DESIGN AND DEVELOPMENT OF A PORTABLE MULTIPLE GAS DETECTOR

THESIS

JOHN LESTER D. CORTEZ

MELVIC O. MACALALAD

College of Engineering and Information Technology

CAVITE STATE UNIVERSITY

Indang, Cavite

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DESIGN AND DEVELOPMENT OF A PORTABLE MULTIPLE GAS DETECTOR

Undergraduate Thesis
Submitted to the Faculty of the
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JOHN LESTER D. CORTEZ
MELVIC O. MACALALAD
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ABSTRACT

CORTEZ, JOHN LESTER D. and MACALALAD, MELVIC O., Design and Development of a Portable Multiple Gas Detector. Undergraduate Design Project. Bachelor of Science in Electronics and Communications Engineering. Cavite State University, Indang, Cavite. April 2014. Adviser: Engr. Michael T. Costa

The main objective of this study was to design and develop a portable multiple gas detector. Specifically, the study also aimed to: 1. design and develop a portable multiple gas detector for Liquefied Petroleum Gas (LPG), methane, and carbon monoxide; 2. design and construct the microcontroller circuit of the device; 3. design and construct the main frame and casing of the portable multiple gas detector specifically the placement of sensors, input and output components; 4. develop the software of the device; 5. construct the prototype of the device; 6. test and evaluate the performance of the device through pilot testing; and 7. conduct cost computation of the device.

The portable multiple gas detector, consisted of GizDuino 168 microcontroller as the processing unit, the MQ gas sensors as the sensing unit, suction fan, 12V 4A gel cell motorcycle battery, LED indicators, and SC204A 4x20 LCD screen.

The testing and evaluation of the project was done by exposing the device to LPG, methane and CO. To determine the accuracy, consistency, and reliability of the designed project ten trials were done. The LPG sensing capability was tested in Bancod, Indang, Cavite. The methane sensing capability was tested on Munasque Farm at Alulod, Indang, Cavite. The CO sensing capability was done in Tanza, Cavite. Based on the results of the evaluation, the device proved to be accurate and reliable.

The total cost of the design project was PhP 7, 393.00.

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John Lester D.Cortez
Melvic O. Macalalad

An undergraduate design project submitted to the faculty of the Department of Computer and Electronics Engineering, College of Engineering and Information Technology, Cavite State University, Indang, Cavite in partial fulfillment of the requirements for the degree of Bachelor of Science in Electronics Engineering with Contribution No.CEIT-2013-14-040. Prepared under the supervision of Engr. Michael T. Costa

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INTRODUCTION

We are living in a world filled with various gases.The atmosphere of the Earth is a layer of gases surrounding the planet that is held by Earth's gravity. It is composed mostly of nitrogen, a lesser part of oxygen, and small percentage of other gases. Not all gases are safe for human to inhale. Exposure to certain concentrations of different gases may lead to serious illness or worst, death.

A gas detector is a device that detects the presence of various gases within an area, usually as part of a safety system. It can be used to detect combustible, flammable and toxic gases, and oxygen depletion. This type of device is used widely in the industry and can be found in a variety of locations such as on oil rigs to monitor manufacture processes. It is also used by rescue teams or other disaster prevention/response teams.