

**UNIVERSITI TEKNOLOGI MARA**

**DESIGN AND FABRICATE  
POCKET ALLEN KEY MACHINE**

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## **ABSTRACT**

The objective of this research is to fabricate a prototype of pocket allen key machine. By using a single DC motor, it is capable of transmitting the power needed to complete the assembly of an IKEA product.

The pocket allen key machine has a big potential in today's market due to the highly numbered of people buying IKEA products. The furnitures built by this famous company often use a hexagonal-head fastener to help lessen the possibilities of the buyers defecting their furnitures. Therefore, this project focus on helping them in needs of assembling the parts easily plus lowering the risk to damage those IKEA's products. The pocket allen key machine provides the community a new product to choose rather than having the only option of buying a cordless drill.

The fabrication process includes measuring, cutting, and drilling. This pocket allen key machine is made of an easily recycled plastic. We want to raise the community's awareness towards this lovely earth. To raise the standard, this project aims to help lowering the temperature of the earth. It is operated by a DC motor as for the rotation of the chuck and allen key. The motor will be low in power to help lessen the risk of defecting the furniture when the assembling process is ongoing. Some recommendations can be added as an initiative such as a three-way switch to control the direction of the rotation.

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# CHAPTER ONE

## INTRODUCTION

### 1.1 Background of Study

A drill is a tool used for making holes or driving fasteners. It is fitted either with a bit or a driver chuck. For heavy works, a hand-operated power drills often used where it is wired and must connected to a plug for electricity. This is the most common tool in woodworking or machining process due to its capability to convert a big leap of electricity into kinetic energy. The first ever electric drill was built in 1889 thanks to Arthur James Arnot and William Blanch Brain. Then, the first portable drill was created by Wilhelm Fein and Carl Fein in 1895 [1]. Twenty-two years later, the famous company known as Black & Decker patented the first trigger-switch pistol-like portable drill. This was the start of modern drill era. Over the last century, variety types of drill and multiple sizes of them has been created for specific uses.

In Malaysia, everyone knows IKEA, a successful Swedish furniture retailer where it offers functional and affordable ones. It sells literally every furniture from bedroom shelves sofas, dining tables, chairs, wardrobes, textiles, decorations and many more [2]. Most of the products can be delivered to our doors directly in the meantime. In order to help lessen the consumers difficulty of assembling the parts, the company decided to only use hexagonal-headed fasteners. The buyers will only need a specific size of allen key to complete the procedures.

Today, people often use a cordless drill where the bits can be change from drills, to a screwdriver or allen keys depends on the fasteners they want to fasten. It is also powered by battery packs where it can be charged means it is wireless. By combining some of the ideas I got from an already made cordless drill, I would like to fabricate a much smaller in size allen key pocket machine. The system inside will be much more simplified than the ones in nowadays market.