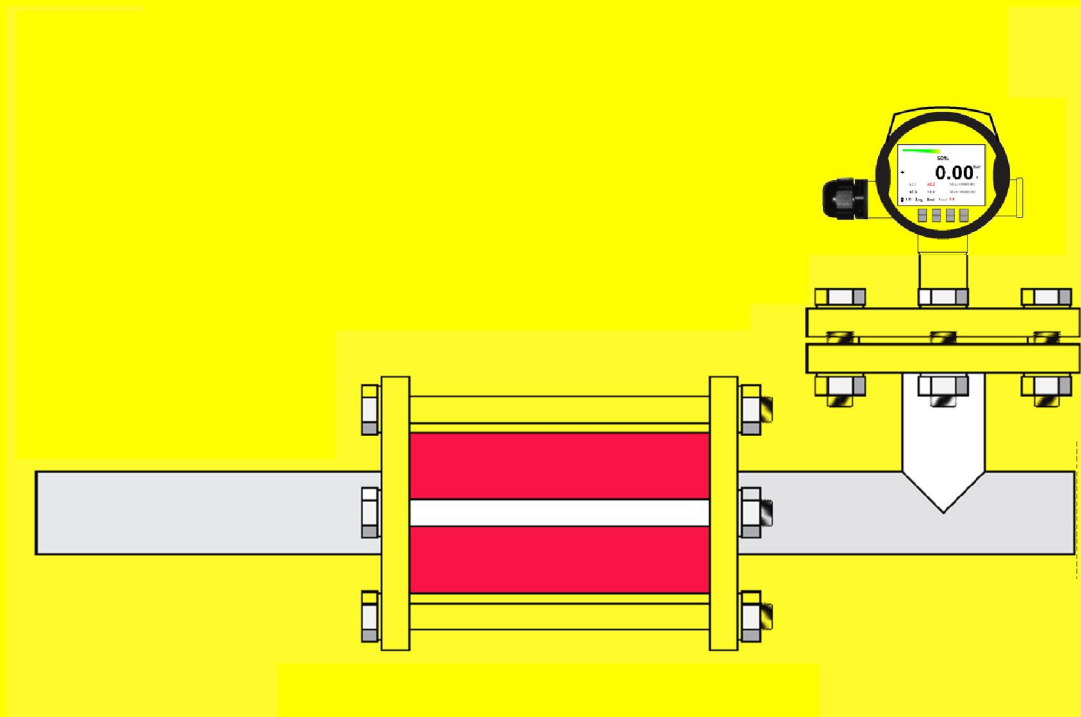


# Smart Temperature Transmitter

## MODEL: SB-TT

# SMART BIENE.



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## Modbus-RTU Map Register

### Format of the master message

each message sent by the master obeys the following format:

Device Address	Function code	n byte parameters (optional)	CRC16_L	CRC16_H
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Device Address: Address of the device.

Address 0 is reserved for broadcasting.

Addresses 1 to 247 can be used for this device

**Function code:** Function number

this function code use for read or write data.

**Parameters:** parameters different based on function

**CRC16:** 16-bit checksum to verify that data received correctly

### Format of the slave message

a message transmitted by the slave obey the following format:

Device Address	Function code	n byte parameters (optional)	CRC16_L	CRC16_H
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• Device Address: **Address of the device.**

• Function code: **The function number is same to the function number sent by the master.**

• Data: **Any data requested via the function follow here. If error occurred function code Oared with 0x80 and returned**

• CRC16

#### Exception errors

If message has been received correctly (no transmission error has occurred), but the transmitted function number and/or the parameters are invalid.

**The slave responds an exception error**, unless the message has been received in broadcasting mode.

The message transmitted as a response by the slave has the following format:

Device Address	Function code	Exception code	CRC16_L	CRC16_H
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### Modbus RTU Frame Layout

> 3.5 char Delay time	8 bit address	8 bit Function code	n*(8 bit data)	CRC16	> 3.5 char Delay time
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The entire message frame must be transmitted continuously. If an interval of more than 1.5 character times occurs between two characters, the message frame is declared incomplete and discarded by the receiver.

### Description of MODBUS functions

**F3: Read registers on MODBUS address space**

**F6: Write single register on MODBUS address space**

**F8: MODBUS Echo function**

**F16: Write multiple registers on MODBUS address space**

#### Function 3: MODBUS Read Register

Read single or multiple registers in the MODBUS address space starting with Start Address. Note that the data returned based on "MODBUS Register Map".

**Request:**

Device Address	0x03	Start addr H	Start addr L	#Reg H	#Reg L	CRC16_L	CRC16_H
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**Response:**

Device Address	0x03	# Bytes	Data H	Data L	...	CRC16_L	CRC16_H
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**Error:**

Device Address	0x83	Error	CRC16_L	CRC16_H
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**Function 6: MODBUS Write Single Register**

This function is similar to F16, but writes only 1 register. Note, that the data will be written based on “MODBUS Register Map”.

**Request:**

Device Address	0x06	Start addr H	Start addr L	Data H	Data L	CRC16_L	CRC16_H
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**Response:**

Device Address	0x06	Start addr H	Start addr L	Data H	Data L	CRC16_L	CRC16_H
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**Error:**

Device Address	0x86	Error	CRC16_L	CRC16_H
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**Function 8: MODBUS Echo Test**

This function used to perform a quick line check. It returns the data that received.

**Request:**

Device Address	0x08	0	0	Data H	Data L	CRC16_L	CRC16_H
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**Response:**

Device Address	0x08	0	0	Data H	Data L	CRC16_L	CRC16_H
----------------	------	---	---	--------	--------	---------	---------

**Error:**

Device Address	0x88	Error	CRC16_L	CRC16_H
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**Function 16: MODBUS WRITE Register**

Write multiple registers on the MODBUS address space starting with Start Address. Note, that the data will be written based on “MODBUS Register Map”.

**Request:**

Device Address	0x10	Start addr H	Start addr L	# Reg H	# Reg L	# Bytes	Data H	Data L	...	CRC16_L	CRC16_H
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**Response:**

Device Address	0x10	Start addr H	Start addr L	# Reg H	#Reg L	CRC16_L	CRC16_H
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**Error:**

Device Address	0x90	Error	CRC16_L	CRC16_H
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### RTU character framing

Start bit	1	2	3	4	5	6	7	8	Even parity	Stop bit
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Note that this device only support baud rate 9600.

### SB-TT Map register

word	name	R/W
0,1(Float IEEE754)	Min measuring range	R
2,3(Float IEEE754)	Max measuring range	R
4,5(Float IEEE754)	Sensor Data	R
6,7(Float IEEE754)	Ambient temp	R
8,9(Float IEEE754)	0 or ambient pressure	R
10(bit)	0-E1 1-E2 2-E3 3-E4 5-AI1On 6-AI2On 7-AI3On 8-AI4On	R
11-16(char)	Model ID	R
17-22(char)	Serial Number	R
23	Unit & sensor type	R
24-35(char)	Tag ID	R/W

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