# Optris Modbus RTU communication interface for CT and CTlaser

## Serial interface parameters

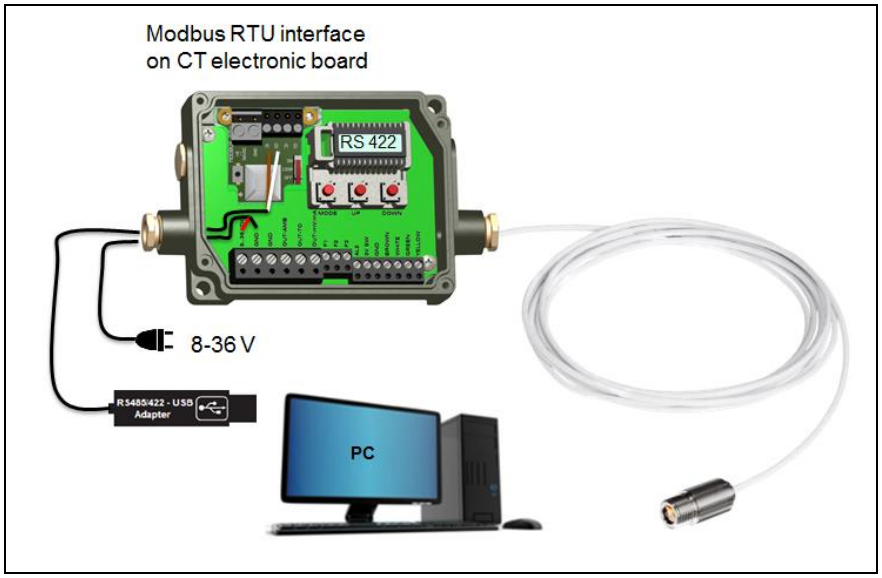
- **Baud rate:** **9600 or 19200, set by user (factory default: 9600)**
- **Data bits:** **8**
- **Parity:** **even**
- **Stop bits:** **2**
- **Flow control:** **off**

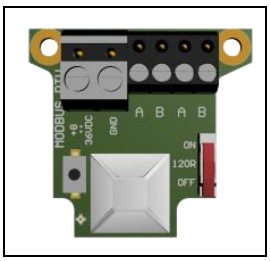
## Protocol

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.

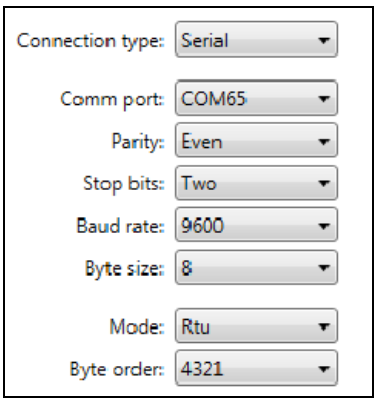


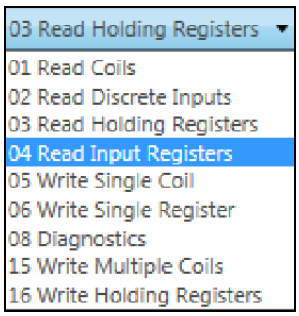



**Modbus RTU interface**

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**.



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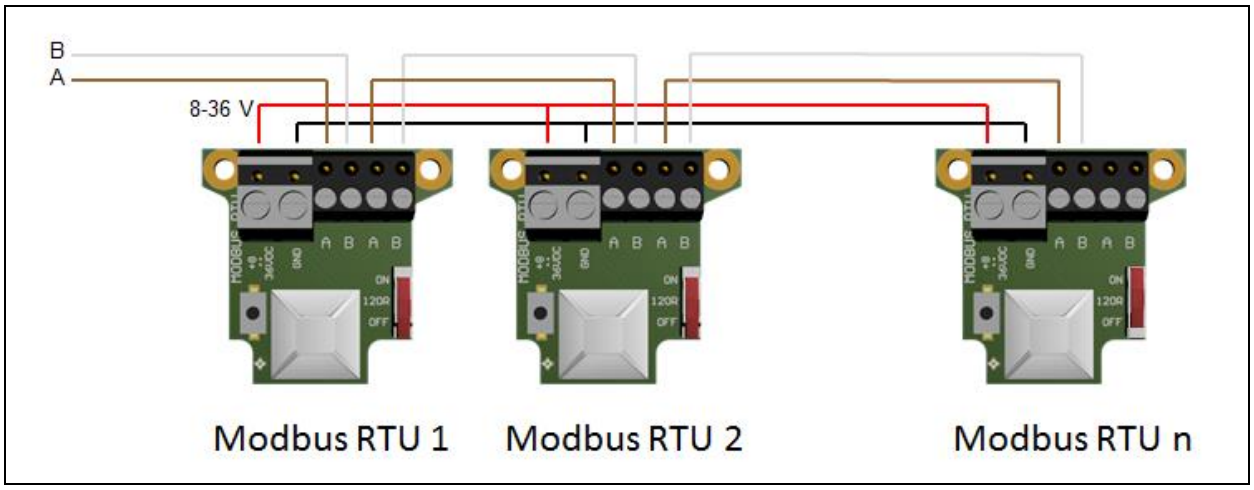
## Connection of more than one device




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 | Check sum | RX-Bytes | Data-Format |
|---|---|---|---|---|---|---|---|
| Serial number | R - Input Register | 1010 | 2 | 0x0E | No | 3 | =(ByteH(1)*65536 + ByteL(1) * 256 + ByteL(2) |
| CT FW Revision | R - Input Register | 1012 | 1 | 0x0F | No | 2 | =(ByteH * 256 + Byte2) |
| CT Sensor Information | R - Input Register | 1013 | 3 | 0x45 | No | 6 | ByteH(1), ByteL(1) = Sensor type<br>ByteH(2), ByteL(2) = Lower Temperature<br>ByteH(3), ByteL(3) = Upper Temperature |

| Description | Type | RegisterAddress | Register-Size | Read-Command | Check sum | RX-Bytes | Data-Format |
|---|---|---|---|---|---|---|---|
| Temp. - process | R - Input Register | 1020 | 1 | 0x01 | No | 2 | =(ByteH * 256 + ByteL - 1000) / 10 |
| Temp. - Head | R - Input Register | 1021 | 1 | 0x02 | No | 2 | =(ByteH * 256 + ByteL - 1000) / 10 |
| Temp. - Box | R - Input Register | 1022 | 1 | 0x03 | No | 2 | =(ByteH * 256 + ByteL - 1000) / 10 |
| Temp. - Act | R - Input Register | 1023 | 1 | 0x81 | No | 2 | =(ByteH * 256 + ByteL - 1000) / 10 |



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# 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<br>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 | Check sum | RX-Bytes | Data-Format |
|---|---|---|---|---|---|---|---|---|
| Epsilon | R/W - Holding Register | 10010 | 1 | 0x04 | 0x84 byte1 byte2 | Yes | 2 | =(ByteH * 256 + ByteL) / 1000 |
| Transmission | R/W - Holding Register | 10011 | 1 | 0x05 | 0x85 byte1 byte2 | Yes | 2 | =(ByteH * 256 + ByteL) / 1000 |
| Spot Illumination Laser | R/W - Holding Register | 10012 | 1 | 0x25 | 0xA5 byte1 | Yes | 1 | 1 = On<br>0 = Off |
| AVG Time | R/W - Holding Register | 10013 | 1 | 0x06 | 0x86 byte1 byte2 | Yes | 2 | =(ByteH * 256 + ByteL) / 10 |
| AVG Mode | R/W - Holding Register | 10014 | 1 | 0x1C | 0x9C byte1 | Yes | 1 | 1 = Smart Averaging<br>0 = Normal |
| Peak Hold Time | R/W - Holding Register | 10015 | 1 | 0x08 | 0x88 byte1 byte2 | Yes | 2 | =(ByteH * 256 + ByteL) / 10 |
| Valley Hold Time | R/W - Holding Register | 10016 | 1 | 0x07 | 0x87 byte1 byte2 | Yes | 2 | =(ByteH * 256 + ByteL) / 10 |
| Advanced Hold Mode | R/W - Holding Register | 10017 | 1 | 0x1D | 0x9D byte1 | Yes | 1 | 0 = Off<br>1 = Peak<br>2 = Valley |
| Advanced Hold Threshold | R/W - Holding Register | 10018 | 1 | 0x1E | 0x9E byte1 byte2 | Yes | 2 | =(ByteH * 256 - ByteL - 1000) / 10 |
| Advanced Hold Hysteresis | R/W - Holding Register | 10019 | 1 | 0x22 | 0xA2 byte1 byte2 | Yes | 2 | =(ByteH * 256 - 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 | '=(ByteH * 256 - ByteL - 1000) / 10 |
| High End for outputs | R/W - Holding Register | 10023 | 1 | 0x19 | 0x99 byte1 byte2 | Yes | 2 | '=(ByteH * 256 - ByteL - 1000) / 10 |
| Skal_Out_Min | R/W - Holding Register | 10024 | 1 | 0x11 | 0x91 byte1 byte2 | Yes | 2 | mV or µA |
| Skal_Out_ Max | R/W - Holding Register | 10025 | 1 | 0x12 | 0x92 byte1 byte2 | Yes | 2 | mV or µA |



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| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **AL1 value** | R/W - Holding Register | 10026 | 1 | 0x0A | 0x8A byte1 byte2 | Yes | 2 | = (ByteH*256 + ByteL - 1000) / 10 |
| **AL2 value** | R/W - Holding Register | 10027 | 1 | 0x0B | 0x8B byte1 byte2 | Yes | 2 | = (ByteH*256 + ByteL - 1000) / 10 |
| **AL3 value** | R/W - Holding Register | 10028 | 1 | 0x0C | 0x8C byte1 byte2 | Yes | 2 | = (ByteH*256 + ByteL - 1000) / 10 |
| **AL4 value** | R/W - Holding Register | 10029 | 1 | 0x0D | 0x8D byte1 byte2 | Yes | 2 | = (ByteH*256 + ByteL - 1000) / 10 |



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