

# AIR POLLUTION MONITORING DEVICE IN PLANT

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## ABSTRACT

*In industries air pollution is the major problem. Due to which it causes instrument damage, human health issues. In this project we have designed a system based on microcontroller which shows the result for various harmful gases present in the industrial atmosphere. E.g. CO<sub>2</sub>, SO<sub>2</sub>, NO<sub>2</sub>. This system also detect the changes in temperature and humidity in environment using temperature sensor and humidity sensor. It compare the range of gases with standard value. If the range of gases exceeded above the standard value it will give indication on indicator and the result is displayed on LCD. The result is send to the control panel through GSM then it will take corrective action on it.*

**Keyword:** - Micro-controller, Gas sensors, GSM

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## 1. INTRODUCTION

Air pollution monitoring is very important in industries for safety . We uses different sensors for measuring the different gases present in industries. It measure CO, CO<sub>2</sub>, NO<sub>2</sub>, Temperature, Humidity present in the industrial environment. It display continuous value of air pollutant on LCD. After exceed condition signal is send to the control panel.

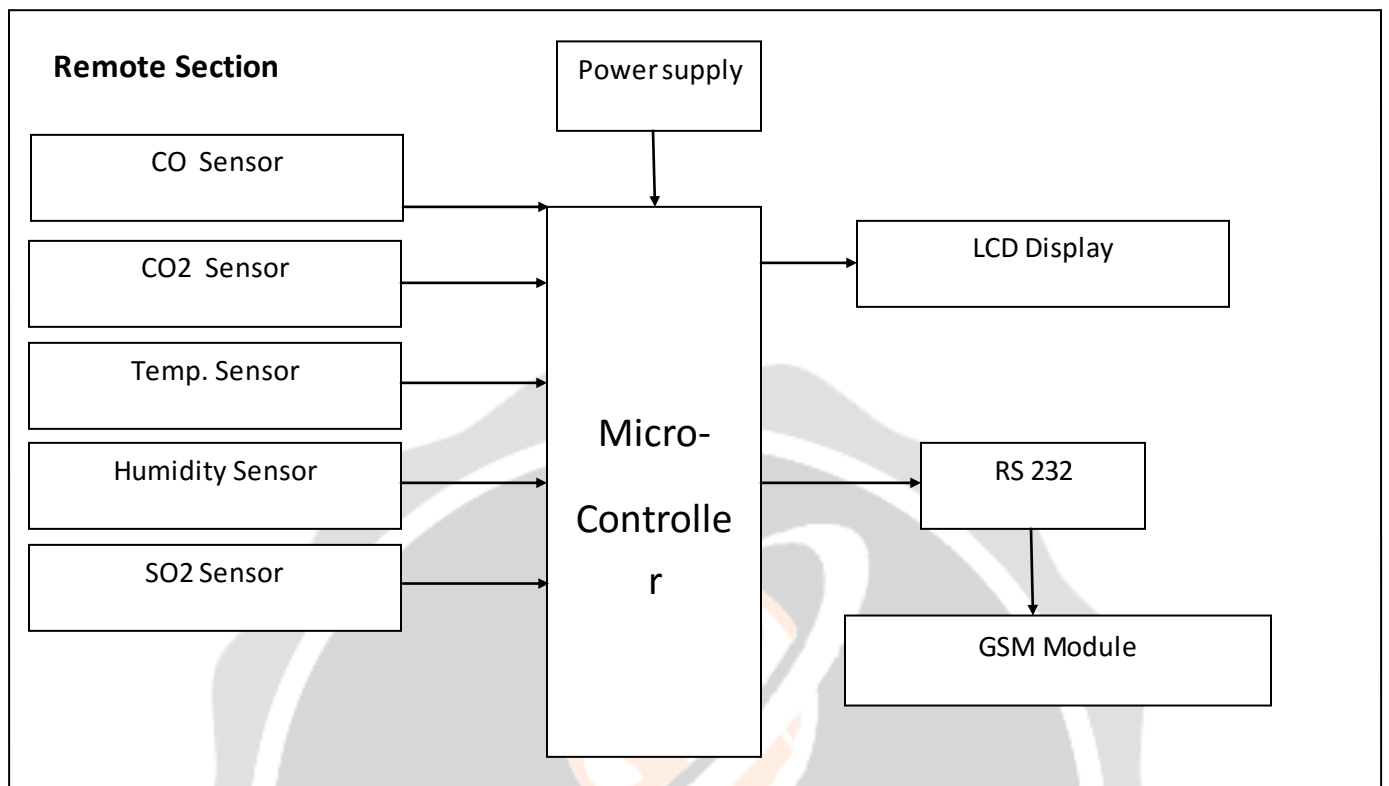
## 2. LITERATURE REVIEW

The current system in plant is if the range of gases exceeded above the standard value it will give indication on the control panel and then this information is send to the worker who is working in that harmful environment. Due to which sometime accident may occur. But our system will help to fulfill that drawback of the current system. This will help in such way that the result will send simultaneously to workers and control panel through GSM. So the corrective action can take workers immediately.

In current system analytical instrument is used to measure the gases E.g. Gas Chromatography. But in this system we use different sensors and microcontroller.

## 3. METHODOLOGY USED

In this system we used standard value i.e set point given to the system. The set point is set to the controller for different sensor. Sensor compare with standard value.



**Fig-1:** Block Diagram of the instrument

### 3.1. Procedure

There are remote section in this system. In that different gas sensors are placed. Microcontroller is also in that section. The sensor sense gas present in the field. Set point is given to the system. The values of sensor compare with the given set point. If the range of measured sensor is exceeded above the set point then it indicate on indicator. It also displayed on LCD. This signal is send to the control panel through GSM. The signal is simultaneously displayed on LCD and also send to the control panel. So worker take corrective action immediately.

### 3.2. Instrument Description

#### a. CO<sub>2</sub> sensor(MQ6)

The carbon dioxide sensor or CO<sub>2</sub> sensor is an instrument for the measurement of carbon dioxide gas. The most common principles for CO<sub>2</sub> sensors are infrared gas sensor (NDIR) and chemical gas sensor. Measuring carbon dioxide is important in monitoring indoor quality and main industrial process.

- High sensitivity to LPG, Iso-Butane, Propane
- Fast response
- Stable and long life
- Circuit Voltage: 5V
- Heating Voltage: 5V

#### b. SO<sub>2</sub> sensor(MQ136)

Sulfur dioxide is colorless gas with a characteristic, irritating, pungent odor. It is released when compounds containing sulfur such as fossil fuels like coal are burned. SO<sub>2</sub> sensor is used to detect these characteristics of SO<sub>2</sub>.

- Supply voltage: 4.5-15V
- Maximum Power dissipation:600 mW
- Operating Temperature: 0-75°C

c. Temperature Sensor(LM35)

Temperature sensors are used to measure a temperature of medium. Most commercial and scientific noncontact temperature sensors measure the thermal radiant power of the infrared or optical radiation received from a known or calculated area on its surface or volume within it.

- Calibrated directly in Celsius.
- Linear +10.0 MV/C scale factor.
- Operates from 4 to 30 V.

d. Humidity()

Humidity is the presence of water in air. The amount of water vapor in air affect human comfort as well as many manufacturing process in industries. The presence of water vapor also influences various physical, chemical and biological processes

e. Arm Microcontroller(LPC2148)

It used to control the action. It is 16bit/32 bit ARM7TDMI-S CPU with real time emulation. It has level sensitivity interrupt pins make these microcontroller suitable for industrial control.

- 8Kb to 40 Kb of on-chip static RAM and 32kb to 512Kb of on chip flash memory.
- Single 10bit DAC provides variable analog output.
- Low power real-time clock with independent power.

f. GSM

This GSM model can accept any GSM network operator SIM card and act like a mobile phone with its own unique phone number .Advantage of using this modem will be that you can use its RS-232 poet to communicate and develop embedded applications.

- Highly flexible plug.
- Highly reliable for 24\*7 operation with matched antenna.
- Simple to use and low cost.
- Status of modem indicated by LED.

g. Power supply

We design 5V power supply for circuit and 3.3V for microcontroller.

### 3. ADVANTAGE

The advantage of this system is to protect human life. This system monitor the range of gases and given the signal to the workers so that worker aware about the harmful condition and can take corrective action suddenly . And save there life. The system is simple to use. We use GSM to communicate over wider range.

### 4. CONCLUSION

This Air pollution monitoring system overcomes all the drawbacks of current system . The main goal of air pollution monitoring device is to provide safety to the human. This system can be cost effective and simple. Due to the use of GSM and ARM controller it lead to low power consumption. It is simple to use for everyone. We can see the ranges of gases on LCD. This system we can used in any enclosed structure. E.g. Home, Hospitals, Hotels. The main purpose of our system is to save human life. The future scope of this system is we can use absorber card which help to control the air pollutant.

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## 6. REFERENCES

- [1]. David Seal, "Arm Architecture Reference Manual," 2nd ed., Addison wesley, .
- [2]. Joseph Yiu, "The Definitive Guide To ARM Cortex-M3 & Cortex-M4 Processors," 3rd ed., Newnes, 2013.
- [3]. James A. Langbridge, "professional Embedded ARM Development," 2014.
- [4]. Hasefratz, David, ogata saukh, Slivan Stuezenegger, And Lothar Thiele"Participatory Air pollution Monitoring Using smartphone."(2012)
- [5].wark,K., & wiener,C.F.(1981). Air pollution: its origin and control.
- [6]. Kularatna,Nihal,and B.H.Sudantha."An environmental air pollution monitoring based on the IEEE. 1451 standard for low cost requirements."Sensors Journal,IEEE 8.4(2008):415-422.

