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Automatic Changeover Switch

Sammed R. Shirdhone[1], Sanket S. Burji[2], Tushar R. Bhagwat[3], Amarjeet S. Badave[4], Yash D. Bhandare[5]

[1]*Lecturer, Department of Electrical Engineering, Sharad Institute of Technology Polytechnic, Ichalkaranji, India*

[2,3,4,5]*Student, Dept. of Electrical Engineering, Sharad Institute of Technology Polytechnic, Ichalkaranji, India*

***Abstract*: The paper focuses on the switching method of MSEB to generator supply which currently has a complex circuitry of relays, MCCBs and electronic components. So we created a circuit switching switch which can alternate the supply between two loads i.e. if two bulbs are connected to this switch then these two bulbs will grow alternately, or two different circuits can also be connected to a single load for example suppose one load has two different power supplies i.e. one AC and another one is DC then when AC supply goes off the load will automatically start taking supply from the DC source.**

***Keywords*: Changeover switch.**

1. Introduction

Circuit switching switch can be used to connect two different circuits with single load, it has two contacts NO (Normally Open) and NC (Normally closed). Only one terminal will get supply during operation, it will have one common phase at its top and through bottom wires will be drawn to circuits and these circuits will have a common neutral. Now one contact of this switch will be always open i.e. before as well as after the operation of contactor, now when supply will be given to the common point of the switch it will only flow through the contact which is closed as current does not flow through open circuit here the same supply is given to contactor so that it can push and pull the contacts of the switch according to the supply presence hence by using contactor we can switch supply path for the current and activate the circuit alternately. Briefly we can switch path of the current automatically and activate the respective circuit that we want.

2. Scope of project

The main application of this project can be alternation of MSEB supply to generator supply, as we saw in the introduction the function of this switch is alternating the path of the supply or alternation between two different supplies when one supply fails. By using a set of switch and contactor we can automatically switch to generator supply when the MSEB supply goes off, this will reduce the complexity of the general electonic circuitry which is required for automatic switching between MSEB to generator. So this switch will help to reduce the complexity of the circuitry which is generally required for Switching supply from MSEB to generator.

3. Literature review

A. S. P engineers and suppliers

In S.P. engineers and suppliers NO and NC contacts are used in MCCBs for connection with the LEDs which indicate the ON, OFF or TRIP condition of the MCCBs. These contacts just perform the function of opening and closing the circuits so these same contacts can be used to alternate supply between generator and MSEB. In this one NO and one NC is given to MSEB and generator supply respectively and the switch will mainly operate on the MSEB supply. (A power contactor is used which pushes and pulls the contacts of the switch and the contactor operates on single phase AC supply.)

B. Current methods of alternation between MSEB to generator supply

1) *Manual source Changeover system:* This is the easiest type of alternation from MSEB to generator supply a manual operator is required for that purpose. In this system manual source changeover system is formed of 2 or 3 automatically interlocked manually operated circuit breakers or switches.
2) *Remote operated source changeover system:* This system is ordinarily used which is generally used for devices with higher ratings i.e. above 400A no human intervention is needed. Transfer from traditional to replacement supply is controlled electrically. A remote controlled source changeover system is formed of 2 or 3 circuit breakers or switch disconnections connected by an electrical interlocking system that will have different configurations. Additionally, a mechanical interlocking system protects against electrical malfunctions and incorrect manual operations.

4. Proposed methodology and Operating principle

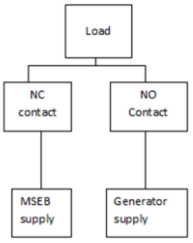
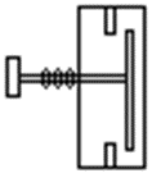


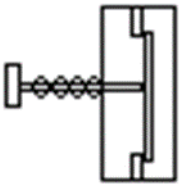
Fig. 1. Block diagram

From the block diagram it is clear that the switch has two contacts one is NO (Normally open) contact and another one is NC (Normally closed) which are also shown in below diagrams:

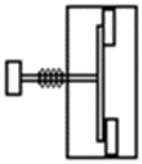
1. NC contact (Before supply is given to the contactor)



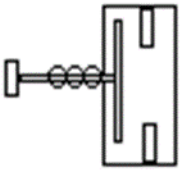
2. NC contact (After supply is given to the contactor)



3. NO contact (Before supply is given to contactor)



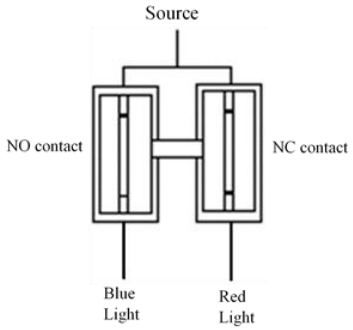
4. NO contact (After supply is given to contactor)



So these four diagrams show respective operations of the terminals/ contacts after and before operation of the power contactor power contactor is used for pushing and pulling the contacts of this switch.

A. Working principle

This switch works on a basic behavior of the current, we know that the current does not flow through the switch will be fitted with a contactor and with the operation of the contactor the two contacts of the switch will operate. The operation of these two contacts will be alternate that means one contact will always remain open. Now two outputs can be drawn out from this switch, suppose there are two light sources of two different colors one is red and one is blue as shown below:



As shown in the diagram (Fig 1.) the switch is supplied from a single source and one contact of the switch is open i.e. NO contact, so current will not flow through that open NO contact and red light will glow. Now after operation of the contactor the NO contact will become NC and the NC contact will become NO contact and the blue light will glow. So basically this switch alters the path of the current from one contact to another one.

B. Components used

Details of the power contactor

1. Voltage: 220V
2. Single phase
3. 3 HP
4. Current rating: 20A

This power contactor is mainly used for pushing and pulling the contacts of the switch, when supply is given to the contactor the contacts will retract and pull the terminals, and when supply goes off its contacts push the contacts of the switch.

5. Application

The first application of alternating of load is shown in the above example of fig. 1. Now this switch can also be used for automatically connecting the load with generator when MSEB supply goes off which is shown in Fig. 2.

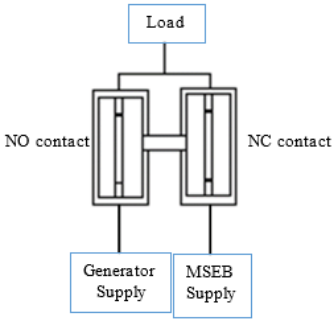


Fig. 2.

1. As shown in the block diagram (Fig 2.) again the load is common at the top, now the contactor and load will operate on the MSEB supply at first.
2. The MSEB supply is given to the load through NC contact and hence load gets supply from the MSEB and the generator remains disconnected as it is connected to the NO contact.
3. When the MSEB supply goes off the contacts of the contactor will push the contacts of the switch and the NC contact of the switch will become NO and NO contact of the switch will become NC and hence automatically the generator will get connected with the load.

A. Advantages

1. Low cost.
2. High heat baring capacity.
3. Simple operation.
4. An easy supplement for electronic based switching.
5. Automatic operation is achieved without programming or electronic parts.

B. Disadvantages

1. Cannot be used for high current ratings.
2. Not reliable as much as the electronic switching.

6. Result and discussion

From this project work the complexity and cost of the circuitry which is required for automatic switching from generator to MSEB supply can be reduced.

7. Conclusion

This project has wide variety of application and also it will enhance auto switching which is generally required for switching supply from MSEB to generator and vice versa.

References

[1] S. P. Engineers and suppliers
[2] Switches: Changeover and transfer switches by ABB.
[3] Paul Horowitz Winfield Hill - The Art of Electronics, Second edition, Cambridge University Press Publication, pp. 200-201.