

CO AND CO₂ MONITORING AND ONTROLING IN VEHICLE

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ABSTRACT

Motor vehicles are the prime source of transportation where vehicles with A/C play a major part. This paper designs an embedded system for a vehicle cabin, which senses the gases like carbon-monoxide and oxygen and displayed at each and every second. If the level of the CO and CO₂ increases than the normal level (30ppm) or the level of the oxygen decreases than the normal level (19%) then an alarm is generated automatically and also ventilation is provided immediately. A warning message is sent to the authorized user via GSM. The advantage of this system is proper detection and faster response time leading to faster diffusion of the intuition, compared with the manual methods. Headache, dizziness, weakness, nausea, vomiting, chest pain, and confusion are the most common symptoms of CO poisoning. This paper designs an embedded system for toxic gas CO and oxygen level detection inside the vehicle cabin and to develop a sensing system using a sensor array and microcontroller. If the toxic gas reaches the maximum threshold level, the detection unit detects, an alarm is generated immediately and the ventilation will be provided automatically. And then an SMS is send to the authorized user through the GSM module.

Keywords: GSM, Sensor, UART, DC Motor, Relay

I. INTRODUCTION

Portable systems began to be developed in the late 1990s in order to better identify actual in-use performance of vehicles. PEMS are designed to measure emissions during the actual use of an internal-combustion engine vehicle or equipment in its regular daily operation, in a manner similar to operation on a chassis Dynamometer. This methodology and approach has been recognized by the USEPA. Many governmental entities (such as the USEPA and the United Nations Framework Convention on Climate Change or UNFCCC) have identified target mobile-source pollutants in various mobile standards as CO₂, NO_x, Particulate Matter (PM), Carbon Monoxide (CO), Hydrocarbons(HC), to ensure that emissions standards are being met. Further, these governing bodies have begun adopting in-use testing program for non-road diesel engines, as well as other types of internal combustion engines, and are requiring the use of PEMS testing. It is important to delineate the various classifications of the latest 'transferable' emissions testing equipment from PEMS equipment, in order to best understand the desire of portability in field-testing of emissions.

II. RESEARCH METHODS

2.1 Research Concept

Hydrogen energy producing equipment (Oxy-Hydrogen Generators), with its characteristics of utilizing inexpensive and abundant water, can produce large amounts of heat via zero-pollution combustion. Water (H₂O) can be separated into its base elements of hydrogen and oxygen gases.

5.1.2 Dc Motor



Fig 2

A DC motor shown in Fig [2] in simple words is a device that converts direct current (electrical energy) into mechanical energy. It's of vital importance for the industry today, and is equally important for engineers.

5.1.3 8051 Controller

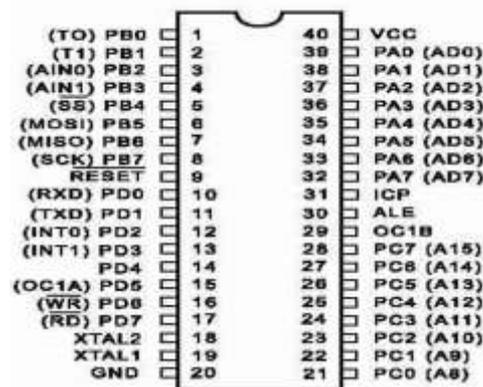


Fig 3

The AT89c51 is a low-power, high-performance CMOS 8-bit microcontroller with 8K bytes of in-system programmable Flash memory. The device is manufactured using Atmel's high-density nonvolatile memory technology and is compatible with the industry-standard 80C51 shown in Fig [3] is instruction set and pin out. The on-chip Flash allows the program memory to be reprogrammed in-system or by a conventional nonvolatile memory programmer. By combining a versatile 8-bit CPU with in-system programmable Flash on a monolithic chip, the Atmel AT89c51 is a powerful microcontroller which provides a highly-flexible and cost-effective solution to many embedded control applications.

5.1.4 Gas Sensor



Fig 4

This is a simple-to-use liquefied petroleum gas (LPG) sensor shown in Fig [4], suitable for sensing LPG concentrations in the air. The MQ-6 can detect gas concentrations anywhere from 200 to 10000ppm. This sensor has a high sensitivity and fast response time. The sensor's output is an analog resistance. The drive circuit is very simple; all you need to do is power the heater coil with 5V, add a load resistance, and connect the output to an ADC.

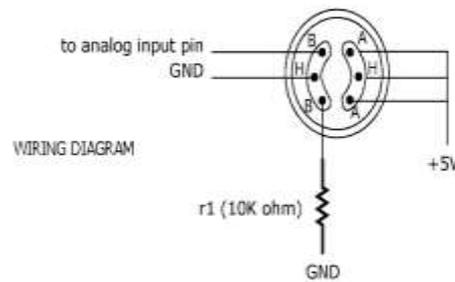


Fig 5

This sensor comes in a package similar to our MQ-3 alcohol sensor, and can be used with the breakout board. This can be easily incorporated into an alarm unit, to sound an alarm or give a visual indication of the LPG concentration. The sensor has excellent sensitivity combined with a quick response time.

5.1.5 Gsm Modem



Fig 6

A GSM modem is a wireless modem that works with a GSM wireless network. A wireless modem behaves like a dial-up modem. The main difference between them is that a dial-up modem sends and receives data through a fixed telephone line while a wireless modem sends and receives data through radio waves. The working of GSM modem is based on commands, the commands always start with AT (which means ATtention) and finish with a <CR> character. For example, the dialing command is ATD<number>; ATD3314629080; here the dialing command ends with semicolon.

The AT commands are given to the GSM modem with the help of PC or controller. The GSM modem is shown in Fig [6] that serially interfaced with the controller with the help of MAX 232. Here max 232 acts as driver which converts TTL levels to the RS 232 levels. For serial interface GSM modem requires the signal based on RS 232 levels. The T1_OUT and R1_IN pin of MAX 232 is connected to the TX and RX pin of GSM modem

5.1.6 Relay

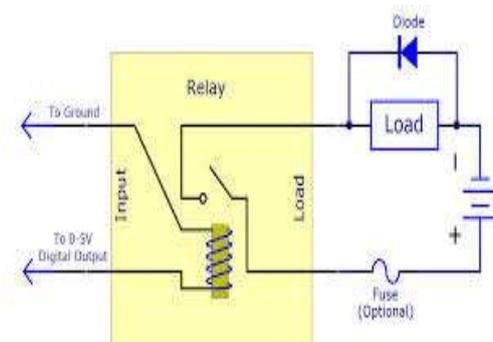


Fig 7

1. A relay which shown in Fig [7] is an electrically operated switch.
2. Electric current through the coil of the relay creates a magnetic field which attracts a lever and changes the switch contacts.
3. The coil current can be on or off so relays have two switch positions and there are double-throw (changeover) switches.
4. It consists of a coil of wire surrounding a soft iron core, an iron yoke, which provides a low reluctance path for magnetic flux, a movable iron armature, and a set, or sets, of contacts.

5.1.7 Uart

The MAX232 is a dual driver/receiver that includes a capacitive voltage generator to supply TIA/EIA-232-F voltage levels from a single 5-V supply. Each receiver converts TIA/EIA-232-F inputs to 5-V TTL/CMOS levels. These receivers have a typical threshold of 1.3 V, a typical hysteresis of 0.5 V, and can accept ± 30 -V inputs. Each driver converts TTL/CMOS input levels into TIA/EIA-232-F levels. The driver, receiver, and voltage-generator functions are available as cells in the Texas Instruments LinASICLibrary.

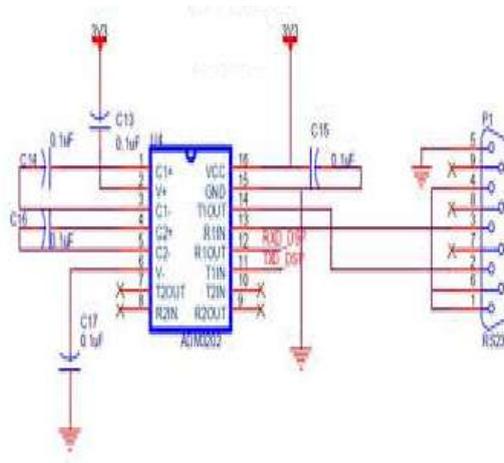


Fig 8

VI. RESULTS AND DISCUSSION



Fig 9

Experimental testing of energy-saving dual fuel boilers with different Oxy-Hydrogen gas production rates; energy saving cost effectiveness and analysis of exhaust gas composition of combustion

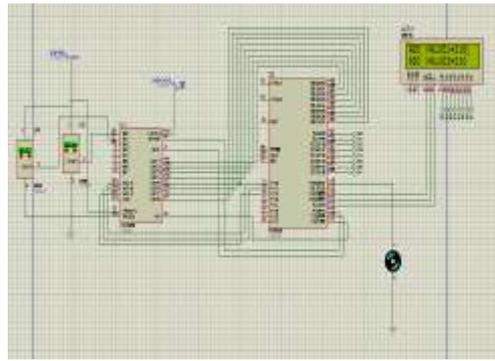


Fig 10

VII. MERIT

A society where people, cars and the environment co-exist. That proposal meets demands for Environment & Safety systems, components.

VIII. CONCLUSIONS AND RECOMMENDATIONS

The level of the toxic gas CO is continuously sensed by the sensor MQ-7. The level is displayed in the LCD continuously for each and every second. When the level of the toxic gas CO exceeds the normal level of 30ppm or the level of Oxygen decreases the normal level of 19.5%, then the microcontroller proceeds with an alarm. The GSM modem inside the vehicle sends a message to the authorized user about the alarming situation inside the cabin with the levels of the gases monitored by the sensors. Then ventilation is provided, so that the level of the toxic gases can be lowered as early as possible. on other hand the project that includes automatic door opening system ,when the level of the toxic gas CO is continuously sensed by the sensor MQ-7. The level is displayed in the LCD continuously for each and every second the gas will reached over the threshold value of gas PPM the door motors are automatically opened. The output has been shown in Fig [10]

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