

# USER GUIDE FOR AMBIENT & PROCESS HUMIDITY & TEMPERATURE SENSOR WITH MODBUS OUTPUT MBRTU-ATH

MBRTU-ATH-MN-EN-01	JUN-2021
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*This document is applied for the following products*

<b>SKU</b>	MBRTU-ATH	<b>HW Ver.</b>	2.5	<b>FW Ver.</b>	5.1
<b>Item Code</b>	MBRTU-ATH-15-300	PROCESS HUMIDITY AND TEMPERATURE SENSOR, -40 .. +120 C, 300MM PROBE, ALL 304SS MATERIAL, SLIDING-FLANGE, RS485/MODBUSRTU, 7..48VDC SUPPLY, M12-M CONNECTOR			

## 1. Functions Change Log

<b>HW Ver.</b>	<b>FW Ver.</b>	<b>Release Date</b>	<b>Function Change</b>
2.5	5.1	-2020	Innitial FW

## 2. Introduction

MBRTU-ATH Humidity and Temperature Sensor utilizes digital temperature sensor delivers high accuracy measurement in range -40°C to + 85°C for ambient version or -40°C to + 120°C for Process version. Output is Modbus RTU for easily integrating with any PLC, controller, SCADA, BMS or IoT gateway.

- Digital sensor technology;
- High accuracy;
- Standard ModbusRTU output;
- Plug & Play.

PROCESS HUMIDITY & TEMPERATURE SENSOR  
WITH MODBUS OUTPUT



MBRTU-ATH-H4.PNG

### 3. Specification

SENSOR SPECIFICATION for AMBIENT VERSION	
Sensor	Digital type, factory calibrated, output both Humidity & Temperature values
Humidity measuring range	0 .. 100 %RH
Humidity accuracy	+/- 3.0%
Humidity resolution	0.1%
Temperature measuring range	-40 .. + 85 °C
Temperature accuracy	+/- 1.0 °C
Temperature resolution	0.1 °C
Sensor Filter	PA (for integrated version) OR 20um Alloy sintered filter (for sensor with cable)
SENSOR SPECIFICATION for PROCESS VERSION	
Sensor	Digital type, factory calibrated, output both Humidity & Temperature values
Humidity measuring range	0 .. 100 %RH
Humidity accuracy	+/- 1.8% RH typical in 30-70%RH range and 0-80 oC
Humidity resolution	0.1%
Temperature measuring range	-40 .. + 120 °C

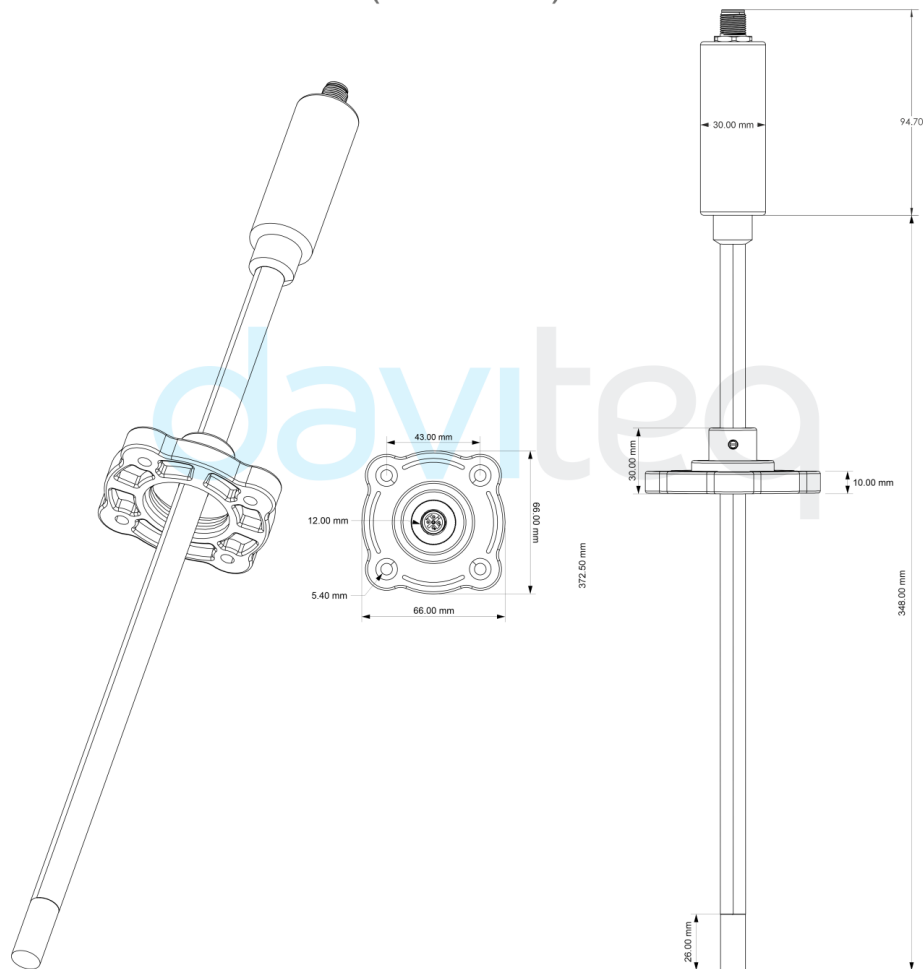
Temperature accuracy	+/- 0.5 °C in 0-100 °C range
Temperature resolution	0.1 °C
Sensor Filter	20um Alloy sintered filter (for sensor with cable)
Sensor Probe	12mm diameter, 304SS with sliding flange Probe length: 300mm, 600mm, 900mm
Working pressure	atmosphere
<b>SENSOR SPECIFICATION for OUTDOOR AMBIENT VERSION -ATHP</b>	
Sensor	Digital type, factory calibrated, output both Humidity & Temperature values
Humidity measuring range	0 .. 100 %RH
Humidity accuracy	+/- 1.8% RH typical in 30-70%RH range and 0-80 oC
Humidity resolution	0.1%
Temperature measuring range	-40 .. + 120 °C
Temperature accuracy	+/- 0.5 °C in 0-100 °C range
Temperature resolution	0.1 °C
Barometric Pressure range	300 .. 1200 mbar abs. (in -20 .. + 85 °C)
Pressure accuracy	+/- 4 mbar (in full measurement range as above)
Pressure resolution	0.1 mbar
Outdoor protection	IP67 electronics housing with Radiation shield with filter for sensor parts
<b>TRANSMITTER SPECIFICATION</b>	
Communication Port	RS485, ModbusRTU protocol, max 19200 baud
Power supply	7..48VDC, avg. < 200mA
Connector	M12-male 4-pin Code A
Working temperature	-40 .. 85 °C
Working humidity	0 .. 100% RH
Housing	304SS
Rating	IP67
Dimension	H100xD30 (without sensor cable)
Mounting	AMBIENT: SS304 L type bracket for wall mounting PROCESS: integral on probe
Net weight	<200 grams

## 4. Product components



## 5. Dimensions

# DIMENSION DRAWINGS OF PROCESS HUMIDITY & TEMPERATURE SENSOR MBRTU-ATH-15-... (Unit: mm)



MBRTU-ATH-H5.PNG

## 6. Wiring

### 6.1 Electrical connector



**M12-Male  
Connector**

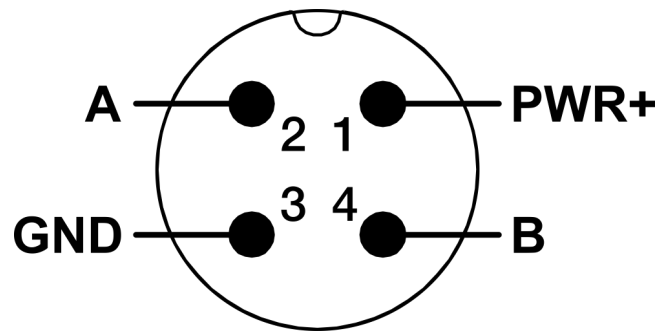


**M12-Female  
Connector**



## 6.2 Pinout

**i** Because the sensor uses an M12 electrical connector, please look closely at the pinouts of the M12 electrical connector as shown below.



**A - B:** RS485/ModbusRTU Output

**PWR+:** Power supply 7..48VDC

**GND:** Ground, 0VDC

## 7. Configuration

### 7.1 Offline Configuration

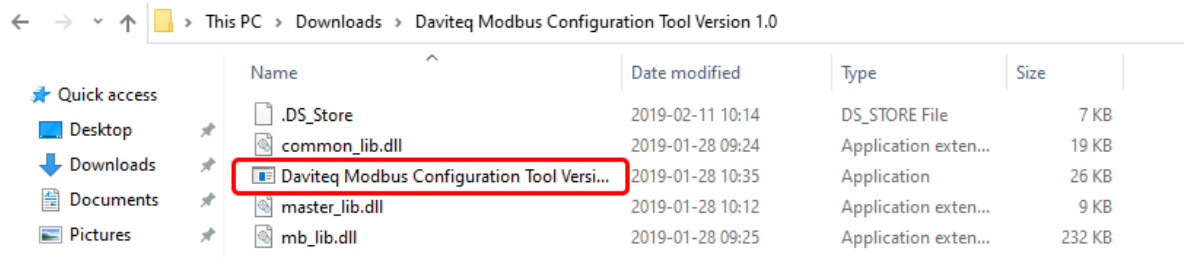
You can download Daviteq Modbus Configuration Tool with the following link:

<https://filerun.daviteq.com/wl/?id=yDOjE5d6kqFIGNVVIMdFg19Aad6aw0Hs>

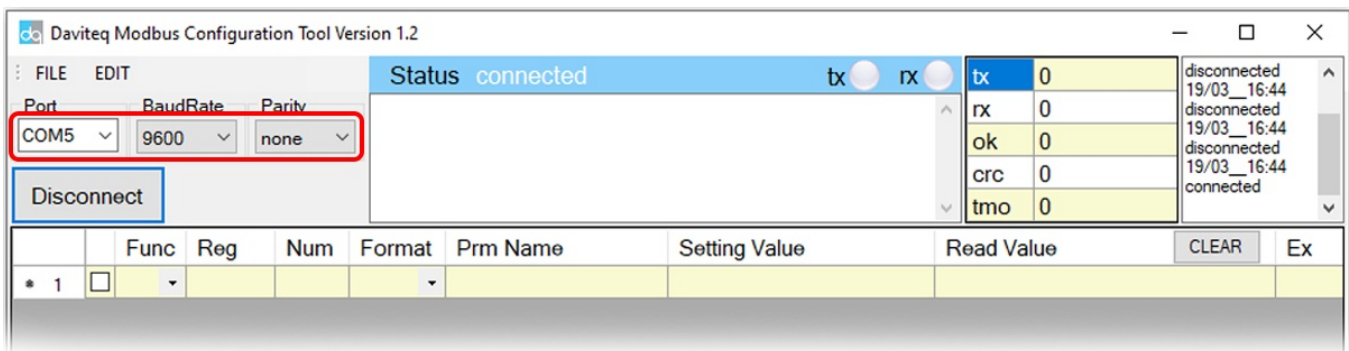
**Template File:** <https://filerun.daviteq.com/wl/?id=pTIOMMJNK1wF9JBszKybiupqoeWapD58>

**How to use the Modbus configuration software**

- Unzip file and run file application "Daviteq Modbus Configuration Tool Version"

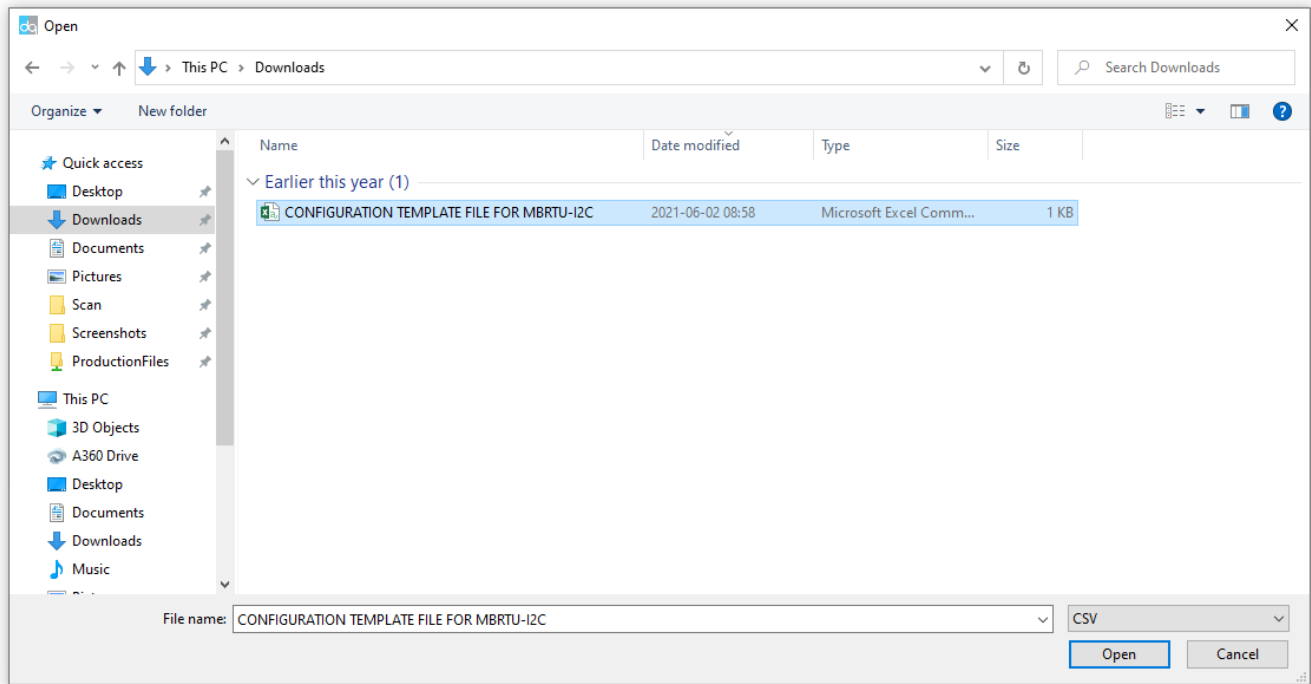


- Choose **COM Port** (the Port which is USB cable plugged in)
- Set the **BaudRate: 9600, Parity: none**



- Click "**Connect**" until the Status displays "**disconnected**" to "**connected**". It means the modbus sensor is

- being connected with computer;
- Next, we need to import the configuration file. Go to MENU:**FILE / Import New /** => select the **template file**.



**Step 3:** Configure parameters of the sensor.

## 7.2 Memmap registers

Modbus Register (DEC)	Modbus Register (HEX)	Func Code (Read)	Func Code (Write)	# of Registers	Description	Range	Default	Format	Property	Comment
2	2	3		4	Firmware version			string	Read	
6	6	3		2	Hardware version			string	Read	
9	9	3		2	Humidity (prm1)	0..100%		float	Read	Value from sensor. This value is parameter 1 of a wireless sensor node
11	B	3		1				uint16	Read	Hi-Byte is error code, Lo-Byte is sensor type
12	C	3		2	Temperature (prm 2)			float	Read	Value from sensor. This value is parameter 2 of a wireless sensor node

14	E	3		1	Logic status of parameters			uint8	Read	Hi-Byte is Logic status of parameter 1, Lo-Byte is Logic status of parameter 2
15	F	3		2	Up-Timer 1			uint32	Read	Total time when Hi-Byte of Logic status = 1
17	11	3		2	Down-Timer 1			uint32	Read	Total time when Hi-Byte of Logic status = 0
19	13	3		2	Rising-Edge Counter 1			uint32	Read	Counter value when Hi-Byte of Logic status changes from 0 to 1
21	15	3		2	Falling-Edge Counter 1			uint32	Read	Counter value when Hi-Byte of Logic status changes from 1 to 0
23	17	3		2	Up-Timer 2			uint32	Read	Total time when Lo-Byte of Logic status = 1
25	19	3		2	Down-Timer 2			uint32	Read	Total time when Lo-Byte of Logic status = 0
27	1B	3		2	Rising-Edge Counter 2			uint32	Read	Counter value when Lo-Byte of Logic status changes from 0 to 1
29	1D	3		2	Falling-Edge Counter 2			uint32	Read	Counter value when Lo-Byte of Logic status changes from 1 to 0
256	100	3	16	1	Modbus address	1-247	1	uint16	Read/Write	Modbus address of device
257	101	3	16	1	Modbus baudrate	0-1	0	uint16	Read/Write	Baudrate: 0: 9600, 1: 19200
258	102	3	16	1	Modbus parity	0-2	0	uint16	Read/Write	Parity: 0: none, 1: odd, 2: even

280	118	3	16	2	a1	1	float	Read/Write	Scale value of parameter_1 = (a1 * Raw sensor value of parameter_1 + b1. For sensor value scale
282	11A	3	16	2	b1	0	float	Read/Write	Scale value of parameter_1 = (a1 * Raw sensor value of parameter_1 + b1. For sensor value scale
284	11C	3	16	2	a2	1	float	Read/Write	Scale value of parameter_2 = (a2 * Raw sensor value of parameter_2 + b2. For sensor value scale
286	11E	3	16	2	b2	0	float	Read/Write	Scale value of parameter_2 = (a2 * Raw sensor value of parameter_2 + b2. For sensor value scale
290	122	3	16	2	High_threshc		float	Read/Write	High threshold value for parameter 1
292	124	3	16	2	Low_threshc		float	Read/Write	Low threshold value for parameter 1
294	126	3	16	2	High_threshc		float	Read/Write	High threshold value for parameter 2
296	128	3	16	2	Low_threshc		float	Read/Write	Low threshold value for parameter 2

## 8. Installation

### 8.1 Height adjustment



The flange can be moved throughout the sensor body and can be fixed with the M2 countersunk



## 8.2 Accessory installation

**i** The accessories are installed as shown



## 8.3 Filter

⚠ Please avoid contaminating the sensor filter when installing to get the most accurate measurement



Alloy sintered filter

## 9. Applications

### MONITORING AMBIENT HUMIDITY & TEMPERATURE WITH PROCESS SENSOR PROBE



MBRTU-ATH-H6.PNG

## 10. Support contacts



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