

## INTISARI

### RANCANG BANGUN *AUTOMATIC TRANSFER SWITCH* PADA MESIN KINCIR AIR TAMBAK DENGAN SISTEM *BACKUP POWER* DARI SISTEM PLTS

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Proyek ini bertujuan merancang dan membangun sistem *Automatic Transfer Switch* pada kincir air tambak dengan menggunakan sistem *Backup Power* dari Pembangkit Listrik Tenaga Surya (PLTS). Sistem ini mengubah energi panas matahari menjadi energi listrik melalui panel surya yang dikontrol oleh *solar charge controller*. Energi listrik disimpan dalam baterai VRLA. Sensor tegangan DC memantau kapasitas baterai dan Mikrokontroler Arduino Nano mengatur sistem.

Ketika kapasitas baterai menurun, sistem mengisi daya melalui *solar charge controller*. Relay dalam posisi *normally open* menggerakkan motor listrik AC saat sensor tegangan AC mendeteksi pemadaman. Baterai cadangan mengkonversi tegangan DC menjadi tegangan AC melalui inverter sebagai sumber daya cadangan. Disaat beban disuplai dengan baterai cadangan maka akan terjadi pengaturan frekuensi sehingga kecepatan motor ac 1 phase berubah melalui dimmer ac. Ketika sumber daya utama dari PLN tersedia, relay dalam posisi *normally close* terhubung dengan jaringan PLN untuk menggerakkan motor ac sebagai sumber utama.

Sistem mengintegrasikan panel surya, baterai cadangan, *solar charge controller*, Arduino Nano, inverter, relay, dimmer AC dan motor ac 1 phase sebagai beban utama. *Automatic Transfer Switch* memungkinkan beralih yang mulus antara sumber daya utama (PLN) dan sumber daya cadangan (baterai dan inverter) saat terjadi pemadaman listrik. Pada saat beralih ke sumber cadangan dengan kapasitas baterai cadangan yang sama untuk menggerakkan beban pada mode suplai 100% didapatkan waktu 40,1 menit, mode suplai 70% didapatkan waktu 67,1 menit, dan mode suplai gradual turun didapatkan waktu 99 menit.

Kata kunci : Panel surya, *Automatic Transfer Switch*, *Backup Power*,  
Arduino Nano, *Solar Charge Controller*, Dimmer AC

## ABSTRACT

### ***DESIGN AND CONSTRUCTION OF AN AUTOMATIC TRANSFER SWITCH ON A TAMB WATER MACHINE WITH A BACKUP POWER SYSTEM FROM A PLTS SYSTEM***

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*This project aims to design and build an Automatic Transfer Switch system for a pond water wheel using a Backup Power system from a Solar Power Plant (PLTS). This system converts solar thermal energy into electrical energy through solar panels which are controlled by a solar charge controller. Electrical energy is stored in VRLA batteries. A DC voltage sensor monitors battery capacity and the Arduino Nano Microcontroller regulates the system.*

*When the battery capacity decreases, the system charges via the solar charge controller. The relay in the normally open position drives the AC electric motor when the AC voltage sensor detects an outage. The backup battery converts DC voltage to AC voltage through an inverter as a backup power source. When the load is supplied with a backup battery, there will be a frequency adjustment so that the speed of the single phase ac motor changes through the ac dimmer. When the main power source from PLN is available, the relay in the normally closed position is connected to the PLN network to drive the ac motor as the main source.*

*The system integrates solar panels, backup batteries, solar charge controllers, Arduino Nano, inverters, relays, AC Dimmer, and single phase ac motors as the main load. The Automatic Transfer Switch enables seamless switching between the main power source (PLN) and backup power sources (batteries and inverters) in the event of a power outage. When switching to a backup source with the same backup battery capacity to drive a load in 100% supply mode, it takes 40.1 minutes, 70% supply mode gets 67,1 minutes, and gradually decreases supply mode gets 99 minutes.*

*Keywords : Solar Panels, Automatic Transfer Switch, Backup Power, Arduino Nano, Solar Charge Controller, AC Dimmer*