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

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|---|---|
| MBRTU-ATH-MN-EN-01 | JUN-2021 |

*This document is applied for the following products*

| | | | | | |
|---|---|---|---|---|---|
| **SKU** | MBRTU-ATH | **HW Ver.** | 2.5 | **FW Ver.** | 5.1 |
| **Item Code** | 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

| HW Ver. | FW Ver. | Release Date | Function Change |
|---|---|---|---|
| 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℃ to + 85℃ for ambient version or -40℃ to + 120℃ 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.




# 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 ℃ |
| Temperature accuracy | +/- 1.0 ℃ |
| Temperature resolution | 0.1 ℃ |
| 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 ℃ |

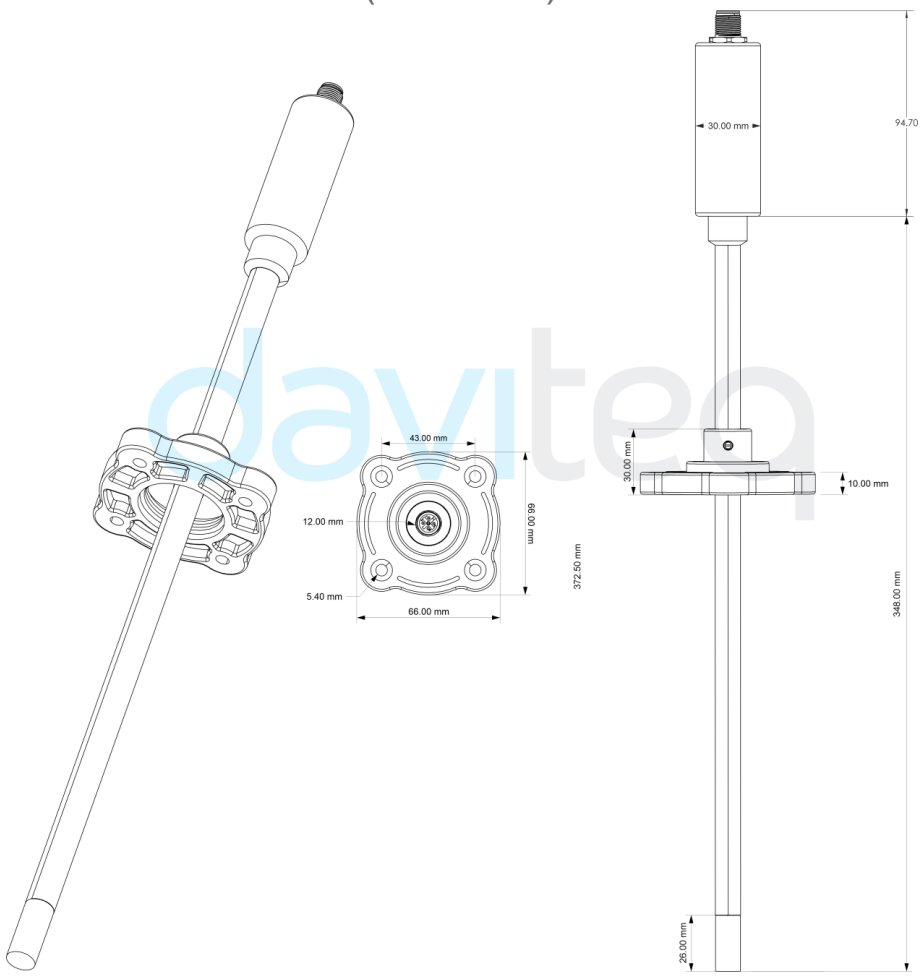
| | |
|---|---|
| Temperature accuracy | +/- 0.5 ℃ in 0-100 ℃ range |
| Temperature resolution | 0.1 ℃ |
| Sensor Filter | 20um Alloy sintered filter (for sensor with cable) |
| Sensor Probe | 12mm diameter, 304SS with sliding flange<br>Probe length: 300mm, 600mm, 900mm |
| Working pressure | atmosphere |
| **SENSOR SPECIFICATION for OUTDOOR AMBIENT VERSION -ATHP** | |
| 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 ℃ |
| Temperature accuracy | +/- 0.5 ℃ in 0-100 ℃ range |
| Temperature resolution | 0.1 ℃ |
| Barometric Pressure range | 300 .. 1200 mbar abs. (in -20 .. + 85 ℃) |
| 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 |
| **TRANSMITTER SPECIFICATION** | |
| 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 ℃ |
| Working humidity | 0 .. 100% RH |
| Housing | 304SS |
| Rating | IP67 |
| Dimension | H100xD30 (without sensor cable) |
| Mounting | AMBIENT: SS304 L type bracket for wall mounting<br>PROCESS: integral on probe |
| Net weight | <200 grams |

# 4. Product components




# 5. Dimensions

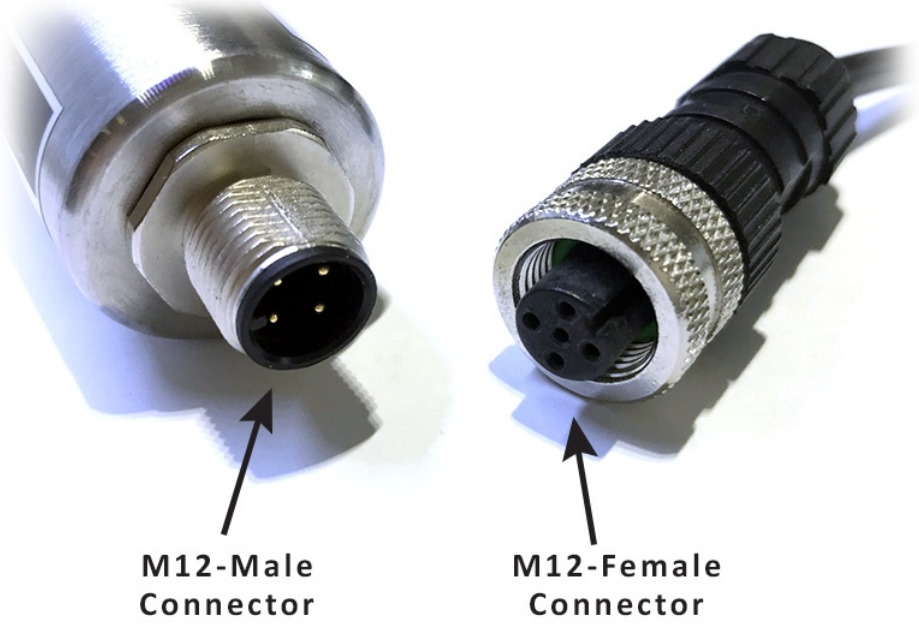
**DIMENSION DRAWINGS OF**
**PROCESS HUMIDITY & TEMPERATURE SENSOR**
**MBRTU-ATH-15-...**
(Unit: mm)




MBRTU-ATH-H5.PNG

# 6. Wiring

## 6.1 Electrical connector

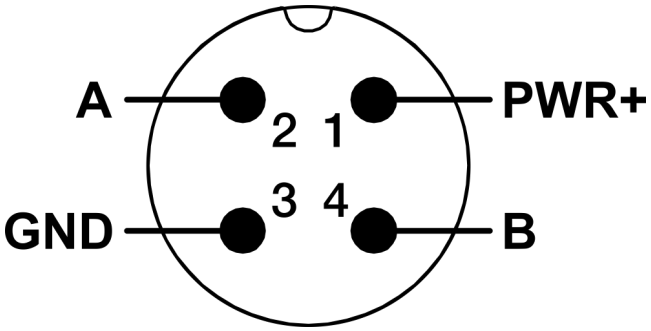






## 6.2 Pinout

**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

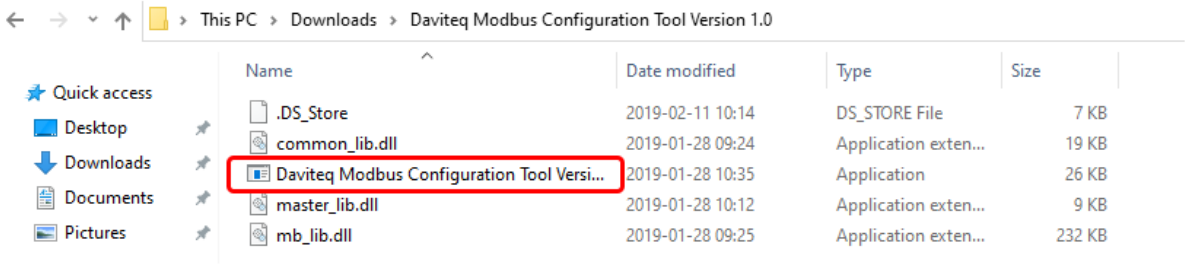
You can download Daviteq Modbus Configuration Tool with the following link:

**https://filerun.daviteq.com/wl/?id=yDOjE5d6kqFlGNVVlMdFg19Aad6aw0Hs**

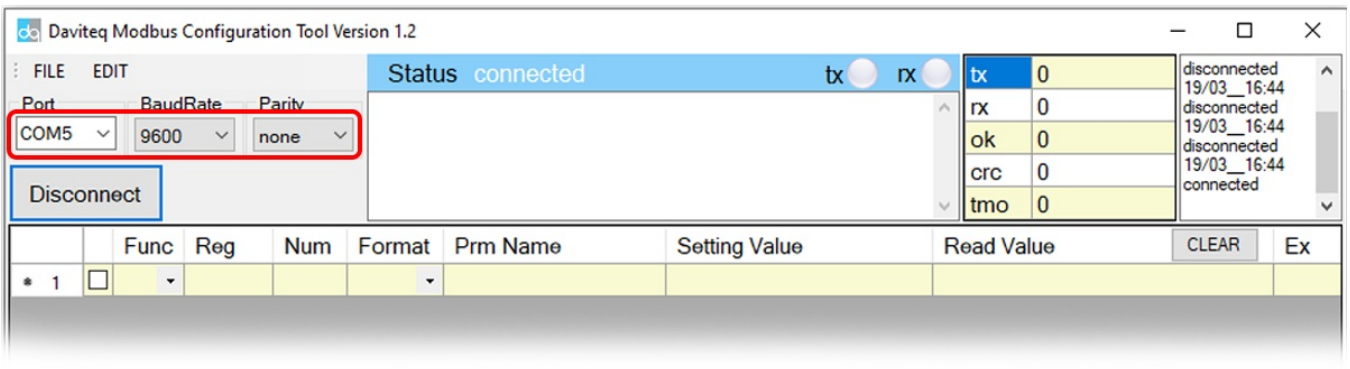
**Template File: https://filerun.daviteq.com/wl/?id=pTlOMMJNK1wF9JBszKybiupqoeWapD58**

**How to use the Modbus configuration software**

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

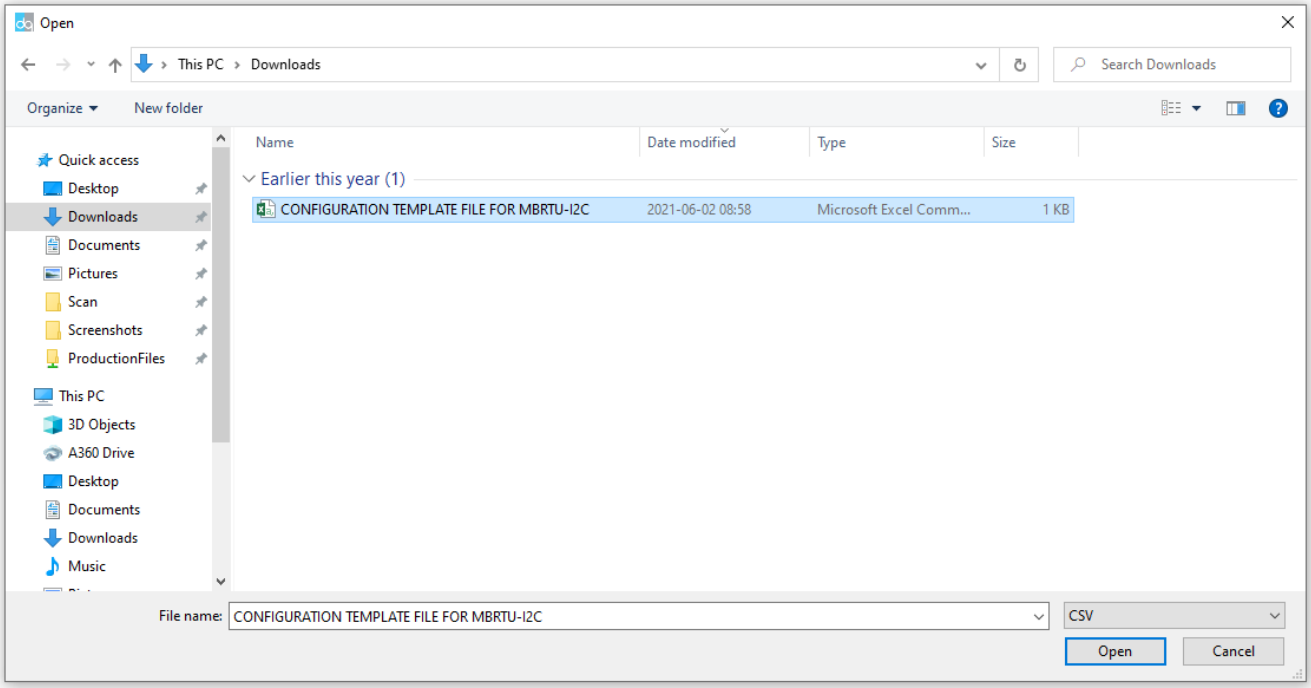



- Choose **COM Port** (the Port which is USB cable plugged in)
- Set the **BaudRate: 9600**, **Parity: none**




- Click " **Connect** " untill 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_thresh | | | float | Read/Write | High threshold value for parameter 1 |
| 292 | 124 | 3 | 16 | 2 | Low_thresho | | | float | Read/Write | Low threshold value for parameter 1 |
| 294 | 126 | 3 | 16 | 2 | High_thresh | | | float | Read/Write | High threshold value for parameter 2 |
| 296 | 128 | 3 | 16 | 2 | Low_thresho | | | 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**

**hex nut.**




## 8.2 Accessory installation

**The accessories are installed as shown**



## 8.3 Filter

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



# 9. Applications




# 10. Support contacts

Manufacturer
**Daviteq Technologies Inc**

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