INSTRUCTION MANUAL
IM145.1-U v1.8 (firmware version 807 or higher)

Modbus RTU & TCP/IP communication protocol for EMA-N and EMS series

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Modbus protocol

RTU – RS485

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 is RS485.
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.

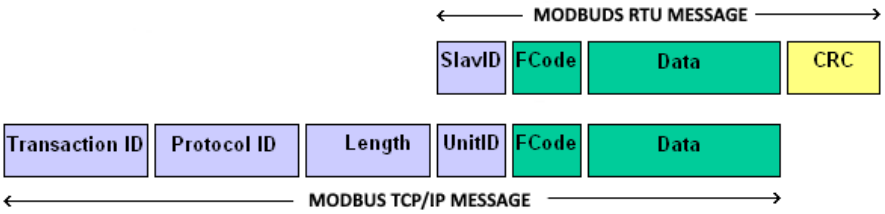
Generic RTU message structure:

START OF FRAME	=	Starting message marker. (silence on line for time >= 4 characters)
ADDRESS FIELD [1 CHAR]	=	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 [1 CHAR]	=	The operation code that you need to perform.
DATA FIELD [N CHAR]	=	Includes the data field.
ERROR CHECK [2 CHARS]	=	Field for the error correction code.
END OF FRAME	=	End message marker. (silence on line for time >= 4 characters)

Wait time for response:
Request of 16 register (64 bytes) → typical 15 ms / worst 30 ms
Request of 64 register (128 bytes) → typical 15ms / worst 50 ms
Scan rate max recommended: 250 ms

TCP/IP - ETHERNET

Modbus TCP/IP (also Modbus-TCP) is simply the Modbus RTU protocol with a TCP interface that runs on Ethernet.
The Modbus messaging structure is the application protocol that defines the rules for organizing and interpreting the data independent of the data transmission medium. TCP/IP refers to the Transmission Control Protocol and Internet Protocol, which provides the transmission medium for Modbus TCP/IP messaging. Simply stated, TCP/IP allows blocks of binary data to be exchanged between computers. It is also a world-wide standard that serves as the foundation for the World Wide Web.
The primary function of TCP is to ensure that all packets of data are received correctly, while IP makes sure that messages are correctly addressed and routed. Note that the TCP/IP combination is merely a transport protocol, and does not define what the data means or how the data is to be interpreted (this is the job of the application protocol, Modbus in this case). So in summary, Modbus TCP/IP uses TCP/IP and Ethernet to carry the data of the Modbus message structure between compatible devices. That is, Modbus TCP/IP combines a physical network (Ethernet), with a networking standard (TCP/IP), and a standard method of representing data (Modbus as the application protocol). Essentially, the Modbus TCP/IP message is simply a Modbus communication encapsulated in an Ethernet TCP/IP wrapper.
In practice, Modbus TCP embeds a standard Modbus data frame into a TCP frame, without the Modbus checksum, as shown in the following diagram.



The Modbus commands and user data are themselves encapsulated into the data container of a TCP/IP telegram without being modified in any way. However, the Modbus error checking field (checksum) is not used, as the standard Ethernet TCP/IP link layer checksum methods are instead used to guaranty data integrity. Further, the Modbus frame address field is supplanted by the unit identifier in Modbus TCP/IP, and becomes part of the Modbus Application Protocol header (more on this later).
From the figure, we see that the function code and data fields are absorbed in their original form. Thus, a Modbus TCP/IP Application Data Unit (ADU) takes the form of a 7 bytes header (transaction identifier + protocol identifier + length field + unit identifier), and the protocol data unit (function code + data). The MBAP header is 7 bytes long and includes the following fields:
- **Transaction/invocation Identifier (2 Bytes)**: This identification field is used for transaction pairing when multiple messages are sent along the same TCP connection by a client without waiting for a prior response.
- Protocol Identifier (2 bytes): This field is always 0 for Modbus services and other values are reserved for future extensions.
- **Length (2 bytes)**: This field is a byte count of the remaining fields and includes the unit identifier byte, function code byte, and the data fields.
- **Unit Identifier (1 byte)**: This field is used to identify a remote server located on a non TCP/IP network (for serial bridging).

Reading multiple registers [function code 03h]

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:

	1° Byte	2° Byte	3°-4° Byte	5°-6° Byte	7°-8° Byte	
Start of Frame	**Address Field**	**Function Code**	**Start Address**	**Number of Registers**	**Check Sum**	**End of Frame**
Starting message marker	*Device address 0x01... 0xF7*	***0x03***	*First register address to be read*	*Number of registers (max 64 bytes) to read **	*CRC*	*End message marker*

**: 4 bytes [1 long] for 1 measure value)*

WARNING:
It is possible to read more than one variable at the same time **(max 252 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:

	1° Byte	2° Byte	3° Byte	n° Byte	n°+1 – n°+2	
Start of Frame	**Address Field**	**Function Code**	**Number of Bytes**	**Data**	**Check Sum**	**End of Frame**
Starting message marker	*Device address 0x01... 0xF7*	***0x03***	*Number of data bytes 0x?? ... 0x?? **	*data bytes 0x?? ... 0x?? ***	*CRC*	*End message marker*

**: 1 register requires 2 data bytes.*
***: Nr. of register x 2 = n. byte.*

Write multiple registers [function code 10h]

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 64 bytes).

QUERY:

	1° Byte	2° Byte	3°-4° Byte	5°-6° Byte	7° Byte	n° Byte	n°+1 – n°+2	
Start of Frame	**Address Field**	**Function Code**	**Start Address**	**Number of Registers**	**Number of Bytes**	**Data**	**Check Sum**	**End of Frame**
Starting message marker	*Device address 0x01... 0xF7*	***0x10***	*First register address to be written*	*Number of registers to be written*	*Number of data bytes**	*Data bytes 0x?? ... 0x?? ***	*CRC*	*End message marker*

**: 1 register requires 2 data bytes.*
***: Nr. of register x 2 = n. byte.*

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

RESPONSE:

	1° Byte	2° Byte	3°-4° Byte	5°-6° Byte	7°-8° Byte	
Start of Frame	**Address Field**	**Function Code**	**Start Address**	**Number of Registers**	**Check Sum**	**End of Frame**
Starting message marker	*Device address 0x01... 0xF7*	***0x10***	*First register address to be written*	*Number of registers to be written*	*CRC*	*End message marker*

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

QUERY:

	1° Byte	2° Byte	3°-4° Byte	5°-6° Byte	7° 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 08h]

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:

	1° Byte	2° Byte	3°-4° Byte	n° Byte	n°+1 – n°+2	
Start of Frame	**Address Field**	**Function Code**	**Sub Function**	**Data**	**Check Sum**	**End of Frame**
Starting message marker	*Device address 0x01 ... 0xF7*	***0x08***	*Sub-function 0 0x00 + 0x00*	*Max 10 data bytes*	*CRC*	*End message marker*

RESPONSE:

The response must be the loopback of the same data.

	1° Byte	2° Byte	3-4° Byte	n° Byte	n+1 - n+2° Byte	
Start of Frame	**Address Field**	**Function Code**	**Sub Function**	**Data**	**Check Sum**	**End of Frame**
Starting message marker	*Device address 0x01 ... 0xF7*	***0x08***	*Sub-function 0 0x00 + 0x00*	*Data bytes*	*CRC*	*End message marker*

DIAGNOSTIC EXAMPLE:

QUERY

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

RESPONSE

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

Report slave ID [function code 11h]

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:

	1° Byte	2° Byte	3 - 4° Byte	
Start of Frame	**Address Field**	**Function Code**	**Check Sum**	**End of Frame**
Starting message marker	*Device address 0x01 ... 0xF7*	***0x11***	*CRC*	*End message marker*

RESPONSE:

	1° Byte	2° Byte	3° Byte	4° Byte	5° Byte	6° - 7° Byte	
Start of Frame	**Address Field**	**Function Code**	**Byte Count**	**Slave ID**	**Run Indicator Status**	**Check sum**	**End of Frame**
Starting message marker	*Device address 0x01 ... 0xF7*	**0x11**	*Number of data bytes (0x02)*	*identifier* ***0x73***	*status* ***0xFF***	*CRC*	*End message marker*

The normal response has the slave ID identifier (**0x73**) and the run indicator Status (**0xFF**).

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	0x73
Run indicator status	0xFF
Error Check (CRC)	0x??
	0x??

Read/Write multiple registers [function code 17h]

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

WARNING WRITE PART:

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 64 bytes)**

QUERY:

	1° Byte	2° Byte	3°-4° Byte	5-6° Byte	7-8° Byte	9°-10° Byte	11° Byte	n° Byte	n°+1 – n°+2	
Start of frame	**Address Field**	**Function Code**	**Start Read Address**	**Number of Read Registers**	**Start Write Address**	**Number of Write Registers**	**Number of Write Bytes**	**Data**	**Check sum**	**End of frame**
Starting message marker	*Device address 0x01 ... 0xF7*	**0x17**	*First register address to be read*	*Number of registers max 64 bytes to read*	*First register address to be written*	*Number of registers to be written*	*Number of data bytes**	*Data bytes***	*CRC*	*End message marker*

**: 1 register requires 2 data bytes.*
***: N of register x 2 = n. byte.*

WARNING READ PART:

It is possible to read more than one variable at the same time **(max 252 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:

	1° Byte	2° Byte	3° Byte	n° Byte	n°+1 – n°+2	
Start of Frame	**Address Field**	**Function Code**	**Number of Bytes**	**Data**	**Check Sum**	**End of Frame**
Starting message marker	*Device address 0x01 ... 0xF7*	**0x17**	*Number of data bytes **	*data bytes ***	*CRC*	*End message marker*

**: 1 register requires 2 data bytes.*
***: N of register x 2 = n. byte).*

Error message from slave to master

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

RESPONSE:

	1° Byte	2° Byte	3° Byte	4° - 5° Byte	
Start of Frame	**Address Field**	**Function Code**	**Error Code**	**Check Sum**	**End of Frame**
Starting message marker	*Device address 0x01 ... 0xF7*	*Operation code with bit 7 high*	*Message containing communication failure*	*CRC*	*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??
	0x??

RESPONSE

Field Name	Example (Hex)
Slave Address	0x 01
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
0x0F = Communication Protection Enabled
(password enabled)
Write PASSWORD parameter before retry.

Registers The following tables shown all the device registers.

Instantaneous (for float format see the next table)

Reg. HEX	Reg. DEC	Word	Description	R/W	M.U. *LMH=0*	M.U. *LMH=1****	M.U. *LMH=2*	Type	Group index
1000	4096	2	SYSTEM VOLTAGE	R	mV	mV	V	Unsigned	1
1002	4098	2	PHASE VOLTAGE L_{1-N}	R	mV	mV	V	Unsigned	2
1004	4100	2	PHASE VOLTAGE L_{2-N}	R	mV	mV	V	Unsigned	3
1006	4102	2	PHASE VOLTAGE L_{3-N}	R	mV	mV	V	Unsigned	4
1008	4104	2	LINE TO LINE VOLTAGE L_{1-2}	R	mV	mV	V	Unsigned	5
100A	4106	2	LINE TO LINE VOLTAGE L_{2-3}	R	mV	mV	V	Unsigned	6
100C	4108	2	LINE TO LINE VOLTAGE L_{3-1}	R	mV	mV	V	Unsigned	7
100E	4110	2	SYSTEM CURRENT	R	mA	mA	A	Unsigned	8
1010	4112	2	LINE CURRENT L_1	R	mA	mA	A	Unsigned	9
1012	4114	2	LINE CURRENT L_2	R	mA	mA	A	Unsigned	10
1014	4116	2	LINE CURRENT L_3	R	mA	mA	A	Unsigned	11
1016	4118	2	SYSTEM POWER FACTOR (*2*)	R	±1000			Signed	12
1018	4120	2	POWER FACTOR L_1 (*2*)	R	±1000			Signed	13
101A	4122	2	POWER FACTOR L_2 (*2*)	R	±1000			Signed	14
101C	4124	2	POWER FACTOR L_3 (*2*)	R	±1000			Signed	15
101E	4126	2	SYSTEM COS φ (*2*)	R	±1000			Signed	16
1020	4128	2	PHASE COS φ_1 (*2*)	R	±1000			Signed	17
1022	4130	2	PHASE COS φ_2 (*2*)	R	±1000			Signed	18
1024	4132	2	PHASE COS φ_3 (*2*)	R	±1000			Signed	19
1026	4134	2	SYSTEM APPARENT POWER	R	mVA	VA	kVA	Unsigned	20
1028	4136	2	APPARENT POWER L_1	R	mVA	VA	kVA	Unsigned	21
102A	4138	2	APPARENT POWER L_2	R	mVA	VA	kVA	Unsigned	22
102C	4140	2	APPARENT POWER L_3	R	mVA	VA	kVA	Unsigned	23
102E	4142	2	SYSTEM ACTIVE POWER	R	mW	W	kW	Signed	24
1030	4144	2	ACTIVE POWER L_1	R	mW	W	kW	Signed	25
1032	4146	2	ACTIVE POWER L_2	R	mW	W	kW	Signed	26
1034	4148	2	ACTIVE POWER L_3	R	mW	W	kW	Signed	27
1036	4150	2	SYSTEM REACTIVE POWER	R	mvar	var	kvar	Signed	28
1038	4152	2	REACTIVE POWER L_1	R	mvar	var	kvar	Signed	29
103A	4154	2	REACTIVE POWER L_2	R	mvar	var	kvar	Signed	30
103C	4156	2	REACTIVE POWER L_3	R	mvar	var	kvar	Signed	31
103E	4158	2	NEUTRAL CURRENT (*1*)	R	mA	mA	A	Unsigned	32
1040	4160	2	FREQUENCY	R	mHz			Unsigned	33
1042	4162	2	TEMPERATURE	R	d °C			Signed	34
1044	4164	2	THD VOLTAGE L_1 (*3*)	R	% * 100			Unsigned	35
1046	4166	2	THD VOLTAGE L_2 (*3*)	R	% * 100			Unsigned	36
1048	4168	2	THD VOLTAGE L_3 (*3*)	R	% * 100			Unsigned	37
104A	4170	2	THD CURRENT L_1 (*3*)	R	% * 100			Unsigned	38
104C	4172	2	THD CURRENT L_2 (*3*)	R	% * 100			Unsigned	39
104E	4174	2	THD CURRENT L_3 (*3*)	R	% * 100			Unsigned	40
1050	4176	2	ANGLE V_1-V_2 (*4*)	R	0 - 3600			Unsigned	41
1052	4178	2	ANGLE V_2-V_3 (*4*)	R	0 - 3600			Unsigned	42
1054	4180	2	ANGLE V_3-V_1 (*4*)	R	0 - 3600			Unsigned	43
1056	4182	2	SYSTEM TANGENT φ (*2*))	R	±100000			Signed	44
1058	4184	2	PHASE TANGENT φ_1 (*2*)	R	±100000			Signed	45
105A	4186	2	PHASE TANGENT φ_2 (*2*)	R	±100000			Signed	46
105C	4188	2	PHASE TANGENT φ_3 (*2*)	R	±100000			Signed	47
105E	4190	2	EXP. SYS ACTIVE POWER (mobile or fixed prevision)	R	mW	W	kW	Signed	48
1060	4192	2	EXP. ACTIVE POWER L_1 (mobile or fixed prevision)	R	mW	W	kW	Signed	49
1062	4194	2	EXP. ACTIVE POWER L_2 (mobile or fixed prevision)	R	mW	W	kW	Signed	50
1064	4196	2	EXP. ACTIVE POWER L_3 (mobile or fixed prevision)	R	mW	W	kW	Signed	51
1066	4198	2	ANGLE V_1-A_1	R	0 - 3600			Unsigned	52
1068	4200	2	ANGLE V_2-A_2	R	0 - 3600			Unsigned	53
106A	4202	2	ANGLE V_3-A_3	R	0 - 3600			Unsigned	54
106C	4204	2	ANGLE A_1-A_2	R	0 - 3600			Unsigned	55
106E	4206	2	ANGLE A_2-A_3	R	0 - 3600			Unsigned	56
1070	4208	2	ANGLE A_3-A_1	R	0 - 3600			Unsigned	57
1072	4210	2	FREQUENCY COMBINED (AVG L1-L2-L3)	R	mHz			Unsigned	58
1074	4212	2	FREQUENCY L_1	R	mHz			Unsigned	59
1076	4214	2	FREQUENCY L_2	R	mHz			Unsigned	60
1078	4216	2	FREQUENCY L_3	R	mHz			Unsigned	61
107A	4218	2	FREQUENCY L_{12}	R	mHz			Signed	62
107C	4220	2	FREQUENCY L_{23}	R	mHz			Signed	63
107E	4222	2	FREQUENCY L_{31}	R	mHz			Signed	64
1080	4224	2	VOLTAGE UNBALANCED	R	mV	mV	V	Signed	65
1082	4226	2	CURRENT UNBALANCED	R	mV	mV	V	Signed	66
1084	4228	2	CREST FACTOR VOLTAGE L_1	R	thousandths			Unsigned	67
1086	4230	2	CREST FACTOR VOLTAGE L_2	R	thousandths			Unsigned	68
1088	4232	2	CREST FACTOR VOLTAGE L_3	R	thousandths			Unsigned	69
108A	4234	2	CREST FACTOR CURRENT L_1	R	thousandths			Unsigned	70
108C	4236	2	CREST FACTOR CURRENT L_2	R	thousandths			Unsigned	71
108E	4238	2	CREST FACTOR CURRENT L_3	R	thousandths			Unsigned	72
1090	4240	2	CREST FACTOR NEUTRAL CURRENT	R	thousandths			Unsigned	73
1092	4242	2	THD VOLTAGE L_{12} (*3*)	R	% * 100			Unsigned	74

1094	4244	2	THD VOLTAGE L_{23} (*3*)	R	% * 100			Unsigned	75
1096	4246	2	THD VOLTAGE L_{31} (*3*)	R	% * 100			Unsigned	76
1098	4248	2	PHASE-PHASE VOLTAGE ASYMMETRY	R	% * 100			Unsigned	77
109A	4250	2	PHASE-NEUTRAL VOLTAGE ASYMMETRY	R	% * 100			Unsigned	78
109C	4252	2	CURRENT ASYMMETRY	R	% * 100			Unsigned	79
109E	4254	2	PHASE VOLTAGE L_{1-N} - HALF CYCLE ****	R	mV	mV	V	Unsigned	80
10A0	4256	2	PHASE VOLTAGE L_{2-N} - HALF CYCLE ****	R	mV	mV	V	Unsigned	81
10A2	4258	2	PHASE VOLTAGE L_{3-N} - HALF CYCLE ****	R	mV	mV	V	Unsigned	82
10A4	4260	2	LINE CURRENT L_1 - HALF CYCLE ****	R	mA	mA	A	Unsigned	83
10A6	4262	2	LINE CURRENT L_2 - HALF CYCLE ****	R	mA	mA	A	Unsigned	84
10A8	4264	2	LINE CURRENT L_3 - HALF CYCLE ****	R	mA	mA	A	Unsigned	85
10AA	4266	2	LINE CURRENT N - HALF CYCLE ****	R	mA	mA	A	Unsigned	86
10AC	4268	2	PHASE VOLTAGE L_{1-N} - 1012	R	mV	mV	V	Unsigned	87
10AE	4270	2	PHASE VOLTAGE L_{2-N} - 1012	R	mV	mV	V	Unsigned	88
10B0	4272	2	PHASE VOLTAGE L_{3-N} - 1012	R	mV	mV	V	Unsigned	89
10B2	4274	2	LINE CURRENT L_1 - 1012	R	mA	mA	A	Unsigned	90
10B4	4276	2	LINE CURRENT L_2 - 1012	R	mA	mA	A	Unsigned	91
10B6	4278	2	LINE CURRENT L_3 - 1012	R	mA	mA	A	Unsigned	92
10B8	4280	2	LINE CURRENT N - 1012	R	mA	mA	A	Unsigned	93
10BA	4282	2	CREST FACTOR VOLTAGE L_{1-2}	R	thousandths			Unsigned	94
10BC	4284	2	CREST FACTOR VOLTAGE L_{2-3}	R	thousandths			Unsigned	95
10BE	4286	2	CREST FACTOR VOLTAGE L_{3-1}	R	thousandths			Unsigned	96
10C0	4288	2	THD CURRENT N	R	% * 100			Unsigned	97
10C2	4290	2	CURRENT SUM	R	mA	mA	A	Unsigned	98
10C4	4292	2	TDD CURRENT L_1	R	% * 100			Unsigned	99
10C6	4294	2	TDD CURRENT L_2	R	% * 100			Unsigned	100
10C8	4296	2	TDD CURRENT L_3	R	% * 100			Unsigned	101
10CA	4298	2	TDD CURRENT N	R	% * 100			Unsigned	102
10CC	4300	2	SYSTEM POWER FACTOR CORRECTION	R	mvar	var	kvar	Signed	103
10CE	4302	2	POWER FACTOR CORRECTION L_1	R	mvar	var	kvar	Signed	104
10D0	4304	2	POWER FACTOR CORRECTION L_2	R	mvar	var	kvar	Signed	105
10D2	4306	2	POWER FACTOR CORRECTION L_3	R	mvar	var	kvar	Signed	106
10D4	4308	2	ESTIMATED AMBIENT TEMPERATURE	R	d°C			Signed	107
10D6	4310	2	DO STATE	R	-			Bit	108
10D8	4312	2	DI STATE	R	-			Bit	109
10DA	4314	2	DO 1 STATE	R	-			Unsigned	110
10DC	4316	2	DO 2 STATE	R	-			Unsigned	111
10DE	4318	2	DO 3 STATE	R	-			Unsigned	112
10E0	4320	2	DO 4 STATE	R	-			Unsigned	113
10E2	4322	2	DO 5 STATE	R	-			Unsigned	114
10E4	4324	2	DO 6 STATE	R	-			Unsigned	115
10E6	4326	2	DO 7 STATE	R	-			Unsigned	116
10E8	4328	2	DO 8 STATE	R	-			Unsigned	117
10EA	4330	2	DI 1 STATE	R	-			Unsigned	118
10EC	4332	2	DI 2 STATE	R	-			Unsigned	119
10EE	4334	2	DI 3 STATE	R	-			Unsigned	120
10F0	4336	2	DI 4 STATE	R	-			Unsigned	121
10F2	4338	2	DI 5 STATE	R	-			Unsigned	122
10F4	4340	2	DI 6 STATE	R	-			Unsigned	123
10F6	4342	2	DI 7 STATE	R	-			Unsigned	124
10F8	4344	2	DI 8 STATE	R	-			Unsigned	125
10FA	4346	2	EXT. DI LOGIC STATE	R	-			Bit	126
10FC	4348	2	EXT. DI 01 LOGIC STATE	R	-			Unsigned	127
10FE	4350	2	EXT. DI 02 LOGIC STATE	R	-			Unsigned	128
1100	4352	2	EXT. DI 03 LOGIC STATE	R	-			Unsigned	129
1102	4354	2	EXT. DI 04 LOGIC STATE	R	-			Unsigned	130
1104	4356	2	EXT. DI 05 LOGIC STATE	R	-			Unsigned	131
1106	4358	2	EXT. DI 06 LOGIC STATE	R	-			Unsigned	132
1108	4360	2	EXT. DI 07 LOGIC STATE	R	-			Unsigned	133
110A	4362	2	EXT. DI 08 LOGIC STATE	R	-			Unsigned	134
110C	4364	2	EXT. DI 09 LOGIC STATE	R	-			Unsigned	135
110E	4366	2	EXT. DI 10 LOGIC STATE	R	-			Unsigned	136
1110	4368	2	EXT. DI 11 LOGIC STATE	R	-			Unsigned	137
1112	4370	2	EXT. DI 12 LOGIC STATE	R	-			Unsigned	138
1114	4372	2	EXT. DI 13 LOGIC STATE	R	-			Unsigned	139
1116	4374	2	EXT. DI 14 LOGIC STATE	R	-			Unsigned	140
1118	4376	2	EXT. DI 15 LOGIC STATE	R	-			Unsigned	141
111A	4378	2	EXT. DI 16 LOGIC STATE	R	-			Unsigned	142

(*1*): calculated or measured, according with device version and command NEUTRAL CURRENT USED

(*2*): Examples: +1000 is equal to +1.000 and -200 is equal to -0.200

(*3*): Examples: 100'00 equal to 100,00% and 50'00 equal to 50,00%

(*4*): Example: 1200 equal to 120,0°

***: Default measure unit – see Unit and Modality setup → LMH

****: only for EMA

Instantaneous - float format

Reg. HEX	Reg. DEC	Word	Description	R/W	Measure unit	Type	Group index
A00	2560	2	SYSTEM VOLTAGE	R	V	Float	1
A02	2562	2	PHASE VOLTAGE L_{1-N}	R	V	Float	2
A04	2564	2	PHASE VOLTAGE L_{2-N}	R	V	Float	3
A06	2566	2	PHASE VOLTAGE L_{3-N}	R	V	Float	4
A08	2568	2	LINE TO LINE VOLTAGE L_{1-2}	R	V	Float	5
A0A	2570	2	LINE TO LINE VOLTAGE L_{2-3}	R	V	Float	6
A0C	2572	2	LINE TO LINE VOLTAGE L_{3-1}	R	V	Float	7
A0E	2574	2	SYSTEM CURRENT	R	A	Float	8
A10	2576	2	LINE CURRENT L_1	R	A	Float	9
A12	2578	2	LINE CURRENT L_2	R	A	Float	10
A14	2580	2	LINE CURRENT L_3	R	A	Float	11
A16	2582	2	SYSTEM POWER FACTOR	R	±1	Float	12
A18	2584	2	POWER FACTOR L_1	R	±1	Float	13
A1A	2586	2	POWER FACTOR L_2	R	±1	Float	14
A1C	2588	2	POWER FACTOR L_3	R	±1	Float	15
A1E	2590	2	SYSTEM COS φ	R	±1	Float	16
A20	2592	2	PHASE COS φ_1	R	±1	Float	17
A22	2594	2	PHASE COS φ_2	R	±1	Float	18
A24	2596	2	PHASE COS φ_3	R	±1	Float	19
A26	2598	2	SYSTEM APPARENT POWER	R	VA	Float	20
A28	2600	2	APPARENT POWER L_1	R	VA	Float	21
A2A	2602	2	APPARENT POWER L_2	R	VA	Float	22
A2C	2604	2	APPARENT POWER L_3	R	VA	Float	23
A2E	2606	2	SYSTEM ACTIVE POWER	R	W	Float	24
A30	2608	2	ACTIVE POWER L_1	R	W	Float	25
A32	2610	2	ACTIVE POWER L_2	R	W	Float	26
A34	2612	2	ACTIVE POWER L_3	R	W	Float	27
A36	2614	2	SYSTEM REACTIVE POWER	R	var	Float	28
A38	2616	2	REACTIVE POWER L_1	R	var	Float	29
A3A	2618	2	REACTIVE POWER L_2	R	var	Float	30
A3C	2620	2	REACTIVE POWER L_3	R	var	Float	31
A3E	2622	2	NEUTRAL CURRENT (*1*)	R	A	Float	32
A40	2624	2	FREQUENCY	R	Hz	Float	33
A42	2626	2	TEMPERATURE	R	d °C	Float	34
A44	2628	2	THD VOLTAGE L_1	R	%	Float	35
A46	2630	2	THD VOLTAGE L_2	R	%	Float	36
A48	2632	2	THD VOLTAGE L_3	R	%	Float	37
A4A	2634	2	THD CURRENT L_1	R	%	Float	38
A4C	2636	2	THD CURRENT L_2	R	%	Float	39
A4E	2638	2	THD CURRENT L_3	R	%	Float	40
A50	2640	2	ANGLE V_1-V_2	R	0 – 360	Float	41
A52	2642	2	ANGLE V_2-V_3	R	0 – 360	Float	42
A54	2644	2	ANGLE V_3-V_1	R	0 - 360	Float	43
A56	2646	2	SYSTEM TANGENT φ	R	±100	Float	44
A58	2648	2	PHASE TANGENT φ_1	R	±100	Float	45
A5A	2650	2	PHASE TANGENT φ_2	R	±100	Float	46
A5C	2652	2	PHASE TANGENT φ_3	R	±100	Float	47
A5E	2654	2	EXP. SYS ACTIVE POWER (mobile or fixed prevision)	R	W	Float	48
A60	2656	2	EXP. ACTIVE POWER L_1 (mobile or fixed prevision)	R	W	Float	49
A62	2658	2	EXP. ACTIVE POWER L_2 (mobile or fixed prevision)	R	W	Float	50
A64	2660	2	EXP. ACTIVE POWER L_3 (mobile or fixed prevision)	R	W	Float	51
A66	2662	2	ANGLE V_1-A_1	R	0 – 360	Float	52
A68	2664	2	ANGLE V_2-A_2	R	0 – 360	Float	53
A6A	2666	2	ANGLE V_3-A_3	R	0 – 360	Float	54
A6C	2668	2	ANGLE A_1-A_2	R	0 – 360	Float	55
A6E	2670	2	ANGLE A_2-A_3	R	0 – 360	Float	56
A70	2672	2	ANGLE A_3-A_1	R	0 – 360	Float	57
A72	2674	2	FREQUENCY COMBINED (AVG L1-L2-L3)	R	Hz	Float	58
A74	2676	2	FREQUENCY L_1	R	Hz	Float	59
A76	2678	2	FREQUENCY L_2	R	Hz	Float	60
A78	2680	2	FREQUENCY L_3	R	Hz	Float	61
A7A	2682	2	FREQUENCY L_{12}	R	Hz	Float	62
A7C	2684	2	FREQUENCY L_{23}	R	Hz	Float	63
A7E	2686	2	FREQUENCY L_{31}	R	Hz	Float	64
A80	2688	2	VOLTAGE UNBALANCED	R	V	Float	65
A82	2690	2	CURRENT UNBALANCED	R	V	Float	66
A84	2692	2	CREST FACTOR VOLTAGE L_1	R	-	Float	67
A86	2694	2	CREST FACTOR VOLTAGE L_2	R	-	Float	68
A88	2696	2	CREST FACTOR VOLTAGE L_3	R	-	Float	69
A8A	2698	2	CREST FACTOR CURRENT L_1	R	-	Float	70
A8C	2700	2	CREST FACTOR CURRENT L_2	R	-	Float	71
A8E	2702	2	CREST FACTOR CURRENT L_3	R	-	Float	72
A90	2704	2	CREST FACTOR NEUTRAL CURRENT	R	-	Float	73
A92	2706	2	THD VOLTAGE L_{12}	R	%	Float	74
A94	2708	2	THD VOLTAGE L_{23}	R	%	Float	75
A96	2710	2	THD VOLTAGE L_{31}	R	%	Float	76

A98	2712	2	PHASE-PHASE VOLTAGE ASYMMETRY	R	%	Float	77
A9A	2714	2	PHASE-NEUTRAL VOLTAGE ASYMMETRY	R	%	Float	78
A9C	2716	2	CURRENT ASYMMETRY	R	%	Float	79
A9E	2718	2	PHASE VOLTAGE L_{1-N} - HALF CYCLE ****	R	V	Float	80
AA0	2720	2	PHASE VOLTAGE L_{2-N} - HALF CYCLE ****	R	V	Float	81
AA2	2722	2	PHASE VOLTAGE L_{3-N} - HALF CYCLE ****	R	V	Float	82
AA4	2724	2	LINE CURRENT L_1 - HALF CYCLE ****	R	A	Float	83
AA6	2726	2	LINE CURRENT L_2 - HALF CYCLE ****	R	A	Float	84
AA8	2728	2	LINE CURRENT L_3 - HALF CYCLE ****	R	A	Float	85
AAA	2730	2	LINE CURRENT N - HALF CYCLE ****	R	A	Float	86
AAC	2732	2	PHASE VOLTAGE L_{1-N} - 1012	R	V	Float	87
AAE	2734	2	PHASE VOLTAGE L_{2-N} - 1012	R	V	Float	88
AB0	2736	2	PHASE VOLTAGE L_{3-N} - 1012	R	V	Float	89
AB2	2738	2	LINE CURRENT L_1 - 1012	R	A	Float	90
AB4	2740	2	LINE CURRENT L_2 - 1012	R	A	Float	91
AB6	2742	2	LINE CURRENT L_3 - 1012	R	A	Float	92
AB8	2744	2	LINE CURRENT N - 1012	R	A	Float	93
ABA	2746	2	CREST FACTOR VOLTAGE L_{1-2}	R	-	Float	94
ABC	2748	2	CREST FACTOR VOLTAGE L_{2-3}	R	-	Float	95
ABE	2750	2	CREST FACTOR VOLTAGE L_{3-1}	R	-	Float	96
AC0	2752	2	THD CURRENT N	R	%	Float	97
AC2	2754	2	CURRENT SUM	R	A	Float	98
AC4	2756	2	TDD CURRENT L_1	R	%	Float	99
AC6	2758	2	TDD CURRENT L_2	R	%	Float	100
AC8	2760	2	TDD CURRENT L_3	R	%	Float	101
ACA	2762	2	TDD CURRENT N	R	%	Float	102
ACC	2764	2	SYSTEM POWER FACTOR CORRECTION	R	var	Float	103
ACE	2766	2	POWER FACTOR CORRECTION L_1	R	var	Float	104
AD0	2768	2	POWER FACTOR CORRECTION L_2	R	var	Float	105
AD2	2770	2	POWER FACTOR CORRECTION L_3	R	var	Float	106
AD4	2772	2	ESTIMATED AMBIENT TEMPERATURE	R	d°C	Float	107

('1'): calculated or measured, according with device version and command NEUTRAL CURRENT USED

('5'): Only if present neutral current input.

****: only for EMA

Harmonics

Harmonics voltage L1

Reg. HEX	Reg. DEC	Word	Description	R/W	Measure Unit	Type
100	256	2	1ST HARMONIC *(Fundamental)*	R	% * 100	Unsigned
102	258	2	2ND HARMONIC	R	% * 100	Unsigned
104	260	2	3RD HARMONIC	R	% * 100	Unsigned
106	262	2	4TH HARMONIC	R	% * 100	Unsigned
108	264	2	5TH HARMONIC	R	% * 100	Unsigned
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17C	380	2	63TH HARMONIC	R	% * 100	Unsigned

Harmonics voltage L2

Reg. HEX	Reg. DEC	Word	Description	R/W	Measure Unit	Type
200	512	2	1ST HARMONIC *(Fundamental)*	R	% * 100	Unsigned
---	---	---	---	---	---	---
27C	636	2	63TH HARMONIC *	R	% * 100	Unsigned

Harmonics voltage L3

Reg. HEX	Reg. DEC	Word	Description	R/W	Measure Unit	Type
300	768	2	1ST HARMONIC *(Fundamental)*	R	% * 100	Unsigned
---	---	---	---	---	---	---
37C	892	2	63TH HARMONIC *	R	% * 100	Unsigned

Harmonics current L1

Reg. HEX	Reg. DEC	Word	Description	R/W	Measure Unit	Type
400	1024	2	1ST HARMONIC *(Fundamental)*	R	% * 100	Unsigned
---	---	---	---	---	---	---
47C	1148	2	63TH HARMONIC *	R	% * 100	Unsigned

Harmonics current L2

Reg. HEX	Reg. DEC	Word	Description	R/W	Measure Unit	Type
500	1280	2	1ST HARMONIC *(Fundamental)*	R	% * 100	Unsigned
---	---	---	---	---	---	---
57C	1404	2	63TH HARMONIC *	R	% * 100	Unsigned

Harmonics current L3

Reg. HEX	Reg. DEC	Word	Description	R/W	Measure Unit	Type
600	1536	2	1ST HARMONIC *(Fundamental)*	R	% * 100	Unsigned
---	---	---	---	---	---	---
67C	1660	2	63TH HARMONIC *	R	% * 100	Unsigned

Harmonics current N

Reg. HEX	Reg. DEC	Word	Description	R/W	Measure Unit	Type
700	1792	2	1ST HARMONIC *(Fundamental)*	R	% * 100	Unsigned
---	---	---	---	---	---	---
77C	1916	2	63TH HARMONIC *	R	% * 100	Unsigned

Harmonics voltage L12

Reg. HEX	Reg. DEC	Word	Description	R/W	Measure Unit	Type
D00	3328	2	1ST HARMONIC *(Fundamental)*	R	% * 100	Unsigned
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D7C	3452	2	63TH HARMONIC *	R	% * 100	Unsigned

Harmonics voltage L23

Reg. HEX	Reg. DEC	Word	Description	R/W	Measure Unit	Type
E00	3584	2	1ST HARMONIC *(Fundamental)*	R	% * 100	Unsigned
---	---	---	---	---	---	---
E7C	3708	2	63TH HARMONIC *	R	% * 100	Unsigned

Harmonics voltage L31

Reg. HEX	Reg. DEC	Word	Description	R/W	Measure Unit	Type
F00	3840	2	1ST HARMONIC *(Fundamental)*	R	% * 100	Unsigned
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F7C	3964	2	63TH HARMONIC *	R	% * 100	Unsigned

Version note: for EMS last harmonic is **32TH**.

Warning: All Harmonics are update every 60s. [Read Examples: 10000 equal to 100,00% - 5000 equal to 50,00%].
Note: fundamental harmonic is ALWAYS considered AT 100.00%.

Energies - Totals

Reg. HEX	Reg. DEC	Word	Description	R/W	M.U. *LMH=0*	M.U. *LMH=1****	M.U. *LMH=2*	Type	Group index
1400	5120	2	SYSTEM ACTIVE ENERGY IN	R	100*mWh	100*Wh	100*kWh	Unsigned	1
1402	5122	2	SYSTEM ACTIVE ENERGY OUT	R	100*mWh	100*Wh	100*kWh	Unsigned	2
1404	5124	2	SYSTEM REACTIVE ENERGY IN	R	100*mvarh	100*varh	100*kvarh	Unsigned	3
1406	5126	2	SYSTEM REACTIVE ENERGY OUT	R	100*mvarh	100*varh	100*kvarh	Unsigned	4
1408	5128	2	SYSTEM APPARENT ENERGY	R	100*mVAh	100*VAh	100*kVAh	Unsigned	5
140A	5130	2	ACTIVE ENERGY IN L_1	R	100*mWh	100*Wh	100*kWh	Unsigned	6
140C	5132	2	ACTIVE ENERGY OUT L_1	R	100*mWh	100*Wh	100*kWh	Unsigned	7
140E	5134	2	REACTIVE ENERGY IN L_1	R	100*mvarh	100*varh	100*kvarh	Unsigned	8
1410	5136	2	REACTIVE ENERGY OUT L_1	R	100*mvarh	100*varh	100*kvarh	Unsigned	9
1412	5138	2	APPARENT ENERGY L_1	R	100*mVAh	100*VAh	100*kVAh	Unsigned	10
1414	5140	2	ACTIVE ENERGY IN L_2	R	100*mWh	100*Wh	100*kWh	Unsigned	11
1416	5142	2	ACTIVE ENERGY OUT L_2	R	100*mWh	100*Wh	100*kWh	Unsigned	12
1418	5144	2	REACTIVE ENERGY IN L_2	R	100*mvarh	100*varh	100*kvarh	Unsigned	13
141A	5146	2	REACTIVE ENERGY OUT L_2	R	100*mvarh	100*varh	100*kvarh	Unsigned	14
141C	5148	2	APPARENT ENERGY L_2	R	100*mVah	100*Vah	100*kVah	Unsigned	15
141E	5150	2	ACTIVE ENERGY IN L_3	R	100*mWh	100*Wh	100*kWh	Unsigned	16
1420	5152	2	ACTIVE ENERGY OUT L_3	R	100*mWh	100*Wh	100*kWh	Unsigned	17
1422	5154	2	REACTIVE ENERGY IN L_3	R	100*mvarh	100*varh	100*kvarh	Unsigned	18
1424	5156	2	REACTIVE ENERGY OUT L_3	R	100*mvarh	100*varh	100*kvarh	Unsigned	19
1426	5158	2	APPARENT ENERGY L_3	R	100*mVAh	100*VAh	100*kVAh	Unsigned	20
1428	5160	2	SYSTEM REACTIVE ENERGY Q1	R	100*mvarh	100*varh	100*kvarh	Unsigned	21
142A	5162	2	SYSTEM REACTIVE ENERGY Q2	R	100*mvarh	100*varh	100*kvarh	Unsigned	22
142C	5164	2	SYSTEM REACTIVE ENERGY Q3	R	100*mvarh	100*varh	100*kvarh	Unsigned	23
142E	5166	2	SYSTEM REACTIVE ENERGY Q4	R	100*mvarh	100*varh	100*kvarh	Unsigned	24
1430	5168	2	REACTIVE ENERGY Q1 L_1	R	100*mvarh	100*varh	100*kvarh	Unsigned	25
1432	5170	2	REACTIVE ENERGY Q2 L_1	R	100*mvarh	100*varh	100*kvarh	Unsigned	26
1434	5172	2	REACTIVE ENERGY Q3 L_1	R	100*mvarh	100*varh	100*kvarh	Unsigned	27
1436	5174	2	REACTIVE ENERGY Q4 L_1	R	100*mvarh	100*varh	100*kvarh	Unsigned	28
1438	5176	2	REACTIVE ENERGY Q1 L_2	R	100*mvarh	100*varh	100*kvarh	Unsigned	29
143A	5178	2	REACTIVE ENERGY Q2 L_2	R	100*mvarh	100*varh	100*kvarh	Unsigned	30
143C	5180	2	REACTIVE ENERGY Q3 L_2	R	100*mvarh	100*varh	100*kvarh	Unsigned	31
143E	5182	2	REACTIVE ENERGY Q4 L_2	R	100*mvarh	100*varh	100*kvarh	Unsigned	32
1440	5184	2	REACTIVE ENERGY Q1 L_3	R	100*mvarh	100*varh	100*kvarh	Unsigned	33
1442	5186	2	REACTIVE ENERGY Q2 L_3	R	100*mvarh	100*varh	100*kvarh	Unsigned	34
1444	5188	2	REACTIVE ENERGY Q3 L_3	R	100*mvarh	100*varh	100*kvarh	Unsigned	35
1446	5190	2	REACTIVE ENERGY Q4 L_3	R	100*mvarh	100*varh	100*kvarh	Unsigned	36

Warning: All the energy values restart from 0 after the 100'000'000 kWh [1'000'000'000 * 100*Wh]

"***": Default measure unit – see Unit and Modality setup → LMH

Energies – Totals – float format

Note: format not supported for RDU and MONITOR version.

Reg. HEX	Reg. DEC	Word	Description	R/W	Measure unit	Type	Group index
B00	2816	2	SYSTEM ACTIVE ENERGY IN	R	kWh	Float	1
B02	2818	2	SYSTEM ACTIVE ENERGY OUT	R	kWh	Float	2
B04	2820	2	SYSTEM REACTIVE ENERGY IN	R	kvarh	Float	3
B06	2822	2	SYSTEM REACTIVE ENERGY OUT	R	kvarh	Float	4
B08	2824	2	SYSTEM APPARENT ENERGY	R	kVAh	Float	5
B0A	2826	2	ACTIVE ENERGY IN L_1	R	kWh	Float	6
B0C	2828	2	ACTIVE ENERGY OUT L_1	R	kWh	Float	7
B0E	2830	2	REACTIVE ENERGY IN L_1	R	kvarh	Float	8
B10	2832	2	REACTIVE ENERGY OUT L_1	R	kvarh	Float	9
B12	2834	2	APPARENT ENERGY L_1	R	kVAh	Float	10
B14	2836	2	ACTIVE ENERGY IN L_2	R	kWh	Float	11
B16	2838	2	ACTIVE ENERGY OUT L_2	R	kWh	Float	12
B18	2840	2	REACTIVE ENERGY IN L_2	R	kvarh	Float	13
B1A	2842	2	REACTIVE ENERGY OUT L_2	R	kvarh	Float	14
B1C	2844	2	APPARENT ENERGY L_2	R	kVah	Float	15
B1E	2846	2	ACTIVE ENERGY IN L_3	R	kWh	Float	16
B20	2848	2	ACTIVE ENERGY OUT L_3	R	kWh	Float	17
B22	2850	2	REACTIVE ENERGY IN L_3	R	kvarh	Float	18
B24	2852	2	REACTIVE ENERGY OUT L_3	R	kvarh	Float	19
B26	2854	2	APPARENT ENERGY L_3	R	kVAh	Float	20
B28	2856	2	SYSTEM REACTIVE ENERGY Q1	R	kvarh	Float	21
B2A	2858	2	SYSTEM REACTIVE ENERGY Q2	R	kvarh	Float	22
B2C	2860	2	SYSTEM REACTIVE ENERGY Q3	R	kvarh	Float	23
B2E	2862	2	SYSTEM REACTIVE ENERGY Q4	R	kvarh	Float	24
B30	2864	2	REACTIVE ENERGY Q1 L_1	R	kvarh	Float	25
B32	2866	2	REACTIVE ENERGY Q2 L_1	R	kvarh	Float	26
B34	2868	2	REACTIVE ENERGY Q3 L_1	R	kvarh	Float	27
B36	2870	2	REACTIVE ENERGY Q4 L_1	R	kvarh	Float	28
B38	2872	2	REACTIVE ENERGY Q1 L_2	R	kvarh	Float	29
B3A	2874	2	REACTIVE ENERGY Q2 L_2	R	kvarh	Float	30
B3C	2876	2	REACTIVE ENERGY Q3 L_2	R	kvarh	Float	31
B3E	2878	2	REACTIVE ENERGY Q4 L_2	R	kvarh	Float	32
B40	2880	2	REACTIVE ENERGY Q1 L_3	R	kvarh	Float	33
B42	2882	2	REACTIVE ENERGY Q2 L_3	R	kvarh	Float	34
B44	2884	2	REACTIVE ENERGY Q3 L_3	R	kvarh	Float	35
B46	2886	2	REACTIVE ENERGY Q4 L_3	R	kvarh	Float	36

Energies - Timeband

Timeband 1

Reg. HEX	Reg. DEC	Word	Description	R/W	M.U. *LMH=0*	M.U. *LMH=1****	M.U. *LMH=2*	Type
1450	5200	2	SYSTEM ACTIVE ENERGY IN	R	100*mWh	100*Wh	100*kWh	Unsigned
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1496	5270	2	REACTIVE ENERGY Q4 L_3	R	100*mvarh	100*varh	100*kvarh	Unsigned

Warning: All the energy values restart from 0 after the 100'000'000 kWh [1'000'000'000 * 100*Wh]

***: Default measure unit – see Unit and Modality setup → LMH

Timeband 2	First parameter 0x14A0 hex – 5280 dec,	Last parameter 0x14E6 hex – 5350 dec
Timeband 3	First parameter 0x14F0 hex – 5360 dec,	Last parameter 0x1536 hex – 5430 dec
Timeband 4	First parameter 0x1540 hex – 5440 dec,	Last parameter 0x1586 hex – 5510 dec
Timeband 5	First parameter 0x1590 hex – 5520 dec,	Last parameter 0x15D6 hex – 5590 dec
Timeband 6	First parameter 0x15E0 hex – 5600 dec,	Last parameter 0x1626 hex – 5670 dec
Timeband 7	First parameter 0x1630 hex – 5680 dec,	Last parameter 0x1676 hex – 5750 dec
Timeband 8	First parameter 0x1680 hex – 5760 dec,	Last parameter 0x16C6 hex – 5830 dec
Timeband 9	First parameter 0x16D0 hex – 5840 dec,	Last parameter 0x1716 hex – 5910 dec
Timeband 10	First parameter 0x1720 hex – 5920 dec,	Last parameter 0x1766 hex – 5990 dec
Timeband 11	First parameter 0x1770 hex – 6000 dec,	Last parameter 0x17B6 hex – 6070 dec
Timeband 12	First parameter 0x17C0 hex – 6080 dec,	Last parameter 0x1806 hex – 6150 dec
Timeband 13	First parameter 0x1810 hex – 6160 dec,	Last parameter 0x1856 hex – 6230 dec
Timeband 14	First parameter 0x1860 hex – 6240 dec,	Last parameter 0x18A6 hex – 6310 dec
Timeband 15	First parameter 0x18B0 hex – 6320 dec,	Last parameter 0x18F6 hex – 6390 dec
Timeband 16	First parameter 0x1900 hex – 6400 dec,	Last parameter 0x1946 hex – 6470 dec

Max Demand

Total power max demand (mobile or fixed window)

Reg. HEX	Reg. DEC	Word	Description	R/W	M.U. *LMH=0*	M.U. *LMH=1***	M.U. *LMH=2*	Type
1A00	6656	2	TIME*	R	---	---	---	Unsigned
1A02	6658	2	DATE**	R	---	---	---	Unsigned
1A04	6660	2	SYSTEM ACTIVE POWER	R	mW	W	kW	Signed
1A06	6662	2	TIME*	R	---	---	---	Unsigned
1A08	6664	2	DATE**	R	---	---	---	Unsigned
1A0A	6666	2	ACTIVE POWER L_1	R	mW	W	kW	Signed
1A0C	6668	2	TIME*	R	---	---	---	Unsigned
1A0E	6670	2	DATE**	R	---	---	---	Unsigned
1A10	6672	2	ACTIVE POWER L_2	R	mW	W	kW	Signed
1A12	6674	2	TIME*	R	---	---	---	Unsigned
1A14	6676	2	DATE**	R	---	---	---	Unsigned
1A16	6678	2	ACTIVE POWER L_3	R	mW	W	kW	Signed
1A18	6680	2	TIME*	R	---	---	---	Unsigned
1A1A	6682	2	DATE**	R	---	---	---	Unsigned
1A1C	6684	2	SYSTEM REACTIVE POWER	R	mvar	var	kvar	Signed
1A1E	6686	2	TIME*	R	---	---	---	Unsigned
1A20	6688	2	DATE**	R	---	---	---	Unsigned
1A22	6690	2	REACTIVE POWER L_1	R	mvar	var	kvar	Signed
1A24	6692	2	TIME*	R	---	---	---	Unsigned
1A26	6694	2	DATE**	R	---	---	---	Unsigned
1A28	6696	2	REACTIVE POWER L_2	R	mvar	var	kvar	Signed
1A2A	6698	2	TIME*	R	---	---	---	Unsigned
1A2C	6700	2	DATE**	R	---	---	---	Unsigned
1A2E	6702	2	REACTIVE POWER L_3	R	mvar	var	kvar	Signed

*: byte order/meaning: EMPTY, HOUR, MINUTE, SECOND
**: byte order/meaning: DAY, MONTH, YEAR, YEAR
***: Default measure unit – see Unit and Modality setup → LMH

Timeband 1 power max demand (mobile or fixed window)

Reg. HEX	Reg. DEC	Word	Description	R/W	M.U. *LMH=0*	M.U. *LMH=1***	M.U. *LMH=2*	Type
1A50	6736	2	TIME*	R	---	---	---	Unsigned
---	---	---	---	---	---	---	---	---
1A7E	6782	2	REACTIVE POWER L_3	R	mvar	var	kvar	Signed

*: byte order/meaning: EMPTY, HOUR, MINUTE, SECOND
**: byte order/meaning: DAY, MONTH, YEAR, YEAR
***: Default measure unit – see Unit and Modality setup → LMH

Timeband 2 power max demand (mobile or fixed window)	First parameter 0x1AA0 hex – 6816 dec,	Last parameter 0x1ACE hex – 6862 dec
Timeband 3 power max demand (mobile or fixed window)	First parameter 0x1AF0 hex – 6896 dec,	Last parameter 0x1B1E hex – 6942 dec
Timeband 4 power max demand (mobile or fixed window)	First parameter 0x1B40 hex – 6976 dec,	Last parameter 0x1B6E hex – 7022 dec
Timeband 5 power max demand (mobile or fixed window)	First parameter 0x1B90 hex – 7056 dec,	Last parameter 0x1BBE hex – 7102 dec
Timeband 6 power max demand (mobile or fixed window)	First parameter 0x1BE0 hex – 7136 dec,	Last parameter 0x1C0E hex – 7182 dec
Timeband 7 power max demand (mobile or fixed window)	First parameter 0x1C30 hex – 7216 dec,	Last parameter 0x1C5E hex – 7262 dec
Timeband 8 power max demand (mobile or fixed window)	First parameter 0x1C80 hex – 7296 dec,	Last parameter 0x1CAE hex – 7342 dec
Timeband 9 power max demand (mobile or fixed window)	First parameter 0x1CD0 hex – 7376 dec,	Last parameter 0x1CFE hex – 7422 dec
Timeband 10 power max demand (mobile or fixed window)	First parameter 0x1D20 hex – 7456 dec,	Last parameter 0x1D2E hex – 7470 dec
Timeband 11 power max demand (mobile or fixed window)	First parameter 0x1D70 hex – 7536 dec,	Last parameter 0x1D9E hex – 7582 dec
Timeband 12 power max demand (mobile or fixed window)	First parameter 0x1DC0 hex – 7816 dec,	Last parameter 0x1DEE hex – 7662 dec
Timeband 13 power max demand (mobile or fixed window)	First parameter 0x1E10 hex – 7696 dec,	Last parameter 0x1E3E hex – 7742 dec
Timeband 14 power max demand (mobile or fixed window)	First parameter 0x1E60 hex – 7776 dec,	Last parameter 0x1E8E hex – 7822 dec
Timeband 15 power max demand (mobile or fixed window)	First parameter 0x1EB0 hex – 7856 dec,	Last parameter 0x1EDE hex – 7902 dec
Timeband 16 power max demand (mobile or fixed window)	First parameter 0x1F00 hex – 7936 dec,	Last parameter 0x1F2E hex – 7982 dec

Input counters

Total input counters

Reg. HEX	Reg. DEC	Word	Description	R/W	Measure Unit	Type
2000	8192	2	INPUT COUNTER 1	R	---	Unsigned
2002	8194	2	INPUT COUNTER 2	R	---	Unsigned
2004	8196	2	INPUT COUNTER 3	R	---	Unsigned
2006	8198	2	INPUT COUNTER 4	R	---	Unsigned
2008	8200	2	INPUT COUNTER 5	R	---	Unsigned
200A	8202	2	INPUT COUNTER 6	R	---	Unsigned
200C	8204	2	INPUT COUNTER 7	R	---	Unsigned
200E	8206	2	INPUT COUNTER 8	R	---	Unsigned

Ton_{min} Input Signal: 30 ms $Toff_{min}$ Input Signal: 30 ms

Timeband 1 input counters

Reg. HEX	Reg. DEC	Word	Description	R/W	Measure Unit	Type
2020	8224	2	INPUT COUNTER 1	R	---	Unsigned
---	---	---	---	---	---	---
202E	8238	2	INPUT COUNTER 8	R	---	Unsigned

Ton_{min} Input Signal: 30 ms $Toff_{min}$ Input Signal: 30 ms

Timeband 2 input counters	First parameter 0x2040 hex – 8256 dec,	Last parameter 0x204E hex – 8270 dec
Timeband 3 input counters	First parameter 0x2060 hex – 8288 dec,	Last parameter 0x206E hex – 8302 dec
Timeband 4 input counters	First parameter 0x2080 hex – 8320 dec,	Last parameter 0x208E hex – 8334 dec
Timeband 5 input counters	First parameter 0x20A0 hex – 8352 dec,	Last parameter 0x20AE hex – 8366 dec
Timeband 6 input counters	First parameter 0x20C0 hex – 8384 dec,	Last parameter 0x20CE hex – 8398 dec
Timeband 7 input counters	First parameter 0x20E0 hex – 8416 dec,	Last parameter 0x20EE hex – 8430 dec
Timeband 8 input counters	First parameter 0x2100 hex – 8448 dec,	Last parameter 0x210E hex – 8462 dec
Timeband 9 input counters	First parameter 0x2120 hex – 8480 dec,	Last parameter 0x212E hex – 8494 dec
Timeband 10 input counters	First parameter 0x2140 hex – 8512 dec,	Last parameter 0x214E hex – 8526 dec
Timeband 11 input counters	First parameter 0x2160 hex – 8544 dec,	Last parameter 0x216E hex – 8558 dec
Timeband 12 input counters	First parameter 0x2180 hex – 8576 dec,	Last parameter 0x218E hex – 5890 dec
Timeband 13 input counters	First parameter 0x21A0 hex – 8608 dec,	Last parameter 0x21AE hex – 8622 dec
Timeband 14 input counters	First parameter 0x21C0 hex – 8624 dec,	Last parameter 0x21CE hex – 8654 dec
Timeband 15 input counters	First parameter 0x21E0 hex – 8672 dec,	Last parameter 0x21EE hex – 8686 dec
Timeband 16 input counters	First parameter 0x2200 hex – 8704 dec,	Last parameter 0x220E hex – 8718 dec

Relative minimums

Reg. HEX	Reg. DEC	Word	Description	R/W	M.U. *LMH=0*	M.U. *LMH=1****	M.U. *LMH=2*	Type
3000	12288	2	SYSTEM VOLTAGE	R	mV	mV	V	Unsigned
3002	12290	2	PHASE VOLTAGE L_1	R	mV	mV	V	Unsigned
3004	12292	2	PHASE VOLTAGE L_2	R	mV	mV	V	Unsigned
3006	12294	2	PHASE VOLTAGE L_3	R	mV	mV	V	Unsigned
3008	12296	2	LINE TO LINE VOLTAGE L_{1-2}	R	mV	mV	V	Signed
300A	12298	2	LINE TO LINE VOLTAGE L_{2-3}	R	mV	mV	V	Signed
300C	12300	2	LINE TO LINE VOLTAGE L_{3-1}	R	mV	mV	V	Signed
300E	12302	2	SYSTEM CURRENT	R	mA	mA	A	Unsigned
3010	12304	2	LINE CURRENT L_1	R	mA	mA	A	Unsigned
3012	12306	2	LINE CURRENT L_2	R	mA	mA	A	Unsigned
3014	12308	2	LINE CURRENT L_3	R	mA	mA	A	Unsigned
3016	12310	2	SYSTEM POWER FACTOR *[max negative value]*	R	±1000	±1000	±1000	Signed
3018	12312	2	POWER FACTOR L_1 *[maximum negative value]*	R	±1000	±1000	±1000	Signed
301A	12314	2	POWER FACTOR L_2 *[maximum negative value]*	R	±1000	±1000	±1000	Signed
301C	12316	2	POWER FACTOR L_3 *[maximum negative value]*	R	±1000	±1000	±1000	Signed
301E	12318	2	SYSTEM COS φ *[maximum negative value]*	R	±1000	±1000	±1000	Signed
3020	12320	2	PHASE COS φ_1 *[maximum negative value]*	R	±1000	±1000	±1000	Signed
3022	12322	2	PHASE COS φ_2 *[maximum negative value]*	R	±1000	±1000	±1000	Signed
3024	12324	2	PHASE COS φ_3 *[maximum negative value]*	R	±1000	±1000	±1000	Signed
3026	12326	2	SYSTEM APPARENT POWER	R	mVA	VA	kVA	Unsigned
3028	12328	2	APPARENT POWER L_1	R	mVA	VA	kVA	Unsigned
302A	12330	2	APPARENT POWER L_2	R	mVA	VA	kVA	Unsigned
302C	12332	2	APPARENT POWER L_3	R	mVA	VA	kVA	Unsigned
302E	12334	2	SYSTEM ACTIVE POWER	R	mW	W	kW	Signed
3030	12336	2	ACTIVE POWER L_1	R	mW	W	kW	Signed
3032	12338	2	ACTIVE POWER L_2	R	mW	W	kW	Signed
3034	12340	2	ACTIVE POWER L_3	R	mW	W	kW	Signed
3036	12342	2	SYSTEM REACTIVE POWER	R	mvar	var	kvar	Signed
3038	12344	2	REACTIVE POWER L_1	R	mvar	var	kvar	Signed
303A	12346	2	REACTIVE POWER L_2	R	mvar	var	kvar	Signed
303C	12348	2	REACTIVE POWER L_3	R	mvar	var	kvar	Signed
303E	12350	2	NEUTRAL CURRENT	R	mA	mA	A	Unsigned
3040	12352	2	FREQUENCY	R	mHz	mHz	mHz	Unsigned
3042	12354	2	TEMPERATURE	R	d°C	d°C	d°C	Signed
3044	12356	2	THD VOLTAGE L_1	R	0 ÷ 10000	0 ÷ 10000	0 ÷ 10000	Unsigned
3046	12358	2	THD VOLTAGE L_2	R	0 ÷ 10000	0 ÷ 10000	0 ÷ 10000	Unsigned
3048	12360	2	THD VOLTAGE L_3	R	0 ÷ 10000	0 ÷ 10000	0 ÷ 10000	Unsigned
304A	12362	2	THD CURRENT L_1	R	0 ÷ 10000	0 ÷ 10000	0 ÷ 10000	Unsigned
304C	12364	2	THD CURRENT L_2	R	0 ÷ 10000	0 ÷ 10000	0 ÷ 10000	Unsigned
304E	12366	2	THD CURRENT L_3	R	0 ÷ 10000	0 ÷ 10000	0 ÷ 10000	Unsigned
3050	12368	2	$ANGLE_{1-2}$	R	0 - 3600	0 - 3600	0 - 3600	Unsigned
3052	12370	2	$ANGLE_{2-3}$	R	0 - 3600	0 - 3600	0 - 3600	Unsigned
3054	12372	2	$ANGLE_{3-1}$	R	0 - 3600	0 - 3600	0 - 3600	Unsigned
3056	12374	2	SYSTEM TANGENT φ	R	±100000	±100000	±100000	Signed
3058	12376	2	PHASE TANGENT φ_1	R	±100000	±100000	±100000	Signed
305A	12378	2	PHASE TANGENT φ_2	R	±100000	±100000	±100000	Signed
305C	12380	2	PHASE TANGENT φ_3	R	±100000	±100000	±100000	Signed

***: Default measure unit – see Unit and Modality setup → LMH

Relative maximums

Reg. HEX	Reg. DEC	Word	Description	R/W	M.U. *LMH=0*	M.U. *LMH=1****	M.U. *LMH=2*	Type
3100	12544	2	SYSTEM VOLTAGE	R	mV	mV	V	Unsigned
3102	12546	2	PHASE VOLTAGE L_1	R	mV	mV	V	Unsigned
3104	12548	2	PHASE VOLTAGE L_2	R	mV	mV	V	Unsigned
3106	12550	2	PHASE VOLTAGE L_3	R	mV	mV	V	Unsigned
3108	12552	2	LINE TO LINE VOLTAGE L_{1-2}	R	mV	mV	V	Signed
310A	12554	2	LINE TO LINE VOLTAGE L_{2-3}	R	mV	mV	V	Signed
310C	12556	2	LINE TO LINE VOLTAGE L_{3-1}	R	mV	mV	V	Signed
310E	12558	2	SYSTEM CURRENT	R	mA	mA	A	Unsigned
3110	12560	2	LINE CURRENT L_1	R	mA	mA	A	Unsigned
3112	12562	2	LINE CURRENT L_2	R	mA	mA	A	Unsigned
3114	12564	2	LINE CURRENT L_3	R	mA	mA	A	Unsigned
3116	12566	2	SYSTEM POWER FACTOR *[max positive value]*	R	±1000	±1000	±1000	Signed
3118	12568	2	POWER FACTOR L_1 *[maximum positive value]*	R	±1000	±1000	±1000	Signed
311A	12570	2	POWER FACTOR L_2 *[maximum positive value]*	R	±1000	±1000	±1000	Signed
311C	12572	2	POWER FACTOR L_3 *[maximum positive value]*	R	±1000	±1000	±1000	Signed
311E	12574	2	SYSTEM COS φ *[maximum positive value]*	R	±1000	±1000	±1000	Signed
3120	12576	2	PHASE COS φ_1 *[maximum positive value]*	R	±1000	±1000	±1000	Signed
3122	12578	2	PHASE COS φ_2 *[maximum positive value]*	R	±1000	±1000	±1000	Signed
3124	12580	2	PHASE COS φ_3 *[maximum positive value]*	R	±1000	±1000	±1000	Signed
3126	12582	2	SYSTEM APPARENT POWER	R	mVA	VA	kVA	Unsigned
3128	12584	2	APPARENT POWER L_1	R	mVA	VA	kVA	Unsigned
312A	12586	2	APPARENT POWER L_2	R	mVA	VA	kVA	Unsigned
312C	12588	2	APPARENT POWER L_3	R	mVA	VA	kVA	Unsigned
312E	12590	2	SYSTEM ACTIVE POWER	R	mW	W	kW	Signed
3130	12592	2	ACTIVE POWER L_1	R	mW	W	kW	Signed
3132	12594	2	ACTIVE POWER L_2	R	mW	W	kW	Signed
3134	12596	2	ACTIVE POWER L_3	R	mW	W	kW	Signed
3136	12598	2	SYSTEM REACTIVE POWER	R	mvar	var	kvar	Signed
3138	12600	2	REACTIVE POWER L_1	R	mvar	var	kvar	Signed
313A	12602	2	REACTIVE POWER L_2	R	mvar	var	kvar	Signed
313C	12604	2	REACTIVE POWER L_3	R	mvar	var	kvar	Signed
313E	12608	2	NEUTRAL CURRENT	R	mA	mA	A	Unsigned
3140	12610	2	FREQUENCY	R	mHz	mHz	mHz	Unsigned
3142	12612	2	TEMPERATURE	R	d°C	d°C	d°C	Signed
3144	12614	2	THD VOLTAGE L_1	R	0 ÷ 10000	0 ÷ 10000	0 ÷ 10000	Unsigned
3146	12616	2	THD VOLTAGE L_2	R	0 ÷ 10000	0 ÷ 10000	0 ÷ 10000	Unsigned
3148	12618	2	THD VOLTAGE L_3	R	0 ÷ 10000	0 ÷ 10000	0 ÷ 10000	Unsigned
314A	12620	2	THD CURRENT L_1	R	0 ÷ 10000	0 ÷ 10000	0 ÷ 10000	Unsigned
314C	12622	2	THD CURRENT L_2	R	0 ÷ 10000	0 ÷ 10000	0 ÷ 10000	Unsigned
314E	12624	2	THD CURRENT L_3	R	0 ÷ 10000	0 ÷ 10000	0 ÷ 10000	Unsigned
3150	12626	2	$ANGLE_{1-2}$	R	0 - 3600	0 - 3600	0 - 3600	Unsigned
3152	12628	2	$ANGLE_{2-3}$	R	0 - 3600	0 - 3600	0 - 3600	Unsigned
3154	12630	2	$ANGLE_{3-1}$	R	0 - 3600	0 - 3600	0 - 3600	Unsigned
3156	12632	2	SYSTEM TANGENT φ	R	±100000	±100000	±100000	Signed
3158	12634	2	PHASE TANGENT φ_1	R	±100000	±100000	±100000	Signed
315A	12636	2	PHASE TANGENT φ_2	R	±100000	±100000	±100000	Signed
315C	12638	2	PHASE TANGENT φ_3	R	±100000	±100000	±100000	Signed

***: Default measure unit – see Unit and Modality setup → LMH

Absolute minimums

Reg. HEX	Reg. DEC	Word	Description	R/W	M.U. *LMH=0*	M.U. *LMH=1****	M.U. *LMH=2*	Type
3200	12800	2	TIME*	R	---	---	---	Unsigned
3202	12802	2	DATE**	R	---	---	---	Unsigned
3204	12804	2	SYSTEM VOLTAGE	R	mV	mV	V	Unsigned
3206	12806	2	TIME*	R	---	---	---	Unsigned
3208	12808	2	DATE**	R	---	---	---	Unsigned
320A	12810	2	PHASE VOLTAGE L_1	R	mV	mV	V	Unsigned
---	---	---	TIME - DATE	---	---	---	---	---
3210	12816	2	PHASE VOLTAGE L_2	R	mV	mV	V	Unsigned
---	---	---	TIME - DATE	---	---	---	---	---
3216	12822	2	PHASE VOLTAGE L_3	R	mV	mV	V	Unsigned
---	---	---	TIME - DATE	---	---	---	---	---
321C	12828	2	LINE TO LINE VOLTAGE L_{1-2}	R	mV	mV	V	Signed
---	---	---	TIME - DATE	---	---	---	---	---
3222	12834	2	LINE TO LINE VOLTAGE L_{2-3}	R	mV	mV	V	Signed
---	---	---	TIME - DATE	---	---	---	---	---
3228	12840	2	LINE TO LINE VOLTAGE L_{3-1}	R	mV	mV	V	Signed
---	---	---	TIME - DATE	---	---	---	---	---
322E	12846	2	SYSTEM CURRENT	R	mA	mA	A	Unsigned
---	---	---	TIME - DATE	---	---	---	---	---
3234	12852	2	LINE CURRENT L_1	R	mA	mA	A	Unsigned
---	---	---	TIME - DATE	---	---	---	---	---
323A	12858	2	LINE CURRENT L_2	R	mA	mA	A	Unsigned
---	---	---	TIME - DATE	---	---	---	---	---
3240	12864	2	LINE CURRENT L_3	R	mA	mA	A	Unsigned
---	---	---	TIME - DATE	---	---	---	---	---
3246	12870	2	SYSTEM POWER FACTOR *[max negative value]*	R	±1000	±1000	±1000	Signed
---	---	---	TIME - DATE	---	---	---	---	---
324C	12876	2	POWER FACTOR L_1 *[maximum negative value]*	R	±1000	±1000	±1000	Signed
---	---	---	TIME - DATE	---	---	---	---	---
3252	12882	2	POWER FACTOR L_2 *[maximum negative value]*	R	±1000	±1000	±1000	Signed
---	---	---	TIME - DATE	---	---	---	---	---
3258	12888	2	POWER FACTOR L_3 *[maximum negative value]*	R	±1000	±1000	±1000	Signed
---	---	---	TIME - DATE	---	---	---	---	---
325E	12894	2	SYSTEM COS φ *[maximum negative value]*	R	±1000	±1000	±1000	Signed
---	---	---	TIME - DATE	---	---	---	---	---
3264	12900	2	PHASE COS φ_1 *[maximum negative value]*	R	±1000	±1000	±1000	Signed
---	---	---	TIME - DATE	---	---	---	---	---
326A	12906	2	PHASE COS φ_2 *[maximum negative value]*	R	±1000	±1000	±1000	Signed
---	---	---	TIME - DATE	---	---	---	---	---
3270	12912	2	PHASE COS φ_3 *[maximum negative value]*	R	±1000	±1000	±1000	Signed
---	---	---	TIME - DATE	---	---	---	---	---
3276	12918	2	SYSTEM APPARENT POWER	R	mVA	VA	kVA	Unsigned
---	---	---	TIME - DATE	---	---	---	---	---
327C	12924	2	APPARENT POWER L_1	R	mVA	VA	kVA	Unsigned
---	---	---	TIME - DATE	---	---	---	---	---
3282	12930	2	APPARENT POWER L_2	R	mVA	VA	kVA	Unsigned
---	---	---	TIME - DATE	---	---	---	---	---
3288	12936	2	APPARENT POWER L_3	R	mVA	VA	kVA	Unsigned
---	---	---	TIME - DATE	---	---	---	---	---
328E	12942	2	SYSTEM ACTIVE POWER	R	mW	W	kW	Signed
---	---	---	TIME - DATE	---	---	---	---	---
3294	12948	2	ACTIVE POWER L_1	R	mW	W	kW	Signed
---	---	---	TIME - DATE	---	---	---	---	---
329A	12954	2	ACTIVE POWER L_2	R	mW	W	kW	Signed
---	---	---	TIME - DATE	---	---	---	---	---
32A0	12960	2	ACTIVE POWER L_3	R	mW	W	kW	Signed
---	---	---	TIME - DATE	---	---	---	---	---
32A6	12966	2	SYSTEM REACTIVE POWER	R	mvar	var	kvar	Signed
---	---	---	TIME - DATE	---	---	---	---	---
32AC	12972	2	REACTIVE POWER L_1	R	mvar	var	kvar	Signed
---	---	---	TIME - DATE	---	---	---	---	---
32B2	12978	2	REACTIVE POWER L_2	R	mvar	var	kvar	Signed
---	---	---	TIME - DATE	---	---	---	---	---
32B8	12984	2	REACTIVE POWER L_3	R	mvar	var	kvar	Signed
---	---	---	TIME - DATE	---	---	---	---	---
32BE	12990	2	NEUTRAL CURRENT	R	mA	mA	A	Unsigned
---	---	---	TIME - DATE	---	---	---	---	---
32C4	12996	2	FREQUENCY	R	mHz	mHz	mHz	Unsigned
---	---	---	TIME - DATE	---	---	---	---	---
32CA	13002	2	TEMPERATURE	R	d °C	d °C	d °C	Signed
---	---	---	TIME - DATE	---	---	---	---	---
32D0	13008	2	THD VOLTAGE L_1	R	0 ÷ 10000	0 ÷ 10000	0 ÷ 10000	Unsigned
---	---	---	TIME - DATE	---	---	---	---	---
32D6	13014	2	THD VOLTAGE L_2	R	0 ÷ 10000	0 ÷ 10000	0 ÷ 10000	Unsigned
---	---	---	TIME - DATE	---	---	---	---	---
32DC	13020	2	THD VOLTAGE L_3	R	0 ÷ 10000	0 ÷ 10000	0 ÷ 10000	Unsigned

---	---	---	TIME - DATE	---	---	---	---	---
32E2	13026	2	THD CURRENT L_1	R	0 ÷ 10000	0 ÷ 10000	0 ÷ 10000	Unsigned
---	---	---	TIME - DATE	---	---	---	---	---
32E8	13032	2	THD CURRENT L_2	R	0 ÷ 10000	0 ÷ 10000	0 ÷ 10000	Unsigned
---	---	---	TIME - DATE	---	---	---	---	---
32EE	13038	2	THD CURRENT L_3	R	0 ÷ 10000	0 ÷ 10000	0 ÷ 10000	Unsigned
---	---	---	TIME - DATE	---	---	---	---	---
32F4	13044	2	$ANGLE_{1-2}$	R	0 - 3600	0 - 3600	0 - 3600	Unsigned
---	---	---	TIME - DATE	---	---	---	---	---
32FA	13050	2	$ANGLE_{2-3}$	R	0 - 3600	0 - 3600	0 - 3600	Unsigned
---	---	---	TIME - DATE	---	---	---	---	---
3300	13056	2	$ANGLE_{3-1}$	R	0 - 3600	0 - 3600	0 - 3600	Unsigned
---	---	---	TIME - DATE	---	---	---	---	---
3306	13062	2	SYSTEM TANGENT φ	R	±100000	±100000	±100000	Signed
---	---	---	TIME - DATE	---	---	---	---	---
330C	13068	2	PHASE TANGENT φ_1	R	±100000	±100000	±100000	Signed
---	---	---	TIME - DATE	---	---	---	---	---
3312	13074	2	PHASE TANGENT φ_2	R	±100000	±100000	±100000	Signed
---	---	---	TIME - DATE	---	---	---	---	---
3318	13080	2	PHASE TANGENT φ_3	R	±100000	±100000	±100000	Signed

*: byte order/meaning: EMPTY, HOUR, MINUTE, SECOND

**: byte order/meaning: DAY, MONYH, YEAR, YEAR

***: Default measure unit – see Unit and Modality setup → LMH

Note: the minimum and maximum values are reset when the device is turned off.

Absolute maximums

Reg. HEX	Reg. DEC	Word	Description	R/W	M.U. *LMH=0*	M.U. *LMH=1****	M.U. *LMH=2*	Type
3400	13312	2	TIME*	R	---	---	---	Unsigned
3402	13314	2	DATE**	R	---	---	---	Unsigned
3404	13316	2	SYSTEM VOLTAGE	R	mV	mV	V	Unsigned
3406	13318	2	TIME*	R	---	---	---	Unsigned
3408	13320	2	DATE**	R	---	---	---	Unsigned
340A	13322	2	PHASE VOLTAGE L_1	R	mV	mV	V	Unsigned
---	---	---	TIME - DATE	---	---	---	---	---
3410	13328	2	PHASE VOLTAGE L_2	R	mV	mV	V	Unsigned
---	---	---	TIME - DATE	---	---	---	---	---
3416	13334	2	PHASE VOLTAGE L_3	R	mV	mV	V	Unsigned
---	---	---	TIME - DATE	---	---	---	---	---
341C	13340	2	LINE TO LINE VOLTAGE L_{1-2}	R	mV	mV	V	Signed
---	---	---	TIME - DATE	---	---	---	---	---
3422	13346	2	LINE TO LINE VOLTAGE L_{2-3}	R	mV	mV	V	Signed
---	---	---	TIME - DATE	---	---	---	---	---
3428	13352	2	LINE TO LINE VOLTAGE L_{3-1}	R	mV	mV	V	Signed
---	---	---	TIME - DATE	---	---	---	---	---
342E	13358	2	SYSTEM CURRENT	R	mA	mA	A	Unsigned
---	---	---	TIME - DATE	---	---	---	---	---
3434	13364	2	LINE CURRENT L_1	R	mA	mA	A	Unsigned
---	---	---	TIME - DATE	---	---	---	---	---
343A	13370	2	LINE CURRENT L_2	R	mA	mA	A	Unsigned
---	---	---	TIME - DATE	---	---	---	---	---
3440	13376	2	LINE CURRENT L_3	R	mA	mA	A	Unsigned
---	---	---	TIME - DATE	---	---	---	---	---
3446	13382	2	SYSTEM POWER FACTOR *[max positive value]*	R	±1000	±1000	±1000	Signed
---	---	---	TIME - DATE	---	---	---	---	---
344C	13388	2	POWER FACTOR L_1 *[maximum positive value]*	R	±1000	±1000	±1000	Signed
---	---	---	TIME - DATE	---	---	---	---	---
3452	13394	2	POWER FACTOR L_2 *[maximum positive value]*	R	±1000	±1000	±1000	Signed
---	---	---	TIME - DATE	---	---	---	---	---
3458	13400	2	POWER FACTOR L_3 *[maximum positive value]*	R	±1000	±1000	±1000	Signed
---	---	---	TIME - DATE	---	---	---	---	---
345E	13406	2	SYSTEM COS φ *[maximum positive value]*	R	±1000	±1000	±1000	Signed
---	---	---	TIME - DATE	---	---	---	---	---
3464	13412	2	PHASE COS φ_1 *[maximum positive value]*	R	±1000	±1000	±1000	Signed
---	---	---	TIME - DATE	---	---	---	---	---
346A	13418	2	PHASE COS φ_2 *[maximum positive value]*	R	±1000	±1000	±1000	Signed
---	---	---	TIME - DATE	---	---	---	---	---
3470	13424	2	PHASE COS φ_3 *[maximum positive value]*	R	±1000	±1000	±1000	Signed
---	---	---	TIME - DATE	---	---	---	---	---
3476	13430	2	SYSTEM APPARENT POWER	R	mVA	VA	kVA	Unsigned
---	---	---	TIME - DATE	---	---	---	---	---
347C	13436	2	APPARENT POWER L_1	R	mVA	VA	kVA	Unsigned
---	---	---	TIME - DATE	---	---	---	---	---
3482	13442	2	APPARENT POWER L_2	R	mVA	VA	kVA	Unsigned
---	---	---	TIME - DATE	---	---	---	---	---
3488	13448	2	APPARENT POWER L_3	R	mVA	VA	kVA	Unsigned
---	---	---	TIME - DATE	---	---	---	---	---
348E	13454	2	SYSTEM ACTIVE POWER	R	mW	W	kW	Signed
---	---	---	TIME - DATE	---	---	---	---	---
3494	13460	2	ACTIVE POWER L_1	R	mW	W	kW	Signed
---	---	---	TIME - DATE	---	---	---	---	---
349A	13466	2	ACTIVE POWER L_2	R	mW	W	kW	Signed
---	---	---	TIME - DATE	---	---	---	---	---
34A0	13472	2	ACTIVE POWER L_3	R	mW	W	kW	Signed
---	---	---	TIME - DATE	---	---	---	---	---
34A6	13478	2	SYSTEM REACTIVE POWER	R	mvar	var	kvar	Signed
---	---	---	TIME - DATE	---	---	---	---	---
34AC	13484	2	REACTIVE POWER L_1	R	mvar	var	kvar	Signed
---	---	---	TIME - DATE	---	---	---	---	---
34B2	13490	2	REACTIVE POWER L_2	R	mvar	var	kvar	Signed
---	---	---	TIME - DATE	---	---	---	---	---
34B8	13496	2	REACTIVE POWER L_3	R	mvar	var	kvar	Signed
---	---	---	TIME - DATE	---	---	---	---	---
34BE	13502	2	NEUTRAL CURRENT	R	mA	mA	A	Unsigned
---	---	---	TIME - DATE	---	---	---	---	---
34C4	13508	2	FREQUENCY	R	mHz	mHz	mHz	Unsigned
---	---	---	TIME - DATE	---	---	---	---	---
34CA	13514	2	TEMPERATURE	R	d °C	d °C	d °C	Signed
---	---	---	TIME - DATE	---	---	---	---	---
34D0	13520	2	THD VOLTAGE L_1	R	0 ÷ 10000	0 ÷ 10000	0 ÷ 10000	Unsigned
---	---	---	TIME - DATE	---	---	---	---	---
34D6	13526	2	THD VOLTAGE L_2	R	0 ÷ 10000	0 ÷ 10000	0 ÷ 10000	Unsigned
---	---	---	TIME - DATE	---	---	---	---	---
34DC	13532	2	THD VOLTAGE L_3	R	0 ÷ 10000	0 ÷ 10000	0 ÷ 10000	Unsigned

---	---	---	TIME - DATE	---	---	---	---	---
34E2	13538	2	THD CURRENT L_1	R	0 ÷ 10000	0 ÷ 10000	0 ÷ 10000	Unsigned
---	---	---	TIME - DATE	---	---	---	---	---
34E8	13542	2	THD CURRENT L_2	R	0 ÷ 10000	0 ÷ 10000	0 ÷ 10000	Unsigned
---	---	---	TIME - DATE	---	---	---	---	---
34EE	13548	2	THD CURRENT L_3	R	0 ÷ 10000	0 ÷ 10000	0 ÷ 10000	Unsigned
---	---	---	TIME - DATE	---	---	---	---	---
34F4	13554	2	$ANGLE_{1-2}$	R	0 - 3600	0 - 3600	0 - 3600	Unsigned
---	---	---	TIME - DATE	---	---	---	---	---
34FA	13560	2	$ANGLE_{2-3}$	R	0 - 3600	0 - 3600	0 - 3600	Unsigned
---	---	---	TIME - DATE	---	---	---	---	---
3500	13568	2	$ANGLE_{3-1}$	R	0 - 3600	0 - 3600	0 - 3600	Unsigned
---	---	---	TIME - DATE	---	---	---	---	---
3506	13574	2	SYSTEM TANGENT φ	R	±100000	±100000	±100000	Signed
---	---	---	TIME - DATE	---	---	---	---	---
350C	13580	2	PHASE TANGENT φ_1	R	±100000	±100000	±100000	Signed
---	---	---	TIME - DATE	---	---	---	---	---
3512	13586	2	PHASE TANGENT φ_2	R	±100000	±100000	±100000	Signed
---	---	---	TIME - DATE	---	---	---	---	---
3518	13592	2	PHASE TANGENT φ_3	R	±100000	±100000	±100000	Signed

*: byte order/meaning: EMPTY, HOUR, MINUTE, SECOND

**: byte order/meaning: DAY, MONYH, YEAR, YEAR

***: Default measure unit – see Unit and Modality setup → LMH

Note: the minimum and maximum values are reset when the device is turned off.

Last average (mobile or fixed window)

Reg. HEX	Reg. DEC	Word	Description	R/W	M.U. *LMH=0*	M.U. *LMH=1****	M.U. *LMH=2*	Type	Group index
3600	13824	2	SYSTEM VOLTAGE	R	mV	mV	V	Unsigned	1
3602	13826	2	PHASE VOLTAGE L_{1-N}	R	mV	mV	V	Unsigned	2
3604	13828	2	PHASE VOLTAGE L_{2-N}	R	mV	mV	V	Unsigned	3
3606	13830	2	PHASE VOLTAGE L_{3-N}	R	mV	mV	V	Unsigned	4
3608	13832	2	SYSTEM CURRENT	R	mA	mA	A	Unsigned	5
360A	13834	2	LINE CURRENT L_1	R	mA	mA	A	Unsigned	6
360C	13836	2	LINE CURRENT L_2	R	mA	mA	A	Unsigned	7
360E	13838	2	LINE CURRENT L_3	R	mA	mA	A	Unsigned	8
3610	13840	2	SYSTEM POWER FACTOR	R	±1000	±1000	±1000	Signed	9
3612	13842	2	POWER FACTOR L_1	R	±1000	±1000	±1000	Signed	10
3614	13844	2	POWER FACTOR L_2	R	±1000	±1000	±1000	Signed	11
3616	13846	2	POWER FACTOR L_3	R	±1000	±1000	±1000	Signed	12
3618	13848	2	SYSTEM COS φ	R	±1000	±1000	±1000	Signed	13
361A	13850	2	PHASE COS φ_1	R	±1000	±1000	±1000	Signed	14
361C	13852	2	PHASE COS φ_2	R	±1000	±1000	±1000	Signed	15
361E	13854	2	PHASE COS φ_3	R	±1000	±1000	±1000	Signed	16
3620	13856	2	SYSTEM APPARENT POWER	R	mVA	VA	kVA	Unsigned	17
3622	13858	2	APPARENT POWER L_1	R	mVA	VA	kVA	Unsigned	18
3624	13860	2	APPARENT POWER L_2	R	mVA	VA	kVA	Unsigned	19
3626	13862	2	APPARENT POWER L_3	R	mVA	VA	kVA	Unsigned	20
3628	13864	2	SYSTEM ACTIVE POWER	R	mW	W	kW	Signed	21
362A	13866	2	ACTIVE POWER L_1	R	mW	W	kW	Signed	22
362C	13868	2	ACTIVE POWER L_2	R	mW	W	kW	Signed	23
362E	13870	2	ACTIVE POWER L_3	R	mW	W	kW	Signed	24
3630	13872	2	SYSTEM REACTIVE POWER	R	mvar	var	kvar	Signed	25
3632	13874	2	REACTIVE POWER L_1	R	mvar	var	kvar	Signed	26
3634	13876	2	REACTIVE POWER L_2	R	mvar	var	kvar	Signed	27
3636	13878	2	REACTIVE POWER L_3	R	mvar	var	kvar	Signed	28
3638	13880	2	NEUTRAL CURRENT CALC	R	mA	mA	A	Unsigned	29
363A	13882	2	FREQUENCY	R	mHz	mHz	mHz	Unsigned	30
363C	13884	2	SYSTEM TANGENT φ	R	±100000	±100000	±100000	Signed	31
363E	13886	2	PHASE TANGENT φ_1	R	±100000	±100000	±100000	Signed	32
3640	13888	2	PHASE TANGENT φ_2	R	±100000	±100000	±100000	Signed	33
3642	13890	2	PHASE TANGENT φ_3	R	±100000	±100000	±100000	Signed	34

***: Default measure unit – see Unit and Modality setup → LMH

Max demand (mobile or fixed window)

Reg. HEX	Reg. DEC	Word	Description	R/W	M.U. *LMH=0*	M.U. *LMH=1****	M.U. *LMH=2*	Type
3700	14080	2	TIME*	R	---	---	---	Unsigned
3702	14082	2	DATE**	R	---	---	---	Unsigned
3704	14084	2	SYSTEM VOLTAGE	R	mV	mV	V	Unsigned
3706	14086	2	TIME*	R	---	---	---	Unsigned
3708	14088	2	DATE**	R	---	---	---	Unsigned
370A	14090	2	PHASE VOLTAGE L_{1-N}	R	mV	mV	V	Unsigned
---	---	---	TIME - DATE	---	---	---	---	---
3710	14096	2	PHASE VOLTAGE L_{2-N}	R	mV	mV	V	Unsigned
---	---	---	TIME - DATE	---	---	---	---	---
3716	14102	2	PHASE VOLTAGE L_{3-N}	R	mV	mV	V	Unsigned
---	---	---	TIME - DATE	---	---	---	---	---
371C	14108	2	SYSTEM CURRENT	R	mA	mA	A	Unsigned
---	---	---	TIME - DATE	---	---	---	---	---
3722	14114	2	LINE CURRENT L_1	R	mA	mA	A	Unsigned
---	---	---	TIME - DATE	---	---	---	---	---
3728	14120	2	LINE CURRENT L_2	R	mA	mA	A	Unsigned
---	---	---	TIME - DATE	---	---	---	---	---
372E	14126	2	LINE CURRENT L_3	R	mA	mA	A	Unsigned
---	---	---	TIME - DATE	---	---	---	---	---
3734	14132	2	SYSTEM POWER FACTOR	R	±1000	±1000	±1000	Signed
---	---	---	TIME - DATE	---	---	---	---	---
373A	14138	2	POWER FACTOR L_1	R	±1000	±1000	±1000	Signed
---	---	---	TIME - DATE	---	---	---	---	---
3740	14144	2	POWER FACTOR L_2	R	±1000	±1000	±1000	Signed
---	---	---	TIME - DATE	---	---	---	---	---
3746	14150	2	POWER FACTOR L_3	R	±1000	±1000	±1000	Signed
---	---	---	TIME - DATE	---	---	---	---	---
374C	14156	2	SYSTEM COS φ	R	±1000	±1000	±1000	Signed
---	---	---	TIME - DATE	---	---	---	---	---
3752	14162	2	PHASE COS φ_1	R	±1000	±1000	±1000	Signed
---	---	---	TIME - DATE	---	---	---	---	---
3758	14168	2	PHASE COS φ_2	R	±1000	±1000	±1000	Signed
---	---	---	TIME - DATE	---	---	---	---	---
375E	14174	2	PHASE COS φ_3	R	±1000	±1000	±1000	Signed
---	---	---	TIME - DATE	---	---	---	---	---
3764	14180	2	SYSTEM APPARENT POWER	R	mVA	VA	kVA	Unsigned
---	---	---	TIME - DATE	---	---	---	---	---
376A	14186	2	APPARENT POWER L_1	R	mVA	VA	kVA	Unsigned
---	---	---	TIME - DATE	---	---	---	---	---
3770	14192	2	APPARENT POWER L_2	R	mVA	VA	kVA	Unsigned
---	---	---	TIME - DATE	---	---	---	---	---
3776	14198	2	APPARENT POWER L_3	R	mVA	VA	kVA	Unsigned
---	---	---	TIME - DATE	---	---	---	---	---
377C	14204	2	SYSTEM ACTIVE POWER	R	mW	W	kW	Signed
---	---	---	TIME - DATE	---	---	---	---	---
3782	14210	2	ACTIVE POWER L_1	R	mW	W	kW	Signed
---	---	---	TIME - DATE	---	---	---	---	---
3788	14216	2	ACTIVE POWER L_2	R	mW	W	kW	Signed
---	---	---	TIME - DATE	---	---	---	---	---
378E	12422	2	ACTIVE POWER L_3	R	mW	W	kW	Signed
---	---	---	TIME - DATE	---	---	---	---	---
3794	14228	2	SYSTEM REACTIVE POWER	R	mvar	var	kvar	Signed
---	---	---	TIME - DATE	---	---	---	---	---
379A	14234	2	REACTIVE POWER L_1	R	mvar	var	kvar	Signed
---	---	---	TIME - DATE	---	---	---	---	---
37A0	14240	2	REACTIVE POWER L_2	R	mvar	var	kvar	Signed
---	---	---	TIME - DATE	---	---	---	---	---
37A6	14246	2	REACTIVE POWER L_3	R	mvar	var	kvar	Signed
---	---	---	TIME - DATE	---	---	---	---	---
37AC	14252	2	NEUTRAL CURRENT	R	mA	mA	A	Unsigned
---	---	---	TIME - DATE	---	---	---	---	---
37B2	14258	2	FREQUENCY	R	mHz	mHz	mHz	Unsigned
---	---	---	TIME - DATE	---	---	---	---	---
37B8	14264	2	SYSTEM TANGENT φ	R	±100000	±100000	±100000	Signed
---	---	---	TIME - DATE	---	---	---	---	---
37BE	14270	2	PHASE TANGENT φ_1	R	±100000	±100000	±100000	Signed
---	---	---	TIME - DATE	---	---	---	---	---
37C4	14276	2	PHASE TANGENT φ_2	R	±100000	±100000	±100000	Signed
---	---	---	TIME - DATE	---	---	---	---	---
37CA	14282	2	PHASE TANGENT φ_3	R	±100000	±100000	±100000	Signed

*: byte order/meaning: EMPTY, HOUR, MINUTE, SECOND

**: byte order/meaning: DAY, MONYH, YEAR, YEAR

***: Default measure unit – see Unit and Modality setup → LMH

Device info

Reg. HEX	Reg. DEC	Word	Description	R/W	Note:
4000	16384	5	SERIAL NUMBER	R	Expressed in ASCII Code 1°-2°-3° Bytes: Product Model 8°-9° Bytes: Progressive Number 4°-5° Bytes: Product Year 10° Bytes: Not Used 6°-7° Bytes: Product Week
4005	16389	4	HW REVISION	R	Expressed in ASCII Code
4009	16393	4	HW CUSTOMIZATION	R	Expressed in ASCII Code
400D	16397	32	CONFIGURATION	R	Expressed in ASCII Code *(see below tables)*

Device state

Reg. HEX	Reg. DEC	Word	Description	R/W	Note:
4100	16640	2	STATE	R	Bit00:calibrationcorrupted[B] Bit08:--- Bit01:calibrationcorrupted[A] Bit09:Warningvoltageconnection* Bit02:calibrationcorrupted[P] Bit10:Warningcurrentconnection** Bit03:--- Bit11:WarningCT1inversion*** Bit04:--- Bit12:WarningCT2inversion*** Bit05:--- Bit13:WarningCT3inversion*** Bit06:alarmtemperature Bit14:NoVoltagesApply Bit07:--- Bit15:NoCurrentsApply

*: The order of voltage connections not be correct
(don't respect 120° between the phases) in the following insertion:
- Three phase
- Three phase balanced
- Three phase multi load balanced
- Single phase multi load
- Multi single phase
Must be apply all voltage inputs.

**: The order of current connections not be correct in the following insertion:
- Three phase
- Three phase balanced
- Three phase multi load balanced
- Single phase multi load
- Multi single phase
Must be apply all current and all voltage inputs and the loads to be balanced.

***: The current in the CT has the opposite sign respect others two phase.
Must be apply all current and all voltage inputs.

Switch On/Off Events

Reg. HEX	Reg. DEC	Word	Description	R/W	Note:
4120	16672	2	TIME	R	byte order/meaning: EMPTY, HOUR, MINUTE, SECOND
4122	16674	2	DATE	R	byte order/meaning: DAY, MONYH, YEAR, YEAR
4124	16676	2	1st SWITCH ON/OFF DETECTED	R	1: Instrument switched on 0: Instrument switched off
4126	16678	2	TIME*	R	byte order/meaning: EMPTY, HOUR, MINUTE, SECOND
4128	16680	2	DATE**	R	byte order/meaning: DAY, MONYH, YEAR, YEAR
412A	16682	2	2nd SWITCH ON/OFF DETECTED	R	1: Instrument switched on 0: Instrument switched off
---	---	---	---	---	---
41DA	16858	2	TIME*	R	byte order/meaning: EMPTY, HOUR, MINUTE, SECOND
41DC	16860	2	DATE**	R	byte order/meaning: DAY, MONYH, YEAR, YEAR
41DE	16862	2	32th SWITCH ON/OFF DETECTED	R	1: Instrument switched on 0: Instrument switched off

Dip/Swell Events

Reg. HEX	Reg. DEC	Word	Description	R/W	Note:
4220	16928	2	1° - TIME	R	byte order/meaning: EMPTY, HOUR, MINUTE, SECOND
4222	16930	2	1° - DATE	R	byte order/meaning: DAY, MONYH, YEAR, YEAR
4224	16932	2	1° - TYPE	R	1: DIP L1, 2: DIP L2, 3: DIP L3 4: SWELL L1, 5: SWELL L2, 6: SWELL L3
4226	16934	2	1° - VALUE	R	Value of dip/swell
---	---	---	---	---	---
4348	17224	2	40° - TIME	R	byte order/meaning: EMPTY, HOUR, MINUTE, SECOND
435A	17226	2	40° - DATE	R	byte order/meaning: DAY, MONYH, YEAR, YEAR
435C	17228	2	40° - TYPE	R	1: DIP L1, 2: DIP L2, 3: DIP L3 4: SWELL L1, 5: SWELL L2, 6: SWELL L3
435E	17230	2	40° - VALUE	R	Value of dip/swell

Warning: Must be send the entire parameter length (2 words or 1 word – see the long of each parameter) for a correct command setting.
Warning: All Write command could be send in Broadcast Mode (Node ID 0) but if the Modbus Register or Modbus Parameters is wrong anything messages are returned.

Password setup

Reg. HEX	Reg. DEC	Word	Description	R/W	Parameters
4FFE	20478	2	VIEW ACCESS KEY VALUE	W	0 ÷ 999'999'999 *[Default 0: Password disabled]*
5000	20480	2	SETUP ACCESS KEY VALUE	W	0 ÷ 999'999'999 *[Default 0: Password disabled]*
5002	20482	2	ACCESS KEY VALID PERIOD	R/W	1 ÷ 60 min *[Default: 5 min]*
5004	20484	2	KEYS PROTECTION	R/W	0: Not protected *[Default]* 1: Protected by password
5006	20486	2	COMMUNICATION PROTECTION	R/W	0: Not protected *[Default]* 1: Protected by password (write command only)
5008	20488	2	ENABLE OPTIONS	R/W	0 ÷ 999'999'999

Warning: If COMMUNICATION PROTECT is enabled, it's necessary to write ACCESS KEY register only before send another write command.

Warning: Must be send the entire parameter length (2 words or 1 word – see the long of each parameter) for a correct command setting.
Warning: All Write command could be send in Broadcast Mode (Node ID 0) but if the Modbus Register or Modbus Parameters is wrong anything messages are returned.

Device setup

Reg. HEX	Reg. DEC	Word	Description	R/W	Parameters
5050	20560	2	RESET	W	0x00000001: Reset to Default 0x00000002: Reset Setup 0x00000004: Reset all Energies 0x00000008: Reset all Energies TB *(no total energies)* 0x00000010: Reset all Counters 0x00000020: Reset all Counters TB *(no total energies)* 0x00000040: Reset Minimums and Maximum 0x00000080: Reset Maximum Demand 0x00000100: Reset Energy Log 0x00000200: Reset Setpoint Log 0x00000400: Reset Generic and Smart Log 0x00000800: Events Log 0x00001000: Manual Reset SP-DO
5052	20562	2	HOUR	R/W	00 to 23 hours (00=Midnight)
5054	20564	2	MINUTE	R/W	00 to 59 minutes
5056	20566	2	SECOND	R/W	00 to 59 seconds
5058	20568	2	DAY OF WEEK	R/W	1 = Monday 4 = Thursday 7 = Sunday 2 = Tuesday 5 = Friday 3 = Wednesday 6 = Saturday
505A	20570	2	DAY	R/W	01 to 31 day-of-month
505C	20572	2	MONTH	R/W	01 to 12 month
505E	20574	2	YEAR	R/W	2000 to 2099 year
5060	20576	2	NOT USED	R/W	NOT USED
5062	20578	2	NOT USED	R/W	NOT USED
5064	20580	2	NOT USED	R/W	NOT USED
5066	20582	2	NOT USED	R/W	NOT USED
5068	20584	2	WINDOW UPDATE TIME	R/W	00: 1 min 03: 5 min 06: 12 min 09: 30 min 01: 2 min 04: 6 min 07: 15 min *[Default]* 10: 60 min 02: 3 min 05: 10 min 08: 20 min After this time the max and min relative, the average, the max demand and the expected power (fixed window) will be reset.
506A	20586	2	WINDOW TYPE (average, max demand, expected power)	R/W	0: Fixed window (synchronized with RTC) *[Default]* 1: Shifting window
506C	20588	2	TIMEBAND ENERGY MODE	R/W	0: Manual *[Default]* 1: Selection from Digital Input 2: Preset
506E	20590	2	TIMEBAND ENERGY USED	R/W	1: Timeband 1 Used *[Default]* - - - - - - - - - - - - - - 16: Timeband 16 Used
5070	20592	2	TIMEBAND COUNTER MODE	R/W	0: Manual *[Default]* 1: Selection from Digital Input
5072	20594	2	TIMEBAND COUNTER USED	R/W	1: Timeband 1 Used *[Default]* - - - - - - - - - - - - - - 16: Timeband 16 Used
5074	20596	2	FUNDAMENTAL FREQUENCY	R/W	1: 50 Hz 2: 60 Hz 3: 50 Hz fixed 4: 60 Hz fixed 5: auto-detect *[Default]*
5076	20598	2	ZERO-CROSSING DETECT	R/W	0: default 1: low 2: medium 3: high
5078	20600	2	NOT USED	R/W	NOT USED
507A	20602	2	NOT USED	R/W	NOT USED
507C	20604	2	WIRING	R/W	0: 3-Phase *[Default]* 1: Aron 2: 3- Phase Balanced 3: 3-Phase Multi Load Balanced 4: Single-Phase 5: Single-Phase - Multi Load 6: Multi Single-Phase 7: Two-Phase
507E	20606	2	NEUTRAL CURRENT	R/W	0: computed *[Default]* 1: measured (if Neutral CT is present).
5080	20608	2	SIGN CONVENTION	R/W	0: Sign convention *[Default]* 1: IEC convention 2: IEEE/DIN convention **Note:** see the user manual for details
5082	20610	2	SETPOINT TIMING	R/W	0: analysis every 1000 ms 1: analysis every 100 ms
5084	20612	2	ROGOWSKI FULL SCALE	R/W	0: 350 mV 1: 175 mV 2: 700mV
5086	20614	2	FILTER LOW VOLTAGE [mV]	R/W	2000 ÷ 20000
5088	20616	2	FILTER LOW CURRENT [uA]	R/W	300 ÷ 200000
508A	20618	2	FILTER THD VOLTAGE [mV]	R/W	2000 ÷ 20000
508C	20620	2	FILTER THD CURRENT [uA]	R/W	300 ÷ 200000
508E	20622	2	POWER FACTOR CORRECTION	R/W	800 ÷ 1000

DIP - SWELL

Reg. HEX	Reg. DEC	Word	Description	R/W	Parameters	
5090	20624	2	THRESHOLD DIP [mV]	R/W	1 ÷ 10'000'000	*[Default: 190000 mV]*
5092	20626	2	CYCLES NUMBER DIP [1 = 10 ms]	R/W	1 ÷ 10'000	*[Default: 250]*
5094	20628	2	THRESHOLD SWELL [mV]	R/W	1 ÷ 10'000'000	*[Default: 270000 mV]*
5096	20630	2	CYCLES NUMBER SWELL [1 = 10 ms]	R/W	1 ÷ 10'000	*[Default: 250]*
5098	20632	2	INTERRUPTION	R/W	10000 ÷ 2000000000	*[Default: 205000 mV]*
509A	20634	2	INTERRUPTION HYSTERESIS	R/W	10000 ÷ 2000000000	*[Default: 215000 mV]*
509C	20636	2	STORAGE	R/W	0: end memory 1: FIFO	*[Default]*

Primary / Secondary Ratio setup

Reg. HEX	Reg. DEC	Word	Description *CT version*	Description *Rogowski version*	R/W	Parameters
50A0	20640	2	CT PRIMARY	ROGOWSKI A @50Hz	R/W	1 ÷ 400'000 *[Default: 1 – CT version / 1000 Rogowski version]*
50A2	20642	2	CT SECONDARY	ROGOWSKI mV @50Hz	R/W	1 ÷ 400'000 *[Default: 1]*
50A4	20644	2	4° CT PRIMARY	ROGOWSKI-4° A @50Hz	R/W	1 ÷ 400'000 *[Default: 1 – CT version / 1000 Rogowski version]*
50A6	20646	2	4° CT SECONDARY	ROGOWSKI-4° mV @50Hz	R/W	1 ÷ 400'000 *[Default: 1]*
50A8	20648	2	VT PRIMARY	VT PRIMARY	R/W	1 ÷ 400'000 *[Default: 1]*
50AA	20650	2	VT SECONDARY	VT SECONDARY	R/W	1 ÷ 400'000 *[Default: 1]*

Units and Modality setup

Reg. HEX	Reg. DEC	Word	Description	R/W	Parameters
50B0	20656	2	UNITS - **LMH**	R/W	0: **L**IGHT → mV, mA, mW/VAr/VA, 100 mWh/mVArh/mVAh 1: **M**EDIUM → mV, mA, W, VAr, VA 100 * Wh/VArh/VAh *[Default]* 2: **H**EAVY → V, A, kW, kVAr, kVA, 100 * kWh/kVArh/kVAh
50B2	20658	2	MODALITY	R/W	0: bidirectional *[Default]* 1: monodirectional
50B4	20660	2	COMPUTE I-SUM – I1+I2+I3+I4	R/W	0: no *[Default]* 1: yes
50B6	20662	2	THD AVERAGE	R/W	1 ÷ 10 *[Default: 1]*

Digital output 1 setup

Reg. HEX	Reg. DEC	Word	Description	R/W	Parameters
50C0	20672	2	STATUS	R/W	State *[Default: 0]*
50C2	20674	2	LEVEL	R/W	0000h: Active Low (Initial State: High Level) 0001h: Active High (Initial State: Low Level) *[Default]* **WARNING**: when it changes, the STATUS come back to default.
50C4	20676	2	MODE	R/W	0000h: State (see STATE command) *[Default]* 0001h: Pulse 0002h: Setpoint 0003h: State + Memory
50C6	20678	2	PULSE WEIGHT (used only in Pulse Mode)	R/W	Weight from 1 to 10000. *[Default: 1]* 1: pulse every 0.1 kWh, 0.1 varh, 0.1 VAh.
50C8	20680	2	PULSE PERIOD (used only in Pulse Mode)	R/W	60 ms ÷ 1000 ms with 50% of duty cicle *[Default: 500 ms]* For example if it send: 500 ms → T_{On} 250 ms – T_{Off} 250 ms
50CA	20682	2	MEASURE ASSOCIATED (used only in Pulse Mode)	R/W	Total Energy Group *[Default: S-Wh-I]*
50CC	20684	2	SINGLE PULSE TIME	R/W	0 ms ÷ 100000 ms

Digital output 2 setup First parameter 0x50D0 hex – 20688 dec, Last parameter 0x50DC hex – 20700 dec
Digital output 3 setup First parameter 0x50E0 hex – 20704 dec, Last parameter 0x50EC hex – 20716 dec
Digital output 4 setup First parameter 0x50F0 hex – 20720 dec, Last parameter 0x50FC hex – 20732 dec
Digital output 5 setup First parameter 0x5150 hex – 20816 dec, Last parameter 0x515C hex – 20828 dec
Digital output 6 setup First parameter 0x5160 hex – 20832 dec, Last parameter 0x516C hex – 20844 dec
Digital output 7 setup First parameter 0x5170 hex – 20848 dec, Last parameter 0x517C hex – 20860 dec
Digital output 8 setup First parameter 0x5180 hex – 20864 dec, Last parameter 0x518C hex – 20876 dec

Digital input 1 setup

Reg. HEX	Reg. DEC	Word	Description	R/W	Parameters
51A0	20896	2	STATE	R	State
51A2	20898	2	MODE	R/W	0000h: Status *[Default]* 0001h: Counter 0002h: Select Energy Timeband Used (DI bit logic) 0003h: Select Counter Timeband Used (DI bit logic) 0004h: Select Energy and Counter Timeband Used (DI bit logic) Examples: DI-4 = 1, DI-3, = 0 DI-2 = 0, DI-1 = 1 TB selected is 1001bin → TB 9 DI-4 = 0, DI-3, = 0 DI-2 = 1, DI-1 = 1 TB selected is 0011bin → TB 3
51A4	20900	2	MULTIPLIER	R/W	1÷100000 *[Default: 1]*
51A6	20902	2	DIVISOR	R/W	1÷100000 *[Default: 1]*
51A8	20904	2	NORMALLY	R/W	0: active low 1: active high *[Default]*
51AA	20906	2	SETPOINT RESET DO	R/W	Bit logic: Bit 0: for reset DO used in Setpoint 1 when DI is engaged Bit 1: for reset DO used in Setpoint 2 when DI is engaged - - - - - - - - - - - - - - Bit 31: for reset DO used in Setpoint 32 when DI is engaged *[Default: 0]*
51AC	20908	2	PRESET COUNTER	R/W	0÷2000000000 *[Default: 1]*

Digital input 2 setup First parameter 0x51B0 hex – 20912 dec, Last parameter 0x51BC hex – 20924 dec
Digital input 3 setup First parameter 0x51C0 hex – 20928 dec, Last parameter 0x51CC hex – 20940 dec
Digital input 4 setup First parameter 0x51D0 hex – 20944 dec, Last parameter 0x51DC hex – 20956 dec
Digital input 5 setup First parameter 0x52A0 hex – 21152 dec, Last parameter 0x52AC hex – 21164 dec
Digital input 6 setup First parameter 0x52B0 hex – 21168 dec, Last parameter 0x52BC hex – 21180 dec
Digital input 7 setup First parameter 0x52C0 hex – 21184 dec, Last parameter 0x52CC hex – 21196 dec
Digital input 8 setup First parameter 0x52D0 hex – 21200 dec, Last parameter 0x52DC hex – 21212 dec

Analog output 1 setup

Reg. HEX	Reg. DEC	Word	Description	R/W	Parameters	
5200	20992	2	RANGE	R/W	0: 0 V to 5 V * 1: 0 V to 10 V * 2: ±5 V * 3: ±10 V * 4: 4 mA to 20 mA 5: 0 mA to 20 mA *[Default]*	
5202	20994	2	SOURCE	R/W	0: Internal Measure *[Default]*	1 to 20: Measure node XX
5204	20996	2	GROUP	R/W	0: Not used *[Default]* 1: Instantaneous measure	
5206	20998	2	ASSOCIATED MEASURE	R/W	If GROUP is 1: See Instantaneous group	
5208	21000	2	HIGH THRESHOLD	R/W	Value: ± 999999 *[Default: 0]*	
520A	21002	2	HIGH THRESHOLD UNIT	R/W	voltage: current: cos phi and PF: power: frequency: THD & Harmonics: angle degree: tan phi energy: *[Default: 0]*	0: mV, 1: V, 2: kV, 3: MV 0: mA, 1: A, 2: kA, 3: MA 0, 1, 2, 3: no unit 0: VA, W, Var 1: kVA, kW, kVAr 2 : MVA, MW, Gvar 3: GVA, GW, Gvar 0, 1, 2, 3: mHz 0, 1, 2, 3: %*100 0, 1, 2, 3: degree*10 0, 1, 2, 3: no unit 0: VAh*100, Wh*100, varh*100 1: kVAh, kWh, kvar 2: MVAh, MWh, Gvarh 3: GVAh, GWh, Gvarh
520C	21004	2	LOW THRESHOLD	R/W	See HIGH THRESHOLD	
520E	21006	2	LOW THRESHOLD UNIT	R/W	See HIGH THRESHOLD UNIT	

*: only for [V-I] version

Analog output 2 setup	First parameter 0x5230 hex – 21040 dec,	Last parameter 0x523F hex – 21055 dec
Analog output 3 setup	First parameter 0x5260 hex – 21088 dec,	Last parameter 0x526F hex – 21103 dec
Analog output 4 setup	First parameter 0x5290 hex – 21136 dec,	Last parameter 0x529F hex – 21151 dec
External AO 1 setup	First parameter 0x5800 hex – 22528 dec,	Last parameter 0x580F hex – 22543 dec
External AO 2 setup	First parameter 0x5830 hex – 22576 dec,	Last parameter 0x583F hex – 22591 dec
External AO 3 setup	First parameter 0x5860 hex – 22624 dec,	Last parameter 0x586F hex – 22639 dec
External AO 4 setup	First parameter 0x5890 hex – 22672 dec,	Last parameter 0x589F hex – 22687 dec

Setpoint

Setpoint 1 status

Reg. HEX	Reg. DEC	Word	Description	R/W	Parameters
5300	21248	2	STATUS	R	0: Between the limits set 1: Over the limits set
5302	21250	2	EVENTS	R	Number of overcoming events
5304	21252	2	TIMER	R	Time over the limit (seconds)

Setpoint 1 setup

Warning: must be completed all setpoint setting before ENABLE setpoint.

Reg. HEX	Reg. DEC	Word	Description	R/W	Parameters
5320	21280	2	ENABLE	R/W	0: Disable *[Default]* 1: Active over limits 2: Active between limits 3: Over high limit 4: Under low limit
5322	21282	2	SOURCE	R/W	0: Internal Measure *[Default]* 1 to 20: Measure node N
5324	21284	2	GROUP	R/W	With SOURCE = Internal Measure: 0: not used *[Default]* — 7: Energies TB-1 1: Instantaneous — - - - 2: Average — 22: Energies TB-16 3: Total Energies — 23: Harmonics V1 4: Digital Input state — 24: Harmonics V2 5: Digital Input Counters — 25: Harmonics V3 6: Logical expression — 26: Harmonics A1 27: Harmonics A2 28: Harmonics A3 With SOURCE = Measure node N: 0: Not used *[Default]* 1: External Measure
5326	21286	2	ITEM	R/W	If GROUP is 1: See Instantaneous group If GROUP is 2: See Average group If GROUP is or 8 … 23: See Total Energy group
5328	21288	2	HIGH THRESHOLD (signed)	R/W	Value: ± 9999'9999 do ACTION after value exceed the threshold *[Default: 0]*
532A	21290	2	HIGH THRESHOLD UNIT	R/W	voltage: 0: mV, 1: V, 2: kV, 3: MV current: 0: mA, 1: A, 2: kA, 3: MA cos phi and PF: 0, 1, 2, 3: no unit power: 0: VA, W, var 1: kVA, kW, kvar frequency: 2 : MVA, MW, Gvar THD-Harmonics: 3: GVA, GW, Gvar angle degree: 0, 1, 2, 3: mHz tan phi 0, 1, 2, 3: %*100 energy: 0, 1, 2, 3: degree*10 0, 1, 2, 3: no unit 0: VAh*100, Wh*100, varh*100 1: kVAh, kWh, kvarh 2 : MVAh, MWh, Gvarh *[Default: 0]* 3: GVAh, GWh, Gvarh
532C	21292	2	LOW THRESHOLD (signed)	R/W	Value: ± 9999'9999 do ACTION after value exceed the threshold *[Default: 0]*
532E	21294	2	LOW THRESHOLD UNIT	R/W	See HIGH THRESHOLD UNIT
5330	21296	2	OVER DELAY	R/W	0: Instantaneous ACTION *[Default: 0]* 1 ÷ 10000: do ACTION after the condition persist for n seconds
5332	21298	2	ENTRY DELAY	R/W	0: Instantaneous ACTION *[Default: 0]* 1 ÷ 10000: do ACTION after the condition persist for n seconds
5334	21300	2	HYSTERESIS	R/W	0 ÷ 100 0: No hysteresis [Default] Example: 5 is equal of 5% of high & low threshold
5336	21302	2	LOGIC OPERATION OVER	R/W	0: Logic operation disabled [Default] 1: operation OR between operands selected 2: operation AND between operands selected **WARNING:** with LOGIC OPERATION, set ACTION in only a setpoint.
5338	21304	2	LOGIC OPERATION ENTRY	R/W	0: Logic operation disabled. [Default] 1: operation OR between operands selected. 2: operation AND between operands selected. **WARNING:** with LOGIC OPERATION, set ACTION in only a setpoint.
533A	21306	2	LOGIC OPERANDS 1 - 16	R/W	Set (**binary format**) *[Default: 0]*: Bit 00: for include set point 01 in the logic. --- Bit 15: for include set point 16 in the logic. **WARNING:** with LOGIC OPERATION, set ACTION in all setpoint.
533C	21308	2	LOGIC OPERANDS 17 - 32	R/W	Set (**binary format**) *[Default: 0]*: Bit 00: for include set point 17 in the logic. --- Bit 15: for include set point 32 in the logic. **WARNING:** with LOGIC OPERATION, set ACTION in all setpoint.
533E	21310	2	ACTION OVER (high or low threshold)	R/W	It possible to select **one, more or anything** action *[Default: 0]*:

					Set bit 00: visualize and save setpoint overcoming in log page Set bit 01: change DO-X state at over Set bit 02: increase events Set bit 03: increase timer
5340	21312	2	ACTION ENTRY (high or low threshold)	R/W	It possible to select **one, more or anything** action *[Default: 0]*: Set bit 00: visualize and save setpoint entry in log page. Set bit 01: recovery DO-XX state at entry
5342	21314	2	DIGITAL OUTPUT USED	R/W	It possible to select one **or** more DO *[Default: 0]*: Bit 00: DO-1 Bit 02: DO-3 Bit 04: DO-5 Bit 06: DO-7 Bit 01: DO-2 Bit 03: DO-4 Bit 05: DO-6 Bit 07: DO-8 **WARNING***:* before to use this function must be sure that the DO-X MODE is set as SETPOINT MODE.
5344	21316	2	DIGITAL OUTPUT PULSE PERIOD	R/W	30 ÷ 999999 ms *[default: 100]*

Setpoint 2 status First parameter 0x5350 hex – 21328 dec, Last parameter 0x5354 hex – 21252 dec
Setpoint 2 setup First parameter 0x5370 hex – 21360 dec, Last parameter 0x5394 hex – 21396 dec
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Setpoint 16 status First parameter 0x57B0 hex – 22448 dec, Last parameter 0x57B4 hex – 21652 dec
Setpoint 16 setup First parameter 0x57D0 hex – 21680 dec, Last parameter 0x57F4 hex – 21716 dec

Setpoint 17 status First parameter 0xBC00 hex – 48128 dec, Last parameter 0xBC04 hex – 48132 dec
Setpoint 17 setup First parameter 0xBC20 hex – 48160 dec, Last parameter 0xBC44 hex – 48196 dec
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Setpoint 32 status First parameter 0xC0B0 hex – 49328 dec, Last parameter 0xC0B4 hex – 49364 dec
Setpoint 32 setup First parameter 0xC0D0 hex – 49360 dec, Last parameter 0xC0F4 hex – 49396 dec

Setpoint log to read

Reg. HEX	Reg. DEC	Word	Description	R/W	Parameters
5A00	23040	2	LOG TO READ	R/W	1 ÷ 256

Setpoint log info

Reg. HEX	Reg. DEC	Word	Description	R/W	Measure Unit	Type
5A10	23056	2	LOG	R	-	Unsigned
5A12	23042	2	MEMORY USED **	R	% * 100	Unsigned

**: Read Examples: 2520 equal to 25,20% - 5000 equal to 50,00%

Setpoint log

Reg. HEX	Reg. DEC	Word	Description	R/W	Parameters
5A20	23072	2	EMPTY, HOUR, MINUTE, SECOND	R	-
5A22	23074	2	DAY, MONYH, YEAR, YEAR	R	-
5A24	23076	2	SETPOINT GENERATED LOG	R	1 to 32
5A26	23078	2	ACTION	R	1: Over 0: Entry

Note: FIFO logic log.

User Pages

User page - Title text

Reg. HEX	Reg. DEC	Word	Description	R/W	Parameters
5B00	23296	2	TITLE PAGE 1 (1°to 4° char)	R/W	ASCII code
5B02	23298	2	TITLE PAGE 1 (5°to 8° char)	R/W	ASCII code
5B04	23300	2	TITLE PAGE 1 (9°to 12° char)	R/W	ASCII code
5B06	23302	2	TITLE PAGE 1 (13°to 16° char)	R/W	ASCII code
5B08	23304	2	TITLE PAGE 1 (17°to 20° char)	R/W	ASCII code
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5B32	23346	2	TITLE PAGE 6 (1°to 4° char)	R/W	ASCII code
5B34	23348	2	TITLE PAGE 6 (5°to 8° char)	R/W	ASCII code
5B36	23350	2	TITLE PAGE 6 (9°to 12° char)	R/W	ASCII code
5B38	23352	2	TITLE PAGE 6 (13°to 16° char)	R/W	ASCII code
5B3A	23354	2	TITLE PAGE 6 (17°to 20° char)	R/W	ASCII code

Note: for EMA-D6 only 1, 2, 3, 4 pages.

User page - Key text

Reg. HEX	Reg. DEC	Word	Description	R/W	Parameters
5B50	23376	2	KEY PAGE 1 (1°to 4° char – ASCII code)	R/W	ASCII code
5B52	23378	2	KEY PAGE 2 (1°to 4° char – ASCII code)	R/W	ASCII code
5B54	23380	2	KEY PAGE 3 (1°to 4° char – ASCII code)	R/W	ASCII code
5B56	23382	2	KEY PAGE 4 (1°to 4° char – ASCII code)	R/W	ASCII code
5B58	23384	2	KEY PAGE 5 (1°to 4° char – ASCII code)	R/W	ASCII code
5B60	23386	2	KEY PAGE 6 (1°to 4° char – ASCII code)	R/W	ASCII code

Note: for EMA-D6 only 1, 2, 3, 4 pages.

User page - Type

Reg. HEX	Reg. DEC	Word	Description	R/W	Parameters
5B60	23392	2	PAGE TYPE 1	R/W	0: Instantaneous measures 1: Average measures 2: Energies
5B62	23394	2	PAGE TYPE 2	R/W	See PAGE TYPE 1
5B64	23396	2	PAGE TYPE 3	R/W	See PAGE TYPE 1
5B66	23398	2	PAGE TYPE 4	R/W	See PAGE TYPE 1
5B68	23400	2	PAGE TYPE 5	R/W	See PAGE TYPE 1
5B6A	23402	2	PAGE TYPE 6	R/W	See PAGE TYPE 1

Note: for EMA-D6 only 1, 2, 3, 4 pages.

User page - Measure

Reg. HEX	Reg. DEC	Word	Description	R/W	Parameters
5B70	23408	2	MEASURE 1 PAGE 1	R/W	If GROUP is 0: See Instantaneous group If GROUP is 1: See Average group If GROUP is 2: See Total Energy group
5B72	23410	2	MEASURE 1 PAGE 2	R/W	See MEASURE 1 PAGE 1
5B74	23412	2	MEASURE 1 PAGE 3	R/W	See MEASURE 1 PAGE 1
5B76	23414	2	MEASURE 1 PAGE 4	R/W	See MEASURE 1 PAGE 1
5B78	23416	2	MEASURE 1 PAGE 5	R/W	See MEASURE 1 PAGE 1
5B7A	23418	2	MEASURE 1 PAGE 6	R/W	See MEASURE 1 PAGE 1
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5BAC	23468	2	MEASURE 6 PAGE 1	R/W	See MEASURE 1 PAGE 1
5BAE	23470	2	MEASURE 6 PAGE 2	R/W	See MEASURE 1 PAGE 1
5BB0	23472	2	MEASURE 6 PAGE 3	R/W	See MEASURE 1 PAGE 1
5BB2	23474	2	MEASURE 6 PAGE 4	R/W	See MEASURE 1 PAGE 1
5BB4	23476	2	MEASURE 6 PAGE 5	R/W	See MEASURE 1 PAGE 1
5BB6	23478	2	MEASURE 6 PAGE 6	R/W	See MEASURE 1 PAGE 1

Note: for EMA-D6 only 1, 2, 3, 4 pages.

Preset timeband

Daily plan 01

Reg. HEX	Reg. DEC	Word	Description	R/W	Parameters
7000	28672	2	START TIME HOUR – PERIOD 01	R/W	Hour: 0 ÷ 23 *[Default: 0]*
7002	28674	2	START TIME MINUTE – PERIOD 01	R/W	Minute: 0 ÷ 59 *[Default: 0]*
7004	28676	2	TIMEBAND USED – PERIOD 01	R/W	Timeband: 0 ÷ 16 *[Default: 0 → Timeband Not Used]*
7006	28678	2	START TIME HOUR – PERIOD 02	R/W	Hour: 0 ÷ 23 *[Default: 0]*
7008	28680	2	START TIME MINUTE – PERIOD 012	R/W	Minute: 0 ÷ 59 *[Default: 0]*
700A	28682	2	TIMEBAND USED – PERIOD 02	R/W	Timeband: 0 ÷ 16 *[Default: 0 → Timeband Not Used]*
700C	28684	2	START TIME HOUR – PERIOD 03	R/W	Hour: 0 ÷ 23 *[Default: 0]*
700E	28686	2	START TIME MINUTE – PERIOD 03	R/W	Minute: 0 ÷ 59 *[Default: 0]*
7010	28688	2	TIMEBAND USED – PERIOD 03	R/W	Timeband: 0 ÷ 16 *[Default: 0 → Timeband Not Used]*
7012	28690	2	START TIME HOUR – PERIOD 04	R/W	Hour: 0 ÷ 23 *[Default: 0]*
7014	28692	2	START TIME MINUTE – PERIOD 04	R/W	Minute: 0 ÷ 59 *[Default: 0]*
7016	28694	2	TIMEBAND USED – PERIOD 04	R/W	Timeband: 0 ÷ 16 *[Default: 0 → Timeband Not Used]*
7018	28696	2	START TIME HOUR – PERIOD 05	R/W	Hour: 0 ÷ 23 *[Default: 0]*
701A	28698	2	START TIME MINUTE – PERIOD 05	R/W	Minute: 0 ÷ 59 *[Default: 0]*
701C	28700	2	TIMEBAND USED – PERIOD 05	R/W	Timeband: 0 ÷ 16 *[Default: 0 → Timeband Not Used]*
701E	28702	2	START TIME HOUR – PERIOD 06	R/W	Hour: 0 ÷ 23 *[Default: 0]*
7020	28704	2	START TIME MINUTE – PERIOD 06	R/W	Minute: 0 ÷ 59 *[Default: 0]*
7022	28706	2	TIMEBAND USED – PERIOD 06	R/W	Timeband: 0 ÷ 16 *[Default: 0 → Timeband Not Used]*
7024	28708	2	START TIME HOUR – PERIOD 07	R/W	Hour: 0 ÷ 23 *[Default: 0]*
7026	28710	2	START TIME MINUTE – PERIOD 07	R/W	Minute: 0 ÷ 59 *[Default: 0]*
7028	28712	2	TIMEBAND USED – PERIOD 07	R/W	Timeband: 0 ÷ 16 *[Default: 0 → Timeband Not Used]*
702A	28714	2	START TIME HOUR – PERIOD 08	R/W	Hour: 0 ÷ 23 *[Default: 0]*
702C	28716	2	START TIME MINUTE – PERIOD 08	R/W	Minute: 0 ÷ 59 *[Default: 0]*
702E	28718	2	TIMEBAND USED – PERIOD 08	R/W	Timeband: 0 ÷ 16 *[Default: 0 → Timeband Not Used]*
7030	28720	2	START TIME HOUR – PERIOD 09	R/W	Hour: 0 ÷ 23 *[Default: 0]*
7032	28722	2	START TIME MINUTE – PERIOD 09	R/W	Minute: 0 ÷ 59 *[Default: 0]*
7034	28724	2	TIMEBAND USED – PERIOD 09	R/W	Timeband: 0 ÷ 16 *[Default: 0 → Timeband Not Used]*
7036	28726	2	START TIME HOUR – PERIOD 10	R/W	Hour: 0 ÷ 23 *[Default: 0]*
7038	28728	2	START TIME MINUTE – PERIOD 10	R/W	Minute: 0 ÷ 59 *[Default: 0]*
703A	28730	2	TIMEBAND USED – PERIOD 10	R/W	Timeband: 0 ÷ 16 *[Default: 0 → Timeband Not Used]*
703C	28732	2	START TIME HOUR – PERIOD 11	R/W	Hour: 0 ÷ 23 *[Default: 0]*
703E	28734	2	START TIME MINUTE – PERIOD 11	R/W	Minute: 0 ÷ 59 *[Default: 0]*
7040	28736	2	TIMEBAND USED – PERIOD 11	R/W	Timeband: 0 ÷ 16 *[Default: 0 → Timeband Not Used]*
7042	28738	2	START TIME HOUR – PERIOD 12	R/W	Hour: 0 ÷ 23 *[Default: 0]*
7044	28740	2	START TIME MINUTE – PERIOD 12	R/W	Minute: 0 ÷ 59 *[Default: 0]*
7046	28742	2	TIMEBAND USED – PERIOD 12	R/W	Timeband: 0 ÷ 16 *[Default: 0 → Timeband Not Used]*
7048	28744	2	START TIME HOUR – PERIOD 13	R/W	Hour: 0 ÷ 23 *[Default: 0]*
704A	28746	2	START TIME MINUTE – PERIOD 13	R/W	Minute: 0 ÷ 59 *[Default: 0]*
704C	28748	2	TIMEBAND USED – PERIOD 13	R/W	Timeband: 0 ÷ 16 *[Default: 0 → Timeband Not Used]*
704E	28750	2	START TIME HOUR – PERIOD 14	R/W	Hour: 0 ÷ 23 *[Default: 0]*
7050	28752	2	START TIME MINUTE – PERIOD 14	R/W	Minute: 0 ÷ 59 *[Default: 0]*
7052	28754	2	TIMEBAND USED – PERIOD 14	R/W	Timeband: 0 ÷ 16 *[Default: 0 → Timeband Not Used]*
7054	28756	2	START TIME HOUR – PERIOD 15	R/W	Hour: 0 ÷ 23 *[Default: 0]*
7056	28758	2	START TIME MINUTE – PERIOD 15	R/W	Minute: 0 ÷ 59 *[Default: 0]*
7058	28760	2	TIMEBAND USED – PERIOD 15	R/W	Timeband: 0 ÷ 16 *[Default: 0 → Timeband Not Used]*
705A	28762	2	START TIME HOUR – PERIOD 16	R/W	Hour: 0 ÷ 23 *[Default: 0]*
705C	28764	2	START TIME MINUTE – PERIOD 16	R/W	Minute: 0 ÷ 59 *[Default: 0]*
705E	28766	2	TIMEBAND USED – PERIOD 16	R/W	Timeband: 0 ÷ 16 *[Default: 0 → Timeband Not Used]*

Daily plan 2	First parameter 0x7100 hex – 28928 dec,	Last parameter 0x715E hex – 29022 dec
Daily plan 3	First parameter 0x7200 hex – 29184 dec,	Last parameter 0x725E hex – 29278 dec
Daily plan 4	First parameter 0x7300 hex – 29440 dec,	Last parameter 0x735E hex – 29534 dec
Daily plan 5	First parameter 0x7400 hex – 29696 dec,	Last parameter 0x745E hex – 29790 dec
Daily plan 6	First parameter 0x7500 hex – 29952 dec,	Last parameter 0x755E hex – 30046 dec
Daily plan 7	First parameter 0x7600 hex – 30208 dec,	Last parameter 0x765E hex – 30302 dec
Daily plan 8	First parameter 0x7700 hex – 30464 dec,	Last parameter 0x775E hex – 30558 dec
Daily plan 9	First parameter 0x7800 hex – 30720 dec,	Last parameter 0x785E hex – 30814 dec
Daily plan 10	First parameter 0x7900 hex – 30976 dec,	Last parameter 0x795E hex – 31070 dec
Daily plan 11	First parameter 0x7A00 hex – 31232 dec,	Last parameter 0x7A5E hex – 31326 dec
Daily plan 12	First parameter 0x7B00 hex – 31488 dec,	Last parameter 0x7B5E hex – 31582 dec
Daily plan 13	First parameter 0x7C00 hex – 31744 dec,	Last parameter 0x7C5E hex – 31838 dec
Daily plan 14	First parameter 0x7D00 hex – 32000 dec,	Last parameter 0x7D5E hex – 32094 dec
Daily plan 15	First parameter 0x7E00 hex – 32256 dec,	Last parameter 0x7E5E hex – 32350 dec
Daily plan 16	First parameter 0x7F00 hex – 32512 dec,	Last parameter 0x7F5E hex – 32606 dec

Period plan 1

Reg. HEX	Reg. DEC	Word	Description	R/W	Parameters
8000	32768	2	ENABLE PLAN	R/W	0: Disabled 1: Enable
8002	32770	2	START PERIOD - MONTH	R/W	1 ÷ 12 *[Default: 1]*
8004	32772	2	START PERIOD - DAY	R/W	1 ÷ 7 *[Default: 1]*
8006	32774	2	END PERIOD - MONTH	R/W	1 ÷ 12 *[Default: 12]*
8008	32776	2	END PERIOD - DAY	R/W	1 ÷ 7 *[Default: 31]*
800A	32778	2	MONDAY PLAN	R/W	Plan: 1 ÷ 16 *[Default: 1]*
800C	32780	2	TUESDAY PLAN	R/W	Plan: 1 ÷ 16 *[Default: 1]*
800E	32782	2	WEDNESDAY PLAN	R/W	Plan: 1 ÷ 16 *[Default: 1]*
8010	32784	2	THURSDAY PLAN	R/W	Plan: 1 ÷ 16 *[Default: 1]*
8012	32786	2	FRIDAY PLAN	R/W	Plan: 1 ÷ 16 *[Default: 1]*
8014	32788	2	SATURDAY PLAN	R/W	Plan: 1 ÷ 16 *[Default: 1]*
8016	32790	2	SUNDAY PLAN	R/W	Plan: 1 ÷ 16 *[Default: 1]*

Period plan 2	First parameter 0x8020 hex – 32800 dec,	Last parameter 0x8036 hex – 32822 dec
Period plan 3	First parameter 0x8040 hex – 32832 dec,	Last parameter 0x8056 hex – 32854 dec
Period plan 4	First parameter 0x8060 hex – 32864 dec,	Last parameter 0x8076 hex – 32886 dec
Period plan 5	First parameter 0x8080 hex – 32896 dec,	Last parameter 0x8096 hex – 32918 dec
Period plan 6	First parameter 0x80A0 hex – 32928 dec,	Last parameter 0x80B6 hex – 32950 dec
Period plan 7	First parameter 0x80C0 hex – 32960 dec,	Last parameter 0x80D6 hex – 32982 dec
Period plan 8	First parameter 0x80E0 hex – 32992 dec,	Last parameter 0x80F6 hex – 33014 dec
Period plan 9	First parameter 0x8100 hex – 33024 dec,	Last parameter 0x8116 hex – 33046 dec
Period plan 10	First parameter 0x8120 hex – 33056 dec,	Last parameter 0x8136 hex – 33078 dec
Period plan 11	First parameter 0x8140 hex – 33088 dec,	Last parameter 0x8156 hex – 33110 dec
Period plan 12	First parameter 0x8160 hex – 33120 dec,	Last parameter 0x8176 hex – 33142 dec
Period plan 13	First parameter 0x8180 hex – 33152 dec,	Last parameter 0x8196 hex – 33174 dec
Period plan 14	First parameter 0x81A0 hex – 33184 dec,	Last parameter 0x81B6 hex – 33206 dec
Period plan 15	First parameter 0x81C0 hex – 33216 dec,	Last parameter 0x81D6 hex – 33238 dec
Period plan 16	First parameter 0x81E0 hex – 33248 dec,	Last parameter 0x81F6 hex – 33270 dec

Holiday

Reg. HEX	Reg. DEC	Word	Description	R/W	Parameters
8200	33280	2	HOLIDAY MONTH 1	R/W	Month: 1 ÷ 12 *[Default: 1]*
8202	33282	2	HOLIDAY DAY 1	R/W	Day: 1 ÷ 31 *[Default: 1]*
8204	33284	2	HOLIDAY PLAN 1	R/W	Plan: 0 ÷ 16 *[Default: 0 → Plan Not Used]*
---	---	---	---	---	---
831A	33562	2	HOLIDAY MONTH 48	R/W	Month: 1 ÷ 12 *[Default: 1]*
831C	33564	2	HOLIDAY DAY 48	R/W	Day: 1 ÷ 31 *[Default: 1]*
831E	33566	2	HOLIDAY PLAN 48	R/W	Plan: 0 ÷ 16 *[Default: 0 → Plan Not Used]*

Month energy log [24 months max]

Reg. HEX	Reg. DEC	Word	Description	R/W	Parameters
9000	36864	2	EMPTY	R	
9002	36866	2	EMPTY	R	
9004	36868	2	MONTH	R	
9006	36670	2	YEAR	R	
9008	36672	2	ACTIVE ENERGY IN - 1° MONTH	R	
900A	36674	2	REACTIVE ENERGY IN - 1° MONTH	R	
900C	36676	2	ACTIVE ENERGY OUT - 1° MONTH	R	
900E	36678	2	REACTIVE ENERGY OUT - 1° MONTH	R	
---	---	---	---	---	
90F8	37112	2	ACTIVE ENERGY IN - 31° MONTH	R	
90FA	37114	2	REACTIVE ENERGY IN - 31° MONTH	R	
90FC	37116	2	ACTIVE ENERGY OUT - 31° MONTH	R	
90FE	37118	2	REACTIVE ENERGY OUT - 31° MONTH	R	

Reg. HEX	Reg. DEC	Word	Description	R/W	Parameters
9110	37136	2	INDEX MONTH TO READ	W	0 ÷ 23 index month (0 = last month – 23 = oldest month)

Logic expression

Reg. HEX	Reg. DEC	Word	Description	R/W	Measure Unit	Type
A500	42240	2	LOGIC RESULT 01	R	---	Signed
A502	42242	2	LOGIC RESULT 02	R	---	Signed
A504	42244	2	LOGIC RESULT 03	R	---	Signed
A506	42246	2	LOGIC RESULT 04	R	---	Signed
A508	42248	2	LOGIC RESULT 05	R	---	Signed
A50A	42250	2	LOGIC RESULT 06	R	---	Signed
A50C	42252	2	LOGIC RESULT 07	R	---	Signed
A50E	42254	2	LOGIC RESULT 08	R	---	Signed
A510	42256	2	LOGIC RESULT 09	R	---	Signed
A512	42258	2	LOGIC RESULT 10	R	---	Signed
A514	42260	2	LOGIC RESULT 11	R	---	Signed
A516	42262	2	LOGIC RESULT 12	R	---	Signed
A518	42264	2	LOGIC RESULT 13	R	---	Signed
A51A	42266	2	LOGIC RESULT 14	R	---	Signed
A51C	42268	2	LOGIC RESULT 15	R	---	Signed
A51E	42270	2	LOGIC RESULT 16	R	---	Signed
A520	42272	2	LOGIC RESULT 17	R	---	Signed
A522	42274	2	LOGIC RESULT 18	R	---	Signed
A524	42276	2	LOGIC RESULT 19	R	---	Signed
A526	42278	2	LOGIC RESULT 20	R	---	Signed

Setup logic expression 1

Reg. HEX	Reg. DEC	Word	Description	R/W	Parameters
A550	42320	2	ENABLE	R/W	0: No *[Default]* 1: Yes
A552	42322	2	INTERVAL	R/W	0: 1 sec. 5: 10 sec. 10: 1 min. 15: 10 min. 20: 60 min. 1: 2 sec. 6: 12 sec. 11: 2 min. 16: 12 min. 21: end day 2: 3 sec. 7: 15 sec. 12: 3 min. 17: 15 min. 22: end week 3: 5 sec. 8: 20 sec. 13: 5 min. 18: 20 min. 23: end month 4: 6 sec. 9: 30 sec. 14: 6 min. 19: 30 min. *[Default: 0]*
A554	42324	2	SOURCE 1	R/W	0: Internal Measure *[Default]* 1 to 20: Measure node XX
A556	43326	2	GROUP 1	R/W	With SOURCE = Internal Measure: 0: Not used [Default] 3: Energies (total) 6: Analog input 1: Instantaneous measure 4: Digital input 7: Logic expression 2: Average 5: Counters With SOURCE = Measure node XX: 0: Not used *[Default]* 1: External Measure
A558	43328	2	ITEM 1	R/W	If GROUP is 1: See Instantaneous group If GROUP is 2: See Average group If GROUP is 3: See Total Energy group If GROUP is 4: See Digital Input group If GROUP is 5: See Counters group If GROUP is 6: See Analog input group If GROUP is 7: See Logic expression group
A55A	43330	2	MULTIPLIER 1	R/W	1 ÷ 100000 *[Default: 1]*
A55C	43332	2	DIVISOR 1	R/W	1 ÷ 100000 *[Default: 1]*
A55E	43334	2	OPERATION	R/W	0: sum *[Default]* 3: division 1: subtraction 4: AND 2: multiplication 5: OR
A560	43336	2	SOURCE 2	R/W	0: Internal Measure *[Default]* 1 to 20: Measure node XX
A562	43338	2	GROUP 2	R/W	With SOURCE = Internal Measure: 0: Not used [Default] 3: Energies (total) 6: Analog input 1: Instantaneous measure 4: Digital input 7: Logic expression 2: Average 5: Counters With SOURCE = Measure node XX: 0: Not used *[Default]* 1: External Measure
A564	43340	2	ITEM 2	R/W	If GROUP is 1: See Instantaneous group If GROUP is 2: See Average group If GROUP is 3: See Total Energy group If GROUP is 4: See Digital Input group If GROUP is 5: See Counters group If GROUP is 6: See Analog input group If GROUP is 7: See Logic expression group
A566	43342	2	MULTIPLIER 2	R/W	1 ÷ 100000 *[Default: 1]*
A568	43344	2	DIVISOR 2	R/W	1 ÷ 100000 *[Default: 1]*

Setup logic expression 2 First parameter 0xA580 hex – 42368 dec, Last parameter 0xA598 hex – 42392 dec
Setup logic expression 3 First parameter 0xA5B0 hex – 42416 dec, Last parameter 0xA5C8 hex – 42440 dec
- - - -
Setup logic expression 20 First parameter 0xA8E0 hex – 43232 dec, Last parameter 0xA8F9 hex – 43257 dec

Generic log setup*

Warning: any changes to the register values DELETES all generic and smart logs saved (except LOG TO READ register).

Reg. HEX	Reg. DEC	Word	Description	R/W	Parameters
B000	45056	2	LOG TO READ	R/W	Log number that must be read. From 1 to n.
B002	45058	2	ENABLE	R/W	0: Disabled *[Default]* 1: Always 2: between dates 3: between hours 4: between dates and hours 5: trigger **Warning**: it's possible to enable max 2 log type at the same time
B004	45060	2	SAMPLING	R/W	0: 1 sec. 6: 12 sec. 12: 3 min. 18: 20 min. 1: 2 sec. 7: 15 sec. 13: 5 min. 19: 30 min. 2: 3 sec. 8: 20 sec. 14: 6 min. 20: 60 min. 3: 5 sec. 9: 30 sec. 15: 10 min. 21: end day 4: 6 sec. 10: 1 min. 16: 12 min. 22: end week 5: 10 sec. 11: 2 min. 17: 15 min. *[Default]* 23: end month
B006	45062	2	STORAGE TYPE	R/W	0: Stop at the end of log space *[Default]* 1: FIFO (after 3 consecutive cycles is automatically disabled)
B008	45064	2	START MONTH	R/W	01 ÷ 12 *[Default: 01]*
B00A	45066	2	START DAY	R/W	01 ÷ 31 *[Default: 01]*
B00C	45068	2	START HOUR	R/W	00 ÷ 23 *[Default: 00]*
B00E	45070	2	START MINUTE	R/W	00 ÷ 59 *[Default: 00]*
B010	45072	2	END MONTH	R/W	01 ÷ 12 *[Default: 12]*
B012	45074	2	END DAY	R/W	01 ÷ 31 *[Default: 31]*
B014	45076	2	END HOUR	R/W	00 ÷ 23 *[Default: 23]*
B016	45078	2	END MINUTE	R/W	00 ÷ 59 *[Default: 59]*
B018	45080	2	MONDAY	R/W	0: Disable log for this day 1: Enable log for this day *[Default]*
B01A	45082	2	TUESDAY	R/W	0: Disable log for this day 1: Enable log for this day *[Default]*
B01C	45084	2	WEDNESDAY	R/W	0: Disable log for this day 1: Enable log for this day *[Default]*
B01E	45086	2	THURSDAY	R/W	0: Disable log for this day 1: Enable log for this day *[Default]*
B020	45088	2	FRIDAY	R/W	0: Disable log for this day 1: Enable log for this day *[Default]*
B022	45090	2	SATURDAY	R/W	0: Disable log for this day 1: Enable log for this day *[Default]*
B024	45092	2	SUNDAY	R/W	0: Disable log for this day 1: Enable log for this day *[Default]*
B026	45094	2	TRIGGER INPUT	R/W	0: DI active high *[Default]* 1: DI active low 2: Setpoint
B028	45096	2	DIGITAL INPUT TRIGGER	R/W	1 ÷ 4 *[Default: 1]*
B02A	45098	2	SETPOINT TRIGGER	R/W	1 ÷ 32 *[Default: 1]*
B02C	45100	2	01st SOURCE	R/W	0: Internal Measure *[Default]* 1 to 20: Measure node XX
B02E	45102	2	01st GROUP	R/W	With SOURCE = Internal Measure 0: not used *[Default]* 10: Energies TB-3 20: Energies TB-13 1: Instantaneous 11: Energies TB-4 21: Energies TB-14 2: Average 12: Energies TB-5 22: Energies TB-15 3: Total Energies 13: Energies TB-6 23: Energies TB-16 4: Digital Input state 14: Energies TB-7 24: Harmonics V1 5: Digital Input Counters 15: Energies TB-8 25: Harmonics V2 6: Analog Input 16: Energies TB-9 26: Harmonics V3 7: Math 17: Energies TB-10 27: Harmonics A1 8: Energies TB-1 18: Energies TB-11 28: Harmonics A2 9: Energies TB-2 19: Energies TB-12 29: Harmonics A3 With SOURCE = Measure node XX 0: not used *[Default]* 1: External Measure
B030	45104	2	01st MEASURE	R/W	If GROUP is 1: See Instantaneous group If GROUP is 2: See Average group If GROUP is 3,8,9,10,11,12,13,14,15,16,17,18,19: See Total Energy group
---	---	---	---	---	---
B07A	45178	2	14th SOURCE	R/W	See 01st SOURCE
B07C	45180	2	14th GROUP	R/W	See 01st GROUP
B07E	45182	2	14th MEASURE	R/W	See 01st MEASURE

*: The log will start at the next "0 Seconds"

Generic log info

Reg. HEX	Reg. DEC	Word	Description	R/W	Measure Unit	Type
B0A0	45216	2	LOG ACQUIRED	R	-	Unsigned
B0A2	45218	2	MEMORY USED**	R	% * 100	Unsigned
B0A4	45220	2	REMAINING TIME	R	Minutes	Unsigned
B0A6	45222	2	TOTAL LOG	R	-	Unsigned
B0A8	45224	2	EXPANSION PRESENT	R	00: not present 01: present	Unsigned
B0AA	45226	2	EXPANSION LOG LENGTH	R	16*16*, 32*32* or 64 *64*only for expansion memory	Unsigned
B0AC	45228	2	EXPANSION LOGS SAVED	R	---	Unsigned

**: Read Examples: 2520 equal to 25,20% - 5000 equal to 50,00%

Generic standard log selected

Reg. HEX	Reg. DEC	Word	Description	R/W	Parameters
B0B0	45232	2	TIME	R	byte order/meaning: EMPTY, HOUR, MINUTE, SECOND
B0B2	45234	2	DATE	R	byte order/meaning: DAY, MONYH, YEAR, YEAR
B0B4	45236	2	01st MEASURE	R	---
---	---	---	---	---	---
B0CC	45260	2	14th MEASURE	R	---

Generic *Expansion* log with 1 or 2 measures enabled (16 logs) *16* **(option)**

Reg. HEX	Reg. DEC	Word	Description	R/W	Parameters
B0F0	45296	2	TIME	R	byte order/meaning: EMPTY, HOUR, MINUTE, SECOND
B0F2	45298	2	DATE	R	byte order/meaning: DAY, MONYH, YEAR, YEAR
B0F4	45300	2	01° MEASURE	R	---
B0F6	45302	2	02° MEASURE	R	0xFFFFFFFF if disabled
B0F8	45304	2	TIME	R	byte order/meaning: EMPTY, HOUR, MINUTE, SECOND
B0FA	45306	2	DATE	R	byte order/meaning: DAY, MONYH, YEAR, YEAR
B0FC	45308	2	01° MEASURE	R	---
B0FE	45310	2	02° MEASURE	R	0xFFFFFFFF if disabled
---	---	-	---	-	---
B168	45424	2	TIME	R	byte order/meaning: EMPTY, HOUR, MINUTE, SECOND
B16A	45426	2	DATE	R	byte order/meaning: DAY, MONYH, YEAR, YEAR
B16C	45428	2	01° MEASURE	R	---
B16E	45430	2	02° MEASURE	R	0xFFFFFFFF if disabled

Generic *Expansion* log with 3 to 6 measures (8 logs) *32* **(option)**

Reg. HEX	Reg. DEC	Word	Description	R/W	Parameters
B0F0	45296	2	TIME	R	byte order/meaning: EMPTY, HOUR, MINUTE, SECOND
B0F2	45298	2	DATE	R	byte order/meaning: DAY, MONYH, YEAR, YEAR
B0F4	45300	2	01° MEASURE	R	---
B0F6	45302	2	02° MEASURE	R	---
B0F8	45304	2	03° MEASURE	R	---
B0FA	45306	2	04° MEASURE	R	0xFFFFFFFF if disabled
B0FC	45308	2	05° MEASURE	R	0xFFFFFFFF if disabled
B0FE	45310	2	06° MEASURE	R	0xFFFFFFFF if disabled
-	-	-	---	-	---
B164	45416	2	TIME	R	byte order/meaning: EMPTY, HOUR, MINUTE, SECOND
B166	45418	2	DATE	R	byte order/meaning: DAY, MONYH, YEAR, YEAR
B164	45420	2	01° MEASURE	R	---
B166	45422	2	02° MEASURE	R	---
B168	45424	2	03° MEASURE	R	---
B16A	45426	2	04° MEASURE	R	0xFFFFFFFF if disabled
B16C	45428	2	05° MEASURE	R	0xFFFFFFFF if disabled
B16E	45430	2	06° MEASURE	R	0xFFFFFFFF if disabled

Generic *Expansion* log with 7 to 14 measures (4 logs) *64* **(option)**

Reg. HEX	Reg. DEC	Word	Description	R/W	Parameters
B0F0	45296	2	TIME	R	byte order/meaning: EMPTY, HOUR, MINUTE, SECOND
B0F2	45298	2	DATE	R	byte order/meaning: DAY, MONYH, YEAR, YEAR
B0F4	45300	2	01° MEASURE	R	---
B0F6	45302	2	02° MEASURE	R	---
B0F8	45304	2	03° MEASURE	R	---
B0FA	45306	2	04° MEASURE	R	---
B0FC	45308	2	05° MEASURE	R	---
B0FE	45310	2	06° MEASURE	R	---
B100	45312	2	07° MEASURE	R	---
B102	45314	2	08° MEASURE	R	0xFFFFFFFF if disabled
B104	45316	2	09° MEASURE	R	0xFFFFFFFF if disabled
B106	45318	2	10° MEASURE	R	0xFFFFFFFF if disabled
B108	45320	2	11° MEASURE	R	0xFFFFFFFF if disabled
B10A	45322	2	12° MEASURE	R	0xFFFFFFFF if disabled
B10C	45324	2	13° MEASURE	R	0xFFFFFFFF if disabled
B10E	45326	2	14° MEASURE	R	0xFFFFFFFF if disabled
-	-	-	---	-	---
B150	45392	2	TIME	R	byte order/meaning: EMPTY, HOUR, MINUTE, SECOND
B152	45394	2	DATE	R	byte order/meaning: DAY, MONYH, YEAR, YEAR
B154	45396	2	01° MEASURE	R	---
B156	45398	2	02° MEASURE	R	---
B158	45400	2	03° MEASURE	R	---
B15A	45402	2	04° MEASURE	R	---
B15C	45404	2	05° MEASURE	R	---
B15E	45406	2	06° MEASURE	R	---
B160	45408	2	07° MEASURE	R	0xFFFFFFFF if disabled
B162	45410	2	08° MEASURE	R	0xFFFFFFFF if disabled
B164	45412	2	09° MEASURE	R	0xFFFFFFFF if disabled
B166	45414	2	10° MEASURE	R	0xFFFFFFFF if disabled
B168	45416	2	11° MEASURE	R	0xFFFFFFFF if disabled
B16A	45418	2	12° MEASURE	R	0xFFFFFFFF if disabled
B16C	45420	2	13° MEASURE	R	0xFFFFFFFF if disabled
B16E	45422	2	14° MEASURE	R	0xFFFFFFFF if disabled

WARNING

Follow this procedure before modify the log setup (except LOG TO READ command):

- Disable Generic (Smart if enabled) log.
- Read all saved logs (Generic and Smart) because the Enable operation delete all logs (refer to log summary table to know the number of actual log saved).
- Modify the log parameters.
- Enable the Generic log. This operation deletes all the log and could be last up to 5 seconds.

Smart log setup

Warning: any changes to the register values DELETES all generic and smart logs saved (except LOG TO READ register).

Reg. HEX	Reg. DEC	Word	Description	R/W	Parameters
B200	45568	2	LOG TO READ	R/W	Log number that must be read. From 1 to n.
B202	45570	2	ENABLE	R/W	0: Disabled *[Default]* 1: Enabled **Warning**: it's possible to enable max 2 log type at the same time
B204	45572	2	WINDOW UPDATE TIME	R/W	00: 1 min 05: 10 min 10: 60 min 01: 2 min 06: 12 min 11: end of day 02: 3 min 07: 15 min *[Default]* 12: end of week 03: 5 min 08: 20 min 13: end of month 04: 6 min 09: 30 min 14: end of year
B206	45574	2	STORAGE TYPE	R/W	0: Stop at the end of log space *[Default]* 1: FIFO (after 10 consecutive cycles is automatically disabled)
B208	45576	2	01st GROUP	R/W	0: not used *[Default]* 1: Instantaneous 2: Average
B20A	45578	2	01st MEASURE	R/W	If GROUP is 1: See Instantaneous group If GROUP is 2: See Average group
---	---	---	---	---	---
B23C	45628	2	14th GROUP	R/W	0: not used *[Default]* 1: Instantaneous 2: Average
B23E	45630	2	14th MEASURE	R/W	If GROUP is 1: See Instantaneous group If GROUP is 2: See Average group

*: The log will start at the next "0 Minutes"

Smart log info

Reg. HEX	Reg. DEC	Word	Description	R/W	Measure Unit	Type
B2A0	45728	2	LOG NUMBER	R	---	Unsigned
B2A2	45730	2	MEMORY USED (*2*)	R	% * 100	Unsigned
B2A4	45732	2	REMAINING TIME	R	Minutes	Unsigned

(***2***): Read Examples: 2520 equal to 25,20% - 5000 equal to 50,00%

Smart log selected

Reg. HEX	Reg. DEC	Word	Description	R/W	Parameters
B2B0	45744	2	TIME	R	byte order/meaning: EMPTY, HOUR, MINUTE, SECOND
B2B2	45746	2	DATE	R	byte order/meaning: DAY, MONYH, YEAR, YEAR
B2B4	45748	2	01st MEASURE MAX	R	---
B2B6	45750	2	01st MEASURE AVERAGE	R	---
B2B8	45752	2	01st MEASURE MIN	R	---
---	---	---	---	---	---
B302	45826	2	14th MEASURE MAX	R	---
B304	45828	2	14th MEASURE AVERAGE	R	---
B306	45830	2	14th MEASURE MIN	R	---

WARNING

Follow this procedure before modify the log setup (except LOG TO READ command):

- Disable Smart (Generic if enabled) log.
- Read all saved logs (Generic and Smart) because the Enable operation delete all logs (refer to log summary table to know the number of actual log saved).
- Modify the setup log parameters.
- Enable the Smart log. This operation deletes all the log and could be last up to 5 seconds.

Slaves Online/Offline

Reg. HEX	Reg. DEC	Word	Description	R/W	Parameters
6450	25680	2	SLAVE 1 STATE	R	0: online 1: offline
6452	25682	2	SLAVE 2 STATE	R	0: online 1: offline
6454	25684	2	SLAVE 3 STATE	R	0: online 1: offline
6456	25686	2	SLAVE 4 STATE	R	0: online 1: offline
6458	25688	2	SLAVE 5 STATE	R	0: online 1: offline
645A	25690	2	SLAVE 6 STATE	R	0: online 1: offline
645C	25692	2	SLAVE 7 STATE	R	0: online 1: offline
645E	25694	2	SLAVE 8 STATE	R	0: online 1: offline
6460	25696	2	SLAVE 9 STATE	R	0: online 1: offline
6462	25698	2	SLAVE 10 STATE	R	0: online 1: offline
6464	25700	2	SLAVE 11 STATE	R	0: online 1: offline
6466	25702	2	SLAVE 12 STATE	R	0: online 1: offline
6468	25704	2	SLAVE 13 STATE	R	0: online 1: offline
646A	25706	2	SLAVE 14 STATE	R	0: online 1: offline
646C	25708	2	SLAVE 15 STATE	R	0: online 1: offline
646E	25710	2	SLAVE 16 STATE	R	0: online 1: offline
6470	25712	2	SLAVE 17 STATE	R	0: online 1: offline
6472	25714	2	SLAVE 18 STATE	R	0: online 1: offline
6474	25716	2	SLAVE 19 STATE	R	0: online 1: offline
6476	25718	2	SLAVE 20 STATE	R	0: online 1: offline

Slaves read N°1

Reg. HEX	Reg. DEC	Word	Description	R/W	Parameters
D000	53248	2	1° REGISTER	R	See list below
---		---	---	---	See list below
D153	53587	2	170° REGISTER	R	See list below

Slaves read N°2

Reg. HEX	Reg. DEC	Word	Description	R/W	Parameters
D154	53588	2	1° REGISTER	R	See list below
---		---	---	---	See list below
D2A7	53927	2	170° REGISTER	R	See list below

Slaves read N°3

Reg. HEX	Reg. DEC	Word	Description	R/W	Parameters
D2A8	53928	2	1° REGISTER	R	See list below
---		---	---	---	See list below
D3FB	54267	2	170° REGISTER	R	See list below

Slaves read N°4

Reg. HEX	Reg. DEC	Word	Description	R/W	Parameters
D3FC	54268	2	1° REGISTER	R	See list below
---		---	---	---	See list below
D54F	54607	2	170° REGISTER	R	See list below

Slaves read N°5 … N°20

offset slave address 0x0154 Hex

EMM-DC slave:
1° register: phase voltage 1
2° register: phase voltage 2
3° register: line current 1
4° register: line current 2
5° register: line power 1
6° register: line power 2
7° register: current sum L1+L2
8° register: power sum L1+L2
9° register: line positive / imported energy L1
10° register: line positive / exported energy L1
11° register: line positive / imported energy L2
12° register: line positive / exported energy L2
13° register: line positive / imported energy SUM L1-L2
14° register: line positive / exported energy SUM L1-L2
15° register: temperature
16° register: hour counters
17° register: max instantaneous voltage V_L

39° register: last avg temperature

See the relative protocol manual for details.

HRI slave:
1° register: insulation resistance
2° register: impedance
3° register: temperature 1
4° register: temperature 2
5° register: current
6° register: mode R
7° register: mode Z
8° register: mode temperature 1
9° register: mode temperature 2
10° register: mode a
11° register: status alarms
12° register: enable alarms
13° register: auxiliary relay
14° register: status remote panel
15° register: frequency
16° register: empty
17° register: threshold resistive insulation
18° register: threshold impedance insulation
19° register: threshold temperature 1
20° register: threshold temperature 2
21° register: threshold current

CTT-8 slave:
1° register: temperature channel 1
2° register: temperature channel 2
3° register: temperature channel 3
4° register: temperature channel 4
5° register: temperature channel 5
6° register: temperature channel 6
7° register: temperature channel 7
8° register: temperature channel 8
9° register: peak temperature channel 1
10° register: peak temperature channel 2
11° register: peak temperature channel 3
12° register: peak temperature channel 4
13° register: peak temperature channel 5
14° register: peak temperature channel 6
15° register: peak temperature channel 7
16° register: peak temperature channel 8
17° register: state of channel 1
18° register: state of channel 2
19° register: state of channel 3
20° register: state of channel 4
21° register: state of channel 5
22° register: state of channel 6
23° register: state of channel 7
24° register: state of channel 8

CTT-4 slave:
1° register: temperature channel 1
2° register: temperature channel 2
3° register: temperature channel 3
4° register: temperature channel 4
5° register: peak temperature channel 1
6° register: peak temperature channel 2
7° register: peak temperature channel 3
8° register: peak temperature channel 4
9° register: state of channel 1
10° register: state of channel 2
11° register: state of channel 3
12° register: state of channel 4

RI-SM slave:
1° register: resistance
2° register: minimum resistance
3° register: trip set
4° register: alarm set
5° register: status

EMT-4s slave:
1°÷47° registers: from sys. voltage to phase tangent phi L3
48°÷68° registers: from sys. active energy in to appar. energy L3

EMM-h slave:
1°÷31° registers: from 3-ph system voltage to reactive power L3
32°÷35° registers: from 3-ph sys. active energy T1 to 3-ph sys. reactive energy T2
36° register: frequency
37° register: neutral current
38° register: 3-phase system apparent energy T1
39° register: 3-phase system apparent energy T2

EMS-96 / EMA-90N slave:
1°÷ 125° registers: from SYSTEM-VOLTAGE to DI-8-STATE
125°÷161° registers: from SYSTEM ACTIVE ENERGY IN to APPARENT ENERGY L3

TTC-V slave:
1° register: Current (A x 100)

DVH 5x slave:
1°÷52° registers: from instantaneous voltage V1 to total "S-"

EMU slave:
1° register: RMS star voltage L1-N [mV]
2° register: RMS star voltage L2-N [mV]
3° register: RMS star voltage L3-N [mV]
4° register: RMS star avg value voltage [mV]
5° register: RMS line voltage L1-L2 [mV]

6° register: RMS line voltage L2-L3 [mV]
7° register: RMS line voltage L3-L1 [mV]
8° register: RMS line avg value voltage [mV]
9° register: RMS line current L1 [mA]
10° register: RMS line current L2 [mA]
11° register: RMS line current L3 [mA]
12° register: RMS line current N [mA] (if 1 or 2 TA connection, I_N = 0)
13° register: RMS avg value current [mA] (excluding neutral current I_N)
14° register: RMS active power line 1 [mW]
15° register: RMS active power line 2 [mW]
16° register: RMS active power line 3 [mW]
17° register: RMS sum active power [mW]
18° register: RMS reactive power line 1 [mVAR]
19° register: RMS reactive power line 2 [mVAR]
20° register: RMS reactive power line 3 [mVAR]
21° register: RMS sum reactive power [mVAR]
22° register: RMS apparent power line 1 [mVAR]
23° register: RMS apparent power line 2 [mVAR]
24° register: RMS apparent power line 3 [mVAR]
25° register: RMS sum apparent power [mVAR]
26° register: Power Factor line 1
27° register: Power Factor line 2
28° register: Power Factor line 3
29° register: Three Phase Power Factor
30° register: Crest Factor line 1
31° register: Crest Factor line 2
32° register: Crest Factor line 3
33° register: Crest Factor Neutral
34° register: Frequency [mHz]
35° register: Active energy line 1 [0.1 kWh]
36° register: Active energy line 2 [0.1 kWh]
37° register: Active energy line 3 [0.1 kWh]
38° register: Active energy three phase [0.1 kWh]
39° register: Positive Active energy line 1 [0.1 kWh]
40° register: Positive Active energy line 2 [0.1 kWh]
41° register: Positive Active energy line 3 [0.1 kWh]
42° register: Positive Active energy three phase [0.1 kWh]
43° register: Negative Active energy line 1 [0.1 kWh]
44° register: Negative Active energy line 2 [0.1 kWh]
45° register: Negative Active energy line 3 [0.1 kWh]
46° register: Negative Active energy three phase [0.1 kWh]
47° register: Reactive energy line 1 [0.1 kVARh]
48° register: Reactive energy line 2 [0.1 kVARh]
49° register: Reactive energy line 3 [0.1 kVARh]
50° register: Reactive energy three phase [0.1 kVARh]
51° register: Apparent energy line 1 [0.1 kVAh]
52° register: Apparent energy line 2 [0.1 kVAh]
53° register: Apparent energy line 3 [0.1 kVAh]
54° register: Apparent energy three phase [0.1 kVAh]

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