

AUTO EARTH SYSTEM FOR HV TEST SET UP FOR TRANSFORMER IN APPLICATION OF CIRCUIT BREAKER

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Abstract – Everyone needs better and safe work place for these reason we choose HV test set up in switchgear industries, to provide such a type of safety we used automatic system for earthing in HV set up. While performing H.V. test we found some drawbacks in old system to overcome such drawbacks we improve old system with automatic earth system for high voltage test on equipment such as circuit breakers. The main objective of project is to know the human safety by using Auto Earth system for H.V test set up by using transformer, automotive set up for auto earth and its control panel. We used the automatic controlling system to the operation that enhance performance and human safety. This paper gives an overview of the Equipments for automatic testing system high voltage test of circuit breaker i.e. Insulation test, VI and insulator. So, proper implementation of testing is essential.

Key Words: Safety, replace HV test set up with auto set up, Transformer, Earthing, HV test, voltmeter, ammeter, timer, switches ,CB, etc

1. INTRODUCTION

Today in the rapid competition of industries to get the best quality of the product in the minimum required time is the main aim of the industries. To get the best quality and maximum production most advanced machine to maintain their performance is the real requirement of the industries.

Any material equipment is come in market place that they should be well test and it's confirm to quality. It shall be comes by performing special tests. In this study we will see various test performed on switchgear system in HV test on materials that we know equipment capability. These tests are for the purpose of revealing faults in material or construction. They do not impair the properties and reliability of test object. The test shall be made whenever reasonably practicable at manufactured, to ensure that the product is in accordance with equipment on which the tests have been pass by following test as standard comprise_

- 1) Dielectric test in main circuit i.e. H.V. Test.
- 2) Mechanical Operation Test.
- 3) Test on Auxiliary and Control Circuit.
- 4) Measurement of Resistance of Main Circuit.
- 5) Design and Visual Check.

The main aim of our project is to ensure human safety also in high voltage and increase capable production in market place.

2. LITERATURE SURVEY:

As we perform different types of tests on equipments to withstand in system voltage and to give better significance for the system operation.

In the high voltage test earthing was provided in manual ways so there is no safety for operator. Also, to change earthing method after high voltage is manual to automatic. This test is very dangerous for human safety, because we have to apply high voltage on that testing jobs for withstand time and that get result equipment should remain sustain and withstand that voltage also we found leakages current present in the system during operation.

To apply this high voltage in mention time after performing test we have observed that there is leakage present in system to discharge manual operation required which is unsafe to overcome that case we install auto earthing system with discharge rod for safe operations.

This earthing discharge is automatic work, after performing the high voltage test or withstand test the discharge rod is mechanically coupled with motor shaft and after test done is automatically discharge surge by earthing rod connected through an transformer earthing.

3. PROBLEM STATEMENT:

After High Voltage Test, Earthing to be used in manual condition and this is not satisfied. Because in the set up equipment the leakage current is present in the body and if the operator unconditionally touches the body he will get severe shock. Hence to avoid such accidents auto earthing is essential. To avoid unsafe practice we have converted manual earth into auto earth.

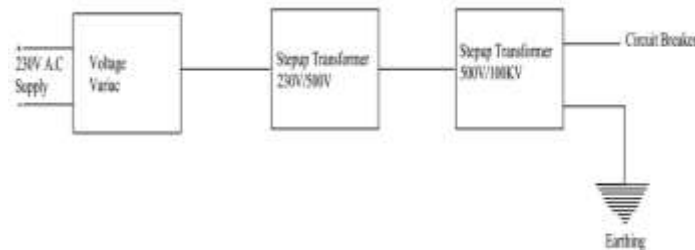
4. METHODOLOGY:

Why earthing is required?

From the project point of view, after conducting the HV test. There is leakage potential charge present in the circuit breaker that may result shock.

Earthing is nothing but its discharge present leakage potential through the conducting body and protect system and operator from shock. In this project leakage requirement

of earthing purpose is that due to earthing provision the present leakage potential charges are discharge by using copper insulating rod. It persists to human safety. Also the earthing system provide return path for discharging fault current and discharge currents/voltages from the earthed points of earthing switches, surge arrester, etc. These parts are connected to the underground earthing system by solid or flexible earthing conductors of adequate short time current carrying capability and low resistance.



BLOCK DIAGRAM OF AUTO EARTH SYSTEM FOR HV TEST SET UP.

From the above block diagram shows that there are three important blocks that is voltage variac, and two blocks are of step up transformers.

230V A.C supply given to the voltage variac.

Voltage Variac:

Voltage variac changes the voltage limit from zero volt to 230V. This voltage variac is connected with the Small step up transformer.

Step up Transformer (230V-500V):

The important work of this transformer is that to step up the incoming 230V obtain from variac to 500V and transferred towards connected second step up transformer.

Step up Transformer (500V-100KV):

The main purpose of this transformer is step up the incoming 500V into high voltage up to 100KV. In this the systematic turning ratios arrangement is made that's helps to check the circuit breakers at different voltage levels. With the help of this transformer H.V testing is carried out also auto earthing set up is installed on this transformer.

WHAT IS HIGH VOLTAGE TEST?

High voltage test which is also called as dielectric withstanding test (DWV) test verifies that the insulation of a product or component is sufficient to protect the operator from electrical shock. High voltage is applied between a products current carrying conductors and its metallic shielding. High voltage test is a term given to a class of electrical safety testing instruments used to verify electrical insulation in finished appliances, cables and other wired assemblies, printed circuit boards, electric motor and transformers. The product will be safe to use under normal operating conditions hence the name as HV Test.

Select the test voltage based on system voltage of unit under test as below table-

System Voltage	Test voltage
3.3Kv	10Kv
6.6Kv	20Kv
11Kv	28Kv
22Kv	50Kv
33Kv	70Kv

5. RECOMMENDATION:

Auto earth system for high voltage test set up for transformer. This project is basically manual to automatic based. We start our project by performing the HV test. While performing the HV test we found that the potential charge is present in the breaker due to that potential charge if the operator unconditionally touches to the breaker. He will get the severe shock.

Hence, to overcome this condition we thought that instead of manual earthing, we have provide safety ways for earthing or discharging the potential charge. We have implemented an auto earthing system which is helpful to eliminate the accidental chances during and after the HV test.

6. IMPLEMENTATION:

To implement the automatic earthing system we used the motorized set up attached with the insulating rod with copper strip, which is coupled to the operating shaft of motor that insulating rod length is nearly equal to HV terminal which is set up and the transformer.

To control the operation of that discharging rod to provide mechanical gear system, that moves the rod clockwise and anticlockwise. Also we used a limit switches to limit the direction of rod during operation. We also provide small control circuit to control the motor direction such as forward and reverse directions.

By using auto earthing system we perform a HV test without getting any manual effort (human efforts) for discharging the potential in the system after conducting HV test as in fault condition.

Due to this implementation HV test performs is safe and shock proffer. Also it reduce the time consumption for the HV test which is beneficial to increases the productivity. So that the implementation in HV test set up i.e. auto earthing system operate successfully with more advantages than the older system.



Fig. Auto Earth System for HV test set up.

7. ADVANTGES:

- 1) Eliminate manual earthing after H.V. test.
- 2) Enhance safety practice by using auto earthing setup.
- 3) Automatic discharge of main H.V. terminals if any fault occurs.
- 4) Human safety.
- 5) Quick Response.
- 6) More efficient.
- 7) Job Test cycle increase.
- 8) Auto discharge hence protection of equipments through surges.
- 9) Actual testing time reduces.

8. DISADVANTAGES:

- 1) Costly affairs.
- 2) Due to motor failure earthing rod is not get proper discharge.

9. CONCLUSIONS:

Safety is prime responsibility in Industry to avoid fatal accidents. In this paper we have implement auto system from manual earthing after HV test done by person or any fault occurs during test. These types of test have a chance of accident in different forms considering potential charge available in system.

Hence, with respect to avoid manual intervention we have implemented auto earth system consideration safety and fulfill desired operation to discharge potential charge in the system after HV test.

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