

SMARTLAB AND POWER SUPPLY WITH AUTO-SWITCHING

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Abstract: The core of this project is to develop a system which will monitor all parameters that are consuming Total Voltage, live current, energy, Units with this project, Also we are going to produce the Alarm buzzer if any of above parameters goes above the set threshold limit or after certain specific value, to prevent the damage of some costly equipment's in our lab. We can set underload and overload protection for whole lab with this project. Also, if any load we forgot to close like most of the students does not switch off the fan, bulbs after practical so with this system we can monitor if any load is still on even after college time then also we can close those loads by Dashboard control panel. In this system we also included the Inverter auto switching in case of mains electricity cut-off by relay mechanism and logic.

Keywords: Arduino Uno, ESP8266, Current sensors, Voltage sensor

1. INTRODUCTION

The electricity wastage is common in populated country like India. This project aims to save the electricity for betterment of environment and for all of us. The parallel operation of inverter has advantages in the low cost and high effective maintenance. The reliability as well as the capability of the system can be increased by replacing a single inverter with multiple ones. Smaller inverters in parallel will form the so-called distributed power system (DPS). The challenging problem of them, however, is the load current sharing among the parallel connected inverters. Without a proper control scheme, the load current cannot be shared properly by each inverter. Seriously, large circulate current among inverters will result in system crash. Many methods can be found in parallel operation of inverters, such as concentrated control, Master-Slave control, distributed logic control, wireless independent control, etc.

2. LITERATURE SURVEY

1. Auto-tuning controller Design of Class E Inverter with Resonant Components Varying

Prof. Yen Fang Li. Department of Electrical Engineering of Ming Hsin University of Science and Technology, Hsinchu, TAIWAN email:yfli@must.edu.tw

From this paper collect information about component used for our project.

2. Auto-Master-Slave Control Technique of Parallel Inverters in Distributed AC Power Systems and UPS Yunqing Pei, Xu Yang, School of Electrical engineering Jiaotong University, China.

3. A Residential load Identification Algorithm Based On periodogram. Han Lu, Wu Xin School Of Electrical and Electronic Engineering, North China Electric Power University, Beijing 102206, China.

3. BLOCK DIAGRAM

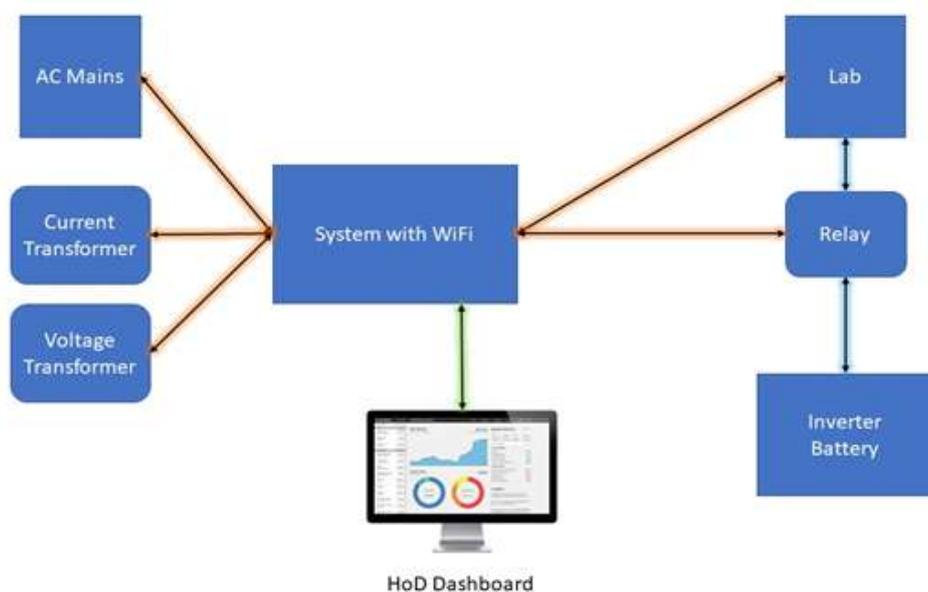


Fig.1 Block Diagram Of System

Block diagram consist of:

- 1) AC mains
- 2) Current transformer
- 3) LCD Display
- 4) WiFi module
- 5) Relay
- 6) Inverter Battery
- 7) Lab

3.1 Ac Mains

Ac Mains is the main power supply consisting of the whole building.

3.2 Current transformer

The ACS712 Current sensor offered on the internet are designed to be easily use with Arduino. These sensors are based on Allegro ACS712ELC chip.

3.3 LCD Display

A 16 *2 Display is very basic module and is very commonly used in various devices and circuits

3.4 WI-FI Module

A ESP 12E WI_FI Module is developed by AI Thinker Core processor ESP8266 in smaller size 32 bit MCU, 160 MHz.

3.5 SSR – Solid State Relay

A Solid State Relay is an electronic switching device that switches on or off when a small external voltage is applied to its terminals

4. Working Of Project

Main objectives of this project is to control use of energy and minimize the electricity bill. In the colleges and private apartment their.s In this project we have provided a Smart lab for auto switching of an electrical switches in college building.

We have used following Hardware,

- A PCB- Printed Circuit Board with programmed circuit.
- An SSR with capability of more than 100 amp
- Current sensor – can measure a load of 100 amp made proportional to 50mA.
- Power supply of 440 volts, 100 amp.

5. Project Hardware Design



Fig.3 Project Hardware Design

6. FUTURE WORK:

- There are several drawbacks of this system which can be further improved. There are several drawbacks of this system which can be further improved in the coming future, More technical and software changes can be made in the future.
- For a small demonstration purpose an LCD screen is attached which shows the status of appliances i.e ON or OFF.

7. ACKNOWLEDGEMENT:

We would like to thank our guide Prof. Sandeep.N.Yadav of Electrical department for the valuable guidance and helping us throughout the project.

8. CONCLUSION :

The most important points concluded from this work can be summarized as below :

1. A Human effort is taken out of consideration for switching the supply on and off.
2. In this paper, the concept of employing smart lab and auto-switching is introduced With the help of parallel operation of current transformer and with micro controller in build Wi-Fi all the parameters in working condition can be seen on LCD screen.

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