

## TEHR-MB Room Temperature Transmitters with Modbus

TEHR-MB temperature transmitters have been designed for accurate measurement of temperature. The temperature measurement signal is available as 0..10Vdc output and over the Modbus Communication network.

TEHR-MB transmitters can be installed on wall surface or on junction box in dry indoor environment. TEHR-MB-N is like TEHR-MB, but with a display for temperature.

The TEHR-MB Modbus sensors have also an additional 0..10Vdc AO3 output channel that is available for control over Modbus. This can be used, for example, for zone valve demand. The unit can also act as a stand-alone P-controller.

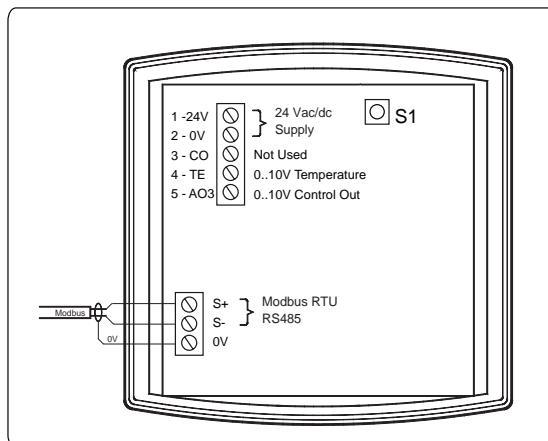


### Features

- Modbus RTU Room Temperature Sensor
- Available with or without Display
- Additional 0..10Vdc Channel available over Modbus for Control
- 24Vac/dc Power Supply

Model Type	Model	Description
	<b>TEHR-MB</b>	Room Temperature Transmitter with Built-In Modbus and Aux Analogue Output Channel
	<b>TEHR-MB-N</b>	Room Temperature Transmitter with Built-In Modbus, Display and Aux Analogue Output Channel
<b>Technical Data</b>	Power supply	24Vac (15...28V) / 0.5VA 24Vdc (15...36V) / 0.5W
	Display (-N Models)	LCD Display for Showing Temperature
	Outputs	Temperature: 1 x 0..10V < 2mA Modbus Channel: 1 x 0..10V < 2mA
	Temperature Range	0..50°C
	Accuracy - Temperature	±0.5°C
	Communications	Modbus RTU, Parity None, 9k6, 19k2 or 38k4 Baud Rate Note: Modbus settings available using HDH-C accessory
	Operating temperature	0°C...+50°C
	Ambient humidity	0...95%rh (non-cond.)
	Housing	ABS-plastic, IP 20
	Dimensions	W87 x H86 x D32mm
<b>Wiring Terminals</b>	1 - 24V	24Vac/dc power supply
	2 - 0V	0V common
	3 - CO	Not In Use
	4 - TE	Temperature output: 0..10Vdc = 0...50°C
	5 - AO3 (RH)	0..10Vdc Channel over Modbus or Temperature Control Output

S+ Modbus RS485+  
 S- Modbus RS485-  
 0V 0V for Modbus



**TEHR-MB Transmitter - Adjustments via HDH-C Configuration Module**

The TEHR-MB transmitter comes from the factory configure with Modbus speed 9600 bps and Modbus slave address 1. To re-program the settings HDH-C configuration option needs to be fitted on the TEHR-MB transmitter.

To change the TEHR-MB Modbus settings using HDH-C tool, please use the following instructions (for further info please refer to HDH-C data sheet).

- Fit the HDH-C unit on the TEHR-MB transmitter display connectors
- Power up the TEHR-MB
- Press + and - continously for 5 seconds, APPL = CAL calibration display is shown
- Press + or - button, APPL = MOD is displayed
- Press OK to show Modbus slave address. Press +/- to modify the slave address.
- Press OK to the baud rate. Press +/- to modify the baud rate.
- Press OK and the new settings are saved

**AO3 Mode Selection**

TEHR-MB has additional analogue output that can be set over the Modbus. The analogue output can also be configured to operate as a control output based on the temperature. The analogue output can be used for local control, or any other control purposes over the Modbus network, e.g. controlling a zone valve.

**To Configure AO3 to Operate as a Fixed Value Set Over the Modbus**

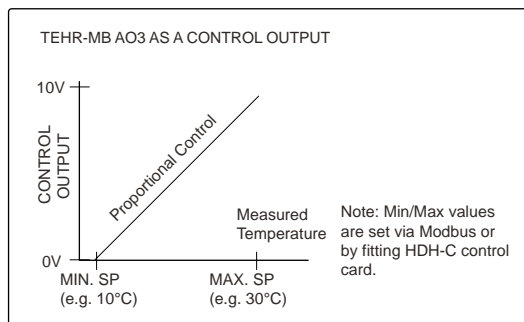
1. Enable AO3 Overdrive Enable (Modbus Coil)
2. Set the required value on the Aout3 Overdrive Value (Modbus Holding Register Write)

The output AO3 is now fixed to the value set in the Aout3 Overdrive Value register.

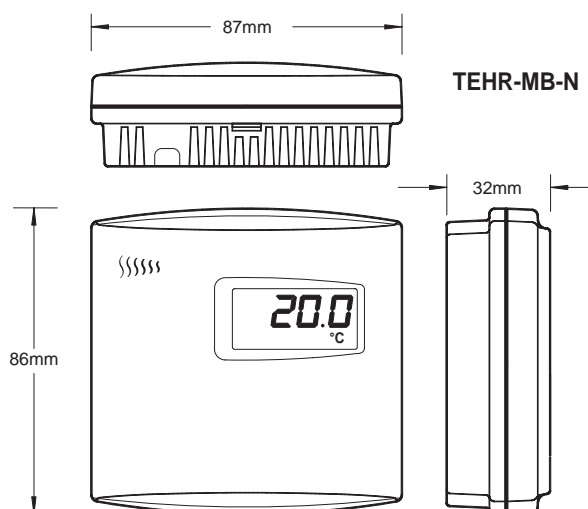
**To Configure AO3 to Operate as Temperature Control Output**

1. Disable AO3 Overdrive Enable (Modbus Coil) - if enabled
2. Set the Aout3 Select Mode to 2 or 4 (Modbus Holding Register Write).
3. Set the required TE Control Low Limit and TE Control High Limit settings.

The output AO3 is now controlled based on the measured temperature and the set limits (see diagram).



**Dimensions**



**MODBUS REGISTERS - TEHR-MB V2.0**

The TEHR-MB transmitter supports the following Modbus registers and function codes. The default communication speed is 9600 bps, 8 data bits, Parity None and 1 Stop Bit. The default Modbus Slave address is 1.

Please note that Modbus register space is specified from the Modbus master perspective as in the Modbus Application Protocol specification. The Modbus registers for Function Codes 02, 03, 06 and 16 have presentation for both Modbus "address blocks" and for actual Modbus register offsets. For example, the Temperature is read from Modbus register 11 using Function Code 04. Some Modbus masters will require Function Code 04, register 1 to be entered, whereas the others will require register 30011 and Function Code 04. T

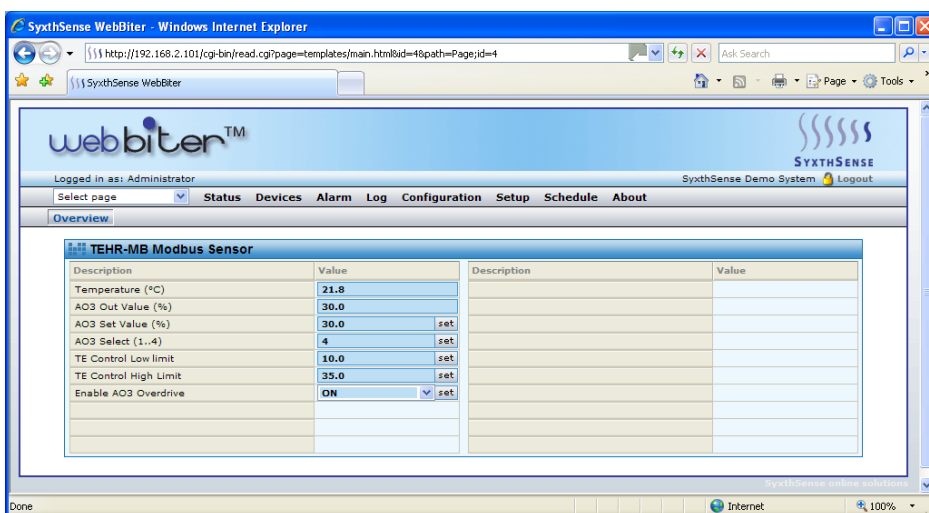
Register	Parameter Description	Data Type	Raw Data	Range
FUNCTION CODE 01 - READ COILS FUNCTION CODE 05 - WRITE SINGLE COIL FUNCTION CODE 15 - WRITE MULTIPLE COILS				
1	AO3 Overdrive Enable	Bit 0		On - Off
FUNCTION CODE 02 - READ DISCRETE INPUTS				
10001	Demo: Display Stopped (TEHR-MB-N Model)	Bit 0		On - Off
FUNCTION CODE 03 - READ HOLDING REGISTERS				
40001	Coils 16-01	Unsigned 16	0..0xFFFF	
40002	Aout3 Select	Unsigned 16	0..4	0..4
40005	TE Control Low Limit	Signed 16	0..480	0.0...48.0°C
40006	TE Control High Limit	Signed 16	20...500	2.0...50.0°C
30009	Aout3 Overdrive Value	Signed 16	0...1000	0.0...100.0%
FUNCTION CODE 04 - READ INPUT REGISTERS				
30001	Coils 16-01	Unsigned 16	0..0xFFFF	
30002	Aout3 Select	Unsigned 16	0..4	0..4
30005	TE Control Low Limit	Signed 16	0..480	0.0...48.0°C
30006	TE Control High Limit	Signed 16	20...500	2.0...50.0°C
30009	Aout3 Overdrive Value	Signed 16	0...1000	0.0...100.0%
30011	TE Temperature	Signed 16	0...500	0.0...50.0°C
30013	Aout3 Value	Signed 16	0...1000	0.0...100.0%
FUNCTION CODE 06 - WRITE SINGLE HOLDING REGISTER FUNCTION CODE 16 - WRITE MULTIPLE HOLDING REGISTERS				

Register	Parameter Description	Data Type	Raw Data	Range
40001	Coils 16-01	Unsigned 16	0..0xFFFF	
40002	Aout3 Select	Unsigned 16	0..4	0..4
40005	TE Control Low Limit	Signed 16	0...480	0.0...48.0°C
40006	TE Control High Limit	Signed 16	20...500	2.0...50.0°C
40009	Aout3 Overdrive Value (Set over Modbus)	Signed 16	0...1000	0.0...100.0%

**Example Modbus Master Screen**

The below screen shows typical Modbus values displayed on the SyxthSense WebBiter Modbus master / web-browser interface.

WebBiter NET-CAB485 Wiring  
 S+ = Orange White (RS485+)  
 S- = Orange (RS485-)



**Example Network Diagram**

