

## AIR QUALITY MONITOR

### 1. ABOUT THE PROJECT:

Many times, we feel very weak while waking up from the bed even after getting a sleep at night. This sometimes happens because of the poor air quality in the closed room at night. This is a low-cost Air Quality Monitor which can monitor the air quality of a room using MQ135 air quality sensor. It also measures the room temperature and humidity using DHT11 and shows the data on an OLED display. It is a fun little project and very helpful too. An air quality monitor is a device used to measure various parameters of the air in a particular environment, such as temperature, humidity, and potentially other pollutants or gases. One common type of sensor used in air quality monitors is the DHT11 temperature and humidity sensor, which provides accurate readings of these two essential environmental factors.

### 2. TECHNICAL REFERENCE MANUAL

#### 2.1 DHT11 Temperature and Humidity Sensor

SPECIFICATIONS:

Parameters	Conditions	Minimum	Typical	Maximum
<b>Humidity</b>				
<b>Resolution</b>		1%RH	1%RH	1%RH
			8 Bit	
<b>Repeatability</b>			±1%RH	
<b>Accuracy</b>	25°C		±4%RH	
	0-50°C			±5%RH
<b>Interchangeability</b>	Fully Interchangeable			
<b>Measurement Range</b>	0°C	30%RH		90%RH
	25°C	20%RH		90%RH
	50°C	20%RH		80%RH
<b>Response Time (Seconds)</b>	1/e(63%)25°C , 1m/s Air	6 S	10 S	15 S
<b>Hysteresis</b>			±1%RH	
<b>Long-Term Stability</b>	Typical		±1%RH/year	

<b>Temperature</b>				
<b>Resolution</b>		1°C	1°C	1°C
		8 Bit	8 Bit	8 Bit
<b>Repeatability</b>			±1°C	
<b>Accuracy</b>		±1°C		±2°C
<b>Measurement Range</b>		0°C		50°C
<b>Response Time (Seconds)</b>	1/e(63%)	6 S		30 S

## 2.2 0.96" I2C OLED Display

## 2.3 Arduino Nano R3

### FEATURES:

- ATmega328 Microcontroller
- High-performance
- Low-power 8-bit processor
- Achieve up to 16 MIPS for 16 MHz clock frequency
- 32 kB of which 2 KB used by bootloader
- 2 kB internal SRAM
- 1 kB EEPROM
- 32 x 8 General Purpose Working Registers
- Real Time Counter with Separate Oscillator
- Six PWM Channels Programmable Serial USART
- Master/Slave SPI Serial Interface

## 2.4 Air Quality Sensor MQ135

Symbol	Parameter name	Technical condition	Remarks
V <sub>c</sub>	Circuit voltage	5V±0.1	AC OR DC
V <sub>H</sub>	Heating voltage	5V±0.1	AC OR DC
R <sub>L</sub>	Load resistance	can adjust	
R <sub>H</sub>	Heater resistance	33Ω±5%	Room Tem
P <sub>H</sub>	Heating consumption	less than 800mw	

## 3. COMPONENT DESCRIPTION:

1. DHT11 Sensor: The DHT11 sensor is a low-cost and easy-to-use sensor that combines a capacitive humidity sensor and a thermistor to measure temperature. It operates by converting the temperature and humidity values into digital signals that can be read and processed by a microcontroller or a development board like the Arduino Nano.
2. Arduino Nano: The Arduino Nano is a compact and popular microcontroller board that is well-suited for prototyping projects like an air quality monitor. It features an Atmel microcontroller, offering a range of input/output pins and built-in analog-to-digital converters (ADCs) to interface with various sensors.
3. MQ135 Sensor: The MQ135 sensor is a popular gas sensor module used for detecting a wide range of air pollutants and gases. It is commonly used in air quality monitoring devices, indoor air quality detectors, and environmental monitoring systems. The sensor module utilizes a tin dioxide (SnO<sub>2</sub>) gas sensing element to detect the presence of various gases in the air.

