

ANR-LAN Communication Protocol MODBUS-TCP Quick Overview

WHAT IS MODBUS TCP/IP?

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.

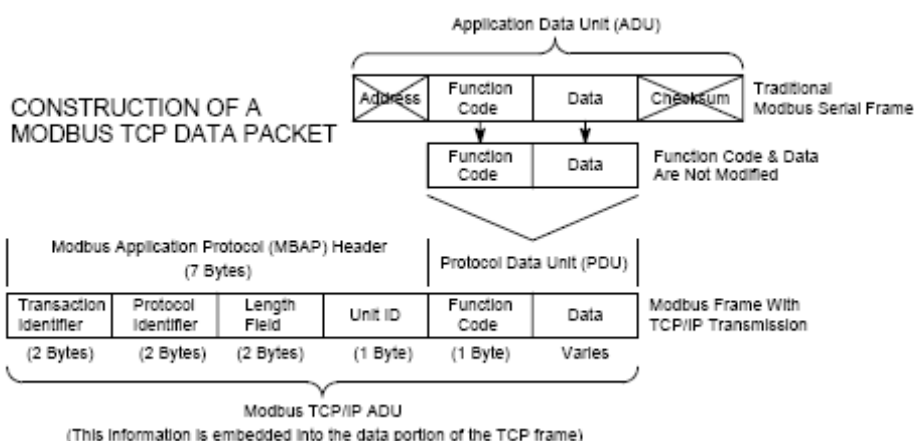
TCP/IP refers to the Transmission Control Protocol and Internet Protocol, which provides the transmission medium for Modbus TCP/IP messaging.

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 byte 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).

Why combine modbus with ethernet?

IEEE 802.3 Ethernet is a long-standing office networking protocol that has gained universal world-wide acceptance. It is also an open standard that is supported by many manufacturers and its infrastructure is widely available and largely installed. Consequently, its TCP/IP suite of protocols is used world-wide and even serves as the foundation for access to the World Wide Web.

As many devices already support Ethernet, it is only natural to augment it for use in industrial applications.

Just as with Ethernet, Modbus is freely available, accessible to anyone, and widely supported by many manufacturers of industrial equipment. It is also easy to understand and a natural candidate for use in building other industrial communication standards. With so much in common, the marriage of the Modbus application protocol with traditional IEEE 802.3 Ethernet transmission forms a powerful industrial communication standard in Modbus TCP/IP. And because Modbus TCP/IP shares the same physical

and data link layers of traditional IEEE 802.3 Ethernet and uses the same TCP/IP suite of protocols, it remains fully compatible with the already installed Ethernet infrastructure of cables, connectors, network interface cards, hubs, and switches.

Application Layer

The uppermost layer of the TCP/IP and OSI Reference Models is the Application Layer. There are many application layer protocols that may reside here, such as FTP, Telnet, HTTP, SMTP, DNS, and NNTP, among others. While each of these protocols has their own specific purpose, for Modbus TCP/IP, the primary application layer protocol of interest is Modbus.

Modbus is an application protocol or messaging structure that defines rules for organizing and interpreting data independent of the data transmission medium. Traditional serial Modbus is a register-based protocol that defines message transactions that occur between masters and slaves. Slave devices listen for communication from the master and simply respond as instructed. The master always controls the communication and may communicate directly to one slave, or all connected slaves, but the slaves cannot communicate directly with each other.

Thus, we see that Modbus operates according to the common client/server (master/slave) model. That is, the client (master) sends a request telegram (service request) to the server (slave), and the server replies with a response telegram. If the server cannot process a request, it will instead return a error function code (exception response) that is the original function code plus 80H.

Modbus functions operate on memory registers to configure, monitor, and control device I/O. Modbus devices usually include a Register Map. You should refer to the register map for your device to gain a better understanding of its operation. You will also find it helpful to refer to the register map as you review the Modbus functions described later in this document.

Modbus Functions and Registers

The “x” following the leading character represents a fourdigit address location in user data memory.

The Modbus registers of a device are organized around the four basic data reference types noted above and this data type is further identified by the leading number of the reference address as follows:

CODE	FUNCTION	REFERENCE
01 (01H)	Read Coil (Output) Status	0xxxx
03 (03H)	Read Holding Registers	4xxxx
04 (04H)	Read Input Registers	3xxxx
05 (05H)	Force Single Coil (Output)	0xxxx
06 (06H)	Preset Single Register	4xxxx
15 (0FH)	Force Multiple Coils (Outputs)	0xxxx
16 (10H)	Preset Multiple Registers	4xxxx
17 (11H)	Report Slave ID	Hidden

Reference	Description
0xxxx	<u>Read/Write Discrete Outputs or Coils.</u> A 0x reference address is used to drive output data to a digital output channel.
1xxxx	<u>Read Discrete Inputs.</u> The ON/OFF status of a 1x reference address is controlled by the corresponding digital input channel.
3xxxx	<u>Read Input Registers.</u> A 3x reference register contains a 16-bit number received from an external source—e.g. an analog signal.
4xxxx	<u>Read/Write Output or Holding Registers.</u> A 4x register is used to store 16-bits of numerical data (binary or decimal), or to send the data from the CPU to an output channel.

The client request data field provides the slave (server) with any additional information required by the slave to complete the action specified by the function code in the client's request. The data field typically includes register addresses, count values, and written data. For some messages, this field may not exist (has zero length), as not all messages will require data.

When the slave device responds to the master, it uses the function code field to indicate either a normal (error-free) response, or that some kind of error has occurred (an exception response).

Modbus Exceptions

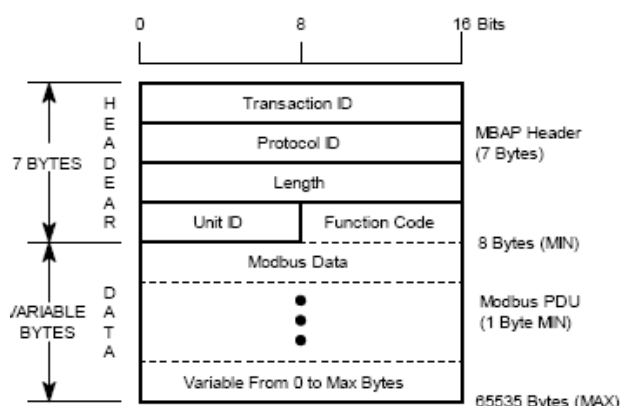
Modbus Exception Codes

Code	Exception	Description
01	Illegal Function	The function code received in the query is not allowed or invalid.
02	Illegal Data Address	The data address received in the query is not an allowable address for the slave or is invalid.
03	Illegal Data Value	A value contained in the query data field is not an allowable value for the slave or is invalid.
04	Slave/Server Device Failure	The server failed during execution. An unrecoverable error occurred while the slave/server was attempting to perform the requested action.
05	Acknowledge	The slave/server has accepted the request and is processing it, but a long duration of time is required to do so. This response is returned to prevent a timeout error from occurring in the master.
06	Slave/Server Device Busy	The slave is engaged in processing a long-duration program command. The master should retransmit the message later when the slave is free.
07	Negative Acknowledge	The slave cannot perform the program function received in the query. This code is returned for an unsuccessful programming request using function code 13 or 14 (codes not supported by this model). The master should request diagnostic information from the slave.
08	Memory Parity Error	The slave attempted to read extended memory, but detected a parity error in memory. The master can retry the request, but service may be required at the slave device.
0A	Gateway Problem	Gateway path(s) not available.
0B	Gateway Problem	The target device failed to respond (the gateway generates this exception).
FF	Extended Exception Response	The exception response PDU contains extended exception information. A subsequent 2 byte length field indicates the size in bytes of this function-code specific exception information.

Modbus TCP/IP Format

We know that the application layer is said to ride on top of TCP. Prior to passing the application message via TCP, a Modbus TCP/IP Application Data Unit is formed from a 7-byte Modbus Application Protocol (MBAP) header and the Protocol Data Unit (Modbus function code and data). This packet takes the following form:

Modbus TCP/IP Application Data Unit



The 7-byte MBAP header includes the following fields:

- **Transaction/Invocation Identifier (2 Bytes):** This identification field is used for transaction pairing when several Modbus transactions are sent along the same TCP connection without waiting for completion of the prior transaction.
- **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 destination identification and data fields.
- **Unit Identifier (1 byte):** This field is used to identify a remote server located on a non TCP/IP network (for bridging Ethernet to a serial sub-network). In a typical slave application, the unit ID is ignored and just echoed back in the response. It is recommended that a unit ID of FF be used to keep this value insignificant to a serial bridge or gateway.

COMMUNICATION PROTOCOL MODBUS-TCP

Reading of the registers (Function Code \$03)

Reads the binary contents of holding registers (2X references) in the slave.

Broadcast is not supported.

The Query message specified the starting register and quantity of register to be read.

QUERY:

HEADER TCP	ADDRESS FIELD	FUNCTION CODE	START ADDRESS	No. OF REGISTERS
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HEADER TCP = Transaction ID, Protocol ID, Length of query modbus.
ADDRESS FIELD = device address (01...F7 HEX) (1 byte).
FUNCTION CODE = Operation code (03 HEX) (1 byte).
START ADDRESS = First register address to be read (2 byte).
No. OF REGISTERS = Number of registers (max 32) to be read (4 bytes for 1 measure value).

WARNING:

It is possible to read more than one variable at the same time (max 16) 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:

HEADER TCP	ADDRESS FIELD	FUNCTION CODE	No. OF BYTES	D0, D1, ..., Dn
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HEADER TCP = Transaction ID, Protocol ID, Length of response modbus.
ADDRESS FIELD = device address (01...F7 HEX) (1byte).
FUNCTION CODE = Operation code (03 HEX) (1 Byte).
No. OF SEND BYTES= Number of data bytes (00...?? HEX) (1 byte).
D0, D1, .., Dn = data bytes (00...?? HEX) (Nr. of register x 2 = n. byte).

See the TABLE OF ANR-LAN REGISTERS (Appendix A) and the EXAMPLE (Appendix B).

Setup of the registers (Function Code \$10)

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

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

QUERY:

HEADER TCP	ADDRESS FIELD	FUNCTION CODE	START ADDRESS	No. OF REGISTERS	No. OF BYTES	D0, D1, ..., Dn
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HEADER TCP = Transaction ID, Protocol ID, Length of query modbus.
ADDRESS FIELD = device address (01...F7 HEX) (1 byte).
FUNCTION CODE = Operation code (10 HEX) (1 byte).
START ADDRESS = First register address to be written (2 byte).
No. OF REGISTER = Number of registers to be written (1 to 4,...) (2 byte).
No. OF BYTES = Number of data bytes (HEX) (1 byte).
D0,D1,...,Dn = Data bytes (00...? HEX) (1 byte) (Nr. of register x 2 = n. byte).

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

RESPONSE:

HEADER TCP	ADDRESS FIELD	FUNCTION CODE	START ADDRESS	No. OF REGISTERS
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HEADER TCP = Transaction ID, Protocol ID, Length of response modbus.
ADDRESS FIELD = device address (01...F7 HEX) (1 byte).
FUNCTION CODE = Operation code (10 HEX) (1 byte).
START ADDRESS = First register address to be written (2 byte).
No. OF REGISTER = Number of registers to be written (2 byte).

See the TABLE OF ANR-LAN REGISTERS (Appendix A) and the EXAMPLE (Appendix B).

TABLE OF ANR REGISTERS

The following table shown all the ANR registers.

The **M.U.** and **Type** columns are referred to integer register (first column).

MEASURED VALUES (Function code \$ 03)

Integer		Float (IEEE)		Description	M.U.	Type
Register HEX	Word	Register HEX	Word			
\$1000	4	\$2000	2	3-PHASE SYSTEM VOLTAGE	[mV]	(Uns.) MSB=0
\$1004	4	\$2002	2	PHASE VOLTAGE L _{1-N}	[mV]	(Unsigned)
\$1008	4	\$2004	2	PHASE VOLTAGE L _{2-N}	[mV]	(Unsigned)
\$100C	4	\$2006	2	PHASE VOLTAGE L _{3-N}	[mV]	(Unsigned)
\$1010	4	\$2008	2	LINE VOLTAGE L ₁₋₂	[mV]	(Unsigned)
\$1014	4	\$200A	2	LINE VOLTAGE L ₂₋₃	[mV]	(Unsigned)
\$1018	4	\$200C	2	LINE VOLTAGE L ₃₋₁	[mV]	(Unsigned)
\$101C	4	\$200E	2	3-PHASE SYSTEM CURRENT	[mA]	(Signed)MSB=1
\$1020	4	\$2010	2	LINE CURRENT L ₁	[mA]	(Signed)
\$1024	4	\$2012	2	LINE CURRENT L ₂	[mA]	(Signed)
\$1028	4	\$2014	2	LINE CURRENT L ₃	[mA]	(Signed)
\$102C	4	\$2016	2	3-PHASE SYS. POWER FACTOR	[-]	(Signed)
\$1030	4	\$2018	2	POWER FACTOR L ₁	[-]	(Signed)
\$1034	4	\$201A	2	POWER FACTOR L ₂	[-]	(Signed)
\$1038	4	\$201C	2	POWER FACTOR L ₃	[-]	(Signed)
\$103C	4	\$201E	2	3-PHASE SYSTEM COSØ	[-]	(Signed)
\$1040	4	\$2020	2	PHASE COSØ ₁	[-]	(Signed)
\$1044	4	\$2022	2	PHASE COSØ ₂	[-]	(Signed)
\$1048	4	\$2024	2	PHASE COSØ ₃	[-]	(Signed)
\$104C	4	\$2026	2	3-PHASE S. APPARENT POWER	[mVA]	(Signed)
\$1050	4	\$2028	2	APPARENT POWER L ₁	[mVA]	(Signed)
\$1054	4	\$202A	2	APPARENT POWER L ₂	[mVA]	(Signed)
\$1058	4	\$202C	2	APPARENT POWER L ₃	[mVA]	(Signed)
\$105C	4	\$202E	2	3-PHASE SYS. ACTIVE POWER	[mW]	(Signed)
\$1060	4	\$2030	2	ACTIVE POWER L ₁	[mW]	(Signed)
\$1064	4	\$2032	2	ACTIVE POWER L ₂	[mW]	(Signed)
\$1068	4	\$2034	2	ACTIVE POWER L ₃	[mW]	(Signed)
\$106C	4	\$2036	2	3-PHASE S. REACTIVE POWER	[mVAR]	(Signed)
\$1070	4	\$2038	2	REACTIVE POWER L ₁	[mVAR]	(Signed)
\$1074	4	\$203A	2	REACTIVE POWER L ₂	[mVAR]	(Signed)
\$1078	4	\$203C	2	REACTIVE POWER L ₃	[mVAR]	(Signed)
\$107C	4	\$203E	2	3-PHASE SYS. ACTIVE ENERGY+	[Wh]	(Unsigned)
\$1080	4	\$2040	2	3-PHASE S. REACTIVE ENERGY+	[VARh]	(Unsigned)
\$1084	4	\$2042	2	3-PHASE SYS.ACTIVE EN.	[Wh]	(Unsigned)
\$1088	4	\$2044	2	3-PHASE SYS.REACT.EN.	[VARh]	(Unsigned)
\$108C	4	\$2046	2	FREQUENCY	[mHz]	(Unsigned)
\$1090	4	\$2048	2	THD VOLTAGE L ₁	[m%]	(Unsigned)
\$1094	4	\$204A	2	THD VOLTAGE L ₂	[m%]	(Unsigned)
\$1098	4	\$204C	2	THD VOLTAGE L ₃	[m%]	(Unsigned)
\$109C	4	\$204E	2	THD CURRENT L ₁	[m%]	(Unsigned)
\$10A0	4	\$2050	2	THD CURRENT L ₂	[m%]	(Unsigned)
\$10A4	4	\$2052	2	THD CURRENT L ₃	[m%]	(Unsigned)
\$10A8	4	\$2054	2	3-PHASE AVG. ACTIVE POWER	[mW]	(Unsigned)
\$10AC	4	\$2056	2	3-PHASE AVERAGE CURRENT	[mA]	(Unsigned)
\$11C0	4	\$2068	2	TEMPERATURE	[m°C]	(Signed)
\$11C4	4	\$2A3A	2	NEUTRAL CURRENT	[mA]	(Signed)
\$11C8	4	\$2A3C	2	3 PHASE AVG. REACTIVE POWER	[mVAR]	(Signed)
\$11CC	4	\$2A40	2	AVERAGE LINE CURRENT L ₁	[mA]	(Signed)
\$11D0	4	\$2A42	2	AVERAGE LINE CURRENT L ₂	[mA]	(Signed)
\$11D4	4	\$2A44	2	AVERAGE LINE CURRENT L ₃	[mA]	(Signed)
\$11D8	4	\$2A46	2	MAX AVERAGE 3-PH. CURRENT	[mA]	(Signed)
\$11DC	4	\$2A48	2	MAX AVERAGE LINE CURRENT L ₁	[mA]	(Signed)
\$11E0	4	\$2A4A	2	MAX AVERAGE LINE CURRENT L ₂	[mA]	(Signed)
\$11E4	4	\$2A4C	2	MAX AVERAGE LINE CURRENT L ₃	[mA]	(Signed)
\$11E8	4	\$2A4E	2	MAX AVG NEUTRAL CURRENT L _N	[mA]	(Signed)
\$11EC	4	\$2A3E	2	AVERAGE NEUTRAL CURRENT L _N	[mA]	(Signed)
\$11F0	4	\$2A6A	2	VOLTAGE UNBALANCE	[m%]	(Unsigned)
\$11F4	4	\$2A6C	2	CURRENT UNBALANCE	[m%]	(Unsigned)

NOTE: WHEN THE INSTRUMENT CAN'T MEASURE IT SEND 0000 AS VALUE.

MIN/MAX VALUES (Function code \$ 03)

Integer		Float (IEEE)		Description	M.U.	Type
Register HEX	Word	Register HEX	Word			
\$10B0	3	\$20B0	3	YY MM DD	[-]	(Unsigned)
\$10B3	3	\$20B3	3	HH MM SS	[-]	(Unsigned)
\$10B6	4	\$20B6	2	MIN 3-PHASE SYSTEM VOLTAGE	[mV]	(Unsigned)
\$10BA	3	\$20B8	3	YY MM DD	[-]	(Unsigned)
\$10BD	3	\$20BB	3	HH MM SS	[-]	(Unsigned)
\$10C0	4	\$20BE	2	MAX 3-PHASE SYSTEM VOLTAGE	[mV]	(Unsigned)
\$10C4	3	\$20C0	3	YY MM DD	[-]	(Unsigned)
\$10C7	3	\$20C3	3	HH MM SS	[-]	(Unsigned)
\$10CA	4	\$20C6	2	MIN 1-PHASE VOLTAGE L _{1-N}	[mV]	(Unsigned)
\$10CE	3	\$20C8	3	YY MM DD	[-]	(Unsigned)
\$10D1	3	\$20CB	3	HH MM SS	[-]	(Unsigned)
\$10D4	4	\$20CE	2	MAX 1-PHASE VOLTAGE L _{1-N}	[mV]	(Unsigned)
\$10D8	3	\$20D0	3	YY MM DD	[-]	(Unsigned)
\$10DB	3	\$20D3	3	HH MM SS	[-]	(Unsigned)
\$10DE	4	\$20D6	2	MIN 1-PHASE VOLTAGE L _{2-N}	[mV]	(Unsigned)
\$10E2	3	\$20D8	3	YY MM DD	[-]	(Unsigned)
\$10E5	3	\$20DB	3	HH MM SS	[-]	(Unsigned)
\$10E8	4	\$20DE	2	MAX 1-PHASE VOLTAGE L _{2-N}	[mV]	(Unsigned)
\$10EC	3	\$20E0	3	YY MM DD	[-]	(Unsigned)
\$10EF	3	\$20E3	3	HH MM SS	[-]	(Unsigned)
\$10F2	4	\$20E6	2	MINIMUM 1-PHASE VOLTAGE L _{3-N}	[mV]	(Unsigned)
\$10F6	3	\$20E8	3	YY MM DD	[-]	(Unsigned)
\$10F9	3	\$20EB	3	HH MM SS	[-]	(Unsigned)
\$10FC	4	\$20EE	2	MAXIMUM 1-PHASE VOLTAGE L _{3-N}	[mV]	(Unsigned)
\$1100	3	\$20F0	3	YY MM DD	[-]	(Unsigned)
\$1103	3	\$20F3	3	HH MM SS	[-]	(Unsigned)
\$1106	4	\$20F6	2	MIN 3-PHASE SYSTEM CURRENT	[mA]	(Signed)
\$110A	3	\$20F8	3	YY MM DD	[-]	(Unsigned)
\$110D	3	\$20FB	3	HH MM SS	[-]	(Unsigned)
\$1110	4	\$20FE	2	MAX 3-PHASE SYSTEM CURRENT	[mA]	(Signed)
\$1114	3	\$2100	3	YY MM DD	[-]	(Unsigned)
\$1117	3	\$2103	3	HH MM SS	[-]	(Unsigned)
\$111A	4	\$2106	2	MINIMUM LINE CURRENT L ₁	[mA]	(Signed)
\$111E	3	\$2108	3	YY MM DD	[-]	(Unsigned)
\$1121	3	\$210B	3	HH MM SS	[-]	(Unsigned)
\$1124	4	\$210E	2	MAXIMUM LINE CURRENT L ₁	[mA]	(Signed)
\$1128	3	\$2110	3	YY MM DD	[-]	(Unsigned)
\$112B	3	\$2113	3	HH MM SS	[-]	(Unsigned)
\$112E	4	\$2116	2	MINIMUM LINE CURRENT L ₂	[mA]	(Signed)
\$1132	3	\$2118	3	YY MM DD	[-]	(Unsigned)
\$1135	3	\$211B	3	HH MM SS	[-]	(Unsigned)
\$1138	4	\$211E	2	MAXIMUM LINE CURRENT L ₂	[mA]	(Signed)
\$113C	3	\$2120	3	YY MM DD	[-]	(Unsigned)
\$113F	3	\$2123	3	HH MM SS	[-]	(Unsigned)
\$1142	4	\$2126	2	MINIMUM LINE CURRENT L ₃	[mA]	(Signed)
\$1146	3	\$2128	3	YY MM DD	[-]	(Unsigned)
\$1149	3	\$212B	3	HH MM SS	[-]	(Unsigned)
\$114C	4	\$212E	2	MAXIMUM LINE CURRENT L ₃	[mA]	(Signed)
\$1150	3	\$2130	3	YY MM DD	[-]	(Unsigned)
\$1153	3	\$2133	3	HH MM SS	[-]	(Unsigned)
\$1156	4	\$2136	2	MIN.3 PHASE SYS. ACTIVE POWER	[mW]	(Signed)
\$115A	3	\$2138	3	YY MM DD	[-]	(Unsigned)
\$115D	3	\$213B	3	HH MM SS	[-]	(Unsigned)
\$1160	4	\$213E	2	MAX.3 PHASE SYS.ACTIVE POWER	[mW]	(Signed)
\$1164	3	\$2140	3	YY MM DD	[-]	(Unsigned)
\$1167	3	\$2143	3	HH MM SS	[-]	(Unsigned)
\$116A	4	\$2146	2	MIN.3 PHASE S.APPARENT POWER	[mVA]	(Signed)
\$116E	3	\$2148	3	YY MM DD	[-]	(Unsigned)
\$1171	3	\$214B	3	HH MM SS	[-]	(Unsigned)
\$1174	4	\$214E	2	MAX.3 PHASE S.APPARENT POWER	[mVA]	(Signed)
\$1178	3	\$2150	3	YY MM DD	[-]	(Unsigned)
\$117B	3	\$2153	3	HH MM SS	[-]	(Unsigned)
\$117E	4	\$2156	2	MIN.3 PHASE S..POWER FACTOR	[-]	(Signed)
\$1182	3	\$2158	3	YY MM DD	[-]	(Unsigned)
\$1185	3	\$215B	3	HH MM SS	[-]	(Unsigned)
\$1188	4	\$215E	2	MAX.3 PHASE S..POWER FACTOR	[-]	(Signed)
\$118C	3	\$2160	3	YY MM DD	[-]	(Unsigned)
\$118F	3	\$2163	3	HH MM SS	[-]	(Unsigned)
\$1192	4	\$2166	2	MIN.3 PHASE AVERAGE POWER	[mW]	(Unsigned)
\$1196	3	\$2168	3	YY MM DD	[-]	(Unsigned)
\$1199	3	\$216B	3	HH MM SS	[-]	(Unsigned)
\$119C	4	\$216E	2	MAX 3 PHASE AVERAGE POWER	[mW]	(Unsigned)

HARMONICS VALUES (Function code \$03)

Integer		Float (IEEE)		Description	M.U.	Type
Register HEX	Word	Register HEX	Word			
\$1200	4	\$2200	2	1 ST VOLTAGE HARMONIC OF THE L ₁ PHASE	[%]	(Unsigned)
\$1204	4	\$2202	2	2 ND VOLTAGE HARMONIC OF THE L ₁ PHASE	[%]	(Unsigned)
\$1208	4	\$2204	2	3 RD VOLTAGE HARMONIC OF THE L ₁ PHASE	[%]	(Unsigned)
\$120C	4	\$2206	2	4 TH VOLTAGE HARMONIC OF THE L ₁ PHASE	[%]	(Unsigned)
\$1210	4	\$2208	2	5 TH VOLTAGE HARMONIC OF THE L ₁ PHASE	[%]	(Unsigned)
\$1214	4	\$220A	2	6 TH VOLTAGE HARMONIC OF THE L ₁ PHASE	[%]	(Unsigned)
\$1218	4	\$220C	2	7 TH VOLTAGE HARMONIC OF THE L ₁ PHASE	[%]	(Unsigned)
\$121C	4	\$220E	2	8 TH VOLTAGE HARMONIC OF THE L ₁ PHASE	[%]	(Unsigned)
\$1220	4	\$2210	2	9 TH VOLTAGE HARMONIC OF THE L ₁ PHASE	[%]	(Unsigned)
\$1224	4	\$2212	2	10 TH VOLTAGE HARMONIC OF THE L ₁ PHASE	[%]	(Unsigned)
\$1228	4	\$2214	2	11 TH VOLTAGE HARMONIC OF THE L ₁ PHASE	[%]	(Unsigned)
\$122C	4	\$2216	2	12 TH VOLTAGE HARMONIC OF THE L ₁ PHASE	[%]	(Unsigned)
\$1230	4	\$2218	2	13 TH VOLTAGE HARMONIC OF THE L ₁ PHASE	[%]	(Unsigned)
\$1234	4	\$221A	2	14 TH VOLTAGE HARMONIC OF THE L ₁ PHASE	[%]	(Unsigned)
\$1238	4	\$221C	2	15 TH VOLTAGE HARMONIC OF THE L ₁ PHASE	[%]	(Unsigned)
\$123C	4	\$221E	2	16 TH VOLTAGE HARMONIC OF THE L ₁ PHASE	[%]	(Unsigned)
\$1240	4	\$2220	2	17 TH VOLTAGE HARMONIC OF THE L ₁ PHASE	[%]	(Unsigned)
\$1244	4	\$2222	2	18 TH VOLTAGE HARMONIC OF THE L ₁ PHASE	[%]	(Unsigned)
\$1248	4	\$2224	2	19 TH VOLTAGE HARMONIC OF THE L ₁ PHASE	[%]	(Unsigned)
\$124C	4	\$2226	2	20 TH VOLTAGE HARMONIC OF THE L ₁ PHASE	[%]	(Unsigned)
\$1250	4	\$2228	2	21 TH VOLTAGE HARMONIC OF THE L ₁ PHASE	[%]	(Unsigned)
\$1254	4	\$222A	2	22 TH VOLTAGE HARMONIC OF THE L ₁ PHASE	[%]	(Unsigned)
\$1258	4	\$222C	2	23 TH VOLTAGE HARMONIC OF THE L ₁ PHASE	[%]	(Unsigned)
\$125C	4	\$222E	2	24 TH VOLTAGE HARMONIC OF THE L ₁ PHASE	[%]	(Unsigned)
\$1260	4	\$2230	2	25 TH VOLTAGE HARMONIC OF THE L ₁ PHASE	[%]	(Unsigned)
\$1460	4	\$2400	2	26 TH VOLTAGE HARMONIC OF THE L ₁ PHASE	[%]	(Unsigned)
\$1464	4	\$2402	2	27 TH VOLTAGE HARMONIC OF THE L ₁ PHASE	[%]	(Unsigned)
\$1468	4	\$2404	2	28 TH VOLTAGE HARMONIC OF THE L ₁ PHASE	[%]	(Unsigned)
\$146C	4	\$2406	2	29 TH VOLTAGE HARMONIC OF THE L ₁ PHASE	[%]	(Unsigned)
\$1470	4	\$2408	2	30 TH VOLTAGE HARMONIC OF THE L ₁ PHASE	[%]	(Unsigned)
\$1474	4	\$240A	2	31 TH VOLTAGE HARMONIC OF THE L ₁ PHASE	[%]	(Unsigned)
\$1264	4	\$2232	2	1 ST VOLTAGE HARMONIC OF THE L ₂ PHASE	[%]	(Unsigned)
\$1268	4	\$2234	2	2 ND VOLTAGE HARMONIC OF THE L ₂ PHASE	[%]	(Unsigned)
\$126C	4	\$2236	2	3 RD VOLTAGE HARMONIC OF THE L ₂ PHASE	[%]	(Unsigned)
\$1270	4	\$2238	2	4 TH VOLTAGE HARMONIC OF THE L ₂ PHASE	[%]	(Unsigned)
\$1274	4	\$223A	2	5 TH VOLTAGE HARMONIC OF THE L ₂ PHASE	[%]	(Unsigned)
\$1278	4	\$223C	2	6 TH VOLTAGE HARMONIC OF THE L ₂ PHASE	[%]	(Unsigned)
\$127C	4	\$223E	2	7 TH VOLTAGE HARMONIC OF THE L ₂ PHASE	[%]	(Unsigned)
\$1280	4	\$2240	2	8 TH VOLTAGE HARMONIC OF THE L ₂ PHASE	[%]	(Unsigned)
\$1284	4	\$2242	2	9 TH VOLTAGE HARMONIC OF THE L ₂ PHASE	[%]	(Unsigned)
\$1288	4	\$2244	2	10 TH VOLTAGE HARMONIC OF THE L ₂ PHASE	[%]	(Unsigned)
\$128C	4	\$2246	2	11 TH VOLTAGE HARMONIC OF THE L ₂ PHASE	[%]	(Unsigned)
\$1290	4	\$2248	2	12 TH VOLTAGE HARMONIC OF THE L ₂ PHASE	[%]	(Unsigned)
\$1294	4	\$224A	2	13 TH VOLTAGE HARMONIC OF THE L ₂ PHASE	[%]	(Unsigned)
\$1298	4	\$224C	2	14 TH VOLTAGE HARMONIC OF THE L ₂ PHASE	[%]	(Unsigned)
\$129C	4	\$224E	2	15 TH VOLTAGE HARMONIC OF THE L ₂ PHASE	[%]	(Unsigned)
\$12A0	4	\$2250	2	16 TH VOLTAGE HARMONIC OF THE L ₂ PHASE	[%]	(Unsigned)
\$12A4	4	\$2252	2	17 TH VOLTAGE HARMONIC OF THE L ₂ PHASE	[%]	(Unsigned)
\$12A8	4	\$2254	2	18 TH VOLTAGE HARMONIC OF THE L ₂ PHASE	[%]	(Unsigned)
\$12AC	4	\$2256	2	19 TH VOLTAGE HARMONIC OF THE L ₂ PHASE	[%]	(Unsigned)
\$12B0	4	\$2258	2	20 TH VOLTAGE HARMONIC OF THE L ₂ PHASE	[%]	(Unsigned)
\$12B4	4	\$225A	2	21 TH VOLTAGE HARMONIC OF THE L ₂ PHASE	[%]	(Unsigned)
\$12B8	4	\$225C	2	22 TH VOLTAGE HARMONIC OF THE L ₂ PHASE	[%]	(Unsigned)
\$12BC	4	\$225E	2	23 TH VOLTAGE HARMONIC OF THE L ₂ PHASE	[%]	(Unsigned)
\$12C0	4	\$2260	2	24 TH VOLTAGE HARMONIC OF THE L ₂ PHASE	[%]	(Unsigned)
\$12C4	4	\$2262	2	25 TH VOLTAGE HARMONIC OF THE L ₂ PHASE	[%]	(Unsigned)
\$1478	4	\$240C	2	26 TH VOLTAGE HARMONIC OF THE L ₂ PHASE	[%]	(Unsigned)
\$147C	4	\$240E	2	27 TH VOLTAGE HARMONIC OF THE L ₂ PHASE	[%]	(Unsigned)
\$1480	4	\$2410	2	28 TH VOLTAGE HARMONIC OF THE L ₂ PHASE	[%]	(Unsigned)
\$1484	4	\$2412	2	29 TH VOLTAGE HARMONIC OF THE L ₂ PHASE	[%]	(Unsigned)
\$1488	4	\$2414	2	30 TH VOLTAGE HARMONIC OF THE L ₂ PHASE	[%]	(Unsigned)
\$148C	4	\$2416	2	31 TH VOLTAGE HARMONIC OF THE L ₂ PHASE	[%]	(Unsigned)

\$12C8	4	\$2264	2	1 ST VOLTAGE HARMONIC OF THE L ₃ PHASE	[%]	(Unsigned)
\$12CC	4	\$2266	2	2 ND VOLTAGE HARMONIC OF THE L ₃ PHASE	[%]	(Unsigned)
\$12D0	4	\$2268	2	3 RD VOLTAGE HARMONIC OF THE L ₃ PHASE	[%]	(Unsigned)
\$12D4	4	\$226A	2	4 TH VOLTAGE HARMONIC OF THE L ₃ PHASE	[%]	(Unsigned)
\$12D8	4	\$226C	2	5 TH VOLTAGE HARMONIC OF THE L ₃ PHASE	[%]	(Unsigned)
\$12DC	4	\$226E	2	6 TH VOLTAGE HARMONIC OF THE L ₃ PHASE	[%]	(Unsigned)
\$12E0	4	\$2270	2	7 TH VOLTAGE HARMONIC OF THE L ₃ PHASE	[%]	(Unsigned)
\$12E4	4	\$2272	2	8 TH VOLTAGE HARMONIC OF THE L ₃ PHASE	[%]	(Unsigned)
\$12E8	4	\$2274	2	9 TH VOLTAGE HARMONIC OF THE L ₃ PHASE	[%]	(Unsigned)
\$12EC	4	\$2276	2	10 TH VOLTAGE HARMONIC OF THE L ₃ PHASE	[%]	(Unsigned)
\$12F0	4	\$2278	2	11 TH VOLTAGE HARMONIC OF THE L ₃ PHASE	[%]	(Unsigned)
\$12F4	4	\$227A	2	12 TH VOLTAGE HARMONIC OF THE L ₃ PHASE	[%]	(Unsigned)
\$12F8	4	\$227C	2	13 TH VOLTAGE HARMONIC OF THE L ₃ PHASE	[%]	(Unsigned)
\$12FC	4	\$227E	2	14 TH VOLTAGE HARMONIC OF THE L ₃ PHASE	[%]	(Unsigned)
\$1300	4	\$2280	2	15 TH VOLTAGE HARMONIC OF THE L ₃ PHASE	[%]	(Unsigned)
\$1304	4	\$2282	2	16 TH VOLTAGE HARMONIC OF THE L ₃ PHASE	[%]	(Unsigned)
\$1308	4	\$2284	2	17 TH VOLTAGE HARMONIC OF THE L ₃ PHASE	[%]	(Unsigned)
\$130C	4	\$2286	2	18 TH VOLTAGE HARMONIC OF THE L ₃ PHASE	[%]	(Unsigned)
\$1310	4	\$2288	2	19 TH VOLTAGE HARMONIC OF THE L ₃ PHASE	[%]	(Unsigned)
\$1314	4	\$228A	2	20 TH VOLTAGE HARMONIC OF THE L ₃ PHASE	[%]	(Unsigned)
\$1318	4	\$228C	2	21 TH VOLTAGE HARMONIC OF THE L ₃ PHASE	[%]	(Unsigned)
\$131C	4	\$228E	2	22 TH VOLTAGE HARMONIC OF THE L ₃ PHASE	[%]	(Unsigned)
\$1320	4	\$2290	2	23 TH VOLTAGE HARMONIC OF THE L ₃ PHASE	[%]	(Unsigned)
\$1324	4	\$2292	2	24 TH VOLTAGE HARMONIC OF THE L ₃ PHASE	[%]	(Unsigned)
\$1328	4	\$2294	2	25 TH VOLTAGE HARMONIC OF THE L ₃ PHASE	[%]	(Unsigned)
\$1490	4	\$2418	2	26 TH VOLTAGE HARMONIC OF THE L ₃ PHASE	[%]	(Unsigned)
\$1494	4	\$241A	2	27 TH VOLTAGE HARMONIC OF THE L ₃ PHASE	[%]	(Unsigned)
\$1498	4	\$241C	2	28 TH VOLTAGE HARMONIC OF THE L ₃ PHASE	[%]	(Unsigned)
\$149C	4	\$241E	2	29 TH VOLTAGE HARMONIC OF THE L ₃ PHASE	[%]	(Unsigned)
\$14A0	4	\$2420	2	30 TH VOLTAGE HARMONIC OF THE L ₃ PHASE	[%]	(Unsigned)
\$14A4	4	\$2422	2	31 TH VOLTAGE HARMONIC OF THE L ₃ PHASE	[%]	(Unsigned)

\$132C	4	\$2296	2	1 ST CURRENT HARMONIC OF THE L ₁ PHASE	[%]	(Unsigned)
\$1330	4	\$2298	2	2 ND CURRENT HARMONIC OF THE L ₁ PHASE	[%]	(Unsigned)
\$1334	4	\$229A	2	3 RD CURRENT HARMONIC OF THE L ₁ PHASE	[%]	(Unsigned)
\$1338	4	\$229C	2	4 TH CURRENT HARMONIC OF THE L ₁ PHASE	[%]	(Unsigned)
\$133C	4	\$229E	2	5 TH CURRENT HARMONIC OF THE L ₁ PHASE	[%]	(Unsigned)
\$1340	4	\$22A0	2	6 TH CURRENT HARMONIC OF THE L ₁ PHASE	[%]	(Unsigned)
\$1344	4	\$22A2	2	7 TH CURRENT HARMONIC OF THE L ₁ PHASE	[%]	(Unsigned)
\$1348	4	\$22A4	2	8 TH CURRENT HARMONIC OF THE L ₁ PHASE	[%]	(Unsigned)
\$134C	4	\$22A6	2	9 TH CURRENT HARMONIC OF THE L ₁ PHASE	[%]	(Unsigned)
\$1350	4	\$22A8	2	10 TH CURRENT HARMONIC OF THE L ₁ PHASE	[%]	(Unsigned)
\$1354	4	\$22AA	2	11 TH CURRENT HARMONIC OF THE L ₁ PHASE	[%]	(Unsigned)
\$1358	4	\$22AC	2	12 TH CURRENT HARMONIC OF THE L ₁ PHASE	[%]	(Unsigned)
\$135C	4	\$22AE	2	13 TH CURRENT HARMONIC OF THE L ₁ PHASE	[%]	(Unsigned)
\$1360	4	\$22B0	2	14 TH CURRENT HARMONIC OF THE L ₁ PHASE	[%]	(Unsigned)
\$1364	4	\$22B2	2	15 TH CURRENT HARMONIC OF THE L ₁ PHASE	[%]	(Unsigned)
\$1368	4	\$22B4	2	16 TH CURRENT HARMONIC OF THE L ₁ PHASE	[%]	(Unsigned)
\$136C	4	\$22B6	2	17 TH CURRENT HARMONIC OF THE L ₁ PHASE	[%]	(Unsigned)
\$1370	4	\$22B8	2	18 TH CURRENT HARMONIC OF THE L ₁ PHASE	[%]	(Unsigned)
\$1374	4	\$22BA	2	19 TH CURRENT HARMONIC OF THE L ₁ PHASE	[%]	(Unsigned)
\$1378	4	\$22BC	2	20 TH CURRENT HARMONIC OF THE L ₁ PHASE	[%]	(Unsigned)
\$137C	4	\$22BE	2	21 TH CURRENT HARMONIC OF THE L ₁ PHASE	[%]	(Unsigned)
\$1380	4	\$22C0	2	22 TH CURRENT HARMONIC OF THE L ₁ PHASE	[%]	(Unsigned)
\$1384	4	\$22C2	2	23 TH CURRENT HARMONIC OF THE L ₁ PHASE	[%]	(Unsigned)
\$1388	4	\$22C4	2	24 TH CURRENT HARMONIC OF THE L ₁ PHASE	[%]	(Unsigned)
\$138C	4	\$22C6	2	25 TH CURRENT HARMONIC OF THE L ₁ PHASE	[%]	(Unsigned)
\$14A8	4	\$2424	2	26 TH CURRENT HARMONIC OF THE L ₁ PHASE	[%]	(Unsigned)
\$14AC	4	\$2426	2	27 TH CURRENT HARMONIC OF THE L ₁ PHASE	[%]	(Unsigned)
\$14B0	4	\$2428	2	28 TH CURRENT HARMONIC OF THE L ₁ PHASE	[%]	(Unsigned)
\$14B4	4	\$242A	2	29 TH CURRENT HARMONIC OF THE L ₁ PHASE	[%]	(Unsigned)
\$14B8	4	\$242C	2	30 TH CURRENT HARMONIC OF THE L ₁ PHASE	[%]	(Unsigned)
\$14BC	4	\$242E	2	31 TH CURRENT HARMONIC OF THE L ₁ PHASE	[%]	(Unsigned)

\$1390	4	\$22C8	2	1 ST CURRENT HARMONIC OF THE L ₂ PHASE	[%]	(Unsigned)
\$1394	4	\$22CA	2	2 ND CURRENT HARMONIC OF THE L ₂ PHASE	[%]	(Unsigned)
\$1398	4	\$22CC	2	3 RD CURRENT HARMONIC OF THE L ₂ PHASE	[%]	(Unsigned)
\$139C	4	\$22CE	2	4 TH CURRENT HARMONIC OF THE L ₂ PHASE	[%]	(Unsigned)
\$13A0	4	\$22D0	2	5 TH CURRENT HARMONIC OF THE L ₂ PHASE	[%]	(Unsigned)
\$13A4	4	\$22D2	2	6 TH CURRENT HARMONIC OF THE L ₂ PHASE	[%]	(Unsigned)
\$13A8	4	\$22D4	2	7 TH CURRENT HARMONIC OF THE L ₂ PHASE	[%]	(Unsigned)
\$13AC	4	\$22D6	2	8 TH CURRENT HARMONIC OF THE L ₂ PHASE	[%]	(Unsigned)
\$13B0	4	\$22D8	2	9 TH CURRENT HARMONIC OF THE L ₂ PHASE	[%]	(Unsigned)
\$13B4	4	\$22DA	2	10 TH CURRENT HARMONIC OF THE L ₂ PHASE	[%]	(Unsigned)
\$13B8	4	\$22DC	2	11 TH CURRENT HARMONIC OF THE L ₂ PHASE	[%]	(Unsigned)
\$13BC	4	\$22DE	2	12 TH CURRENT HARMONIC OF THE L ₂ PHASE	[%]	(Unsigned)
\$13C0	4	\$22E0	2	13 TH CURRENT HARMONIC OF THE L ₂ PHASE	[%]	(Unsigned)
\$13C4	4	\$22E2	2	14 TH CURRENT HARMONIC OF THE L ₂ PHASE	[%]	(Unsigned)
\$13C8	4	\$22E4	2	15 TH CURRENT HARMONIC OF THE L ₂ PHASE	[%]	(Unsigned)
\$13CC	4	\$22E6	2	16 TH CURRENT HARMONIC OF THE L ₂ PHASE	[%]	(Unsigned)
\$13D0	4	\$22E8	2	17 TH CURRENT HARMONIC OF THE L ₂ PHASE	[%]	(Unsigned)
\$13D4	4	\$22EA	2	18 TH CURRENT HARMONIC OF THE L ₂ PHASE	[%]	(Unsigned)
\$13D8	4	\$22EC	2	19 TH CURRENT HARMONIC OF THE L ₂ PHASE	[%]	(Unsigned)
\$13DC	4	\$22EE	2	20 TH CURRENT HARMONIC OF THE L ₂ PHASE	[%]	(Unsigned)
\$13E0	4	\$22F0	2	21 TH CURRENT HARMONIC OF THE L ₂ PHASE	[%]	(Unsigned)
\$13E4	4	\$22F2	2	22 TH CURRENT HARMONIC OF THE L ₂ PHASE	[%]	(Unsigned)
\$13E8	4	\$22F4	2	23 TH CURRENT HARMONIC OF THE L ₂ PHASE	[%]	(Unsigned)
\$13EC	4	\$22F6	2	24 TH CURRENT HARMONIC OF THE L ₂ PHASE	[%]	(Unsigned)
\$13F0	4	\$22F8	2	25 TH CURRENT HARMONIC OF THE L ₂ PHASE	[%]	(Unsigned)
\$14C0	4	\$2430	2	26 TH CURRENT HARMONIC OF THE L ₂ PHASE	[%]	(Unsigned)
\$14C4	4	\$2432	2	27 TH CURRENT HARMONIC OF THE L ₂ PHASE	[%]	(Unsigned)
\$14C8	4	\$2434	2	28 TH CURRENT HARMONIC OF THE L ₂ PHASE	[%]	(Unsigned)
\$14CC	4	\$2436	2	29 TH CURRENT HARMONIC OF THE L ₂ PHASE	[%]	(Unsigned)
\$14D0	4	\$2438	2	30 TH CURRENT HARMONIC OF THE L ₂ PHASE	[%]	(Unsigned)
\$14D4	4	\$243A	2	31 TH CURRENT HARMONIC OF THE L ₂ PHASE	[%]	(Unsigned)

\$13F4	4	\$22FA	2	1 ST CURRENT HARMONIC OF THE L ₃ PHASE	[%]	(Unsigned)
\$13F8	4	\$22FC	2	2 ND CURRENT HARMONIC OF THE L ₃ PHASE	[%]	(Unsigned)
\$13FC	4	\$22FE	2	3 RD CURRENT HARMONIC OF THE L ₃ PHASE	[%]	(Unsigned)
\$13F0	4	\$2300	2	4 TH CURRENT HARMONIC OF THE L ₃ PHASE	[%]	(Unsigned)
\$1404	4	\$2302	2	5 TH CURRENT HARMONIC OF THE L ₃ PHASE	[%]	(Unsigned)
\$1408	4	\$2304	2	6 TH CURRENT HARMONIC OF THE L ₃ PHASE	[%]	(Unsigned)
\$140C	4	\$2306	2	7 TH CURRENT HARMONIC OF THE L ₃ PHASE	[%]	(Unsigned)
\$1410	4	\$2308	2	8 TH CURRENT HARMONIC OF THE L ₃ PHASE	[%]	(Unsigned)
\$1414	4	\$230A	2	9 TH CURRENT HARMONIC OF THE L ₃ PHASE	[%]	(Unsigned)
\$1418	4	\$230C	2	10 TH CURRENT HARMONIC OF THE L ₃ PHASE	[%]	(Unsigned)
\$141C	4	\$230E	2	11 TH CURRENT HARMONIC OF THE L ₃ PHASE	[%]	(Unsigned)
\$1420	4	\$2310	2	12 TH CURRENT HARMONIC OF THE L ₃ PHASE	[%]	(Unsigned)
\$1424	4	\$2312	2	13 TH CURRENT HARMONIC OF THE L ₃ PHASE	[%]	(Unsigned)
\$1428	4	\$2314	2	14 TH CURRENT HARMONIC OF THE L ₃ PHASE	[%]	(Unsigned)
\$142C	4	\$2316	2	15 TH CURRENT HARMONIC OF THE L ₃ PHASE	[%]	(Unsigned)
\$1430	4	\$2318	2	16 TH CURRENT HARMONIC OF THE L ₃ PHASE	[%]	(Unsigned)
\$1434	4	\$231A	2	17 TH CURRENT HARMONIC OF THE L ₃ PHASE	[%]	(Unsigned)
\$1438	4	\$231C	2	18 TH CURRENT HARMONIC OF THE L ₃ PHASE	[%]	(Unsigned)
\$143C	4	\$231E	2	19 TH CURRENT HARMONIC OF THE L ₃ PHASE	[%]	(Unsigned)
\$1440	4	\$2320	2	20 TH CURRENT HARMONIC OF THE L ₃ PHASE	[%]	(Unsigned)
\$1444	4	\$2322	2	21 TH CURRENT HARMONIC OF THE L ₃ PHASE	[%]	(Unsigned)
\$1448	4	\$2324	2	22 TH CURRENT HARMONIC OF THE L ₃ PHASE	[%]	(Unsigned)
\$144C	4	\$2326	2	23 TH CURRENT HARMONIC OF THE L ₃ PHASE	[%]	(Unsigned)
\$1450	4	\$2328	2	24 TH CURRENT HARMONIC OF THE L ₃ PHASE	[%]	(Unsigned)
\$1454	4	\$232A	2	25 TH CURRENT HARMONIC OF THE L ₃ PHASE	[%]	(Unsigned)
\$14D8	4	\$243C	2	26 TH CURRENT HARMONIC OF THE L ₃ PHASE	[%]	(Unsigned)
\$14DC	4	\$243E	2	27 TH CURRENT HARMONIC OF THE L ₃ PHASE	[%]	(Unsigned)
\$14E0	4	\$2440	2	28 TH CURRENT HARMONIC OF THE L ₃ PHASE	[%]	(Unsigned)
\$14E4	4	\$2442	2	29 TH CURRENT HARMONIC OF THE L ₃ PHASE	[%]	(Unsigned)
\$14E8	4	\$2444	2	30 TH CURRENT HARMONIC OF THE L ₃ PHASE	[%]	(Unsigned)
\$14EC	4	\$2446	2	31 TH CURRENT HARMONIC OF THE L ₃ PHASE	[%]	(Unsigned)

TIME BAND ENERGY COUNTER (FUNCTION CODE \$03)

Integer		Float (IEEE)		Description	M.U.	Type
Register HEX	Word	Register HEX	Word			
\$1500	4	\$2500	2	Acquired active energy previous month band 1	[Wh]	(Unsigned)
\$1504	4	\$2502	2	Inductive reactive energy previous month band 1	[VArh]	(Unsigned)
\$1508	4	\$2504	2	Transferred active energy previous month band 1	[Wh]	(Unsigned)
\$150C	4	\$2506	2	Capacitive reactive energy previous month band 1	[VArh]	(Unsigned)
\$1510	4	\$2508	2	Acquired active energy previous month band 2	[Wh]	(Unsigned)
\$1514	4	\$250A	2	Inductive reactive energy previous month band 2	[VArh]	(Unsigned)
\$1518	4	\$250C	2	Transferred active energy previous month band 2	[Wh]	(Unsigned)
\$151C	4	\$250E	2	Capacitive reactive energy previous month band 2	[VArh]	(Unsigned)
\$1520	4	\$2510	2	Acquired active energy previous month band 3	[Wh]	(Unsigned)
\$1524	4	\$2512	2	Inductive reactive energy previous month band 3	[VArh]	(Unsigned)
\$1528	4	\$2514	2	Transferred active energy previous month band 3	[Wh]	(Unsigned)
\$152C	4	\$2516	2	Capacitive reactive energy previous month band 3	[VArh]	(Unsigned)
\$15C0	4	\$2560	2	Acquired active energy previous month band 4	[Wh]	(Unsigned)
\$15C4	4	\$2562	2	Inductive reactive energy previous month band 4	[VArh]	(Unsigned)
\$15C8	4	\$2564	2	Transferred active energy previous month band 4	[Wh]	(Unsigned)
\$15CC	4	\$2566	2	Capacitive reactive energy previous month band 4	[VArh]	(Unsigned)
\$1530	4	\$2518	2	Acquired active energy current month band 1	[Wh]	(Unsigned)
\$1534	4	\$251A	2	Inductive reactive energy current month band 1	[VArh]	(Unsigned)
\$1538	4	\$251C	2	Transferred active energy current month band 1	[Wh]	(Unsigned)
\$153C	4	\$251E	2	Capacitive reactive energy current month band 1	[VArh]	(Unsigned)
\$1540	4	\$2520	2	Acquired active energy current month band 2	[Wh]	(Unsigned)
\$1544	4	\$2522	2	Inductive reactive energy current month band 2	[VArh]	(Unsigned)
\$1548	4	\$2524	2	Transferred active energy current month band 2	[Wh]	(Unsigned)
\$154C	4	\$2526	2	Capacitive reactive energy current month band 2	[VArh]	(Unsigned)
\$1550	4	\$2528	2	Acquired active energy current month band 3	[Wh]	(Unsigned)
\$1554	4	\$252A	2	Inductive reactive energy current month band 3	[VArh]	(Unsigned)
\$1558	4	\$252C	2	Transferred active energy current month band 3	[Wh]	(Unsigned)
\$155C	4	\$252E	2	Capacitive reactive energy current month band 3	[VArh]	(Unsigned)
\$15D0	4	\$2568	2	Acquired active energy current month band 4	[Wh]	(Unsigned)
\$15D4	4	\$256A	2	Inductive reactive energy current month band 4	[VArh]	(Unsigned)
\$15D8	4	\$256C	2	Transferred active energy current month band 4	[Wh]	(Unsigned)
\$15DC	4	\$256E	2	Capacitive reactive energy current month band 4	[VArh]	(Unsigned)
\$1560	4	\$2530	2	Acquired active energy previous day band 1	[Wh]	(Unsigned)
\$1564	4	\$2532	2	Inductive reactive energy previous day band 1	[VArh]	(Unsigned)
\$1568	4	\$2534	2	Transferred active energy previous day band 1	[Wh]	(Unsigned)
\$156C	4	\$2536	2	Capacitive reactive energy previous day band 1	[VArh]	(Unsigned)
\$1570	4	\$2538	2	Acquired active energy previous day band 2	[Wh]	(Unsigned)
\$1574	4	\$253A	2	Inductive reactive energy previous day band 2	[VArh]	(Unsigned)
\$1578	4	\$253C	2	Transferred active energy previous day band 2	[Wh]	(Unsigned)
\$157C	4	\$253E	2	Capacitive reactive energy previous day band 2	[VArh]	(Unsigned)
\$1580	4	\$2540	2	Acquired active energy previous day band 3	[Wh]	(Unsigned)
\$1584	4	\$2542	2	Inductive reactive energy previous day band 3	[VArh]	(Unsigned)
\$1588	4	\$2544	2	Transferred active energy previous day band 3	[Wh]	(Unsigned)
\$158C	4	\$2546	2	Capacitive reactive energy previous day band 3	[VArh]	(Unsigned)
\$15E0	4	\$2570	2	Acquired active energy previous day band 4	[Wh]	(Unsigned)
\$15E4	4	\$2572	2	Inductive reactive energy previous day band 4	[VArh]	(Unsigned)
\$15E8	4	\$2574	2	Transferred active energy previous day band 4	[Wh]	(Unsigned)
\$15EC	4	\$2576	2	Capacitive reactive energy previous day band 4	[VArh]	(Unsigned)
\$1590	4	\$2548	2	Acquired active energy current day band 1	[Wh]	(Unsigned)
\$1594	4	\$254A	2	Inductive reactive energy current day band 1	[VArh]	(Unsigned)
\$1598	4	\$254C	2	Transferred active energy current day band 1	[Wh]	(Unsigned)
\$159C	4	\$254E	2	Capacitive reactive energy current day band 1	[VArh]	(Unsigned)
\$15A0	4	\$2550	2	Acquired active energy current day band 2	[Wh]	(Unsigned)
\$15A4	4	\$2552	2	Inductive reactive energy current day band 2	[VArh]	(Unsigned)
\$15A8	4	\$2554	2	Transferred active energy current day band 2	[Wh]	(Unsigned)
\$15AC	4	\$2556	2	Capacitive reactive energy current day band 2	[VArh]	(Unsigned)
\$15B0	4	\$2558	2	Acquired active energy current day band 3	[Wh]	(Unsigned)
\$15B4	4	\$255A	2	Inductive reactive energy current day band 3	[VArh]	(Unsigned)
\$15B8	4	\$255C	2	Transferred active energy current day band 3	[Wh]	(Unsigned)
\$15BC	4	\$255E	2	Capacitive reactive energy current day band 3	[VArh]	(Unsigned)
\$15F0	4	\$2578	2	Acquired active energy current day band 4	[Wh]	(Unsigned)
\$15F4	4	\$257A	2	Inductive reactive energy current day band 4	[VArh]	(Unsigned)
\$15F8	4	\$257C	2	Transferred active energy current day band 4	[Wh]	(Unsigned)
\$15FC	4	\$257E	2	Capacitive reactive energy current day band 4	[VArh]	(Unsigned)
\$1F80	4	\$2FA0	2	Acquired active energy previous year band 1	[Wh]	(Unsigned)
\$1F84	4	\$2FA2	2	Inductive reactive energy previous year band 1	[VArh]	(Unsigned)
\$1F88	4	\$2FA4	2	Transferred active energy previous year band 1	[Wh]	(Unsigned)
\$1F8C	4	\$2FA6	2	Capacitive reactive energy previous year band 1	[VArh]	(Unsigned)
\$1F90	4	\$2FA8	2	Acquired active energy previous year band 2	[Wh]	(Unsigned)
\$1F94	4	\$2FAA	2	Inductive reactive energy previous year band 2	[VArh]	(Unsigned)
\$1F98	4	\$2FAC	2	Transferred active energy previous year band 2	[Wh]	(Unsigned)
\$1F9C	4	\$2FAE	2	Capacitive reactive energy previous year band 2	[VArh]	(Unsigned)
\$1FA0	4	\$2FB0	2	Acquired active energy previous year band 3	[Wh]	(Unsigned)
\$1FA4	4	\$2FB2	2	Inductive reactive energy previous year band 3	[VArh]	(Unsigned)
\$1FA8	4	\$2FB4	2	Transferred active energy previous year band 3	[Wh]	(Unsigned)
\$1FAC	4	\$2FB6	2	Capacitive reactive energy previous year band 3	[VArh]	(Unsigned)
\$1FB0	4	\$2FB8	2	Acquired active energy previous year band 4	[Wh]	(Unsigned)
\$1FB4	4	\$2FBA	2	Inductive reactive energy previous year band 4	[VArh]	(Unsigned)
\$1FB8	4	\$2FBC	2	Transferred active energy previous year band 4	[Wh]	(Unsigned)
\$1FBC	4	\$2FBE	2	Capacitive reactive energy previous year band 4	[VArh]	(Unsigned)

\$1FC0	4	\$2FC0	2	Acquired active energy current year band 1	[Wh]	(Unsigned)
\$1FC4	4	\$2FC2	2	Inductive reactive energy current year band 1	[VArh]	(Unsigned)
\$1FC8	4	\$2FC4	2	Transferred active energy current year band 1	[Wh]	(Unsigned)
\$1FCC	4	\$2FC6	2	Capacitive reactive energy current year band 1	[VArh]	(Unsigned)
\$1FD0	4	\$2FC8	2	Acquired active energy current year band 2	[Wh]	(Unsigned)
\$1FD4	4	\$2FCA	2	Inductive reactive energy current year band 2	[VArh]	(Unsigned)
\$1FD8	4	\$2FCC	2	Transferred active energy current year band 2	[Wh]	(Unsigned)
\$1FDC	4	\$2FCE	2	Capacitive reactive energy current year band 2	[VArh]	(Unsigned)
\$1FE0	4	\$2FD0	2	Acquired active energy current year band 3	[Wh]	(Unsigned)
\$1FE4	4	\$2FD2	2	Inductive reactive energy current year band 3	[VArh]	(Unsigned)
\$1FE8	4	\$2FD4	2	Transferred active energy current year band 3	[Wh]	(Unsigned)
\$1FEC	4	\$2FD6	2	Capacitive reactive energy current year band 3	[VArh]	(Unsigned)
\$1FF0	4	\$2FD8	2	Acquired active energy current year band 4	[Wh]	(Unsigned)
\$1FF4	4	\$2FDA	2	Inductive reactive energy current year band 4	[VArh]	(Unsigned)
\$1FF8	4	\$2FDC	2	Transferred active energy current year band 4	[Wh]	(Unsigned)
\$1FFC	4	\$2FDE	2	Capacitive reactive energy current year band 4	[VArh]	(Unsigned)

TOTAL TIME BAND ENERGY COUNTER- Double format (Function code \$03)

N.A.		\$2A60	4	Total Acquired active energy band 1	[-]	(Unsigned)
N.A.		\$2A64	4	Total Transferred active energy band 1	[-]	(Unsigned)
N.A.		\$2A68	4	Total Inductive reactive energy band 1	[-]	(Unsigned)
N.A.		\$2A6C	4	Total Capacitive reactive energy band 1	[-]	(Unsigned)
N.A.		\$2A70	4	Total Acquired active energy band 2	[-]	(Unsigned)
N.A.		\$2A74	4	Total Transferred active energy band 2	[-]	(Unsigned)
N.A.		\$2A78	4	Total Inductive reactive energy band 2	[-]	(Unsigned)
N.A.		\$2A7C	4	Total Capacitive reactive energy band 2	[-]	(Unsigned)
N.A.		\$2A80	4	Total Acquired active energy band 3	[-]	(Unsigned)
N.A.		\$2A84	4	Total Transferred active energy band 3	[-]	(Unsigned)
N.A.		\$2A88	4	Total Inductive reactive energy band 3	[-]	(Unsigned)
N.A.		\$2A8C	4	Total Capacitive reactive energy band 3	[-]	(Unsigned)
N.A.		\$2A90	4	Total Acquired active energy band 4	[-]	(Unsigned)
N.A.		\$2A94	4	Total Transferred active energy band 4	[-]	(Unsigned)
N.A.		\$2A98	4	Total Inductive reactive energy band 4	[-]	(Unsigned)
N.A.		\$2A9C	4	Total Capacitive reactive energy band 4	[-]	(Unsigned)

VALUES STORED IN RAM (Function.code \$03)

Integer		Float (IEEE)		Description	M.U.	Type
Register HEX	Word	Register HEX	Word			
\$1600	1	\$2600	1	LOGICAL NUMBER	[-]	(Unsigned)
\$1601	3	\$2601	3	YYMMDD	[-]	(Unsigned)
\$1604	1	\$2604	1	nn= order no. of 15'energy value stored in a day	[-]	(Unsigned)
\$1605	4	\$2605	2	ACTIVE 15'	[mWh]	(Unsigned)
\$1609	4	\$2607	2	REACTIVE 15'	[mVarh]	(Unsigned)

MIN/MAX VALUES STORED IN RAM (Function.code \$03)

HEADER

Integer		Float (IEEE)		Description	U.M.	Type
Register HEX	Word	Register HEX	Word			
\$1B30	3	\$2B30	3	YY MM DD	[-]	(Unsigned)
\$1B33	3	\$2B33	3	HH MM SS	[-]	(Unsigned)
\$1B36	1	\$2B36	1	time of mem	[min]	(Unsigned)

1st DATA BLOCK

Integer		Float (IEEE)		Description	U.M.	Type
Register HEX	Word	Register HEX	Word			
\$1B47	4	\$2B47	4	Block num.(2 word) + \$0 (1 word) + Block full of 0=NO/1=Yes (1 word)		
\$1B4B	4	\$2B4B	2	MIN 3-PHASE SYSTEM VOLTAGE	[mV]	(Unsigned)
\$1B4F	4	\$2B4D	2	MAX 3-PHASE SYSTEM VOLTAGE	[mV]	(Unsigned)
\$1B53	4	\$2B4F	2	MIN PHASE VOLTAGE L _{1-N}	[mV]	(Unsigned)
\$1B57	4	\$2B51	2	MAX PHASE VOLTAGE L _{1-N}	[mV]	(Unsigned)
\$1B5B	4	\$2B53	2	MIN PHASE VOLTAGE L _{2-N}	[mV]	(Unsigned)
\$1B5F	4	\$2B55	2	MAX PHASE VOLTAGE L _{2-N}	[mV]	(Unsigned)
\$1B63	4	\$2B57	2	MIN PHASE VOLTAGE L _{3-N}	[mV]	(Unsigned)
\$1B67	4	\$2B59	2	MAX PHASE VOLTAGE L _{3-N}	[mV]	(Unsigned)
\$1B6B	4	\$2B5B	2	MIN 3-PHASE SYSTEM CURRENT	[mA]	(Signed)
\$1B6F	4	\$2B5D	2	MAX 3-PHASE SYSTEM CURRENT	[mA]	(Signed)
\$1B73	4	\$2B5F	2	MIN LINE CURRENT L ₁	[mA]	(Signed)
\$1B77	4	\$2B61	2	MAX LINE CURRENT L ₁	[mA]	(Signed)
\$1B7B	4	\$2B63	2	MIN LINE CURRENT L ₂	[mA]	(Signed)
\$1B7F	4	\$2B65	2	MAX LINE CURRENT L ₂	[mA]	(Signed)
\$1B83	4	\$2B67	2	MIN LINE CURRENT L ₃	[mA]	(Signed)
\$1B87	4	\$2B69	2	MAX LINE CURRENT L ₃	[mA]	(Signed)
\$1B8B	4	\$2B6B	2	MIN 3 PHASE SYSTEM ACTIVE POWER	[mW]	(Signed)
\$1B8F	4	\$2B6D	2	MAX 3 PHASE SYSTEM ACTIVE POWER	[mW]	(Signed)
\$1B93	4	\$2B6F	2	MIN 3 PHASE SYSTEM REACTIVE POWER	[mW]	(Signed)
\$1B97	4	\$2B71	2	MAX 3 PHASE SYSTEM REACTIVE POWER	[mW]	(Signed)
\$1B9B	4	\$2B73	2	MIN 3 PHASE SYSTEM POWER FACTOR	[-]	(Signed)
\$1B9F	4	\$2B75	2	MAX 3 PHASE SYSTEM POWER FACTOR	[-]	(Signed)
\$1BA3	4	\$2B77	2	MIN 3 PHASE SYSTEM AVERAGE POWER	[mW]	(Signed)
\$1BA7	4	\$2B79	2	MAX 3 PHASE SYSTEM AVERAGE POWER	[mW]	(Signed)

2ND DATA BLOCK

Integer		Float (IEEE)		Description	U.M.	Type
Register HEX	Word	Register HEX	Word			
\$1BAB	4	\$2B7B	4	Block num.(2 word) + \$0 (1 word) + Block full of 0=NO/1=Yes (1 word)		
\$1BAF	4	\$2B7F	2	MIN 3 PHASE SYSTEM VOLTAGE	[mV]	(Unsigned)
\$1BB3	4	\$2B81	2	MAX 3 PHASE SYSTEM VOLTAGE	[mV]	(Unsigned)
\$1BB7	4	\$2B83	2	MIN PHASE VOLTAGE L _{1-N}	[mV]	(Unsigned)
\$1BBB	4	\$2B85	2	MAX PHASE VOLTAGE L _{1-N}	[mV]	(Unsigned)
\$1BBF	4	\$2B87	2	MIN PHASE VOLTAGE L _{2-N}	[mV]	(Unsigned)
\$1BC3	4	\$2B89	2	MAX PHASE VOLTAGE L _{2-N}	[mV]	(Unsigned)
\$1BC7	4	\$2B8B	2	MIN PHASE VOLTAGE L _{3-N}	[mV]	(Unsigned)
\$1BCB	4	\$2B8D	2	MAX PHASE VOLTAGE L _{3-N}	[mV]	(Unsigned)
\$1BCF	4	\$2B8F	2	MIN 3-PHASE SYSTEM CURRENT	[mA]	(Signed)
\$1BD3	4	\$2B91	2	MAX 3-PHASE SYSTEM CURRENT	[mA]	(Signed)
\$1BD7	4	\$2B93	2	MIN LINE CURRENT L ₁	[mA]	(Signed)
\$1BDB	4	\$2B95	2	MAX LINE CURRENT L ₁	[mA]	(Signed)
\$1BDF	4	\$2B97	2	MIN LINE CURRENT L ₂	[mA]	(Signed)
\$1BE3	4	\$2B99	2	MAX LINE CURRENT L ₂	[mA]	(Signed)
\$1BE7	4	\$2B9B	2	MIN LINE CURRENT L ₃	[mA]	(Signed)
\$1BEB	4	\$2B9D	2	MAX LINE CURRENT L ₃	[mA]	(Signed)
\$1BEF	4	\$2B9F	2	MIN 3-PHASE SYSTEM ACTIVE POWER	[mW]	(Signed)
\$1BF3	4	\$2BA1	2	MAX 3-PHASE SYSTEM ACTIVE POWER	[mW]	(Signed)
\$1BF7	4	\$2BA3	2	MIN 3-PHASE SYSTEM REACTIVE POWER	[mW]	(Signed)
\$1BFB	4	\$2BA5	2	MAX 3-PHASE SYSTEM REACTIVE POWER	[mW]	(Signed)
\$1BFF	4	\$2BA7	2	MIN 3-PHASE SYSTEM POWER FACTOR	[-]	(Signed)
\$1C03	4	\$2BA9	2	MAX 3-PHASE SYSTEM POWER FACTOR	[-]	(Signed)
\$1C07	4	\$2BAB	2	MIN 3-PHASE SYSTEM AVERAGE POWER	[mW]	(Signed)
\$1C0B	4	\$2BAD	2	MAX 3-PHASE SYSTEM AVERAGE POWER	[mW]	(Signed)

3RD10TH DATA BLOCK
(3RD DATA BLOCK)

Integer		Float (IEEE)		Description	U.M.	Type
Register HEX	Word	Register HEX	Word			
\$1C0F	4	\$2BAF	4	Block num.(2 word) + \$0 (1 word) + Block full of 0=NO/1=Yes (1 word)		
.....
.....
\$1C6F	4	\$2BE1	2	MAX 3-PHASE SYSTEM AVERAGE POWER	[mW]	(Signed)

(4TH DATA BLOCK)

Integer		Float (IEEE)		Description	U.M.	Type
Register HEX	Word	Register HEX	Word			
\$1C73	4	\$2BE3	4	Block num.(2 word) + \$0 (1 word) + Block full of 0=NO/1=Yes (1 word)		
.....
.....
\$1CD3	4	\$2C15	2	MAX 3-PHASE SYSTEM AVERAGE POWER	[mW]	(Signed)

(5TH DATA BLOCK)

Integer		Float (IEEE)		Description	U.M.	Type
Register HEX	Word	Register HEX	Word			
\$1CD7	4	\$2C17	4	Block num.(2 word) + \$0 (1 word) + Block full of 0=NO/1=Yes (1 word)		
.....
.....
\$1D37	4	\$2C49	2	MAX 3-PHASE SYSTEM AVERAGE POWER	[mW]	(Signed)

(6TH DATA BLOCK)

Integer		Float (IEEE)		Description	U.M.	Type
Register HEX	Word	Register HEX	Word			
\$1D3B	4	\$2C4B	4	Block num.(2 word) + \$0 (1 word) + Block full of 0=NO/1=Yes (1 word)		
.....
.....
\$1D9B	4	\$2C7D	2	MAX 3-PHASE SYSTEM AVERAGE POWER	[mW]	(Signed)

(7TH DATA BLOCK)

Integer		Float (IEEE)		Description	U.M.	Type
Register HEX	Word	Register HEX	Word			
\$1D9F	4	\$2C7F	4	Block num.(2 word) + \$0 (1 word) + Block full of 0=NO/1=Yes (1 word)		
.....
.....
\$1DFF	4	\$2CB1	2	MAX 3-PHASE SYSTEM AVERAGE POWER	[mW]	(Signed)

(8TH DATA BLOCK)

Integer		Float (IEEE)		Description	U.M.	Type
Register HEX	Word	Register HEX	Word			
\$1E03	4	\$2CB3	4	Block num.(2 word) + \$0 (1 word) + Block full of 0=NO/1=Yes (1 word)		
.....
.....
\$1E63	4	\$2CE5	2	MAX 3-PHASE SYSTEM AVERAGE POWER	[mW]	(Signed)

(9TH DATA BLOCK)

Integer		Float (IEEE)		Description	U.M.	Type
Register HEX	Word	Register HEX	Word			
\$1E67	4	\$2CE7	4	Block num.(2 word) + \$0 (1 word) + Block full of 0=NO/1=Yes (1 word)		
.....
.....
\$1EC7	4	\$2D19	2	MAX 3-PHASE SYSTEM AVERAGE POWER	[mW]	(Signed)

(10TH DATA BLOCK)

Integer		Float (IEEE)		Description	U.M.	Type
Register HEX	Word	Register HEX	Word			
\$1ECB	4	\$2D1B	4	Block num.(2 word) + \$0 (1 word) + Block full of 0=NO/1=Yes (1 word)		
.....
.....
\$1F2B	4	\$2D4D	2	MAX 3-PHASE SYSTEM AVERAGE POWER	[mW]	(Signed)

HARMONICS VALUES STORED IN RAM (Function code \$03)

Integer		Float (IEEE)		Description	M.U.	Type
Register HEX	Word	Register HEX	Word			
\$1660	1	\$2660	1	LOGICAL NUMBER	[-]	(Unsigned)
\$1661	3	\$2661	3	YY MM DD	[-]	(Unsigned)
\$1664	1	\$2664	1	nn=order number of 15' in a day	[-]	(Unsigned)
\$1665	4	\$2665	2	1 ST VOLTAGE HARMONIC OF THE L ₁ PHASE	[%]	(Unsigned)
\$1669	4	\$2667	2	2 ND VOLTAGE HARMONIC OF THE L ₁ PHASE	[%]	(Unsigned)
\$166D	4	\$2669	2	3 RD VOLTAGE HARMONIC OF THE L ₁ PHASE	[%]	(Unsigned)
\$1671	4	\$266B	2	4 TH VOLTAGE HARMONIC OF THE L ₁ PHASE	[%]	(Unsigned)
\$1675	4	\$266D	2	5 TH VOLTAGE HARMONIC OF THE L ₁ PHASE	[%]	(Unsigned)
\$1679	4	\$266F	2	6 TH VOLTAGE HARMONIC OF THE L ₁ PHASE	[%]	(Unsigned)
\$167D	4	\$2671	2	7 TH VOLTAGE HARMONIC OF THE L ₁ PHASE	[%]	(Unsigned)
\$1681	4	\$2673	2	8 TH VOLTAGE HARMONIC OF THE L ₁ PHASE	[%]	(Unsigned)
\$1685	4	\$2675	2	9 TH VOLTAGE HARMONIC OF THE L ₁ PHASE	[%]	(Unsigned)
\$1689	4	\$2677	2	10 TH VOLTAGE HARMONIC OF THE L ₁ PHASE	[%]	(Unsigned)
\$168D	4	\$2679	2	11 TH VOLTAGE HARMONIC OF THE L ₁ PHASE	[%]	(Unsigned)
\$1691	4	\$267B	2	12 TH VOLTAGE HARMONIC OF THE L ₁ PHASE	[%]	(Unsigned)
\$1695	4	\$267D	2	13 TH VOLTAGE HARMONIC OF THE L ₁ PHASE	[%]	(Unsigned)
\$1699	4	\$267F	2	14 TH VOLTAGE HARMONIC OF THE L ₁ PHASE	[%]	(Unsigned)
\$169D	4	\$2681	2	15 TH VOLTAGE HARMONIC OF THE L ₁ PHASE	[%]	(Unsigned)
\$16A1	4	\$2683	2	16 TH VOLTAGE HARMONIC OF THE L ₁ PHASE	[%]	(Unsigned)
\$16A5	4	\$2685	2	17 TH VOLTAGE HARMONIC OF THE L ₁ PHASE	[%]	(Unsigned)
\$16A9	4	\$2687	2	18 TH VOLTAGE HARMONIC OF THE L ₁ PHASE	[%]	(Unsigned)
\$16AD	4	\$2689	2	19 TH VOLTAGE HARMONIC OF THE L ₁ PHASE	[%]	(Unsigned)
\$16B1	4	\$268B	2	20 TH VOLTAGE HARMONIC OF THE L ₁ PHASE	[%]	(Unsigned)
\$16B5	4	\$268D	2	21 TH VOLTAGE HARMONIC OF THE L ₁ PHASE	[%]	(Unsigned)
\$16B9	4	\$268F	2	22 TH VOLTAGE HARMONIC OF THE L ₁ PHASE	[%]	(Unsigned)
\$16BD	4	\$2691	2	23 TH VOLTAGE HARMONIC OF THE L ₁ PHASE	[%]	(Unsigned)
\$16C1	4	\$2693	2	24 TH VOLTAGE HARMONIC OF THE L ₁ PHASE	[%]	(Unsigned)
\$16C5	4	\$2695	2	25 TH VOLTAGE HARMONIC OF THE L ₁ PHASE	[%]	(Unsigned)
\$1900	4	\$2800	2	26 TH VOLTAGE HARMONIC OF THE L ₁ PHASE	[%]	(Unsigned)
\$1904	4	\$2802	2	27 TH VOLTAGE HARMONIC OF THE L ₁ PHASE	[%]	(Unsigned)
\$1908	4	\$2804	2	28 TH VOLTAGE HARMONIC OF THE L ₁ PHASE	[%]	(Unsigned)
\$190C	4	\$2806	2	29 TH VOLTAGE HARMONIC OF THE L ₁ PHASE	[%]	(Unsigned)
\$1910	4	\$2808	2	30 TH VOLTAGE HARMONIC OF THE L ₁ PHASE	[%]	(Unsigned)
\$1914	4	\$280A	2	31 TH VOLTAGE HARMONIC OF THE L ₁ PHASE	[%]	(Unsigned)

\$16C9	4	\$2697	2	1 ST VOLTAGE HARMONIC OF THE L ₂ PHASE	[%]	(Unsigned)
\$16CD	4	\$2699	2	2 ND VOLTAGE HARMONIC OF THE L ₂ PHASE	[%]	(Unsigned)
\$16D1	4	\$269B	2	3 RD VOLTAGE HARMONIC OF THE L ₂ PHASE	[%]	(Unsigned)
\$16D5	4	\$269D	2	4 TH VOLTAGE HARMONIC OF THE L ₂ PHASE	[%]	(Unsigned)
\$16D9	4	\$269F	2	5 TH VOLTAGE HARMONIC OF THE L ₂ PHASE	[%]	(Unsigned)
\$16DD	4	\$26A1	2	6 TH VOLTAGE HARMONIC OF THE L ₂ PHASE	[%]	(Unsigned)
\$16E1	4	\$26A3	2	7 TH VOLTAGE HARMONIC OF THE L ₂ PHASE	[%]	(Unsigned)
\$16E5	4	\$26A5	2	8 TH VOLTAGE HARMONIC OF THE L ₂ PHASE	[%]	(Unsigned)
\$16E9	4	\$26A7	2	9 TH VOLTAGE HARMONIC OF THE L ₂ PHASE	[%]	(Unsigned)
\$16ED	4	\$26A9	2	10 TH VOLTAGE HARMONIC OF THE L ₂ PHASE	[%]	(Unsigned)
\$16F1	4	\$26AB	2	11 TH VOLTAGE HARMONIC OF THE L ₂ PHASE	[%]	(Unsigned)
\$16F5	4	\$26AD	2	12 TH VOLTAGE HARMONIC OF THE L ₂ PHASE	[%]	(Unsigned)
\$16F9	4	\$26AF	2	13 TH VOLTAGE HARMONIC OF THE L ₂ PHASE	[%]	(Unsigned)
\$16FD	4	\$26B1	2	14 TH VOLTAGE HARMONIC OF THE L ₂ PHASE	[%]	(Unsigned)
\$1701	4	\$26B3	2	15 TH VOLTAGE HARMONIC OF THE L ₂ PHASE	[%]	(Unsigned)
\$1705	4	\$26B5	2	16 TH VOLTAGE HARMONIC OF THE L ₂ PHASE	[%]	(Unsigned)
\$1709	4	\$26B7	2	17 TH VOLTAGE HARMONIC OF THE L ₂ PHASE	[%]	(Unsigned)
\$170D	4	\$26B9	2	18 TH VOLTAGE HARMONIC OF THE L ₂ PHASE	[%]	(Unsigned)
\$1711	4	\$26BB	2	19 TH VOLTAGE HARMONIC OF THE L ₂ PHASE	[%]	(Unsigned)
\$1715	4	\$26BD	2	20 TH VOLTAGE HARMONIC OF THE L ₂ PHASE	[%]	(Unsigned)
\$1719	4	\$26BF	2	21 TH VOLTAGE HARMONIC OF THE L ₂ PHASE	[%]	(Unsigned)
\$171D	4	\$26C1	2	22 TH VOLTAGE HARMONIC OF THE L ₂ PHASE	[%]	(Unsigned)
\$1721	4	\$26C3	2	23 TH VOLTAGE HARMONIC OF THE L ₂ PHASE	[%]	(Unsigned)
\$1725	4	\$26C5	2	24 TH VOLTAGE HARMONIC OF THE L ₂ PHASE	[%]	(Unsigned)
\$1729	4	\$26C7	2	25 TH VOLTAGE HARMONIC OF THE L ₂ PHASE	[%]	(Unsigned)
\$1918	4	\$280C	2	26 TH VOLTAGE HARMONIC OF THE L ₂ PHASE	[%]	(Unsigned)
\$191C	4	\$280E	2	27 TH VOLTAGE HARMONIC OF THE L ₂ PHASE	[%]	(Unsigned)
\$1920	4	\$2810	2	28 TH VOLTAGE HARMONIC OF THE L ₂ PHASE	[%]	(Unsigned)
\$1924	4	\$2812	2	29 TH VOLTAGE HARMONIC OF THE L ₂ PHASE	[%]	(Unsigned)
\$1928	4	\$2814	2	30 TH VOLTAGE HARMONIC OF THE L ₂ PHASE	[%]	(Unsigned)
\$192C	4	\$2816	2	31 TH VOLTAGE HARMONIC OF THE L ₂ PHASE	[%]	(Unsigned)

\$172D	4	\$26C9	2	1 ST VOLTAGE HARMONIC OF THE L ₃ PHASE	[%]	(Unsigned)
\$1731	4	\$26CB	2	2 ND VOLTAGE HARMONIC OF THE L ₃ PHASE	[%]	(Unsigned)
\$1735	4	\$26CD	2	3 RD VOLTAGE HARMONIC OF THE L ₃ PHASE	[%]	(Unsigned)
\$1739	4	\$26CF	2	4 TH VOLTAGE HARMONIC OF THE L ₃ PHASE	[%]	(Unsigned)
\$173D	4	\$26D1	2	5 TH VOLTAGE HARMONIC OF THE L ₃ PHASE	[%]	(Unsigned)
\$1741	4	\$26D3	2	6 TH VOLTAGE HARMONIC OF THE L ₃ PHASE	[%]	(Unsigned)
\$1745	4	\$26D5	2	7 TH VOLTAGE HARMONIC OF THE L ₃ PHASE	[%]	(Unsigned)
\$1749	4	\$26D7	2	8 TH VOLTAGE HARMONIC OF THE L ₃ PHASE	[%]	(Unsigned)
\$174D	4	\$26D9	2	9 TH VOLTAGE HARMONIC OF THE L ₃ PHASE	[%]	(Unsigned)
\$1751	4	\$26DB	2	10 TH VOLTAGE HARMONIC OF THE L ₃ PHASE	[%]	(Unsigned)
\$1755	4	\$26DD	2	11 TH VOLTAGE HARMONIC OF THE L ₃ PHASE	[%]	(Unsigned)
\$1759	4	\$26DF	2	12 TH VOLTAGE HARMONIC OF THE L ₃ PHASE	[%]	(Unsigned)
\$175D	4	\$26E1	2	13 TH VOLTAGE HARMONIC OF THE L ₃ PHASE	[%]	(Unsigned)
\$1761	4	\$26E3	2	14 TH VOLTAGE HARMONIC OF THE L ₃ PHASE	[%]	(Unsigned)
\$1765	4	\$26E5	2	15 TH VOLTAGE HARMONIC OF THE L ₃ PHASE	[%]	(Unsigned)
\$1769	4	\$26E7	2	16 TH VOLTAGE HARMONIC OF THE L ₃ PHASE	[%]	(Unsigned)
\$176D	4	\$26E9	2	17 TH VOLTAGE HARMONIC OF THE L ₃ PHASE	[%]	(Unsigned)
\$1771	4	\$26EB	2	18 TH VOLTAGE HARMONIC OF THE L ₃ PHASE	[%]	(Unsigned)
\$1775	4	\$26ED	2	19 TH VOLTAGE HARMONIC OF THE L ₃ PHASE	[%]	(Unsigned)
\$1779	4	\$26EF	2	20 TH VOLTAGE HARMONIC OF THE L ₃ PHASE	[%]	(Unsigned)
\$177D	4	\$26F1	2	21 TH VOLTAGE HARMONIC OF THE L ₃ PHASE	[%]	(Unsigned)
\$1781	4	\$26F3	2	22 TH VOLTAGE HARMONIC OF THE L ₃ PHASE	[%]	(Unsigned)
\$1785	4	\$26F5	2	23 TH VOLTAGE HARMONIC OF THE L ₃ PHASE	[%]	(Unsigned)
\$1789	4	\$26F7	2	24 TH VOLTAGE HARMONIC OF THE L ₃ PHASE	[%]	(Unsigned)
\$178D	4	\$26F9	2	25 TH VOLTAGE HARMONIC OF THE L ₃ PHASE	[%]	(Unsigned)
\$1930	4	\$2818	2	26 TH VOLTAGE HARMONIC OF THE L ₃ PHASE	[%]	(Unsigned)
\$1934	4	\$281A	2	27 TH VOLTAGE HARMONIC OF THE L ₃ PHASE	[%]	(Unsigned)
\$1938	4	\$281C	2	28 TH VOLTAGE HARMONIC OF THE L ₃ PHASE	[%]	(Unsigned)
\$193C	4	\$281E	2	29 TH VOLTAGE HARMONIC OF THE L ₃ PHASE	[%]	(Unsigned)
\$1940	4	\$2820	2	30 TH VOLTAGE HARMONIC OF THE L ₃ PHASE	[%]	(Unsigned)
\$1944	4	\$2822	2	31 TH VOLTAGE HARMONIC OF THE L ₃ PHASE	[%]	(Unsigned)

\$1791	4	\$26FB	2	1 ST CURRENT HARMONIC OF THE L ₁ PHASE	[%]	(Unsigned)
\$1795	4	\$26FD	2	2 ND CURRENT HARMONIC OF THE L ₁ PHASE	[%]	(Unsigned)
\$1799	4	\$26FF	2	3 RD CURRENT HARMONIC OF THE L ₁ PHASE	[%]	(Unsigned)
\$179D	4	\$2701	2	4 TH CURRENT HARMONIC OF THE L ₁ PHASE	[%]	(Unsigned)
\$17A1	4	\$2703	2	5 TH CURRENT HARMONIC OF THE L ₁ PHASE	[%]	(Unsigned)
\$17A5	4	\$2705	2	6 TH CURRENT HARMONIC OF THE L ₁ PHASE	[%]	(Unsigned)
\$17A9	4	\$2707	2	7 TH CURRENT HARMONIC OF THE L ₁ PHASE	[%]	(Unsigned)
\$17AD	4	\$2709	2	8 TH CURRENT HARMONIC OF THE L ₁ PHASE	[%]	(Unsigned)
\$17B1	4	\$270B	2	9 TH CURRENT HARMONIC OF THE L ₁ PHASE	[%]	(Unsigned)
\$17B5	4	\$270D	2	10 TH CURRENT HARMONIC OF THE L ₁ PHASE	[%]	(Unsigned)
\$17B9	4	\$270F	2	11 TH CURRENT HARMONIC OF THE L ₁ PHASE	[%]	(Unsigned)
\$17BD	4	\$2711	2	12 TH CURRENT HARMONIC OF THE L ₁ PHASE	[%]	(Unsigned)
\$17C1	4	\$2713	2	13 TH CURRENT HARMONIC OF THE L ₁ PHASE	[%]	(Unsigned)
\$17C5	4	\$2715	2	14 TH CURRENT HARMONIC OF THE L ₁ PHASE	[%]	(Unsigned)
\$17C9	4	\$2717	2	15 TH CURRENT HARMONIC OF THE L ₁ PHASE	[%]	(Unsigned)
\$17CD	4	\$2719	2	16 TH CURRENT HARMONIC OF THE L ₁ PHASE	[%]	(Unsigned)
\$17D1	4	\$271B	2	17 TH CURRENT HARMONIC OF THE L ₁ PHASE	[%]	(Unsigned)
\$17D5	4	\$271D	2	18 TH CURRENT HARMONIC OF THE L ₁ PHASE	[%]	(Unsigned)
\$17D9	4	\$271F	2	19 TH CURRENT HARMONIC OF THE L ₁ PHASE	[%]	(Unsigned)
\$17DD	4	\$2721	2	20 TH CURRENT HARMONIC OF THE L ₁ PHASE	[%]	(Unsigned)
\$17E1	4	\$2723	2	21 TH CURRENT HARMONIC OF THE L ₁ PHASE	[%]	(Unsigned)
\$17E5	4	\$2725	2	22 TH CURRENT HARMONIC OF THE L ₁ PHASE	[%]	(Unsigned)
\$17E9	4	\$2727	2	23 TH CURRENT HARMONIC OF THE L ₁ PHASE	[%]	(Unsigned)
\$17ED	4	\$2729	2	24 TH CURRENT HARMONIC OF THE L ₁ PHASE	[%]	(Unsigned)
\$17F1	4	\$272B	2	25 TH CURRENT HARMONIC OF THE L ₁ PHASE	[%]	(Unsigned)
\$1948	4	\$2824	2	26 TH CURRENT HARMONIC OF THE L ₁ PHASE	[%]	(Unsigned)
\$194C	4	\$2826	2	27 TH CURRENT HARMONIC OF THE L ₁ PHASE	[%]	(Unsigned)
\$1950	4	\$2828	2	28 TH CURRENT HARMONIC OF THE L ₁ PHASE	[%]	(Unsigned)
\$1954	4	\$282A	2	29 TH CURRENT HARMONIC OF THE L ₁ PHASE	[%]	(Unsigned)
\$1958	4	\$282C	2	30 TH CURRENT HARMONIC OF THE L ₁ PHASE	[%]	(Unsigned)
\$195C	4	\$282E	2	31 TH CURRENT HARMONIC OF THE L ₁ PHASE	[%]	(Unsigned)

\$17F5	4	\$272D	2	1 ST CURRENT HARMONIC OF THE L ₂ PHASE	[%]	(Unsigned)
\$17F9	4	\$272F	2	2 ND CURRENT HARMONIC OF THE L ₂ PHASE	[%]	(Unsigned)
\$17FD	4	\$2731	2	3 RD CURRENT HARMONIC OF THE L ₂ PHASE	[%]	(Unsigned)
\$1801	4	\$2733	2	4 TH CURRENT HARMONIC OF THE L ₂ PHASE	[%]	(Unsigned)
\$1805	4	\$2735	2	5 TH CURRENT HARMONIC OF THE L ₂ PHASE	[%]	(Unsigned)
\$1809	4	\$2737	2	6 TH CURRENT HARMONIC OF THE L ₂ PHASE	[%]	(Unsigned)
\$180D	4	\$2739	2	7 TH CURRENT HARMONIC OF THE L ₂ PHASE	[%]	(Unsigned)
\$1811	4	\$273B	2	8 TH CURRENT HARMONIC OF THE L ₂ PHASE	[%]	(Unsigned)
\$1815	4	\$273D	2	9 TH CURRENT HARMONIC OF THE L ₂ PHASE	[%]	(Unsigned)
\$1819	4	\$273F	2	10 TH CURRENT HARMONIC OF THE L ₂ PHASE	[%]	(Unsigned)
\$181D	4	\$2741	2	11 TH CURRENT HARMONIC OF THE L ₂ PHASE	[%]	(Unsigned)
\$1821	4	\$2743	2	12 TH CURRENT HARMONIC OF THE L ₂ PHASE	[%]	(Unsigned)
\$1825	4	\$2745	2	13 TH CURRENT HARMONIC OF THE L ₂ PHASE	[%]	(Unsigned)
\$1829	4	\$2747	2	14 TH CURRENT HARMONIC OF THE L ₂ PHASE	[%]	(Unsigned)
\$182D	4	\$2749	2	15 TH CURRENT HARMONIC OF THE L ₂ PHASE	[%]	(Unsigned)
\$1831	4	\$274B	2	16 TH CURRENT HARMONIC OF THE L ₂ PHASE	[%]	(Unsigned)
\$1835	4	\$274D	2	17 TH CURRENT HARMONIC OF THE L ₂ PHASE	[%]	(Unsigned)
\$1839	4	\$274F	2	18 TH CURRENT HARMONIC OF THE L ₂ PHASE	[%]	(Unsigned)
\$183D	4	\$2751	2	19 TH CURRENT HARMONIC OF THE L ₂ PHASE	[%]	(Unsigned)
\$1841	4	\$2753	2	20 TH CURRENT HARMONIC OF THE L ₂ PHASE	[%]	(Unsigned)
\$1845	4	\$2755	2	21 TH CURRENT HARMONIC OF THE L ₂ PHASE	[%]	(Unsigned)
\$1849	4	\$2757	2	22 TH CURRENT HARMONIC OF THE L ₂ PHASE	[%]	(Unsigned)
\$184D	4	\$2759	2	23 TH CURRENT HARMONIC OF THE L ₂ PHASE	[%]	(Unsigned)
\$1851	4	\$275B	2	24 TH CURRENT HARMONIC OF THE L ₂ PHASE	[%]	(Unsigned)
\$1855	4	\$275D	2	25 TH CURRENT HARMONIC OF THE L ₂ PHASE	[%]	(Unsigned)
\$1960	4	\$2830	2	26 TH CURRENT HARMONIC OF THE L ₂ PHASE	[%]	(Unsigned)
\$1964	4	\$2832	2	27 TH CURRENT HARMONIC OF THE L ₂ PHASE	[%]	(Unsigned)
\$1968	4	\$2834	2	28 TH CURRENT HARMONIC OF THE L ₂ PHASE	[%]	(Unsigned)
\$196C	4	\$2836	2	29 TH CURRENT HARMONIC OF THE L ₂ PHASE	[%]	(Unsigned)
\$1970	4	\$2838	2	30 TH CURRENT HARMONIC OF THE L ₂ PHASE	[%]	(Unsigned)
\$1974	4	\$283A	2	31 TH CURRENT HARMONIC OF THE L ₂ PHASE	[%]	(Unsigned)

\$1859	4	\$275F	2	1 ST CURRENT HARMONIC OF THE L ₃ PHASE	[%]	(Unsigned)
\$185D	4	\$2761	2	2 ND CURRENT HARMONIC OF THE L ₃ PHASE	[%]	(Unsigned)
\$1861	4	\$2763	2	3 RD CURRENT HARMONIC OF THE L ₃ PHASE	[%]	(Unsigned)
\$1865	4	\$2765	2	4 TH CURRENT HARMONIC OF THE L ₃ PHASE	[%]	(Unsigned)
\$1869	4	\$2767	2	5 TH CURRENT HARMONIC OF THE L ₃ PHASE	[%]	(Unsigned)
\$186D	4	\$2769	2	6 TH CURRENT HARMONIC OF THE L ₃ PHASE	[%]	(Unsigned)
\$1871	4	\$276B	2	7 TH CURRENT HARMONIC OF THE L ₃ PHASE	[%]	(Unsigned)
\$1875	4	\$276D	2	8 TH CURRENT HARMONIC OF THE L ₃ PHASE	[%]	(Unsigned)
\$1879	4	\$276F	2	9 TH CURRENT HARMONIC OF THE L ₃ PHASE	[%]	(Unsigned)
\$187D	4	\$2771	2	10 TH CURRENT HARMONIC OF THE L ₃ PHASE	[%]	(Unsigned)
\$1881	4	\$2773	2	11 TH CURRENT HARMONIC OF THE L ₃ PHASE	[%]	(Unsigned)
\$1885	4	\$2775	2	12 TH CURRENT HARMONIC OF THE L ₃ PHASE	[%]	(Unsigned)
\$1889	4	\$2777	2	13 TH CURRENT HARMONIC OF THE L ₃ PHASE	[%]	(Unsigned)
\$188D	4	\$2779	2	14 TH CURRENT HARMONIC OF THE L ₃ PHASE	[%]	(Unsigned)
\$1891	4	\$277B	2	15 TH CURRENT HARMONIC OF THE L ₃ PHASE	[%]	(Unsigned)
\$1895	4	\$277D	2	16 TH CURRENT HARMONIC OF THE L ₃ PHASE	[%]	(Unsigned)
\$1899	4	\$277F	2	17 TH CURRENT HARMONIC OF THE L ₃ PHASE	[%]	(Unsigned)
\$189D	4	\$2781	2	18 TH CURRENT HARMONIC OF THE L ₃ PHASE	[%]	(Unsigned)
\$18A1	4	\$2783	2	19 TH CURRENT HARMONIC OF THE L ₃ PHASE	[%]	(Unsigned)
\$18A5	4	\$2785	2	20 TH CURRENT HARMONIC OF THE L ₃ PHASE	[%]	(Unsigned)
\$18A9	4	\$2787	2	21 TH CURRENT HARMONIC OF THE L ₃ PHASE	[%]	(Unsigned)
\$18AD	4	\$2789	2	22 TH CURRENT HARMONIC OF THE L ₃ PHASE	[%]	(Unsigned)
\$18B1	4	\$278B	2	23 TH CURRENT HARMONIC OF THE L ₃ PHASE	[%]	(Unsigned)
\$18B5	4	\$278D	2	24 TH CURRENT HARMONIC OF THE L ₃ PHASE	[%]	(Unsigned)
\$18B9	4	\$278F	2	25 TH CURRENT HARMONIC OF THE L ₃ PHASE	[%]	(Unsigned)
\$1978	4	\$283C	2	26 TH CURRENT HARMONIC OF THE L ₃ PHASE	[%]	(Unsigned)
\$197C	4	\$283E	2	27 TH CURRENT HARMONIC OF THE L ₃ PHASE	[%]	(Unsigned)
\$1980	4	\$2840	2	28 TH CURRENT HARMONIC OF THE L ₃ PHASE	[%]	(Unsigned)
\$1984	4	\$2842	2	29 TH CURRENT HARMONIC OF THE L ₃ PHASE	[%]	(Unsigned)
\$1988	4	\$2844	2	30 TH CURRENT HARMONIC OF THE L ₃ PHASE	[%]	(Unsigned)
\$198C	4	\$2846	2	31 TH CURRENT HARMONIC OF THE L ₃ PHASE	[%]	(Unsigned)

SAMPLES VALUES STORED IN RAM (Function code \$03)

Integer		Float (IEEE)		Description	M.U.	Type
Register HEX	Word	Register HEX	Word			
\$19A3	3	\$2B37	3	YY MM DD	[-]	(Unsigned)
\$19A6	3	\$2B3A	3	HH MM SS	[-]	(Unsigned)
\$19A9	1	\$2B3D	1	time of mem	[min]	(Unsigned)
\$1A4D	4	\$2DA0	2	3-PHASE SYSTEM VOLTAGE	[mV]	(Unsigned)
\$1A51	4	\$2DA2	2	PHASE VOLTAGE L _{1-N}	[mV]	(Unsigned)
\$1A55	4	\$2DA4	2	PHASE VOLTAGE L _{2-N}	[mV]	(Unsigned)
\$1A59	4	\$2DA6	2	PHASE VOLTAGE L _{3-N}	[mV]	(Unsigned)
\$1A5D	4	\$2DA8	2	LINE VOLTAGE L ₁₋₂	[mV]	(Unsigned)
\$1A61	4	\$2DAA	2	LINE VOLTAGE L ₂₋₃	[mV]	(Unsigned)
\$1A65	4	\$2DAC	2	LINE VOLTAGE L ₃₋₁	[mV]	(Unsigned)
\$1A69	4	\$2DAE	2	3-PHASE SYSTEM CURRENT	[mA]	(Signed)
\$1A6D	4	\$2DB0	2	LINE CURRENT L ₁	[mA]	(Signed)
\$1A71	4	\$2DB2	2	LINE CURRENT L ₂	[mA]	(Signed)
\$1A75	4	\$2DB4	2	LINE CURRENT L ₃	[mA]	(Signed)
\$1A79	4	\$2DB6	2	3-PHASE SYS. POWER FACTOR	[-]	(Signed)
\$1A7D	4	\$2DB8	2	POWER FACTOR L ₁	[-]	(Signed)
\$1A81	4	\$2DBA	2	POWER FACTOR L ₂	[-]	(Signed)
\$1A85	4	\$2DBC	2	POWER FACTOR L ₃	[-]	(Signed)
\$1A89	4	\$2DBE	2	3-PHASE S. APPARENT POWER	[mVA]	(Signed)
\$1A8D	4	\$2DC0	2	APPARENT POWER L ₁	[mVA]	(Signed)
\$1A91	4	\$2DC2	2	APPARENT POWER L ₂	[mVA]	(Signed)
\$1A95	4	\$2DC4	2	APPARENT POWER L ₃	[mVA]	(Signed)
\$1A99	4	\$2DC6	2	3-PHASE SYS. ACTIVE POWER	[mW]	(Signed)
\$1A9D	4	\$2DC8	2	ACTIVE POWER L ₁	[mW]	(Signed)
\$1AA1	4	\$2DCA	2	ACTIVE POWER L ₂	[mW]	(Signed)
\$1AA5	4	\$2DCC	2	ACTIVE POWER L ₃	[mW]	(Signed)
\$1AA9	4	\$2DCE	2	3-PHASE S. REACTIVE POWER	[mVAR]	(Signed)
\$1AAD	4	\$2DD0	2	REACTIVE POWER L ₁	[mVAR]	(Signed)
\$1AB1	4	\$2DD2	2	REACTIVE POWER L ₂	[mVAR]	(Signed)
\$1AB5	4	\$2DD4	2	REACTIVE POWER L ₃	[mVAR]	(Signed)
\$1AB9	4	\$2DD6	2	FREQUENCY	[mHz]	(Unsigned)
\$1ABD	4	\$2DD8	2	THD VOLTAGE L ₁	[m%]	(Unsigned)
\$1AC1	4	\$2DDA	2	THD VOLTAGE L ₂	[m%]	(Unsigned)
\$1AC5	4	\$2DDC	2	THD VOLTAGE L ₃	[m%]	(Unsigned)
\$1AC9	4	\$2DDE	2	THD CURRENT L ₁	[m%]	(Unsigned)
\$1ACD	4	\$2DE0	2	THD CURRENT L ₂	[m%]	(Unsigned)
\$1AD1	4	\$2DE2	2	THD CURRENT L ₃	[m%]	(Unsigned)
\$1AD5	4	\$2DE4	2	3-PHASE AVG. ACTIVE POWER	[mW]	(Unsigned)

COUNTERS VALUES STORED IN RAM (Function.code \$03)

Integer		Double (IEEE)		Description	U.M.	Type
Register HEX	Word	Register HEX	Word			
\$1F40	3	\$2E00	3	YY MM DD	[-]	(Unsigned)
\$1F43	3	\$2E03	3	HH MM 00	[-]	(Unsigned)
\$1F46	1	\$2E06	1	time of mem	[min]	(Unsigned)
\$1F47	1	\$2E07	1	Block full of 0=NO/1=Yes (1 word)	[-]	(Unsigned)
\$1F48	4	\$2E08	4	Wh+	[-]	(Unsigned)
\$1F4C	4	\$2E0C	4	VArh+	[-]	(Unsigned)
\$1F50	4	\$2E10	4	Wh-	[-]	(Unsigned)
\$1F54	4	\$2E14	4	VArh-	[-]	(Unsigned)
\$1F58	4	\$2E18	4	Counter 1	[-]	(Unsigned)
\$1F5C	4	\$2E1C	4	Counter 2	[-]	(Unsigned)
\$1F60	4	\$2E20	4	Counter 3	[-]	(Unsigned)
\$1F64	4	\$2E24	4	Counter 4	[-]	(Unsigned)
\$1F68	4	\$2E28	4	Counter 5	[-]	(Unsigned)
\$1F6C	4	\$2E2C	4	Counter 6	[-]	(Unsigned)
\$1F70	4	\$2E30	4	Counter 7	[-]	(Unsigned)
\$1F74	4	\$2E34	4	Counter 8	[-]	(Unsigned)

ENERGY COUNTERS - Double format (Function code \$03)

Integer		Float (IEEE)		Description	M.U.	Type
Register HEX	Word	Register HEX	Word			
N.A.		\$2A50	4	3-PHASE SYS. ACTIVE ENERGY+	[-]	[-]
N.A.		\$2A54	4	3-PHASE SYS. ACTIVE ENERGY-	[-]	[-]
N.A.		\$2A58	4	3-PHASE SYS. REACTIVE EN.+	[-]	[-]
N.A.		\$2A5C	4	3-PHASE SYS. REACTIVE.EN.-	[-]	[-]

ANALOG OUTPUT PWM VALUES (Function code \$03)

(Returned values: 0=0mA ÷ 255=20mA)

Integer		Float (IEEE)		Description	M.U.	Type
Register HEX	Word	Register HEX	Word			
\$1A1A	2	N.A.	[-]	PWM ANALOG OUTPUT 1	[-]	[-]
\$1A1B	2	N.A.	[-]	PWM ANALOG OUTPUT 2	[-]	[-]
\$1A1C	2	N.A.	[-]	PWM ANALOG OUTPUT 3	[-]	[-]
\$1A1D	2	N.A.	[-]	PWM ANALOG OUTPUT 4	[-]	[-]

WAVEFORM'S SAMPLES (Function code \$03)

(64 x integer value)

Integer		Float (IEEE)		Description	M.U.	Type
Register HEX	Word	Register HEX	Word			
\$1F30	64	N.A.	[-]	64 SAMPLES OF LINE VOLTAGE L ₁	[-]	[-]
\$1F32	64	N.A.	[-]	64 SAMPLES OF LINE VOLTAGE L ₂	[-]	[-]
\$1F34	64	N.A.	[-]	64 SAMPLES OF LINE VOLTAGE L ₃	[-]	[-]
\$1F36	64	N.A.	[-]	64 SAMPLES OF LINE CURRENT L ₁	[-]	[-]
\$1F38	64	N.A.	[-]	64 SAMPLES OF LINE CURRENT L ₂	[-]	[-]
\$1F3A	64	N.A.	[-]	64 SAMPLES OF LINE CURRENT L ₃	[-]	[-]

HOURL COUNTERS – Long Integer format (Function code \$03)

Integer		Float (IEEE)		Description	M.U.	Type
Register HEX	Word	Register HEX	Word			
\$1625	4	N.A.	[-]	HOUR COUNTER 1	[s]	[-]
\$1629	4	N.A.	[-]	HOUR COUNTER 2	[s]	[-]
\$162D	4	N.A.	[-]	HOUR COUNTER 3	[s]	[-]
\$1631	4	N.A.	[-]	HOUR COUNTER 4	[s]	[-]
\$1635	4	N.A.	[-]	HOUR COUNTER 5	[s]	[-]
\$1639	4	N.A.	[-]	HOUR COUNTER 6	[s]	[-]

ONLY READ ANR PARAMETERS (Function code \$03)

Register HEX	Word	Description	Range
\$1A00	5	SERIAL NUMBER	XXXXXXXXXX
\$1A05	7	VERSION NUMBER	XXX.XXXX
\$1A0D	1	TYPE OF RAM	1=32 kB 2=128 kB 3=256 kB 4=512 kB 5=1024 Kb
\$1A0E	1	BI/MO DIRECTIONAL	1=mono 2=bidir.
\$1A0F	1	NUMBER OF DIGITAL OUTPUTS	0=none 1=1 ecc.=ecc.
\$1A10	1	NUMBER OF ANALOG OUTPUTS	0=none 1=1 ecc.=ecc.
\$1A11	1	NUMBER OF DIGITAL INPUTS	0=none 1=1 ecc.=ecc.
\$1A12	9	INFO STORAGE AVG.POWERS	byte1÷2: status (0=OFF; 1= ON) (int) byte3÷6: number of records (long) byte7÷10: memory reserved (KB) (float) byte11÷14: memory used (KB) (float) byte15÷18: memory free (KB) (float)
\$1A13	9	INFO STORAGE MIN./MAX	as before
\$1A14	9	INFO STORAGE HARMONICS	as before
\$1A15	9	INFO STORAGE SAMPLES	as before
\$1A17	9	INFO STORAGE COUNTERS	as before
\$1A18	2	HARDWARE & OPTIONS INFO	bit0: harmonics (0=dis.; 1=en.) bit1: time bands (0=dis.; 1=en.) bit2÷3: N.A. bit4÷7: number of Dig.Inp (0÷15) bit8÷11: number of Dig.Out (0÷15) bit12÷15: number of An.Out (0÷15) bit16÷31: N.A.
\$1A19	1	SUB-VERSION FIRMWARE	XX
\$1A28	1	BAUD RATE	2=1200 baud 3=2400 baud 4=4800 baud 5=9600 baud 6=19200 baud
\$1A29	1	PARITY	0=none 1=even parity 2=odd parity
\$1A2A	1	BIT	7=7 bit 8=8 bit
\$1ADB	2	DIGITAL OUTPUT STATUS	bit(n)=DI(n+1) n=0..5 (0=OFF; 1=ON)
\$1ADC	2	DIGITAL INPUT STATUS	bit(n)=DI(n+1) n=0..5 (0=OFF; 1=ON)

READ & WRITE ANR PARAMETERS (Function code \$03 & \$10)

NOTE: the variable indicated by yes resets the instrument. Wait 1 second before sending another command

Integer Register HEX	Word	Description	Range	Reset
\$1A16	2	ENERGY TYPE	0=normal(kWh-kVArh) 1=heavy (MWh-MVArh)	YES
\$1A20	1	LOGICAL NUMBER	01-255	YES
\$1A21	3	DATE	YY MMDD	YES
\$1A24	1	DAY OF WEEK	1=monday 2=tuesday 3=wednesday 4=thursday 5=friday 6=saturday 7=sunday	NO
\$1A25	3	TIME	HH MM SS	NO
\$1A2B	1	TRANSFORM RATIO KCT	1÷2500	YES
\$1A2C	1	TRANSFORM RATIO KVT	1÷3000	YES
\$1A2D	1	SYNCHRO TYPE	0=internal 1=external	NO
\$1A2E	1	FREQUENCY	5÷500 Hz (x100)	NO
\$1A2F	1	TIME FOR AVERAGE	1÷99	YES
\$1A30	1	BACKLIGHT ON TIME (sec)	0÷360	NO
\$1A40	1	MIN/MAX TIME TO STORE IN RAM	1-9999	NO
\$1A41	1	MIN/MAX 3-PH.VOLTAGE STORE	0=do not store 1=store	NO
\$1A42	1	MIN/MAX VOLTAGE L _{1-N} STORE	0=do not store 1=store	NO
\$1A43	1	MIN/MAX VOLTAGE L _{2-N} STORE	0=do not store 1=store	NO
\$1A44	1	MIN/MAX VOLTAGE L _{3-N} STORE	0=do not store 1=store	NO
\$1A45	1	MIN/MAX 3PH.CURRENT STORE	0=do not store 1=store	NO
\$1A46	1	MIN/MAX CURRENT L ₁ STORE	0=do not store 1=store	NO
\$1A47	1	MIN/MAX CURRENT L ₂ STORE	0=do not store 1=store	NO
\$1A48	1	MIN/MAX CURRENT L ₃ STORE	0=do not store 1=store	NO
\$1A49	1	MIN/MAX ACTIVE POWER STORE	0=do not store 1=store	NO
\$1A4A	1	MIN/MAX APP.POWER STORE	0=do not store 1=store	NO
\$1A4B	1	MIN/MAX POWER FACT.STORE	0=do not store 1=store	NO
\$1A4C	1	MIN/MAX AV.POWER STORE	0=do not store 1=store	NO
\$1ADA	2	DIGITAL INPUT TYPE	0=not used 1=sync rtc 2=periods 3=generic counters 4=GMC 5=GME 6=ELKO	YES
\$1ADD	2	WIRING MODE	0=4 wire 1=3 wire 2=Aron	YES

Float Register HEX	Word	Description	Range	Reset
\$2A32	2	TRANFORM CT RATIO floating point	0.01÷9999.99	YES
\$2A34	2	TRANFORM VT RATIO floating point	0.01÷9999.99	YES
\$2A36	2	FORCED FREQUENCY floating point	5.00÷500.00	(readonly)

(Firmware x.11.15 or previous)
TIMEBANDS- TARIFF PERIOD 1

Integer Register HEX	Word	Description	Range	Reset
\$3100	3	Hours and Minutes and band of begin the 1 st tariff band	(1)	NO
\$3103	3	Hours and Minutes and band of begin the 2 nd tariff band	(1)	NO
\$3106	3	Hours and Minutes and band of begin the 3 rd tariff band	(1)	NO
\$3109	3	Hours and Minutes and band of begin the 4 th tariff band	(1)	NO
\$310C	3	Hours and Minutes and band of begin the 5 th tariff band	(1)	NO
\$310F	3	Hours and Minutes and band of begin the 6 th tariff band	(1)	NO
\$3112	3	Hours and Minutes and band of begin the 7 th tariff band	(1)	NO
\$3115	3	Hours and Minutes and band of begin the 8 th tariff band	(1)	NO
\$3118	1	DAY selecting	(2)	NO
\$3119	1	MONTH selecting	(3)	NO

(1) it defines the beginning (hours and minutes) of each tariff band during the day.
it is possible to input up to 8 changes during the day.
it is possible to set four different bands (0,1,2,3).
i.e.: to program the start of 2st tariff band (1) at 06:00 send \$0006,\$0000,\$0001

(2) DAY: Programming: put to 1 the Bit relative to the day which are selected.

X	X	X	X	X	X	X	0	0	0	0	0	0	0	0	0
Mo	Tu	We	Th	Fr	Sa	Su									

i.e.:to program all day from Monday to Friday send \$F800

(3) MONTH Programming: put to 1 the Bit relative to the month which are selected.

X	X	X	X	X	X	X	X	X	X	X	X	0	0	0	0
Ja	Fe	Ma	Ap	Ma	Ju	Ju	Au	Se	Oc	No	De				

i.e.:to programming the month of November,December,January,February and March send \$E030

TIMEBANDS-TARIFF PERIOD 2

Integer Register HEX	Word	Description	Range	Reset
\$311A	3	Hours and Minutes and band of begin the 1 st tariff band	(1)	NO
\$311D	3	Hours and Minutes and band of begin the 2 nd tariff band	(1)	NO
\$3120	3	Hours and Minutes and band of begin the 3 rd tariff band	(1)	NO
\$3123	3	Hours and Minutes and band of begin the 4 th tariff band	(1)	NO
\$3126	3	Hours and Minutes and band of begin the 5 th tariff band	(1)	NO
\$3129	3	Hours and Minutes and band of begin the 6 th tariff band	(1)	NO
\$312C	3	Hours and Minutes and band of begin the 7 th tariff band	(1)	NO
\$312F	3	Hours and Minutes and band of begin the 8 th tariff band	(1)	NO
\$3132	1	DAY selecting	(2)	NO
\$3133	1	MONTH selecting	(3)	NO

TIMEBANDS-TARIFF PERIOD 3

Integer Register HEX	Word	Description	Range	Reset
\$3134	3	Hours and Minutes and band of begin the 1 st tariff band	(1)	NO
\$3137	3	Hours and Minutes and band of begin the 2 nd tariff band	(1)	NO
\$313A	3	Hours and Minutes and band of begin the 3 rd tariff band	(1)	NO
\$313D	3	Hours and Minutes and band of begin the 4 th tariff band	(1)	NO
\$3140	3	Hours and Minutes and band of begin the 5 th tariff band	(1)	NO
\$3143	3	Hours and Minutes and band of begin the 6 th tariff band	(1)	NO
\$3146	3	Hours and Minutes and band of begin the 7 th tariff band	(1)	NO
\$3149	3	Hours and Minutes and band of begin the 8 th tariff band	(1)	NO
\$314C	1	DAY selecting	(2)	NO
\$314D	1	MONTH selecting	(3)	NO

TIMEBANDS-TARIFF PERIOD 4

Integer Register HEX	Word	Description	Range	Reset
\$314E	3	Hours and Minutes and band of begin the 1 st tariff band	(1)	NO
\$3151	3	Hours and Minutes and band of begin the 2 nd tariff band	(1)	NO
\$3154	3	Hours and Minutes and band of begin the 3 rd tariff band	(1)	NO
\$3157	3	Hours and Minutes and band of begin the 4 th tariff band	(1)	NO
\$315A	3	Hours and Minutes and band of begin the 5 th tariff band	(1)	NO
\$315D	3	Hours and Minutes and band of begin the 6 th tariff band	(1)	NO
\$3160	3	Hours and Minutes and band of begin the 7 th tariff band	(1)	NO
\$3163	3	Hours and Minutes and band of begin the 8 th tariff band	(1)	NO
\$3166	1	DAY selecting	(2)	NO
\$3167	1	MONTH selecting	(3)	NO

TIMEBANDS-TARIFF PERIOD 5

Integer Register HEX	Word	Description	Range	Reset
\$3168	3	Hours and Minutes and band of begin the 1 st tariff band	(1)	NO
\$316B	3	Hours and Minutes and band of begin the 2 nd tariff band	(1)	NO
\$316E	3	Hours and Minutes and band of begin the 3 rd tariff band	(1)	NO
\$3171	3	Hours and Minutes and band of begin the 4 th tariff band	(1)	NO
\$3174	3	Hours and Minutes and band of begin the 5 th tariff band	(1)	NO
\$3177	3	Hours and Minutes and band of begin the 6 th tariff band	(1)	NO
\$317A	3	Hours and Minutes and band of begin the 7 th tariff band	(1)	NO
\$317D	3	Hours and Minutes and band of begin the 8 th tariff band	(1)	NO
\$3180	1	DAY selecting	(2)	NO
\$3181	1	MONTH selecting	(3)	NO

TIMEBANDS-TARIFF PERIOD 6

Integer Register HEX	Word	Description	Range	Reset
\$3182	3	Hours and Minutes and band of begin the 1 st tariff band	(1)	NO
\$3185	3	Hours and Minutes and band of begin the 2 nd tariff band	(1)	NO
\$3188	3	Hours and Minutes and band of begin the 3 rd tariff band	(1)	NO
\$318B	3	Hours and Minutes and band of begin the 4 th tariff band	(1)	NO
\$318E	3	Hours and Minutes and band of begin the 5 th tariff band	(1)	NO
\$3191	3	Hours and Minutes and band of begin the 6 th tariff band	(1)	NO
\$3194	3	Hours and Minutes and band of begin the 7 th tariff band	(1)	NO
\$3197	3	Hours and Minutes and band of begin the 8 th tariff band	(1)	NO
\$319A	1	DAY selecting	(2)	NO
\$319B	1	MONTH selecting	(3)	NO

TIMEBANDS-TARIFF PERIOD 7

Integer Register HEX	Word	Description	Range	Reset
\$319C	3	Hours and Minutes and band of begin the 1 st tariff band	(1)	NO
\$319F	3	Hours and Minutes and band of begin the 2 nd tariff band	(1)	NO
\$31A2	3	Hours and Minutes and band of begin the 3 rd tariff band	(1)	NO
\$31A5	3	Hours and Minutes and band of begin the 4 th tariff band	(1)	NO
\$31A8	3	Hours and Minutes and band of begin the 5 th tariff band	(1)	NO
\$31AB	3	Hours and Minutes and band of begin the 6 th tariff band	(1)	NO
\$31AE	3	Hours and Minutes and band of begin the 7 th tariff band	(1)	NO
\$31B1	3	Hours and Minutes and band of begin the 8 th tariff band	(1)	NO
\$31B4	1	DAY selecting	(2)	NO
\$31B5	1	MONTH selecting	(3)	NO

TIMEBANDS-TARIFF PERIOD 8

Integer Register HEX	Word	Description	Range	Reset
\$31B6	3	Hours and Minutes and band of begin the 1 st tariff band	(1)	NO
\$31B9	3	Hours and Minutes and band of begin the 2 nd tariff band	(1)	NO
\$31BC	3	Hours and Minutes and band of begin the 3 rd tariff band	(1)	NO
\$31BF	3	Hours and Minutes and band of begin the 4 th tariff band	(1)	NO
\$31C2	3	Hours and Minutes and band of begin the 5 th tariff band	(1)	NO
\$31C5	3	Hours and Minutes and band of begin the 6 th tariff band	(1)	NO
\$31C8	3	Hours and Minutes and band of begin the 7 th tariff band	(1)	NO
\$31CB	3	Hours and Minutes and band of begin the 8 th tariff band	(1)	NO
\$31CE	1	DAY selecting	(2)	NO
\$31CF	1	MONTH selecting	(3)	NO

TIMEBANDS-TARIFF PERIOD 9

Integer Register HEX	Word	Description	Range	Reset
\$31D0	3	Hours and Minutes and band of begin the 1 st tariff band	(1)	NO
\$31D3	3	Hours and Minutes and band of begin the 2 nd tariff band	(1)	NO
\$31D6	3	Hours and Minutes and band of begin the 3 rd tariff band	(1)	NO
\$31D9	3	Hours and Minutes and band of begin the 4 th tariff band	(1)	NO
\$31DC	3	Hours and Minutes and band of begin the 5 th tariff band	(1)	NO
\$31DF	3	Hours and Minutes and band of begin the 6 th tariff band	(1)	NO
\$31E2	3	Hours and Minutes and band of begin the 7 th tariff band	(1)	NO
\$31E5	3	Hours and Minutes and band of begin the 8 th tariff band	(1)	NO
\$31E8	1	DAY selecting	(2)	NO
\$31E9	1	MONTH selecting	(3)	NO

TIMEBANDS-TARIFF PERIOD 10

Integer Register HEX	Word	Description	Range	Reset
\$31EA	3	Hours and Minutes and band of begin the 1 st tariff band	(1)	NO
\$31ED	3	Hours and Minutes and band of begin the 2 nd tariff band	(1)	NO
\$31F0	3	Hours and Minutes and band of begin the 3 rd tariff band	(1)	NO
\$31F3	3	Hours and Minutes and band of begin the 4 th tariff band	(1)	NO
\$31F6	3	Hours and Minutes and band of begin the 5 th tariff band	(1)	NO
\$31F9	3	Hours and Minutes and band of begin the 6 th tariff band	(1)	NO
\$31FC	3	Hours and Minutes and band of begin the 7 th tariff band	(1)	NO
\$31FF	3	Hours and Minutes and band of begin the 8 th tariff band	(1)	NO
\$3202	1	DAY selecting	(2)	NO
\$3203	1	MONTH selecting	(3)	NO

Integer Register HEX	Word	Description	Range	Reset
\$3100	3	Hours and Minutes and band of begin the 1 st tariff band	(1)	NO
\$3103	3	Hours and Minutes and band of begin the 2 nd tariff band	(1)	NO
\$3106	3	Hours and Minutes and band of begin the 3 rd tariff band	(1)	NO
\$3109	3	Hours and Minutes and band of begin the 4 th tariff band	(1)	NO
\$310C	3	Hours and Minutes and band of begin the 5 th tariff band	(1)	NO
\$310F	3	Hours and Minutes and band of begin the 6 th tariff band	(1)	NO
\$3112	3	Hours and Minutes and band of begin the 7 th tariff band	(1)	NO
\$3115	3	Hours and Minutes and band of begin the 8 th tariff band	(1)	NO
\$3118	3	Hours and Minutes and band of begin the 9 th tariff band	(1)	NO
\$311B	3	Hours and Minutes and band of begin the 10 th tariff band	(1)	NO
\$311E	3	Hours and Minutes and band of begin the 11 th tariff band	(1)	NO
\$3121	3	Hours and Minutes and band of begin the 12 th tariff band	(1)	NO
\$3124	1	DAY selecting	(2)	NO
\$3125	1	StartMonth	(3)	NO
\$3126	1	StartDay	(3)	NO
\$3127	1	StopMonth	(3)	NO
\$3128	1	StopDay	(3)	NO

- (1) it defines the beginning (hours and minutes) of each tariff band during the day.
it is possible to input up to 12 changes during the day.
it is possible to set four different bands (0,1,2,3).
i.e.: to program the start of 2st tariff band (1) at 06:00 send \$0006,\$0000,\$0001

- (2) DAY: Programming: put to 1 the Bit relative to the day which are selected.

X	X	X	X	X	X	X	0	0	0	0	0	0	0	0
Mo	Tu	We	Th	Fr	Sa	Su								

i.e.:to program all day from Monday to Friday send \$F800

- (3) it defines the beginning (month and day) and the ending (month and day) of the period.
Month: 1=January, ..., 12=December.
Day: 1...31.

TIMEBANDS- TARIFF PERIOD 2

Integer Register HEX	Word	Description	Range	Reset
\$3129	3	Hours and Minutes and band of begin the 1 st tariff band	(1)	NO
\$312C	3	Hours and Minutes and band of begin the 2 nd tariff band	(1)	NO
\$312F	3	Hours and Minutes and band of begin the 3 rd tariff band	(1)	NO
\$3132	3	Hours and Minutes and band of begin the 4 th tariff band	(1)	NO
\$3135	3	Hours and Minutes and band of begin the 5 th tariff band	(1)	NO
\$3138	3	Hours and Minutes and band of begin the 6 th tariff band	(1)	NO
\$313B	3	Hours and Minutes and band of begin the 7 th tariff band	(1)	NO
\$313E	3	Hours and Minutes and band of begin the 8 th tariff band	(1)	NO
\$3141	3	Hours and Minutes and band of begin the 9 th tariff band	(1)	NO
\$3144	3	Hours and Minutes and band of begin the 10 th tariff band	(1)	NO
\$3147	3	Hours and Minutes and band of begin the 11 th tariff band	(1)	NO
\$314A	3	Hours and Minutes and band of begin the 12 th tariff band	(1)	NO
\$314D	1	DAY selecting	(2)	NO
\$314E	1	StartMonth	(3)	NO
\$314F	1	StartDay	(3)	NO
\$3150	1	StopMonth	(3)	NO
\$3151	1	StopDay	(3)	NO

TIMEBANDS- TARIFF PERIOD 3

Integer Register HEX	Word	Description	Range	Reset
\$3152	3	Hours and Minutes and band of begin the 1 st tariff band	(1)	NO
\$3155	3	Hours and Minutes and band of begin the 2 nd tariff band	(1)	NO
\$3158	3	Hours and Minutes and band of begin the 3 rd tariff band	(1)	NO
\$315B	3	Hours and Minutes and band of begin the 4 th tariff band	(1)	NO
\$315E	3	Hours and Minutes and band of begin the 5 th tariff band	(1)	NO
\$3161	3	Hours and Minutes and band of begin the 6 th tariff band	(1)	NO
\$3164	3	Hours and Minutes and band of begin the 7 th tariff band	(1)	NO
\$3167	3	Hours and Minutes and band of begin the 8 th tariff band	(1)	NO
\$316A	3	Hours and Minutes and band of begin the 9 th tariff band	(1)	NO
\$316D	3	Hours and Minutes and band of begin the 10 th tariff band	(1)	NO
\$3170	3	Hours and Minutes and band of begin the 11 th tariff band	(1)	NO
\$3173	3	Hours and Minutes and band of begin the 12 th tariff band	(1)	NO
\$3176	1	DAY selecting	(2)	NO
\$3177	1	StartMonth	(3)	NO
\$3178	1	StartDay	(3)	NO
\$3179	1	StopMonth	(3)	NO
\$317A	1	StopDay	(3)	NO

TIMEBANDS- TARIFF PERIOD 4

Integer Register HEX	Word	Description	Range	Reset
\$317B	3	Hours and Minutes and band of begin the 1 st tariff band	(1)	NO
\$317E	3	Hours and Minutes and band of begin the 2 nd tariff band	(1)	NO
\$3181	3	Hours and Minutes and band of begin the 3 rd tariff band	(1)	NO
\$3184	3	Hours and Minutes and band of begin the 4 th tariff band	(1)	NO
\$3187	3	Hours and Minutes and band of begin the 5 th tariff band	(1)	NO
\$318A	3	Hours and Minutes and band of begin the 6 th tariff band	(1)	NO
\$318D	3	Hours and Minutes and band of begin the 7 th tariff band	(1)	NO
\$3190	3	Hours and Minutes and band of begin the 8 th tariff band	(1)	NO
\$3193	3	Hours and Minutes and band of begin the 9 th tariff band	(1)	NO
\$3196	3	Hours and Minutes and band of begin the 10 th tariff band	(1)	NO
\$3199	3	Hours and Minutes and band of begin the 11 th tariff band	(1)	NO
\$319C	3	Hours and Minutes and band of begin the 12 th tariff band	(1)	NO
\$319F	1	DAY selecting	(2)	NO
\$31A0	1	StartMonth	(3)	NO
\$31A1	1	StartDay	(3)	NO
\$31A2	1	StopMonth	(3)	NO
\$31A3	1	StopDay	(3)	NO

TIMEBANDS- TARIFF PERIOD 5

Integer Register HEX	Word	Description	Range	Reset
\$31A4	3	Hours and Minutes and band of begin the 1 st tariff band	(1)	NO
\$31A7	3	Hours and Minutes and band of begin the 2 nd tariff band	(1)	NO
\$31AA	3	Hours and Minutes and band of begin the 3 rd tariff band	(1)	NO
\$31AD	3	Hours and Minutes and band of begin the 4 th tariff band	(1)	NO
\$31B0	3	Hours and Minutes and band of begin the 5 th tariff band	(1)	NO
\$31B3	3	Hours and Minutes and band of begin the 6 th tariff band	(1)	NO
\$31B6	3	Hours and Minutes and band of begin the 7 th tariff band	(1)	NO
\$31B9	3	Hours and Minutes and band of begin the 8 th tariff band	(1)	NO
\$31BC	3	Hours and Minutes and band of begin the 9 th tariff band	(1)	NO
\$31BF	3	Hours and Minutes and band of begin the 10 th tariff band	(1)	NO
\$31C2	3	Hours and Minutes and band of begin the 11 th tariff band	(1)	NO
\$31C5	3	Hours and Minutes and band of begin the 12 th tariff band	(1)	NO
\$31C8	1	DAY selecting	(2)	NO
\$31C9	1	StartMonth	(3)	NO
\$31CA	1	StartDay	(3)	NO
\$31CB	1	StopMonth	(3)	NO
\$31CC	1	StopDay	(3)	NO

TIMEBANDS- TARIFF PERIOD 6

Integer Register HEX	Word	Description	Range	Reset
\$31CD	3	Hours and Minutes and band of begin the 1 st tariff band	(1)	NO
\$31D0	3	Hours and Minutes and band of begin the 2 nd tariff band	(1)	NO
\$31D3	3	Hours and Minutes and band of begin the 3 rd tariff band	(1)	NO
\$31D6	3	Hours and Minutes and band of begin the 4 th tariff band	(1)	NO
\$31D9	3	Hours and Minutes and band of begin the 5 th tariff band	(1)	NO
\$31DC	3	Hours and Minutes and band of begin the 6 th tariff band	(1)	NO
\$31DF	3	Hours and Minutes and band of begin the 7 th tariff band	(1)	NO
\$31E2	3	Hours and Minutes and band of begin the 8 th tariff band	(1)	NO
\$31E5	3	Hours and Minutes and band of begin the 9 th tariff band	(1)	NO
\$31E8	3	Hours and Minutes and band of begin the 10 th tariff band	(1)	NO
\$31EB	3	Hours and Minutes and band of begin the 11 th tariff band	(1)	NO
\$31EE	3	Hours and Minutes and band of begin the 12 th tariff band	(1)	NO
\$31F1	1	DAY selecting	(2)	NO
\$31F2	1	StartMonth	(3)	NO
\$31F3	1	StartDay	(3)	NO
\$31F4	1	StopMonth	(3)	NO
\$31F5	1	StopDay	(3)	NO

TIMEBANDS- TARIFF PERIOD 7

Integer Register HEX	Word	Description	Range	Reset
\$31F6	3	Hours and Minutes and band of begin the 1 st tariff band	(1)	NO
\$31F9	3	Hours and Minutes and band of begin the 2 nd tariff band	(1)	NO
\$31FC	3	Hours and Minutes and band of begin the 3 rd tariff band	(1)	NO
\$31FF	3	Hours and Minutes and band of begin the 4 th tariff band	(1)	NO
\$3202	3	Hours and Minutes and band of begin the 5 th tariff band	(1)	NO
\$3205	3	Hours and Minutes and band of begin the 6 th tariff band	(1)	NO
\$3208	3	Hours and Minutes and band of begin the 7 th tariff band	(1)	NO
\$320B	3	Hours and Minutes and band of begin the 8 th tariff band	(1)	NO
\$320E	3	Hours and Minutes and band of begin the 9 th tariff band	(1)	NO
\$3211	3	Hours and Minutes and band of begin the 10 th tariff band	(1)	NO
\$3214	3	Hours and Minutes and band of begin the 11 th tariff band	(1)	NO
\$3217	3	Hours and Minutes and band of begin the 12 th tariff band	(1)	NO
\$321A	1	DAY selecting	(2)	NO
\$321B	1	StartMonth	(3)	NO
\$321C	1	StartDay	(3)	NO
\$321D	1	StopMonth	(3)	NO
\$321E	1	StopDay	(3)	NO

TIMEBANDS- TARIFF PERIOD 8

Integer Register HEX	Word	Description	Range	Reset
\$321F	3	Hours and Minutes and band of begin the 1 st tariff band	(1)	NO
\$3222	3	Hours and Minutes and band of begin the 2 nd tariff band	(1)	NO
\$3225	3	Hours and Minutes and band of begin the 3 rd tariff band	(1)	NO
\$3228	3	Hours and Minutes and band of begin the 4 th tariff band	(1)	NO
\$322B	3	Hours and Minutes and band of begin the 5 th tariff band	(1)	NO
\$322E	3	Hours and Minutes and band of begin the 6 th tariff band	(1)	NO
\$3231	3	Hours and Minutes and band of begin the 7 th tariff band	(1)	NO
\$3234	3	Hours and Minutes and band of begin the 8 th tariff band	(1)	NO
\$3237	3	Hours and Minutes and band of begin the 9 th tariff band	(1)	NO
\$323A	3	Hours and Minutes and band of begin the 10 th tariff band	(1)	NO
\$323D	3	Hours and Minutes and band of begin the 11 th tariff band	(1)	NO
\$3240	3	Hours and Minutes and band of begin the 12 th tariff band	(1)	NO
\$3243	1	DAY selecting	(2)	NO
\$3244	1	StartMonth	(3)	NO
\$3245	1	StartDay	(3)	NO
\$3246	1	StopMonth	(3)	NO
\$3247	1	StopDay	(3)	NO

TIMEBANDS- TARIFF PERIOD 9

Integer Register HEX	Word	Description	Range	Reset
\$3248	3	Hours and Minutes and band of begin the 1 st tariff band	(1)	NO
\$324B	3	Hours and Minutes and band of begin the 2 nd tariff band	(1)	NO
\$324E	3	Hours and Minutes and band of begin the 3 rd tariff band	(1)	NO
\$3251	3	Hours and Minutes and band of begin the 4 th tariff band	(1)	NO
\$3254	3	Hours and Minutes and band of begin the 5 th tariff band	(1)	NO
\$3257	3	Hours and Minutes and band of begin the 6 th tariff band	(1)	NO
\$325A	3	Hours and Minutes and band of begin the 7 th tariff band	(1)	NO
\$325D	3	Hours and Minutes and band of begin the 8 th tariff band	(1)	NO
\$3260	3	Hours and Minutes and band of begin the 9 th tariff band	(1)	NO
\$3263	3	Hours and Minutes and band of begin the 10 th tariff band	(1)	NO
\$3266	3	Hours and Minutes and band of begin the 11 th tariff band	(1)	NO
\$3269	3	Hours and Minutes and band of begin the 12 th tariff band	(1)	NO
\$326C	1	DAY selecting	(2)	NO
\$326D	1	StartMonth	(3)	NO
\$326E	1	StartDay	(3)	NO
\$326F	1	StopMonth	(3)	NO
\$3270	1	StopDay	(3)	NO

TIMEBANDS- TARIFF PERIOD 10

Integer Register HEX	Word	Description	Range	Reset
\$3271	3	Hours and Minutes and band of begin the 1 st tariff band	(1)	NO
\$3274	3	Hours and Minutes and band of begin the 2 nd tariff band	(1)	NO
\$3277	3	Hours and Minutes and band of begin the 3 rd tariff band	(1)	NO
\$327A	3	Hours and Minutes and band of begin the 4 th tariff band	(1)	NO
\$327D	3	Hours and Minutes and band of begin the 5 th tariff band	(1)	NO
\$3280	3	Hours and Minutes and band of begin the 6 th tariff band	(1)	NO
\$3283	3	Hours and Minutes and band of begin the 7 th tariff band	(1)	NO
\$3286	3	Hours and Minutes and band of begin the 8 th tariff band	(1)	NO
\$3289	3	Hours and Minutes and band of begin the 9 th tariff band	(1)	NO
\$328C	3	Hours and Minutes and band of begin the 10 th tariff band	(1)	NO
\$328F	3	Hours and Minutes and band of begin the 11 th tariff band	(1)	NO
\$3292	3	Hours and Minutes and band of begin the 12 th tariff band	(1)	NO
\$3295	1	DAY selecting	(2)	NO
\$3296	1	StartMonth	(3)	NO
\$3297	1	StartDay	(3)	NO
\$3298	1	StopMonth	(3)	NO
\$3299	1	StopDay	(3)	NO

TIMEBANDS- TARIFF PERIOD 11

Integer Register HEX	Word	Description	Range	Reset
\$329A	3	Hours and Minutes and band of begin the 1 st tariff band	(1)	NO
\$329D	3	Hours and Minutes and band of begin the 2 nd tariff band	(1)	NO
\$32A0	3	Hours and Minutes and band of begin the 3 rd tariff band	(1)	NO
\$32A3	3	Hours and Minutes and band of begin the 4 th tariff band	(1)	NO
\$32A6	3	Hours and Minutes and band of begin the 5 th tariff band	(1)	NO
\$32A9	3	Hours and Minutes and band of begin the 6 th tariff band	(1)	NO
\$32AC	3	Hours and Minutes and band of begin the 7 th tariff band	(1)	NO
\$32AF	3	Hours and Minutes and band of begin the 8 th tariff band	(1)	NO
\$32B2	3	Hours and Minutes and band of begin the 9 th tariff band	(1)	NO
\$32B5	3	Hours and Minutes and band of begin the 10 th tariff band	(1)	NO
\$32B8	3	Hours and Minutes and band of begin the 11 th tariff band	(1)	NO
\$32BB	3	Hours and Minutes and band of begin the 12 th tariff band	(1)	NO
\$32BE	1	DAY selecting	(2)	NO
\$32BF	1	StartMonth	(3)	NO
\$32C0	1	StartDay	(3)	NO
\$32C1	1	StopMonth	(3)	NO
\$32C2	1	StopDay	(3)	NO

TIMEBANDS- TARIFF PERIOD 12

Integer Register HEX	Word	Description	Range	Reset
\$32C3	3	Hours and Minutes and band of begin the 1 st tariff band	(1)	NO
\$32C6	3	Hours and Minutes and band of begin the 2 nd tariff band	(1)	NO
\$32C9	3	Hours and Minutes and band of begin the 3 rd tariff band	(1)	NO
\$32CC	3	Hours and Minutes and band of begin the 4 th tariff band	(1)	NO
\$32CF	3	Hours and Minutes and band of begin the 5 th tariff band	(1)	NO
\$32D2	3	Hours and Minutes and band of begin the 6 th tariff band	(1)	NO
\$32D5	3	Hours and Minutes and band of begin the 7 th tariff band	(1)	NO
\$32D8	3	Hours and Minutes and band of begin the 8 th tariff band	(1)	NO
\$32DB	3	Hours and Minutes and band of begin the 9 th tariff band	(1)	NO
\$32DE	3	Hours and Minutes and band of begin the 10 th tariff band	(1)	NO
\$32E1	3	Hours and Minutes and band of begin the 11 th tariff band	(1)	NO
\$32E4	3	Hours and Minutes and band of begin the 12 th tariff band	(1)	NO
\$32E7	1	DAY selecting	(2)	NO
\$32E8	1	StartMonth	(3)	NO
\$32E9	1	StartDay	(3)	NO
\$32EA	1	StopMonth	(3)	NO
\$32EB	1	StopDay	(3)	NO

TIMEBANDS- TARIFF PERIOD 13

Integer Register HEX	Word	Description	Range	Reset
\$32EC	3	Hours and Minutes and band of begin the 1 st tariff band	(1)	NO
\$32EF	3	Hours and Minutes and band of begin the 2 nd tariff band	(1)	NO
\$32F2	3	Hours and Minutes and band of begin the 3 rd tariff band	(1)	NO
\$32F5	3	Hours and Minutes and band of begin the 4 th tariff band	(1)	NO
\$32F8	3	Hours and Minutes and band of begin the 5 th tariff band	(1)	NO
\$32FB	3	Hours and Minutes and band of begin the 6 th tariff band	(1)	NO
\$32FE	3	Hours and Minutes and band of begin the 7 th tariff band	(1)	NO
\$3301	3	Hours and Minutes and band of begin the 8 th tariff band	(1)	NO
\$3304	3	Hours and Minutes and band of begin the 9 th tariff band	(1)	NO
\$3307	3	Hours and Minutes and band of begin the 10 th tariff band	(1)	NO
\$330A	3	Hours and Minutes and band of begin the 11 th tariff band	(1)	NO
\$330D	3	Hours and Minutes and band of begin the 12 th tariff band	(1)	NO
\$3310	1	DAY selecting	(2)	NO
\$3311	1	StartMonth	(3)	NO
\$3312	1	StartDay	(3)	NO
\$3313	1	StopMonth	(3)	NO
\$3314	1	StopDay	(3)	NO

TIMEBANDS- TARIFF PERIOD 14

Integer Register HEX	Word	Description	Range	Reset
\$3315	3	Hours and Minutes and band of begin the 1 st tariff band	(1)	NO
\$3318	3	Hours and Minutes and band of begin the 2 nd tariff band	(1)	NO
\$331B	3	Hours and Minutes and band of begin the 3 rd tariff band	(1)	NO
\$331E	3	Hours and Minutes and band of begin the 4 th tariff band	(1)	NO
\$3321	3	Hours and Minutes and band of begin the 5 th tariff band	(1)	NO
\$3324	3	Hours and Minutes and band of begin the 6 th tariff band	(1)	NO
\$3327	3	Hours and Minutes and band of begin the 7 th tariff band	(1)	NO
\$332A	3	Hours and Minutes and band of begin the 8 th tariff band	(1)	NO
\$332D	3	Hours and Minutes and band of begin the 9 th tariff band	(1)	NO
\$3330	3	Hours and Minutes and band of begin the 10 th tariff band	(1)	NO
\$3333	3	Hours and Minutes and band of begin the 11 th tariff band	(1)	NO
\$3336	3	Hours and Minutes and band of begin the 12 th tariff band	(1)	NO
\$3339	1	DAY selecting	(2)	NO
\$333A	1	StartMonth	(3)	NO
\$333B	1	StartDay	(3)	NO
\$333C	1	StopMonth	(3)	NO
\$333D	1	StopDay	(3)	NO

TIMEBANDS- TARIFF PERIOD 15

Integer Register HEX	Word	Description	Range	Reset
\$333E	3	Hours and Minutes and band of begin the 1 st tariff band	(1)	NO
\$3341	3	Hours and Minutes and band of begin the 2 nd tariff band	(1)	NO
\$3344	3	Hours and Minutes and band of begin the 3 rd tariff band	(1)	NO
\$3347	3	Hours and Minutes and band of begin the 4 th tariff band	(1)	NO
\$334A	3	Hours and Minutes and band of begin the 5 th tariff band	(1)	NO
\$334D	3	Hours and Minutes and band of begin the 6 th tariff band	(1)	NO
\$3350	3	Hours and Minutes and band of begin the 7 th tariff band	(1)	NO
\$3353	3	Hours and Minutes and band of begin the 8 th tariff band	(1)	NO
\$3356	3	Hours and Minutes and band of begin the 9 th tariff band	(1)	NO
\$3359	3	Hours and Minutes and band of begin the 10 th tariff band	(1)	NO
\$335C	3	Hours and Minutes and band of begin the 11 th tariff band	(1)	NO
\$335F	3	Hours and Minutes and band of begin the 12 th tariff band	(1)	NO
\$3362	1	DAY selecting	(2)	NO
\$3363	1	StartMonth	(3)	NO
\$3364	1	StartDay	(3)	NO
\$3365	1	StopMonth	(3)	NO
\$3366	1	StopDay	(3)	NO

HOLIDAYS (read only)

Integer Register HEX	Word	Description
\$3400	1	day of holyday no. 1
\$3401	1	month of holyday no. 1
\$3402	1	day of holyday no. 2
\$3403	1	month of holyday no. 2
\$3404	1	day of holyday no. 3
\$3405	1	month of holyday no. 3
\$3406	1	day of holyday no. 4
\$3407	1	month of holyday no. 4
\$3408	1	day of holyday no. 5
\$3409	1	month of holyday no. 5
\$340A	1	day of holyday no. 6
\$340B	1	month of holyday no. 6
\$340C	1	day of holyday no. 7
\$340D	1	month of holyday no. 7
\$340E	1	day of holyday no. 8
\$340F	1	month of holyday no. 8
\$3410	1	day of holyday no. 9
\$3411	1	month of holyday no. 9
\$3412	1	day of holyday no. 10
\$3413	1	month of holyday no. 10
\$3414	1	day of holyday no. 11
\$3415	1	month of holyday no. 11
\$3416	1	day of holyday no. 12
\$3417	1	month of holyday no. 12
\$3418	1	day of holyday no. 13
\$3419	1	month of holyday no. 13
\$341A	1	day of holyday no. 14
\$341B	1	month of holyday no. 14
\$341C	1	day of holyday no. 15
\$341D	1	month of holyday no. 15
\$341E	1	day of holyday no. 16
\$341F	1	month of holyday no. 16
\$3420	1	day of holyday no. 17
\$3421	1	month of holyday no. 17
\$3422	1	day of holyday no. 18
\$3423	1	month of holyday no. 18
\$3424	1	day of holyday no. 19
\$3425	1	month of holyday no. 19
\$3426	1	day of holyday no. 20
\$3427	1	month of holyday no. 20
\$3428	1	day of holyday no. 21
\$3429	1	month of holyday no. 21
\$342A	1	day of holyday no. 22
\$342B	1	month of holyday no. 22
\$342C	1	day of holyday no. 23
\$342D	1	month of holyday no. 23
\$342E	1	day of holyday no. 24
\$342F	1	month of holyday no. 24
\$3430	1	day of holyday no. 25
\$3431	1	month of holyday no. 25
\$3432	1	day of holyday no. 26
\$3433	1	month of holyday no. 26
\$3434	1	day of holyday no. 27
\$3435	1	month of holyday no. 27
\$3436	1	day of holyday no. 28
\$3437	1	month of holyday no. 28
\$3438	1	day of holyday no. 29
\$3439	1	month of holyday no. 29
\$343A	1	day of holyday no. 30
\$343B	1	month of holyday no. 30
\$343C	1	day of holyday no. 31
\$343D	1	month of holyday no. 31
\$343E	1	day of holyday no. 32
\$343F	1	month of holyday no. 32
\$3440	1	day of holyday no. 33
\$3441	1	month of holyday no. 33
\$3442	1	day of holyday no. 34
\$3443	1	month of holyday no. 34
\$3444	1	day of holyday no. 35
\$3445	1	month of holyday no. 35
\$3446	1	day of holyday no. 36
\$3447	1	month of holyday no. 36
\$3448	1	day of holyday no. 37
\$3449	1	month of holyday no. 37
\$344A	1	day of holyday no. 38
\$344B	1	month of holyday no. 38
\$344C	1	day of holyday no. 39
\$344D	1	month of holyday no. 39
\$344E	1	day of holyday no. 40
\$344F	1	month of holyday no. 40

GENERIC COUNTERS VALUES- Double format

Register HEX	Word	Description	Range	Reset
\$2B00	4	Generic Counter 1 Value	0÷99999999.9	NO
\$2B02	4	Generic Counter 2 Value	0÷99999999.9	NO
\$2B04	4	Generic Counter 3 Value	0÷99999999.9	NO
\$2B06	4	Generic Counter 4 Value	0÷99999999.9	NO
\$2B08	4	Generic Counter 5 Value	0÷99999999.9	NO
\$2B0A	4	Generic Counter 6 Value	0÷99999999.9	NO
\$2B0C	4	Generic Counter 7 Value	0÷99999999.9	NO
\$2B0E	4	Generic Counter 8 Value	0÷99999999.9	NO

GENERIC COUNTERS SETTINGS

Register HEX	Word	Description	Range	Reset
\$2B10	7	Generic Counter 1 Setting	(*)	NO
\$2B12	7	Generic Counter 2 Setting	(*)	NO
\$2B14	7	Generic Counter 3 Setting	(*)	NO
\$2B16	7	Generic Counter 4 Setting	(*)	NO
\$2B18	7	Generic Counter 5 Setting	(*)	NO
\$2B1A	7	Generic Counter 6 Setting	(*)	NO
\$2B1C	7	Generic Counter 7 Setting	(*)	NO
\$2B1E	7	Generic Counter 8 Setting	(*)	NO

(*)
Description:
Byte(s) Read/Write
1: Counter (i) -> Digital Input association
2: Counter's name type (0=kWh+; 1=kWh-; 2=kVArh+; 3=kVArh-; 4=Water; 5=Gas; 6=User.)
3÷10: Counter's name (ASCII codes)
11÷14: Pulse's weight (0÷1999.99)

ONLY WRITE ANR PARAMETERS (Function code \$10)

Register HEX	Word	Description	Range	Reset
\$1A90	1	DELETING RAM	9=deleting all archives	YES
\$1A91	1	SET RAM STORING	0=nothing 1=15' 2=min/max 3=15'+min/max 4=armonics 5=15'+armonics 6=min/max+armonics 7=15'+min/max+armonics 8=sample 9=15'+sample A=min/max+sample B=15'+min/max+sample C=armonics+sample D=15'+armonics+sample E=min/max+armonics+sample F=15'+min/max+armonics+sample 10=counters 11=15'+counters 12=min/max+counters 13=15'+min/max+counters 14=armonics+counters 15=15'+armonics+counters 16=min/max+armonics+counters 17=15'+min/max+armonics+counters 18=sample+counters 19=15'+sample+counters 1A=min/max+sample+counters 1B=15'+min/max+sample+counters 1C=armonics+sample+counters 1D=15'+armonics+sample+counters 1E=min/max+armonics+sample+counters 1F=15'+min/max+armonics+sample+counters	YES
\$1A92	1	15' STORED IN RAM	0=nothing 1=delete first one	YES
\$1A93	1	MIN/MAX STORED IN RAM	0=nothing 1=sending the following block 2=deleting all min/max value in RAM	NO
\$1A94	1	HARMONICS STORED IN RAM	0=nothing 1=delete first one	NO
\$1A95	1	SAMPLES STORED IN RAM	0=nothing 1=delete first one	NO
\$1A96	1	CONSUMPTION ENERGY COUNTER	1=reset count B0...B3 2=reset timebands 3=reset all	YES
\$1A97	1	MIN/MAX VALUES	1=reset all	NO
\$1A98	1	COUNTERS STORED IN RAM	0=nothing 1=delete first one	NO
\$1A4D	-	SAMPLES RATE + SET VARIABLE	See Note 1	YES
\$1A50	1	COUNTERS RATE	0÷9999 (min.)	NO
\$1A51	1	Wh+	0=disabled 1=enabled	NO
\$1A52	1	VArh+	0=disabled 1=enabled	NO
\$1A53	1	Wh-	0=disabled 1=enabled	NO
\$1A54	1	VArh-	0=disabled 1=enabled	NO
\$1A55	1	Counter 1	0=disabled 1=enabled	NO
\$1A56	1	Counter 2	0=disabled 1=enabled	NO
\$1A57	1	Counter 3	0=disabled 1=enabled	NO
\$1A58	1	Counter 4	0=disabled 1=enabled	NO
\$1A59	1	Counter 5	0=disabled 1=enabled	NO
\$1A5A	1	Counter 6	0=disabled 1=enabled	NO
\$1A5B	1	Counter 7	0=disabled 1=enabled	NO
\$1A5C	1	Counter 8	0=disabled 1=enabled	NO

Note 1.

The first word is the rate in seconds (Int type).

The following chars are the measure code of the variables that must be enabled.

If the number of the activated variables is odd, then it is necessary to follow a 0x00 char to end the list.

If the number of the activated variables is even, then it is necessary to follow a 0x0000 word to end the list.

Ex.

Setting for all the available variables:

80 81 82 83 84 85 86 88 89 8A 8B 90 91 92 93 98 99 9A 9B A0 A1 A2 A3 A8 A9 AA AB B4 B6 B7 B8 8C 8D 8E B9 00
list of variables plus 0x00 termination

Setting for an even number of variables:

81 82 83 89 8A 8B 00 00 list of variables plus 0x0000 termination

Setting for an odd number of variables:

80 81 83 88 8B 90 B4 00 list of variables plus 0x00 termination

The measure code for the variables available to store into the RAM are the following:

Measure	Code
3-PHASE SYSTEM VOLTAGE	\$80
PHASE VOLTAGE L _{1-N}	\$81
PHASE VOLTAGE L _{2-N}	\$82
PHASE VOLTAGE L _{3-N}	\$83
LINE VOLTAGE L ₁₋₂	\$84
LINE VOLTAGE L ₂₋₃	\$85
LINE VOLTAGE L ₃₋₁	\$86
3-PHASE SYSTEM CURRENT	\$88
LINE CURRENT L ₁	\$89
LINE CURRENT L ₂	\$8A
LINE CURRENT L ₃	\$8B
3-PHASE SYS. POWER FACTOR	\$90
POWER FACTOR L ₁	\$91
POWER FACTOR L ₂	\$92
POWER FACTOR L ₃	\$93
3-PHASE S. APPARENT POWER	\$98
APPARENT POWER L ₁	\$99
APPARENT POWER L ₂	\$9A
APPARENT POWER L ₃	\$9B
3-PHASE SYS. ACTIVE POWER	\$A0
ACTIVE POWER L ₁	\$A1
ACTIVE POWER L ₂	\$A2
ACTIVE POWER L ₃	\$A3
3-PHASE S. REACTIVE POWER	\$A8
REACTIVE POWER L ₁	\$A9
REACTIVE POWER L ₂	\$AA
REACTIVE POWER L ₃	\$AB
FREQUENCY	\$B4
THD VOLTAGE L ₁	\$B6
THD VOLTAGE L ₂	\$B7
THD VOLTAGE L ₃	\$B8
THD CURRENT L ₁	\$8C
THD CURRENT L ₂	\$8D
THD CURRENT L ₃	\$8E
3-PHASE AVG. ACTIVE POWER	\$B9

DIGITAL OUT 1

Register HEX	Word	Description	Range	Reset
\$1AA0	1	MODE	0= off 1= upper limit 2= lower limit 3= pulse 4= band 5= always on	YES
\$1AA1	1	VARIABLE	80-BC	YES
\$1AA2	1	PULSE COEFFICIENT	0÷9.999	YES
\$1AA3	1	PULSE DURATION (msec)	50÷999	YES
\$1AA4	1	INTERVENTION VALUE (integer)		YES
\$1AA5	1	HYSTERISIS	0-99	YES
\$1AA6	1	DELAY TIME in sec	0-999	YES
\$2AA8	2	FLOAT INTERVENTION VALUE		YES
\$2AAA	2	FLOAT INF. BAND VALUE		YES
\$2AAC	2	FLOAT SUP.BAND VALUE		YES

DIGITAL OUT 2

Register HEX	Word	Description	Range	Reset
\$1AB0	1	MODE	0= off 1= upper limit 2= lower limit 3= pulse 4= band 5= always on	YES
\$1AB1	1	VARIABLE	80-BC	YES
\$1AB2	1	PULSE COEFFICIENT	0÷9.999	YES
\$1AB3	1	PULSE DURATION (msec)	50÷999	YES
\$1AB4	1	INTERVENTION VALUE		YES
\$1AB5	1	HYSTERISIS	0-99	YES
\$1AB6	1	DELAY TIME in sec	0-999	YES
\$2AB8	2	FLOAT INTERVENTION VALUE		YES
\$2ABA	2	FLOAT INF. BAND VALUE		YES
\$2ABC	2	FLOAT SUP.BAND VALUE		YES

DIGITAL OUT 3

Register HEX	Word	Description	Range	Reset
\$1AC0	1	MODE	0= off 1= upper limit 2= lower limit 3= pulse 4= band 5= always on	YES
\$1AC1	1	VARIABLE	80-BC	YES
\$1AC2	1	PULSE COEFFICIENT	0÷9.999	YES
\$1AC3	1	PULSE DURATION (msec)	50÷999	YES
\$1AC4	1	INTERVENTION VALUE		YES
\$1AC5	1	HYSTERISIS	0-99	YES
\$1AC6	1	DELAY TIME in sec	0-999	YES
\$2AC8	2	FLOAT INTERVENTION VALUE		YES
\$2ACA	2	FLOAT INF. BAND VALUE		YES
\$2ACC	2	FLOAT SUP.BAND VALUE		YES

DIGITAL OUT 4

Register HEX	Word	Description	Range	Reset
\$1AD0	1	MODE	0= off 1= upper limit 2= lower limit 3= pulse 4= band 5= always on	YES
\$1AD1	1	VARIABLE	80-BC	YES
\$1AD2	1	PULSE COEFFICIENT	0÷9.999	YES
\$1AD3	1	PULSE DURATION (msec)	50÷999	YES
\$1AD4	1	INTERVENTION VALUE		YES
\$1AD5	1	HYSTERISIS	0-99	YES
\$1AD6	1	DELAY TIME in sec	0-999	YES
\$2AD8	2	FLOAT INTERVENTION VALUE		YES
\$2ADA	2	FLOAT INF. BAND VALUE		YES
\$2ADC	2	FLOAT SUP.BAND VALUE		YES

DIGITAL OUT 5

Register HEX	Word	Description	Range	Reset
\$1A70	1	MODE	0= off 1= upper limit 2= lower limit 3= pulse 4= band 5= always on	YES
\$1A71	1	VARIABLE	80-BC	YES
\$1A72	1	PULSE COEFFICIENT	0÷9.999	YES
\$1A73	1	PULSE DURATION (msec)	50÷999	YES
\$1A74	1	INTERVENTION VALUE		YES
\$1A75	1	HYSTERISIS	0-99	YES
\$1A76	1	DELAY TIME in sec	0-999	YES
\$2AE8	2	FLOAT INTERVENTION VALUE		YES
\$2AEA	2	FLOAT INF. BAND VALUE		YES
\$2AEC	2	FLOAT SUP.BAND VALUE		YES

DIGITAL OUT 6

Register HEX	Word	Description	Range	Reset
\$1A80	1	MODE	0= off 1= upper limit 2= lower limit 3= pulse 4= band 5= always on	YES
\$1A81	1	VARIABLE	80-BC	YES
\$1A82	1	PULSE COEFFICIENT	0÷9.999	YES
\$1A83	1	PULSE DURATION (msec)	50÷999	YES
\$1A84	1	INTERVENTION VALUE		YES
\$1A85	1	HYSTERISIS	0-99	YES
\$1A86	1	DELAY TIME in sec	0-999	YES
\$2AF8	2	FLOAT INTERVENTION VALUE		YES
\$2AFA	2	FLOAT INF. BAND VALUE		YES
\$2AFC	2	FLOAT SUP.BAND VALUE		YES

ANALOG OUT1

Register HEX	Word	Description	Range	Reset
\$1AE0	1	MODE	0=0-20mA mono 1=4-20mA mono	YES
\$1AE1	1	VARIABLE	80..BC	YES
\$1AE2	1	MIN LIMIT VALUE	YES	
\$1AE3	1	MAX.LIMIT VALUE	YES	

ANALOG OUT 2

Register HEX	Word	Description	Range	Reset
\$1AE8	1	MODE	0=0-20mA mono 1=4-20mA mono	YES
\$1AE9	1	VARIABLE	80..BC	YES
\$1AEA	1	MIN LIMIT VALUE	YES	
\$1AEB	1	MAX.LIMIT VALUE	YES	

ANALOG OUT 3

Register HEX	Word	Description	Range	Reset
\$1AF0	1	MODE	0=0-20mA mono 1=4-20mA mono	YES
\$1AF1	1	VARIABLE	80..BC	YES
\$1AF2	1	MIN LIMIT VALUE	YES	
\$1AF3	1	MAX.LIMIT VALUE	YES	

ANALOG OUT 4

Register HEX	Word	Description	Range	Reset
\$1AF8	1	MODE	0=0-20mA mono 1=4-20mA mono	YES
\$1AF9	1	VARIABLE	80..BC	YES
\$1AFA	1	MIN LIMIT VALUE	YES	
\$1AFB	1	MAX.LIMIT VALUE	YES	

DIGITAL IN 1

Register HEX	Word	Description	Range	Reset
\$1ADA	1	MODE	0= off 1= sync. RTC 2= Timeband (with Digital In 2)	YES

DIGITAL IN 2

Register HEX	Word	Description	Range	Reset
\$1ADB	1	MODE	0= off 1= sync. RTC 2= Timeband (with Digital In 2)	YES

ADVICE:PROGRAM OUTPUT PARAMETERS ALL AT THE SAME TIME TO PREVENT THE INSTRUMENT FROM RESETTNG REPEATEDLY,THUS AVOIDING TIME WASTE

EXAMPLE

Stream data send to ANR-LAN (3-Phase System Voltage):

TX 00 02 00 00 00 06 01 03 10 00 00 02
HEADER TCP = 00 02 00 00 00 06
(00 02) Transaction ID
(00 00 00) Protocol ID
(06) Length of query modbus
ADDRESS FIELD = 01
FUNCTION CODE = 03
START ADDRESS = 10 00
No. OF REGISTERS = 00 02

Response from ANR-LAN:

RX 00 02 00 00 00 07 01 03 04 00 00 0E 1D
HEADER TCP = 00 02 00 00 00 07
(00 02) Transaction ID
(00 00 00) Protocol ID
(07) Length of response modbus
ADDRESS FIELD = 01
FUNCTION CODE = 03
No. OF SEND BYTES = 04
D0, D1, ..., Dn = 00 00 0E 1D

Stream data send to ANR-LAN (3-Phase Sys. Active and Reactive Energy):

TX 00 01 00 00 00 06 01 03 10 3E 00 04
HEADER TCP = 00 01 00 00 00 06
(00 01) Transaction ID
(00 00 00) Protocol ID
(06) Length of query modbus
ADDRESS FIELD = 01
FUNCTION CODE = 03
START ADDRESS = 10 3E
No. OF REGISTERS = 00 04

Response from ANR-LAN:

RX 00 01 00 00 00 0B 01 03 08 0E F7 58 BF 0B F9 13 81
HEADER TCP = 00 01 00 00 00 0B
(00 02) Transaction ID
(00 00 00) Protocol ID
(0B) Length of response modbus
ADDRESS FIELD = 01
FUNCTION CODE = 03
No. OF SEND BYTES = 08
D0, D1, ..., Dn = 0E F7 58 BF 0B F9 13 81

TX 01 17 00 00 00 06 01 03 20 00 00 10	
HEADER TCP	= 01 17 00 00 00 06
	(01 17) Transaction ID
	(00 00 00) Protocol ID
	(06) Length of query modbus
ADDRESS FIELD	= 01
FUNCTION CODE	= 03
START ADDRESS	= 20 00
No. OF REGISTERS	= 00 10

RX	01 17 00 00 00 23 01 03 20 32 30 30 38 30 33 31 31 31 35 34 39 0E 59 37 C8 0B 7A 93 88 20 20 20 20 20 20 20 20 20 20 20
HEADER TCP	= 01 17 00 00 00 23 (01 17) Transaction ID (00 00 00) Protocol ID (23) Length of response modbus
ADDRESS FIELD	= 01
FUNCTION CODE	= 03
No. OF SEND BYTES	= 20
D0, D1, ..., Dn	= 32 30 30 38 30 33 31 31 31 35 34 39 0E 59 37 C8 0B 7A 93 88 20 20 20 20 20 20 20 20 20 20 20 20 20 20 20 20 20

TX 00 08 00 00 00 06 01	03 20 10 00 10
HEADER TCP	= 00 08 00 00 00 06
	(00 08) Transaction ID
	(00 00 00) Protocol ID
	(06) Length of query modbus
ADDRESS FIELD	= 01
FUNCTION CODE	= 03
START ADDRESS	= 20 D0
No. OF REGISTERS	= 00 10

RX 00 08 00 00 00 23 01 03 20 32 30 30 38 30 33 31 31 31 37 33 32 0E F8 A0 5E 0B FA 13 9F 20 20 20 20 20 20 20
20 20 20 20 20

HEADER TCP = 00 08 00 00 00 23
(00 08) Transaction ID
(00 00 00) Protocol ID
(23) Length of response modbus

ADDRESS FIELD = 01
FUNCTION CODE = 03
No. OF SEND BYTES= 20

D0, D1, ..., Dn = 32 30 30 38 30 33 31 31 31 37 33 32 0E F8 A0 5E 0B FA 13 9F 20 20 20 20 20 20 20 20 20 20 20 20
20 20 20



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