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BRIDGE TYPE SOLID STATE FAULT CURRENT LIMITER USING AC/DC REACTOR (BSSFCL)

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Abstract - : *The aim of this project is to reduce magnitude of fault current using AC/DC reactor in bridge type solid state fault current limiter topology(BSSFCL). In this project bridge rectifier with reactor is used. Where during normal working condition the topology is in DC mode, whereas when fault occurs a topology change into AC mode. The advantage of BSSFCL over existing DC reactor type fault current limiter(FCL) is that, at normal operating condition the impedance is negligible whereas, at fault the impedance is high. The switching of circuit DC to AC mode is controlled by TRIAC switching component.*

Key Words: ACS712, Arduino Atmega 328P, TRIAC, Reactor.

1. INTRODUCTION

Because of utilization development, new power age plants ought to be introduced. Creating systems and the interconnections may expand the flaw current dimensions, which are more than the most extreme short out limit of circuit breakers. The expanded deficiency current dimension can make serious harms the system. Among various blames in dispersion organize, the short out shortcoming is the most common one and can cause genuine harms, for example, overvoltage, loss of synchronization, overcurrent, overheating, equipment connected to system may lead to malfunction and insulation breakdown .

To anticipate these issues, a few arrangements are utilized, for example,

Updating the switchgear and other related parts. Associating the power electronic converter interface among systems and recently introduced dispersed generator (DG). Control framework reconfiguration. Associating high impedance transformers for expanding impedance of the system and furthermore new arrangement like the use of the Unified Interphase Power Controller (UIPC) for flaw current control in interconnected frameworks.

2. METHODOLOGY

In this system we using Atmega 328P Arduino controller for switching sequence of TRIAC'S . This switching sequence can be controlled, on the condition of system that is 1. Normal operating condition and 2. At fault occurrence. This project reduces some amount of magnitude of fault current, which will make the system to work as a normal condition. For this to happen bridge rectifier circuit is used, where reactor changes its mode from DC to AC. During normal operating condition BSSFCL topology remain in DC mode, such a way it changes into AC mode when fault occurs.

3. PROPOSED METHOD

This device is a progressive energy framework gadget which delivers issues because of expanded issue current dimensions. Whereas name suggests, this device is a gadget that reduces imminent flaw flows to a lowest dimension.

The essential thought of any extension type issue current limiter, is as per the following,[7]. 1) t is smaller than T shortcoming, therefore impedance of the proposed BSSFCL is near 0ω 2) At t is greater than T deficiency, therefore impedance of the proposed BSSFCL increases forcefully couple of milliseconds. A shortcoming current limiter (BSSFCL) is the best answer for the deficiency current confinement Regarding BSSFCLs defensive response, BSSFCL can be classified into two types.

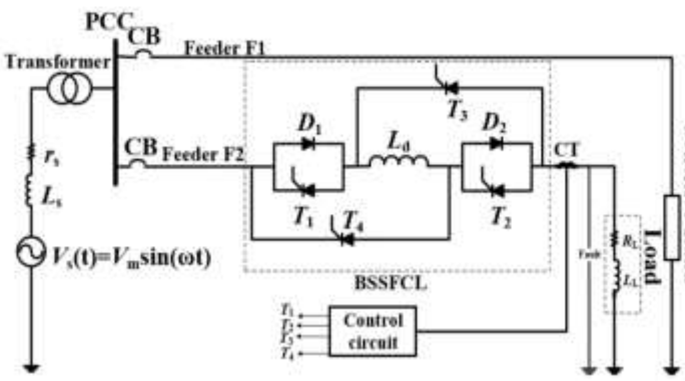

Fig -1: Proposed Method Of BSSFCL

3.1 DC OPERATION MODE

Fig.1.1. Demonstrate the DC actuating method of BSSFCL.[7] For this situation, the BSSFCL works as a rectifier connect that actuates dc voltage on the arrangement reactor and

short circuit it by freewheeling activity. In shortcoming origin, the expanded flaw current achieves the edge current dimension and after this dimension, the controller changes the BSSFCL topology to air conditioning mode.

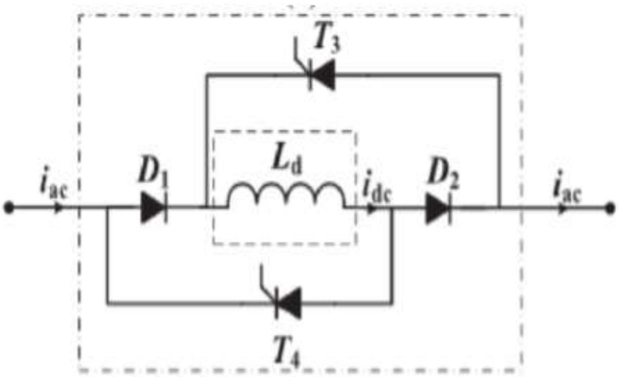

Fig 1.1-: DC Operation Mode

3.2 AC OPERATION MODE

Fig 1.2 Demonstrate the AC task method of BSSFCL. [7]In this mode the pinnacle of the line current reaches the per-characterized esteem and the controller changes the proposed model's topology from the dc mode to the ac mode. For this situation, D1 with T1 and D2 with T2 structure two antiparallel switches that feed the reactor with ac voltage as appeared in Fig. 2.1. So also, T3 and T4 are killing at initial zero intersection current and the new circuit topology initiates an ac voltage on the Ld. .With this exchanging design in the deficiency interim , the impedance of the ac reactor increments and the shortcoming current adequacy diminishes to the predetermined dimension.

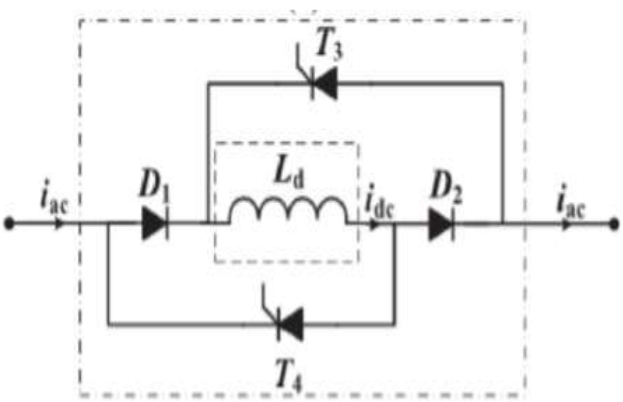

Fig 1.2-: AC Operation Mode

4. BLOCKDIAGRAM

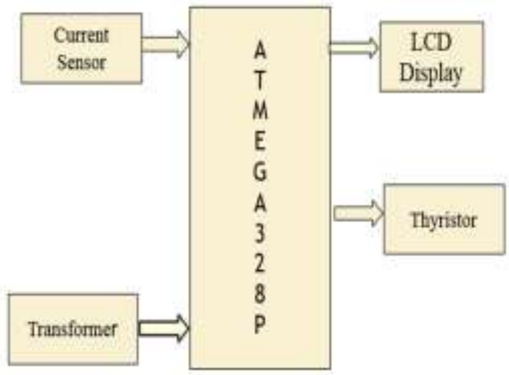

Fig 2-: Block Diagram of BSSFCL Circuit

5. HARDWARE DESCRIPTION

Sr.no	Components
1.	Ardiuno – ATMEGA 328 P
2.	TRAIC – BT136
3.	Current Sensor – ASC712
4.	LCD Display -16x2
5.	Inductor -0.1 H
6.	Diodes
7.	Load – Resistive

Table content major component used for BSSFCL circuit .

6. EXPERIMENTAL SETUP

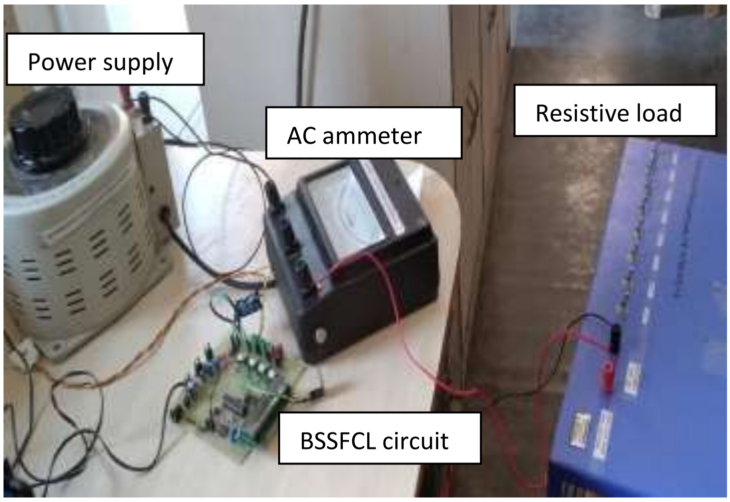

Fig 3-: Block Diagram Of BSSFCL Circuit

7. RESULT ANALYSIS

Fig -4: Current Value at Normal Condition

Fig -4.1: Current Value at fault condition

From fig.4.1 it is seen that current value is reduced from 1.55amp to 1.48amp, thus there is 0.7amp decrease in fault current.

8. ADVANTAGES

Avoid equipment damaging, Use lower fault rated equipment Reduce voltage dips on adjacent feeders, Enhance power grid transient stability , Enhanced system safety, stability, and efficiency of the power delivery systems, Reduced or eliminated wide-area blackouts, reduced localized disruptions, and increased recovery time when disruptions do occur, Reduced maintenance costs by protecting expensive downstream T&D system equipment from constant electrical surges that degrade equipment and require costly replacement, Near-zero Insertion Impedance: Under normal conditions, the SFCL acts as a near perfect electrical conductor. Automatic Reinsertion: After a current-limiting operation, the SFCL automatically resets and is ready for the next operation.

9. CONCLUSION

The proposed BSSFCL is fit for controlling the size of flaw current. So as to control the flaw current, essential twisting of a disengaging reactor is associated in arrangement with the line and the auxiliary side is associated with strong state gadget.

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