International Journal of Scientific Research in Engineering and Management (IJSREM)
Volume: 07 Issue: 04 | April - 2023 Impact Factor: 8.176 ISSN: 2582-3930

SWAYAM PHASE CHANGER (Change Phase Automatically)

Shrikrishana Amati[1], Omkar Gavali[2], Swapnil Patil[3],Prathmesh Patil[4]

[1]Student,Electrical Department & BSCOER,Pune.
[2]Student, Electrical Department & BSCOER,Pune.
[3]Student, Electrical Department & BSCOER,Pune.
[4]Student, Electrical Department & BSCOER,Pune.

Abstract – Phase absence is a common & server problem in industry, home or office where one or two phases of a three-phase supply may not be live. This can cause electrical appliances to be on in one room and off in another, creating a big disturbance in our routine work. Power failure is also a common problem, as it hampers production, construction work, and building. Therefore, an automatic phase selector system is required for uninterrupted power to critical loads in the event of a power failure in any phase. There is no need for a backup power supply and there is no time consumption, as the phase is changed automatically within a few seconds.

***Key Words*:** Phase, Power failure, system, industry, faults, times.

1.INTRODUCTION

This project is designed to check the availability of any live phase, and the load will be connected to the particular live phase only. This controller continuously checks for live condition of all phases connected to it, and the controller connects the load to the active phase using a Relay. In developing countries like Nigeria and Bangladesh, power instability and phase failure have posed serious threats to their economic development. Therefore, there is need for automation of phase change during phase failure or total power failure in order to safe guard consumer appliances from epileptic power supply. In most cases, manufacturing companies, be it domestic or industrial, which employ single phase equipment for its operation sometimes experience challenges during unbalance voltages, overloads and undervoltage, in power supply, much time would be required in the process of manual change over. Therefore, there is need for automatic phase switching system.

Most commercial, industrial, and even domestic are dependent on public power supply which has abnormal supply such as phase failure total power failure due to one or many technical problems in power generation, transmission or distribution. In most cases, many manufacturing companies, whether they are domestic or industrial, which uses single phase equipment for its operation sometimes experience challenges during failures in power supply. large time is required for manual changing of phases. This means that time and the process required for the phase change may take to serious losses to production as well as equipment. Hence, there is need for automatic phase switching system. If there is a phase failure from the public utility power supply, the meter can stop working and manual changeover required for resume the operation.

To solve this problem automatic system is required. The basic idea for the project is to provide uninterrupted supply to the any type of single-phase load. More than 85% of the fault are single phase faults. For buildings like hospitals, schools, where there is incoming 3phase supply if any of the phases, out of the 3 phases faces fault, then the supply will be automatically shifted to the next active phase from the 3-phase supply.

Hence, it is most important to make automation in phase change during phase failure, to overcome many dangerous situations. In most cases, many manufacturing firms, be it domestic or industrial, which uses single phase equipment for its operation might come across challenges during abnormal supply of power, where much time would be required in the process of manual change over. due to automation time and energy can be saved and can eliminate serious damage to the workers on line. Hence, this system will provide a single phase correct voltage in the same power supply lines through relays from other phase where correct voltage is available. The system operates by stepping down 220 Volts AC to 5 Volts DC, rectified and fed into the NODE MCU through the voltage divider circuit. The NODE MCU compares the three phases and switches the relays through the transistor drives.

2. LITRATURE REVIEW

Vinesh Gamit [1], "FAULT ANALYSIS ON THREE PHASE SYSTEM BY AUTO RECLOSING MECHANISM"

Conclusion: Faults have been simulated to develop an automatic tripping mechanism for the three-phase supply system. Timer 555 has been used with relay for fault analysis, with short duration faults back to the supply immediately, while long duration faults result in permanent trips.

Sathish Bakanagiri [2], "THREE PHASE FAULT ANALYSIS WITH AUTO RESET FOR TEMPORARY FAULT AND TRIP FOR PERMANENT FAULT"

Conclusion: The goal of this project is to create a system for three single phase transformers with an output voltage of 230 volts to 12 volts to automatically trip. To evaluate if a malfunction is temporary or permanent, 555 times are used with relays. A short-duration defect instantly restores the supply to the load, whereas a long-duration fault causes a permanent trip. By connecting a GSM modem, the idea can be expanded to allow SMS messages to be sent to authorities.

Deendayal Nagar [3], "THREE PHASE AUTO RECLOSER SCHEME"

Conclusion: This project is creating hardware for three single phase transformers 230v to 12V of output to develop an automatic tripping mechanism for the three-phase supply system when a temporary or permanent fault arises. A 555 timer and relay are being used to determine if the fault is transient or permanent, and a fault with a short length will quickly restore the supply to the load, while a fault with a long duration will result in a permanent trip. The idea may one day be expanded to include creating a system for sending messages to the authorities via SMS by connecting a GSM modem

Edvin Lewis and F.Z Frank [4]. In three phase equipment's, if supply voltage is low in any of the one phase and you if you wish to run all the equipment properly. This equipment will help you to rescue this situation. However proper rating fuse need to be used in three phases i.e., R, Y, and B inputs lines. Where the correct voltage is available at that time. Other low voltage phase shift to correct voltage in same manner, to run all the equipment on the single phase in the building. The circuit consist of relay comparator, transformer.

3.BLOCK DIAGRAM

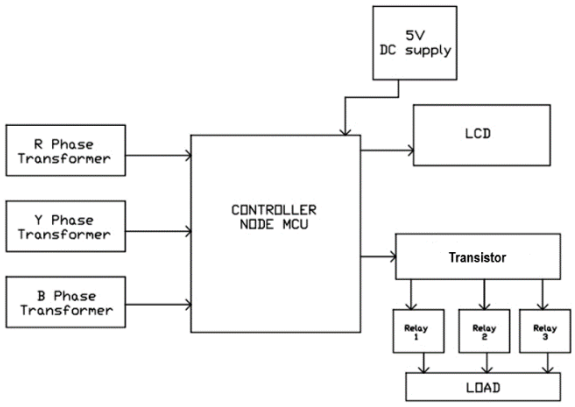

Fig -1: BLOCK Diagram

Automated systems are becoming increasingly popular in all fields due to their flexibility, reliability, and accuracy. They have fewer manual tasks, are flexible, reliable, and accurate, and are performing well in the electronics sector.

This project uses 3 phase supply, R-, Y-, B-, which are single phase supply's that are used to put some load continuously when any one of the 3-phase supply has gone. Then relay will shift available phase controller on only one relay at time The LCD display which phase is available.

3.1 DETAILED DIAGRAM DECRIPTION

- In this project we continuously on Load using three phases.
- If all phases are present microcontroller turn on Load on phase 1.at that on LCD displayas "Phase 1 selected"
- If first phase absence, Load automatically shift to phase 2 with the help of relay circuit.
- Same if first two phase absent microcontroller shift that load to phase 3 with the help of rely circuit.
- System will display selected phase on LCD.
- This project uses regulated 5v, 750mA power supply.
- Also, use of bridge rectifier to convert 230V/12V

3.4 DETAILED DIAGRAM

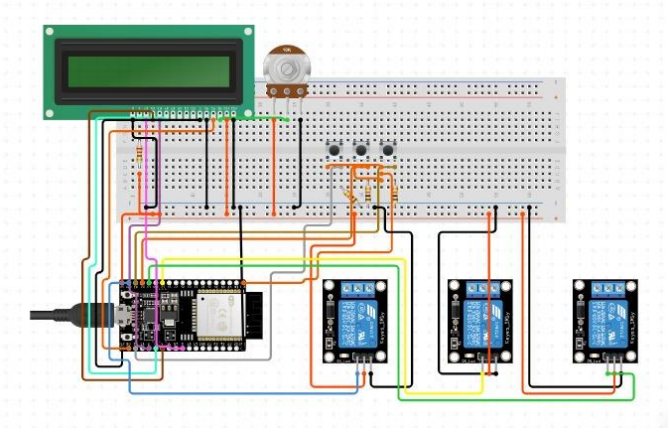

Fig -2: Detailed Diagram

4. METHODOLOGY

- We use an automatic active phase selector in the system. This project is separated into three sections: input, control, and output.
- We regularly examine the three phases in the input portion. In this part, we examine any phase absences.
- esp32 controlling part continuously takes input from the input section.
- The esp32 sends a different signal to the output portion depending on the input situation.
- In the output If there is no phase absence, the load will be carried by the first phase.
- If there is any phase absence in the output, the esp32 can switch the load to the live phase using a relay circuit.
- If there is any phase absence in the output, the esp32 can switch the load to the live phase using a relay circuit.

5. DIFFERENT TECHNIQUE USED

- On thingspeak fault and healthy line data will show live.also generate spreadsheet of daily data.
- It will store 1 year data
- The most important details in this text are that the sensor data logging service offered by Blynk IoT and Thingspeak is free, highly secured, fast, and reliable.

This project will use the ESP32 WiFi module with Excel Sheets for the sensor data logging. Excel Sheets is a spreadsheet program included as part of the free, web-based Excel Docs Editors suite offered by Excel.

CONCLUSION

- In this system we automatically shift the phase if any phase absence.
- It tested on hardware with some trials and error conditions.
- We make some truth table for it and using truth table we checking failure condition and depend on that truth table
- The costing developing it, makes it much affordable than comparable product**.** condition we shift the phase automatically.
- The system operates smoothly as expected.
- It durable, portable and reliable.

RESULT

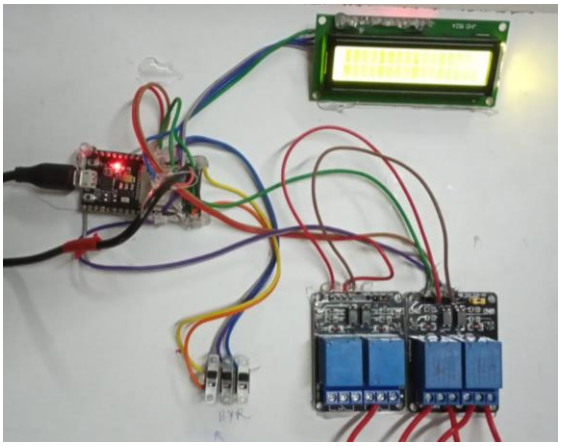

Fig -3: Kit of SWAYAM Phase Selector

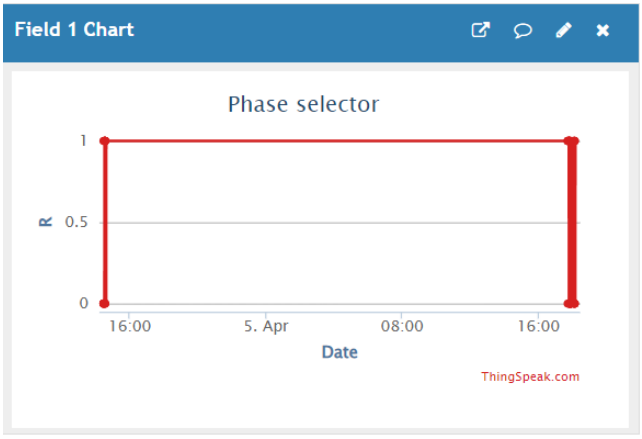

Fig -3: DATA Of R Phase

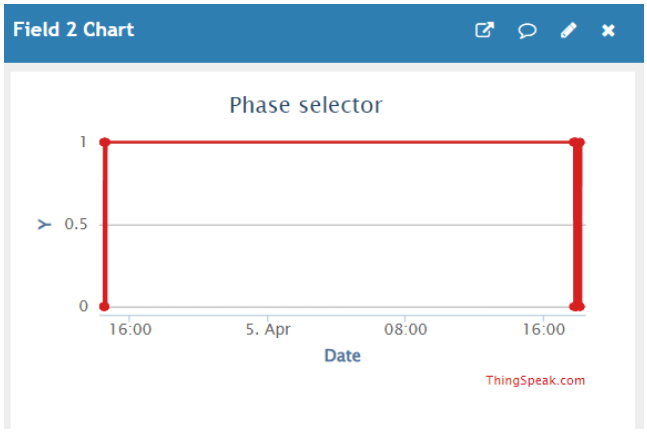

Fig -4: DATA Of Y Phase

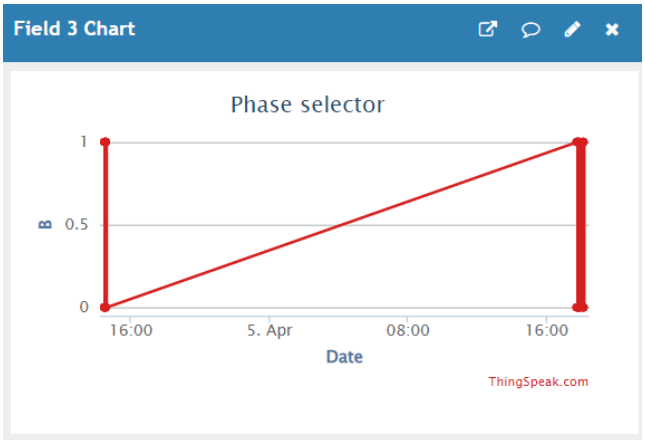

Fig -5: DATA Of B Phase

REFERENCES

1. NodeMCU for ESP32 Development Workshop by Agus Kurniawan (Author)
2. Power System Modeling & Fault Analysis By Nasser Tlies,Second Edition.
3. http://www.ijsrd.com/articles/IJSRDV3I1094.pdf Auto Reset and Tripping Technique for Temporary and Permanent Fault Analysis-Mr. Bhushan K. Dhuve, Ms. Priyanka M. Dhawade,Mr. Swapnil C. Naghate, Ms. Ashvini B. Nagdewate
4. http://esatjournals.net/ijret/2015v04/i05/IJRET20150405055.pdf Three Phase Fault Analysis with Auto Reset for Temporary Fault and Trip for Permanent Fault- Sathish Bakanagari, A. Mahesh Kumar, M. Cheenya
5. http://esatjournals.net/ijret/2015v04/i05/IJRET201504050.pdf Three Phase Fault Analysis with Auto Reset for Temporary Fault and Trip for Permanent Fault- Sathish Bakanagari, A. Mahesh Kumar, M. Cheenya
6. L.S. Ezema, B.U. Peter, O.O. Harris, "DESIGN OFAUTOMATIC CHANCE OVER SWITCH WITHGENERATOR CONTROI MECHANISM" ,ISSN:2223-9944 Vol.3,November 2012
7. F. U. Nweke and R. C. Iwu, "Design and Construction of Automatic Three Phase Power System Selector" IOSR Journal of Applied Physics (IOSR-JAP) eISSN: 2278-4861.Volume 7, Issue 6 Ver. I (Nov. -Dec. 2015), PP 11-14, Modeling & Fault Analysis By Nasser Tlies,Second Edition.
8. http://esatjournals.net/ijret/2015v04/i05/IJRET20150405055.pdf Three Phase Fault Analysis with Auto Reset for Temporary Fault and Trip for Permanent Fault- Sathish Bakanagari, A. Mahesh Kumar, M. Cheenya.
9. http://esatjournals.net/ijret/2015v04/i05/IJRET201504050.pdf Three Phase Fault Analysis with Auto Reset for Temporary Fault and Trip for Permanent Fault- Sathish Bakanagari, A. Mahesh Kumar, M. Cheenya.
10. Phase Loads", 2015 IEEE International ConferenceAnu P, Divya R, Dr. Manjula G Nair, "STATCOM BasedController For a Three Phase System Feeding Single.
11. January-February 2000.Steven M. Hietpas, Mark Naden,"Automatic "Voltage regulator using an AC Voltage-Voltage Converter" IEEE Transaction on industrial Application Vol36,no 3,january-february 2000.
12. Design of Automatic Phase Selector From Any Available 3 phase with the use of logic gate and relay driver, published

by, Nimadi sill (techno India collage of technology),Say debate(technoindia collage of technology) June 2016.

13. Marek, Simple Direct Power Control Of Three Phase PWM Rectifier Using Space Vector Modulation (DPCSVM), "IEEE Transaction on Industrial Electronic", Vol.51,No.2,April 2004 .