

# PROTOTYPE DESIGN COLLECTION

## SERIES 2



# Prototype Design Collection

Series 2



**AHMAD NAJMIE RUSLI**

**UNIVERSITI TEKNOLOGI MARA CAWANGAN JOHOR  
KAMPUS PASIR GUDANG**

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# FOREWORD

This digital book on Prototype Design Collection Series 2 (PDC Series 2) is published as a reference design for mechanical engineering students. The designs presented experience a few phases of analysis before fabrication of prototype. Each project summarises the project description, prototype, figures, and design parameter. The design products vary in tools or equipment for household, workshop, entrepreneur, etc. Suggested material and detail of prototype dimension are also mentioned in this book.

It is hoped that this book will assist the students to have more ideas on innovation design products in the future.

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## CHAPTER 117

### Mini Cooling Fridge using Peltier

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#### PROJECT DESCRIPTION

The objective of this project is to enhance energy efficiency by replacing the compressor with a Peltier device. The utilization of a compressor in cooling systems results in higher power consumption, leading to increased electric costs. Additionally, compressors themselves are relatively expensive compared to Peltier devices. To address these challenges, this study proposes the implementation of a Peltier device as the cooling agent in refrigeration systems, specifically in fridges. In this design, the cold side of the Peltier device will be attached to an inner aluminium plate within the fridge, while the hot side will be connected to an aluminium plate, heat sink, and fans, which will serve as a radiator. Power will be supplied by a 12V AC adapter, and extruded polystyrene will act as a thermal insulator. By adopting this approach, the Peltier device can effectively function as a cooling agent, leading to reduced electricity bills and production costs associated with fridges.

**Keywords:** *Mini cooling fridge, Peltier, Cooling agent*

#### PROTOTYPE



### DESIGN PARAMETER

