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Implementation of Overvoltage and Under voltage Protection

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ABSTRACT

This project aims to develop low voltage and high voltage indicators. The system will save expensive electrical and electronic equipment from high and low voltage. A project to simulate overvoltage and under voltage protection and equipment is proposed. The advantages of the design and wide single voltage range from 2.0 V DC to 36 V DC, independent of the supply voltage, very low current flow (0.8 - 0.9 m A), low input current 25mA. The common-mode input voltage range includes the differential input voltage corresponding to the device supply voltage.

Keywords: - Power Quality, Over Voltage, Under Voltage ⚡

1. Title -1. INFORMATION ABOUT THE OVER VOLTAGE AND UNDER VOLTAGE ⚡

Computers are similar devices, based on which and control is terminated by the supply electronic voltage, data may be lost. The devices were heating, lighting and surge protection in substations could be motors that were not very sensitive to voltage fluctuations. The degree of surge protection provided to a station is governed by the reliability required as well as the economics of obtaining such reliability. Since main stations generally contain strategic and high-value power equipment, surge protection is essential to avoid or minimize major system failures as well as major equipment failures.

Temporary over voltages that occur in our system can cause malfunctions and failure of industrial and household equipment. Over voltages in the electrical system can occur for several reasons, such as lightning strikes or switching operations of inductive or capacitive loads. The main substation is protected in such a way that lightning never strikes it twice directly, but instead, the traveling wave caused by lightning at a point not far from the main substation enters the substation through the tower and the power line. Looking at the progress of the thesis, the study of voltage and voltage transients and their effect on substations and household appliances is modeled on equipment including equipment protection.

1.1 Sub Title-1 power quality and its problems

According to the Institute of Electrical and Electronics Engineers (IEEE) recommended practices for monitoring, reliability and quality terms are the absence of electrical and electronic devices and cause power quality problems due to the linearity of each device. Power quality issues are listed below:
• Handling of linear and unbalanced loads,
• book disruption, for example. transformers and cables,
• Malfunctions in distribution substations and plants.
• Lightning and natural disasters;
• On the line, storm, etc. snow formation.
• Connecting capacitor banks and transformers;
• Replacing or commissioning large loads. Induction motor

Natural phenomena are to blame for most faults in systems dominated by overhead lines, transmission and distribution systems, especially lightning strikes. In fact, lightning strikes can cause a temporary increase in line voltage. However, an arc is created between the strike and the ground and the phase is struck, resulting in the voltage dropping to zero. Once unbalanced loading occurs in the system, it creates unbalanced voltages across the phases, resulting in power quality problems. This unbalance voltage increases the heating of the rotor due to the negative DC magnetic flux generated inside the stator winding. The main cause of power quality problems is short circuit faults on the distribution side. This communication can lead to a huge increase in network flow and ultimately wear and tear on supply chain barriers.

Impact of power quality problems Power grid degradation has many adverse effects on power grid equipment and commodities. Whether or not the device malfunctions, there will be internal losses and heating, which can shorten the life of the device. These effects are so dangerous that they are not visible until the failure occurs inside the device.

• The impact of poor power quality on capacitors, rotating machines, cables and transformers, fuses and customer equipment may include heating, noise, poor performance, etc.

• Premature failure of the distribution transformer due to heating will occur due to harmonics. • Due to sudden surges in voltage and / or current, the failure of electrical grid components and customer load may occur.

• When harmonics are added to the supply, the voltage device can take a high value of the design voltage and is prone to failure. This can cause additional harmonics and interference by forcing the electronic components of the high voltage power grid to operate in saturation.

1.2 Sub Title-2 OVERVOLTAGE

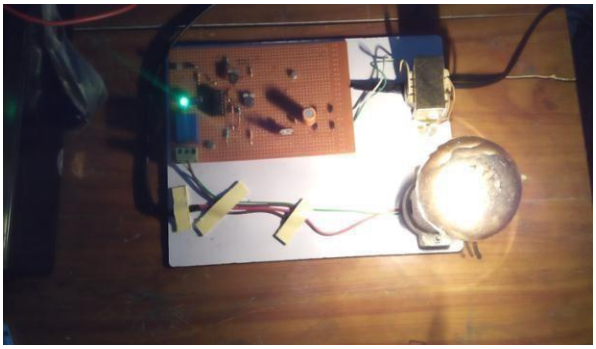
Surge is defined as the rise in r.m.s. voltage value up to a level between 1.1 pu to 1.8 pu at the supply frequency for half a cycle to a second as shown in Fig.

This can be caused by the interference of the heavy industrial load running on the capacitor bank. This is often associated with ungrounded or floating-earth delta systems, where a change in reference will increase the voltage of the ungrounded system. The cause of overvoltage is mainly due to the energization of the capacitor bank. It can also be made by sudden shedding load. As a result of the interruption of the load, there is a sudden decrease in current that can cause voltage, where L is the inductance of the line. The effects of overvoltage are more severe and damaging. should cause electrical equipment to fail due to overheating caused by high voltage. Electronic and other sensitive devices are also subject to interference.

2. TITLE-2 UNDER VOLTAGE

In voltage, it is characterized as a shock drop by the root mean square (r.m.) of the voltage, and is often characterized by residual (retained) voltage. Electricity, thus immediate discount. The voltage that occurs at the start of the motor is large and device faults, especially through the fast circuit.

In addition, the on-state voltage can be classified according to the mean current as shown in the voltage table under IEEE.



Under voltage is a power outage that has a significant impact on commercial and large business customers, including damage to sensitive equipment and daily production and financial disruption. Examples of sensitive devices are Programmable Logic Controller (PLC), Adjustable Speed Drive (ASD) and Chiller control. The voltage at the device terminals is caused by a fast fault, possibly several kilometers outside the transmitter.

2.1 Sub Title-1 Causes of Under voltage

There are many reasons why the voltage can rise in the voltage of the device:
• Closing and Opening of Circuit Breakers: If the circuit breaker of a segment suddenly opens, several kilometers of feeder lines may be disrupted for a moment. Different feeder tracks from the same substation equipment will operate at the same voltage.
• Due to fault: Current due to fault can be critical to the operation of the power plant. The volt value may or may not be the same on each segment and depends on whether the shaft is symmetrical or asymmetrical.
• Due to the motor starting: The current due to the starting motor is symmetrical, due to the load balance of the 3-segment induction motor, it can produce the same excess starting in all phases.
• Due to Transformer Energization: There is a specific cause of voltage drop due to transformer energization. One is the normal operation of the gadget which consists of energy guiding transformer and the other is the shutdown operation. This lower voltage is asymmetric in nature.
• Equipment failure: Electrical equipment failure such as broken insulation or overheating or short circuit etc. caused by
• Unstable weather: lightning flows outside the power line, high voltage range. Floor faults occur when the floor moves and stays on the floor.
• Contamination: Typhoons can occur in coastal areas where electrical cables are exposed to salt. This salt formation acts as an excellent energy conductor and defects occur.
• Construction Work: Usually all electrical traces are underground in urban areas, digging for house mains can damage underground cables and cause electrocution.

2.2 Sub Title-2 How to prevent diabetes ?

Undervoltage relay that disconnects the motor from the carrier when the condition is undervoltage to prevent the motor from being over-current or large induction or synchronous motor.
starting under low voltage conditions.

3. TITLE-3 HARDWARE DESIGN AND PRODUCT CONSEQUENCES

This circuit protects the refrigerator and other electronics from over and under voltage. As the name can say, if the input voltage is more or less than the required voltage, then the electrical device is turned off and disconnects from the corresponding power supply. This voltage protection circuit is designed to develop low voltage and high voltage drive mechanism to protect the load from any damage. Many households and industries experience frequent power supply fluctuations. Electronic devices are easily damaged by changes. To overcome this problem, we can apply an under/over voltage protection circuit mechanism for protection
burden of torts.

3.1 Sub Title-1Types of load

A. durable load
Placing equipment for a resistive load is achieved by connecting a fifty watt bulb. Lamps up to 150V to 230V. If the voltage drops below 150V, it is an under voltage condition and if it is above 230V, it is an over voltage condition. The operating voltage limit can change the use of 2 potentiometers inside the device. . Thus, the relay allows the supply voltage to be fed to the load. Operating Voltage: (150-230V)

Source	**1 phase 230 v , 50 z ,**
1 phase auto transformer	**K =23;1**
1 phase diodes bridge 4 diode's	**Ideal**
Capacitor	**0.0019 F**
Resistor	**12 ohm**
Relay operation in voltage	**12 V**

Fig -2 Name of the figure. Test System Table specification

B. Potential load
The design of the device for the power load is done by connecting a capacitor of 2.50μF ± 5%. The LED indicator glows between 148V and 200V. If the voltage is below 148V and above 200V, it is an under voltage condition. The operating voltage range can be adjusted using two potentiometers connected to the device.

C. Inductive load
Device design for inductive loads is done by connecting coil links. The LED indicator glows between 148V and 230V. If the voltage drops below 148V, it is under voltage and if it is above 230V, it is under voltage. The operating voltage range can be adjusted using two potentiometers connected to the device.

4. CONCLUSIONS

It is discussed that power and voltage surges are very common and can cause problems for consumer goods and industrial applications. So, this system was modeled using relays and comparators and it was found to be good in cutting off the supply when one of the above problems was encountered.

5. ACKNOWLEDGEMENT

The author says about the over voltage and under voltage ⚡ controller and Protection for the power system it is necessary to use this device it works on any system .

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