

LamaPLC: Humidity/temperature / air-pressure / gas / air-quality sensors and modules for Arduino

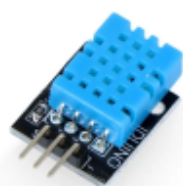
The following tables contain a list of Arduino-compatible sensors. The first table lists the sensors in ABC order and their technical characteristics.

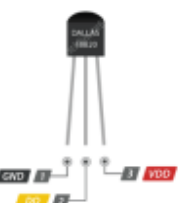
The second table (modules) contains a list of Arduino-compatible sensor modules. In many cases, the voltage level of the sensors is not the same as that of the Arduino (3.3V or 5V). The listed modules improve this shortcoming, among other things.

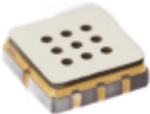
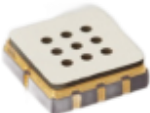
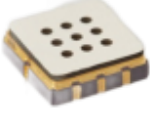
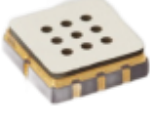
Sensors

Type of measurement	Model	Power voltage	Measurement, range, accuracy	Communication	Note
 Airflow Sensor Nebulizer Air Switch	Unidro 6025/6027 	3.3V (2.5 .. 4.5V)	Output voltage: 3.7V	Analog	Load current: 5mA Response time: 46ms
 Temperature Humidity	Adafruit AM2315C 	3.3 / 5 V (2.2 .. 5.5V)	Temperature measurement range: -40 .. +80 °C Temperature measurement accuracy: ±0.3°C Humidity measurement range: 0..100% RH Humidity measurement accuracy: ±2%	I ² C	Measure: 3.2 mW Reaction time: 8s
 Temperature Air-pressure	Bosch BMP180 	3.3 V (1.62 .. 3.6V)	Temperature measurement range: -40 .. +85 °C Temperature measurement accuracy: ±1.5°C Air pressure Range: 4.35PSI .. 15.95PSI (30kPa .. 110kPa) Air pressure accuracy: ±2%	I ² C default addr.: 0x77 (fix)	Maximum Pressure: 145.04PSI (1000kPa) Temperature resolution: 0.1 °C Pressure resolution: 1 Pa

Type of measurement	Model	Power voltage	Measurement, range, accuracy	Communication	Note
 Temperature Humidity Air pressure	Bosch BME280 	3.3 V (1.71 .. 3.6V)	Temperature measurement range: -40 .. +80 °C Temperature measurement accuracy: ±0.5°C (-40..85) Humidity measurement range: 0..100% RH Humidity measurement accuracy: ±3% Air pressure Range: 300 .. 1100 hPa Air pressure accuracy: ±0.25%	I²C default addr.: 0x76/77 SPI	-
 Temperature Humidity Air pressure	Bosch BME680 	3.3 V (1.71 .. 3.6V)	Temperature measurement range: -40 .. +80 °C Temperature measurement accuracy: ±1.5°C Humidity measurement range: 0..100% RH Humidity measurement accuracy: ±3% Air pressure Range: 300 .. 1100 hPa Air pressure accuracy: ±0.25%	I²C default addr.: 0x76/77 SPI	Direct output of IAQ: Index for Air Quality
 Temperature Air-pressure	Bosch BMP280 	3.3 V (1.71 .. 3.6V)	Temperature measurement range: -40 .. +85 °C Temperature measurement accuracy: ±1.5°C Air pressure Range: 4.35PSI .. 15.95PSI (30kPa .. 110kPa) Air pressure accuracy: ±2%	I²C default addr.: 0x76 SPI	Maximum Pressure: 290.08PSI (2000kPa) Temperature resolution: 0.01 °C Pressure resolution: 0.16 Pa
 CO ₂ VOC	Sciosense CCS811 	3.3V (1.8 .. 3.6V)	equivalent CO ₂ (eCO ₂): 400 ppm .. 32768 ppm equivalent Total Volatile Organic Compound (eTVOC): 0 ppb .. 29206 ppb.	I²C default address: 0x5A / 0x5B	Standard (100kbit/s) and fast (400kbit/s) I ² C interface Power Consumption maximum: 46 mW

Type of measurement	Model	Power voltage	Measurement, range, accuracy	Communication	Note
 Non-Contact Thermal Sensor	Omron D6T-32L 	5V	Number of elements: 1024 (32 × 32) Current consumption: 19 mA Object temperature detection: D6T-32L-01A: 0 to 200°C	I ² C	Response time: 200 msec Arduino lib
 Non-Contact Thermal Sensor	Omron D6T-44L 	5V	Number of elements: 16 (4 × 4) Current consumption: 5 mA Object temperature detection: D6T-44L-06: 5 .. 50°C D6T-44L-06H: 5 .. 200°C	I ² C	Response time: 300 msec Arduino lib
 Non-Contact Thermal Sensor	Omron D6T-8L 	5V	Number of elements: 8 (1 × 8) Current consumption: 5 mA Object temperature detection: D6T-8L-09: 5 .. 50°C D6T-8L-09H: 5 .. 200°C	I ² C	Response time: 250 msec Arduino lib
 Non-Contact Thermal Sensor	Omron D6T-1A 	5V	Number of elements: 1 (1 × 1) Current consumption: 3.5 mA Object temperature detection: D6T-1A-01: 5 .. 50°C D6T-1A-02: -40 .. 80°C	I ² C	Response time: 100 msec Arduino lib
  Temperature Humidity	DHT11 	3.3 / 5 V (3.3 .. 5.5V)	Temperature measurement range: 0 .. +50 °C Temperature measurement accuracy: ±2°C Humidity measurement range: 20..90% RH Humidity measurement accuracy: ±5%	1-Wire	8 bit resolution, response time 10 sec

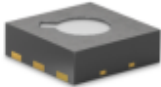
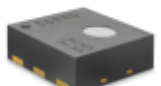
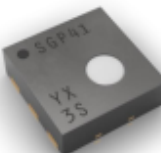
Type of measurement	Model	Power voltage	Measurement, range, accuracy	Communication	Note
 Temperature Humidity	DHT20 	3.3 / 5 V (2.2 .. 5.5V)	Temperature measurement range: -40 .. +80 °C Temperature measurement accuracy: $\pm 0.5^{\circ}\text{C}$ (-40..80) Humidity measurement range: 0..100% RH Humidity measurement accuracy: $\pm 3\%$	I²C default addr.: 0x38	-
 Temperature Humidity	DHT22 AM2302 	3.3 / 5 V (2.2 .. 5.5V)	Temperature measurement range: -40 .. +80 °C Temperature measurement accuracy: $\pm 0.5^{\circ}\text{C}$ (-40..80) Humidity measurement range: 0..100% RH Humidity measurement accuracy: $\pm 2\%$	single-bus	-
 Barometric Pressure Sensor	Infineon DPS310 	3.3V	Supply voltage: VDD _{IO} : 1.2 .. 3.6 V Operation range: Pressure: 300 .. 1200 hPa. Temperature: -40 - 85 °C Pressure sensor precision: ± 0.002 hPa (or ± 0.02 m) (high precision mode) Relative accuracy: ± 0.06 hPa (or ± 0.5 m) Absolute accuracy: ± 1 hPa (or ± 8 m) Temperature accuracy: $\pm 0.5^{\circ}\text{C}$ Pressure temperature sensitivity: 0.5Pa/K	I²C or SPI I2C default address: 0x76 (SDO←GND) or 0x77 (SDO←VDD _{IO})	Measurement time: Typical: 27.6 ms
 Temperature	Dallas DS18B20 	3.3 / 5 V (3.3 .. 5.5V)	Temperature measurement range: -55 .. +125 °C Temperature measurement accuracy: $\pm 0.5^{\circ}\text{C}$	1-Wire	9 to 12 bit (selectable) resolution Conversion Time < 750ms Current Consumption: 1mA

Type of measurement	Model	Power voltage	Measurement, range, accuracy	Communication	Note
 NO ²	MEMS GM-102b 	5V	Detection Range: 0.1~10ppm (NO ²) Heater Resistance: 80Ω±20Ω@room temperature	analog signal	-
 alcohol gas	MEMS GM-302b 	5V	Detection Range: 1..500ppm (Ethanol vapor) 80Ω±20Ω@room temperature	analog signal	-
 Alcohol (C ₂ H ₅ OH) Hydrogen(H ₂) Formaldehyde(CH ₂ O)	MEMS GM-502b 	5V	Detection: Alcohol (C ₂ H ₅ OH), 10..500ppm Detection: Hydrogen(H ₂), 1..1000ppm Detection: Formaldehyde(CH ₂ O), 10..100ppm	analog signal	-
 Carbon monoxide (CO) Hydrogen (H ₂)	MEMS GM-702b 	5V	Detection: Carbon monoxide sensor (CO) : 10..5000ppm Hydrogen sensor (H ₂): 10..500ppm	analog signal	-
 TVOC eCO ₂	ScioSense ENS-160 	3.3V	Detection: TVOC: 0..65000ppm eCO ₂ : 400..65000ppm AQI-UBA1: 1..5 (Classified TVOC output signal)	I ² C default addr.: 0x40	-
  Temperature Humidity	Texas Instruments HDC 1080 	3.3 - 5V (2.7 .. 5.5V)	Temperature measurement range: -40 .. +125 °C Temperature measurement accuracy: ±0.2°C Humidity measurement range: 0..100% RH Humidity measurement accuracy: ±2%	I ² C default addr.: 0x40	14 Bit Measurement Resolution 100 nA Sleep Mode Current

Type of measurement	Model	Power voltage	Measurement, range, accuracy	Communication	Note
 Temperature Humidity	TE Connectivity HTU21 	3.3V (1.5 .. 3.6V)	Temperature measurement range: -40 .. +125 °C Temperature measurement accuracy: $\pm 0.3^{\circ}\text{C}$ Humidity measurement range: 0..100% RH Humidity measurement accuracy: $\pm 2\%$	I²C default addr.: 0x40 (fix)	Power Dissipation: 2.7 μW Resolution: 12 / 8 bit Measuring Time: 3..16 ms
 Carbon monoxide (CO) Methane (CH ₄) Ethanol (C ₂ H ₅ OH) Propane (C ₃ H ₈) Butane (C ₄ H ₁₀) Hydrogen (H ₂) Hydrogen sulfide (H ₂ S) Ammonia (NH ₃)	Fermion MICS-5524 V1.0 	5V	The module is intended for educational and hobby purposes! Measuring range: 1 .. 1000 ppm (carbon monoxide CO) 10 .. 500ppm (Ethanol C ₂ H ₅ OH) 1 .. 1000ppm (Hydrogen H ₂) 1 .. 500 ppm (NH ₃ ammonia) > 1000 ppm (methane CH ₄)	analog signal	-
 Smoke gas Combustible gas	Winsen MQ-2 	5V	Flammable gas concentration: 300 .. 10'000ppm Heater Resistance; RH: $29\Omega \pm 3\Omega$ room tem. Heater consumption; PH: $\leq 950\text{mW}$ Sensitivity; S: $R_o(\text{in air}) / R_s(2000 \text{ ppm } C_3H_8) \geq 5$ Output Voltage; Vs: $2.5V \square 4.0V$ in 2000 ppm C ₃ H ₈ Concentration Slope; $\alpha: \leq 0.6 (R_{3000 \text{ ppm}} / R_{1000 \text{ ppm } C_3H_8})$	analog signal	Lifespan: 10 years Preheat time: Over 24 hour

Type of measurement	Model	Power voltage	Measurement, range, accuracy	Communication	Note
G Alcohol gas Small sensitivity: Benzine gas	Winsen MQ-3 	5V	Detecting concentration scope 0.05 mg / 10 mg/L Alcohol Sensing Resistance: 1 MΩ - 8 MΩ (0.4 mg/L alcohol)	analog signal	Preheat time: Over 24 hour
G CH ₄ gas Natural gas LNG Small sensitivity: Alcohol Smoke	Winsen MQ-4 	5V	Detecting concentration scope 200-10'000ppm CH ₄ , natural gas Sensing Resistance: 10KΩ- 60KΩ (1000ppm CH ₄)	analog signal	Preheat time: Over 24 hour
G LPG Iso-butane Propane Small sensitivity: Alcohol Smoke	Winsen MQ-5 	5V	Detecting concentration scope 200-10'000ppm LPG, LNG, Natural gas, Iso-butane, Propane, Town gas Sensing Resistance: 10KΩ- 60KΩ (5000 ppm methane)	analog signal	Preheat time: Over 24 hour
G Town gas Natural gas LPG LNG Iso-butane Propane Small sensitivity: Alcohol Smoke	Winsen MQ-6 	5V	Detecting concentration scope 200-10'000ppm LPG, iso-butane, propane, LNG Sensing Resistance: 10KΩ- 60KΩ (10'00ppm LPG)	analog signal	Preheat time: Over 24 hour
G CO	Winsen MQ-7 	5V	Detecting concentration scope over 300 ppm CO (Carbon Monoxide) Sensing Resistance: 2KΩ- 20KΩ (100 ppm CO)	analog signal	Preheat time: Over 48 hour
G H ₂ Small sensitivity: Alcohol LPG cooking fumes	Winsen MQ-8 	5V	Detecting concentration scope 100-10000ppm Hydrogen (H ₂) Sensing Resistance: 10KΩ- 60KΩ (1000 ppm H ₂)	analog signal	Preheat time: Over 24 hour

Type of measurement	Model	Power voltage	Measurement, range, accuracy	Communication	Note
G CO CH ₄ gas LPG	Winsen MQ-9 	5V	Detecting range□ 20 ppm .. 2000 ppm carbon monoxide 500 ppm .. 10'000 ppm CH ₄ 500 ppm .. 10'000 ppm LPG Sensing Resistance: 2KΩ- 20KΩ (100 ppm CH ₄)	analog signal	Preheat time: Over 48 hour
G NO _x NH ₃ alcohol Benzene smoke CO ₂	Winsen MQ-135 	5V	Detecting range□ 10 ppm .. 300 ppm NH ₃ 10 ppm .. 1000 ppm Benzene 10 ppm .. 300 ppm Alcohol Sensing Resistance: 30KΩ- 200KΩ (100 ppm NH ₃)	analog signal	Preheat time: Over 24 hour
G Oxygen	AlphaSense O2-A2 	5V	Range of oxygen sensor: 0..30 % Load resistance: 47-100 Ω	analog signal	-
G T H CO ₂ humidity temperature	SCD-30 	3.3V / 5V	Humidity range: 0 .. 100 %RH Temperature range: -40°C .. 70°C CO ₂ range: 0 .. 40'000 ppm (I ² C, UART), 0 .. 5'000 ppm (PWM)	UART (Modbus Point to Point; TTL Logic), PWM and I ² C	Response time: 20s Sensor lifetime: 15 years
G T H CO ₂ Air-quality Temperature Humidity	Sensirion SCD40-D-R2 	3.3V / 5V (2.4 .. 5.5V)	CO ₂ output range: 0 .. 40'000 ppm CO ₂ measurement accuracy: ± 40 ppm Humidity measurement range: 0 %RH .. 100 %RH Humidity measurement accuracy: ±6 %RH Temperature measurement range: 10°C .. 60°C Temperature measurement accuracy: ±1.5 °C	I ² C default address: 0x62	SCL clock frequency: 100 kHz

Type of measurement	Model	Power voltage	Measurement, range, accuracy	Communication	Note
 VOC - CO2-eq Sensor	Sensirion SGP30 	1.8V	Supply voltage 1.62 .. 1.98 V Measurement range (CO ₂ -eq): 0 .. 1000 ppm Specified range: Ethanol signal: 0.3 ppm .. 30 ppm H ₂ signal 0.5 ppm .. 3 ppm	I ² C I2C default address: 0x58	Sampling frequency: Max. 40 Hz Data sheet
 Indoor Air Quality Sensor for VOC Measurements	Sensirion SGP40 	3.3V	Supply voltage 1.7 .. 3.6 V Ethanol in clean air: 0 .. 1000 ppm	I ² C I2C default address: 0x59	Sampling frequency: Max. 40 Hz Data sheet
 Air Quality Sensor for VOC and NOx Measurements	Sensirion SGP41 	3.3V	Supply voltage 1.7 .. 3.6 V Ethanol in clean air: 0 .. 1.000.000 ppm NO ₂ in clean air: 0 .. 10.000 ppm	I ² C I2C default address: 0x59	Sampling frequency: Max. 40 Hz Data sheet
 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)

Type of measurement	Model	Power voltage	Measurement, range, accuracy	Communication	Note
 Temperature Humidity	Sensirion SHT25 	3.3V (2.1 .. 3.6V)	Temperature measurement range: -40 .. +125 °C Temperature measurement accuracy: $\pm 0.2^{\circ}\text{C}$ Humidity measurement range: 0..100% RH Humidity measurement accuracy: $\pm 1.8\%$	I²C default addr.: 0x40/41	3.2 μW (at 8 bits, 1 measurement /s)
 Temperature Humidity	Sensirion SHT30 	3.3 / 5 V (2.15 .. 5.5V)	Temperature measurement range: -40 .. +125 °C Temperature measurement accuracy: $\pm 0.2^{\circ}\text{C}$ Humidity measurement range: 0..100% RH Humidity measurement accuracy: $\pm 2\%$ (10..90%)	I²C default addr.: 0x44/45	4.8 μW (1 measurement/s)
 Temperature Humidity	Sensirion SHT31 	3.3 / 5 V (2.15 .. 5.5V)	Temperature measurement range: -40 .. +125 °C Temperature measurement accuracy: $\pm 0.2^{\circ}\text{C}$ Humidity measurement range: 0..100% RH Humidity measurement accuracy: $\pm 2\%$ (0..100%)	I²C default addr.: 0x44/45	4.8 μW (1 measurement/s)
 Temperature Humidity	Sensirion SHT35 	3.3 / 5 V (2.15 .. 5.5V)	Temperature measurement range: -40 .. +125 °C Temperature measurement accuracy: $\pm 0.2^{\circ}\text{C}$ Humidity measurement range: 0..100% RH Humidity measurement accuracy: $\pm 1.5\%$ (0..80%)	I²C default addr.: 0x44/45	4.8 μW (1 measurement/s)

Type of measurement	Model	Power voltage	Measurement, range, accuracy	Communication	Note
 Temperature Humidity	Sensirion SHT40 	3.3 (1.08 .. 3.6V)	Temperature measurement range: -40 .. +125 °C Temperature measurement accuracy: $\pm 0.2^{\circ}\text{C}$ Humidity measurement range: 0..100% RH Humidity measurement accuracy: $\pm 1.8\%$	I²C default addr.: 0x44/45	4.0 μW (1 measurement/s)
 Temperature Humidity	Siliconlabs Si-7021 	3.3V (1.9 .. 3.6V)	Temperature measurement range: -40 .. +125 °C Temperature measurement accuracy: $\pm 0.3^{\circ}\text{C}$ Humidity measurement range: 0..100% RH Humidity measurement accuracy: $\pm 2\%$	I²C default addr.: 0x40	-
 Temperature	Microchip TC1047A 	5 / 3.3V (2.5 .. 5.5V)	Temperature measurement range: -40 .. +125 °C Temperature measurement accuracy: $\pm 0.5^{\circ}\text{C}$	analog 10mV/°C	Maximum Supply Current 60uA
 Methane Natural gas	GL Sciences TGS-2611 	5V	Sensor resistance in 5000ppm of methane at 20°C and 65% R.H. Sensor resistance: 0.68 .. 6.8 k Ω in 5000 ppm methane	analog signal	Conditioning period before test: 7 days

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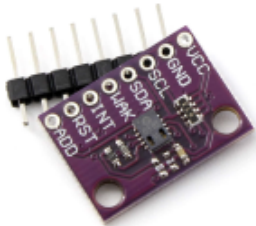
Arduino compatible sensor modules

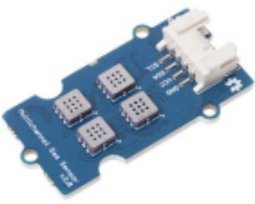
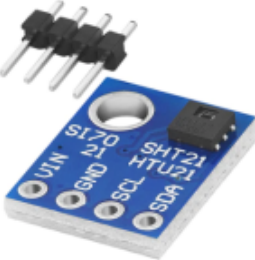
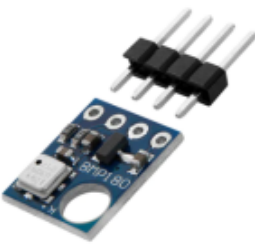
Humidity / Temperature Arduino modules

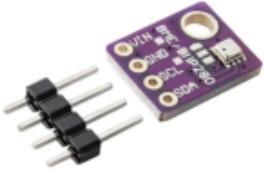
The temperature/humidity sensor modules contain the additional technology required for sensor ICs (voltage regulation, pull-up resistors,...), and the connection pins simplify the connection of the sensors to, for example, [Arduinos](#). The modules are typically universal and can be used with several sensors. Therefore, it's worth paying attention to which sensor is installed on the module, mainly because of the power supply (almost all sensors operate with 3.3V, but not all of them are compatible with 5V). There are often bridges used for addressing the modules, which can be soldered in and out; for example, [I²C](#) addresses can be set with them.

Gas sensor Arduino modules

The gas sensor modules contain the additional technology required for sensor ICs (such as voltage regulation and pull-up resistors), and the connection pins simplify the connection of the sensors to, for example, [Arduino](#) boards. The modules are typically universal and can be used with several sensors. Therefore, it's worth paying attention to which sensor is installed on the module, mainly because of the power supply (almost all sensors operate with 3.3V, but not all of them are compatible with 5V). There are often bridges used for addressing the modules, which can be soldered in and out; for example, [I²C](#) addresses can be set with them.

Type of measurement	Name	Pics	Sensors	Description
G CO₂ TVOC	CJMCU-811		CCS811	I²C interface, address: ADDR pin low: 0x5A , ADD pin high: 0x5B VCC : normally 3.3V GND : GND SCL : Serial Clock Line, interface to I2C SDA : Serial Data Address, interface to I2C WAK : Wake (active low, not connected) INT : Interrupt (active low, not connected) RST : Reset (active low, not connected) ADD : 10k pull- down to GND, setting the I2C address to 0x5A Arduino library: ✓
T P - Barometric Pressure Sensor	Pressure Shield2Go		DPS310	I²C or SPI I2C default address: 0x76 (SDO←GND) or 0x77 (SDO←VDD _{IO}) ✓ Arduino library

Type of measurement	Name	Pics	Sensors	Description
 CO H ₂ Alcohol (C ₂ H ₅ OH) Hydrogen(H ₂) Formaldehyde(CH ₂ O) Alcohol gas NO ₂	GRV GAS SENS V2		All 4 sensors in one platform: GM-102b (NO ₂) GM-302b (alcohol gas) GM-502b (Alcohol (C ₂ H ₅ OH), Hydrogen(H ₂), Formaldehyde(CH ₂ O)) GM-702b (Carbon monoxide (CO), Hydrogen (H ₂))	I ² C interface, default address: 0x55 VCC: normally 5V GND: GND SCL: Serial Clock Line, interface to I ² C SDA: Serial Data Address, interface to I ² C Arduino library: ✓
 - Temperature - Humidity	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
 - Temperature - Air-press	GY-68, BMP180		BMP180	- I ² C interface (only 1 modul) - The I ² C address on the BMP180 is 0x77. And it is fixed, making it impossible to add multiple sensors to the same I ² C bus. - Compatible with Arduino, Atmega328p, ESP and Raspberry

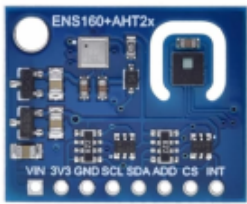
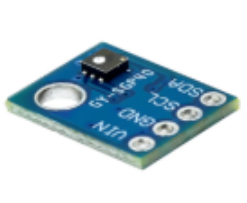
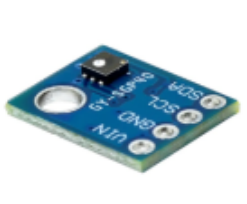
Type of measurement	Name	Pics	Sensors	Description
T H P - Temperature - Humidity - Air press	GY-BME280		BME280	- I²C interface (max. 2 moduls) - The module's default I2C address is 0x76, which can be easily changed to 0x77 using the provided solder jumper.* - Compatible with Arduino, Atmega328p, ESP, and Raspberry <i>*: To change the i2c address to 0x77, cut the trace between the middle and left copper pads with a sharp knife. Then, add a solder blob between the middle and right copper pads to short them.</i>

Type of measurement	Name	Pics	Sensors	Description
T P - Temperature - Air press	GY-BMP280-3.3,BMP280		BMP280	- Or I²C interface (max. 2 moduls; up to 3.4 MHz) - Or SPI interface (up to 10 MHz) - Current consumption of sensor BMP280: 2.7µA @ 1 Hz sampling rate - The Chip Select (CSB) and Serial Data Output (SDO) pins of the BMP280 are necessary only when SPI-based (four-wire) communication is applied. I²C is a two-wire interface, comprising SDA and SCK. - Default I²C is: 0x76 (SDO pin low) - To I²C 0x77 address connect pin 6 of the module (SDO) to Vcc, which would typically be the 3.3V supply - Pin 5 of the module (CSB) must be connected to Vcc to select the I²C interface
T H - Temperature - Humidity	HDC1080 Modul		HDC1080	I ² C interface (only 1 modul , default address: 0x40)

Type of measurement	Name	Pics	Sensors	Description
T H - Temperature - Humidity	TE Connectivity HTU21D		HTU21	20-pin Xplained Pro-compatible connector I ² C interface Xplained Pro hardware identification chip Fully calibrated Selectable 8- to 12-bit resolution for humidity Selectable 12- to 14-bit resolution for temperature Very low power consumption
P - Ported Pressure Sensor	Adafruit MPRLS		-	I ² C interface, default addr.: 0x18 Vin - Power pin 3-5 VDC 3v3 - 3.3V output, max. 100mA SCL - I2C clock SDA - I2C data RST - Hardware reset (GND: reset) EOC - End Of Conversion output ✓ Arduino library

Type of measurement	Name	Pics	Sensors	Description
 gas	MQ-nnn	 	MQ-2 (flamable gas) MQ-3 (alcohol) MQ-4 (CH ₄) MQ-5 (LPG, LNG, natural gas) MQ-6 (LPG, iso-butane,...) MQ-7 (CO) MQ-8 (H ₂) MQ-9 (CO, CH ₄ , LPG) MQ-135 (NH ₃ , benzene)	Analog and digital signals <i>Pinout for modul:</i> VCC: normally 5V GND: GND DO: Digital (alarm) signal, by setting a threshold value using the potentiometer AO: Analog (measuring) signal, 0..5 V <i>Pinout for sensor:</i> H-Pins: Out of the two H pins, one pin is connected to supply and the other to ground A-B-Pins: A pins and B pins are interchangeable. These pins will be tied to the supply voltage Preheat duration minimum 20 seconds Arduino library: ✓

Type of measurement	Name	Pics	Sensors	Description
GTH - Temperature - Humidity -CO²	SCD-30 modul		SCD-30	Pinout: - VDD: Supply Voltage (-0.3 V –6.0V) - GND: Ground - TX/SCL: Modbus: Transmission line (Push/Pull with 3V level) I²C:Serial clock(internal 45kΩ pull-up resistor, pulled to 3V, for higher voltages a level shifter is needed) - RX/SDA: Modbus: Receive line (Input must not exceed 5.5V) I²C:Serial data(internal 45kΩ pull-up resistor, pulled to3V, for higher voltages a level shifter is needed) - RDY: Data ready pin. High when data is ready for read-out - PWM: PWM output of CO² concentration measurement - SEL: Interface selectpin. Pull to VDD(do not exceed 4V, use a voltage divider in case your VDD is > 4V)for selecting Modbus, leave floating, or connect to GND for selecting I²C

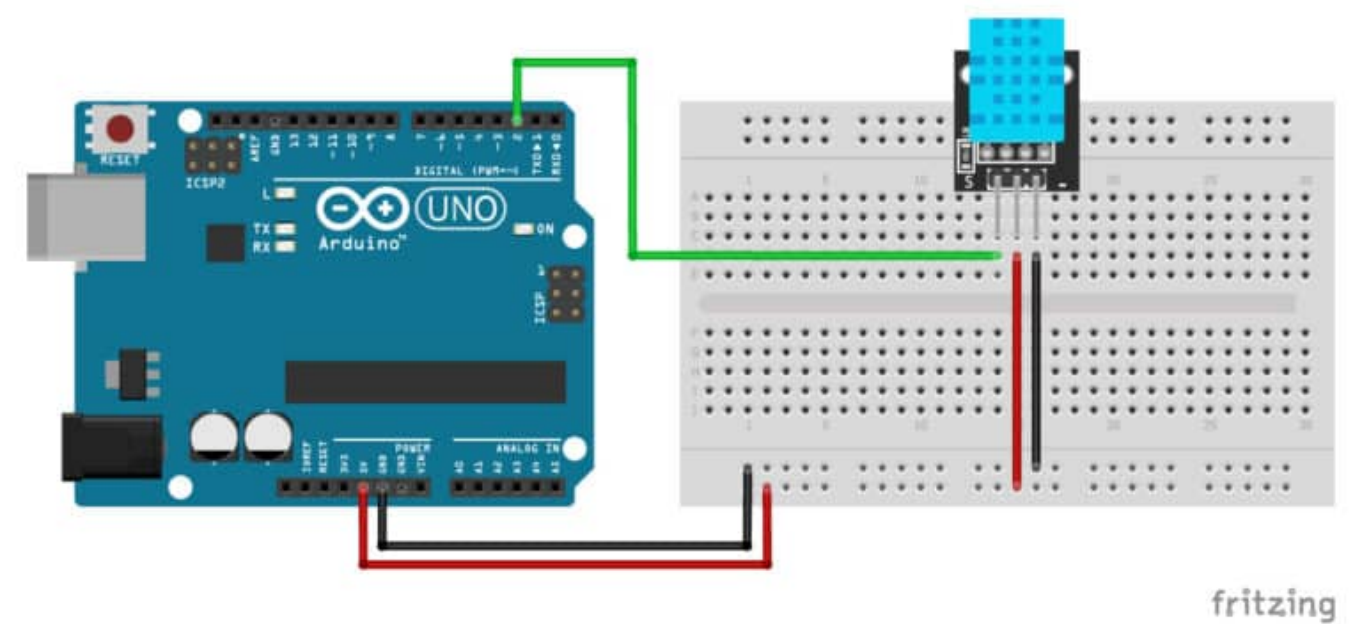
Type of measurement	Name	Pics	Sensors	Description
 Indoor Air Quality Sensor for TVOC and CO ₂ eq Measurements	ENS-160 modul		ENS-160	I ² C interface default address: 0x40 wiring colors: - GND - VCC (3.3V / 5V) - SDA - SCL
 Indoor Air Quality Sensor for TVOC and CO ₂ eq Measurements	SGP30 modul		SGP30	I ² C interface default address: 0x58 wiring colors: - GND - VCC (3.3V / 5V) - SDA - SCL
 Indoor Air Quality Sensor for VOC Measurements	SGP40 modul		SGP40	I ² C interface default address: 0x59 wiring colors: - GND - VCC (3.3V / 5V) - SDA - SCL
 Air Quality Sensor for VOC and NO _x Measurements	SGP41 modul		SGP41	I ² C interface default address: 0x59 wiring colors: - GND - VCC (3.3V / 5V) - SDA - SCL
 - Temperature - Humidity	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
 - Digital barometric pressure sensor	Tru TC-10093132		-	Analog interface Voltage supply: 3.3 .. 5 V DC Pressure: 0 .. 40 KPa ✓ Arduino library

Type of measurement	Name	Pics	Sensors	Description
T H - Temperature - Humidity	UICPAL Temp.humi.sensor		-	Interface: Analog: 0-5V / 0-10V / 4-20mA RS485: Modbus RTU , default addr.:1 Temperature range: standard -40 .. 80°C Humidity range: 0 .. 100%RH Accuracy: ±0.3°C (0°C-65°C); ±3%RH (10%-90%) Power supply voltage: 10 .. 30V DC More information on LamaPLC (wiring, modbus map, ..) here
G ammonia, hydrogen, alcohol, carbon monoxide, methane, propane, Gan, styrene, propylene glycol, alkyl phenol, toluene, ethylbenzene, xylene, formaldehyde and other volatile organic gases, incense smoke, wood, paper smoke burning out	TPM-300A-V1.2		-	UART or I²C communication <i>Pinout for modul:</i> VCC: normally 5V GND: GND A, B: UART ports Preheat duration minimum 60 seconds Arduino library: ✓

Software example

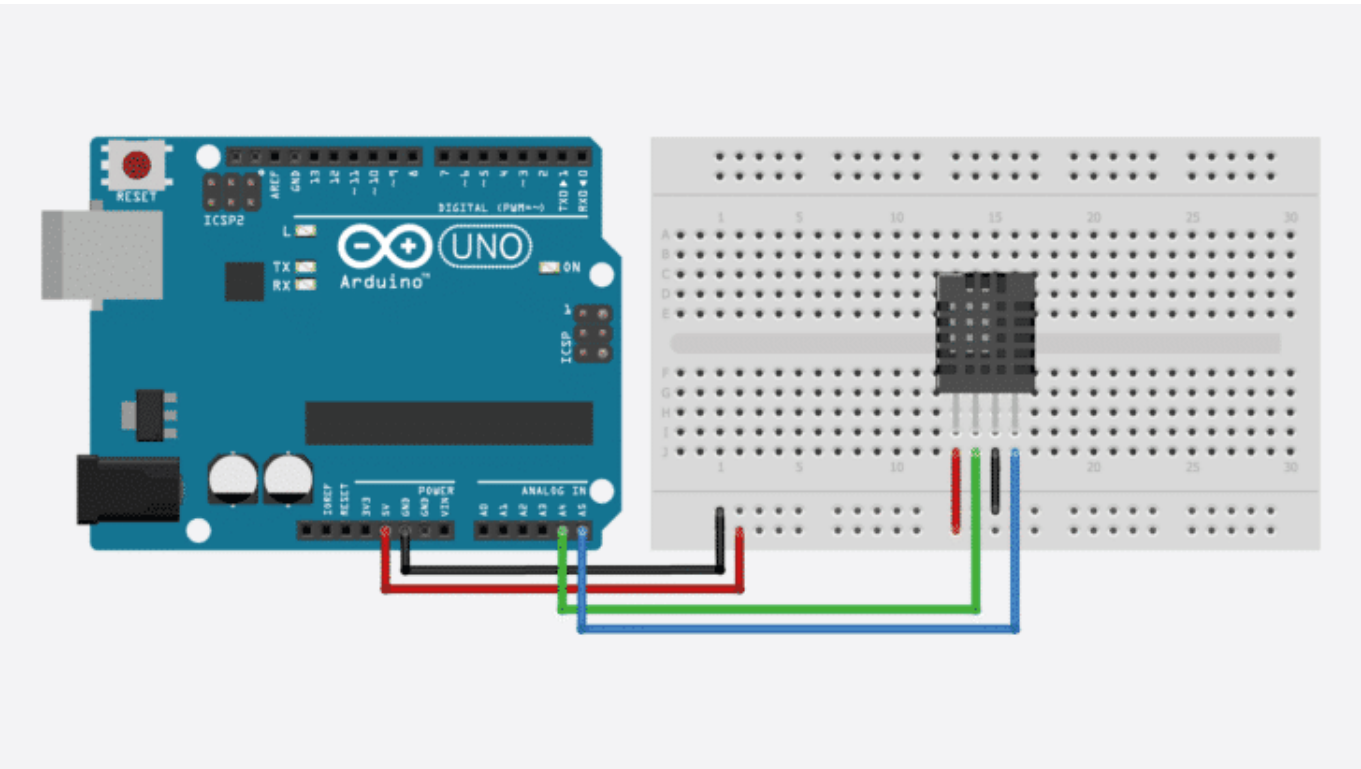
The easiest way to find the example program for the current sensor is in the Arduino program in the "Library Manager".

Example to oneWire wiring with DHT-11 sensor



Only one pin is needed to connect oneWire; it can even be the 2nd - there is no rule for this. The supply voltage should be adjusted to the table above. In the case of the **DHT 11**, it can be 5V or 3.3V.

Example of I²C wiring with AM-2302 sensor



For **I²C** communication, pins **A4 (SDA)** and **A5 (SCL)** can be used, or the two unmarked pins before the AREF pin can be connected in parallel with them. According to the table above, the power supply can be 5V or 3.3V.

Arduino pin	Modul pin	Description
3.3 V or 5 V	Vin	According to the table above, the power supply can be 5V or 3.3V
GND	GND	-
A4	SDA	Standard I²C connection

Arduino pin	Modul pin	Description
A5	SCL	Standard I ² C connection

[sht20](#), [sht21](#), [sht25](#), [sht30](#), [sht31](#), [sht35](#), [sht40](#), [dht11](#), [dht20](#), [dht22](#), [am2302](#), [dps310](#), [bme280](#), [bme680](#), [bmp180](#), [bmp280](#), [si7021](#), [tc1047a](#), [ds18b20](#), [htu21](#), [htu21d](#), [gy21](#), [gy68](#), [gy](#) [bme280](#), [scd30](#), [modul](#), [humidity](#), [temperature](#), [air-press](#), [sensor](#), [i2c](#), [spi](#), [modbus](#), [onewire](#), [communication](#)

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