# AKO Industrial Equipment

®

## Temperature & Humidity Transmitter TH Series

## Instruction Manual

*Duct type*     *Room type*

**Please read the following safety considerations before use.**

## Safety considerations

*Please observe all safety considerations for safe and proper product operation to avoid hazards.*

*Warning:* Fail-safe device must be installed when using the unit with machinery that may cause serious injury or economic loss.(e.g. nuclear power control, medical equipment, ships, railways, aircraft, combustion, safety equipment, etc.)

*Warning:* Do not connect, repair or inspect the unit while connected to a power source.

*Warning:* Do not disassemble or modify the unit, please contact us if necessary.

*Warning:* check input power specification and check power terminal polarity before connecting the power source.

*Caution:* Do not use the unit outdoors.

*Caution:* Do not touch the temperature \ humidity Sensor by hands.

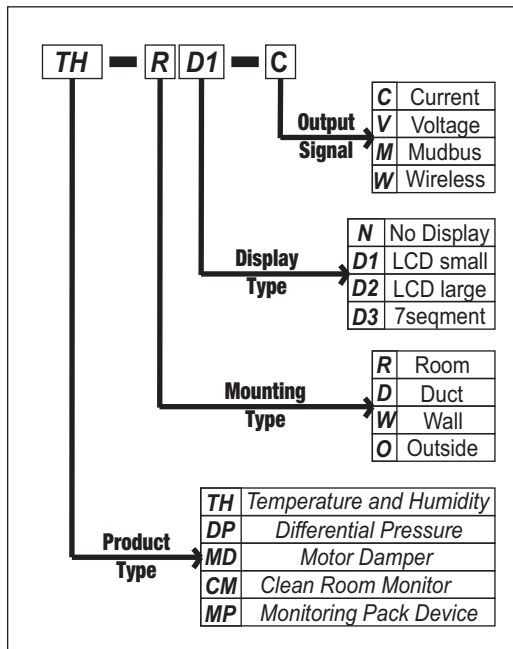*Caution:* Do not use the water or oil-based detergent when clean the unit.

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*Caution:* Do not use the unit where flammable or explosive gas, direct sunlight, radiant heat, vibration or impact may be present.

*Caution:* keep dust and wire residue from flowing into the unit.
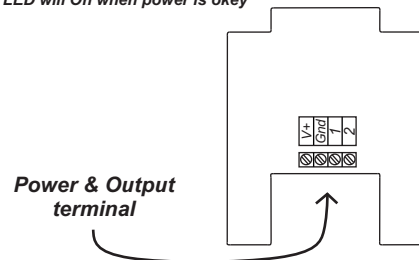
*Caution During use:*

1. Do not store at the high temperature /humidity environment.
2. For cleaning use dry towel and do not use acid ,chrome acid, solvent but alcohol.
3. Separate the unit cable from high voltage line. power line to avoid inductive noise.
4. installation environment: it shall be used indoor and pollution degree 2

**Failure to follow these instruction may result in product damage.**
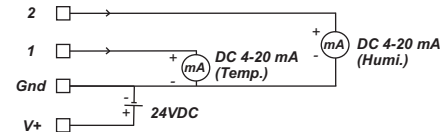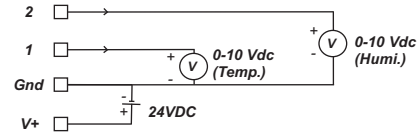
## Ordering Information

TH — R D1 — C

| | |
|---|---|
| **Output Signal** | |
| C | Current |
| V | Voltage |
| M | Mudbus |
| W | Wireless |

| | |
|---|---|
| **Display Type** | |
| N | No Display |
| D1 | LCD small |
| D2 | LCD large |
| D3 | 7seqment |

| | |
|---|---|
| **Mounting Type** | |
| R | Room |
| D | Duct |
| W | Wall |
| O | Outside |

| | |
|---|---|
| **Product Type** | |
| TH | Temperature and Humidity |
| DP | Differential Pressure |
| MD | Motor Damper |
| CM | Clean Room Monitor |
| MP | Monitoring Pack Device |

## Terminal Connection

*Yellow LED will On when power is okey*

**Power & Output terminal**

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TH - ☐ - ☐ - C

2 →
1 →   DC 4-20 mA (Temp.)    DC 4-20 mA (Humi.)
Gnd
V+   24VDC

TH - ☐ - ☐ - V

2 →
1 →   0-10 Vdc (Temp.)    0-10 Vdc (Humi.)
Gnd
V+   24VDC

TH - ☐ - ☐ - M

2 B(+)    B (+) **Master device**
1 A(-)    A (-)
Gnd    B (+) **Slave device**
V+   24VDC    A (-)
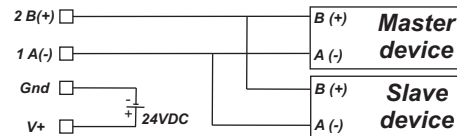
## Set Measuring rang

*Measuring range is Multi range and can set by 2 Dip switches.*

TH - ☐ - ☐ - C
TH - ☐ - ☐ - V

ON   DIP
1 2 3 4
**Sw1**
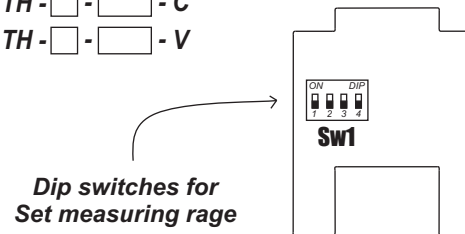
**Dip switches for Set measuring rage**

| Sw1 | | Temperature Range |
|---|---|---|
| **S1** | **S2** | |
| Off | Off | 0 … +50 'c |
| Off | On | 0 … 100 'c |
| On | Off | -30 … +20 'c |
| On | On | -40 … +125 'c |

## Specification

| Model | TH-D☐-☐ | TH-R☐-☐ |
|---|---|---|
| Power supply | 24 VDC ± 10% 2.4W | |
| Measuring Range | -40 ... +125°c , 0 ... 100% RH | |
| Accuracy | Humidity ±2%RH, Temperature ±0.3°c | |
| Sensitivity | Humidity ±0.1%RH, Temperature ±0.1°c | |
| Output signal | TH - ☐-☐- C ==> 4 ~20 mA<br>TH - ☐-☐- V ==> 0 ~ 10 Vdc<br>TH - ☐-☐- M ==> Modbus RTU<br>TH - ☐-☐- W ==> WIFI (Wirless) | |
| Resolution | 16 Bit | |
| Protection class | IP 65 | |
| Cable | Ø 0.5mm , 4-Wire | |

## Certificate of Calibration

y = 0.9955x + 0.1649
R² = 1
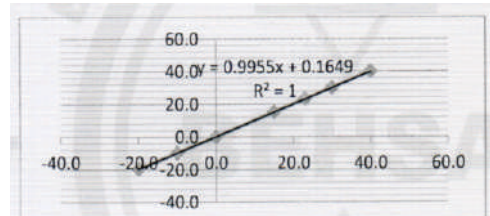
| NO. | REF. TEMP °C | UUC TEMP °C | ERROR °C | EXP.UN °C |
|---|---|---|---|---|
| 1 | -20.0 | -19.7 | 0.3 | |
| 2 | -10.0 | -9.8 | 0.2 | |
| 3 | 0.0 | 0.1 | 0.1 | |
| 4 | 15.0 | 15.1 | 0.1 | ± 0.3 |
| 5 | 23.0 | 23.1 | 0.1 | |
| 6 | 30.0 | 30.0 | 0.0 | |
| 7 | 40.0 | 40.0 | 0.0 | |

| NO. | REF. VALUE %RH | UUC READING %RH | ERROR %RH | EXP.UN %RH |
|---|---|---|---|---|
| 1 | 20.0 | 19.4 | -0.6 | |
| 2 | 40.0 | 41.8 | 1.8 | ± 1.8 |
| 3 | 60.0 | 62.4 | 2.4 | |
| 4 | 80.0 | 83.9 | 3.9 | |

# Modbus communication

## Interface

| Comm. protocol | Modbus RTU |
|---|---|
| Comm. type | Rs485 |
| Max.connection | 255unit(address:01up255) for use max 31 devices, must use Repeater |
| Comm. method | Two-wire half duplex |
| Comm. distance | Max. 500m for max 150m, must use Repeater |
| Comm. speed | 9.6 and 19.2kbps(selectable) |
| Start bit | 1-bit (fixed) |
| Data bit | 8-bit (fixed) |
| Parity bit | None (fixed) |
| Stop bit | 1-bit (fixed) |

## Modbus network connection
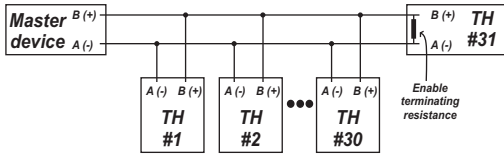


## Modbus Mapping Table

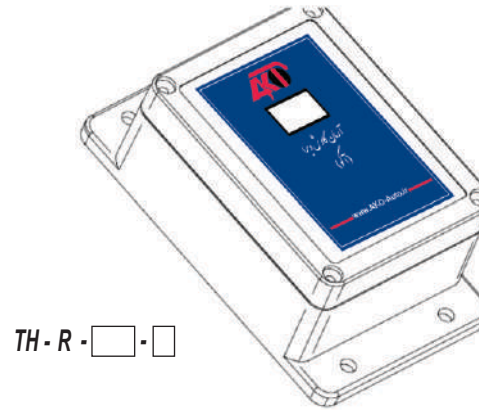| Address | Item | Remark |
|---|---|---|
| 40002 (0001) | Temperature value | Temperature value x 0.01 |
| 40003 (0002) | Humidity value | Humidity value x 0.01 |

## Modbus communication setting

TH - ☐ - ☐ - M

2 Dip switches for Set Communication Speed

sw2

Enable or Disable Terminating resistance

j1

sw1

8 Dip switches for Set communication address
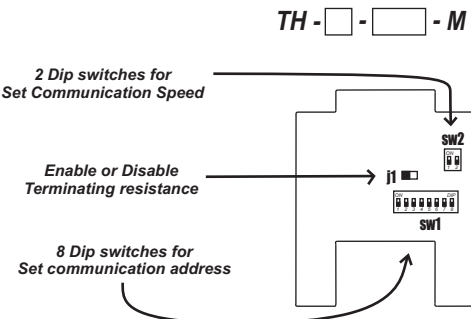


## Modbus communication address

| S8 | S7 | S6 | S5 | S4 | S3 | S2 | S1 | Address |
|---|---|---|---|---|---|---|---|---|
| 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 |
| 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 2 |
| 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 3 |
| 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 4 |
| 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 5 |
| 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 6 |
| 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 7 |
| 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 8 |
| 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 9 |
| 0 | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 10 |
| 0 | 0 | 0 | 0 | 1 | 0 | 1 | 1 | 11 |
| 0 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 12 |
| 0 | 0 | 0 | 0 | 1 | 1 | 0 | 1 | 13 |
| 0 | 0 | 0 | 0 | 1 | 1 | 1 | 0 | 14 |
| 0 | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 15 |
| 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 16 |
| 0 | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 17 |
| 0 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 18 |
| 0 | 0 | 0 | 1 | 0 | 0 | 1 | 1 | 19 |
| 0 | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 20 |
| 0 | 0 | 0 | 1 | 0 | 1 | 0 | 1 | 21 |
| 0 | 0 | 0 | 1 | 0 | 1 | 1 | 0 | 22 |
| 0 | 0 | 0 | 1 | 0 | 1 | 1 | 1 | 23 |
| 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 24 |
| 0 | 0 | 0 | 1 | 1 | 0 | 0 | 1 | 25 |
| . | . | . | . | . | . | . | . | . |
| . | . | . | . | . | . | . | . | . |
| . | . | . | . | . | . | . | . | . |
| 1 | 1 | 1 | 1 | 1 | 1 | 0 | 1 | 253 |
| 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 254 |
| 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 255 |

## Modbus communication speed

| S7 | S6 | Baud rate |
|---|---|---|
| 0 | 0 | 9.6 kbps |
| 0 | 1 | 19.2 kbps |
| 1 | 0 | - |
| 1 | 1 | - |

## Dimensions



TH - D - ☐ - ☐

TH - R - ☐ - ☐

TH - R - ☐ - ☐