

Operating Instructions
Modbus RTU

Supplementary description of the Modbus RTU interface for the thermoMETER CT and CTL system

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thermoMETER Modbus RTU communication interface for CT and CTlaser

Serial Interface Parameters

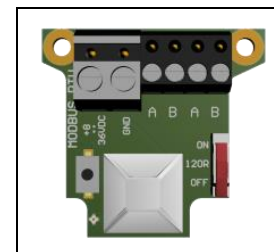
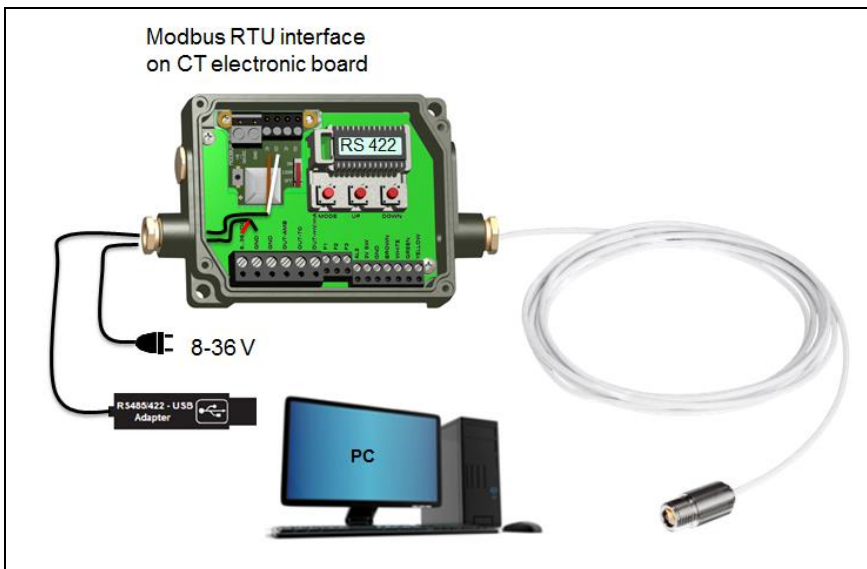
- Baud rate: 9600 or 19200, set by user (factory default: 9600)
- Data bits: 8
- Parity: even
- Stop bits: 2
- Flow control: off

Protocol

The protocol is a Modbus RTU protocol.

Installation Overview

Insert the Modbus RTU interface on the CT electronic board and power it with 8-36 V. The RS422 mode has to be selected on the electronic box.



Modbus RTU interface

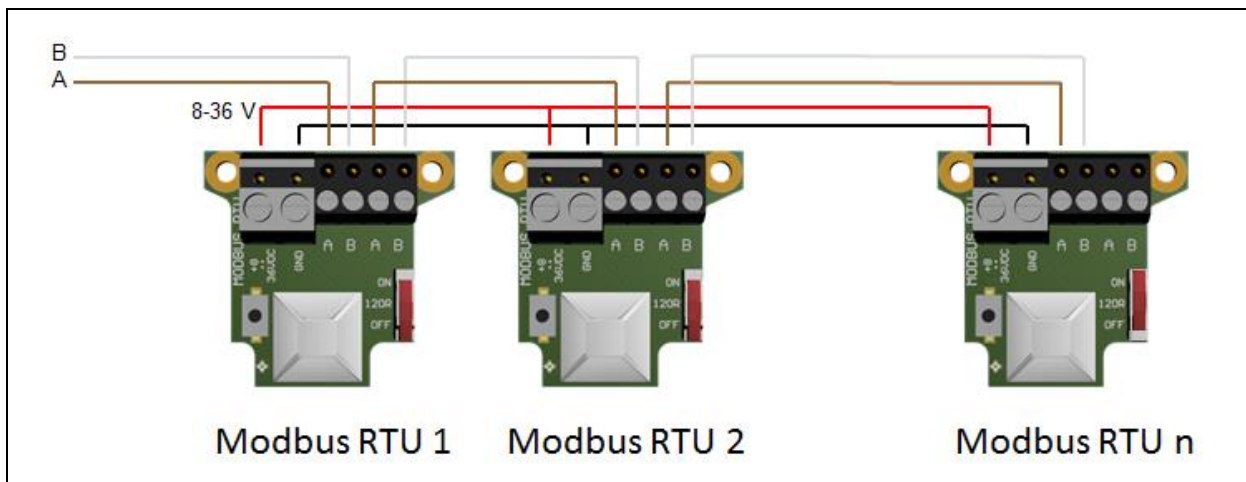
Use a Modbus RTU program to read out the data. This is done via the **Read Holding Register** and **Read Input Register**.

Changing the settings of the device is done over the **Write Holding Register**.

Connection type:	Serial
Comm port:	COM65
Parity:	Even
Stop bits:	Two
Baud rate:	9600
Byte size:	8
Mode:	Rtu
Byte order:	4321

03 Read Holding Registers
01 Read Coils
02 Read Discrete Inputs
03 Read Holding Registers
04 Read Input Registers
05 Write Single Coil
06 Write Single Register
08 Diagnostics
15 Write Multiple Coils
16 Write Holding Registers

Connection of more than one Device



The 120R-switch has to be turned to ON for the last connected CT unit.

For the assignment of the Modbus ID of the individual devices, the devices must be connected one after the other. By default the Modbus ID is for every device 1. In order to communicate, each device needs its own ID. The numbers 1 to 247 can be selected.

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1 Input Register

Description	Type	Register Address	Register-Size	Checksum	Data-Format	Comment
Modbus CT FW Revision	R - Input Register	1000	1	No	=Value/100	Set by Firmware
Error-FileID	R - Input Register	1001	1	-	FileID where error is triggered	
Error-Line	R - Input Register	1002	1	-	Line in file where error is triggered	
Error-Code	R - Input Register	1003	1	-	Error code e.g. HAL_ERROR	
Error-Data	R - Input Register	1004	1	-	Additional data e.g. state	
Error-Count	R - Input Register	1005	1	-	Count how often this error has occurred	

Description	Type	Register Address	Register-Size	Read-Command	Checksum	RX-Bytes	Data-Format
Serial number	R - Input Register	1010	2	0x0E	No	3	$=(\text{ByteH}(1) * 65536 + \text{ByteL}(1) * 256 + \text{ByteL}(2))$
CT FW Revision	R - Input Register	1012	1	0x0F	No	2	$=(\text{ByteH} * 256 + \text{ByteL})$
CT Sensor Information	R - Input Register	1013	3	0x45	No	6	ByteH(1), ByteL(1) = Sensor type ByteH(2), ByteL(2) = Lower Temperature ByteH(3), ByteL(3) = Upper Temperature

Description	Type	Register Address	Register-Size	Read-Command	Checksum	RX-Bytes	Data-Format
Temp. - process	R - Input Register	1020	1	0x01	No	2	$=(\text{ByteH} * 256 + \text{ByteL} - 1000) / 10$
Temp. - Head	R - Input Register	1021	1	0x02	No	2	$=(\text{ByteH} * 256 + \text{ByteL} - 1000) / 10$
Temp. - Box	R - Input Register	1022	1	0x03	No	2	$=(\text{ByteH} * 256 + \text{ByteL} - 1000) / 10$
Temp. - Act	R - Input Register	1023	1	0x81	No	2	$=(\text{ByteH} * 256 + \text{ByteL} - 1000) / 10$

2 Holding Register

Description	Type	Register Address	Register-Size	Data-Format	Comment
MODBUS-ID	R/W - Holding Register	10000	1	ID: 1 - 247	MODBUS Setting
MODBUS Baudrate	R/W - Holding Register	10001	1	1: 9600 Baud 2: 19200 Baud	MODBUS Setting
Error-Count Reset	R/W - Holding Register	10002	1	0: Idle 1: Reset	Resets the error repetition count to 0

Description	Type	Register Address	Register-Size	Read-Command	Write-Command	Checksum	RX-Bytes	Data-Format
Epsilon	R/W - Holding Register	10010	1	0x04	0x84 byte1 byte2	Yes	2	$=(\text{ByteH} * 256 + \text{ByteL}) / 1000$
Transmission	R/W - Holding Register	10011	1	0x05	0x85 byte1 byte2	Yes	2	$=(\text{ByteH} * 256 + \text{ByteL}) / 1000$
Spot Illumination Laser	R/W - Holding Register	10012	1	0x25	0xA5 byte1	Yes	1	1 = On 0 = Off
AVG Time	R/W - Holding Register	10013	1	0x06	0x86 byte1 byte2	Yes	2	$=(\text{ByteH} * 256 + \text{ByteL}) / 10$
AVG Mode	R/W - Holding Register	10014	1	0x1C	0x9C byte1	Yes	1	1 = Smart Averaging 0 = Normal
Peak Hold Time	R/W - Holding Register	10015	1	0x08	0x88 byte1 byte2	Yes	2	$=(\text{ByteH} * 256 + \text{ByteL}) / 10$
Valley Hold Time	R/W - Holding Register	10016	1	0x07	0x87 byte1 byte2	Yes	2	$=(\text{ByteH} * 256 + \text{ByteL}) / 10$
Advanced Hold Mode	R/W - Holding Register	10017	1	0x1D	0x9D byte1	Yes	1	0 = Off 1 = Peak 2 = Valley
Advanced Hold Threshold	R/W - Holding Register	10018	1	0x1E	0x9E byte1 byte2	Yes	2	$=(\text{ByteH} * 256 - \text{ByteL} - 1000) / 10$
Advanced Hold Hysteresis	R/W - Holding Register	10019	1	0x22	0xA2 byte1 byte2	Yes	2	$=(\text{ByteH} * 256 - \text{ByteL}) / 10$
ALARMx Mode	R/W - Holding Register	10021	1	0x28	0xA8 byte1 byte2	Yes	2	See CT-CTlaser-CTvideo-commands.pdf
Low End for outputs	R/W - Holding Register	10022	1	0x18	0x98 byte1 byte2	Yes	2	$=(\text{ByteH} * 256 - \text{ByteL} - 1000) / 10$
High End for outputs	R/W - Holding Register	10023	1	0x19	0x99 byte1 byte2	Yes	2	$=(\text{ByteH} * 256 - \text{ByteL} - 1000) / 10$
Skal_Out_Min	R/W - Holding Register	10024	1	0x11	0x91 byte1 byte2	Yes	2	mV or μ A
Skal_Out_Max	R/W - Holding Register	10025	1	0x12	0x92 byte1 byte2	Yes	2	mV or μ A
AL1 value	R/W - Holding Register	10026	1	0x0A	0x8A byte1 byte2	Yes	2	$=(\text{ByteH} * 256 + \text{ByteL} - 1000) / 10$
AL2 value	R/W - Holding Register	10027	1	0x0B	0x8B byte1 byte2	Yes	2	$=(\text{ByteH} * 256 + \text{ByteL} - 1000) / 10$
AL3 value	R/W - Holding Register	10028	1	0x0C	0x8C byte1 byte2	Yes	2	$=(\text{ByteH} * 256 + \text{ByteL} - 1000) / 10$
AL4 value	R/W - Holding Register	10029	1	0x0D	0x8D byte1 byte2	Yes	2	$=(\text{ByteH} * 256 + \text{ByteL} - 1000) / 10$

3 Contact information

If you have further questions please contact:

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