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
T H 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%	I²C default addr.: **0x40/41**	3.2 µW (at 8 bits, 1 measurement /s)
T H 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%	I²C default addr.: **0x40/41**	3.2 µW (at 8 bits, 1 measurement /s)
T H 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%	I²C default addr.: **0x40/41**	3.2 µW (at 8 bits, 1 measurement /s)

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

Type of measurement	Model	Power voltage	Measurement, range, accuracy	Communication	Note
T H 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%	I²C 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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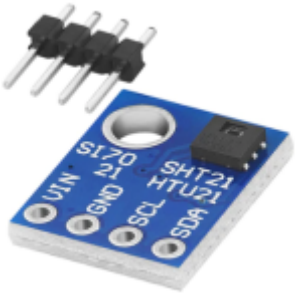
SHT Sensor Comparison Table

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	I²C, 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	I²C, 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	I²C, PWM, SDM	Highest performance of SHT2x series
SHT30	±3% RH (@20-80% RH)	±0.2°C (@0-65°C)	2.15V to 5.5V	I²C (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	I²C (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	I²C (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	I²C (two addresses)	Fourth generation, ultra-low power, faster response time, smaller package

Moduls

Type of measurement	Name	Pics	Sensors	Description
T H - Temperature - Humidity	**SHTxx modul**		SHT20 SHT30 SHT40	I²C interface default address: 0x44/45 wiring colors: - black: GND - red: VCC (3.3V / 5V) - white: SDA - yellow: SCL
T H - Temperature - Humidity	**GY-21**		HTU21 Si-7021 SHT21	I²C 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