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# DOOR LOCKING ARRANGEMENTTHROUGH VPIS FOR MV SWITCHGEAR

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**ABSTRACT**

*Safety is one of key aspects in the operation of any distribution system. This is because MV systems, with their comparatively easy accessibility to live components, are usually the most involved in electrical accidents.*

*In modern power system voltage indicator would provide rapid information, help to track fault and also warn workers about the presence of voltage. VPIS is a device supplies continuously an electrical signal for phase comparison and optical blinking LED for voltage indication. Voltage indicating control units are generally used in H.V. panels. Voltage indicating control unit get 3-phase A.C. input signal through capacitive voltage detecting insulator. so when any one phase or all three phase are live then it is indicated by red bright LED which fitted on the front panel of indicating unit. It complies with requirements given in the IEC 61958 (2000) international standard . So by using this device we can provide protection for high voltage system.*

*Circuit protection includes protection from equipment overload condition, undervoltage and overvoltage condition. In our proposed work supply voltage is indicated by using VPIS , which is device used for indication of High Voltage of R, Y, B phase. Voltage of VPIS is continuously compare with desired values of comparator IC LM324. If the voltage is not as per the requirement then output of the IC is given to amplifier, then output of the amplifier will actuates relay to lock control panel door.*

*The future scope of this abstract is it will be self healing process in which this system will self detect ,self analysis and mitigate that fault by itself.*

***Keyword: VPIS- Voltage Presence Indicating System***

## I.INTRODUCTION

In 1973 there was a device which monitor the circuit continuity, phase sequence , voltage magnitude , etc. The first series of lamp monitors circuit continuity , second series of threshold lamps indicate voltage magnitude, additional indicator lamps are provided to indicate phase sequence.

In 2000 , a new voltage detecting system developed which consist of epoxy pin insulators with capacitive voltage divider and an electronic indicator unit. They are not used for measurement or protection but they are used for indication of High Voltage of R, Y, B, phase.

Modern electrical equipment continues to increase in complexity and importance in industrial, commercial and installation. Determining whether circuit is adequately protected can require a high level view of the electrical distribution system from a fault current available at the source of supply down to end device connected in the system .Circuit protection includes protection from equipment overload condition, undervoltage and overvoltage condition**.**

## II.BLOCK DIAGRAM

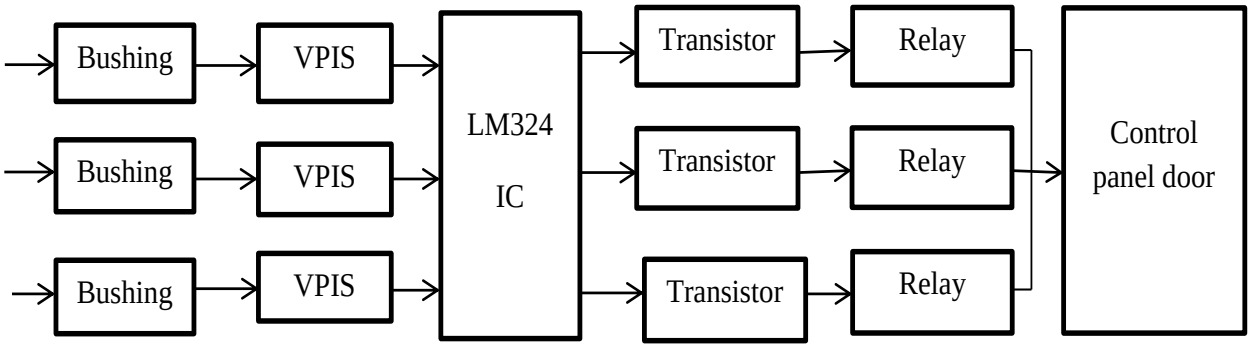


Fig. Block Diagram

## III.ALGORITHM

Step 1: VPIS is connected across bushings.

Step 2: VPIS permanently monitor all three line voltage and flashing LEDs ensures the presence of voltage across bushing.

Step 3: This presence of voltage is compared with reference voltage by using comparator IC LM324.

Step 4: When overvoltage occurs difference between two voltage will increase and this voltage apply to transistor which will amplify it.

Step 5: This amplified voltage is applied to relay . It will operate and lock control panel door to protect a personnel operating on it .

## IV.CIRCUIT DIAGRAM

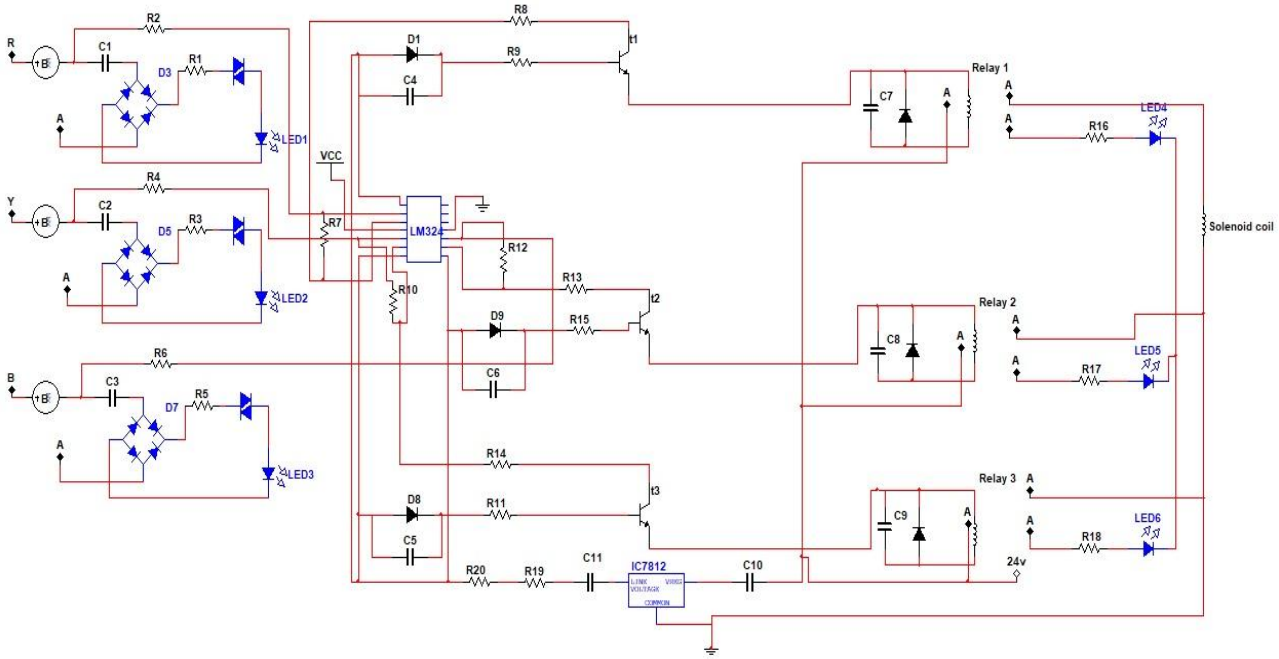


Fig: Circuit Diagram

## V. LIST OF COMPONENTS

1. VPIS
2. IC LM324
3. TRANSISTOR
4. RELAY
5. REGULATOR

5.1 VPIS

PRINCIPLE OF OPERATION**:**

Voltage indicating control units are generally used in H.V panels. They are not used for measurement or protection but they are used for indication of High Voltage of R, Y, B phase. Voltage Indicating control unit basically give LED indication of R , Y , B phase. Voltage Indicating control Unit get 3-phase A.C input signal through capacitive voltage detecting insulator (Item 001 & 002). So when any one phase or all the 3-phases are live then it is indicated by Red bright LED which fitted on the front panel of indicating unit.

APPLICATION**:**

The integrated voltage detecting system is used for voltage detection according to IEC-61243-5 at medium voltage switchgears for indoor use in standard environment, for intermediate panels of rated voltage from 3.3 kV up to 33 kV / 50Hz.

5.2 IC LM324

LM324 is a 14pin IC consisting of four independent operational amplifiers (op-amps) compensated in a single package. Op-amps are high gain electronic voltage amplifier with differential input and, usually, a single-ended output. The output voltage is many times higher than the voltage difference between input terminals of an op-amp.

5.3 RELAY

Relay is an electromagnetic device which is used to isolate two circuits electrically and connect them magnetically. They are very useful devices and allow one circuit to switch another one while they are completely separate. They are often used to interface an electronic circuit (working at a low voltage) to an electrical circuit which works at very high voltage

5.4 REGULATOR

7812 is a famous IC which is being widely used in 12V voltage regulator circuits. Truly speaking it is a complete standalone voltage regulator. We only need to use two capacitors, one on the input and second one on the output of 7812 in order to achieve clean voltage output and even these capacitors are optional to use. To achieve 12V 1A current, 7812 should be mounted on a good heatsink plate. Thanks to the transistor like shape of 7812 which makes it easy to mount on a heatsink plate. 7812 has built in over heat and short circuit protection which makes it a good choice for making power supplies

## VI.CONCLUSION

In this way by providing door locking arrangement through VPIS on control panel we can preverify voltage presence and provide protection.

6.1 ADVANTAGES**:**

**1.** It is used for indication of high voltage 3 phase and protection purpose**.**

**2.** VPIS pre-verify that system is de-energized during maintenance .

**3.** It provides protection to personnel in the event when backup generator is energized**.**

**4.** It has LED's for voltage indication

6.2 APPLICATION :

**1.** VPIS is a device which is used to indicate voltage oresence across bushing .

**2**. A door mounted VPIS gives personnel visual indication , if voltage is present in the panel before they open the enclosure door .

**3.** After modification VPIS is not used for protection purpose**.**