

# INSTRUCTION Version 11.05.2018

## BUSCOMPATIBLE TEMPERATURE SENSORS



Sleeve temperature sensor  
HTF RS485 Teflon 2m



Surface contacting  
temperature sensor  
ALTF2 RS485



Outside temperature  
sensor  
ATF2 RS485



Duct temperature sensor  
KTF1 RS485



Immersion temperature sensor  
ETF2 RS485



Outside temperature  
sensor ATF2 RS485  
with only 1 PG

### Following temperature sensors are available:

ALTF1 RS485  
ALTF2 RS485  
ATF2 RS485

Modbus®-RTU and S-Bus  
Modbus®-RTU and S-Bus  
Modbus®-RTU and S-Bus  
(When mounting it at outside area at the model with 2 PG's the second PG must be closed – for reasons of moisture or use the model with 1 PG)

HTF RS485  
ETF1 RS485  
ETF2 RS485  
KTF1 RS485  
MWTF RS485  
RPTF RS485

Modbus®-RTU and S-Bus  
Modbus®-RTU and S-Bus  
Modbus®-RTU and S-Bus  
Modbus®-RTU and S-Bus  
Modbus®-RTU and S-Bus  
Modbus®-RTU and S-Bus

Surface contacting temperature sensor with axial sensor tube  
Surface contacting/tube contacting temperature sensor  
Outside temperature sensor with external sideways sensor tube  
(When mounting it at outside area at the model with 2 PG's the second PG must be closed – for reasons of moisture or use the model with 1 PG)

Sleeve temperature sensor with plastic enclosure  
Immersion temp. sensor – immersion sleeve brass nickel plated  
Immersion temp. sensor – immersion sleeve stainless steel  
Duct temperature sensor including mounting flange  
Mean value temperature sensor  
Room pendulum temperature sensor

Dear Sir or Madam,

again we would like to thank you for your confidence given us by buying our product.

The bus compatible temperature sensors are electronic devices which signals communicate via RS485.

### **Generald description for bus system RS485 (Modbus® RTU / S-Bus)**

Modbus®-RTU / S-Bus is an open serial communication protocol which is based on Master/Slave architecture. As it is easy to implement at any serial interfaces, it found a wide spreading. It is often used for connection of central and local in- and output groups (fieldbus devices).

The bus consists of the masterstation (**SPS, DDC, Hakko Touch Panel**) und several slave stations, whereas the communication will be controlled by the master.

Modbus®-RTU / S-Bus includes two basic communication mechanism:

Question/Answer (Polling): The master sends an inquiry telegram to the bus compatible temperature sensor and expect its answer telegram.

These telegrams allow writing and reading of process datas (Input-/Output datas) optional or individual or in groups. The datas will be transferred into Modbus®-RTU or S-Bus Data Mode format.

Modbus®-RTU / S-Bus is used on different transmitting mediums. The implementation on the RS485 bus physics, a twisted, shielded two-wire line with load resistance is widely used.

## Systemdatas Modbus®-RTU / S-Bus

Current input load:	15mA
Number of I/O-stations:	63 devices (1...63)
Transmitting medium:	shielded, twisted copper cable 2 x 0,25mm(RS485)
Cable length:	max. 1200 m (depending on baud rate)
Transfer rate:	4800, 9600, 19200, 38400 Baud
Communication type:	Read-/Writing access word oriented
Configuration possibility:	via DIP-switch (address number, parity, Baud)
Protocols:	Modbus RTU / S-Bus (Data-Mode)
Modbus-data lines:	+ (=D0) (=A) - (=D1) (=B)
<b>Terminating resistor:</b>	<b>has to be activated with the jumper. Attention: Bus resistor may only be activated at the end!</b>
Buspolarisation:	A buspolarisation is recommended at strong disorders: At one point in network from the "+" data line 560R to GND and from the "-" data line 560R to +5V (alternative 3,3K to +24V)

## Analogue input:

The bus compatible temperature sensors have following input:

Input analogue: PT1000 (24 Bit, resolution 0,1°C)

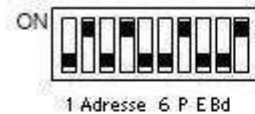
## Bus compatible temperature sensors interface Modbus®-RTU / S-Bus

Technical datas:

Voltage supply:	24V DC +/- 20%
Current input idle state:	15 mA
Busprotocol:	RS 485 Modbus®-RTU / S-Bus Data Mode
Possibility of configuration:	via DIP-switch (address number, parity, Baud)
Address number:	1 to 63 (0 not allowed)
Parity Modbus:	no parity, even parity, odd parity
Transfer rate:	4800, 9600, 19200, 38400 Baud
Input analogue:	PT1000 (24 Bit resolution 0,1°C)
Ambient temperature:	-30°C...+60 °C
Storage temperature:	-40°C...+70 °C
Accuracy:	<0,1% for temperature measurement PT1000
Temperature coefficient:	<0,003% / K for temperature measurement PT1000
Enclosure:	plastic, material polyamide, 30% glass globe reinforced, with quick-locking screws
Terminals:	Double-Push-in terminals
Air humidity:	< 95% r.H.
EMC regulations:	according EN55011 class B
Standards:	CE Conformity
Protection class:	III (acc. EN 60 730)
Protection type:	IP65 (acc. IEC 529)

## 1 DIP-switch

For serial communication some pre-adjustments must be made. They will be done at the bus compatible sensors by ten available dip switches.



The functions of the DIP-switches are as follows:

### Busaddress (DIP-switch 1 to 6):

A bus address must be given to each buscompatible sensor. The temperature sensors work all as slaves. In total there are 64 bus addresses available, slave „1“ to slave „63“.

The adjustment is done in the same way as at a binary number:

DIP-switch	123456		(0: OFF; 1: ON)
	100000	→	Slave 1
	010000	→	Slave 2
	...		
	101001	→	Slave 37
	...		
	111111	→	Slave 63

Codetable decimal / BCD coded						
Dip-switch	1	2	3	4	5	6
Valence	2 <sup>0</sup>	2 <sup>1</sup>	2 <sup>2</sup>	2 <sup>3</sup>	2 <sup>4</sup>	2 <sup>5</sup>
	1	2	4	8	16	32
e.g: 37	1	0	1	0	0	1

For following example the bus address was adjusted to „37“.. Accordingly the dip-switches „1“, „3“ und „6“ must be adjusted to „ON“.

### Parity (DIP-switch 7 and 8):

At serial communication the parity must be configured.

At the bus compatible temperature sensors following mappings are possible.

DIP-switch	78		(0:OFF; 1: ON)
	00	→	Modbus / no parity
	10	→	Modbus / Parity: odd
	11	→	Modbus / Parity: even
	01	→	S-Bus – Data Mode

### Baudrate (DIP-switch 9 and 10):

Also the baudrate must be configured. 4 different settings for the baudrate are available:

DIP-switch	9 10		(0:OFF; 1: ON)
	0 0	→	baudrate: 4800 Bd
	1 0	→	baudrate: 9600 Bd
	0 1	→	baudrate: 19200 Bd
	1 1	→	baudrate: 38400 Bd

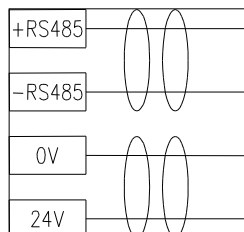
## 2 Address

Based on the communication protocols Modbus®-RTU / S-Bus Data Mode register will be assigned as addresses for each bus compatible temperature sensor.  
For analogue inputs register in format „Word“ are used.

### Bus compatible temperature sensor – Register:

Function	Modbus®-RTU	S-BUS
PT1000 [0,01°C] 20000..32767: - 200,0 to 327,67°C	Inputregister 0	100
PT1000 temperature [0,1°C] -2000..8000: - 200,0 to 800,0° C	Inputregister 3	103
HW + SW Info	1000-1001	1000-1001

### Connecting diagram:



## LED Functions

Flashing green LED  
Flasing red LED

### Reason:

Red and green LED  
Flashing simultaneously

Slave addressed and command carried out  
**no bus connection**

wrong busmode  
wrong baudrate  
wrong parity

+/- interchanged on bus

Bus failure because of 2 same slave addresses in network

wrong register address  
or no implemented order