"HIGH VOLTAGE TESTER"

P.K.Vinkare[2]Manoorkar Prabhakar [1], Bhosale Dnyaneshwar[3], Kulkarni Varad[4], Waghmare Adesh[5]

[2]Professor, [1,3,4,5] Students, Department Electrical Engineering, Government Polytechnic Nanded, Maharashtra, India

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Abstract - It is expected today that an individual who wants to authenticate himself for a service must have a token and/or password for example identity card, ATM card, driving license, health card and so on. Carrying different cards and remembering passwords for different services is a significant issue for individuals and organizations. A secure and effective identity management system plays an important role in the successful deployment of an attendance management system. To make the identity management system more secure and reliable for authent ication, biometrics data are integrated in the attendance management systems. Biometrics technologies verify identity through characteristics such as fingerprints, faces, irises, retinal patterns, palm prints, voice, hand-written signatures, and so on. These techniques, which use physical data, are receiving attention as a personal authentication method that is more convenient than conventional methods such as a password or ID cards because it uses data taken from measurements and such data is unique to the individual and remains so throughout one's lifetime. In these technologies, fingerprint becomes the most mature and popular biometrics technology used in automatic personal identification. The reason for the popularity of fingerprint verification is that fingerprints satisfy uniqueness, stability, permanency and easily taking.

1. INTRODUCTION

High Voltage Breakdown Tester and we are also specialized in Calibration Services. Our setup is situated in Pune, Maharashtra, India. These products are known by other names like Hi Pot Testers, Voltage Withstand Capability Testers or simply High Voltage Testers also Designed with better features and accuracy, our offered range of Breakdown Tester is meant for testing the electrical insulation ability and electric strength. ZEAL make testers are ideal for performing high voltage breakdown tests in production, in the laboratory, and for type approvals also. The tester of this category is robustly designed. Standard accessories of the tester include HV test probe, fully insulated crocodile clip & mains cord. High Voltage testing is usually performed to qualify the device to operate safely during rated electrical conditions, a way to check the effectiveness of its insulation. The objective sought during the high voltage testing will determine the type and amount of voltage applied and the acceptable current flow. A high voltage is used to verify that the clearances and solid insulation of components have adequate dielectric strength to resist expected overvoltage conditions. The electrical power demand is rising rapidly. Now days, huge quantity of electrical power is necessary to transmit from one place to other for fulfilling this rising power demand. Bulk power transmission can be most efficiently done through high voltage electrical power transmission system. Hence, high voltage system becomes most essential requirement for power transmission. The equipments used in these high voltage transmission system, should be capable of withstanding this high voltage stress.

2. LITERATURE SURVEY

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3. COMPONENT SELECTION:

3.1 TRANSFORMER:- Autotransformer is a single winding transformer that works on the principle of Faraday's Law of electromagnetic induction. Mostly used in low voltage range, for industrial, commercial and laboratory purposes. Also known as variac, dimmer stat, etc. autotransformer can be single and three-phase. Due to single winding, autotransformers have fewer losses, more efficient and robust. By taking tapping on the secondary side, a wide range of voltage can be obtained. In some applications, they are also connected to converters for rectifying the output AC voltage. What is Autotransformer? The principle of the autotransformer is the same as two winding transformers. It works on the principle of Faraday's Law of electromagnetic Induction, according to which whenever there is a relative change in magnetic field and conductors, an emf is induced in the conductors.

3.2 STEPPER MOTOR: The stepper motor is an electromagnetic device that converts digital pulses into mechanical shaft rotation. Advantages of step motors are low cost, high reliability, high torque at low speeds and a simple, rugged construction that operates in almost any environment. In simple words, it is a combination of DC motor with electronics technology which allows the motor to rotate and stop at specified angle. It is mostly used in robotics where move the arm of robots at specified angle and hold there for some time and get back return after it. This is a brushless electromechanical device which is used to convert the series of electric pulses applied at their excitation winding into precisely defined step by step the mechanical shaft rotation. In others words, the stepper motor is an electromechanical device which converts electrical power into mechanical power.

3.3 RELAY: A Relay is a simple electromechanical switch. While we use normal switches to close or open a circuit manually, a Relay is also a switch that connects or disconnects two circuits. But instead of a manual operation, a relay uses an electrical signal to control an electromagnet, which in turn connects or disconnects another circuit.

3.4 PROBE: High voltage measurements have a variety of different requirements, and our PVM series and VD series probes are designed for most of these requirements. The PVM probes are designed for wide bandwidth and ease of portability where a variety of measurements must be made. The VD series probes are designed for use at higher voltage ranges, and where physical stability is required. The design of the probes is unique. The probe comes fully adjusted without any requirement to further adjust the probe in the field. Stray capacitances internal to the probe are factory calibrated. Stray capacitances due to proximity effects are minimized by the unique conductor placement.

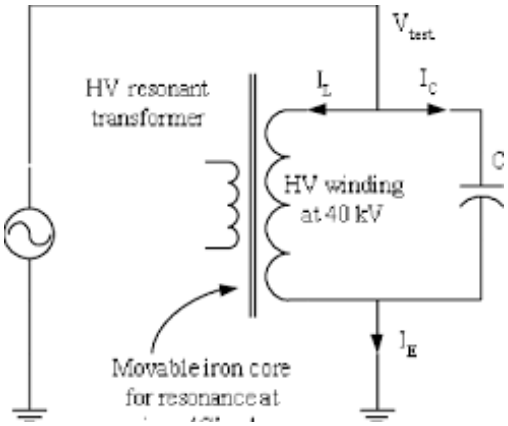
3.5 ARDUINO: ATmega-328 is basically an Advanced Virtual RISC (AVR) micro-controller. It supports the data up to eight (8) bits. ATmega-328 has 32KB internal builtin memory. This micro-controller has a lot of other characteristics. You should also have a look at Introduction to PIC16F877a (it's a PIC Microcontroller) and then compare functions of these two Microcontrollers. ATmega 328 has 1KB Electrically Erasable Programmable Read Only Memory (EEPROM). This property shows if the electric supply supplied to the microcontroller is removed, even then it can store the data and can provide results after providing it with the electric supply. Moreover, ATmega-328 has 2KB Static Random Access Memory (SRAM). Other characteristics will be explained later. ATmega 328 has several different features which make it the most popular device in today's market.

3.6 POWER SUPPLY:

A switch mode power supply is a power converter that utilises switching devices such as MOSFETs that continuously turn on and off at high frequency; and energy storage devices such as the capacitors and inductors to supply power during the non-conduction state of the switching device. The supplies have higher efficiencies of up to 90%, are small in size and widely used in computers and other sensitive electronic equipment. The basic switch mode power supplies (SMPS) are categorized based on supply input and output voltage. The main four groups are: 1. AC to DC – Off-line DC power supply 2. DC to DC – Converter 3. DC to AC – Inverter 4. AC to AC – Cycloconverter of frequency changer

3.7 MOTOR DRIVER MODULE: The L298N Motor Driver Module is a high voltage Dual HBridge manufactured by ST company. It is designed to accept standard TTL voltage levels. H drivers are used to drive inductive loads that Motors, and Stepper Mot bridge ors. This Dual HBridge driver is capable of driving voltages up to 46V and continuous current up to 2A in each channels. Specifications 1. 2. 3. 4. 5. Driver: L298 Dual H Bridge DC Motor Driver IC Operating Voltage: 7 to 35V Peak current: 2A Maximum power consumption: 20W (when the temperature T = 75 °C) Driver Board Size: 55mm * 49mm * 33mm (with fixed copper pillar and the heat sink height) requires forward and reverse function with speed control such as DC 6. Driver Board Weight: 33g

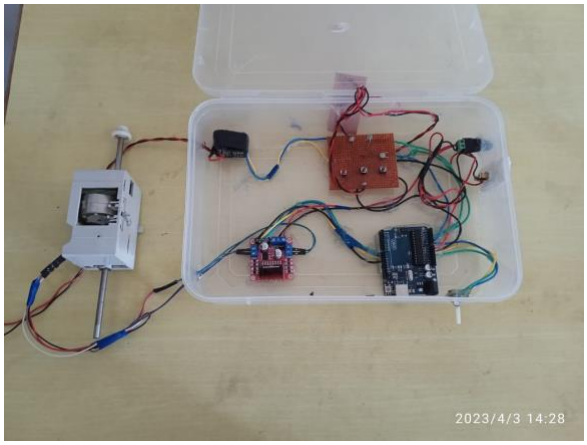
4. SCHEMATIC DIAGRAM:

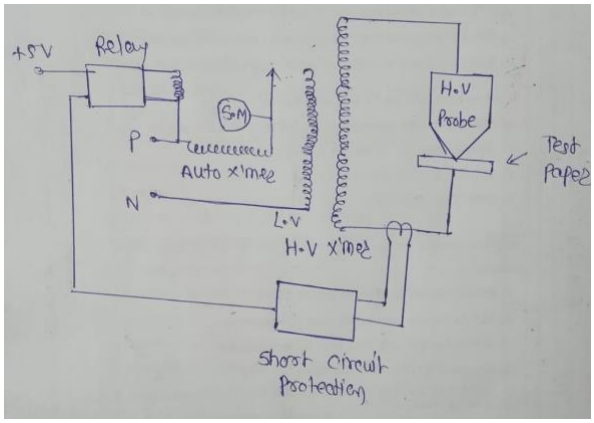


5. WORKING METHODOLOGY:

This proposed system introduces a new Electrical equipment must be capable of withstanding overvoltages during operation. Thus by suitable testing procedure we must ensure that this is done.High voltage testing can be broadly classified into testing of insulating materials (samples of dielectrics) and tests on completed equipment. The tests carried out on samples of dielectric consist generally of the measurement of permittivity, dielectric loss per unit volume, and the dielectric strength of the material. The first two can be measured using the High Voltage Schering Bridge. The tests carried out on completed equipment are the measurement of capacitance, the power factor or the total dielectric loss, the ultimate breakdown voltage and the flash-over voltage. The breakdown voltage tests on equipment is only done on a few samples since it permanently damages and destroys the equipment from further use. However since all equipment have to stand up to a certain voltage without damage under operating conditions, all equipment are subjected to withstand tests on which the voltage applied is about twice the normal voltage, but which is less than the breakdown voltage.

6. PHOTO OF ACTUAL CIRCUIT CONNECT





7. ADVANTAGES :

1. The high voltage transmission requires a thin conductor.
2. It carries or transmits bulk power over a long distance.
3. It improves the voltage regulation and reduces the voltage drop.
4. This transmission has a good tendency to increase power efficiency at high voltage levels.
5. It reduces the power losses (especially line losses).
6. Extra high voltage (EHV) transmission provides good flexibility for enhancing future systems.

7. DISADVANTAGES

1. The initial cost of installation and required material are very high.
2. More amount of protective devices (such as transformers, switchgear, overhead components, etc) are needed.
3. It also requires relay, contractor and circuit breaker to avoid hazardous situations.
4. A high length tower is needed that creates more clearance in between conductors and the ground.
5. More insulations are required.
6. More corona loss occurs in high voltage transmission.
7. While transmitting bulk power, more hissing noise is created.

8. RESULT:

In general, two dielectric test results indicate insulation failure. The first is excessive current flow during the test due to low insulation resistance of the insulating material separating the two conductors. 6.2 Application It is possible to have preventative maintenance on cables and high voltage equipment by using High Voltage Testers (also called the hipot testers). Preventative maintenance allows for the user to figure out out potential issues before the problem and resolve them before they get out of hand. It is also used to test new systems as mentioned earlier to ensure that it withstands the specified voltage as per standards.

9. CONCLUSION:

At the conclusion of high-voltage testing, attention should be given to the following:1)Discharging cables and cable systems including test equipment. The discharging of the cableshould be carefully monitored for the time needed to fully discharge.2)Grounding requirements for cables and test equipment to help eliminate the after effects ofrecharging the cables due to dielectric absorption and capacitance characteristics. If the during high voltage test of no failure of insulation occurs and full test volaget, then test be successful that is quality of And level of insulation is good. If the insulation failure occurs then replace the quality of insulation is poor. 7.2 Future scope High voltage engineering will enable you to become an expert in insulating materials and their applications in various electrical equipment. Knowing modelling coupled with finite element analysis (like Ansys), will make the HV engineer all the more in demand by the industry

10. References:

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