



# MODBUS Protocol

## for CS121

### network card family

## Summary

<b>1. MODBUS PROTOCOL .....</b>	<b>2</b>
1.1. AVAILABLE MODBUS FUNCTION CODES.....	2
1.2. EXCEPTION CODES .....	3
<b>2. AVAILABLE MODBUS MODES ( ASCII / RTU ).....</b>	<b>4</b>
2.1. MODBUS COMMANDS .....	4
2.1.1. <i>Read Words (Functions 03h and 04h)</i> .....	4
2.1.2. <i>Write One Word (Function 06h)</i> .....	5
2.1.3. <i>Write Words (Function 10h)</i> .....	6
<b>3. MODBUS TABLES .....</b>	<b>8</b>
3.1. NIKY, NIKY S, KEOR LINE RT.....	8
3.2. DAKER DK, KEOR LP, KEOR S.....	10
3.3. DHEA, WHAD 800/2500, MEGALINE .....	12
3.4. WHAD 3000/6000, TRIMOD, TRIMOD HE, ARCHIMOD, ARCHIMOD HE .....	14
3.4.1. <i>CS121 firmware version before 5.30.x</i> .....	14
3.4.2. <i>CS121 firmware version from 5.30.x</i> .....	16
3.5. KEOR T .....	18
3.6. KEOR HP .....	20
3.7. KEOR HPE .....	22
3.8. STATUS BYTES TABLE ( SEE REGISTRY 109 OF ALL PREVIOUS TABLES ) .....	24
<b>4. APPENDIX.....</b>	<b>25</b>
4.1. RS485 CONNECTOR FOR CS121M AND CS121M SK.....	25
4.2. BUS TERMINATION .....	25

# 1. MODBUS protocol

For remote control and monitoring of devices, the MODBUS interface in each CS121 can read out measurement values, events, status and other information in a master-slave protocol.

## 1.1. Available Modbus Function Codes

Implemented MODBUS functions in the CS121 units:

Code	Original Modbus Function
03H	read n output words (read / write words)
04H	read n input words (read only words)
06H	write one output word
10H	write n output words

The CS121 makes no difference between output- and input-bits or words, that means there is no difference between function 03H and 04H. The baudrate is adjustable from 1200 up to 38400 Baud.

**ASCII Mode** works with communication parameters 7/E/2, or 7/E/1 or with 7/N/2. We recommend for ASCII the use of 7/N/2. ASCII mode is not available on MODBUS over TCP/IP.

**RTU Mode** works with communication parameters 8/E/1 or 8/N/2 or 8/N/1 or 8/E/2 or 8/O/2 or with 8/O/1. We recommend for RTU the use of 8/E/1.

## 1.2. Exception Codes

Except for broadcast messages, when a master device sends a query to a slave device it expects a normal response. One of four possible events can occur from the master's query:

If the slave device receives the query without a communication error, and can handle the query normally, it returns a normal response.

If the slave does not receive the query due to a communication error, no response is returned. The master program will eventually process a timeout condition for the query.

If the slave receives the query, but detects a communication error parity, LRC, or CRC, no response is returned. The master program will eventually process a timeout condition for the query.

If the slave receives the query without a communication error, but cannot handle it (for example, if the request is to read a non-existent register the slave will return an exception response informing the master of the nature of the error.

### Available Exception codes:

Code	Meaning
02H	<b>Illegal data Address:</b> The data address received in the query is not an allowable address for the slave.
03H	<b>Illegal data value:</b> A value contained in the query is not an allowable value for the slave.
06H	<b>Slave device busy:</b> The slave is processing a long-duration program command. The master should retransmit the message later when the slave is free.

## 2. Available MODBUS modes ( ASCII / RTU )

### 2.1. Modbus commands

The following tables contain the general command descriptions and examples with ASCII and RTU framing.

ASCII mode is not available on MODBUS over TCP/IP.

#### 2.1.1. Read Words (Functions 03h and 04h)

For the CS121 there is no difference between these two functions.

Query:

slave number	function code	address of first word to read		word count		checksum, LRC or CRC
1 byte	1 byte	high byte	Low byte	high byte	low byte	1 or 2 byte(s)

Answer:

slave number	function code	Byte count	high byte of first word	low byte of first word	bytes with contents of n words	Checksum LRC or CRC
1 byte	1 byte	1 byte	1 byte	1 byte	n * 2 bytes	1 or 2 byte(s)

#### Example: Read Words, Function 04h, ASCII Mode

Read one word at address 63h (= 99 decimal):

Query:

Byte	1	2, 3	4, 5	6, 7	8, 9	10, 11	12, 13	14, 15	16	17
<b>Meaning</b>	leading colon	Slave number	function code	address of first word to read		word count to read		LRC	Carriage return	line feed LF
				high byte	low byte	high byte	low byte			
<b>ASCII</b>	:	0 1	0 4	0 0	6 3	0 0	0 1	9 7	<CR>	<LF>
<b>HEX</b>	[3A]	[30][31]	[30][34]	[30][30]	[36][33]	[30][30]	[30][31]	[39][37]	[0D]	[0A]

**ASCII:** Data, which will send over the link as ASCII characters.

**HEX:** Hexadecimal values of the data

Answer:

Byte	1	2, 3	4, 5	6, 7	8, 9	10, 11	12, 13	14	15
<b>Meaning</b>	leading colon	Slave number	function code	byte count	contents of the word		LRC	carriage return	line feed LF
					high byte	low byte			
<b>ASCII</b>	:	0 1	0 4	0 2	1 2	3 4	B 3	<CR>	<LF>
<b>HEX</b>	[3A]	[30][31]	[30][34]	[30][32]	[31][32]	[33][34]	[42][33]	[0D]	[0A]

→ The word at address contains the value 1234h = 4660 decimal.

**Example: Read Words, Function 04h, RTU Mode**

Read one word at address 63h (= 99 decimal):

Query:

Byte		1	2	3	4	5	6	7	8	
<b>Meaning</b>	silent interval >= 3.5 characters	Slave number	function code	address of first word to read high byte   low byte		word count to read high byte   low byte		CRC low byte   High byte		silent interval >= 3.5 characters
<b>RTU HEX</b>		[01]	[04]	[00]	[63]	[00]	[01]	[C1]	[D4]	

Answer:

Byte		1	2	3	4	5	6	7	
<b>Meaning</b>	silent interval >= 3.5 characters	Slave number	function code	byte count	Contents of the word high byte   low byte		CRC low byte   high byte		Silent interval >= 3.5 characters
<b>RTU HEX</b>		[01]	[04]	[02]	[12]	[34]	[B4]	[47]	

→ The word at address contains the value 1234h = 4660 decimal.

**2.1.2. Write One Word (Function 06h)**

Query:

slave number	function code	address of word to write		word value		checksum, LRC or CRC
1 byte	1 byte	high byte	low byte	high byte	low byte	1 or 2 byte(s)

Answer:

slave number	function code	address of word to write		word value		checksum, LRC or CRC
1 byte	1 byte	high byte	low byte	high byte	low byte	1 or 2 byte(s)

**Example: Write One Word, Function 06h, ASCII Mode**

Write one word at address 3Dh (= 61 decimal) with value 10E1h (= 1234 decimal).

Query:

Byte	1	2, 3	4, 5	6, 7	8, 9	10, 11	12, 13	14, 15	16	17
<b>Meaning</b>	leading colon	Slave number	function code	address of word to write high byte   low byte		word value high byte   low byte		LRC	carriage return	Line feed LF
<b>ASCII</b>	:	0 1	0 6	0 0	3 D	1 0	E 1	C B	<CR>	<LF>
<b>HEX</b>	[3A]	[30][31]	[30][36]	[30][30]	[33][44]	[31][30]	[45][31]	[43][42]	[0D]	[0A]

Answer:

Byte	1	2, 3	4, 5	6, 7	8, 9	10, 11	12, 13	14, 15	16	17
<b>Meaning</b>	leading colon	Slave number	function code	address of word to write high byte   low byte		word value high byte   low byte		LRC	carriage return	Line feed LF
<b>ASCII</b>	:	0 1	0 6	0 0	3 D	1 0	E 1	C B	<CR>	<LF>
<b>HEX</b>	[3A]	[30][31]	[30][36]	[30][30]	[33][44]	[31][30]	[45][31]	[43][42]	[0D]	[0A]

### Example: Write One Word, Function 06h, RTU Mode

Write one word at address 3Dh (= 61 decimal) with value 10E1h (= 1234 decimal).

Query:

Byte		1	2	3	4	5	6	7	8	
<b>Meaning</b>	silent interval >= 3.5 characters	Slave number	function code	address of word to write high byte   low byte		word value high byte   low byte		CRC low byte   high byte		silent interval >= 3.5 characters
<b>RTU HEX</b>		[01]	[06]	[00]	[3D]	[10]	[E1]	[D5]	[8E]	

Answer:

Byte		1	2	3	4	5	6	7	8	
<b>Meaning</b>	silent interval >= 3.5 characters	Slave number	function code	address of word to write high byte   low byte		word value high byte   low byte		CRC low byte   high byte		Silent interval >= 3.5 characters
<b>RTU HEX</b>		[01]	[06]	[00]	[3D]	[10]	[E1]	[D5]	[8E]	

### 2.1.3. Write Words (Function 10h)

Query:

slave number	function code	Address of first word to write		Number of words to write		number of data bytes	high byte for first word	low data byte for first word	data bytes	checksum LRC or CRC
1 byte	1 byte	High byte	low byte	high byte	low byte	1 byte	1 byte	1 byte	n bytes	1 or 2 byte(s)

Answer:

slave number	function code	address of first word to write		number of words to write		checksum, LRC or CRC	
1 byte	1 byte	high byte	low byte	high byte	low byte	1 or 2 byte(s)	

### Example: Write Words, Function 10h, ASCII Mode

Write three words at address 41h..43h (= 65..67 decimal) with the values 10E1h (= 1234 decimal), 1357h (= 4951 decimal) and ABCDh (= 43981 decimal).

Query:

Byte	1	2, 3	4, 5	6, 7	8, 9	10, 11	12, 13	14, 15
<b>Meaning</b>	leading colon	Slave number	function code	address of first word to write high byte   low byte		number of words to write high byte   low byte		number of data bytes
<b>ASCII</b>	:	0 1	1 0	0 0	4 1	0 0	0 3	0 6
<b>HEX</b>	[3A]	[30][31]	[31][30]	[30][30]	[34][31]	[30][30]	[30][33]	[30][36]

16, 17	18, 19	20, 21	22, 23	24, 25	26, 27	28, 29	30	31
Word value for first word high byte   low byte		word value for second word high byte   low byte		word value for third word high byte   low byte		LRC	carriage return	line feed LF
1 0	E 1	1 3	5 7	A B	C D	D 2	<CR>	<LF>
[31][30]	[45][31]	[31][33]	[35][37]	[41][42]	[43][44]	[44][32]	[0D]	[0A]

Answer:

Byte	1	2, 3	4, 5	6, 7	8, 9	10, 11	12, 13	14, 15	14, 15	17
Meaning	leading colon	Slave number	function code	address of first word to write high byte   low byte		number of words to write high byte   low byte		LRC	carriage return	line feed LF
ASCII	:	0 1	1 0	0 0	4 1	0 0	0 3	A B	<CR>	<LF>
HEX	[3A]	[30][31]	[31][30]	[30][30]	[34][31]	[30][30]	[30][33]	[41][42]	[0D]	[0A]

**Example: Write Words, Function 10h, RTU Mode**

Write three words at address 41h..43h (= 65..67 decimal) with the values 10E1h (= 1234 decimal), 1357h (= 4951 decimal) and ABCDh (= 43981 decimal).

Query:

Byte		1	2	3	4	5	6	7	
Meaning	silent interval >= 3.5 characters	Slave number	function code	address of first word to write high byte   low byte		number of words to write high byte   low byte		number of data bytes	
RTU HEX		[01]	[10]	[00]	[41]	[00]	[03]	[06]	

	8	9	10	11	12	13	14	15	
	word value for first word High byte   low byte		word value for second word high byte   low byte		word value for third word high byte   low byte		CRC low byte   high byte		silent interval >= 3.5 characters
	[10]	[E1]	[13]	[57]	[AB]	[CD]	[00]	[E6]	

Answer:

Byte		1	2	3	4	5	6	7	8	
Meaning	silent interval >= 3.5 characters	Slave number	function code	address of first word to write high byte   low byte		number of words to write high byte   low byte		CRC low byte   high byte		silent interval >= 3.5 characters
RTU HEX		[01]	[10]	[00]	[41]	[00]	[03]	[D0]	[1C]	

### 3. MODBUS tables

Note: "Type U/S": this defines whether the answer has an algebraic sign (math. +/-) or not:

**U** means "unsigned".

**S** means "signed", so this answer may be positive or negative.

#### 3.1. Niky, Niky S, Keor Line RT

Address	Type	Function	Description	Length	Notes
97	U	3 / 4	Output Voltage [V]	1	(1)
100	U	3 / 4	Output Power [%]	1	
103	U	3 / 4	Battery Charge Level [%]	1	
104	S	3 / 4	Input Voltage [V]	1	
107	S	3 / 4	Temperature [C°]	1	
108	S	3 / 4	Autonomy Time [minutes]	1	
109	U	3 / 4	UPS Status (ASCII HEX) Please check "Status Bytes table" below	1	
110	S	3 / 4	Battery Voltage [V]	1	
111	U	3 / 4	Input Frequency [Hz]	1	
114	U	3 / 4	Powerfail Counter	1	
116	U	3 / 4	Alarm: On Battery 1 = active; 0 = not active	1	
117	U	3 / 4	Alarm: Battery Low 1 = active; 0 = not active	1	
119	U	3 / 4	Alarm: Over Temperature 1 = active; 0 = not active	1	
122	U	3 / 4	Alarm: Output Overload 1 = active; 0 = not active	1	
132	U	3 / 4	Alarm: General Fault 1 = active; 0 = not active	1	
134	U	3 / 4	Alarm: UPS communication lost 1 = active; 0 = not active	1	
138	U	3 / 4	Alarm: Test in progress 1 = active; 0 = not active	1	
139	U	3 / 4	AUX Port 1 1 = active (high); 0 = not active (low)	1	(2)
140	U	3 / 4	AUX Port 2 1 = active (high); 0 = not active (low)	1	(2)
141	U	3 / 4	AUX Port 3 1 = active (high); 0 = not active (low)	1	(2)
142	U	3 / 4	AUX Port 4 1 = active (high); 0 = not active (low)	1	(2)
143	U	3 / 4	Sensormanager / SM_T_COM sensor 1 Analog value	1	(3)
144	U	3 / 4	Sensormanager / SM_T_COM sensor 2 Analog value	1	(3)
145	U	3 / 4	Sensormanager sensor 3 Analog value	1	(3)



146	U	3 / 4	Sensormanager sensor 4 Analog value	1	(3)
147	U	3 / 4	Sensormanager sensor 5 Analog value	1	(3)
148	U	3 / 4	Sensormanager sensor 6 Analog value	1	(3)
149	U	3 / 4	Sensormanager sensor 7 Analog value	1	(3)
150	U	3 / 4	Sensormanager sensor 8 Analog value	1	(3)
151	U	3 / 4	Output voltage [V]	1	(4)

- (1) available only for CS121 firmware version from 5.20.x
- (2) not available in CS121B, CS121B SK
- (3) available only in CS121, CS121 SK
- (4) available only for CS121 firmware version before 5.20.x

### 3.2. Daker DK, Keor LP, Keor S

Address	Type	Function	Description	Length	Note
97	U	3 / 4	Output Voltage [V]	1	(1)
100	U	3 / 4	Output Power [%]	1	
103	U	3 / 4	Battery Charge Level [%]	1	
104	S	3 / 4	Input Voltage phase L1 [V]	1	
105	S	3 / 4	Input Voltage phase L2 [V]	1	(2)
106	S	3 / 4	Input Voltage phase L3 [V]	1	(2)
107	S	3 / 4	Temperature [C°]	1	
108	S	3 / 4	Autonomy Time [minutes]	1	
109	U	3 / 4	UPS Status (ASCII HEX) Please check "Status Bytes table" below	1	
110	S	3 / 4	Battery Voltage [V]	1	
111	U	3 / 4	Input Frequency phase L1 [Hz]	1	
112	U	3 / 4	Input Frequency phase L2 [Hz]	1	(2)
113	U	3 / 4	Input Frequency phase L3 [Hz]	1	(2)
114	U	3 / 4	Powerfail Counter	1	
116	U	3 / 4	Alarm: On Battery 1 = active; 0 = not active	1	
117	U	3 / 4	Alarm: Battery Low 1 = active; 0 = not active	1	
119	U	3 / 4	Alarm: Over Temperature 1 = active; 0 = not active	1	
122	U	3 / 4	Alarm: Output Overload 1 = active; 0 = not active	1	
123	U	3 / 4	Alarm: On Bypass 1 = active; 0 = not active	1	
132	U	3 / 4	Alarm: General Fault 1 = active; 0 = not active	1	
134	U	3 / 4	Alarm: UPS communication lost 1 = active; 0 = not active	1	
138	U	3 / 4	Alarm: Test in progress 1 = active; 0 = not active	1	
139	U	3 / 4	AUX Port 1 1 = active (high); 0 = not active (low)	1	(3)
140	U	3 / 4	AUX Port 2 1 = active (high); 0 = not active (low)	1	(3)
141	U	3 / 4	AUX Port 3 1 = active (high); 0 = not active (low)	1	(3)
142	U	3 / 4	AUX Port 4 1 = active (high); 0 = not active (low)	1	(3)
143	U	3 / 4	Sensormanager / SM_T_COM sensor 1 Analog value	1	(4)
144	U	3 / 4	Sensormanager / SM_T_COM sensor 2 Analog value	1	(4)
145	U	3 / 4	Sensormanager sensor 3 Analog value	1	(4)
146	U	3 / 4	Sensormanager sensor 4 Analog value	1	(4)

147	U	3 / 4	Sensormanager sensor 5 Analog value	1	(4)
148	U	3 / 4	Sensormanager sensor 6 Analog value	1	(4)
149	U	3 / 4	Sensormanager sensor 7 Analog value	1	(4)
150	U	3 / 4	Sensormanager sensor 8 Analog value	1	(4)
151	U	3 / 4	Output voltage [V]	1	(5)

- (1) available only for CS121 firmware version from 5.20.x
- (2) available only for three-phase UPS
- (3) not available in CS121B, CS121B SK
- (4) available only in CS121, CS121 SK
- (5) available only for CS121 firmware version before 5.20.x

### 3.3. Dhea, Whad 800/2500, Megaline

Address	Type	Function	Name	Length	Notes
97	U	3 / 4	Output Voltage [V]	1	(1)
100	U	3 / 4	Output Power [%]	1	
103	U	3 / 4	Battery Charge Level [%]	1	
104	S	3 / 4	Input Voltage [V]	1	
107	S	3 / 4	Temperature [C°]	1	
108	S	3 / 4	Autonomy Time [minutes]	1	
109	U	3 / 4	UPS Status (ASCII HEX) Please check "Status Bytes table" below	1	
110	S	3 / 4	Battery Voltage [V]	1	
114	U	3 / 4	Powerfail Counter	1	
116	U	3 / 4	Alarm: On Battery 1 = active; 0 = not active	1	
117	U	3 / 4	Alarm: Battery Low 1 = active; 0 = not active	1	
119	U	3 / 4	Alarm: Over Temperature 1 = active; 0 = not active	1	
122	U	3 / 4	Alarm: Output Overload 1 = active; 0 = not active	1	
123	U	3 / 4	Alarm: On Bypass 1 = active; 0 = not active	1	
127	U	3 / 4	Alarm: Charger failed 1 = active; 0 = not active	1	
132	U	3 / 4	Alarm: General Fault 1 = active; 0 = not active	1	
134	U	3 / 4	Alarm: UPS communication lost 1 = active; 0 = not active	1	
138	U	3 / 4	Alarm: test in progress 1 = active; 0 = not active	1	
139	U	3 / 4	AUX Port 1 1 = active (high); 0 = not active (low)	1	(2)
140	U	3 / 4	AUX Port 2 1 = active (high); 0 = not active (low)	1	(2)
141	U	3 / 4	AUX Port 3 1 = active (high); 0 = not active (low)	1	(2)
142	U	3 / 4	AUX Port 4 1 = active (high); 0 = not active (low)	1	(2)
143	U	3 / 4	Sensormanager / SM_T_COM sensor 1 Analog value	1	(3)
144	U	3 / 4	Sensormanager / SM_T_COM sensor 2 Analog value	1	(3)
145	U	3 / 4	Sensormanager sensor 3 Analog value	1	(3)
146	U	3 / 4	Sensormanager sensor 4 Analog value	1	(3)
147	U	3 / 4	Sensormanager sensor 5 Analog value	1	(3)
148	U	3 / 4	Sensormanager sensor 6 Analog value	1	(3)

149	U	3 / 4	Sensormanager sensor 7 Analog value	1	(3)
150	U	3 / 4	Sensormanager sensor 8 Analog value	1	(3)

- (1) available only for CS121 firmware version from 5.20.x
- (2) not available in CS121B, CS121B SK
- (3) available only in CS121, CS121 SK

### 3.4. Whad 3000/6000, Trimod, Trimod HE, Archimod, Archimod HE

#### 3.4.1. CS121 firmware version before 5.30.x

Address	Type	Function	Name	Length	Notes
97	U	3 / 4	Output Voltage phase L1 [V]	1	(1)
98	U	3 / 4	Output Voltage phase L2 [V]	1	(1) (2)
99	U	3 / 4	Output Voltage phase L2 [V]	1	(1) (2)
100	U	3 / 4	Output Power phase L1 [%]	1	
101	U	3 / 4	Output Power phase L2 [%]	1	(2)
102	U	3 / 4	Output Power phase L3 [%]	1	(2)
103	U	3 / 4	Battery Charge Level [%]	1	
104	S	3 / 4	Input Voltage phase L1 [V]	1	
105	S	3 / 4	Input Voltage phase L2 [V]	1	(2)
106	S	3 / 4	Input Voltage phase L3 [V]	1	(2)
107	S	3 / 4	Temperature [C°]	1	
108	S	3 / 4	Autonomy Time [minutes]	1	
109	U	3 / 4	UPS Status (ASCII HEX) Please check "Status Bytes table" below	1	
110	S	3 / 4	Battery Voltage [V]	1	
114	U	3 / 4	Powerfail Counter	1	
116	U	3 / 4	Alarm: On Battery 1 = active; 0 = not active	1	
134	U	3 / 4	Alarm: UPS communication lost 1 = active; 0 = not active	1	
138	U	3 / 4	Alarm: Test in progress 1 = active; 0 = not active	1	
139	U	3 / 4	AUX Port 1 1 = active (high); 0 = not active (low)	1	(3)
140	U	3 / 4	AUX Port 2 1 = active (high); 0 = not active (low)	1	(3)
141	U	3 / 4	AUX Port 3 1 = active (high); 0 = not active (low)	1	(3)
142	U	3 / 4	AUX Port 4 1 = active (high); 0 = not active (low)	1	(3)
143	U	3 / 4	Sensormanager / SM_T_COM sensor 1 Analog value	1	(4)
144	U	3 / 4	Sensormanager / SM_T_COM sensor 2 Analog value	1	(4)
145	U	3 / 4	Sensormanager sensor 3 Analog value	1	(4)
146	U	3 / 4	Sensormanager sensor 4 Analog value	1	(4)
147	U	3 / 4	Sensormanager sensor 5 Analog value	1	(4)
148	U	3 / 4	Sensormanager sensor 6 Analog value	1	(4)
149	U	3 / 4	Sensormanager sensor 7 Analog value	1	(4)
150	U	3 / 4	Sensormanager sensor 8 Analog value	1	(4)

- (1) available only for CS121 firmware version from 5.20.x
- (2) available only in three-phase UPS
- (3) not available in CS121B, CS121B SK
- (4) available only in CS121, CS121 SK

### 3.4.2. CS121 firmware version from 5.30.x

Address	Type	Function	Description	Length	Notes
99	U	16 (10H)	Time synchronization signal When this signal is set, the CS121 sets the internal clock to 01:00 of the same day. Write only: commands 3 and 4 are not allowed.	1	
100	U	3 / 4	Output Power phase L1 [%]	1	
101	U	3 / 4	Output Power phase L2 [%]	1	(1)
102	U	3 / 4	Output Power phase L3 [%]	1	(1)
103	U	3 / 4	Battery Charge Level [%]	1	
104	S	3 / 4	Input Voltage phase L1 [V]	1	
105	S	3 / 4	Input Voltage phase L2 [V]	1	(1)
106	S	3 / 4	Input Voltage phase L3 [V]	1	(1)
107	S	3 / 4	UPS Temperature [C°]	1	
108	S	3 / 4	Autonomy Time [minutes]	1	
109	U	3 / 4	UPS Status (ASCII HEX) Please check "Status Bytes table" below	1	
110	S	3 / 4	Battery Voltage [V]	1	
111	U	3 / 4	Input Frequency phase L1 [Hz]	1	
112	U	3 / 4	Input Frequency phase L2 [Hz]	1	(1)
113	U	3 / 4	Input Frequency phase L3 [Hz]	1	(1)
114	U	3 / 4	Powerfail Counter	1	
115	U	3 / 4	Alarm Battery Bad 1 = active; 0 = not active)	1	
116	U	3 / 4	Alarm: On Battery 1 = active; 0 = not active	1	
117	U	3 / 4	Alarm: Battery Low 1 = active; 0 = not active	1	
119	U	3 / 4	Alarm: Over temperature 1 = active; 0 = not active	1	
120	U	3 / 4	Alarm: Input Bad 1 = active; 0 = not active	1	
121	U	3 / 4	Alarm: Output Bad 1 = active; 0 = not active	1	(2)
122	U	3 / 4	Alarm: Output Overload 1 = active; 0 = not active	1	
123	U	3 / 4	Alarm: On Bypass 1 = active; 0 = not active	1	
124	U	3 / 4	Alarm: Bypass Bad 1 = active; 0 = not active	1	
125	U	3 / 4	Alarm: Output Off as requested 1 = active; 0 = not active	1	
126	U	3 / 4	Alarm: UPS Off as requested 1 = active; 0 = not active	1	
127	U	3 / 4	Alarm: Charger Failed 1 = active; 0 = not active	1	
128	U	3 / 4	Alarm: UPS Output Off 1 = active; 0 = not active	1	
129	U	3 / 4	Alarm: UPS System Off 1 = active; 0 = not active	1	



132	U	3 / 4	Alarm: General fault 1 = active; 0 = not active	1	
133	U	3 / 4	Alarm: Diagnose test failed 1 = active; 0 = not active	1	
134	U	3 / 4	Alarm: UPS Communication lost 1 = active; 0 = not active	1	
136	U	3 / 4	Alarm: Shutdown pending 1 = active; 0 = not active	1	
137	U	3 / 4	Alarm: shutdown imminent 1 = active; 0 = not active	1	
138	U	3 / 4	Alarm: Test in progress 1 = active; 0 = not active	1	
139	U	3 / 4	Alarm: Manual Bypass Switch Closed 1 = active; 0 = not active	1	
140	U	3 / 4	Output Voltage phase L1 [V]	1	
141	U	3 / 4	Output Voltage phase L2 [V]	1	(1)
142	U	3 / 4	Output Voltage phase L3 [V]	1	(1)
143	U	3 / 4	Output Current phase L1 [A*10]	1	
144	U	3 / 4	Output Current phase L2 [A*10]	1	(1)
145	U	3 / 4	Output Current phase L3 [A*10]	1	(1)
152	U	3 / 4	Sensormanager / SM_T_COM sensor 1 Analog value	1	(3)
153	U	3 / 4	Sensormanager / SM_T_COM sensor 2 Analog value	1	(3)
154	U	3 / 4	Sensormanager sensor 3 Analog value	1	(3)
155	U	3 / 4	Sensormanager sensor 4 Analog value	1	(3)
156	U	3 / 4	Sensormanager sensor 5 Analog value	1	(3)
157	U	3 / 4	Sensormanager sensor 6 Analog value	1	(3)
158	U	3 / 4	Sensormanager sensor 7 Analog value	1	(3)
159	U	3 / 4	Sensormanager sensor 8 Analog value	1	(3)
160	U	3 / 4	Output Power phase L1 [kW]	1	
161	U	3 / 4	Output Power phase L2 [kW]	1	(1)
162	U	3 / 4	Output Power phase L3 [kW]	1	(1)
163	U	3 / 4	AUX Port 1 1 = active (high); 0 = not active (low)	1	(4)
164	U	3 / 4	AUX Port 2 1 = active (high); 0 = not active (low)	1	(4)
165	U	3 / 4	AUX Port 3 1 = active (high); 0 = not active (low)	1	(4)
166	U	3 / 4	AUX Port 4 1 = active (high); 0 = not active (low)	1	(4)

- (1) available only in three-phase UPSs  
(2) available only in Trimod HE, Archimod HE  
(3) available only in CS121, CS121 SK  
(4) not available in CS121B, CS121B SK

### 3.5. Keor T

Address	Type	Function	Name	Length	Notes
100	U	3 / 4	Output Power phase L1 [%]	1	
101	U	3 / 4	Output Power phase L2 [%]	1	
102	U	3 / 4	Output Power phase L3 [%]	1	
103	U	3 / 4	Battery Charge Level [%]	1	
104	S	3 / 4	Input Voltage phase L1 [V]	1	
105	S	3 / 4	Input Voltage phase L2 [V]	1	
106	S	3 / 4	Input Voltage phase L3 [V]	1	
107	S	3 / 4	Temperature [C°]	1	
108	S	3 / 4	Autonomy Time [minutes]	1	
109	U	3 / 4	UPS Status (ASCII HEX) Please check "Status Bytes table" below	1	
110	S	3 / 4	Battery Voltage [V]	1	
111	U	3 / 4	Input Frequency phase L1 [Hz]	1	
112	U	3 / 4	Input Frequency phase L2 [Hz]	1	
113	U	3 / 4	Input Frequency phase L3 [Hz]	1	
114	U	3 / 4	Powerfail Counter	1	
115	U	3 / 4	Alarm Battery Bad 1 = active; 0 = not active)	1	
116	U	3 / 4	Alarm: On Battery 1 = active; 0 = not active	1	
117	U	3 / 4	Alarm: Battery Low 1 = active; 0 = not active	1	
118	U	3 / 4	Alarm: Battery Depleted 1 = active; 0 = not active	1	
119	U	3 / 4	Alarm: Over temperature 1 = active; 0 = not active	1	
120	U	3 / 4	Alarm: Input Bad 1 = active; 0 = not active	1	
121	U	3 / 4	Alarm: Output Bad 1 = active; 0 = not active	1	
122	U	3 / 4	Alarm: Output Overload 1 = active; 0 = not active	1	
123	U	3 / 4	Alarm: On Bypass 1 = active; 0 = not active	1	
124	U	3 / 4	Alarm: Bypass Bad 1 = active; 0 = not active	1	
128	U	3 / 4	Alarm: UPS Output Off 1 = active; 0 = not active	1	
131	U	3 / 4	Alarm: Fuse failure 1 = active; 0 = not active	1	
132	U	3 / 4	Alarm: General fault 1 = active; 0 = not active	1	
133	U	3 / 4	Alarm: Diagnose test failed 1 = active; 0 = not active	1	
134	U	3 / 4	Alarm: Communication lost 1 = active; 0 = not active	1	
138	U	3 / 4	Alarm: Test in progress 1 = active; 0 = not active	1	

139	U	3 / 4	AUX Port 1 1 = active (high); 0 = not active (low)	1	(1)
140	U	3 / 4	AUX Port 2 1 = active (high); 0 = not active (low)	1	(1)
141	U	3 / 4	AUX Port 3 1 = active (high); 0 = not active (low)	1	(1)
142	U	3 / 4	AUX Port 4 1 = active (high); 0 = not active (low)	1	(1)
143	U	3 / 4	Sensormanager / SM_T_COM sensor 1 Analog value	1	(2)
144	U	3 / 4	Sensormanager / SM_T_COM sensor 2 Analog value	1	(2)
145	U	3 / 4	Sensormanager sensor 3 Analog value	1	(2)
146	U	3 / 4	Sensormanager sensor 4 Analog value	1	(2)
147	U	3 / 4	Sensormanager sensor 5 Analog value	1	(2)
148	U	3 / 4	Sensormanager sensor 6 Analog value	1	(2)
149	U	3 / 4	Sensormanager sensor 7 Analog value	1	(2)
150	U	3 / 4	Sensormanager sensor 8 Analog value	1	(2)
151	U	3 / 4	Output Voltage phase L1 [V]	1	
152	U	3 / 4	Output Voltage phase L2 [V]	1	
153	U	3 / 4	Output Voltage phase L3 [V]	1	
154	U	3 / 4	Output Current phase L1 [A * 10]	1	
155	U	3 / 4	Output Current phase L2 [A * 10]	1	
156	U	3 / 4	Output Current phase L3 [A * 10]	1	

(1) not available in CS121B, CS121B SK

(2) available only in CS121, CS121 SK

### 3.6. Keor HP

Address	Type	Function	Name	Length	Notes
97	U	3 / 4	Output Voltage phase L1 [V]	1	
98	U	3 / 4	Output Voltage phase L2 [V]	1	
99	U	3 / 4	Output Voltage phase L2 [V]	1	
100	U	3 / 4	Output Power phase L1 [%]	1	
101	U	3 / 4	Output Power phase L2 [%]	1	
102	U	3 / 4	Output Power phase L3 [%]	1	
103	U	3 / 4	Battery Charge Level [%]	1	
104	S	3 / 4	Input Voltage phase L1 [V]	1	
105	S	3 / 4	Input Voltage phase L2 [V]	1	
106	S	3 / 4	Input Voltage phase L3 [V]	1	
107	S	3 / 4	Temperature [C°]	1	
108	S	3 / 4	Autonomy Time [minutes]	1	
109	U	3 / 4	UPS Status (ASCII HEX) Please check "Status Bytes table" below	1	
110	S	3 / 4	Battery Voltage [V]	1	
111	U	3 / 4	Input Frequency phase L1 [Hz]	1	
112	U	3 / 4	Input Frequency phase L2 [Hz]	1	
113	U	3 / 4	Input Frequency phase L3 [Hz]	1	
114	U	3 / 4	Powerfail Counter	1	
115	U	3 / 4	Alarm Battery Bad 1 = active; 0 = not active)	1	
116	U	3 / 4	Alarm: On Battery 1 = active; 0 = not active	1	
117	U	3 / 4	Alarm: Battery Low 1 = active; 0 = not active	1	
118	U	3 / 4	Alarm: Battery Depleted 1 = active; 0 = not active	1	
119	U	3 / 4	Alarm: Over temperature 1 = active; 0 = not active	1	
120	U	3 / 4	Alarm: Input Bad 1 = active; 0 = not active	1	
121	U	3 / 4	Alarm: Output Bad 1 = active; 0 = not active	1	
122	U	3 / 4	Alarm: Output Overload 1 = active; 0 = not active	1	
123	U	3 / 4	Alarm: On Bypass 1 = active; 0 = not active	1	
124	U	3 / 4	Alarm: Bypass Bad 1 = active; 0 = not active	1	
125	U	3 / 4	Alarm: Output Off as requested 1 = active; 0 = not active	1	
126	U	3 / 4	Alarm: UPS Off as requested 1 = active; 0 = not active	1	
127	U	3 / 4	Alarm: Charger Failed 1 = active; 0 = not active	1	
128	U	3 / 4	Alarm: UPS Output Off 1 = active; 0 = not active	1	

129	U	3 / 4	Alarm: UPS System Off 1 = active; 0 = not active	1	
130	U	3 / 4	Alarm: Fan Failure 1 = active; 0 = not active	1	
131	U	3 / 4	Alarm: Fuse Failure 1 = active; 0 = not active	1	
132	U	3 / 4	Alarm: General fault 1 = active; 0 = not active	1	
133	U	3 / 4	Alarm: Diagnose test failed 1 = active; 0 = not active	1	
134	U	3 / 4	Alarm: UPS communication lost 1 = active; 0 = not active	1	
135	U	3 / 4	Alarm: Awaiting Power 1 = active; 0 = not active	1	
136	U	3 / 4	Alarm: Shutdown pending 1 = active; 0 = not active	1	
137	U	3 / 4	Alarm: Shutdown imminent 1 = active; 0 = not active	1	
138	U	3 / 4	Alarm: Test in progress 1 = active; 0 = not active	1	
139	U	3 / 4	AUX Port 1 1 = active (high); 0 = not active (low)	1	(1)
140	U	3 / 4	AUX Port 2 1 = active (high); 0 = not active (low)	1	(1)
141	U	3 / 4	AUX Port 3 1 = active (high); 0 = not active (low)	1	(1)
142	U	3 / 4	AUX Port 4 1 = active (high); 0 = not active (low)	1	(1)
143	U	3 / 4	Sensormanager / SM_T_COM sensor 1 Analog value	1	(2)
144	U	3 / 4	Sensormanager / SM_T_COM sensor 2 Analog value	1	(2)
145	U	3 / 4	Sensormanager sensor 3 Analog value	1	(2)
146	U	3 / 4	Sensormanager sensor 4 Analog value	1	(2)
147	U	3 / 4	Sensormanager sensor 5 Analog value	1	(2)
148	U	3 / 4	Sensormanager sensor 6 Analog value	1	(2)
149	U	3 / 4	Sensormanager sensor 7 Analog value	1	(2)
150	U	3 / 4	Sensormanager sensor 8 Analog value	1	(2)

(1) not available in CS121B, CS121B SK

(2) available only in CS121, CS121 SK

### 3.7. Keor HPE

Address	Type	Function	Name	Length	Notes
100	U	3 / 4	Output Power phase L1 [%]	1	
101	U	3 / 4	Output Power phase L2 [%]	1	
102	U	3 / 4	Output Power phase L3 [%]	1	
103	U	3 / 4	Battery Charge Level [%]	1	
104	S	3 / 4	Input Voltage phase L1 [V]	1	
105	S	3 / 4	Input Voltage phase L2 [V]	1	
106	S	3 / 4	Input Voltage phase L3 [V]	1	
107	S	3 / 4	Temperature [C°]	1	
108	S	3 / 4	Autonomy Time [minutes]	1	
109	U	3 / 4	UPS Status (ASCII HEX) Please check "Status Bytes table" below	1	
110	S	3 / 4	Battery Voltage [V]	1	
111	U	3 / 4	Input Frequency phase L1 [Hz]	1	
112	U	3 / 4	Input Frequency phase L2 [Hz]	1	
113	U	3 / 4	Input Frequency phase L3 [Hz]	1	
114	U	3 / 4	Powerfail Counter	1	
115	U	3 / 4	Alarm Battery Bad 1 = active; 0 = not active)	1	
116	U	3 / 4	Alarm: On Battery 1 = active; 0 = not active	1	
117	U	3 / 4	Alarm: Battery Low 1 = active; 0 = not active	1	
118	U	3 / 4	Alarm: Battery Depleted 1 = active; 0 = not active	1	
119	U	3 / 4	Alarm: Over temperature 1 = active; 0 = not active	1	
120	U	3 / 4	Alarm: Input Bad 1 = active; 0 = not active	1	
121	U	3 / 4	Alarm: Output Bad 1 = active; 0 = not active	1	
122	U	3 / 4	Alarm: Output Overload 1 = active; 0 = not active	1	
123	U	3 / 4	Alarm: On Bypass 1 = active; 0 = not active	1	
124	U	3 / 4	Alarm: Bypass Bad 1 = active; 0 = not active	1	
125	U	3 / 4	Alarm: Output Off as requested 1 = active; 0 = not active	1	
126	U	3 / 4	Alarm: UPS Off as requested 1 = active; 0 = not active	1	
127	U	3 / 4	Alarm: Charger Failed 1 = active; 0 = not active	1	
128	U	3 / 4	Alarm: UPS Output Off 1 = active; 0 = not active	1	
129	U	3 / 4	Alarm: UPS System Off 1 = active; 0 = not active	1	
130	U	3 / 4	Alarm: Fan Failure 1 = active; 0 = not active	1	

131	U	3 / 4	Alarm: Fuse Failure 1 = active; 0 = not active	1	
132	U	3 / 4	Alarm: General fault 1 = active; 0 = not active	1	
133	U	3 / 4	Alarm: Diagnose test failed 1 = active; 0 = not active	1	
134	U	3 / 4	Alarm: UPS communication lost 1 = active; 0 = not active	1	
135	U	3 / 4	Alarm: Awaiting Power 1 = active; 0 = not active	1	
136	U	3 / 4	Alarm: Shutdown pending 1 = active; 0 = not active	1	
137	U	3 / 4	Alarm: Shutdown imminent 1 = active; 0 = not active	1	
138	U	3 / 4	Alarm: Test in progress 1 = active; 0 = not active	1	
139	U	3 / 4	AUX Port 1 1 = active (high); 0 = not active (low)	1	(1)
140	U	3 / 4	AUX Port 2 1 = active (high); 0 = not active (low)	1	(1)
141	U	3 / 4	AUX Port 3 1 = active (high); 0 = not active (low)	1	(1)
142	U	3 / 4	AUX Port 4 1 = active (high); 0 = not active (low)	1	(1)
143	U	3 / 4	Sensormanager / SM_T_COM sensor 1 Analog value	1	(2)
144	U	3 / 4	Sensormanager / SM_T_COM sensor 2 Analog value	1	(2)
145	U	3 / 4	Sensormanager sensor 3 Analog value	1	(2)
146	U	3 / 4	Sensormanager sensor 4 Analog value	1	(2)
147	U	3 / 4	Sensormanager sensor 5 Analog value	1	(2)
148	U	3 / 4	Sensormanager sensor 6 Analog value	1	(2)
149	U	3 / 4	Sensormanager sensor 7 Analog value	1	(2)
150	U	3 / 4	Sensormanager sensor 8 Analog value	1	(2)

- (1) not available in CS121B, CS121B SK  
(2) available only in CS121, CS121 SK

### 3.8. Status Bytes table ( see registry 109 of all previous tables )

UPS Status	Hex Value	Dec Value	Description
UPS_SB_BYPASS_MODE	0x0001	1	UPS is in bypass
UPS_SB_SHUTDOWN	0x0002	2	Shutdown UPS
UPS_SB_OUTPUT_ACT	0x0004	4	Inverter on = UPS OK
UPS_SB_BACKUP_MODE	0x0008	8	UPS is in battery
UPS_SB_BATTERY_LOW	0x0010	16	Battery Low signal
UPS_SB_OVER_TEMP	0x0020	32	Over temperature
UPS_SB_TEST_ACT	0x0040	64	Test in progress
UPS_SB_INPUT_HIGH	0x0080	128	Input voltage too high
UPS_SB_OUTPUT_HIGH	0x0100	256	Overload
UPS_SB_INVERTER_FAILURE	0x0200	512	Inverter error
UPS_SB_BATTERY_BAD	0x0400	1024	Battery error
UPS_SB_ECO_MODE	0x0800	2048	ECO mode
UPS_SB_COMM_LOST	0x4000	16384	For snmp

#### Examples (decimal):

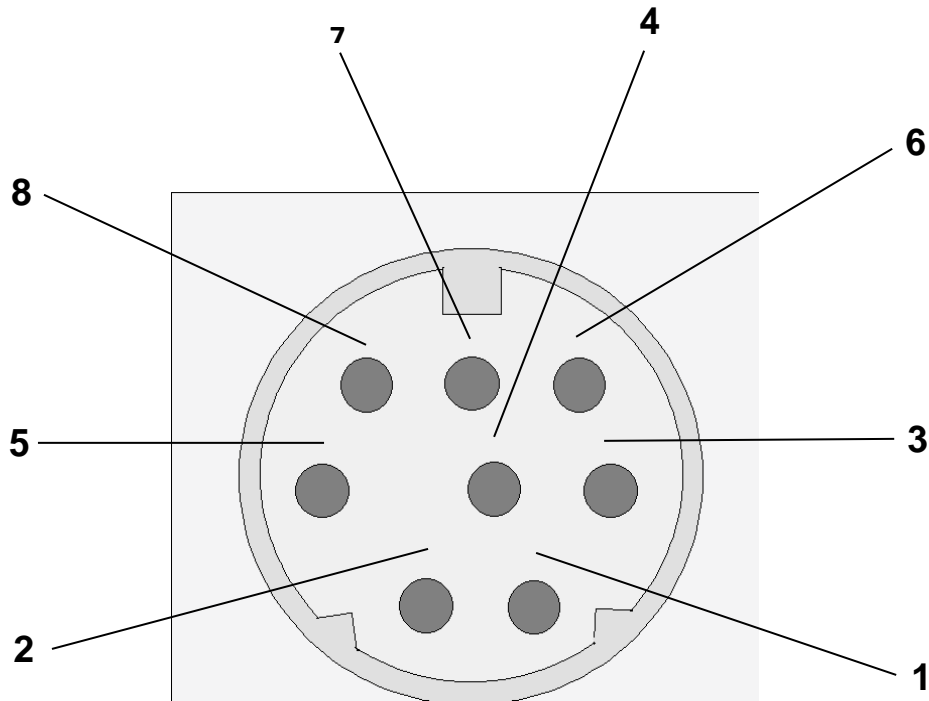
- STATUS= "4" means UPS\_SB\_OUTPUT\_ACT (4) + no other alarms = UPS OK
- STATUS= "5" means UPS\_SB\_OUTPUT\_ACT (4) + UPS\_SB\_BYPASS\_MODE (1) are active ! = UPS on Bypass!
- STATUS= "12" means UPS\_SB\_OUTPUT\_ACT (4) + UPS\_SB\_BACKUP\_MODE (8) are active ! = UPS Powerfail!
- STATUS= "22" means UPS\_SB\_OUTPUT\_ACT (4) + UPS\_SB\_BACKUP\_MODE (8) + UPS\_SB\_BATTERY\_LOW (10) are active ! = UPS Powerfail and Battery low!
- STATUS= "68" means UPS\_SB\_OUTPUT\_ACT (4) + UPS\_SB\_TEST\_ACT (64) are active ! = UPS battery test is running



## 4. Appendix

### 4.1. RS485 Connector for CS121M and CS121M SK

Mini-DIN 8 poles connector:



Pic.1 Mini DIN 8 Female Connector Frontview

Pin 1: -> RS485 (+)  
Pin 5: -> RS485 (-)

### 4.2. Bus termination

It is necessary to set the last bus device on the RS-485 Bus jumper for the bus termination. The jumper is already set in newly delivered adapters. Please remove the 4 screws at the bottom of the adapter in order to open the box. You will find the jumper J1 near the network connector, near the PCB shows a "+" symbol. (see image below).

Default is OPEN = CS121M is NOT last device. To terminate the RS485 bus at your CS121M, please CLOSE the Jumper.

