MOTORCYCLE ANTI-THEFT SYSTEM

(MATS)

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I am dedicating this credit to my lecturer Mdm. Afifah Maheran Bt. Abdul Hamid, my parents Mr. Abu Bin Daros and Mdm. Masita Bt.Abd Majid, my family, and all my fellow friends for helping me directly or indirectly in this project.

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ABSTRACT

This project is about motorcycle anti-theft system which is a system that can prevent a motorcycle from being stolen. Alarm systems that have in the market nowadays are very sensitive and make many false alarms. Also, the current system, use a vibrate sensor or shock sensor as a main sensor. The false alarm will increase because if anyone touches the motorcycle, the alarm will trigger easily even though they do not have any senses of stealing. So, by doing this project, the motorcycle anti-theft system will reduce the false alarm as main objective. To do so, first is a research about the alarm system for motorcycle was done. The main component in the alarm circuit and sensor that will be used to achieve the objective was studied. After that, the circuit was constructed and the testing was done to make sure the system is running well. In this motorcycle anti-theft system, the main sensor is mercury tilt sensor. This system will trigger when the mercury touch their two lids and the buzzer will ON. The mercury tilt sensor will place on the bike's center stand, side stand and on the handle. For the best result, is on the double stand because the change of degree for the mercury can be more accurate at the double stand. Then, the alarm will just trigger when the stand is lift up or the handle is being turn out. From this method, it will reduce the false alarm.

ABSTRAK

Projek ini adalah berkaitan sistem anti-kecurian motosikal yang merupakan sistem yang boleh menghalang sesebuah motosikal daripada dicuri dengan mudah. Sistem penggera yang kini di pasaran, terlalu sensitif dan mengakibatkan peningkatan kepada penggera palsu. Sistem ini juga menggunakan sensor bergetar atau sengatan sensor sebagai sensor utama. Penggera palsu akan meningkat kerana walaupun apabila seseorang yang tidak mempunyai niat untuk mencuri, menyentuh motosikal itu, penggera akan berbunyi dengan segera. Jadi, dengan menjalankan projek ini, sistem anti-kecurian motosikal ini akan mengurangkan penggera palsu sebagai objektif utamanya. Untuk melakukannya, pertama adalah membuat kajian tentang sistem penggera motosikal yang sedia ada di pasaran. Carian dan kajian mengenai litar penggera, komponen utama dalam litar penggera itu, dan sensor yang akan digunakan untuk mencapai objektif utama telah dilakukan. Setelah itu, litar dibangunkan dan ujian dilakukan untuk memastikan sistem berjalan dengan baik. Dalam sistem anti-kecurian motosikal ini, sensor utama adalah merkuri sensor kemiringan. Sistem ini akan berfungsi apabila merkuri menyentuh dua kaki sensor itu dan menyebabkan penggera berbunyi. Sensor merkuri itu akan ditempatkan pada dua kaki berdiri motosikal, kaki tunggal motosikal dan pada pegangan motosikal. Hasil yang terbaik, adalah di dua kaki berdiri motosikal kerana perubahan darjah merkuri beralih adalah lebih sempurna. Kemudian, penggera hanya akan berbunyi apabila dua kaki berdiri motosikal dialihkan ke kedudukan asal. Dari kaedah yang dijalankan ini, akan dapat mengurangkan penggera palsu.

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IC	-	Integrated Circuit

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CHAPTER 1

PROJECT OVERVIEW

This chapter will explain briefly about the project background, objectives to be achieved, problem statement and scope of work.

1.1 Introduction

Nowadays we heard so many cases about the loss motorcycle. It is not just the cases that have been reported but they are also many cases that is not been reported. There are many kind of alarm system for motorcycle available in the market such as an alarm in a lock and a vibrate circuit. Most of the current alarm systems are too sensitive, so the false alarm is going higher. Of course we want our security alarm to be sensitive but if the sensitive increase a false alarm, it not too practical.

By doing this project that using tilt switches which is mercury, it will trigger the alarm when the steering is moved or when the bike is lifted off its side-stand or its centre-stand. Of course this kind of alarm unable to catch the thief 100% but it prevents the motorcycle from being stolen easily. Despite the suspect can broke the key place at ignition starter without trigger an alarm, the motorcycle still cannot be stole easily because the system has locked at the ignition circuit until one of the reset switch has been pressed.

This project will control the false alarm because it is not only about vibrate or just touch the motorcycle, but it will trigger when the lid at mercury switch is contacted by the mercury. This project, cover the application of mercury sensor, ignition circuit, relay, and NAND gate.

1.2 Objectives

The objectives of this project are as the following: -

i. To make the system more accurate to sense the suspect. It is because when the system accurate it can make the suspect stops willing to steal the motorcycle and also the false alarm will reduce. That is the reason we use a mercury tilt switch.

ii. To make the motorcycle will not easily to turn ON without switch off first the system. If the suspect still trying to cut the wire or other else, they still do not disturb the system

iii. To make the alarm triggered after the mercury switch ON the system.

iv. To get the neighbors alert when the motorcycle try to be stolen. So that, we construct the circuit of this alarm system with the siren or buzzer that sound loudly.

1.3 Problem Statements

Nowadays, there are many cases about the motorcycle theft. At the market currently, just have the conventional lock or the simple alarm system. The conventional alarm system functions when the motorcycle has been shacked and touched. It might not too accurate because whoever touches it, the alarm will ON immediately. The alarm's ringing just a few second that is too shorts in alert others.

1.4 Project Scope

Components such are a buzzer or siren, tilt switch (mercury), relay, and logic IC will be used to develop the motorcycle anti-theft system. For the first step, the theory about this system should to be research. When all the components are ready, we will combine it in one circuit. The alarm should be able to generate loud sound and stop after 30seconds. The ignition starter on the motorcycle has been modified so that whenever the thief attempt to steal the motorcycle, they cannot steal it easily because the ignition circuit is still breakdown until the reset button is pressed on the system.

CHAPTER 2

LITERATURE REVIEW

This chapter describes about the literature review involved to gather information about the project. This study is focused especially on the application related to the project.

2.1 Introduction

There are many inventions on the security system. The most common vehicle equipped with this kind of system is car. On the other hand, there is still less invention in the market for motorcycle. This project is focused on motorcycle security system. It will use alarm, some sensors, and doing some modification at the starter of the motorcycle. The main objective of this project is to minimize a false alarm.

Some security system that using such a Remocon unit is accident operated by the driver or a passenger whiles the vehicle is being driven, thereby bringing the security system into an active state. When the system is armed while the vehicle is in motion, a vehicle vibration sensor or a noise sensor in the system immediately detects vehicle vibrations or noise. As a consequence, the siren suddenly sounds, the vehicle headlights are flashed, the starter is cut off or the supply of fuel to the vehicle is cut off to thereby stop the vehicle, causing great danger [1].

While, an electronic control system for the starter motor of a vehicle which includes a novel key-controlled means actuable to energize a series of gates that control the flow of electrical current from the ignition switch through related components to the starter motor switch. The system also includes lock means enabling one to render the electrical system operable in selected instances when the key is removed [2]. The early transistor control boxes, unfortunately, were extremely sensitive to electrical disturbances such as radiation and electrical storms. These early transistor control boxes often called the “fox” too many times, and the police became very disturbed. Customers began receive “bills” after a few false alarms [3].

Whichever alarm build, the circuit board and switches must be protected from the elements. Without the terminal blocks, the board is small. Ideally, try to find a siren with enough spare space inside to accommodate it. Fit a 1-amp in-line fuse as close as possible to the power source. The fuse is there to protect the wiring not the circuit board. Instead of using a key-switch, hidden switch also can be used; or use the normally-closed contacts of a small relay. Wire the relay coil so that it's energized while the ignition is on. Then every time the ignition is turned off, the alarm will set itself. When the alarms are not sounding, the circuits use no current. This should make them useful in other circumstances where a power supply is not readily available. Powered by dry batteries with the relay and siren voltages chosen to suit the alarms could be fitted almost anywhere [4].

If a security device is to be convenient to the owner, it must be unobtrusive in the normal used of the vehicle by the owner or authorized user, as in starting the motorcycle, traveling thereon, getting off, and in maintenance. Unfortunately, if the normal use of the ignition circuit is employed by owner to disable the security alarm device, then a thief hotwiring the ignition in the engine area of the motorcycle can disable the security alarm device too. Moreover, when the motorcycle is undergoing maintenance with ignition off, the owner himself or herself can be annoyed by false alarms [5].

The external or axial force applied to the active sensing portion of the force sensor chip made of a semiconductor substrate or the like can be dampened to a required level by providing a dampening or buffering mechanism that dampens the external force and applies a part of the external force to the force sensor chip. Considerable external force can thereby be detected. The dampening mechanism that has an external force buffering effect functions as a principal component of the buffering device in a force sensor. Such a buffering device can be manufactured in the form of a cube, cylinder, disc, rod, or other modified shape in accordance with the shape and structure of the dampening mechanism. As a result, a force sensor having such a buffering device can itself be manufactured in various shapes and forms. Force sensors having a large number of variations can expand the range of use and application, and force sensors having an optimal shape and other features can be mounted in the intended location [6].

One other issue that desirably could be corrected is the wasting of electricity and the wasting of space when a motorcycle is an alarm system or other theft deterrent device in addition to the basic electronic control unit (ECU). While physical locks are functional, they require storage space or complicated mechanical structure. Thus, alarms are preferred from the standpoint of space and simplicity of design. One drawback to alarm systems, however, is the proliferation of electrical components required for such alarm systems and the consequent difficulty in manufacturing an OEM-optional alarm device. In other words, motorcycle manufactures need to reduce the number of variations in base components, such as circuit boards. Providing an alarm system as an option has heretofore been undesirable due to the need to provide different circuitry for alarm equipped motorcycles and for non alarm equipped motorcycles, respectively. As an alternative, the circuitry could be designed with most of the components necessary for the alarm already present and active on the circuit but the alarm device and other related components not present. This is undesirable, however, because of the increased power consumption that would result. Accordingly, a simple but energy efficient alarm option is desired [7].

Motion sensors and each one of the referenced items, however, suffer from one or more of the following disadvantages. Motion sensors are expensive to purchase, to install and to maintain especially motion sensors utilizing microwave technology, passive infrared light technology, and photo electric technology. Motion sensors are susceptible to a high rate of false alarms due to malfunction, children, pets, wind moving objects into the motion sensor’s view, and other false triggers. Motion sensors must be permanently mounted to a fixed object and can only protect a predefined specific area. Outdoor motion sensors deteriorate quickly from constant exposure to the elements.

Other references employ the use of a flexible conduit containing an electrical alarm circuit. These references also suffer from several disadvantages. First, the length of the conduit cannot be adjusted to fit varying conditions. As such, the conduit must protect the same sized element in the same general location all the time. Second, the end of the flexible conduit must be returned to a fixed receptacle in order to complete the electrical circuit. When securing a movable object that is far away from the receptacle, or when securing a group of movable objects, the conduit must be long enough and flexible enough to thread through the objects being secured and still be long enough to plug into the fixed receptacle and complete the circuit. Third, it is simply inconvenient and cumbersome to have to loop the flexible conduit through each object being secured and have to plug the end of the conduit back into the fixed receptacle [8].

2.2 Tilt Switch or Mercury Switch

Figure 2.1: Mercury Tilt sensor

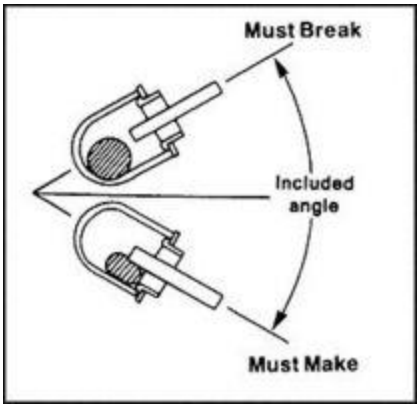

Figure 2.2: Movement of mercury tilt sensor

Tilt switches contain a conductive liquid and when tilted this bridges the contacts inside, closing the switch. They can be used as a sensor to detect the position of an object. Some tilt switches contain mercury which is poisonous.

A mercury switch (also known as a mercury tilt switch) is a switch whose purpose is to allow or interrupt the flow of electric current in an electrical circuit in a manner that is dependent on the switch's physical position or alignment relative to the direction of the "pull" of earth's gravity, or other inertia.

Mercury switches consist of one or more sets of electrical contacts in a sealed glass envelope which contains a bead of mercury. The envelope may also contain air, an inert gas, or a vacuum. Gravity is constantly pulling the drop of mercury to the lowest point in the envelope. When the switch is tilted in the appropriate direction, the mercury touches a set of contacts, thus completing the electrical circuit through those contacts.

Tilting the switch the opposite direction causes the mercury to move away from that set of contacts, thus breaking that circuit [see Figure 2.3]. The switch may contain multiple sets of contacts, closing different sets at different angles allowing, for example, Single-Pole, Double-Throw *(*SPDT*)* operation.