MAIN FEATURES

- *Single Transmitter to measure Ambient Temperature and Relative Humidity.*
- *Ambient Temperature Range is -40 - 60 deg. C (typical).*
- *RH range 0-100% (typical).*
- *Temperature Output voltage range -0.4VDC @ -40 deg.C to 0.6VDC @ 60 deg. C .*
- *RH Output voltage range 0.00VDC @ 0 RH% to 1.0VDC @ 100 RH%.*
- RS485 interface using the Modbus RTU command. (Optional).
- *Low power consumption*
- *Excellent long term stability*

DESCRIPTION

MTH-200 is an advanced transmitter for measuring Relative Humidity and Ambient Temperature with a high precision and high accuracy .

MTH-200 is combined Humidity and temperature probe for use in meteorology and similar demanding applications for example Weather Stations , tunnels , airports etc.

Except for the sensor element , MTH-200is protected against unintentional penetration of Humidity.

Its linear voltage output has been matched to the requirements of data collection and transmission systems.

MTH-200 is RS485 interface using the Modbus RTU command. (Optional).

MTH-200 is factory adjusted before delivering , for which reason checking upon reception of the instrument is not necessary as a rule. The probe is ready for a reliable measurements 5 sec after being switched on.

The **MTH-200** offers possibility of Offset adjustment for both Temperature and RH read out using two push buttons installed on the main board inside the sensor .

The **MTH-200** provides an output signals for both Temperature and Humidity. For temperature the output voltage range is -0.4VDC @ -40 deg.C to 0.6VDC @ 60 deg. C . For Humidity the output voltage range is 0.00VDC @ 0 RH% to 1.0VDC @ 100 RH%.

TECHNICAL DATA

Ranges
Temperature   -40-60 deg. C.
Relative Humidity   0-100 %

Output signal
Temperature   -0.4 VDC - 0.6 VDC
Relative Humidity   0.00 VDC - 1.0 VDC

Digital Communication
RS485 interface using the Modbus RTU command. (Optional).

Accuracy at 23 0C
Temperature   +- 0.5 deg. C.
Relative Humidity   +- 3 RH%

Repeatability
Temperature   +- 0.1 deg. C.
Relative Humidity   +- 0.5 RH%

Response time
τ (63%) (5 sec typical)

Long Term Stability for Humidity
Relative Humidity   <0.5 RH% / Year

Input Power
From 7VDC up to 30VDC (12VDC typical power).

Characteristic
Linear

Isolation voltage
500 Vac

Storage temp.
-40-70℃

ELECTRICAL CONNECTIONS

Cable Connection

PIN 1 – Input Power . (12 VDC typical)   - *Red*
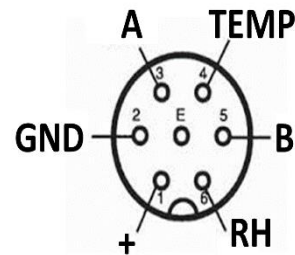
PIN 2 – Ground - *Black*

PIN 3 – RS485 (A) - *Yellow*

PIN 4 – Ambient Temperature output voltage - *White*
RANGE (-0.4VDC - 0.6VDC)

PIN 5 – RS485 (B) - *Brown*

PIN 6 – Relative Humidity - *Green*
RANGE (-0.0VDC - 1.0VDC)

PROGRAMMING

Open the top cover you shall be able to see the two programming push buttons

TEMPERATURE OUTPUT VOLTAGE ZERO – SPAN ADJUSTMENTS
- Press Temperature Push Button and keep it pressed till Temperature LED (RED) is turned ON.
- Keep pressing the Temp. Push Button till the RH LED (Green) blinks with frequency of 0.5 HZ. The Temp. output voltage should be -0.4VDC (ZERO) .
- If adjustment is needed , Temp. Push Button to increase the output voltage , and RH Push Button to decrease the output voltage .
- After adjustment is complete , Press both Temperature Push Button and RH Push Button together , both LED's will be ON for 1 sec , then both will turn OFF for 0.5 Sec.
- Temp. LED (RED) will be ON again and the RH LED (Green) blinks with higher frequency of 0.25 HZ. The Temp. output voltage should be 0.6VDC (FULL SCALE) .
- If adjustment is needed , Temp. Push Button to increase the output voltage , and RH Push Button to decrease the output voltage .
- After adjustment is complete , Press both Temperature Push Button and RH Push Button together , both LED's will be OFF. And temperature output calibration is completed.

RH OUTPUT VOLTAGE ZERO – SPAN ADJUSTMENTS
- Press RH Push Button and keep it pressed till RH LED (GREEN) is turned ON.
- Keep pressing the RH Push Button till the Temp. LED (RED) blinks with frequency of 0.5 HZ. The RH. output voltage should be -0.0VDC (ZERO) .

- If adjustment is needed , Temp. Push Button to increase the output voltage , and RH Push Button to decrease the output voltage .
- After adjustment is complete , Press both Temperature Push Button and RH Push Button together , both LED's will be ON for 1 sec , then both will turn OFF for 0.5 Sec.
- RH. LED (GREEN) will be ON again and the Temp. LED (RED) blinks with higher frequency of 0.25 HZ. The RH. output voltage should be 1.0VDC (FULL SCALE) .
- If adjustment is needed , Temp. Push Button to increase the output voltage , and RH Push Button to decrease the output voltage .
- After adjustment is complete , Press both Temperature Push Button and RH Push Button together , both LED's will be OFF. And RH. output calibration is completed.

TEMPERATURE AND RH CALIBRATION

- Press both Temperature and RH Push Button together and keep them pressed.
- Both Temperature LED (RED) and RH LED (GREEN) is turned ON alternatively (one ON the other is OFF).
- There will be a time where both LEDS are ON together for the first time (TEMP. CALIBRATION MODE).
- If both Push Buttons are kept pressed , then alternative blinking will start again . and for the second time both LEDS are ON together (RH. CALIBRATION MODE).

TEMPERATURE CALIBRATION

- When both LEDS are ON together for the first time (TEMP. CALIBRATION MODE).
- Release both Push Buttons . Temp LED (RED) will be ON while the RH. LED (GREEN) will be blinking with frequency of 0.5 HZ. The Temp. output voltage should read the ambient temperature..
- If adjustment is needed , Temp. Push Button to increase the output voltage , and RH Push Button to decrease the output voltage .
- After adjustment is complete , Press both Temperature Push Button and RH Push Button together , both LED's will be ON for 1 sec , then both will turn OFF .

RH CALIBRATION

- When both LEDS are ON together for the second time (RH. CALIBRATION MODE).
- Release both Push Buttons . RH. LED (GREEN) will be ON while the TEMP. LED (RED) will be blinking with frequency of 0.5 HZ. The RH. output voltage should read the ambient RH%.
- If adjustment is needed , Temp. Push Button to increase the output voltage , and RH Push Button to decrease the output voltage .
- After adjustment is complete , Press both Temperature Push Button and RH Push Button together , both LED's will be ON for 1 sec , then both will turn OFF for 0.5 sec.
- RH. LED (GREEN) will be ON again and the Temp. LED (RED) blinks with higher frequency of 0.25 HZ. The RH. output voltage should be 1VDC (FULL SCALE) .

- If adjustment is needed , Temp. Push Button to increase the output voltage , and RH Push Button to decrease the output voltage .
- After adjustment is complete , Press both Temperature Push Button and RH Push Button together , both LED's will be OFF. And calibration is done.

MODBUS

RTU Mode

Modbus network is set for RTU (Remote Terminal Unit) mode, each eight-bit byte in a message contains two four-bit hexadecimal characters.

READING DATA FROM MTH-200 "SLAVE HOLDING REGISTER"

Request From Master
The request message specifies the starting register and quantity of registers to be read.

Example of a request to read 0...1 (register 40001 to 40002) from slave device 1:

Field Name	RTU (hex)
Slave Address	01
Function	03
Starting Address Hi	00
Starting Address Lo	00
Quantity of Registers Hi	00
Quantity of Registers Lo	02
Error Check Lo	C4
Error Check Hi	0B

Response from Slave "MTH-200"
The register data in the response message are packed as two bytes per register, with the binary contents right justified within each byte. For each register the first byte contains the high-order bits, and the second contains the low-order bits.

Two more registers are reserved for any more data might be required to be transmitted like calculated Dew Point (if needed).

Example of a response to the request: Temp. = 21.55 0C   %RH – 75.25

Field Name	RTU (hex)
Slave Address	01
Function	03
Byte Count	0C
Temp. Data Hi	00
Temp. Data Lo	21
Temp. Decimal Data Hi	00
Temp. Decimal Data Lo	55
%RH Data Hi	00
%RH Data Lo	75
%RH Decimal Data Hi	00
%RH Decimal Data Lo	25
RESERVED Data1 Hi	00
RESERVED Data1 Lo	00
RESERVED Data2 Hi	00
RESERVED Data2 Lo	00
Error Check Lo	DA
Error Check Hi	31

Write Single Register (Slave Address)

Request From Master
Example of a request to change Slave Address device from 1 to 3:

Field Name	RTU (hex)
Slave Address	01
Function	06
Register Address Hi	00
Register Address Lo	00
Write Data Hi	00
Write Data Lo	03
Error Check Lo	9A
Error Check Hi	9B

Response from Slave "MTH-200"

Field Name	RTU (hex)
New Slave Address	03
Function	06
Coil Address Hi	00
Coil Address Lo	00
New Slave Address Hi	00
New Slave Address Lo	03
Error Check Lo	C9
Error Check Hi	CB

Read Single Register (Slave Address)

Request From Master
Example of a request to read Slave Address :

Field Name	RTU (hex)
Read Slave Address	FF
Function	07
Register Address Hi	00
Register Address Lo	00
Register Address Hi	00
Register Address Lo	00
Error Check Lo	A1
Error Check Hi	D4

Response from Slave "MTH-200"

Field Name	RTU (hex)
Read Slave Address	FF
Function	07
Register Address Hi	00
Register Address Lo	00
Slave Address Hi	00
Slave Address Lo	01
Error Check Lo	60
Error Check Hi	14

HOW TO ORDER

MTH-200 – AA – BB – CC – DD-EE

AA – Temperature Range , Please write directly
-40 – 60 0C (TYPICAL)

BB – RH Range , Please write directly
0% – 100% (TYPICAL)

CC – Output Voltage
TEMPERATURE : -0.4 – +0.6 VDC (TYPICAL)
R. HUMIDITY % : -0.0 – +1.0 VDC (TYPICAL)
MODBUS- RS485
OTHERS (PLEASE SPECIFY)

DD – Supply Voltage
12 VDC (TYPICAL)

EE – Other Requirements
Please specify