

Modification of High Voltage Testing Panel for Testing Bus-Bar Trunking System

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Abstract – This paper proposed, the modification of high voltage testing panel which is used for testing the bus-bar trunking system uses form mostly industrial and commercial areas. For better regulation of power forwarding is to be maintain by using this bus-bar trunking system, to maintain this policy high voltage testing panel operated to do the various testings to withstand against different problem s occurs in bus-bar trunking system. High voltage testing panel performance getting low by its anytime working operation, to redo that problem s the panel must be modified.

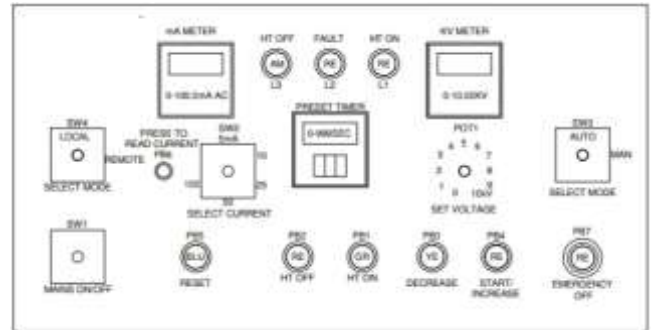


Fig.1 General High Voltage Panel Circuit Diagram

Keywords: Busbar Trunking, High voltage testing panel, various testing, bus-bar trunking equipment, panel modification, electrical testing parameters.

1. Introduction

Bus-bar trunking system is very rare to introduce in our country, to provide the better regulation of power to the consumer this system very grateful to us to use and this is used in industrial as well as commercial uses well. Bus-bar trunking system is dependently uses over a high voltage power transfer. More than one bus duct is connected to each other form s bus -bar trunking system. Generally, this bus ducts is to be tested by high voltage testing panel different techniques and dusts are probably made up of aluminium and copper which is have ratings is 250A - 5000A & 415V/690V to the 1000V / 1100V is for aluminium and 400A – 6300A & 415V / 690V up to 1100V. These voltage ratings can be properly handled by high voltage testing panel. To check bus duct is capable or not to transfer the better power regulation various tests like dielectric strength capability, insulation and leakage current etc. High voltage testing panel having two probes to check the phases one by one and then reading or collection data readings provides us the nature of bus duct to use.

1.1 Overview of General Testing Panel

Basically, this panel is used to test the bus ducts with the 2.5KV voltage supply to withstand against the insulation, dielectric, and strength problems. Input to the panel is set 230V to step up to 2.5KV and this output is connected to bus duct by the probes, the tests taken out by each phases i.e R,Y,B,N. to check continuity.

1.2 Testing Sequence Manner

At the time of testing firstly one phase is connected by probes and other phases will be shortened and 2.5 KV supply will provide. Similarly, one by one phase to be checked out and overall test result gives perm it to duct is pass or fail. By this procedure we got lots of barriers to collect the proper calculations over this high voltage panel. While carrying and moving onwards the testing results there is most of the times physical hazardous problems occurs in this panel. High voltage panel is as good to test the bus duct product but it takes probably long lengthy time to cover up the results. Sometimes it won't work to show the sufficient testing data over the product. Some of one testing result is shown up at below table:

Sr. No.	Testing Voltage (KV)	Test		Leakage Current (mA)	Time (sec)
		Phase	Shorted Phases		
1.	2.5	R	YBNE	0.35	5
2.	2.5	Y	RBNE	9.6	5
3.	2.5	B	RYNE	12.57	5
4.	2.5	N	RYBE	19.02	5
5.	2.5	E	RYBN	19.1	5

Table.1 Old panel testing results

The panel will reset after conducting one test on duct and we have to vary the knob towards zero and connections get disconnected and this activity is repeated 4-5 times per

duct this will increase the operation of time. While changing one phase to another, supply sometimes keeps on and system is complex due to human interference, hands may communicate with live wires and hence shock hazard to human cause's death.

Generalized testing panel results conclude that, every test with this high voltage panel requires more time, whenever test is carried out data doesn't store anymore it should be hand written on notepad, it having less safety due to this hazard possibilities increases.

2. Testing Panel Modification Work

As observing above foundation, it is necessary to modify the panel to overcome the issues. Different types of equipments and protecting devices are connected consequently for perfect working operation.

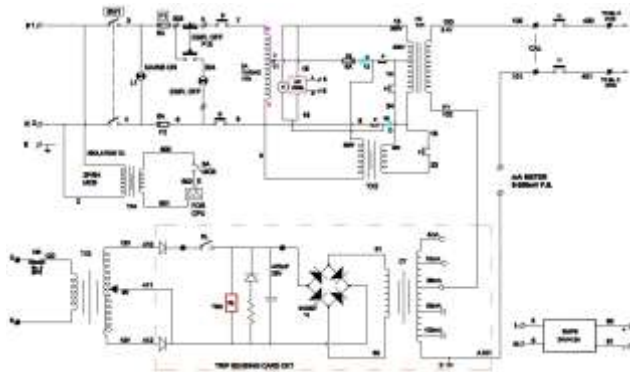


Fig.2 Modification Circuitry

This is the main circuit of a modified panel which having primary supply is provided to panel input is 230V, and then it will step up to 2.5KV. Between these 2 fuses, 1 switch and 1 emergency are connected sequentially.

A varying auto transformer is connected to main supply and this helps to step up the voltage up to 2.5KV which is used to test the bus duct. A potential transformer (TX2) is connected just beside the current transformer (HV TX1); this is used to measure the conducting voltage and one current transformer is connected to limit the current which is varying step up. A trip sensing card circuit as coordinately connected to main supply which having bridge circuit which helps to control the output current and voltage; this supply is used for trip circuit which are protecting devices.

Accordingly, a mA meter is connected to both the output side to calculate the leakage current.

3. Internal System Structure

System stands over a software basis like Programmable logical control which can be handled by single software named as LabVIEW. Special program med PLC is used to

vary the supply voltage automatic to adjustable supply which fed to check the dielectric strength and insulating property etc.

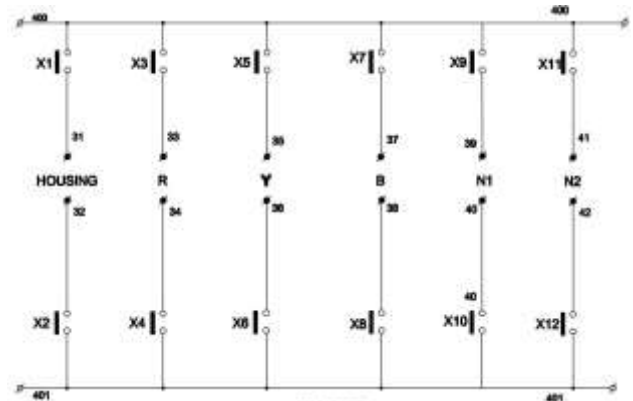


Fig.3 HV circuit housing diagram

The new HV panel modulation having this housing circuitry diagram which notifies the proper connections of the new panel configuration. This is having some notation to show the clear outfits of circuit diagram.

This diagram also called as control fragment of modified HV panel, the upper horizontal line is 440V line is a phase line and it is of 2.5 KV also at other hand bottom horizontal line is of 400V neutral line is shown. Testing bus-duct likely having the round 6 main terminals which has to be used for the testing, the terminals are HOUSING, R, Y, B, N, N1, N2 where RYB are the main phases & N1, N2 are the neutral points & HOUSING is the ground wire. The notation observed in the housing diagram X1, X2, X3, X4, X5, X6, X7, X8, X9, X10, X11, X12 are the contactors in the circuitry of 32 pin contactors and 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42 are the total number of pins of the contactors. By the appearance of testing terminals this having totaled 5 tests carried out according to new panel without using HOUSING terminal.

TEST1: At the time first test the contact X3 has to be closed and all bottom level contacts are short circuited except X4 and this test is taken out up to 5 second, now second test is carried out with the help of PLC controller & Rockwell software for the controlling testing terminal joints.

TEST2: Now contact X5 is closed and all the bottom side contacts are short circuited except X6 is up to 5 second. So, as per using of PLC controllers and different software like LabVIEW and it is very helpful for new high voltage testing panel to test the bus duct.

4. Result

Here, it just stated that the modification of old high voltage testing panel gives the better result than other systems. With the help of the software it stores the testing data and reduces the time zone of testing point of operation. Due to

use of PLC controlled software it is very much safe to human from shock communication with bare hand while changing the connections of product terminals.

Sr. No.	Testing Voltage (KV)	Test (Automatic Phase changes / New Panel model)		Leakage Current (mA)	Time (sec)
		Phase	Shorted Phases		
1.	2.5	R	YBNE	13.7	5 sec for all test
2.	2.5	Y	RBNE	14.4	
3.	2.5	B	RYNE	17.7	
4.	2.5	N	RYBE	17.6	
5.	2.5	E	RYBN	14.2	

Table.2 New modified panel testing results

CONCLUSION

The overall information about new module panel is ideation part which having all wellbeing equipment which covers the all associated problems comes under the old high voltage testing panel. Basically, modified new panel having PLC controlled and software handled too that's why it will be helps to describes safety, time, data storing and more things comes under the problems. We made suavity to the safety and insulated prospects and time will be minimizing due to use of software basis PLC which work safely. Data is stored eventually by the help of software uses.

REFERENCES

- [1] IEC 61439 rule, part 6 for a dielectric strength
- [2] Electrical standard product Larsen & Toubro Limited busbar trunking system catalog SP 5970RI
- [3] User manual programmable high voltage tester (PHVT – 10/100 miliA AC) manufacturing company SCR electronics.