

Final year Honours degree project Proposal

Precision Control Circuit for a High Current, Short Circuit Tester



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# Introduction

This document is a project proposal in accordance with a third level, final year honours degree project in the study of computer and electronic engineering at Galway-Mayo Institute of Technology. For this project, the main research will be focused into the detection and synchronisation of alternating current (AC) mains voltage.

Should the average human come into contact with an electric current exceeding 30 milliamps, that individual will be at serious risk of a fatal electric shock if it is not interrupted immediately. The effects of this amount of current can cause a human to go into cardiac arrest which likely results in death. This dangerous level of electric current can be found at all power outlets and sockets from the mains power supply in 99% of residential homes, businesses and industrial buildings.

To interrupt a person being fatally shocked by the flow of electric current it must be disconnected immediately. A **Residual Current Device**, or **RCD**, is a life-saving device that is fitted in electrical installations by monitoring the flow of electricity. If it detects an electric current imbalance flowing through a person’s body or electrical equipment above a certain threshold the device will be activated and automatically remove power from the appliance. A *Residual Current Device* can also provide protection against electrical fire in certain cases.

Western Automation R&D produce, test and validate these safety devices. They follow strict international standards and procedures to make sure they are producing the safest products for human use. One of these validation tests is an extremely high electric current test which tests the durability of the safety device under the stressful condition of a short circuit. This test passes huge amounts of electric current through the RCD and simulates a sudden appearance of an electrical fault in the *Residual Current Device* and how the device copes with the much larger current than normal operational electric current.

The main aim of my project is to improve this validation test by adding a more precise and controlled means to test the device under specified conditions of high current. To date, the technicians carrying out the test have no way of controlling the specific point of the mains voltage signal which is used when the test starts. Although this is suitable for testing, it would be more efficient to implement a controlled and accurate functionality to the test. The technician will be able to apply additional settings to thoroughly observe the effects that high current has on the device in many more conditions than what is available today. It is my aim that this project will vastly improve the validation process of the *Residual Current Devices* and ultimately benefit Western Automation’s product standard of safety.