

**DEVELOPMENT OF MINIATURIZED CONTROL CIRCUIT OF
AUTO RECLOSE EARTH LEAKAGE RELAY FOR A SINGLE
PHASE 230V**

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ABSTRACT

Power distribution networks have been operated in an easy and simple unidirectional way. Many of electrical faults such as short circuit or over current and earth fault that occur are momentary in nature. The breaker disconnects the circuit whenever it detects unbalance current between the phase conductor and the neutral conductor. Such an unbalance is sometimes caused by current leakage through the body of a person who is grounded when accidentally touch the energized part of circuit. Normally the breaker that available in the market has to be reset manually when the fault occur and cannot differentiate between temporary fault and permanents fault. When the fault occurs in protected area, the protection system will force the breaker to trip. In order to turn the power back to normal operation, consumer needs to reconnect manually. One of the drawbacks of the common breaker is that, its cannot reconnect the power with the utility supply to normal operation condition although only a short disturbance occurs such as the lightning strike around the protected area. This paper presents the automatic reclosing circuit breaker which is a system that will be able to reconnect the system to the utility supply automatically without any human interference. The important of having automatic reclosing circuit breaker is to make power system self-sufficient. This system can be applied to single phase systems which are common systems that used in Malaysia. This circuit can be performed by application of an electronic control circuit (digital technology). The advantages of the system are reducing in consumer equipment's down time and maintenance time. This circuit consist of the electronic control circuit that used to reset the system. The general conclusion from this thesis work is that the circuit breaker will reconnect to the utility supply automatically when the breaker disconnects causes by the unbalance current.

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CHAPTER 1

INTRODUCTION

1.1 BACKGROUND OF STUDY

Power distribution networks have been operated in an easy and simple unidirectional way. Many of electrical fault such as short circuit or overcurrent and earth fault that occur are momentary in nature. As an example, earth fault mainly occur due to lightning strike. In networks with directly earthed neutral an earth fault is equivalent to a phase-to-earth short circuit. The current magnitude in this case will be almost equal to the fault current of phase-to-phase short circuit. Malaysia is one of the countries that have the high frequency of lightning strike in the world.

Statistics have shown that Malaysia has an average of 204 lightning days a year which is equivalent to 40 strikes per square kilometres per year. Based on the report by The Star, March 2011, Malaysia is the second highest lightning strike occurs in the world. Nowadays, most of the common use protection component in consumer units is residual current devices (RCD), while in distribution board (DB) is earth leakage relay (ELR). ELR is a safety device that switches off electricity automatically whenever it detects unbalance electric current between the live conductor and the neutral conductor, which is then the breaker will open automatically. It will act by cut the electricity supply off to your house if there were any damages to assembly or electrical appliances such as leakage current to earth through live wire contact to electrical appliances frame which could expose the consumer to electric shock.