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Automatic Active Phase Selector

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ABSTRACT

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 phase i.e. R, Y, and B inputs lines. Where the correct voltage is available 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. Phase absence is a very common and severe problem in any industry, home or office. Many times one or two phases may not be live in three phase supply. Because of this many times some electrical appliances will be on in one room and OFF in another room. This creates a big disturbance to our routine work. Power Failure is common problem. it hampers the production of industry construction work of new plants and building. It is often noticed that power interruption in distribution system is about 70% for single phase faults while other two phases are in normal condition. Thus, in any commercial or domestic power supply system where 3 phases is available, an automatic phase selector system is required for uninterrupted power to critical loads in the event of power failure in any phase. There is no requirement of backup power supply in that case. Also there is no time consumption as the phase is changed automatically within a few seconds.

Keywords: Arduino uno, Relay module, LCD Display, Load

I. INTRODUCTION

Now, in 21st century, fully world is of automation, and it is the time we must think of Arduino to control. All automatic controllers like remote controller, hand held communication devices, automatic and semiautomatic washing machine, automobile indicating and measuring instruments have its application in each. The project described here being also a Arduino based project used for automatic phase changer. The Arduino Uno is a Arduino board based on the ATmega328 (datasheet). It has 14 digital input/output pins (of which 6 can be used as PWM outputs), 6 analog inputs, a 16 MHz ceramic resonator, a USB connection, a power jack, an ICSP header, and a reset button. It contains everything needed to support the Arduino; simply connect it to a computer with a USB cable or power it with a AC-to-DC adapter or battery to get started. The Uno differs from all preceding boards in that it does not use the FTDI USB-to-serial driver chip. Instead, it features the Atmega16U2 (Atmega8U2 up to version R2) programmed as a USB-to-serial converter.

The Arduino used for this project is at mega 328. Now a days many times out of three phases one of the phase cut's off and the circuit breaker trips at that time the MSEB Operator has to operate it manually by turning on the at the time of office hours at that time the hooter shouts and gives us an alert. Keeping in mind the day to day life of human being, the circumstances which occur due to power instability

issues we decided to design such a system which would overcome these issues ultimately and help to reduce human efforts too. Secondly in order to overcome the various phase change issue and avoid damages in industries and automation area plus hospitals & airports

II. LITERATURE SURVEY

[1] DESIGN AND IMPLEMENTATION OF AUTOMATIC THREE PHASE CHANGER USING LM324 QUAD INTEGRATED CIRCUIT

Author:-Oduobuk, E. J., Ettah, E. B., Ekpenyong, E. E.

Design and implementation of an automatic three phase changer using LM324 quad integrated circuit was carried out. The system was designed and simulated using. The circuit components were mounted a Vero board. LM324 integrated circuit (comparator) and 2N2222 transistors were used as active components alongside other passive components. Result shows that, when the three phase a.c inputs: Red phase ( ), yellow phase ( ) and blue phase ( ) from public utility supply was fed to the system, the system compared the inputs with regard to phase imbalances, and the input with the highest voltage appears across the output. It also changes over from one phase to another immediately the circuit senses further phase imbalance.

[2] AUTOMATIC PHASE CHANGER:

Author:-Bhanu,Bhawesh

In three-phase applications, if low voltage is available in any one or two phases and youwant your equipment to work on normal voltage, this circuit will solve your problem. However, a proper-rating fuse needs to be used in the input lines (R, Y and B) of each phase. The circuit provides correct voltage in the same power supply lines through relays from the other phase where correct voltage is available. Using it you can operate all your equipment even when correct voltage is available on a single phase in the building.

The circuit is built around a transformer, comparator, transistor and relay. Three identical sets of this circuit, one each for three phases, are used. The mains power supply phase Ris stepped down by transformer X1 todeliver 12V,300 mA, which is rectifiedby diode D1 and filtered by capacitor C1 to produce the operatingvoltage for the operational amplifier (IC1). The voltage at inverting pin 2 of operational amplifier IC1 is taken from the voltage divider circuit of resistorR1and preset resistor VR1. VR1 is usedto set the reference voltage accordingto therequirement. The reference voltage at non-inverting pin 3 is fixed to5.1V through zener diode ZD1. The phase voltage is compared against the reference voltage and if the phase voltage is low the relay trips and shifts the load to other phase.

III. METHODOLOGY

BLOCK DIAGRAM:

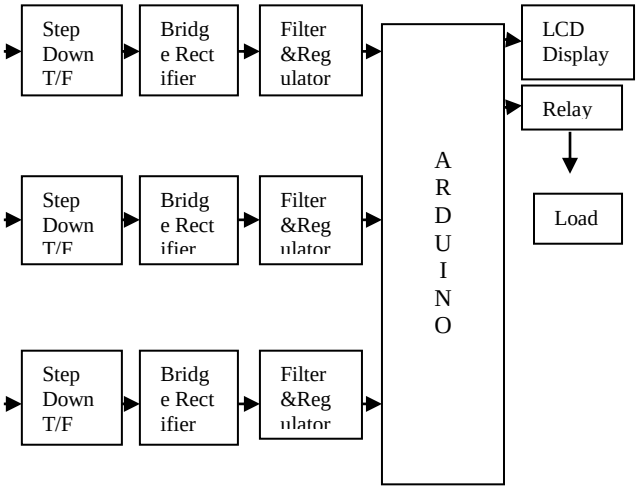

Figure 1. Block Diagram

IV. PROPOSED SYSTEM

- In this project we continuously on Load using three phase.
- If all phase are present Arduino turn on Load on phase 1.at that on LCD display as “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 Arduino 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. 7805, a three terminal voltage regulator is used for voltage regulation. Bridge type full wave rectifier is used to rectify the ac output of secondary of 230/12v step down transformer.

FLOWCHART AND ALGORITHM

ALGORITHM

STEP 1:- Power Up hardware.

STEP 2:- Initialize hardware Module.

STEP 3:-Display On LCD as "Active Phase Selector"

STEP 4:- if all phase are active by default load shifted to R phase.

STEP 5:- if R phase is absent then load shifted to Y phase

STEP 6:- if both R and Y phase are absent then load shifted to B phase.

STEP 7:- if all phases are absent by default load will off.

FLOWCHART

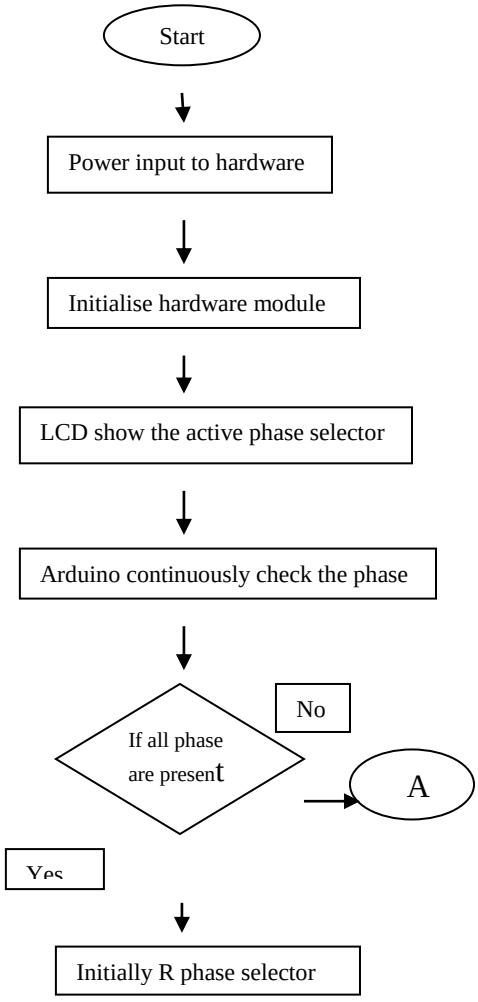

Figure 2. flowchart

V. CONCLUSION

In this system we automatically shift phase if any phase absence .It tested on hardware with some trial n error conditions. We make some truth table for it n using truth table we checking failure condition & depend on that condition we shift phase automatically. The system operates smoothly as expected. It is reliable, durable and portable. The cost involved in developing it, makes it much more affordable than comparable product.

VI. REFERENCES

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