of Frame

START OF FRAME   = *Starting message marker.*
ADDRESS FIELD   = *EML16 device address (0x01... 0xF7)*   *(1 byte).*
FUNCTION CODE   = *Operation code (0x10)*   *(1 byte).*
START ADDRESS   = *First register address to be written*   *(2 byte).*
No. OF REGISTER   = *Number of registers to be written (1 to 4,...)*   *(2 byte).*
No. OF BYTES   = *Number of data bytes (HEX)*   *(1 byte): 1register requires 2*
        data bytes.
D0,D1,..,Dn   = *Data bytes (0x00...?)*   *(1 byte) (Nr. of register x 2 = n. byte).*
CHECK SUM   = *Check sum.*
END OF FRAME   = *End message marker.*

The normal response returns the slave address, function code, starting address and quantity of register preset.

RESPONSE:

	0° Byte	1° Byte	2-3° Byte	4-5° Byte	6-7° Byte	
Start of Frame	Address Field	Function Code	Start Address	Number of Registers	Check Sum	End of Frame

START OF FRAME   = *Starting message marker.*
ADDRESS FIELD   = *EML16 device address (0x01... 0xF7)*   *(1 byte).*
FUNCTION CODE   = *Operation code (0x10)*   *(1 byte).*
START ADDRESS   = *First register address to be written*   *(2 byte).*
No. OF REGISTER   = *Number of registers to be written*   *(2 byte).*
ERROR CHECK   = *Check sum.*
END OF FRAME   = *End message marker.*

See the TABLE OF Data Concentrator-EML16 REGISTERS and the EXAMPLE.

Broadcast command

It is possible to send a broadcast command (Address Field equal 0x00) for all write command.

QUERY:

	0° Byte	1° Byte	2-3° Byte	4-5° Byte	6° Byte	n° Byte	n+1 - n+2° Byte	
Start of Frame	0x00	Function Code	Start Address	Number of Registers	Number of Bytes	Data	Check Sum	End of Frame

RESPONSE: *No Response.*

Diagnostic (Function Code $08)

This function provides a test for checking the communication system. Broadcast is not supported.
The instrument's protocol has only the sub-function 0 of the diagnostics sub-functions set of the standard modbus protocol.
The Query and the Response messages are the following:

QUERY:

Start of Frame	Address Field	Function Code	Sub Function	Data	Check Sum	End of Frame
	0° Byte	1° Byte	2-3° Byte	n° Byte	n+1 - n+2 Byte	

START OF FRAME = *Starting message marker.*
ADDRESS FIELD = *EML16 device address (0x01...0xF7)*   *(1 byte).*
FUNCTION CODE = *Operation code (0x08 HEX)*   *(1 byte).*
SUB FUNCTION = *Sub-function 0 (0x00 0x00)*   *(2 byte).*
DATA = *Max 10 data bytes.*
CHECK SUM = *Check sum.*
END OF FRAME = *End message marker.*

RESPONSE:

The response must be the loopback of the same data.

Start of Frame	Address Field	Function Code	Sub Function	Data	Check Sum	End of Frame
	0° Byte	1° Byte	2-3° Byte	n° Byte	n+1 - n+2° Byte	

START OF FRAME = *Starting message marker.*
ADDRESS FIELD = *EML16 device address (0x01... 0xF7)*   *(1 byte).*
FUNCTION CODE = *Operation code (0x08 HEX)*   *(1 byte).*
SUB FUNCTION = *Sub-function 0 (0x00 0x00)*   *(2 byte).*
DATA = *Data bytes.*
CHECK SUM = *Check sum.*
END OF FRAME = *End message marker.*

DIAGNOSTIC EXAMPLE:

QUERY		RESPONSE	
Field Name	Example (Hex)	Field Name	Example (Hex)
Slave Address	0x01	Slave Address	0x01
Function Code	0x08	Function Code	0x08
Sub-function Hi	0x00	Sub-function Hi	0x00
Sub-function Lo	0x00	Sub-function Lo	0x00
Data Hi	0xF1	Data Hi	0xF1
Data Lo	0xA7	Data Lo	0xA7
Error Check (CRC)	0x??	Error Check (CRC)	0x??
	0x??		0x??

Report Slave ID (Function Code $11)

This function returns the type of the instrument and the current status of the slave run indicator. Broadcast is not supported. The Query and the Response messages are the following:

QUERY:

0° Byte	1° Byte	2 - 3° Byte	
Start of Frame	Address Field	Function Code	Check Sum	End of Frame

START OF FRAME	= *Starting message marker.*	
ADDRESS FIELD	= *EML16 device address (0x01... 0xF7)*	*(1 byte).*
FUNCTION CODE	= *Operation code (0x11)*	*(1 byte).*
CHECK SUM	= *Check sum.*	
END OF FRAME	= *End message marker.*	

RESPONSE:

0° Byte	1° Byte	2° Byte	3° Byte	4° Byte	5° - 6° Byte	
Start of Frame	Address Field	Function Code	Byte Count	Slave ID	Run Indicator Status	Check Sum	End of Frame

START OF FRAME	= *Starting message marker.*	
ADDRESS FIELD	= *EML16 device address (0x01... 0xF7)*	*(1 byte).*
FUNCTION CODE	= *Operation code (0x11)*	*(1 byte).*
BYTE COUNT	= *Number of data bytes (0x16)*	*(1 byte).*
SLAVE ID	= *Slave ID identifier (**0x5F**)*	*(1 byte).*
RUN INDICATOR STATUS	= *Run indicator status (**0xFF**)*	*(1 byte).*
DATA	= *Data bytes*	
CHECK SUM	= *Check sum.*	
END OF FRAME	= *End message marker.*	

The normal answer has the slave ID identifier (**0x5D**), the run indicator Status (**0xFF**), 20 data bytes with the following meaning:
- 17-18 Byte: Boot Version.

- 19-20 Byte: Firmware Version.

REPORT SLAVE ID EXAMPLE:

QUERY

Field Name	Example (Hex)
Slave Address	0xXX
Function Code	0x11
Error Check (CRC)	0x??
	0x??

RESPONSE

Field Name	Example (Hex)
Slave Address	0x01
Function Code	0x11
Byte count	0x02
Slave ID	0x5D
Run indicator status	0xFF
Data	20 Bytes
Error Check (CRC)	0x??
	0x??

Error message from Slave to Master

When a slave device receives a not valid query, it does transmit an error message.

RESPONSE:

0° Byte	1° Byte	2° Byte	3 - 4° Byte	
Start of Frame	Address Field	Function Code	Error Code	Check Sum	End of Frame

START OF FRAME	= *Starting message marker.*	
ADDRESS FIELD	= *EML16 device address (0x01... 0xF7)*	*(1 byte).*
FUNCTION CODE	= *Operation code with bit 7 high*	*(1 byte).*
ERROR CODE	= *Message containing communication failure*	*(1 byte).*
CHECK SUM	= *Check sum.*	
END OF FRAME	= *End message marker.*	

ERROR EXAMPLE:

QUERY

Field Name	Example (Hex)
Slave Address	0x01
Function Code	0x03
Starting Address Hi	0x00
Starting Address Lo	0x00
Number Of Word Hi	0x00
Number Of Word Lo	0x05
Error Check (CRC)	0x??
high.	
	0x??

RESPONSE

Field Name	Example (Hex)	
Slave Address	0x01	
Function Code	0x83	(1)
Error Code	0x02	(2)
Error Check (CRC)	0x??	
	0x??	

(1):   Function Code transmitted by master with bit 7 high.

(2):   Error type:
0x01 =   Illegal Function
0x02 =   Illegal data address
0x03 =   Illegal data value

Data Concentrator-EML16 Registers

The following tables shown all the Data Concentrator-EML16 registers.

NOTE: the values are expressed x1000

Register HEX	Register DEC	Word	Description	Value	W/R	Type
TOTAL COUNTERS						
$100	256	4	TOTAL COUNTER 1	0÷100000000000	R	Unsigned
$104	260	4	TOTAL COUNTER 2		R	Unsigned
$108	264	4	TOTAL COUNTER 3		R	Unsigned
$10C	268	4	TOTAL COUNTER 4		R	Unsigned
$110	272	4	TOTAL COUNTER 5		R	Unsigned
$114	276	4	TOTAL COUNTER 6		R	Unsigned
$118	280	4	TOTAL COUNTER 7		R	Unsigned
$11C	284	4	TOTAL COUNTER 8		R	Unsigned
$120	288	4	TOTAL COUNTER 9		R	Unsigned
$124	292	4	TOTAL COUNTER 10		R	Unsigned
$128	296	4	TOTAL COUNTER 11		R	Unsigned
$12C	300	4	TOTAL COUNTER 12		R	Unsigned
$130	304	4	TOTAL COUNTER 13		R	Unsigned
$134	308	4	TOTAL COUNTER 14		R	Unsigned
$138	312	4	TOTAL COUNTER 15		R	Unsigned
$13C	316	4	TOTAL COUNTER 16		R	Unsigned
PARTIAL COUNTERS						
$140	320	4	PARTIAL COUNTER 1	0÷100000000000	R	Unsigned
$144	324	4	PARTIAL COUNTER 2		R	Unsigned
$148	328	4	PARTIAL COUNTER 3		R	Unsigned
$14C	332	4	PARTIAL COUNTER 4		R	Unsigned
$150	336	4	PARTIAL COUNTER 5		R	Unsigned
$154	340	4	PARTIAL COUNTER 6		R	Unsigned
$158	344	4	PARTIAL COUNTER 7		R	Unsigned
$15C	348	4	PARTIAL COUNTER 8		R	Unsigned
$160	352	4	PARTIAL COUNTER 9		R	Unsigned
$164	356	4	PARTIAL COUNTER 10		R	Unsigned
$168	360	4	PARTIAL COUNTER 11		R	Unsigned
$16C	364	4	PARTIAL COUNTER 12		R	Unsigned
$170	368	4	PARTIAL COUNTER 13		R	Unsigned
$174	372	4	PARTIAL COUNTER 14		R	Unsigned
$178	376	4	PARTIAL COUNTER 15		R	Unsigned
$17C	380	4	PARTIAL COUNTER 16		R	Unsigned
DERIVATE COUNTERS						
$180	384	4	DERIVATE COUNTER 1	0÷100000000000	R	Unsigned
$184	388	4	DERIVATE COUNTER 2		R	Unsigned
$188	392	4	DERIVATE COUNTER 3		R	Unsigned
$18C	396	4	DERIVATE COUNTER 4		R	Unsigned
$190	400	4	DERIVATE COUNTER 5		R	Unsigned
$194	404	4	DERIVATE COUNTER 6		R	Unsigned
$198	408	4	DERIVATE COUNTER 7		R	Unsigned
$19C	412	4	DERIVATE COUNTER 8		R	Unsigned
$1A0	416	4	DERIVATE COUNTER 9		R	Unsigned
$1A4	420	4	DERIVATE COUNTER 10		R	Unsigned
$1A8	424	4	DERIVATE COUNTER 11		R	Unsigned
$1AC	428	4	DERIVATE COUNTER 12		R	Unsigned
$1B0	432	4	DERIVATE COUNTER 13		R	Unsigned
$1B4	436	4	DERIVATE COUNTER 14		R	Unsigned
$1B8	440	4	DERIVATE COUNTER 15		R	Unsigned
$1BC	444	4	DERIVATE COUNTER 16		R	Unsigned
BOOLEAN VALUES						
$1C0	448	2	BOOLEAN VALUE 1	0÷1	R	Unsigned
$1C2	450	2	BOOLEAN VALUE 2		R	Unsigned
$1C4	452	2	BOOLEAN VALUE 3		R	Unsigned
$1C6	454	2	BOOLEAN VALUE 4		R	Unsigned
$1C8	456	2	BOOLEAN VALUE 5		R	Unsigned
$1CA	458	2	BOOLEAN VALUE 6		R	Unsigned
$1CC	460	2	BOOLEAN VALUE 7		R	Unsigned
$1CE	462	2	BOOLEAN VALUE 8		R	Unsigned
$1D0	464	2	BOOLEAN VALUE 9		R	Unsigned
$1D2	466	2	BOOLEAN VALUE 10		R	Unsigned
$1D4	468	2	BOOLEAN VALUE 11		R	Unsigned
$1D6	470	2	BOOLEAN VALUE 12		R	Unsigned
$1D8	472	2	BOOLEAN VALUE 13		R	Unsigned
$1DA	474	2	BOOLEAN VALUE 14		R	Unsigned
$1DC	476	2	BOOLEAN VALUE 15		R	Unsigned
$1DE	478	2	BOOLEAN VALUE 16		R	Unsigned
MATHEMATICS COUNTERS						
$200	512	4	MATHEMATICS COUNTER 1	-100000000000 +100000000000	R	Unsigned

$204	516	4	MATHEMATICS COUNTER 2		R	Unsigned
$208	520	4	MATHEMATICS COUNTER 3		R	Unsigned
$20C	524	4	MATHEMATICS COUNTER 4		R	Unsigned
$210	528	4	MATHEMATICS COUNTER 5		R	Unsigned
$214	532	4	MATHEMATICS COUNTER 6		R	Unsigned
$218	536	4	MATHEMATICS COUNTER 7		R	Unsigned
$21C	540	4	MATHEMATICS COUNTER 8		R	Unsigned
$220	542	4	MATHEMATICS COUNTER 9		R	Unsigned
$224	546	4	MATHEMATICS COUNTER 10		R	Unsigned
$228	550	4	MATHEMATICS COUNTER 11		R	Unsigned
$22C	554	4	MATHEMATICS COUNTER 12		R	Unsigned
$230	558	4	MATHEMATICS COUNTER 13		R	Unsigned
$234	562	4	MATHEMATICS COUNTER 14		R	Unsigned
$238	566	4	MATHEMATICS COUNTER 15		R	Unsigned
$23C	570	4	MATHEMATICS COUNTER 16		R	Unsigned
ALARM STATUS						
$300	768	2	ALARM STATUS 1	0 = OFF 1 = ON	R	Unsigned
$302	770	2	ALARM STATUS 2		R	Unsigned
$304	772	2	ALARM STATUS 3		R	Unsigned
$306	774	2	ALARM STATUS 4		R	Unsigned
$308	776	2	ALARM STATUS 5		R	Unsigned
$30A	778	2	ALARM STATUS 6		R	Unsigned
$30C	780	2	ALARM STATUS 7		R	Unsigned
$30E	782	2	ALARM STATUS 8		R	Unsigned
$310	784	2	ALARM STATUS 9		R	Unsigned
$312	786	2	ALARM STATUS 10		R	Unsigned
$314	788	2	ALARM STATUS 11		R	Unsigned
$316	790	2	ALARM STATUS 12		R	Unsigned
$318	792	2	ALARM STATUS 13		R	Unsigned
$31A	794	2	ALARM STATUS 14		R	Unsigned
$31C	796	2	ALARM STATUS 15		R	Unsigned
$31E	798	2	ALARM STATUS 16		R	Unsigned
ACKNOLEDGED ALARM						
$320	800	2	ACKNOLEDGED ALARMS	0 = All alarms ack 1 = Almost one alarm not ack	R	Unsigned
$322	802	2	NOT ACKNOLEDGED ALARMS NUMBER	0÷16	R	Unsigned
TOTAL TIMEBAND 1 COUNTERS						
$400	1024	4	TOTAL TIMEBAND 1 COUNTERS 1	0÷100000000000	R	Unsigned
$404	1028	4	TOTAL TIMEBAND 1 COUNTERS 2		R	Unsigned
$408	1032	4	TOTAL TIMEBAND 1 COUNTERS 3		R	Unsigned
$40C	1036	4	TOTAL TIMEBAND 1 COUNTERS 4		R	Unsigned
$410	1040	4	TOTAL TIMEBAND 1 COUNTERS 5		R	Unsigned
$414	1044	4	TOTAL TIMEBAND 1 COUNTERS 6		R	Unsigned
$418	1048	4	TOTAL TIMEBAND 1 COUNTERS 7		R	Unsigned
$41C	1052	4	TOTAL TIMEBAND 1 COUNTERS 8		R	Unsigned
$420	1056	4	TOTAL TIMEBAND 1 COUNTERS 9		R	Unsigned
$424	1060	4	TOTAL TIMEBAND 1 COUNTERS 10		R	Unsigned
$428	1064	4	TOTAL TIMEBAND 1 COUNTERS 11		R	Unsigned
$42C	1068	4	TOTAL TIMEBAND 1 COUNTERS 12		R	Unsigned
$430	1072	4	TOTAL TIMEBAND 1 COUNTERS 13		R	Unsigned
$434	1076	4	TOTAL TIMEBAND 1 COUNTERS 14		R	Unsigned
$438	1080	4	TOTAL TIMEBAND 1 COUNTERS 15		R	Unsigned
$43C	1084	4	TOTAL TIMEBAND 1 COUNTERS 16		R	Unsigned
TOTAL TIMEBAND 2 COUNTERS						
$440	1088	4	TOTAL TIMEBAND 2 COUNTERS 1	0÷100000000000	R	Unsigned
$444	1092	4	TOTAL TIMEBAND 2 COUNTERS 2		R	Unsigned
$448	1096	4	TOTAL TIMEBAND 2 COUNTERS 3		R	Unsigned
$44C	1100	4	TOTAL TIMEBAND 2 COUNTERS 4		R	Unsigned
$450	1104	4	TOTAL TIMEBAND 2 COUNTERS 5		R	Unsigned
$454	1108	4	TOTAL TIMEBAND 2 COUNTERS 6		R	Unsigned
$458	1112	4	TOTAL TIMEBAND 2 COUNTERS 7		R	Unsigned
$45C	1116	4	TOTAL TIMEBAND 2 COUNTERS 8		R	Unsigned
$460	1120	4	TOTAL TIMEBAND 2 COUNTERS 9		R	Unsigned
$464	1124	4	TOTAL TIMEBAND 2 COUNTERS 10		R	Unsigned
$468	1128	4	TOTAL TIMEBAND 2 COUNTERS 11		R	Unsigned
$46C	1132	4	TOTAL TIMEBAND 2 COUNTERS 12		R	Unsigned
$470	1136	4	TOTAL TIMEBAND 2 COUNTERS 13		R	Unsigned
$474	1140	4	TOTAL TIMEBAND 2 COUNTERS 14		R	Unsigned
$478	1144	4	TOTAL TIMEBAND 2 COUNTERS 15		R	Unsigned
$47C	1148	4	TOTAL TIMEBAND 2 COUNTERS 16		R	Unsigned
TOTAL TIMEBAND 3 COUNTERS						
$480	1152	4	TOTAL TIMEBAND 3 COUNTERS 1	0÷100000000000	R	Unsigned
$484	1156	4	TOTAL TIMEBAND 3 COUNTERS 2		R	Unsigned
$488	1160	4	TOTAL TIMEBAND 3 COUNTERS 3		R	Unsigned
$48C	1164	4	TOTAL TIMEBAND 3 COUNTERS 4		R	Unsigned
$490	1168	4	TOTAL TIMEBAND 3 COUNTERS 5		R	Unsigned
$494	1172	4	TOTAL TIMEBAND 3 COUNTERS 6		R	Unsigned

$498	1176	4	TOTAL TIMEBAND 3 COUNTERS 7			R	Unsigned
$49C	1180	4	TOTAL TIMEBAND 3 COUNTERS 8			R	Unsigned
$4A0	1184	4	TOTAL TIMEBAND 3 COUNTERS 9			R	Unsigned
$4A4	1188	4	TOTAL TIMEBAND 3 COUNTERS 10			R	Unsigned
$4A8	1192	4	TOTAL TIMEBAND 3 COUNTERS 11			R	Unsigned
$4AC	1196	4	TOTAL TIMEBAND 3 COUNTERS 12			R	Unsigned
$4B0	1200	4	TOTAL TIMEBAND 3 COUNTERS 13			R	Unsigned
$4B4	1204	4	TOTAL TIMEBAND 3 COUNTERS 14			R	Unsigned
$4B8	1208	4	TOTAL TIMEBAND 3 COUNTERS 15			R	Unsigned
$4BC	1212	4	TOTAL TIMEBAND 3 COUNTERS 16			R	Unsigned
TOTAL TIMEBAND 4 COUNTERS							
$4C0	1216	4	TOTAL TIMEBAND 4 COUNTERS 1	0÷100000000000		R	Unsigned
$4C4	1220	4	TOTAL TIMEBAND 4 COUNTERS 2			R	Unsigned
$4C8	1224	4	TOTAL TIMEBAND 4 COUNTERS 3			R	Unsigned
$4CC	1228	4	TOTAL TIMEBAND 4 COUNTERS 4			R	Unsigned
$4D0	1232	4	TOTAL TIMEBAND 4 COUNTERS 5			R	Unsigned
$4D4	1236	4	TOTAL TIMEBAND 4 COUNTERS 6			R	Unsigned
$4D8	1240	4	TOTAL TIMEBAND 4 COUNTERS 7			R	Unsigned
$4DC	1244	4	TOTAL TIMEBAND 4 COUNTERS 8			R	Unsigned
$4E0	1248	4	TOTAL TIMEBAND 4 COUNTERS 9			R	Unsigned
$4E4	1252	4	TOTAL TIMEBAND 4 COUNTERS 10			R	Unsigned
$4E8	1256	4	TOTAL TIMEBAND 4 COUNTERS 11			R	Unsigned
$4EC	1260	4	TOTAL TIMEBAND 4 COUNTERS 12			R	Unsigned
$4F0	1264	4	TOTAL TIMEBAND 4 COUNTERS 13			R	Unsigned
$4F4	1268	4	TOTAL TIMEBAND 4 COUNTERS 14			R	Unsigned
$4F8	1272	4	TOTAL TIMEBAND 4 COUNTERS 15			R	Unsigned
$4FC	1276	4	TOTAL TIMEBAND 4 COUNTERS 16			R	Unsigned
PARTIAL TIMEBAND 1 COUNTERS							
$500	1280	4	PARTIAL TIMEBAND 1 COUNTERS 1	0÷100000000000		R	Unsigned
$504	1284	4	PARTIAL TIMEBAND 1 COUNTERS 2			R	Unsigned
$508	1288	4	PARTIAL TIMEBAND 1 COUNTERS 3			R	Unsigned
$50C	1292	4	PARTIAL TIMEBAND 1 COUNTERS 4			R	Unsigned
$510	1296	4	PARTIAL TIMEBAND 1 COUNTERS 5			R	Unsigned
$514	1300	4	PARTIAL TIMEBAND 1 COUNTERS 6			R	Unsigned
$518	1304	4	PARTIAL TIMEBAND 1 COUNTERS 7			R	Unsigned
$51C	1308	4	PARTIAL TIMEBAND 1 COUNTERS 8			R	Unsigned
$520	1312	4	PARTIAL TIMEBAND 1 COUNTERS 9			R	Unsigned
$524	1316	4	PARTIAL TIMEBAND 1 COUNTERS 10			R	Unsigned
$528	1320	4	PARTIAL TIMEBAND 1 COUNTERS 11			R	Unsigned
$52C	1324	4	PARTIAL TIMEBAND 1 COUNTERS 12			R	Unsigned
$530	1328	4	PARTIAL TIMEBAND 1 COUNTERS 13			R	Unsigned
$534	1332	4	PARTIAL TIMEBAND 1 COUNTERS 14			R	Unsigned
$538	1336	4	PARTIAL TIMEBAND 1 COUNTERS 15			R	Unsigned
$53C	1340	4	PARTIAL TIMEBAND 1 COUNTERS 16			R	Unsigned
PARTIAL TIMEBAND 2 COUNTERS							
$540	1344	4	PARTIAL TIMEBAND 2 COUNTERS 1	0÷100000000000		R	Unsigned
$544	1348	4	PARTIAL TIMEBAND 2 COUNTERS 2			R	Unsigned
$548	1352	4	PARTIAL TIMEBAND 2 COUNTERS 3			R	Unsigned
$54C	1356	4	PARTIAL TIMEBAND 2 COUNTERS 4			R	Unsigned
$550	1360	4	PARTIAL TIMEBAND 2 COUNTERS 5			R	Unsigned
$554	1364	4	PARTIAL TIMEBAND 2 COUNTERS 6			R	Unsigned
$558	1368	4	PARTIAL TIMEBAND 2 COUNTERS 7			R	Unsigned
$55C	1372	4	PARTIAL TIMEBAND 2 COUNTERS 8			R	Unsigned
$560	1376	4	PARTIAL TIMEBAND 2 COUNTERS 9			R	Unsigned
$564	1380	4	PARTIAL TIMEBAND 2 COUNTERS 10			R	Unsigned
$568	1384	4	PARTIAL TIMEBAND 2 COUNTERS 11			R	Unsigned
$56C	1388	4	PARTIAL TIMEBAND 2 COUNTERS 12			R	Unsigned
$570	1392	4	PARTIAL TIMEBAND 2 COUNTERS 13			R	Unsigned
$574	1396	4	PARTIAL TIMEBAND 2 COUNTERS 14			R	Unsigned
$578	1400	4	PARTIAL TIMEBAND 2 COUNTERS 15			R	Unsigned
$57C	1404	4	PARTIAL TIMEBAND 2 COUNTERS 16			R	Unsigned
PARTIAL TIMEBAND 3 COUNTERS							
$580	1408	4	PARTIAL TIMEBAND 3 COUNTERS 1	0÷100000000000		R	Unsigned
$584	1412	4	PARTIAL TIMEBAND 3 COUNTERS 2			R	Unsigned
$588	1416	4	PARTIAL TIMEBAND 3 COUNTERS 3			R	Unsigned
$58C	1420	4	PARTIAL TIMEBAND 3 COUNTERS 4			R	Unsigned
$590	1424	4	PARTIAL TIMEBAND 3 COUNTERS 5			R	Unsigned
$594	1428	4	PARTIAL TIMEBAND 3 COUNTERS 6			R	Unsigned
$598	1432	4	PARTIAL TIMEBAND 3 COUNTERS 7			R	Unsigned
$59C	1436	4	PARTIAL TIMEBAND 3 COUNTERS 8			R	Unsigned
$5A0	1440	4	PARTIAL TIMEBAND 3 COUNTERS 9			R	Unsigned
$5A4	1444	4	PARTIAL TIMEBAND 3 COUNTERS 10			R	Unsigned
$5A8	1448	4	PARTIAL TIMEBAND 3 COUNTERS 11			R	Unsigned
$5AC	1452	4	PARTIAL TIMEBAND 3 COUNTERS 12			R	Unsigned
$5B0	1456	4	PARTIAL TIMEBAND 3 COUNTERS 13			R	Unsigned
$5B4	1460	4	PARTIAL TIMEBAND 3 COUNTERS 14			R	Unsigned
$5B8	1464	4	PARTIAL TIMEBAND 3 COUNTERS 15			R	Unsigned
$5BC	1468	4	PARTIAL TIMEBAND 3 COUNTERS 16			R	Unsigned
PARTIAL TIMEBAND 4 COUNTERS							

$5C0	1472	4	PARTIAL TIMEBAND 4 COUNTERS 1	0÷100000000000	R	Unsigned
$5C4	1476	4	PARTIAL TIMEBAND 4 COUNTERS 2		R	Unsigned
$5C8	1480	4	PARTIAL TIMEBAND 4 COUNTERS 3		R	Unsigned
$5CC	1484	4	PARTIAL TIMEBAND 4 COUNTERS 4		R	Unsigned
$5D0	1488	4	PARTIAL TIMEBAND 4 COUNTERS 5		R	Unsigned
$5D4	1492	4	PARTIAL TIMEBAND 4 COUNTERS 6		R	Unsigned
$5D8	1496	4	PARTIAL TIMEBAND 4 COUNTERS 7		R	Unsigned
$5DC	1500	4	PARTIAL TIMEBAND 4 COUNTERS 8		R	Unsigned
$5E0	1504	4	PARTIAL TIMEBAND 4 COUNTERS 9		R	Unsigned
$5E4	1508	4	PARTIAL TIMEBAND 4 COUNTERS 10		R	Unsigned
$5E8	1512	4	PARTIAL TIMEBAND 4 COUNTERS 11		R	Unsigned
$5EC	1516	4	PARTIAL TIMEBAND 4 COUNTERS 12		R	Unsigned
$5F0	1520	4	PARTIAL TIMEBAND 4 COUNTERS 13		R	Unsigned
$5F4	1524	4	PARTIAL TIMEBAND 4 COUNTERS 14		R	Unsigned
$5F8	1528	4	PARTIAL TIMEBAND 4 COUNTERS 15		R	Unsigned
$5FC	1532	4	PARTIAL TIMEBAND 4 COUNTERS 16		R	Unsigned
MEMORY RATED TOTAL COUNTERS						
$600	1536	4	MEMORY RATED TOTAL COUNTERS 1	0÷100000000000	R	Unsigned
$604	1540	4	MEMORY RATED TOTAL COUNTERS 2		R	Unsigned
$608	1544	4	MEMORY RATED TOTAL COUNTERS 3		R	Unsigned
$60C	1548	4	MEMORY RATED TOTAL COUNTERS 4		R	Unsigned
$610	1552	4	MEMORY RATED TOTAL COUNTERS 5		R	Unsigned
$614	1556	4	MEMORY RATED TOTAL COUNTERS 6		R	Unsigned
$618	1560	4	MEMORY RATED TOTAL COUNTERS 7		R	Unsigned
$61C	1564	4	MEMORY RATED TOTAL COUNTERS 8		R	Unsigned
$620	1568	4	MEMORY RATED TOTAL COUNTERS 9		R	Unsigned
$624	1572	4	MEMORY RATED TOTAL COUNTERS 10		R	Unsigned
$628	1576	4	MEMORY RATED TOTAL COUNTERS 11		R	Unsigned
$62C	1580	4	MEMORY RATED TOTAL COUNTERS 12		R	Unsigned
$630	1584	4	MEMORY RATED TOTAL COUNTERS 13		R	Unsigned
$634	1588	4	MEMORY RATED TOTAL COUNTERS 14		R	Unsigned
$638	1592	4	MEMORY RATED TOTAL COUNTERS 15		R	Unsigned
$63C	1596	4	MEMORY RATED TOTAL COUNTERS 16		R	Unsigned
MEMORY RATED PARTIAL COUNTERS						
$640	1600	4	MEMORY RATED PARTIAL COUNTERS 1	0÷100000000000	R	Unsigned
$644	1604	4	MEMORY RATED PARTIAL COUNTERS 2		R	Unsigned
$648	1608	4	MEMORY RATED PARTIAL COUNTERS 3		R	Unsigned
$64C	1612	4	MEMORY RATED PARTIAL COUNTERS 4		R	Unsigned
$650	1616	4	MEMORY RATED PARTIAL COUNTERS 5		R	Unsigned
$654	1620	4	MEMORY RATED PARTIAL COUNTERS 6		R	Unsigned
$658	1624	4	MEMORY RATED PARTIAL COUNTERS 7		R	Unsigned
$65C	1628	4	MEMORY RATED PARTIAL COUNTERS 8		R	Unsigned
$660	1632	4	MEMORY RATED PARTIAL COUNTERS 9		R	Unsigned
$664	1636	4	MEMORY RATED PARTIAL COUNTERS 10		R	Unsigned
$668	1640	4	MEMORY RATED PARTIAL COUNTERS 11		R	Unsigned
$66C	1644	4	MEMORY RATED PARTIAL COUNTERS 12		R	Unsigned
$670	1648	4	MEMORY RATED PARTIAL COUNTERS 13		R	Unsigned
$674	1652	4	MEMORY RATED PARTIAL COUNTERS 14		R	Unsigned
$678	1656	4	MEMORY RATED PARTIAL COUNTERS 15		R	Unsigned
$67C	1660	4	MEMORY RATED PARTIAL COUNTERS 16		R	Unsigned
DIGITAL OUTPUT STATUS						
$720	1824	2	DO1 STATUS	0 = OFF 1 = ON	R	Unsigned
$722	1826	2	DO2 STATUS	0 = OFF 1 = ON	R	Unsigned

Device Parameters

It is possible to send a broadcast command (Address Field equal 0x00) for all write command.

<u>**Warning**</u>: All Write command could be send in Broadcast Mode (Modbus Node ID 0) but if the Modbus Register or Modbus Parameters is wrong anything messages are returned.

Register HEX	Register DEC	Word	Description	Value	W/R	Type
			GENERAL			
LANGUAGE						
$1000	4096	2	LANGUAGE	1 = English (def.) 2 = Italian	W/R	Unsigned
TIME						
$1002	4098	2	HOUR	0÷23 (default 12)	W/R	Unsigned
$1004	4100	2	MINUTE	0÷59 (default 0)	W/R	Unsigned
$1006	4102	2	SECOND	0÷59 (default 0)	W/R	Unsigned
DATE						
$1008	4104	2	WEK-DAY	0 = Sunday 1 = Monday (def.) 2 = Tuesday 3 = Wednesday 4 = Thursday 5 = Friday 6 = Saturday	W/R	Unsigned
$100A	4106	2	DAY	1 (default)÷31	W/R	Unsigned
$100C	4108	2	MONTH	1 (default)÷12	W/R	Unsigned
$100E	4110	2	YEAR	19 (default)÷250	W/R	Unsigned
BUZZER						
$1010	4012	2	BUZZER	0 = OFF (def.) 1 = ON	W/R	Unsigned
			COUNTERS			
VISUALIZATION						
$1100	4111	2	VISUALIZATION COUNTER 1	0 = OFF 1 = ON (def.)	W/R	Unsigned
$1102	4112	2	VISUALIZATION COUNTER 2		W/R	Unsigned
$1104	4113	2	VISUALIZATION COUNTER 3		W/R	Unsigned
$1106	4114	2	VISUALIZATION COUNTER 4		W/R	Unsigned
$1108	4115	2	VISUALIZATION COUNTER 5		W/R	Unsigned
$110A	4116	2	VISUALIZATION COUNTER 6		W/R	Unsigned
$110C	4117	2	VISUALIZATION COUNTER 7		W/R	Unsigned
$110E	4118	2	VISUALIZATION COUNTER 8		W/R	Unsigned
$1110	4119	2	VISUALIZATION COUNTER 9		W/R	Unsigned
$1112	4120	2	VISUALIZATION COUNTER 10		W/R	Unsigned
$1114	4121	2	VISUALIZATION COUNTER 11		W/R	Unsigned
$1116	4122	2	VISUALIZATION COUNTER 12		W/R	Unsigned
$1118	4123	2	VISUALIZATION COUNTER 13		W/R	Unsigned
$111A	4124	2	VISUALIZATION COUNTER 14		W/R	Unsigned
$111C	4125	2	VISUALIZATION COUNTER 15		W/R	Unsigned
$111E	4126	2	VISUALIZATION COUNTER 16		W/R	Unsigned
DESCRIPTION						
$1120	4384	10	DESCRIPTION COUNTER 1	Up to 20 characters ($20÷$7A) (def.: Counter 01)	W/R	Unsigned
$112A	4394	10	DESCRIPTION COUNTER 2	(def.: Counter 02)	W/R	Unsigned
$1134	4404	10	DESCRIPTION COUNTER 3	(def.: Counter 03)	W/R	Unsigned
$113E	4414	10	DESCRIPTION COUNTER 4	(def.: Counter 04)	W/R	Unsigned
$1148	4424	10	DESCRIPTION COUNTER 5	(def.: Counter 05)	W/R	Unsigned
$1152	4434	10	DESCRIPTION COUNTER 6	(def.: Counter 06)	W/R	Unsigned
$115C	4444	10	DESCRIPTION COUNTER 7	(def.: Counter 07)	W/R	Unsigned
$1166	4454	10	DESCRIPTION COUNTER 8	(def.: Counter 08)	W/R	Unsigned
$1170	4464	10	DESCRIPTION COUNTER 9	(def.: Counter 09)	W/R	Unsigned
$117A	4474	10	DESCRIPTION COUNTER 10	(def.: Counter 10)	W/R	Unsigned
$1184	4484	10	DESCRIPTION COUNTER 11	(def.: Counter 11)	W/R	Unsigned
$118E	4494	10	DESCRIPTION COUNTER 12	(def.: Counter 12)	W/R	Unsigned
$1198	4504	10	DESCRIPTION COUNTER 13	(def.: Counter 13)	W/R	Unsigned
$11A2	4514	10	DESCRIPTION COUNTER 14	(def.: Counter 14)	W/R	Unsigned
$11AC	4524	10	DESCRIPTION COUNTER 15	(def.: Counter 15)	W/R	Unsigned
$11B6	4534	10	DESCRIPTION COUNTER 16	(def.: Counter 16)	W/R	Unsigned
MEASURE UNIT						
$11C0	4544	3	M.U. COUNTER 1	Up to 6 characters ($20÷$7A) (default: kWh+)	W/R	Unsigned
$11C3	4547	3	M.U. COUNTER 2		W/R	Unsigned
$11C6	4550	3	M.U. COUNTER 3		W/R	Unsigned
$11C9	4553	3	M.U. COUNTER 4		W/R	Unsigned
$11CC	4556	3	M.U. RDUNTER 5		W/R	Unsigned
$11CF	4559	3	M.U. COUNTER 6		W/R	Unsigned
$11D2	4562	3	M.U. COUNTER 7		W/R	Unsigned
$11D5	4565	3	M.U. COUNTER 8		W/R	Unsigned

$11D8	4568	3	M.U. COUNTER 9		W/R	Unsigned
$11DB	4571	3	M.U. COUNTER 10		W/R	Unsigned
$11DE	4574	3	M.U. COUNTER 11		W/R	Unsigned
$11E1	4577	3	M.U. COUNTER 12		W/R	Unsigned
$11E4	4580	3	M.U. COUNTER 13		W/R	Unsigned
$11E7	4583	3	M.U. COUNTER 14		W/R	Unsigned
$11EA	4586	3	M.U. COUNTER 15		W/R	Unsigned
$11ED	4589	3	M.U. COUNTER 16		W/R	Unsigned
SOURCE						
$11F0	4592	2	SOURCE COUNTER 1	0 = OFF (default) 1÷16 = Input 1÷16 17÷32 = Alarm 1÷16 33÷48 = Bool 1÷16	W/R	Unsigned
$11F2	4594	2	SOURCE COUNTER 2		W/R	Unsigned
$11F4	4596	2	SOURCE COUNTER 3		W/R	Unsigned
$11F6	4598	2	SOURCE COUNTER 4		W/R	Unsigned
$11F8	4600	2	SOURCE COUNTER 5		W/R	Unsigned
$11FA	4602	2	SOURCE COUNTER 6		W/R	Unsigned
$11FC	4604	2	SOURCE COUNTER 7		W/R	Unsigned
$11FE	4606	2	SOURCE COUNTER 8		W/R	Unsigned
$1200	4608	2	SOURCE COUNTER 9		W/R	Unsigned
$1202	4610	2	SOURCE COUNTER 10		W/R	Unsigned
$1204	4612	2	SOURCE COUNTER 11		W/R	Unsigned
$1206	4614	2	SOURCE COUNTER 12		W/R	Unsigned
$1208	4616	2	SOURCE COUNTER 13		W/R	Unsigned
$120A	4618	2	SOURCE COUNTER 14		W/R	Unsigned
$120C	4620	2	SOURCE COUNTER 15		W/R	Unsigned
$120E	4622	2	SOURCE COUNTER 16		W/R	Unsigned
MULTIPLIER						
$1210	4624	2	MULTIPLIER COUNTER 1	1 (default)÷1000	W/R	Unsigned
$1212	4626	2	MULTIPLIER COUNTER 2		W/R	Unsigned
$1214	4628	2	MULTIPLIER COUNTER 3		W/R	Unsigned
$1216	4630	2	MULTIPLIER COUNTER 4		W/R	Unsigned
$1218	4632	2	MULTIPLIER COUNTER 5		W/R	Unsigned
$121A	4634	2	MULTIPLIER COUNTER 6		W/R	Unsigned
$121C	4636	2	MULTIPLIER COUNTER 7		W/R	Unsigned
$121E	4638	2	MULTIPLIER COUNTER 8		W/R	Unsigned
$1220	4640	2	MULTIPLIER COUNTER 9		W/R	Unsigned
$1222	4642	2	MULTIPLIER COUNTER 10		W/R	Unsigned
$1224	4644	2	MULTIPLIER COUNTER 11		W/R	Unsigned
$1226	4646	2	MULTIPLIER COUNTER 12		W/R	Unsigned
$1228	4648	2	MULTIPLIER COUNTER 13		W/R	Unsigned
$122A	4650	2	MULTIPLIER COUNTER 14		W/R	Unsigned
$122C	4652	2	MULTIPLIER COUNTER 15		W/R	Unsigned
$122E	4654	2	MULTIPLIER COUNTER 16		W/R	Unsigned
DIVIDER						
$1230	4656	2	DIVIDER COUNTER 1	1 (default)÷1000	W/R	Unsigned
$1232	4658	2	DIVIDER COUNTER 2		W/R	Unsigned
$1234	4660	2	DIVIDER COUNTER 3		W/R	Unsigned
$1236	4662	2	DIVIDER COUNTER 4		W/R	Unsigned
$1238	4664	2	DIVIDER COUNTER 5		W/R	Unsigned
$123A	4666	2	DIVIDER COUNTER 6		W/R	Unsigned
$123C	4668	2	DIVIDER COUNTER 7		W/R	Unsigned
$123E	4670	2	DIVIDER COUNTER 8		W/R	Unsigned
$1240	4672	2	DIVIDER COUNTER 9		W/R	Unsigned
$1242	4674	2	DIVIDER COUNTER 10		W/R	Unsigned
$1244	4676	2	DIVIDER COUNTER 11		W/R	Unsigned
$1246	4678	2	DIVIDER COUNTER 12		W/R	Unsigned
$1248	4680	2	DIVIDER COUNTER 13		W/R	Unsigned
$124A	4682	2	DIVIDER COUNTER 14		W/R	Unsigned
$124C	4684	2	DIVIDER COUNTER 15		W/R	Unsigned
$124E	4686	2	DIVIDER COUNTER 16		W/R	Unsigned
DERIVATE TIME						
$1250	4688	2	DERIVATE TIME COUNTER 1	0 = OFF (def) 1÷60 (minute)	W/R	Unsigned
$1252	4690	2	DERIVATE TIME COUNTER 2		W/R	Unsigned
$1254	4692	2	DERIVATE TIME COUNTER 3		W/R	Unsigned
$1256	4694	2	DERIVATE TIME COUNTER 4		W/R	Unsigned
$1258	4696	2	DERIVATE TIME COUNTER 5		W/R	Unsigned
$125A	4698	2	DERIVATE TIME COUNTER 6		W/R	Unsigned
$125C	4700	2	DERIVATE TIME COUNTER 7		W/R	Unsigned
$125E	4702	2	DERIVATE TIME COUNTER 8		W/R	Unsigned
$11260	4704	2	DERIVATE TIME COUNTER 9		W/R	Unsigned
$1262	4706	2	DERIVATE TIME COUNTER 10		W/R	Unsigned
$1264	4708	2	DERIVATE TIME COUNTER 11		W/R	Unsigned
$1266	4710	2	DERIVATE TIME COUNTER 12		W/R	Unsigned
$1268	4712	2	DERIVATE TIME COUNTER 13		W/R	Unsigned
$126A	4714	2	DERIVATE TIME COUNTER 14		W/R	Unsigned
$126C	4716	2	DERIVATE TIME COUNTER 15		W/R	Unsigned

$126E	4718	2	DERIVATE TIME COUNTER 16		W/R	Unsigned

DERIVATE MULTIPLIER

$1270	4720	2	DERIVATE MULTIPLIER COUNTER 1	1÷1000 (default 60)	W/R	Unsigned
$1272	4722	2	DERIVATE MULTIPLIER COUNTER 2		W/R	Unsigned
$1274	4724	2	DERIVATE MULTIPLIER COUNTER 3		W/R	Unsigned
$1276	4726	2	DERIVATE MULTIPLIER COUNTER 4		W/R	Unsigned
$1278	4728	2	DERIVATE MULTIPLIER COUNTER 5		W/R	Unsigned
$127A	4730	2	DERIVATE MULTIPLIER COUNTER 6		W/R	Unsigned
$127C	4732	2	DERIVATE MULTIPLIER COUNTER 7		W/R	Unsigned
$127E	4734	2	DERIVATE MULTIPLIER COUNTER 8		W/R	Unsigned
$1280	4736	2	DERIVATE MULTIPLIER COUNTER 9		W/R	Unsigned
$1282	4738	2	DERIVATE MULTIPLIER COUNTER 10		W/R	Unsigned
$1284	4740	2	DERIVATE MULTIPLIER COUNTER 11		W/R	Unsigned
$1286	4742	2	DERIVATE MULTIPLIER COUNTER 12		W/R	Unsigned
$1288	4744	2	DERIVATE MULTIPLIER COUNTER 13		W/R	Unsigned
$128A	4746	2	DERIVATE MULTIPLIER COUNTER 14		W/R	Unsigned
$128C	4748	2	DERIVATE MULTIPLIER COUNTER 15		W/R	Unsigned
$128E	4750	2	DERIVATE MULTIPLIER COUNTER 16		W/R	Unsigned

DERIVATE DIVIDER

$1290	4752	2	DERIVATE DIVIDER COUNTER 1	1 (default)÷1000	W/R	Unsigned
$1292	4754	2	DERIVATE DIVIDER COUNTER 2		W/R	Unsigned
$1294	4756	2	DERIVATE DIVIDER COUNTER 3		W/R	Unsigned
$1296	4758	2	DERIVATE DIVIDER COUNTER 4		W/R	Unsigned
$1298	4760	2	DERIVATE DIVIDER COUNTER 5		W/R	Unsigned
$129A	4762	2	DERIVATE DIVIDER COUNTER 6		W/R	Unsigned
$129C	4764	2	DERIVATE DIVIDER COUNTER 7		W/R	Unsigned
$129E	4766	2	DERIVATE DIVIDER COUNTER 8		W/R	Unsigned
$12A0	4768	2	DERIVATE DIVIDER COUNTER 9		W/R	Unsigned
$12A2	4770	2	DERIVATE DIVIDER COUNTER 10		W/R	Unsigned
$12A4	4772	2	DERIVATE DIVIDER COUNTER 11		W/R	Unsigned
$12A6	4774	2	DERIVATE DIVIDER COUNTER 12		W/R	Unsigned
$12A8	4776	2	DERIVATE DIVIDER COUNTER 13		W/R	Unsigned
$12AA	4778	2	DERIVATE DIVIDER COUNTER 14		W/R	Unsigned
$12AC	4780	2	DERIVATE DIVIDER COUNTER 15		W/R	Unsigned
$12AE	4782	2	DERIVATE DIVIDER COUNTER 16		W/R	Unsigned

DERIVATE MEASURE UNIT

$12B0	4784	3	DERIVATE M.U. COUNTER 1	Up to 6 characters ($20÷$7A) (default: kW+)	W/R	Unsigned
$12B3	4787	3	DERIVATE M.U. COUNTER 2		W/R	Unsigned
$12B6	4790	3	DERIVATE M.U. COUNTER 3		W/R	Unsigned
$12B9	4793	3	DERIVATE M.U. COUNTER 4		W/R	Unsigned
$12BC	4796	3	DERIVATE M.U. COUNTER 5		W/R	Unsigned
$12BF	4799	3	DERIVATE M.U. COUNTER 6		W/R	Unsigned
$12C2	4802	3	DERIVATE M.U. COUNTER 7		W/R	Unsigned
$12C5	4805	3	DERIVATE M.U. COUNTER 8		W/R	Unsigned
$12C8	4808	3	DERIVATE M.U. COUNTER 9		W/R	Unsigned
$12CB	4811	3	DERIVATE M.U. COUNTER 10		W/R	Unsigned
$12CE	4814	3	DERIVATE M.U. COUNTER 11		W/R	Unsigned
$12D1	4817	3	DERIVATE M.U. COUNTER 12		W/R	Unsigned
$12D4	4820	3	DERIVATE M.U. COUNTER 13		W/R	Unsigned
$12D7	4823	3	DERIVATE M.U. COUNTER 14		W/R	Unsigned
$12DA	4826	3	DERIVATE M.U. COUNTER 15		W/R	Unsigned
$12DD	4829	3	DERIVATE M.U. COUNTER 16		W/R	Unsigned

MEMORY TYPE

$12E0	4832	2	MEMORY TYPE COUNTER 1	0 = OFF (default) 1 = Total 2 = Differential	W/R	Unsigned
$12E2	4834	2	MEMORY TYPE COUNTER 2		W/R	Unsigned
$12E4	4836	2	MEMORY TYPE COUNTER 3		W/R	Unsigned
$12E6	4838	2	MEMORY TYPE COUNTER 4		W/R	Unsigned
$12E8	4840	2	MEMORY TYPE COUNTER 5		W/R	Unsigned
$12EA	4842	2	MEMORY TYPE COUNTER 6		W/R	Unsigned
$12EC	4844	2	MEMORY TYPE COUNTER 7		W/R	Unsigned
$12EE	4846	2	MEMORY TYPE COUNTER 8		W/R	Unsigned
$12F0	4848	2	MEMORY TYPE COUNTER 9		W/R	Unsigned
$12F2	4850	2	MEMORY TYPE COUNTER 10		W/R	Unsigned
$12F4	4852	2	MEMORY TYPE COUNTER 11		W/R	Unsigned
$12F6	4854	2	MEMORY TYPE COUNTER 12		W/R	Unsigned
$12F8	4856	2	MEMORY TYPE COUNTER 13		W/R	Unsigned
$12FA	4858	2	MEMORY TYPE COUNTER 14		W/R	Unsigned
$12FC	4860	2	MEMORY TYPE COUNTER 15		W/R	Unsigned
$12FE	4862	2	MEMORY TYPE COUNTER 16		W/R	Unsigned

MEMORY RATE

$1300	4864	2	MEMORY RATE COUNTER 1	0 = Day 1 = Week 2 = Month (default) 3 = Year	W/R	Unsigned
$1302	4866	2	MEMORY RATE COUNTER 2		W/R	Unsigned

$1304	4868	2	MEMORY RATE COUNTER 3		W/R	Unsigned
$1306	4870	2	MEMORY RATE COUNTER 4		W/R	Unsigned
$1308	4872	2	MEMORY RATE COUNTER 5		W/R	Unsigned
$130A	4874	2	MEMORY RATE COUNTER 6		W/R	Unsigned
$130C	4876	2	MEMORY RATE COUNTER 7		W/R	Unsigned
$130E	4878	2	MEMORY RATE COUNTER 8		W/R	Unsigned
$1310	4880	2	MEMORY RATE COUNTER 9		W/R	Unsigned
$1312	4882	2	MEMORY RATE COUNTER 10		W/R	Unsigned
$1314	4884	2	MEMORY RATE COUNTER 11		W/R	Unsigned
$1316	4886	2	MEMORY RATE COUNTER 12		W/R	Unsigned
$1318	4888	2	MEMORY RATE COUNTER 13		W/R	Unsigned
$131A	4890	2	MEMORY RATE COUNTER 14		W/R	Unsigned
$131C	4892	2	MEMORY RATE COUNTER 15		W/R	Unsigned
$131E	4894	2	MEMORY RATE COUNTER 16		W/R	Unsigned

ALARMS

SOURCE

$1400	5120	2	SOURCE ALARM 1	0 = OFF (default) 1÷16 = Input 1÷16 17÷32 = Cnt.Tot. 1÷16 33÷48 = Cnt.Par. 1÷16 49÷64 = Derivate 1÷16 65÷80 = Bool. 1÷16 81÷96 = Math. 1÷16	W/R	Unsigned
$1402	5122	2	SOURCE ALARM 2		W/R	Unsigned
$1404	5124	2	SOURCE ALARM 3		W/R	Unsigned
$1406	5126	2	SOURCE ALARM 4		W/R	Unsigned
$1408	5128	2	SOURCE ALARM 5		W/R	Unsigned
$140A	5130	2	SOURCE ALARM 6		W/R	Unsigned
$140C	5132	2	SOURCE ALARM 7		W/R	Unsigned
$140E	5134	2	SOURCE ALARM 8		W/R	Unsigned
$1410	5136	2	SOURCE ALARM 9		W/R	Unsigned
$1412	5138	2	SOURCE ALARM 10		W/R	Unsigned
$1414	5140	2	SOURCE ALARM 11		W/R	Unsigned
$1416	5142	2	SOURCE ALARM 12		W/R	Unsigned
$1418	5144	2	SOURCE ALARM 13		W/R	Unsigned
$141A	5146	2	SOURCE ALARM 14		W/R	Unsigned
$141C	5148	2	SOURCE ALARM 15		W/R	Unsigned
$141E	5150	2	SOURCE ALARM 16		W/R	Unsigned

DESCRIPTION

$1420	5152	10	DESCRIPTION ALARM 1	Up to 20 characters ($20÷$7A) (def.: Alarm 01)	W/R	Unsigned
$142A	5162	10	DESCRIPTION ALARM 2	(def.: Alarm 02)	W/R	Unsigned
$1434	5172	10	DESCRIPTION ALARM 3	(def.: Alarm 03)	W/R	Unsigned
$143E	5182	10	DESCRIPTION ALARM 4	(def.: Alarm 04)	W/R	Unsigned
$1448	5192	10	DESCRIPTION ALARM 5	(def.: Alarm 05)	W/R	Unsigned
$1452	5202	10	DESCRIPTION ALARM 6	(def.: Alarm 06)	W/R	Unsigned
$145C	5212	10	DESCRIPTION ALARM 7	(def.: Alarm 07)	W/R	Unsigned
$1466	5222	10	DESCRIPTION ALARM 8	(def.: Alarm 08)	W/R	Unsigned
$1470	5232	10	DESCRIPTION ALARM 9	(def.: Alarm 09)	W/R	Unsigned
$147A	5242	10	DESCRIPTION ALARM 10	(def.: Alarm 10)	W/R	Unsigned
$1484	5252	10	DESCRIPTION ALARM 11	(def.: Alarm 11)	W/R	Unsigned
$148E	5262	10	DESCRIPTION ALARM 12	(def.: Alarm 12)	W/R	Unsigned
$1498	5272	10	DESCRIPTION ALARM 13	(def.: Alarm 13)	W/R	Unsigned
$14A2	5282	10	DESCRIPTION ALARM 14	(def.: Alarm 14)	W/R	Unsigned
$14AC	5292	10	DESCRIPTION ALARM 15	(def.: Alarm 15)	W/R	Unsigned
$14B6	5302	10	DESCRIPTION ALARM 16	(def.: Alarm 16)	W/R	Unsigned

MEMORY

$14C0	5312	2	MEMORY ALARM 1	0 = OFF (default) 1 = ON	W/R	Unsigned
$14C2	5314	2	MEMORY ALARM 2		W/R	Unsigned
$14C4	5316	2	MEMORY ALARM 3		W/R	Unsigned
$14C6	5318	2	MEMORY ALARM 4		W/R	Unsigned
$14C8	5320	2	MEMORY ALARM 5		W/R	Unsigned
$14CA	5322	2	MEMORY ALARM 6		W/R	Unsigned
$14CC	5324	2	MEMORY ALARM 7		W/R	Unsigned
$14CE	5326	2	MEMORY ALARM 8		W/R	Unsigned
$14D0	5328	2	MEMORY ALARM 9		W/R	Unsigned
$14D2	5330	2	MEMORY ALARM 10		W/R	Unsigned
$14D4	5332	2	MEMORY ALARM 11		W/R	Unsigned
$14D6	5334	2	MEMORY ALARM 12		W/R	Unsigned
$14D8	5336	2	MEMORY ALARM 13		W/R	Unsigned
$14DA	5338	2	MEMORY ALARM 14		W/R	Unsigned
$14DC	5340	2	MEMORY ALARM 15		W/R	Unsigned
$14DE	5342	2	MEMORY ALARM 16		W/R	Unsigned

TYPE

$14E0	5344	2	TYPE ALARM 1	0 = Min 1 = Max (default) 2 = Min-Max (external)	W/R	Unsigned

$14E2	5346	2	TYPE ALARM 2		W/R	Unsigned
$14E4	5348	2	TYPE ALARM 3		W/R	Unsigned
$14E6	5350	2	TYPE ALARM 4		W/R	Unsigned
$14E8	5352	2	TYPE ALARM 5		W/R	Unsigned
$14EA	5354	2	TYPE ALARM 6		W/R	Unsigned
$14EC	5356	2	TYPE ALARM 7		W/R	Unsigned
$14EE	5358	2	TYPE ALARM 8		W/R	Unsigned
$14F0	5360	2	TYPE ALARM 9		W/R	Unsigned
$14F2	5362	2	TYPE ALARM 10		W/R	Unsigned
$14F4	5364	2	TYPE ALARM 11		W/R	Unsigned
$14F6	5366	2	TYPE ALARM 12		W/R	Unsigned
$14F8	5368	2	TYPE ALARM 13		W/R	Unsigned
$14FA	5370	2	TYPE ALARM 14		W/R	Unsigned
$14FC	5372	2	TYPE ALARM 15		W/R	Unsigned
$14FE	5374	2	TYPE ALARM 16		W/R	Unsigned
UPPER THRESHOLD						
$1500	5376	2	UPPER THRESHOLD ALARM 1	-9999÷9999 (def.0)	W/R	Signed
$1502	5378	2	UPPER THRESHOLD ALARM 2		W/R	Signed
$1504	5380	2	UPPER THRESHOLD ALARM 3		W/R	Signed
$1506	5382	2	UPPER THRESHOLD ALARM 4		W/R	Signed
$1508	5384	2	UPPER THRESHOLD ALARM 5		W/R	Signed
$150A	5386	2	UPPER THRESHOLD ALARM 6		W/R	Signed
$150C	5388	2	UPPER THRESHOLD ALARM 7		W/R	Signed
$150E	5390	2	UPPER THRESHOLD ALARM 8		W/R	Signed
$1510	5392	2	UPPER THRESHOLD ALARM 9		W/R	Signed
$1512	5394	2	UPPER THRESHOLD ALARM 10		W/R	Signed
$1514	5396	2	UPPER THRESHOLD ALARM 11		W/R	Signed
$1516	5398	2	UPPER THRESHOLD ALARM 12		W/R	Signed
$1518	5400	2	UPPER THRESHOLD ALARM 13		W/R	Signed
$151A	5402	2	UPPER THRESHOLD ALARM 14		W/R	Signed
$151C	5404	2	UPPER THRESHOLD ALARM 15		W/R	Signed
$151E	5406	2	UPPER THRESHOLD ALARM 16		W/R	Signed
UPPER MULTIPLIER						
$1520	5408	2	UPPER MULTIPLIER ALARM 1	0 = /100 1 = /10 2 = x1 (default) 3 = x10 4 = x100 5 = x1000	W/R	Unsigned
$1522	5410	2	UPPER MULTIPLIER ALARM 2		W/R	Unsigned
$1524	5412	2	UPPER MULTIPLIER ALARM 3		W/R	Unsigned
$1526	5414	2	UPPER MULTIPLIER ALARM 4		W/R	Unsigned
$1528	5416	2	UPPER MULTIPLIER ALARM 5		W/R	Unsigned
$152A	5418	2	UPPER MULTIPLIER ALARM 6		W/R	Unsigned
$152C	5420	2	UPPER MULTIPLIER ALARM 7		W/R	Unsigned
$152E	5422	2	UPPER MULTIPLIER ALARM 8		W/R	Unsigned
$1530	5424	2	UPPER MULTIPLIER ALARM 9		W/R	Unsigned
$1532	5426	2	UPPER MULTIPLIER ALARM 10		W/R	Unsigned
$1534	5428	2	UPPER MULTIPLIER ALARM 11		W/R	Unsigned
$1536	5430	2	UPPER MULTIPLIER ALARM 12		W/R	Unsigned
$1538	5432	2	UPPER MULTIPLIER ALARM 13		W/R	Unsigned
$153A	5434	2	UPPER MULTIPLIER ALARM 14		W/R	Unsigned
$153C	5436	2	UPPER MULTIPLIER ALARM 15		W/R	Unsigned
$153E	5438	2	UPPER MULTIPLIER ALARM 16		W/R	Unsigned
UPPER DELAY						
$1540	5440	2	UPPER DELAY ALARM 1	0 (default) ÷ 900s	W/R	Unsigned
$1542	5442	2	UPPER DELAY ALARM 2		W/R	Unsigned
$1544	5444	2	UPPER DELAY ALARM 3		W/R	Unsigned
$1546	5446	2	UPPER DELAY ALARM 4		W/R	Unsigned
$1548	5448	2	UPPER DELAY ALARM 5		W/R	Unsigned
$154A	5450	2	UPPER DELAY ALARM 6		W/R	Unsigned
$154C	5452	2	UPPER DELAY ALARM 7		W/R	Unsigned
$154E	5454	2	UPPER DELAY ALARM 8		W/R	Unsigned
$1550	5456	2	UPPER DELAY ALARM 9		W/R	Unsigned
$1552	5458	2	UPPER DELAY ALARM 10		W/R	Unsigned
$1554	5460	2	UPPER DELAY ALARM 11		W/R	Unsigned
$1556	5462	2	UPPER DELAY ALARM 12		W/R	Unsigned
$1558	5464	2	UPPER DELAY ALARM 13		W/R	Unsigned
$155A	5466	2	UPPER DELAY ALARM 14		W/R	Unsigned
$155C	5468	2	UPPER DELAY ALARM 15		W/R	Unsigned
$155E	5470	2	UPPER DELAY ALARM 16		W/R	Unsigned
LOWER THRESHOLD						
$1560	5472	2	LOWER THRESHOLD ALARM 1	-9999÷9999 (def.0)	W/R	Signed
$1562	5474	2	LOWER THRESHOLD ALARM 2		W/R	Signed
$1564	5476	2	LOWER THRESHOLD ALARM 3		W/R	Signed
$1566	5478	2	LOWER THRESHOLD ALARM 4		W/R	Signed
$1568	5480	2	LOWER THRESHOLD ALARM 5		W/R	Signed
$156A	5482	2	LOWER THRESHOLD ALARM 6		W/R	Signed
$156C	5484	2	LOWER THRESHOLD ALARM 7		W/R	Signed

$156E	5486	2	LOWER THRESHOLD ALARM 8			W/R	Signed
$1570	5488	2	LOWER THRESHOLD ALARM 9			W/R	Signed
$1572	5490	2	LOWER THRESHOLD ALARM 10			W/R	Signed
$1574	5492	2	LOWER THRESHOLD ALARM 11			W/R	Signed
$1576	5494	2	LOWER THRESHOLD ALARM 12			W/R	Signed
$1578	5496	2	LOWER THRESHOLD ALARM 13			W/R	Signed
$157A	5498	2	LOWER THRESHOLD ALARM 14			W/R	Signed
$157C	5500	2	LOWER THRESHOLD ALARM 15			W/R	Signed
$157E	5502	2	LOWER THRESHOLD ALARM 16			W/R	Signed
LOWER MULTIPLIER							
$1580	5504	2	LOWER MULTIPLIER ALARM 1		0 = /100 1 = /10 2 = x1 (default) 3 = x10 4 = x100 5 = x1000	W/R	Unsigned
$1582	5506	2	LOWER MULTIPLIER ALARM 2			W/R	Unsigned
$1584	5508	2	LOWER MULTIPLIER ALARM 3			W/R	Unsigned
$1586	5510	2	LOWER MULTIPLIER ALARM 4			W/R	Unsigned
$1588	5512	2	LOWER MULTIPLIER ALARM 5			W/R	Unsigned
$158A	5514	2	LOWER MULTIPLIER ALARM 6			W/R	Unsigned
$158C	5516	2	LOWER MULTIPLIER ALARM 7			W/R	Unsigned
$158E	5518	2	LOWER MULTIPLIER ALARM 8			W/R	Unsigned
$1590	5520	2	LOWER MULTIPLIER ALARM 9			W/R	Unsigned
$1592	5522	2	LOWER MULTIPLIER ALARM 10			W/R	Unsigned
$1594	5524	2	LOWER MULTIPLIER ALARM 11			W/R	Unsigned
$1596	5526	2	LOWER MULTIPLIER ALARM 12			W/R	Unsigned
$1598	5528	2	LOWER MULTIPLIER ALARM 13			W/R	Unsigned
$159A	5530	2	LOWER MULTIPLIER ALARM 14			W/R	Unsigned
$159C	5532	2	LOWER MULTIPLIER ALARM 15			W/R	Unsigned
$159E	5534	2	LOWER MULTIPLIER ALARM 16			W/R	Unsigned
LOWER DELAY							
$15A0	5536	2	LOWER DELAY ALARM 1		0 (default) ÷ 900s	W/R	Unsigned
$15A2	5538	2	LOWER DELAY ALARM 2			W/R	Unsigned
$15A4	5540	2	LOWER DELAY ALARM 3			W/R	Unsigned
$15A6	5542	2	LOWER DELAY ALARM 4			W/R	Unsigned
$15A8	5544	2	LOWER DELAY ALARM 5			W/R	Unsigned
$15AA	5546	2	LOWER DELAY ALARM 6			W/R	Unsigned
$15AC	5548	2	LOWER DELAY ALARM 7			W/R	Unsigned
$15AE	5550	2	LOWER DELAY ALARM 8			W/R	Unsigned
$15B0	5552	2	LOWER DELAY ALARM 9			W/R	Unsigned
$15B2	5554	2	LOWER DELAY ALARM 10			W/R	Unsigned
$15B4	5556	2	LOWER DELAY ALARM 11			W/R	Unsigned
$15B6	5558	2	LOWER DELAY ALARM 12			W/R	Unsigned
$15B8	5560	2	LOWER DELAY ALARM 13			W/R	Unsigned
$15BA	5562	2	LOWER DELAY ALARM 14			W/R	Unsigned
$15BC	5564	2	LOWER DELAY ALARM 15			W/R	Unsigned
$15BE	5566	2	LOWER DELAY ALARM 16			W/R	Unsigned
REST STATUS							
$15C0	5568	2	REST STATUS ALARM 1		0 = OFF (default) 1 = ON	W/R	Unsigned
$15C2	5570	2	REST STATUS ALARM 2			W/R	Unsigned
$15C4	5572	2	REST STATUS ALARM 3			W/R	Unsigned
$15C6	5574	2	REST STATUS ALARM 4			W/R	Unsigned
$15C8	5576	2	REST STATUS ALARM 5			W/R	Unsigned
$15CA	5578	2	REST STATUS ALARM 6			W/R	Unsigned
$15CC	5580	2	REST STATUS ALARM 7			W/R	Unsigned
$15CE	5582	2	REST STATUS ALARM 8			W/R	Unsigned
$15D0	5584	2	REST STATUS ALARM 9			W/R	Unsigned
$15D2	5586	2	REST STATUS ALARM 10			W/R	Unsigned
$15D4	5588	2	REST STATUS ALARM 11			W/R	Unsigned
$15D6	5590	2	REST STATUS ALARM 12			W/R	Unsigned
$15D8	5592	2	REST STATUS ALARM 13			W/R	Unsigned
$15DA	5594	2	REST STATUS ALARM 14			W/R	Unsigned
$15DC	5596	2	REST STATUS ALARM 15			W/R	Unsigned
$15DE	5598	2	REST STATUS ALARM 16			W/R	Unsigned
DIGITAL OUTPUT							
$15E0	5600	2	DIG.OUT FOR ALARM 1		0 = OFF (default) 1 = DO1 2 = DO2 3 = DO1+DO2	W/R	Unsigned
$15E2	5602	2	DIG.OUT FOR ALARM 2			W/R	Unsigned
$15E4	5604	2	DIG.OUT FOR ALARM 3			W/R	Unsigned
$15E6	5606	2	DIG.OUT FOR ALARM 4			W/R	Unsigned
$15E8	5608	2	DIG.OUT FOR ALARM 5			W/R	Unsigned
$15EA	5610	2	DIG.OUT FOR ALARM 6			W/R	Unsigned
$15EC	5612	2	DIG.OUT FOR ALARM 7			W/R	Unsigned
$15EE	5614	2	DIG.OUT FOR ALARM 8			W/R	Unsigned
$15F0	5616	2	DIG.OUT FOR ALARM 9			W/R	Unsigned

$15F2	5618	2	DIG.OUT FOR ALARM 10			W/R	Unsigned
$15F4	5620	2	DIG.OUT FOR ALARM 11			W/R	Unsigned
$15F6	5622	2	DIG.OUT FOR ALARM 12			W/R	Unsigned
$15F8	5624	2	DIG.OUT FOR ALARM 13			W/R	Unsigned
$15FA	5626	2	DIG.OUT FOR ALARM 14			W/R	Unsigned
$15FC	5628	2	DIG.OUT FOR ALARM 15			W/R	Unsigned
$15FE	5630	2	DIG.OUT FOR ALARM 16			W/R	Unsigned
			INPUTS				
FUNCTION							
$1600	5632	2	FUNCTION INPUT 1	0 = OFF (default) 1 = ON 2 = SYNC. 3 = TAR.1 4 = TAR.2		W/R	Unsigned
$1602	5634	2	FUNCTION INPUT 2			W/R	Unsigned
$1604	5636	2	FUNCTION INPUT 3			W/R	Unsigned
$1606	5638	2	FUNCTION INPUT 4			W/R	Unsigned
$1608	5640	2	FUNCTION INPUT 5			W/R	Unsigned
$160A	5642	2	FUNCTION INPUT 6			W/R	Unsigned
$160C	5644	2	FUNCTION INPUT 7			W/R	Unsigned
$160E	5646	2	FUNCTION INPUT 8			W/R	Unsigned
$1610	5648	2	FUNCTION INPUT 9			W/R	Unsigned
$1612	5650	2	FUNCTION INPUT 10			W/R	Unsigned
$1614	5652	2	FUNCTION INPUT 11			W/R	Unsigned
$1616	5654	2	FUNCTION INPUT 12			W/R	Unsigned
$1618	5656	2	FUNCTION INPUT 13			W/R	Unsigned
$161A	5658	2	FUNCTION INPUT 14			W/R	Unsigned
$161C	5660	2	FUNCTION INPUT 15			W/R	Unsigned
$161E	5662	2	FUNCTION INPUT 16			W/R	Unsigned
REST STATUS							
$1620	5664	2	REST STATUS INPUT 1	0 = OFF (default) 1 = ON		W/R	Unsigned
$1622	5666	2	REST STATUS INPUT 2			W/R	Unsigned
$1624	5668	2	REST STATUS INPUT 3			W/R	Unsigned
$1626	5670	2	REST STATUS INPUT 4			W/R	Unsigned
$1628	5672	2	REST STATUS INPUT 5			W/R	Unsigned
$162A	5674	2	REST STATUS INPUT 6			W/R	Unsigned
$162C	5676	2	REST STATUS INPUT 7			W/R	Unsigned
$162E	5678	2	REST STATUS INPUT 8			W/R	Unsigned
$1630	5680	2	REST STATUS INPUT 9			W/R	Unsigned
$1632	5682	2	REST STATUS INPUT 10			W/R	Unsigned
$1634	5684	2	REST STATUS INPUT 11			W/R	Unsigned
$1636	5686	2	REST STATUS INPUT 12			W/R	Unsigned
$1638	5688	2	REST STATUS INPUT 13			W/R	Unsigned
$163A	5690	2	REST STATUS INPUT 14			W/R	Unsigned
$163C	5692	2	REST STATUS INPUT 15			W/R	Unsigned
$163E	5694	2	REST STATUS INPUT 16			W/R	Unsigned
			BOOLEAN				
OPERAND 1							
$1700	5888	2	OPERAND 1 BOOLEAN 1	0 = OFF (default) 1÷16 = Input 1÷16 17÷32 = Alarm. 1÷16 33÷48 = Bool 1÷16		W/R	Unsigned
$1702	5890	2	OPERAND 1 BOOLEAN 2			W/R	Unsigned
$1704	5892	2	OPERAND 1 BOOLEAN 3			W/R	Unsigned
$1706	5894	2	OPERAND 1 BOOLEAN 4			W/R	Unsigned
$1708	5896	2	OPERAND 1 BOOLEAN 5			W/R	Unsigned
$170A	5898	2	OPERAND 1 BOOLEAN 6			W/R	Unsigned
$170C	5900	2	OPERAND 1 BOOLEAN 7			W/R	Unsigned
$170E	5902	2	OPERAND 1 BOOLEAN 8			W/R	Unsigned
$1710	5904	2	OPERAND 1 BOOLEAN 9			W/R	Unsigned
$1712	5906	2	OPERAND 1 BOOLEAN 10			W/R	Unsigned
$1714	5908	2	OPERAND 1 BOOLEAN 11			W/R	Unsigned
$1716	5910	2	OPERAND 1 BOOLEAN 12			W/R	Unsigned
$1718	5912	2	OPERAND 1 BOOLEAN 13			W/R	Unsigned
$171A	5914	2	OPERAND 1 BOOLEAN 14			W/R	Unsigned
$171C	5916	2	OPERAND 1 BOOLEAN 15			W/R	Unsigned
$171E	5918	2	OPERAND 1 BOOLEAN 16			W/R	Unsigned
OPERATOR							
$1720	5920	2	OPERATOR BOOLEAN 1	0 = --- (default) 1 = AND 2 = OR		W/R	Unsigned
$1722	5922	2	OPERATOR BOOLEAN 2			W/R	Unsigned
$1724	5924	2	OPERATOR BOOLEAN 3			W/R	Unsigned
$1726	5926	2	OPERATOR BOOLEAN 4			W/R	Unsigned
$1728	5928	2	OPERATOR BOOLEAN 5			W/R	Unsigned
$172A	5930	2	OPERATOR BOOLEAN 6			W/R	Unsigned

$172C	5932	2	OPERATOR BOOLEAN 7		W/R	Unsigned
$172E	5934	2	OPERATOR BOOLEAN 8		W/R	Unsigned
$1730	5936	2	OPERATOR BOOLEAN 9		W/R	Unsigned
$1732	5938	2	OPERATOR BOOLEAN 10		W/R	Unsigned
$1734	5940	2	OPERATOR BOOLEAN 11		W/R	Unsigned
$1736	5942	2	OPERATOR BOOLEAN 12		W/R	Unsigned
$1738	5944	2	OPERATOR BOOLEAN 13		W/R	Unsigned
$173A	5946	2	OPERATOR BOOLEAN 14		W/R	Unsigned
$173C	5948	2	OPERATOR BOOLEAN 15		W/R	Unsigned
$173E	5950	2	OPERATOR BOOLEAN 16		W/R	Unsigned
OPERAND 2						
$1740	5952	2	OPERAND 2 BOOLEAN 1	0 = OFF (default) 1÷16 = Input 1÷16 17÷32 = Alarm. 1÷16 33÷48 = Bool 1÷16	W/R	Unsigned
$1742	5954	2	OPERAND 2 BOOLEAN 2		W/R	Unsigned
$1744	5956	2	OPERAND 2 BOOLEAN 3		W/R	Unsigned
$1746	5958	2	OPERAND 2 BOOLEAN 4		W/R	Unsigned
$1748	5960	2	OPERAND 2 BOOLEAN 5		W/R	Unsigned
$174A	5962	2	OPERAND 2 BOOLEAN 6		W/R	Unsigned
$174C	5964	2	OPERAND 2 BOOLEAN 7		W/R	Unsigned
$174E	5966	2	OPERAND 2 BOOLEAN 8		W/R	Unsigned
$1750	5968	2	OPERAND 2 BOOLEAN 9		W/R	Unsigned
$1752	5970	2	OPERAND 2 BOOLEAN 10		W/R	Unsigned
$1754	5972	2	OPERAND 2 BOOLEAN 11		W/R	Unsigned
$1756	5974	2	OPERAND 2 BOOLEAN 12		W/R	Unsigned
$1758	5976	2	OPERAND 2 BOOLEAN 13		W/R	Unsigned
$175A	5978	2	OPERAND 2 BOOLEAN 14		W/R	Unsigned
$175C	5980	2	OPERAND 2 BOOLEAN 15		W/R	Unsigned
$175E	5982	2	OPERAND 2 BOOLEAN 16		W/R	Unsigned
MATHEMATICS						
VISUALIZATION						
$1800	6144	2	VISUALIZATION MATHEMATHICS 1	0 = OFF (default) 1 = ON	W/R	Unsigned
$1802	6146	2	VISUALIZATION MATHEMATHICS 2		W/R	Unsigned
$1804	6148	2	VISUALIZATION MATHEMATHICS 3		W/R	Unsigned
$1806	6150	2	VISUALIZATION MATHEMATHICS 4		W/R	Unsigned
$1808	6152	2	VISUALIZATION MATHEMATHICS 5		W/R	Unsigned
$180A	6154	2	VISUALIZATION MATHEMATHICS 6		W/R	Unsigned
$180C	6156	2	VISUALIZATION MATHEMATHICS 7		W/R	Unsigned
$180E	6158	2	VISUALIZATION MATHEMATHICS 8		W/R	Unsigned
$1810	6160	2	VISUALIZATION MATHEMATHICS 9		W/R	Unsigned
$1812	6162	2	VISUALIZATION MATHEMATHICS 10		W/R	Unsigned
$1814	6164	2	VISUALIZATION MATHEMATHICS 11		W/R	Unsigned
$1816	6166	2	VISUALIZATION MATHEMATHICS 12		W/R	Unsigned
$1818	6168	2	VISUALIZATION MATHEMATHICS 13		W/R	Unsigned
$181A	6170	2	VISUALIZATION MATHEMATHICS 14		W/R	Unsigned
$181C	6172	2	VISUALIZATION MATHEMATHICS 15		W/R	Unsigned
$181E	6174	2	VISUALIZATION MATHEMATHICS 16		W/R	Unsigned
DESCRIPTION						
$1820	6176	10	DESCRIPTION MATHEMATHICS 1	Up to 20 characters ($20÷$7A) (def.: Math 01)	W/R	Unsigned
$182A	6186	10	DESCRIPTION MATHEMATHICS 2	(def.: Math 02)	W/R	Unsigned
$1834	6196	10	DESCRIPTION MATHEMATHICS 3	(def.: Math 03)	W/R	Unsigned
$183E	6206	10	DESCRIPTION MATHEMATHICS 4	(def.: Math 04)	W/R	Unsigned
$1848	6216	10	DESCRIPTION MATHEMATHICS 5	(def.: Math 05)	W/R	Unsigned
$1852	6226	10	DESCRIPTION MATHEMATHICS 6	(def.: Math 06)	W/R	Unsigned
$185C	6236	10	DESCRIPTION MATHEMATHICS 7	(def.: Math 07)	W/R	Unsigned
$1866	6246	10	DESCRIPTION MATHEMATHICS 8	(def.: Math 08)	W/R	Unsigned
$1870	6256	10	DESCRIPTION MATHEMATHICS 9	(def.: Math 09)	W/R	Unsigned
$187A	6266	10	DESCRIPTION MATHEMATHICS 10	(def.: Math 10)	W/R	Unsigned
$1884	6276	10	DESCRIPTION MATHEMATHICS 11	(def.: Math 11)	W/R	Unsigned
$188E	6286	10	DESCRIPTION MATHEMATHICS 12	(def.: Math 12)	W/R	Unsigned
$1898	6296	10	DESCRIPTION MATHEMATHICS 13	(def.: Math 13)	W/R	Unsigned
$18A2	6306	10	DESCRIPTION MATHEMATHICS 14	(def.: Math 14)	W/R	Unsigned
$18AC	6316	10	DESCRIPTION MATHEMATHICS 15	(def.: Math 15)	W/R	Unsigned
$18B6	6326	10	DESCRIPTION MATHEMATHICS 16	(def.: Math 16)	W/R	Unsigned
MEASURE UNIT						
$18C0	6336	3	M.U. MATHEMATHICS 1	Up to 6 characters ($20÷$7A) (def.: kWh+)	W/R	Unsigned
$18C3	6339	3	M.U. MATHEMATHICS 2		W/R	Unsigned
$18C6	6342	3	M.U. MATHEMATHICS 3		W/R	Unsigned
$18C9	6345	3	M.U. MATHEMATHICS 4		W/R	Unsigned
$18CC	6348	3	M.U. MATHEMATHICS 5		W/R	Unsigned
$18CF	6351	3	M.U. MATHEMATHICS 6		W/R	Unsigned
$18D2	6354	3	M.U. MATHEMATHICS 7		W/R	Unsigned
$18D5	6357	3	M.U. MATHEMATHICS 8		W/R	Unsigned

$18D8	6360	3	M.U. MATHEMATHICS 9		W/R	Unsigned
$18DB	6363	3	M.U. MATHEMATHICS 10		W/R	Unsigned
$18DE	6366	3	M.U. MATHEMATHICS 11		W/R	Unsigned
$18E1	6369	3	M.U. MATHEMATHICS 12		W/R	Unsigned
$18E4	6372	3	M.U. MATHEMATHICS 13		W/R	Unsigned
$18E7	6375	3	M.U. MATHEMATHICS 14		W/R	Unsigned
$18EA	6378	3	M.U. MATHEMATHICS 15		W/R	Unsigned
$18ED	6381	3	M.U. MATHEMATHICS 16		W/R	Unsigned
OPERAND 1						
$18F0	6384	2	OPERAND 1 MATHEMATHICS 1	0 = OFF (default) 1÷16 = Cnt.Tot 1÷16 17÷32 = Cnt.Par. 1÷16 33÷48 = Derivate 1÷16 49÷64 = Math. 1÷16	W/R	Unsigned
$18F2	6386	2	OPERAND 1 MATHEMATHICS 2		W/R	Unsigned
$18F4	6388	2	OPERAND 1 MATHEMATHICS 3		W/R	Unsigned
$18F6	6390	2	OPERAND 1 MATHEMATHICS 4		W/R	Unsigned
$18F8	6392	2	OPERAND 1 MATHEMATHICS 5		W/R	Unsigned
$18FA	6394	2	OPERAND 1 MATHEMATHICS 6		W/R	Unsigned
$18FC	6396	2	OPERAND 1 MATHEMATHICS 7		W/R	Unsigned
$18FE	6398	2	OPERAND 1 MATHEMATHICS 8		W/R	Unsigned
$1900	6400	2	OPERAND 1 MATHEMATHICS 9		W/R	Unsigned
$1902	6402	2	OPERAND 1 MATHEMATHICS 10		W/R	Unsigned
$1904	6404	2	OPERAND 1 MATHEMATHICS 11		W/R	Unsigned
$1906	6406	2	OPERAND 1 MATHEMATHICS 12		W/R	Unsigned
$1908	6408	2	OPERAND 1 MATHEMATHICS 13		W/R	Unsigned
$190A	6410	2	OPERAND 1 MATHEMATHICS 14		W/R	Unsigned
$190C	6412	2	OPERAND 1 MATHEMATHICS 15		W/R	Unsigned
$190E	6414	2	OPERAND 1 MATHEMATHICS 16		W/R	Unsigned
OPERATOR						
$1910	6416	2	OPERATOR MATHEMATHICS 1	0 = + (default) 1 = - 2 = /	W/R	Unsigned
$1912	6418	2	OPERATOR MATHEMATHICS 2		W/R	Unsigned
$1914	6420	2	OPERATOR MATHEMATHICS 3		W/R	Unsigned
$1916	6422	2	OPERATOR MATHEMATHICS 4		W/R	Unsigned
$1918	6424	2	OPERATOR MATHEMATHICS 5		W/R	Unsigned
$191A	6426	2	OPERATOR MATHEMATHICS 6		W/R	Unsigned
$191C	6428	2	OPERATOR MATHEMATHICS 7		W/R	Unsigned
$191E	6430	2	OPERATOR MATHEMATHICS 8		W/R	Unsigned
$1920	6432	2	OPERATOR MATHEMATHICS 9		W/R	Unsigned
$1922	6434	2	OPERATOR MATHEMATHICS 10		W/R	Unsigned
$1924	6436	2	OPERATOR MATHEMATHICS 11		W/R	Unsigned
$1926	6438	2	OPERATOR MATHEMATHICS 12		W/R	Unsigned
$1928	6440	2	OPERATOR MATHEMATHICS 13		W/R	Unsigned
$192A	6442	2	OPERATOR MATHEMATHICS 14		W/R	Unsigned
$192C	6444	2	OPERATOR MATHEMATHICS 15		W/R	Unsigned
$192E	6446	2	OPERATOR MATHEMATHICS 16		W/R	Unsigned
OPERAND 2						
$1930	6448	2	OPERAND 2 MATHEMATHICS 1	0 = OFF (default) 1÷16 = Cnt.Tot 1÷16 17÷32 = Cnt.Par. 1÷16 33÷48 = Derivate 1÷16 49÷64 = Math. 1÷16	W/R	Unsigned
$1932	6450	2	OPERAND 2 MATHEMATHICS 2		W/R	Unsigned
$1934	6452	2	OPERAND 2 MATHEMATHICS 3		W/R	Unsigned
$1936	6454	2	OPERAND 2 MATHEMATHICS 4		W/R	Unsigned
$1938	6456	2	OPERAND 2 MATHEMATHICS 5		W/R	Unsigned
$193A	6458	2	OPERAND 2 MATHEMATHICS 6		W/R	Unsigned
$193C	6460	2	OPERAND 2 MATHEMATHICS 7		W/R	Unsigned
$193E	6462	2	OPERAND 2 MATHEMATHICS 8		W/R	Unsigned
$1940	6464	2	OPERAND 2 MATHEMATHICS 9		W/R	Unsigned
$1942	6466	2	OPERAND 2 MATHEMATHICS 10		W/R	Unsigned
$1944	6468	2	OPERAND 2 MATHEMATHICS 11		W/R	Unsigned
$1946	6470	2	OPERAND 2 MATHEMATHICS 12		W/R	Unsigned
$1948	6472	2	OPERAND 2 MATHEMATHICS 13		W/R	Unsigned
$194A	6474	2	OPERAND 2 MATHEMATHICS 14		W/R	Unsigned
$194C	6476	2	OPERAND 2 MATHEMATHICS 15		W/R	Unsigned
$194E	6478	2	OPERAND 2 MATHEMATHICS 16		W/R	Unsigned
SERIAL COM 1						
$1A00	6656	2	ID ADDRESS	1 (default)÷247	W/R	Unsigned
$1A02	6658	2	BAUD RATE	0 = 1200 1 = 2400 2 = 4800 3 = 9600 4 = 19200 5 = 38400 (def.) 6 = 57600 7 = 115200	W/R	Unsigned
$1A04	6660	2	PARITY	0 = None (def.)	W/R	Unsigned

Register HEX	Register DEC	Word	Description	Measure Unit	W/R	Type
				1 = Odd 2 = Even		
$1A06	6662	2	STOP BIT	1 (default)÷2	W/R	Unsigned
RESET						
$2FF0	12272	2	RESET TOTAL COUNTERS	0 = NO 1÷16 = TOT.CNT. n. 255 = ALL TOT.CNT.	W	Unsigned
$2FF2	12274	2	RESET PARTIAL COUNTERS	0 = NO 1÷16 = PAR.CNT. n. 255 = ALL PAR.CNT.	W	Unsigned
$2FF4	12276	2	RESET TIMEBANDS	0 = NO 1÷16 = ALARM n. 255 = ALL ALARMS	W	Unsigned
$2FF6	12278	2	RESET ALARMS	0 = NO 1÷16 = ALARM n. 255 = ALL ALARMS	W	Unsigned
$2FF8	12280	2	RESET MEMORY	255 = RESET	W	Unsigned
$2FFA	12282	2	RESET SETUP	255 = RESET	W	Unsigned
$2FFC	12284	2	RESET SYSTEM	255 = RESET	W	Unsigned

MEMORY RECORD

Register HEX	Register DEC	Word	Description	Measure Unit	W/R	Type
$0700	1792	2	ALARM STATE	0 = OFF 1 = ON	R	Unsigned
$0702	1794	2	ALARM n. or SYSTEM in ALARM	1÷16 = Alarm n. 255 = System	R	Unsigned
$0704	1796	2	ALARM DATE - DAY	1÷31	R	Unsigned
$0706	1798	2	ALARM DATE - MONTH	1÷12	R	Unsigned
$0708	1800	2	ALARM DATE - YEAR	0÷99	R	Unsigned
$070A	1802	2	ALARM TIME - HOUR	0÷23	R	Unsigned
$070C	1804	2	ALARM TIME - MINUTE	0÷59	R	Unsigned
$070E	1806	2	ALARM TIME - SECOND	0÷59	R	Unsigned
$8000	32768	2	NEXT RECORD	255 = JUMP	W	Unsigned

Note: see "Reading of the records in memory" chapter.

PASSWORD

Register HEX	Register DEC	Word	Description	Measure Unit	W/R	Type
$1B10	6928	2	ENABLE MODIFY OF SETUP BY PASSWORD	Stored Password (0÷9999)	W	Unsigned
$1B12	6930	2	PASSWORD	0÷9999	W	Unsigned

Note: If the password has been set (other than 0000), sending the command $ 1B10 - ENABLE MODIFY OF SETUP BY PASSWORD, enables for 5 minutes writing serial of the setup parameters: after this time, the writing of the parameters of setup will be inhibited until the next command $ 1B10 is sent.
The sending of write commands, when the password is set, does not change the value of the parameters and results in an exception error 15 ($ 0F) by the device if previously was not sent the $1B10 command.

Info Device & Firmware Version

Register HEX	Register DEC	Word	Description	W/R	Note:
$9000	36864	18	SERIAL NUMBER	R	Expressed in ASCII Code (1 char per dword) - Only numbers - Word: 00-05: Identity Code (016) 06-09: Production Year (19÷99) 10-13: Production Week of the year (01÷52) 14-17: Progressive Number (01÷99)
$9012	36882	28	CONFIGURATION CODE	R	Expressed in ASCII Code (1 char per dword) *(for details see the following table)*
$902E	36910	8	HW REVISION	R	Expressed in ASCII Code
$9036	36918	8	HW CUSTOMIZATION	R	Expressed in ASCII Code

Configuration code

Device	Digital IO	Serial Com.	Supply
EML16-	00: 16DI 24Vac/dc + 6DO 24Vdc 01: 16DI 48Vac/dc + 6DO 24Vdc 02: 16DI 115Vac/dc + 6DO 24Vdc 03: 16DI 230Vac/dc + 6DO 24Vdc 04: 14DI 24Vac/dc + 8DO 24Vdc 05: 14DI 48Vac/dc + 8DO 24Vdc 06: 14DI 115Vac/dc + 8DO 24Vdc 07: 14DI 230Vac/dc + 8DO 24Vdc	00: Not present 01: COM1 02: COM1+COM2	00: 115/230Vac 01: 20÷60Vac/dc 02: 90÷250Vac/dc

Boot Version

Register HEX	Register DEC	Word	Description	W/R	Note:
$903E	36926	2	BOOT VERSION	R	

Firmware Version

Register HEX	Register DEC	Word	Description	W/R	Note:
$9040	36928	2	FIRMWARE VERSION	R	

TROUBLESHOOTING

If response from Data Concentrator-EML16 doesn't happen:
- check connection from Data Concentrator-EML16 and RS232/RS485 converter;
- check if data outgoing from the RS232 serial port of the PC come in the RS232/485 converter
- try to increase the wait time for response (1000ms is good);
- check if the transmitted data stream is **EXACTLY** as in example, monitoring the data on the RS485 serial line with a terminal (i.e. Hyperterminal or other emulator);
- if the RS232/485 converter is not our model EMI-1, be sure the turnaround-time is set in 1ms ÷ 2ms range