# Temperature &Humidity Sensor

## TS60x

## ◆ Introduction

TS60x is a compact temperature and humidity sensor with a visualized data display. It features extendable connecting lines, a diverse range of detecting probes, and an IP67 waterproof design, making it applicable for accurate temperature and humidity data detection in various harsh environments. The enclosure, made of food-grade materials, allows safe contact with food or medicines. It not only supports multiple application modes that are compatible with IoT platforms, but is also equipped with base station positioning for tracking and security purposes.

TS60x is widely used for temperature and humidity monitoring applications such as cold chain transportation of food or medicine.


TS601


TS602

# ◆ Features

## Shared Values

- IP67 waterproof with a specialized battery compartment design, making it suitable for harsh environment
- Locally stores historical records and supports retransmission to prevent data loss
- Built-in 3-axis accelerometer for monitoring device status
- Equipped with a light sensor for cargo box opening detection and alarm
- Support flight mode to comply with aviation safety requirements
- Support management and OTA upgrades via the Milesight Development Platform and AWS
- Flexible design supports various mounting options
- Equipped with NFC for quick and easy configuration
- Equipped with base station positioning for tracking
- Support one-click reporting functionality
- Support cumulative reporting to reduce power consumption
- Support multiple network protocols to compatibility with IoT platforms

## TS601 Only

- Equipped with an indicator to indicate device status and threshold alarms

## TS602 Only

- Provides optional high accuracy PT100 temperature probes, DS18B20 temperature probe and TH temperature - humidity probe
- Features a high resolution 0.96-inch OLED display, enabling intuitive data reading

# ◆ Specifications

| Model Name | TS601 | TS602 |
|---|---|---|
| Connector Type | - | 5-pin M12 A-Coded Male Connector |
| Connector Number | - | 1 × Connector for TH/DS18B20/PT100 Sensor |
| **Sensor** | | |
| **Temperature** | | |
| Operating Principle | Digital CMOSens® technology (MEMS) | Refer to Optional Sensors |
| Range | -35°C to + 70°C | |
| Accuracy | Typ.[1]: +/- 0.3°C (-35°C to 0°C) | |

| | | |
|---|---|---|
| | +/- 0.2°C (0°C to 65°C)<br>+/- 0.5°C (65°C to 70°C) | |
| Resolution | +/- 0.1°C | |
| **Humidity** | | |
| Operating Principle | Digital CMOSens® technology (MEMS) | Refer to Optional Sensors |
| Range | 0% to 100% RH | |
| Accuracy | Typ.[2][3]:<br>+/- 2% RH | |
| Resolution | +/- 0.1% RH | |
| **Light** | | |
| Range | 0 to 600 Lux | |
| Status | Light/Dark | |
| **Device Position** | | |
| Status | Normal/Tilt | |
| Measurement Range | -90° to +90° (on all X, Y, Z axes) | |
| **Base Station Positioning** | | |
| Parameters | Longitude/Latitude | |
| Accuracy<br>(On Urban Main Roads) | Typ. Deviation: 1 km<br>Max Deviation: 5 km | |
| **Wireless Transmission** | | |
| Technology | LTE Cat.1 | |
| Frequency | LTE - FDD: B1/B3/B5/B7/B8/B20/B28<br>for EMEA+Australia/New Zealand | |
| SIM Slot | 1 x Micro SIM (3FF) Slot, 1.8V/3V | |
| Application Mode | TCP/UDP/MQTT/AWS/Milesight Development Platform | |
| **Others** | | |
| Screen | - | 0.96-inch OLED |
| LED | 1 × Status Indicator | - |
| Button | 1 × Reset/Power Button | |
| USB | 1 × Type-C Port for Power Supply (Internal) | |
| **Software** | | |
| Power On/Off | NFC, USB, Power Button | |
| Configuration | Mobile App via NFC | |
| Min. Packet<br>Transmission Interval[6] | 30min@Operating Temperature≤ 0°C<br>15min@Operating Temperature>0°C | |

| | | |
|---|---|---|
| Advanced Features | Threshold Alarm, Data Storage (5,000 entries), Data Retransmission | |
| **Physical Characteristics** | | |
| Power Supply | 2 × 2500 mAh CR18505 Li-$MnO_2$ Batteries | |
| Battery Life[7] (6 Times Report per Day, per Report includes 8 Packages with 30-min Collection Interval, Positioning Disabled, -20°C) | MQTT/TCP - Around 4.8 Years<br>AWS - Around 3.9 Years<br>UDP - Around 5.1 Years | MQTT/TCP - Around 4.2 Years<br>AWS - Around 3.5 Years<br>UDP - Around 4.6 Years |
| Operating Temperature | -35°C to 70°C | |
| Relative Humidity | 0% - 95% (non-condensing) | |
| Ingress Protection | IP67 | |
| Housing&Color | ABS+PC (Food-grade), White | |
| Weight (Batteries included) | 192g | 200g |
| Dimension | 112 × 72 × 29mm | |
| Installation | Cable-tie Mounting, 3M Tape Mounting,<br>Wall Screw Mounting, Magnetic Mounting (Opt.) | |

## ◆ Optional Sensors

| Model | Measuring Range | Accuracy Class | Accuracy | Drift | Sensor Probe | Cable | Installation |
|---|---|---|---|---|---|---|---|
| **PT100 Sensor** | | | | | | | |
| Regular Version (SP11-B05-125-200) | -40 °C ~ 125 °C | B | Typ.[4]: ± 0.5°C (-40°C~40°C), ± 1°C (40°C~125°C) | / | Straight tube, 304 Stainless Steel, Φ4*50 mm, IP67 | 2 m, PVC, -30 °C~105 °C | Contact, Thermal Buffer Bottle Installation(Opt.) |
| Food Applications (SP11-AF10-125-150) | -40 °C ~ 125 °C | A | Typ.[4]: ± 0.4°C | / | Needle, 316 Stainless Steel (Food Grade), Φ4*100 mm, IP67 | 1.5 m, Silicone (Food Grade), -60 °C~250 °C | Insert Installation |
| Low Temperature Applications (SP11-A03-050-150) | -200 °C ~ 50 °C | A | Typ.[4]: ± 0.5°C (-175°C~50°C), ± 0.55°C (-200°C~-175°C) | / | Straight tube, 304 Stainless Steel, Φ4*30 mm, IP67 | 1.5 m, Teflon, -200 °C~290 °C | Contact |
| Industrial Applications (SP11-A05-500-150) | -50 °C ~ 500 °C | A | Typ.[4]: ± 0.4°C (-50°C~125°C), ± 1.15°C (125°C~500°C) | / | Straight tube, 304 Stainless Steel, Φ4*30 mm, IP30 | 1.5 m, Fiberglass, -50 °C~500 °C | Contact |

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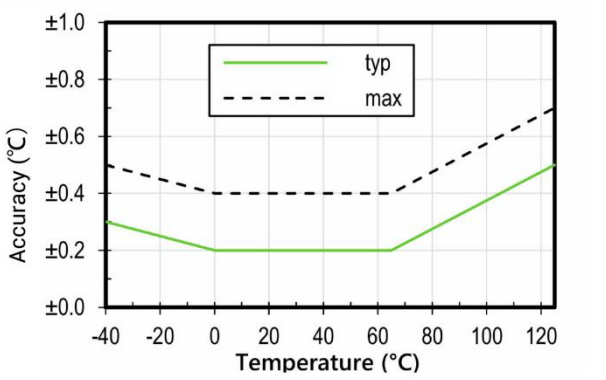
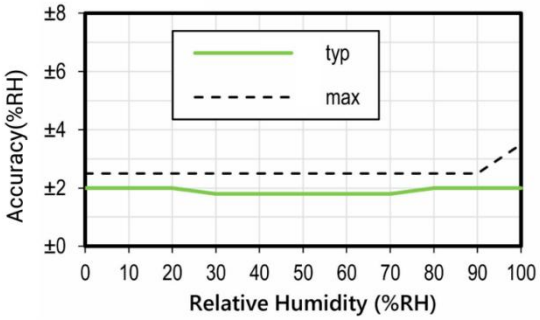
|---|---|---|---|---|---|---|---|
| **DS18B20 Sensor** | | | | | | | |
| Independent Calibration Applications (SP12-125-150) | -40 °C ~ 125 °C | - | Typ.[5]: ± 0.5°C (-10°C~85°C), ± 2°C (-40°C~-10°C, 85°C~125°C) | Typ.[8]: ±0.2°C | Straight tube, 316 Stainless Steel, Φ6*50 mm, IP67 | 1.5 m, PVC, -40 °C ~ 125 °C | Contact |
| **TH Sensor** | | | | | | | |
| Temperature and Humidity Measurement (SP13-125-150) | Temperature: -40 °C ~ 125 °C Humidity: 0% RH ~ 100% RH | - | Temperature typ.[1]: ± 0.3°C (-40°C~0°C), ± 0.2°C (0°C~65°C), ± 0.5°C (65°C~125°C) Humidity Typ.[2][3]:: ± 2% RH | Typ.[9]: 0.03°C/year | Straight tube, 304 Stainless Steel, Φ6*50 mm, IP67 | 1.5 m, PVC, -40 °C ~ 125 °C | Contact |

**Note:**

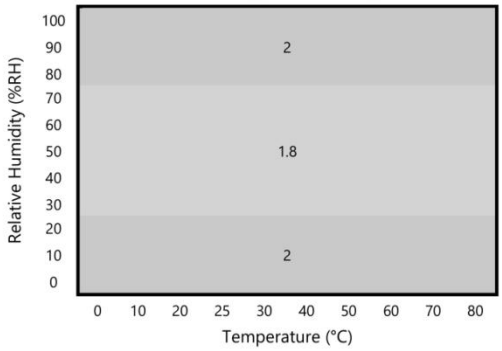
1. Accuracy corresponding to the temperature.



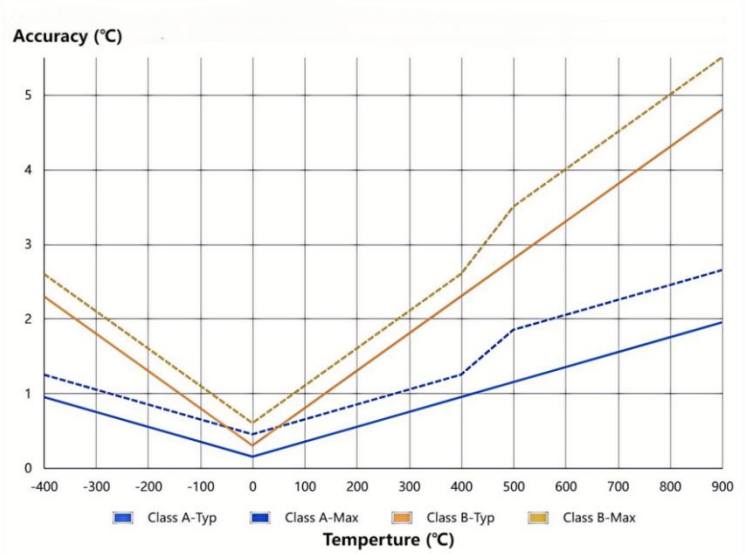

2. Accuracy corresponding to the relative humidity of TH sensor (25°C).



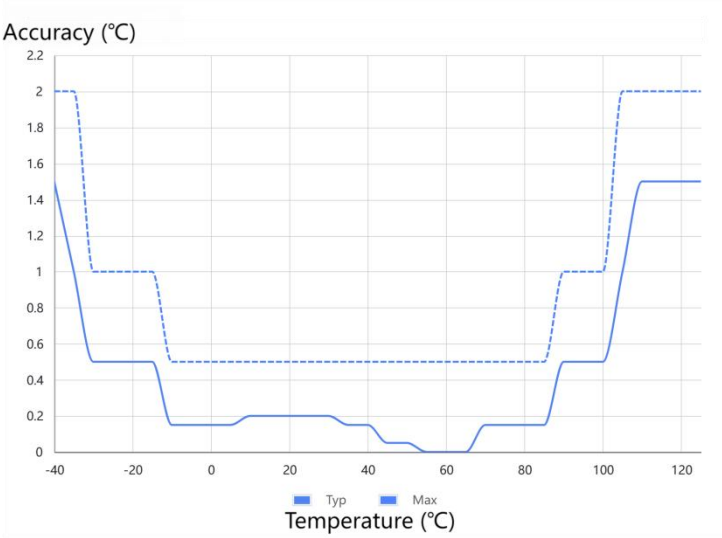

3. Typical RH accuracy corresponding to the temperature of TH sensor.




4. Accuracy corresponding to the temperature.



5. Accuracy corresponding to the temperature.



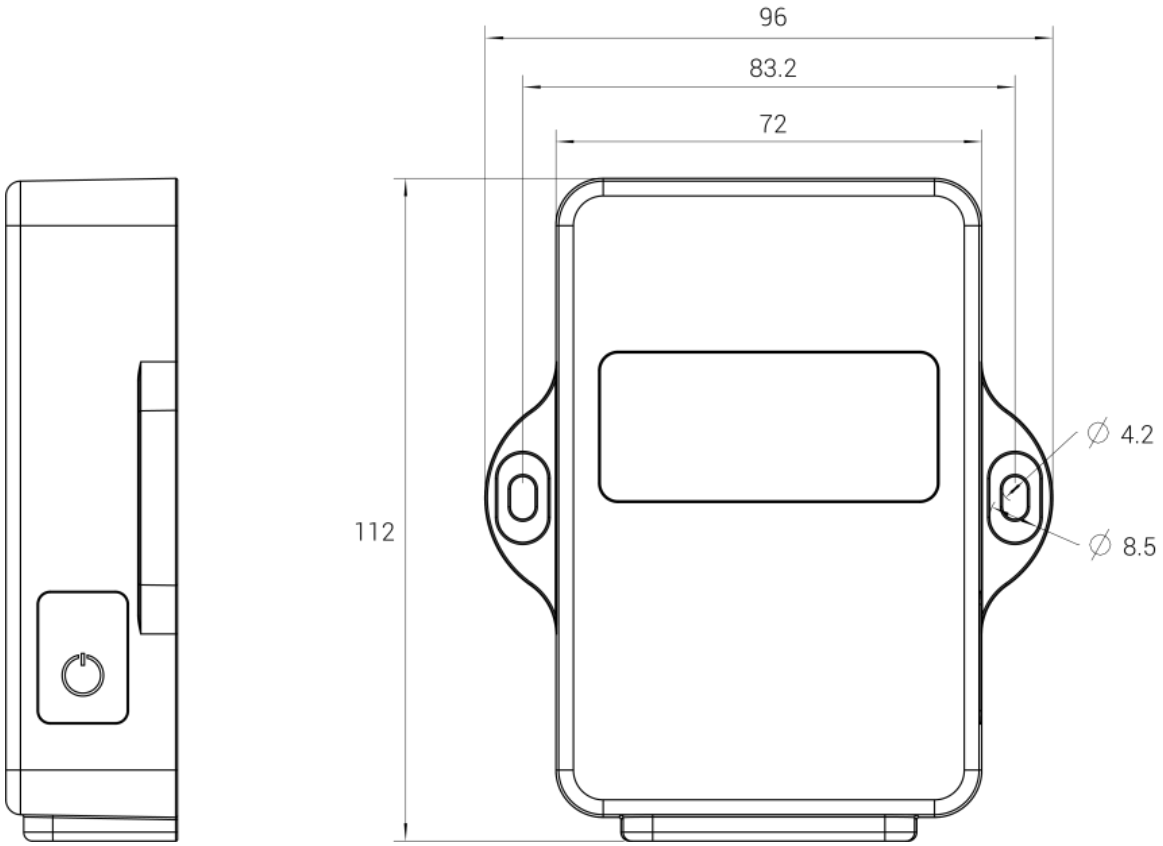

6. Packet transmission interval = Reporting interval × Cumulative numbers.
7. Battery precautions:

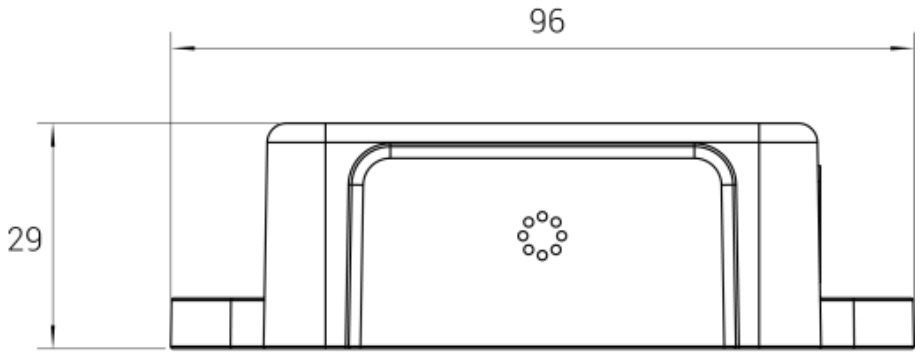
- The battery life is based on test results under laboratory conditions using the standard battery provided by Milesight. Actual performance may vary depending on battery brand and environmental factors.
- Operating the device above 0°C will significantly extend its service life.
- For the TS602 device, the battery life varies depending on the type of probe used.
- Intensified communication behavior (e.8. bad connection or local provider settings) and application below -20°C and above +55°C will shorten battery life.

8. Based on a 1000-hour stress test at +125°C with $V_{DD}$ = 5.5V. Annual calibration of the device is recommended in accordance with industry standards.
9. Max. value is < 0.04°C/y. Annual calibration of the device is recommended in accordance with industry standards.

## ◆ Dimensions

**TS601**



## TS602