

# Over Voltage Protection under Voltage Protection with Comparator

Ashish Baneriya<sup>1</sup>, Babali morya<sup>2</sup>, Anil tadwal<sup>3</sup>, Nitin tigga<sup>4</sup>, DR.Vijay Bhuria<sup>5</sup>, Shailendra Pratap Singh<sup>6</sup>

<sup>1-6</sup>B.E. Student, Department of Electrical Engineering, Madhav Institute of Technology and Science Gwalior, Madhya Pradesh

\*\*\*

**ABSTRACT:** The main aims of this project to alert the relay when some difference in supply power for shield electrical home equipment and industrial instrument under over-voltage and under-voltage. The chances of damaged electronic devices are more because the equipment is much conscious in different power supply. In this scenario, it needs an extra shield system to shield the instrument by a different power. With the voltage comparator integrated circuits decide the trip of relay system get function as the voltage differs higher than or down the set worth. The major profit by that it also shields the 3-phase device from 1-phase and variation of power in ac power waveform. In the coming days it also possible earth fault detection and protection.

**KEYWORDS:** Over-voltage and under-voltage shield, voltage comparator circuitry, voltage sensor.

## I. INTRODUCTION

At this time the main issue in the factory as the same as the home is instantly over-voltage and under-voltage which outcomes harm the instruments. Equipment load more and more in-home, as same as others, uses and the equipment so conscious to power variations. In this forecast focal point to defend the instruments in over-voltage and under-voltage and other power condition complications.

In the power system, unwanted situations are short circuit, over-voltage, and under-voltage. The capability of the shield equipment is demand not only for profitable purposes but for the best system. An under-voltage situation comes if the power decreases ostensible power by 10% for longer than one minute. This situation is the short the circuit and under-voltage position. Less duration intermittent offer decline will less anyplace from 0.5 to 1 minute.

Over-voltage could be a state of affairs whenever a bigger than meant electrical phenomenon happens by a conductor. Leading to excessive generation of warmth, also the chances of fireplace and harm them instrumentally.

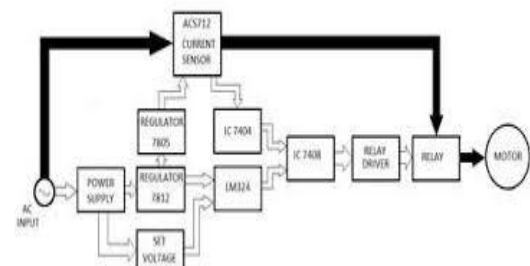
Owed to the constant damage done by variations in the voltage offer, there's dire have to be compelled to address the matter. Over different alternations, that offer rise to make of an instrumentally to safeguard the attached masses opposite below power after below power, and over-voltage shield is required in the middle of the offer terminal and also the instrument.

Over voltage causes The main reason for this overvoltage in home and industries are due to lightning impulses and switching impulses of the system may also be caused by insulation failure and resonance.

Under voltage causes – The main reasons for the under-voltage situation by undersized, facility transformer. Under high requirement time, the service feels a major issue. The requirement for electricity exceeds the capacity of the transformer and this results in the voltage drop.

## II. METHOD USED FOR PROTECTION

The main purpose of this circuit is to shield the load throughout the under-voltage and over-voltage situation by dominant the relay trip coil employing an LM324 comparator. The comparison is done with the help of comparator the provision voltage with the specified planned voltage and can trip the relay coil if the voltage lags below the specified planned worth. The coil of relay also will trip. The under-voltage and under-current protective instrument is seen within the figure down.



(Fig source IRJET)

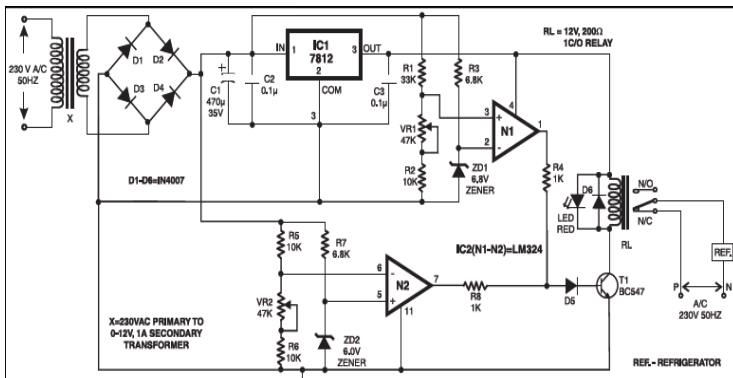
(Fig -1) METHODS USED FOR PROTECTION

## III. EQUIPMENT USE IN CIRCUIT

- 1-Transformer
- 2- Comparator
- 3- Zener Diode
- 4- Relay
- 5- Load
- 6- Regulator IC 7812
- 7- IC LM324

- 8- Diode of IN4007
- 9- Bridge wave rectifier
- 10- Capacitor
- 11- Potentiometer
- 12- Resistance
- 13- Led

CIRCUIT DIAGRAM



(Fig-2)

CIRCUIT DIAGRAM

IV.WORKING

220 volts AC input current is applied in a circuit and the voltage reduces to 12volt with the help of step down transformer and 12volt output is achieved by rectifier IC.

We tend to get regulator DC offer Regulator input at pin one and a pair of and from pin three and four output is received by using IC LM7812.IC LM324 function heart of shield circuit. In this four comparator present. The Vcc connects to the fourth pin and the eleventh pin is grounded. 2 Zener diodes of half-dozen volt and 6.8 volts are used. 6.8 Voltage Zener diode is attached to the second pin of ICLM324.6 voltage Zener diode is attached to the fifth pin of the IC LM324.

IC 2/1 of comparator IC use for over-voltage shield.IC 2/2 of comparator IC use for beneath voltage shield. Once offer voltage higher on the far side or down r voltage corresponding modification of dc voltage and command to relay driver to relay by the relay driver IC, a tripped get by the relay.

V. CONCLUSION

The purpose of coming up with and make a less under-voltage and over-voltage-current shield equipment was reached during this work. By the upper analysis, it's shown that of under-voltage and over-voltage, drawbacks are quite the same and may produce

drawbacks for clients and others. Therefore system ought to be shield by sure shield. Therefore here system exploitation comparator and relay to cut the connection offer once any over-voltage and under-voltage drawback happens. The equipment provides load to the linked load whenever the input offer is inside the specified preset voltage, thereby protective the output linked masses from irrelevant harm. The equipment is found to be profit, easy to keep up, and repaired.

VI. APPLICATIONS

- Home appliances
- Industry machines
- Microwave
- Water motor pumps
- Office appliances

VII. REFERENCES

1. J.B GUPTA (2018) A COURSE IN POWER SYSTEMS, PART-III: Switchgear and Protection, Chapter-9.
2. ROBERT L. BOYLESTAD, LOUIS NASHELSKY (2015) Electronic Devices and Circuit Theory 11<sup>th</sup> Edition, Chapter-10.
3. "IEEE Recommended Practice for Monitoring Electric Power Quality," IEEE Std. 1159-1995, June 1995.
4. Girish Chandra Thakur, Kumar Shantanu Kaushal, Manish Ranjan, Sandip kumar Gupta. "Implementation of single phasing, over voltage, under voltage, Protection of Three Phase Appliances without using Microcontroller", Int. journal of Engineering Research and Applications,ISSN:2248-9622, vol. 5, Issue 5, (Part-6), pp.110-115,May 2015.
5. Sourav Ghosh, Soumik Bakshi, saurav Ghosh, Rahul kundu, Indrajit Koleys. "Development of a low cost under voltage and over current protection device", Int. Journal of Advance Research in Electrical, Electronics and Instrumentation Engineering, ISSN: 2278-8875, vol.5, Issue 5, May 2016.
6. Gorkshanath Bhosale, Aakash Vakhare, Abhishek Kaystha, Amol Aher, Vishal Pansare. "Overvoltage, Undervoltage, Protection of Electrical Equipment", Int. Research Journal of Engineering and Technology(IRJET), ISSN: 2395-0056, vol.5, Issue 2, Feb 2018.