Modbus RTU & TCP/IP communication protocol for COMPALARM-E series

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Modbus RTU protocol

Modbus is a master-slave communication protocol able to support up to 247 slaves

organized as a bus or as a star network. The physical link layer is RS485.

The communication is half-duplex. The network messages can be Query-Response or Broadcast type. The Query-Response command is transmitted from the Master to an established Slave and generally it is followed by an answering message.
The Broadcast command is transmitted from the Master to all Slaves and is never followed by an answer.

Generic RTU message structure:

START OF FRAME	=	Starting message marker. (silence on line for time >= 4 haracters)
ADDRESS FIELD [1 CHAR]	=	Includes device address in which you need to communicate in Query-Response mode. In case the message is a Broadcast type it includes 00.
FUNCTION CODE [1 CHAR]	=	The operation code that you need to perform.
DATA FIELD [N CHAR]	=	Includes the data field.
ERROR CHECK [2 CHARS]	=	Field for the error correction code.
END OF FRAME	=	End message marker. (silence on line for time >= 4 characters)

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

Modbus TCP/IP protocol

Modbus TCP/IP (also Modbus-TCP) is simply the Modbus RTU protocol with a TCP interface that runs on Ethernet.
The Modbus messaging structure is the application protocol that defines the rules for organizing and interpreting the data independent of the data transmission medium. TCP/IP refers to the Transmission Control Protocol and Internet Protocol, which provides the transmission medium for Modbus TCP/IP messaging. Simply stated, TCP/IP allows blocks of binary data to be exchanged between computers. It is also a world-wide standard that serves as the foundation for the World Wide Web.
The primary function of TCP is to ensure that all packets of data are received correctly, while IP makes sure that messages are correctly addressed and routed. Note that the TCP/IP combination is merely a transport protocol, and does not define what the data means or how the data is to be interpreted (this is the job of the application protocol, Modbus in this case). So in summary, Modbus TCP/IP uses TCP/IP and Ethernet to carry the data of the Modbus message structure between compatible devices. That is, Modbus TCP/IP combines a physical network (Ethernet), with a networking standard (TCP/IP), and a standard method of representing data (Modbus as the application protocol). Essentially, the Modbus TCP/IP message is simply a Modbus communication encapsulated in an Ethernet TCP/IP wrapper.
In practice, Modbus TCP embeds a standard Modbus data frame into a TCP frame, without the Modbus checksum, as shown in the following diagram.
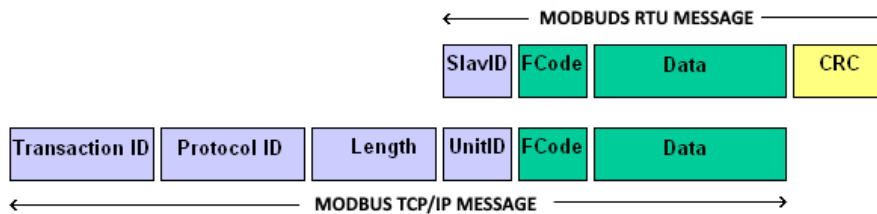
The Modbus commands and user data are themselves encapsulated into the data container of a TCP/IP telegram without being modified in any way. However, the Modbus error checking field (checksum) is not used, as the standard Ethernet TCP/IP link layer checksum methods are instead used to guaranty data integrity. Further, the Modbus frame address field is supplanted by the unit identifier in Modbus TCP/IP, and becomes part of the Modbus Application Protocol header (more on this later).
From the figure, we see that the function code and data fields are absorbed in their original form. Thus, a Modbus TCP/IP Application Data Unit (ADU) takes the form of a 7 bytes header (transaction identifier + protocol identifier + length field + unit identifier), and the protocol data unit (function code + data). The MBAP header is 7 bytes long and includes the following fields:
- **Transaction/invocation Identifier (2 Bytes)**: This identification field is used for transaction pairing when multiple messages are sent along the same TCP connection by a client without waiting for a prior response.
- **Protocol Identifier (2 bytes)**: This field is always 0 for Modbus services and other values are reserved for future extensions.
- **Length (2 bytes)**: This field is a byte count of the remaining fields and includes the unit identifier byte, function code byte, and the data fields.
- **Unit Identifier (1 byte)**: This field is used to identify a remote server located on a non TCP/IP network (for serial bridging).

Reading multiple registers [function code 03h]

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

Broadcast is not supported. The Query message specified the starting register and quantity of register to be read.

QUERY:

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

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

WARNING:

It is possible to read more than one variable at the same time **(max 252 bytes)** only if their addresses are consecutive and the variables on the same line cannot be divided.

The register data in the response message are packet as two bytes per register, with the binary contents right justified within each byte.

For each register, the first byte contains the high order bits and the second contains the low order bits.

RESPONSE:

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

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

Write multiple registers [function code 10h]

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

WARNING: It is possible to write more than one variable at the same time only if their addresses are consecutive and the variables on the same line cannot be divided. (max 64 bytes).

QUERY:

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

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

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

RESPONSE:

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

BROADCAST COMMAND:

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

QUERY:

Start of Frame	1° Byte 0x00	2° Byte Function Code	3°-4° Byte Start Address	5°-6° Byte Number of Registers	7° Byte Number of Bytes	n° Byte Data	n+1 - n+2° Byte Check Sum	End of Frame

RESPONSE: *No Response.*

Diagnostic [function code 08h]

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

QUERY:

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

RESPONSE:

The response must be the loopback of the same data.

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

DIAGNOSTIC EXAMPLE:

QUERY

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

RESPONSE

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

Report slave ID [function code 11h]

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

QUERY:

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

RESPONSE:

	1° Byte	2° Byte	3° Byte	4° Byte	5° Byte	6° - 7° Byte	
Start of Frame	Address Field	Function Code	Byte Count	Slave ID	Run Indicator Status	Check sum	End of Frame
Starting message marker	*Device address 0x01 ... 0xF7*	*0x11*	*Number of data bytes (0x02)*	*identifier* **0x65**	*status* **0xFF**	*CRC*	*End message marker*

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

REPORT SLAVE ID EXAMPLE:

QUERY

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

RESPONSE

Field Name	Example (Hex)
Slave Address	0x01
Function Code	0x11
Byte count	0x02
Slave ID	0x65
Run indicator status	0xFF
Error Check (CRC)	0x??
	0x??

Read/Write multiple registers [function code 17h]

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

WARNING WRITE PART:

It is possible to write more than one variable at the same time only if their addresses are consecutive and the variables on the same line cannot be divided. **(max 64 bytes)**

QUERY:

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

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

WARNING READ PART:

It is possible to read more than one variable at the same time **(max 252 bytes)** only if their addresses are consecutive and the variables on the same line cannot be divided.
The register data in the response message are packet as two bytes per register, with the binary contents right justified within each byte.
For each register, the first byte contains the high order bits and the second contains the low order bits.

RESPONSE:

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

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

Error message from slave to master

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

RESPONSE:

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

ERROR EXAMPLE:

QUERY

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

RESPONSE

Field Name	Example (Hex)	
Slave Address	0x 01	
Function Code	0x83	(1)
Error Code	0x02	(2)
Error Check (CRC)	0x??	
	0x??	

(1): Function Code transmitted by master with bit 7 high.
(2): Error type:
0x01 = Illegal Function
0x02 = Illegal data address
0x03 = Illegal data value
0x0F = Communication Protection Enabled (password enabled)
Write PASSWORD parameter before retry.

COMPALARM-E registers

The following tables shown all the COMPALARM-E registers.

Main registers

Register HEX	Register DEC	Word	Description	R/W	Type
0100	256	2	DIGITAL INPUTS STATE	R	Bit 00: digital input 1 (1: engaged, 0: open) Bit 01: digital input 2 (1: engaged, 0: open) - - - Bit 15: digital input 16 (1: engaged, 0: open)
0102	258	2	LOGIC INPUTS STATE	R	Bit 00: logic input 1 Bit 01: logic input 2 - - - Bit 15: logic input 16
0104	260	2	ALARMS STATE	R	Bit 00: channel 1 (1: alarm, 0: normal) [logic state] Bit 01: channel 2 (1: alarm, 0: normal) [logic state] - - - Bit 15: channel 16 (1: alarm, 0: normal) [logic state]
0106	262	2	ALARMS SILENCE	R	Bit 00: channel 1 (1: sound active, 0: off) Bit 01: channel 2 (1: sound active, 0: off) - - - Bit 15: channel 16 (1: sound active, 0: sound off)
0108	264	2	ALARMS ACKNOWLEDGE	R	Bit 00: acknowledge input 1 (1: ack, 0: no ack) Bit 01: acknowledge input 2 (1: ack, 0: no ack) - - - Bit 15: acknowledge input 16 (1: ack, 0: no ack)
010A	266	2	FIRST OUT	R	Bit 00: channel 1 (1: F.O. from this channel, 0: normal) Bit 01: channel 2 (1: F.O. from this channel, 0: normal) - - - Bit 15: channel 16 (1: F.O. from this channel, 0: normal)
010C	268	2	VISUAL STATE INPUT 1	R	0: VISUAL OFF 1: VISUAL FIX ON 2: VISUAL SLOW FLASHING 3: VISUAL FAST FLASHING 4: VISUAL INTERMITTENT FLASHING
010E	270	2	VISUAL STATE INPUT 2	R	See VISUAL STATE INPUT 1 register for details
0110	272	2	VISUAL STATE INPUT 3	R	See VISUAL STATE INPUT 1 register for details
0112	274	2	VISUAL STATE INPUT 4	R	See VISUAL STATE INPUT 1 register for details
0114	276	2	VISUAL STATE INPUT 5	R	See VISUAL STATE INPUT 1 register for details
0116	278	2	VISUAL STATE INPUT 6	R	See VISUAL STATE INPUT 1 register for details
0118	280	2	VISUAL STATE INPUT 7	R	See VISUAL STATE INPUT 1 register for details
011A	282	2	VISUAL STATE INPUT 8	R	See VISUAL STATE INPUT 1 register for details
011C	284	2	VISUAL STATE INPUT 9	R	See VISUAL STATE INPUT 1 register for details
011E	286	2	VISUAL STATE INPUT 10	R	See VISUAL STATE INPUT 1 register for details
0120	288	2	VISUAL STATE INPUT 11	R	See VISUAL STATE INPUT 1 register for details
0122	290	2	VISUAL STATE INPUT 12	R	See VISUAL STATE INPUT 1 register for details
0124	292	2	VISUAL STATE INPUT 13	R	See VISUAL STATE INPUT 1 register for details
0126	294	2	VISUAL STATE INPUT 14	R	See VISUAL STATE INPUT 1 register for details
0128	296	2	VISUAL STATE INPUT 15	R	See VISUAL STATE INPUT 1 register for details
012A	298	2	VISUAL STATE INPUT 16	R	See VISUAL STATE INPUT 1 register for details
012C	300	2	OUTPUT STATE	R	Bit 00: output 1 (1: engaged, 0: open) [logic state] Bit 01: output 2 (1: engaged, 0: open) [logic state] Bit 02: output 3 (1: engaged, 0: open) [logic state] Bit 03: output 4 (1: engaged, 0: open) [logic state]
012E	302	2	AUDIBLE STATE (INTERNAL BUZZER)	R	Bit 00: channel 1 (1: alarm, 0: normal) Bit 01: channel 2 (1: alarm, 0: normal) - - - Bit 15: channel 16 (1: alarm, 0: normal)
0130	304	2	GROUPS STATE	R	Bit 00: group 1 (1: alarm present in group, 0: no alarm) Bit 01: group 2 (1: alarm present in group, 0: no alarm) - - - Bit 15: group 16 (1: alarm present in group, 0: no alarm)

Main registers read from Slave 1   from 0x0200 to 0x0229   with same meaning of "main registers"
Main registers read from Slave 2   from 0x0300 to 0x0329   with same meaning of "main registers"
Main registers read from Slave 3   from 0x0400 to 0x0429   with same meaning of "main registers"
Main registers read from Slave 4   from 0x0500 to 0x0529   with same meaning of "main registers"
Main registers read from Slave 5   from 0x0600 to 0x0629   with same meaning of "main registers"
Main registers read from Slave 6   from 0x0700 to 0x0729   with same meaning of "main registers"
Main registers read from Slave 7   from 0x0800 to 0x0829   with same meaning of "main registers"
Main registers read from Slave 8   from 0x0900 to 0x0929   with same meaning of "main registers"
Main registers read from Slave 9   from 0x0A00 to 0x0A29   with same meaning of "main registers"
Main registers read from Slave 10   from 0x0B00 to 0x0B29   with same meaning of "main registers"
Main registers read from Slave 11   from 0x0C00 to 0x0C29   with same meaning of "main registers"
Main registers read from Slave 12   from 0x0D00 to 0x0D29   with same meaning of "main registers"
Main registers read from Slave 13   from 0x0E00 to 0x0E29   with same meaning of "main registers"
Main registers read from Slave 14   from 0x0F00 to 0x0F29   with same meaning of "main registers"
Main registers read from Slave 15   from 0x1000 to 0x1029   with same meaning of "main registers"

Group state

Register HEX	Register DEC	Word	Description	R/W	Type
0x1100	4352	2	GROUP 1 – ALARM 1 TO 32	R	Bit 00: alarm 1 (1: alarm, 0: open) - - - Bit 31: alarm 32 (1: alarm, 0: open)
0x1102	4354	2	GROUP 1 – ALARM 33 TO 64	R	Bit 00: alarm 33 (1: alarm, 0: open) - - - Bit 31: alarm 64 (1: alarm, 0: open)
0x1104	4356	2	GROUP 1 – ALARM 65 TO 96	R	Bit 00: alarm 65 (1: alarm, 0: open) - - - Bit 31: alarm 96 (1: alarm, 0: open)
0x1106	4358	2	GROUP 1 – ALARM 97 TO 128	R	Bit 00: alarm 97 (1: alarm, 0: open) - - - Bit 31: alarm 128 (1: alarm, 0: open)
0x1108	4360	2	GROUP 1 – ALARM 129 TO 160	R	Bit 00: alarm 129 (1: alarm, 0: open) - - - Bit 31: alarm 160 (1: alarm, 0: open)
0x110A	4362	2	GROUP 1 – ALARM 161 TO 192	R	Bit 00: alarm 161 (1: alarm, 0: open) - - - Bit 31: alarm 192 (1: alarm, 0: open)
0x110C	4364	2	GROUP 1 – ALARM 193 TO 224	R	Bit 00: alarm 193 (1: alarm, 0: open) - - - Bit 31: alarm 224 (1: alarm, 0: open)
0x110E	4366	2	GROUP 1 – ALARM 225 TO 256	R	Bit 00: alarm 225 (1: alarm, 0: open) - - - Bit 31: alarm 256 (1: alarm, 0: open)
0x1110	4368	2	GROUP 2 – ALARM 1 TO 32	R	See GROUP 1
0x1112	4370	2	GROUP 2 – ALARM 33 TO 64	R	See GROUP 1
0x1114	4372	2	GROUP 2 – ALARM 65 TO 96	R	See GROUP 1
0x1116	4374	2	GROUP 2 – ALARM 97 TO 128	R	See GROUP 1
0x1118	4376	2	GROUP 2 – ALARM 129 TO 160	R	See GROUP 1
0x111A	4378	2	GROUP 2 – ALARM 161 TO 192	R	See GROUP 1
0x111C	4380	2	GROUP 2 – ALARM 193 TO 224	R	See GROUP 1
0x111E	4382	2	GROUP 2 – ALARM 225 TO 256	R	See GROUP 1
0x1120	4384	2	GROUP 3 – ALARM 1 TO 32	R	See GROUP 1
0x1122	4386	2	GROUP 3 – ALARM 33 TO 64	R	See GROUP 1
0x1124	4388	2	GROUP 3 – ALARM 65 TO 96	R	See GROUP 1
0x1126	4390	2	GROUP 3 – ALARM 97 TO 128	R	See GROUP 1
0x1128	4392	2	GROUP 3 – ALARM 129 TO 160	R	See GROUP 1
0x112A	4394	2	GROUP 3 – ALARM 161 TO 192	R	See GROUP 1
0x112C	4396	2	GROUP 3 – ALARM 193 TO 224	R	See GROUP 1
0x112E	4398	2	GROUP 3 – ALARM 225 TO 256	R	See GROUP 1
0x1130	4400	2	GROUP 4 – ALARM 1 TO 32	R	See GROUP 1
0x1132	4402	2	GROUP 4 – ALARM 33 TO 64	R	See GROUP 1
0x1134	4404	2	GROUP 4 – ALARM 65 TO 96	R	See GROUP 1
0x1136	4406	2	GROUP 4 – ALARM 97 TO 128	R	See GROUP 1
0x1138	4408	2	GROUP 4 – ALARM 129 TO 160	R	See GROUP 1
0x113A	4410	2	GROUP 4 – ALARM 161 TO 192	R	See GROUP 1
0x113C	4412	2	GROUP 4 – ALARM 193 TO 224	R	See GROUP 1
0x113E	4414	2	GROUP 4 – ALARM 225 TO 256	R	See GROUP 1
- - -	- - -	- - -	- - -	- - -	- - -
0x11F0	4592	2	GROUP 16 – ALARM 1 TO 32	R	See GROUP 1
0x11F2	4594	2	GROUP 16 – ALARM 33 TO 64	R	See GROUP 1
0x11F4	4596	2	GROUP 16 – ALARM 65 TO 96	R	See GROUP 1
0x11F6	4598	2	GROUP 16 – ALARM 97 TO 128	R	See GROUP 1
0x11F8	4600	2	GROUP 16 – ALARM 129 TO 160	R	See GROUP 1
0x11FA	4602	2	GROUP 16 – ALARM 161 TO 192	R	See GROUP 1
0x11FC	4604	2	GROUP 16 – ALARM 193 TO 224	R	See GROUP 1
0x11FE	4608	2	GROUP 16 – ALARM 225 TO 256	R	See GROUP 1

Virtual input state

Register HEX	Register DEC	Word	Description	R/W	Type
1300	4864	2	ALARM 1 TO 16	R	Bit 00: alarm 1 (1: alarm, 0: open) - - - Bit 15: alarm 16 (1: alarm, 0: open)
1302	4866	2	ALARM 17 TO 32	R	Bit 00: alarm 17 (1: alarm, 0: open) - - - Bit 15: alarm 32 (1: alarm, 0: open)
1304	4868	2	ALARM 33 TO 48	R	Bit 00: alarm 33 (1: alarm, 0: open) - - - Bit 15: alarm 48 (1: alarm, 0: open)
1306	4870	2	ALARM 49 TO 64	R	Bit 00: alarm 49 (1: alarm, 0: open) - - - Bit 31: alarm 64 (1: alarm, 0: open)
1308	4872	2	ALARM 65 TO 80	R	Bit 00: alarm 65 (1: alarm, 0: open) - - - Bit 31: alarm 80 (1: alarm, 0: open)
130A	4874	2	ALARM 81 TO 96	R	Bit 00: alarm 181 (1: alarm, 0: open) - - - Bit 31: alarm 96 (1: alarm, 0: open)
130C	4876	2	ALARM 97 TO 112	R	Bit 00: alarm 97 (1: alarm, 0: open) - - - Bit 31: alarm 112 (1: alarm, 0: open)
130E	4878	2	ALARM 113 TO 128	R	Bit 00: alarm 113 (1: alarm, 0: open) - - - Bit 31: alarm 128 (1: alarm, 0: open)
1310	4880	2	ALARM 129 TO 144	R	Bit 00: alarm 129 (1: alarm, 0: open) - - - Bit 31: alarm 144 (1: alarm, 0: open)
1312	4882	2	ALARM 145 TO 160	R	Bit 00: alarm 145 (1: alarm, 0: open) - - - Bit 31: alarm 160 (1: alarm, 0: open)
1314	4884	2	ALARM 161 TO 176	R	Bit 00: alarm 161 (1: alarm, 0: open) - - - Bit 31: alarm 176 (1: alarm, 0: open)
1316	4886	2	ALARM 177 TO 192	R	Bit 00: alarm 177 (1: alarm, 0: open) - - - Bit 31: alarm 192 (1: alarm, 0: open)
1318	4890	2	ALARM 193 TO 208	R	Bit 00: alarm 193 (1: alarm, 0: open) - - - Bit 31: alarm 208 (1: alarm, 0: open)
131A	4892	2	ALARM 209 TO 224	R	Bit 00: alarm 209 (1: alarm, 0: open) - - - Bit 31: alarm 224 (1: alarm, 0: open)
131C	4894	2	ALARM 225 TO 240	R	Bit 00: alarm 225 (1: alarm, 0: open) - - - Bit 31: alarm 240 (1: alarm, 0: open)
131E	4896	2	ALARM 241 TO 256	R	Bit 00: alarm 241 (1: alarm, 0: open) - - - Bit 31: alarm 256 (1: alarm, 0: open)

Setup Operation Mode

Warning: Must be send the entire parameter length (2 words or 1 word – see the long of each parameter) for a correct command setting.

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

Register HEX	Register DEC	Word	Description	R/W	Parameters
0x2000	8192	2	NOTIFICATIONS	R/W	0: overview *[default]* 2: showed last alarm 1: showed first alarm 3: loop
0x2002	8194	2	WINDOWS SIZE	R/W	0: visual 4 channel on screen 1: visual 8 channel on screen 2: visual 12 channel on screen 3: visual 16 channel on screen *[default]*
0x2004	8196	2	MODE	R/W	0: standard 1: inputs expansion (master read this device how slave) 2: repeater
0x2006	8198	2	SEQUENCE	R/W	0: custom *[default]* 6: ISA sequence M5 1: ISA sequence A 7: ISA sequence F1M 2: ISA sequence F1A 8: ISA sequence F2M 3: ISA sequence F2A 9: ISA sequence F3M 4: ISA sequence F3A 10: ISA sequence R8 5: ISA sequence M
0 2008	8200	2	SILENCE TYPE	R/W	0: local 1: global (used in master mode)
0x200A	8202	2	AUTO SILENCE*	R/W	0: No *[default]* 1: Yes
0x200C	8204	2	AUTO SILENCE AFTER ALARM*	R/W	1 ÷ 100'000 s *[default: 60]*
0x200E	8206	2	ACKNOWLEDGE TYPE	R/W	0: local 1: global (used in master mode - serial connection)
0x2010	8208	2	AUTO ACKNOWLEDGE*	R/W	0: No *[default]* 1: Yes
0x2012	8210	2	AUTO ACKNOWLEDGE AFTER ALARM*	R/W	1 ÷ 100'000 s *[default: 120]*
0x2014	8212	2	RESET TYPE	R/W	0: local 1: global (used in master mode)
0x2016	8214	2	AUTO RESET*	R/W	0: No *[default]* 1: Yes
0x2018	8216	2	AUTO RESET AFTER ALARM DISAPEARS*	R/W	1 ÷ 100'000 s *[default: 180]*
0x201A	8218	2	RINGBACK AUDIBLE*	R/W	0: No *[default]* 1: Yes
0x201C	8220	2	SILENCE INTERLOCK	R/W	0: No *[default]* 1: Yes
0x201E	8222	2	SOUND LEVEL (INTERNAL BUZZER)	R/W	0 ÷ 10 (0: OFF ÷ 10: MAX)
0x2020	8224	2	MASTER READ ALARM TEXTS	R/W	Set to 1 to active read alarm texts to slaves
0x2022	8226	2	VISUAL EXTERNAL SYNC	R/W	0: No *[default]* 1: Yes
0x2024	8228	2	POP-UP	R/W	0: disabled *[default]* 1: enabled "first-last" 2: enabled "rotation"
0x2026	8230	2	OFFLINE ALERT	R/W	0: disabled 1: enabled
0x2028	8232	2	ALARMS MEMORY	R/W	0: No *[default]* 1: Yes

***: only for <u>custom</u> sequence**

Setup Alarm Input Order

Warning: Must be send the entire parameter length (2 words or 1 word – see the long of each parameter) for a correct command setting.

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

Register HEX	Register DEC	Word	Description	R/W	Parameters
0x2100	8448	2	INPUT 1	R/W	0: DI-1 *[Default]* 1: DI-2 - - - 15: DI-16
0x2102	8450	2	INPUT 2	R/W	See INPUT 1 *[Default: 1]*
0x2104	8452	2	INPUT 3	R/W	See INPUT 1 *[Default: 2]*
0x2106	8454	2	INPUT 4	R/W	See INPUT 1 *[Default: 3]*
0x2108	8456	2	INPUT 5	R/W	See INPUT 1 *[Default: 4]*
0x210A	8458	2	INPUT 6	R/W	See INPUT 1 *[Default: 5]*
0x210C	8460	2	INPUT 7	R/W	See INPUT 1 *[Default: 6]*
0x210E	8462	2	INPUT 8	R/W	See INPUT 1 *[Default: 7]*
0x2110	8464	2	INPUT 9	R/W	See INPUT 1 *[Default: 8]*
0x2112	8466	2	INPUT 10	R/W	See INPUT 1 *[Default: 9]*
0x2114	8468	2	INPUT 11	R/W	See INPUT 1 *[Default: 10]*
0x2116	8470	2	INPUT 12	R/W	See INPUT 1 *[Default: 11]*
0x2118	8472	2	INPUT 13	R/W	See INPUT 1 *[Default: 12]*
0x211A	8474	2	INPUT 14	R/W	See INPUT 1 *[Default: 13]*
0x211C	8476	2	INPUT 15	R/W	See INPUT 1 *[Default: 14]*
0x211E	8478	2	INPUT 16	R/W	See INPUT 1 *[Default: 15]*

Setup First-Out

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

Register HEX	Register DEC	Word	Description	R/W	Parameters
0xD000	53248	2	INPUT 1	R/W	The channel can be recognized as the first. 0: disable 1: enable [default]
0xD002	53250	2	INPUT 2	R/W	See INPUT 1
0xD004	53252	2	INPUT 3	R/W	See INPUT 1
0xD006	53254	2	INPUT 4	R/W	See INPUT 1
0xD008	53256	2	INPUT 5	R/W	See INPUT 1
0xD00A	53258	2	INPUT 6	R/W	See INPUT 1
0xD00C	53260	2	INPUT 7	R/W	See INPUT 1
0xD00E	53262	2	INPUT 8	R/W	See INPUT 1
0xD010	53264	2	INPUT 9	R/W	See INPUT 1
0xD012	53266	2	INPUT 10	R/W	See INPUT 1
0xD014	53268	2	INPUT 11	R/W	See INPUT 1
0xD016	53270	2	INPUT 12	R/W	See INPUT 1
0xD018	53272	2	INPUT 13	R/W	See INPUT 1
0xD01A	53274	2	INPUT 14	R/W	See INPUT 1
0xD01C	53276	2	INPUT 15	R/W	See INPUT 1
0xD01E	53278	2	INPUT 16	R/W	See INPUT 1
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0xD1FE	53758	2	INPUT 256	R/W	See INPUT 1

Setup Group of Alarm

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

Register HEX	Register DEC	Word	Description	R/W	Parameters
0x21A0	8604	2	INPUT 1	R/W	0: group 1 [default] 1: group 2 - - - 15: group 16
0x2152	8606	2	INPUT 2	R/W	See INPUT 1
- - -	- - -	- - -	- - -	- - -	- - -
0x239E	9118	2	INPUT 256	R/W	See INPUT 1

Setup Window Alarm

Setup Window Alarm 1

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

Register HEX	Register DEC	Word	Description	R/W	Parameters
0x2400	9216	2	COLOR TEXT ALARM	R/W	0: black 7: green 1: gray 8: dark green 2: white 9: sky blue 3: dark red 10: blue 4: red 11: dark purple 5: orange 12: purple 6: yellow
0x2402	9218	2	COLOR BACKGROUND ALARM	R/W	See COLOR TEXT ALARM
0x2404	9220	2	COLOR TEXT NO ALARM	R/W	See COLOR TEXT ALARM
0x2406	9222	2	COLOR BACKGROUND NO ALARM	R/W	See COLOR TEXT ALARM
0x2408	9224	2	ROW NUMBER	R/W	1: show text only on row 1 2: show texts on rows 1 and 2 3: show texts on rows 1, 2 and 3

Setup Window Alarm 2   from 0x2420 to 0x2409   with same meaning of "Setup Window Alarm 1"
Setup Window Alarm 3   from 0x2440 to 0x2449   with same meaning of "Setup Window Alarm 1"
Setup Window Alarm 4   from 0x2460 to 0x2469   with same meaning of "Setup Window Alarm 1"
- - - - - - - - - - - - -
Setup Window Alarm 256   from 0x43E0 to 0x43E9   with same meaning of "Setup Window Alarm 1"

Setup Window Group

Setup Window Group 1

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

Register HEX	Register DEC	Word	Description	R/W	Parameters
0x4400	17408	2	COLOR TEXT – ALARM	R/W	0: black 7: green 1: gray 8: dark green 2: white 9: sky blue 3: dark red 10: blue 4: red 11: dark purple 5: orange 12: purple 6: yellow
0x4402	17410	2	COLOR BACKGROUND – ALARM	R/W	See "COLOR BACKGROUND – NO ALARM"
0x4404	17412	2	COLOR TEXT – NO ALARM	R/W	See "COLOR BACKGROUND – NO ALARM"
0x4406	17414	2	COLOR BACKGROUND – NO ALARM	R/W	See "COLOR BACKGROUND – NO ALARM"
0x4408	17416	2	ROW NUMBER	R/W	1 ÷ 3

Setup Window Group 2   from 0x4450 to 0x4459 with same meaning of "Setup Window Group 1"
Setup Window Group 3   from 0x44A0 to 0x44A9 with same meaning of "Setup Window Group 1"
Setup Window Group 4   from 0x44F0 to 0x44F9 with same meaning of "Setup Window Group 1"
Setup Window Group 5   from 0x4540 to 0x4549 with same meaning of "Setup Window Group 1"
Setup Window Group 6   from 0x4590 to 0x4599 with same meaning of "Setup Window Group 1"
Setup Window Group 7   from 0x45E0 to 0x45E9 with same meaning of "Setup Window Group 1"
Setup Window Group 8   from 0x4630 to 0x4639 with same meaning of "Setup Window Group 1"
Setup Window Group 9   from 0x4680 to 0x4689 with same meaning of "Setup Window Group 1"
Setup Window Group 10   from 0x46D0 to 0x46D9 with same meaning of "Setup Window Group 1"
Setup Window Group 11   from 0x4720 to 0x4729 with same meaning of "Setup Window Group 1"
Setup Window Group 12   from 0x4770 to 0x4779 with same meaning of "Setup Window Group 1"
Setup Window Group 13   from 0x47C0 to 0x47C9 with same meaning of "Setup Window Group 1"
Setup Window Group 14   from 0x4810 to 0x4819 with same meaning of "Setup Window Group 1"
Setup Window Group 15   from 0x4860 to 0x4869 with same meaning of "Setup Window Group 1"
Setup Window Group 16   from 0x48B0 to 0x48B9 with same meaning of "Setup Window Group 1"

Setup Digital Input

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

Register HEX	Register DEC	Word	Description	R/W	Parameters
0xD300	54016	2	NORMALY	R/W	0: input normaly open (alarm when input is 1) *[default]* 1: input normaly closed (alarm when input is 0)
0xD302	54018	2	VALIDATION TIME	R/W	20 ÷ 100'000'000 ms *[default: 20]* Time after which the change of state of the input is recognized as alarm.
0xD304	54020	2	TYPE	R/W	Choose the input functionality: 0: alarm input *[default]* 2: acknowledge 1: silence 3: reset
0xD306	54022	2	SOURCE	R/W	0: wired 1: software simulated

Setup Digital Input 2	from 0xD320 to 0xD327	with same meaning of "Setup Digital Input 1"
Setup Digital Input 3	from 0xD340 to 0xD347	with same meaning of "Setup Digital Input 1"
Setup Digital Input 4	from 0xD360 to 0xD367	with same meaning of "Setup Digital Input 1"
Setup Digital Input 5	from 0xD380 to 0xD387	with same meaning of "Setup Digital Input 1"
Setup Digital Input 6	from 0xD3A0 to 0xD3A7	with same meaning of "Setup Digital Input 1"
Setup Digital Input 7	from 0xD3C0 to 0xD3C7	with same meaning of "Setup Digital Input 1"
Setup Digital Input 8	from 0xD3E0 to 0xD3E7	with same meaning of "Setup Digital Input 1"
Setup Digital Input 9	from 0xD400 to 0xD407	with same meaning of "Setup Digital Input 1"
Setup Digital Input 10	from 0xD420 to 0xD427	with same meaning of "Setup Digital Input 1"
Setup Digital Input 11	from 0xD440 to 0xD447	with same meaning of "Setup Digital Input 1"
Setup Digital Input 12	from 0xD460 to 0xD467	with same meaning of "Setup Digital Input 1"
Setup Digital Input 13	from 0xD480 to 0xD487	with same meaning of "Setup Digital Input 1"
Setup Digital Input 14	from 0xD4A0 to 0xD4A7	with same meaning of "Setup Digital Input 1"
Setup Digital Input 15	from 0xD4C0 to 0xD4C7	with same meaning of "Setup Digital Input 1"
Setup Digital Input 16	from 0xD4E0 to 0xD4E7	with same meaning of "Setup Digital Input 1"
Setup Digital Input 17	from 0xD500 to 0xD507	with same meaning of "Setup Digital Input 1"
Setup Digital Input 18	from 0xD520 to 0xD527	with same meaning of "Setup Digital Input 1"
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Setup Digital Input 256	from 0xF2E0 to 0xF2E7	with same meaning of "Setup Digital Input 1"

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

Register HEX	Register DEC	Word	Description	R/W	Parameters
0x5300	21248	2	NORMALY	R/W	0: output normally open *[default]* 1: output normally closed
0x5302	21250	2	TYPE	R/W	0: not used 2: audible-ISA 4: repeat input 1: visual-ISA *[default]* 3: repeat alarm 5: group state
0x5304	21252	2	REPEATED INPUT/ALARM	R/W	1 ÷ 16 (only for alarm input)
0x5306	21254	2	GROUP	R/W	1 ÷ 16

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

Register HEX	Register DEC	Word	Description	R/W	Parameters
0x5320	21280	2	NORMALY	R/W	0: output normally open *[default]* 1: output normally closed
0x5322	21282	2	TYPE	R/W	0: not used 2: audible-ISA 4: repeat input 1: visual-ISA *[default]* 3: repeat alarm 5: group state
0x5324	21284	2	REPEATED INPUT/ALARM	R/W	1 ÷ 16 (only for alarm input)
0x5326	21286	2	GROUP	R/W	1 ÷ 16

Setup output 3
Warning: Must be send the entire parameter length (2 words or 1 word – see the long of each parameter) for a correct command setting.
Warning: All Write command could be send in Broadcast Mode (Node ID 0) but if the Modbus Register or Modbus Parameters is wrong anything messages are returned.

Register HEX	Register DEC	Word	Description	R/W	Parameters
0x5340	21312	2	NORMALY	R/W	0: output normally open *[default]* 1: output normally closed
0x5342	21314	2	TYPE	R/W	0: not used 2: audible-ISA 4: repeat input 1: visual-ISA *[default]* 3: repeat alarm 5: group state
0x5344	21316	2	REPEATED INPUT/ALARM	R/W	1 ÷ 16 (only for alarm input)
0x5346	21318	2	GROUP	R/W	1 ÷ 16

Setup output 4
Warning: Must be send the entire parameter length (2 words or 1 word – see the long of each parameter) for a correct command setting.
Warning: All Write command could be send in Broadcast Mode (Node ID 0) but if the Modbus Register or Modbus Parameters is wrong anything messages are returned.

Register HEX	Register DEC	Word	Description	R/W	Parameters
0x5360	21344	2	NORMALY	R/W	0: output normally open *[default]* 1: output normally closed
0x5362	21346	2	TYPE	R/W	0: not used 2: audible-ISA 4: repeat input 1: visual-ISA *[default]* 3: repeat alarm 5: group state
0x5364	21348	2	REPEATED INPUT/ALARM	R/W	1 ÷ 16 (only for alarm input)
0x5366	21350	2	GROUP	R/W	1 ÷ 16

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

Register HEX	Register DEC	Word	Description	R/W	Parameters
0x6000	24576	2	ALARM TEXT INDEX	R/W	1°, 2°, 3°, 4° characters (ASCII format)
0x6002	24578	2	ALARM TEXT ROW 1	R/W	1°, 2°, 3°, 4° characters (ASCII format)
0x6004	24580	2	ALARM TEXT ROW 1	R/W	5°, 6°, 7°, 8° characters (ASCII format)
0x6006	24582	2	ALARM TEXT ROW 1	R/W	9°, 10°, 11°, 12° characters (ASCII format)
0x6008	24584	2	ALARM TEXT ROW 2	R/W	1°, 2°, 3°, 4° characters (ASCII format)
0x600A	24586	2	ALARM TEXT ROW 2	R/W	5°, 6°, 7°, 8° characters (ASCII format)
0x600C	24588	2	ALARM TEXT ROW 2	R/W	9°, 10°, 11°, 12° characters (ASCII format)
0x600E	24590	2	ALARM TEXT ROW 3	R/W	1°, 2°, 3°, 4° characters (ASCII format)
0x6010	24592	2	ALARM TEXT ROW 3	R/W	5°, 6°, 7°, 8° characters (ASCII format)
0x6012	24594	2	ALARM TEXT ROW 3	R/W	9°, 10°, 11°, 12° characters (ASCII format)
0x6014	24596	2	HELP ALARM TEXT ROW 1	R/W	1°, 2°, 3°, 4° characters (ASCII format)
0x6016	24598	2	HELP ALARM TEXT ROW 1	R/W	5°, 6°, 7°, 8° characters (ASCII format)
0x6018	24600	2	HELP ALARM TEXT ROW 1	R/W	9°, 10°, 11°, 12° characters (ASCII format)
0x601A	24602	2	HELP ALARM TEXT ROW 2	R/W	1°, 2°, 3°, 4° characters (ASCII format)
0x601C	24604	2	HELP ALARM TEXT ROW 2	R/W	5°, 6°, 7°, 8° characters (ASCII format)
0x601E	24606	2	HELP ALARM TEXT ROW 2	R/W	9°, 10°, 11°, 12° characters (ASCII format)
0x6020	24608	2	HELP ALARM TEXT ROW 3	R/W	1°, 2°, 3°, 4° characters (ASCII format)
0x6022	24610	2	HELP ALARM TEXT ROW 3	R/W	5°, 6°, 7°, 8° characters (ASCII format)
0x6024	24612	2	HELP ALARM TEXT ROW 3	R/W	9°, 10°, 11°, 12° characters (ASCII format)

Alarm texts 2   from 0x6050 to 0x607D with same meaning of "Alarm texts 1"
- - - - - - - - - -
Alarm texts 256   from 0x9FC0 to 0x9FED with same meaning of "Alarm texts 1"

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

Register HEX	Register DEC	Word	Description	R/W	Parameters
0xA000	40960	2	ALARM TEXT INDEX	R/W	1°, 2°, 3°, 4° characters (ASCII format)
0xA002	40962	2	ALARM TEXT ROW 1	R/W	1°, 2°, 3°, 4° characters (ASCII format)
0xA004	40964	2	ALARM TEXT ROW 1	R/W	5°, 6°, 7°, 8° characters (ASCII format)
0xA006	40966	2	ALARM TEXT ROW 1	R/W	9°, 10°, 11°, 12° characters (ASCII format)
0xA008	40968	2	ALARM TEXT ROW 2	R/W	1°, 2°, 3°, 4° characters (ASCII format)
0xA00A	40970	2	ALARM TEXT ROW 2	R/W	5°, 6°, 7°, 8° characters (ASCII format)
0xA00C	40972	2	ALARM TEXT ROW 2	R/W	9°, 10°, 11°, 12° characters (ASCII format)
0xA00E	40974	2	ALARM TEXT ROW 3	R/W	1°, 2°, 3°, 4° characters (ASCII format)
0xA010	40976	2	ALARM TEXT ROW 3	R/W	5°, 6°, 7°, 8° characters (ASCII format)
0xA012	40978	2	ALARM TEXT ROW 3	R/W	9°, 10°, 11°, 12° characters (ASCII format)

Group texts 2   from 0xA050 to 0xA063 with same meaning of "Group texts 1"
Group texts 3   from 0xA0A0 to 0xA0B3 with same meaning of "Group texts 1"
Group texts 4   from 0xA0F0 to 0xA103 with same meaning of "Group texts 1"
Group texts 5   from 0xA140 to 0xA153 with same meaning of "Group texts 1"
Group texts 6   from 0xA190 to 0xA1A3 with same meaning of "Group texts 1"
Group texts 7   from 0xA1E0 to 0xA1F3 with same meaning of "Group texts 1"
Group texts 8   from 0xA230 to 0xA243 with same meaning of "Group texts 1"
Group texts 9   from 0xA280 to 0xA293 with same meaning of "Group texts 1"
Group texts 10   from 0xA2D0 to 0xA2E3 with same meaning of "Group texts 1"
Group texts 11   from 0xA320 to 0xA333 with same meaning of "Group texts 1"
Group texts 12   from 0xA370 to 0xA383 with same meaning of "Group texts 1"
Group texts 13   from 0xA3C0 to 0xA3B3 with same meaning of "Group texts 1"
Group texts 14   from 0xA410 to 0xA423 with same meaning of "Group texts 1"
Group texts 15   from 0xA460 to 0xA473 with same meaning of "Group texts 1"
Group texts 16   from 0xA4B0 to 0xA4C3 with same meaning of "Group texts 1"

Switch ON/OFF - Log

Register HEX	Register DEC	Word	Description	R/W	Type
0xA500	42240	2	1st LOG - TIME	R	byte order/meaning: EMPTY, HOUR, MINUTE, SECOND
0xA502	42242	2	1st LOG - DATA	R	byte order/meaning: DAY, MONYH, YEAR, YEAR
0xA504	42244	2	1st LOG – EVENT TYPE	R	0: switch off 1: switch on
0xA506	42246	2	2nd LOG - TIME	R	byte order/meaning: EMPTY, HOUR, MINUTE, SECOND
0xA508	42248	2	2nd LOG - DATA	R	byte order/meaning: DAY, MONYH, YEAR, YEAR
0xA50A	42250	2	2nd LOG – EVENT TYPE	R	0: switch off 1: switch on
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0xA6FA	42746	2	64th LOG - TIME	R	byte order/meaning: EMPTY, HOUR, MINUTE, SECOND
0xA6FC	42748	2	64th LOG - DATA	R	byte order/meaning: DAY, MONYH, YEAR, YEAR
0xA6FE	42750	2	64th LOG – EVENT TYPE	R	0: switch off 1: switch on

Note: time and date is 0 if the log it is not present

Alarms - Log

Register HEX	Register DEC	Word	Description	R/W	Type
0xA700	42752	2	1st LOG - TIME	R	byte order/meaning: EMPTY, HOUR, MINUTE, SECOND
0xA702	42754	2	1st LOG - MILLISECONDS	R	
0xA704	42756	2	1st LOG - DATA	R	byte order/meaning: DAY, MONYH, YEAR, YEAR
0xA706	42758	2	1st LOG – EVENT TYPE	R	0: firstout alarm 2: alarm recovery 4: reset 1: alarm entry 3: alarm acknowledge
0xA708	42760	2	1st LOG – INPUT	R	Input that produced the alarm.
0xA70A	42762	2	1st LOG - GROUP	R	Group of alarm. 0: group 1 … 15: group 15
0xA70C	42764	2	2nd LOG - TIME	R	byte order/meaning: EMPTY, HOUR, MINUTE, SECOND
0xA70E	42766	2	2nd LOG - DATA	R	byte order/meaning: DAY, MONYH, YEAR, YEAR
0xA710	42768	2	2nd LOG - INPUT	R	Input that produced the alarm.
0xA712	42770	2	2nd LOG – EVENT TYPE	R	0: firstout alarm 2: alarm recovery 4: reset 1: alarm entry 3: alarm acknowledge
0xA714	42772	---	2nd LOG - GROUP	R	Group of alarm. 0: group 1 … 15: group 15
---	---	---	---	---	---
---	---	---	---	---	---
---	---	---	---	---	---
0xA7F4	42996	2	10th LOG - TIME	R	byte order/meaning: EMPTY, HOUR, MINUTE, SECOND
0xA7F6	42998	2	10th LOG - MILLISECONDS	R	
0xA7F8	43000	2	10th LOG - DATA	R	byte order/meaning: DAY, MONYH, YEAR, YEAR
0xBEFA	43002	2	10th LOG – INPUT	R	0: firstout alarm 2: alarm recovery 4: reset 1: alarm entry 3: alarm acknowledge
0xA7FC	43004	2	10th LOG – EVENT TYPE	R	Input that produced the alarm.
0xA7FE	43006	2	10th LOG – GROUP	R	Group of alarm. 0: group 1 … 15: group 15

Note: time and date is 0 if the log it is not present
Warning: every read automatic increase the index to 10 logs

Alarms – Log Index

Register HEX	Register DEC	Word	Description	R/W	Parameters
0xA800	43008	2	LOG ALARM INDEX	R/W	0 – 999

Password setup

Warning: Must be send the entire parameter length (2 words or 1 word – see the long of each parameter) for a correct command setting.

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

Register HEX	Register DEC	Word	Description	R/W	Parameters
0xBF00	48896	2	ACCESS KEY VALUE	W	0 ÷ 999'999'999 *[Default 0: Password disabled]*
0xBF02	48898	2	ACCESS KEY VALID PERIOD	R/W	1 ÷ 60 min *[Default: 5 min]*
0xBF04	48900	2	KEYS PROTECTION	R/W	0: Not protected *[Default]* 1: Protected by password
0xBF06	48902	2	COMMUNICATION PROTECTION	R/W	0: Not protected *[Default]* 1: Protected by password (write command only).
0xBF08	48904	2	ENABLE OPTIONS	R/W	0 ÷ 999'999'999

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

Reset

Warning: Must be send the entire parameter length (2 words or 1 word – see the long of each parameter) for a correct command setting.

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

Register HEX	Register DEC	Word	Description	R/W	Parameters
0xBF20	48928	2	RESET	W	00000001h: Reset to Default 00000002h: Reset Setup 00000004h: Reset Logs 00000008h: Reset Texts

Date & Time

Warning: Must be send the entire parameter length (2 words or 1 word – see the long of each parameter) for a correct command setting.

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

Register HEX	Register DEC	Word	Description	R/W	Parameters
0xBF40	48960	2	HOUR	R/W	00 to 23 hours (00=Midnight)
0xBF42	48962	2	MINUTE	R/W	00 to 59 minutes
0xBF44	48964	2	SECOND	R/W	00 to 59 seconds
0xBF46	48966	2	DAY OF WEEK	R/W	0001h = Monday 0004h = Thursday 0007h = Sunday 0002h = Tuesday 0005h = Friday 0003h = Wednesday 0006h = Saturday
0xBF48	48968	2	DAY	R/W	01 to 31 day-of-month
0xBF4A	48970	2	MONTH	R/W	01 to 12 month
0xBF4C	48972	2	YEAR	R/W	2000 to 2099 year
0xBF4E	48974	2	SYNCHRONIZE CLOCK	W	00000000h: only valid parameter (set to 00 second)

Reply key functionality

Warning: Must be send the entire parameter length (2 words or 1 word – see the long of each parameter) for a correct command setting.

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

Register HEX	Register DEC	Word	Description	R/W	Parameters
0xBF60	48992	2	SILENCE	W	Write 1 to reply SILENCE key functionality (see product manual)
0xBF62	48994	2	ACKNOWLEDGE	W	Write 1 to reply ACK key functionality (see product manual)
0xBF64	48996	2	RESET	W	Write 1 to reply RESET key functionality (see product manual)

Display setup

Warning: Must be send the entire parameter length (2 words or 1 word – see the long of each parameter) for a correct command setting.

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

Register HEX	Register DEC	Word	Description	R/W	Parameters
0xBF80	49024	2	BRIGHTNESS	R/W	01 to 15 *[Default: 15 = MAX]*
0xBF82	49026	2	*RESERVED – NOT USED*	-	-
0xBF84	49028	2	*RESERVED – NOT USED*	-	-
0xBF86	49030	2	*RESERVED – NOT USED*	-	-
0xBF88	49032	2	*RESERVED – NOT USED*	-	-
0xBF8A	49034	2	FRONTAL LEDS	R/W	0: No 1: Yes *[default]*

COM (option)

COM 1 setup (option)

Register HEX	Register DEC	Word	Description	R/W	Parameters
C000	49152	2	OPERATION MODE *	R/W	0000h: Slave mode *[Default]* 0001h: Master Compalarm mode 0002h: Master IO mode
C002	49154	2	SLAVE CONNECTED (used only in Master Mode)	R/W	0000h ÷ 000Fh (000 ÷ 015 dec) *[Default: 0]* **Note**: valid only in Master mode.
C004	49156	2	MASTER TIMEOUT (used only in Master Mode)	R/W	0 ÷ 10000 ms *[Default: 800]*
C006	49158	2	MASTER SCAN RATE (used only in Master Mode)	R/W	0 ÷ 10000 ms *[Default: 1000]* Delay between two master request (master mode). **Note**: this value must be greater than MASTER TIMEOUT.
C008	49160	2	NODE ID*	R/W	0001h ÷ 00F7h (001 ÷ 247 dec) *[Default: 1]* **Note**: valid only in Slave Mode.
C00A	49162	2	BAUD RATE*	R/W	0000h:4800Baud 0001h:9600Baud 0002h:19200Baud 0003h:38400Baud *[Default]* 0004h:57600Baud 0005h:115200Baud
C00C	49164	2	STOP BITS*	R/W	0000h: 1 Stop Bit *[Default]* 0001h: 2 Stop Bits
C00E	49166	2	PARITY*	R/W	0000h: None *[Default]* 0001h: Parity Odd 0002h: Parity Even
C010	49168	2	MINIMUM RESPONSE DELAY	R/W	5 ÷ 100 ms *[Default: 10]* **Note**: valid only in Slave Mode.

* The Serial setting will be changed after the command response.

COM 2 setup (option)

Register HEX	Register DEC	Word	Description	R/W	Parameters
C300	49920	2	OPERATION MODE *	R/W	0000h: Slave mode *[Default]* 0001h: Master Compalarm mode 0002h: Master IO mode
C302	49922	2	SLAVE CONNECTED (used only in Master Mode)	R/W	0000h ÷ 000Fh (000 ÷ 015 dec) *[Default: 0]* **Note**: valid only in Master mode.
C304	49924	2	MASTER TIMEOUT (used only in Master Mode)	R/W	0 ÷ 10000 ms *[Default: 800]*
C306	49926	2	MASTER SCAN RATE (used only in Master Mode)	R/W	0 ÷ 10000 ms *[Default: 1000]* Delay between two master request (master mode). **Note**: this value must be greater than MASTER TIMEOUT.
C308	49928	2	NODE ID*	R/W	0001h ÷ 00F7h (001 ÷ 247 dec) *[Default: 1]* **Note**: valid only in Slave Mode.
C30A	49930	2	BAUD RATE*	R/W	0000h:4800Baud 0001h:9600Baud 0002h:19200Baud 0003h:38400Baud *[Default]* 0004h:57600Baud 0005h:115200Baud
C30C	49932	2	STOP BITS*	R/W	0000h: 1 Stop Bit *[Default]* 0001h: 2 Stop Bits
C30E	49934	2	PARITY*	R/W	0000h: None *[Default]* 0001h: Parity Odd 0002h: Parity Even
C310	49936	2	MINIMUM RESPONSE DELAY	R/W	5 ÷ 100 ms *[Default: 10]* **Note**: valid only in Slave Mode.