















LamaPLC: SHT Sensirion Temperature/humidity sensor with I²C communication


Sensirion SHT sensors are a series of highly accurate, reliable digital humidity and temperature sensors built on the company's proprietary CMOSens Technology, offering fully calibrated outputs and long-term stability for a wide range of applications.

| Type of measurement | Model | Power voltage | Measurement, range, accuracy | Communication | Note |
|--|--|---------------------------------|--|--|--|
|  Temperature Humidity | Sensirion SHT20  | 3.3V (2.1 .. 3.6V) | Temperature measurement range: -40 .. +125 °C Temperature measurement accuracy: ±0.3°C Humidity measurement range: 0..100% RH Humidity measurement accuracy: ±3% | I ² C default addr.: 0x40/41 | 3.2 µW (at 8 bits, 1 measurement /s) |
|  Temperature Humidity | Sensirion SHT21  | 3.3V (2.1 .. 3.6V) | Temperature measurement range: -40 .. +125 °C Temperature measurement accuracy: ±0.3°C Humidity measurement range: 0..100% RH Humidity measurement accuracy: ±2% | I ² C default addr.: 0x40/41 | 3.2 µW (at 8 bits, 1 measurement /s) |
|  Temperature Humidity | Sensirion SHT25  | 3.3V (2.1 .. 3.6V) | Temperature measurement range: -40 .. +125 °C Temperature measurement accuracy: ±0.2°C Humidity measurement range: 0..100% RH Humidity measurement accuracy: ±1.8% | I ² C default addr.: 0x40/41 | 3.2 µW (at 8 bits, 1 measurement /s) |

| Type of measurement | Model | Power voltage | Measurement, range, accuracy | Communication | Note |
|---|---|--|---|--|---------------------------------|
|  <p>Temperature Humidity</p> | <p>Sensirion SHT30</p>  | <p>3.3 / 5 V (2.15 .. 5.5V)</p> | <p>Temperature measurement range: -40 .. +125 °C Temperature measurement accuracy: ±0.2°C Humidity measurement range: 0..100% RH Humidity measurement accuracy: ±2% (10..90%)</p> | <p>I²C default addr.: 0x44/45</p> | <p>4.8 µW (1 measurement/s)</p> |
|  <p>Temperature Humidity</p> | <p>Sensirion SHT31</p>  | <p>3.3 / 5 V (2.15 .. 5.5V)</p> | <p>Temperature measurement range: -40 .. +125 °C Temperature measurement accuracy: ±0.2°C Humidity measurement range: 0..100% RH Humidity measurement accuracy: ±2% (0..100%)</p> | <p>I²C default addr.: 0x44/45</p> | <p>4.8 µW (1 measurement/s)</p> |
|  <p>Temperature Humidity</p> | <p>Sensirion SHT35</p>  | <p>3.3 / 5 V (2.15 .. 5.5V)</p> | <p>Temperature measurement range: -40 .. +125 °C Temperature measurement accuracy: ±0.2°C Humidity measurement range: 0..100% RH Humidity measurement accuracy: ±1.5% (0..80%)</p> | <p>I²C default addr.: 0x44/45</p> | <p>4.8 µW (1 measurement/s)</p> |

| Type of measurement | Model | Power voltage | Measurement, range, accuracy | Communication | Note |
|--|--|---------------------------------|--|--|-----------------------------|
|  Temperature Humidity | Sensirion SHT40  | 3.3 (1.08 .. 3.6V) | Temperature measurement range: -40 .. +125 °C Temperature measurement accuracy: ±0.2°C Humidity measurement range: 0..100% RH Humidity measurement accuracy: ±1.8% | I ² C default addr.: 0x44/45 | 4.0 µW (1 measurement/s) |

The SGP sensors can be integrated with the [Tasmota](#) system. For more information, [see here](#).



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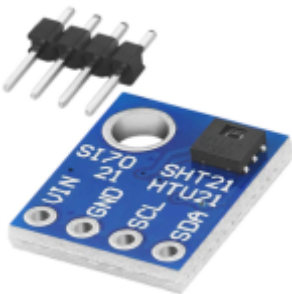
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SHT Sensor Comparison Table

| Model | Typical RH Accuracy | Typical Temperature Accuracy | Supply Voltage Range | Interface | Key Features |
|--------------|----------------------------|------------------------------|----------------------|----------------------------------|---|
| SHT20 | ±3% RH (@20-80% RH) | ±0.3°C (@10-40°C) | 2.1V to 3.6V | I ² C, PWM, SDM | Low-cost version of SHT2x series |
| SHT21 | ±2% RH (@0-100% RH) | ±0.3°C (@10-40°C) | 2.1V to 3.6V | I ² C, PWM, SDM | Standard version of SHT2x series |
| SHT25 | ±1.5% RH (@0-80% RH) | ±0.2°C (@5-60°C) | 2.1V to 3.6V | I ² C, PWM, SDM | Highest performance of SHT2x series |
| SHT30 | ±3% RH (@20-80% RH) | ±0.2°C (@0-65°C) | 2.15V to 5.5V | I ² C (two addresses) | Low-cost version of SHT3x series, integrated heater |
| SHT31 | ±2% RH (@0-100% RH, @25°C) | ±0.2°C (@0-90°C) | 2.15V to 5.5V | I ² C (two addresses) | Standard version of SHT3x series, integrated heater |
| SHT35 | ±1% RH (@20-60% RH) | ±0.1°C (@20-60°C) | 2.15V to 5.5V | I ² C (two addresses) | Premium version of SHT3x series, highest accuracy |
| SHT40 | ±1.8% RH (@25-75% RH) | ±0.2°C (@0-75°C) | 1.08V to 3.6V | I ² C (two addresses) | Fourth generation, ultra-low power, faster response time, smaller package |

Moduls

| Type of measurement | Name | Pics | Sensors | Description |
|---|--------------------|---|---------------------------|---|
|  <p>- Temperature - Humidity</p> | SHTxx modul |  | SHT20 SHT30 SHT40 | I ² C interface default address: 0x44/45 wiring colors: - black: GND - red: VCC (3.3V / 5V) - white: SDA - yellow: SCL |
|  <p>- Temperature - Humidity</p> | GY-21 |  | HTU21 Si-7021 SHT21 | I ² C interface (only 1 modul , default address: 0x40) GY-21 is a reliable and durable module for detecting temperature and humidity values compatible with Arduino, Atmega328p, ESP and Raspberry Typical measurement accuracy temperature: +/-1°C deviation between -30°C and 90°C Typical measurement accuracy humidity: +/-2% RL between 5% and 95% RL |

¹: The SHT20, HTU20, and Si7020 are different manufacturers' versions of essentially the same I²C digital humidity and temperature sensor chip, designed to be hardware- and software-compatible. The GY-20 is a generic breakout board that uses one of these chips.

²: The SHT21, HTU21, and Si7021 are very similar digital humidity and temperature sensor chips from different manufacturers (Sensirion, Measurement Specialties, and Silicon Labs, respectively), while the GY-21 is a generic breakout board that uses one of these chips. They are largely interchangeable in hardware and software for most general-purpose applications.

³: The SHT31, HTU31, and Si7031 are high-accuracy digital temperature and humidity sensor chips from different manufacturers (Sensirion, TE Connectivity, and Silicon Labs, respectively) that are designed to be largely interchangeable. The GY-31 is a generic name for a breakout board that typically uses the SHT31 chip.

Arduino & SHT21

Wiring

- SCL: A5
- GND: GND
- SDA: A4
- Vdd: 5V or 3.3V

Arduino code

This example uses the SHT21 library to read temperature and humidity every 2 seconds

```
#include <Wire.h>
#include "SHT21.h" // Install "SHT21" or "HTU21D" library via Library
Manager

SHT21 sht;

void setup() {
  Wire.begin();           // Initialize I2C communication
  Serial.begin(115200); // Set baud rate for Serial Monitor
  Serial.println("GY-21 (SHT21) Sensor Test");
}

void loop() {
  // Read values from the sensor
  float temperature = sht.getTemperature();
  float humidity = sht.getHumidity();

  // Check if readings are valid
  if (!isnan(temperature) && !isnan(humidity)) {
    Serial.print("Temperature: ");
    Serial.print(temperature, 1); // Print with 1 decimal place
    Serial.print(" °C\t");

    Serial.print("Humidity: ");
    Serial.print(humidity, 1);
    Serial.println(" %");
  } else {
    Serial.println("Failed to read from GY-21 sensor!");
  }

  delay(2000); // Wait 2 seconds before the next reading
}
```

Example codes

none

[SHT20](#), [SHT21](#), [SHT25](#), [SHT30](#), [SHT31](#), [SHT35](#), [SHT40](#), [GY21](#), [temperature](#), [humidity](#), [i2c](#), [communication](#), [sensor](#), [arduino](#), [code](#)

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