

**CONTROLLER BASED LINE PROTECTION USING AUTO
RE-CLOSING SCHEME**Dishant Patel¹¹B.E. Student, Electrical Engineering Department, Gujarat Technological University.

ABSTARCT:-Almost 70-80% of faults in transmission lines in power system are transient or temporary. These faults lead to substantial damage to the power system equipment. These faults might be L-G, L-L, L-L-L in power system. To overcome this problem a system is built, which can sense these faults and automatically disconnects the supply. Our project is to develop an automatic tripping mechanism for three phase supply system. The Project output resets automatically after interruption because of temporary fault while it remains in tripped condition in case of the permanent fault. So, Consumers will get continuous supply. This method is simple and requires less hardware. Therefore, application of this method is highly recommended in transmission line.

1. INTRODUCTION**1.1 Need of Auto Reclosing scheme**

Several research paper and surveys have analyzed that 80% of faults on overhead transmission lines are transient in nature. Temporary faults, also known as transient faults can be cleared by momentarily de-energizing the line. They occur because of lightning, swinging wires and temporary contact foreign objects.

Hence, there is need to use an automatic reclosing system to improve service continuity, particularly for distribution systems. Use of high speed auto reclosing in interconnecting tie lines greatly improves the stability of the system. On the other hand, faults on ground cables are permanent in nature. Hence, this faults should be cleared without the use of auto reclosing system. At the same time, auto reclosing operation in permanent faults, particularly at transmission levels results in a fault has not been cleared. Hence knowledge of proper selection and application of auto reclosing system is extremely necessary.

1.2 AIM AND OBJECTIVE OF PROJECT

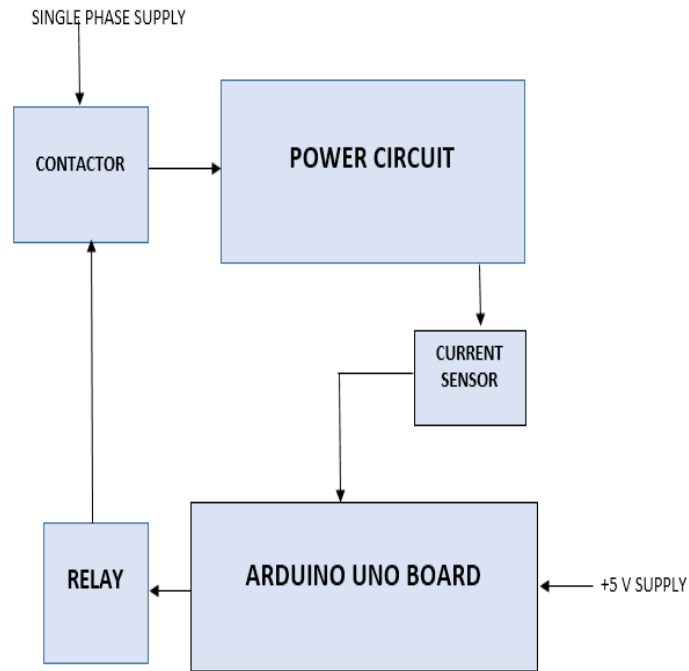
- To reduce de energizing time
- To increase reliability
- To increase stability
- Reduce switching of capacitor bank
- To increase continuity of supply

1.3 ADVANTAGE OF AUTO RECLOSING SCHEME

The use of auto reclosing system in transmission and distribution lines is quite common, it has been accepted worldwide from various reports that only about 5-10% of the fault out of total permanent in nature. The auto reclosing scheme provides below advantages.

1. Use of auto reclosing system minimize the interruption of supply at consumer side
2. Employing a high speed auto reclosing system on long extra and ultra-high voltage lines increases system stability as well as synchronism
3. Use of auto reclosing system restores system capacity and reliability
4. In modern power system some of the loads are very critical and continuity of power supply is extremely important. From auto reclosing we can get continuous supply
5. If the auto reclosing scheme is employed then there is a higher probability of recovery of continuity of power supply
6. Use of high auto reclosing scheme reduce the duration of fault it also eliminates most temporary faults. Hence, damage due to persistence faults for long duration reduces
7. Employing delayed auto reclosing scheme increase the chances of clearance of semi-permanent faults in distribution system where fuse is used

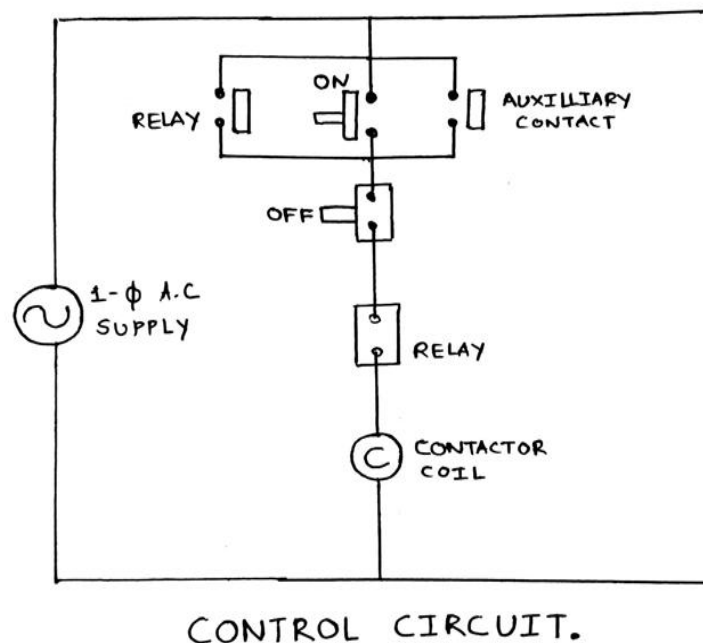
2.BLOCK DIAGRAM



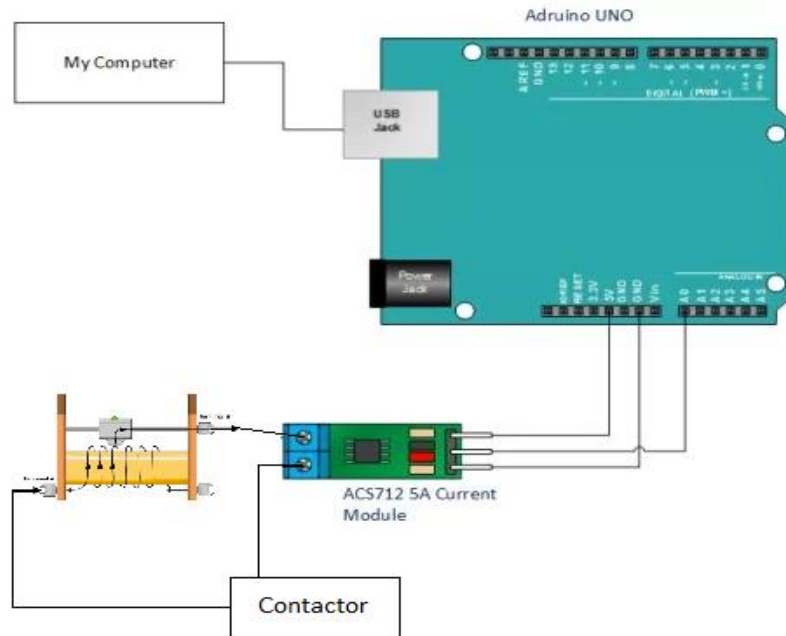
3.COMPONENTS REQUIRED

1. Arduino UNO (controller)
2. Current Sensor ACS 712
3. Contactor MNX A1
4. Driver card (using relay)
5. Variac 230V
6. Relay (230 Volts, 10 Amp)
7. Load Bank

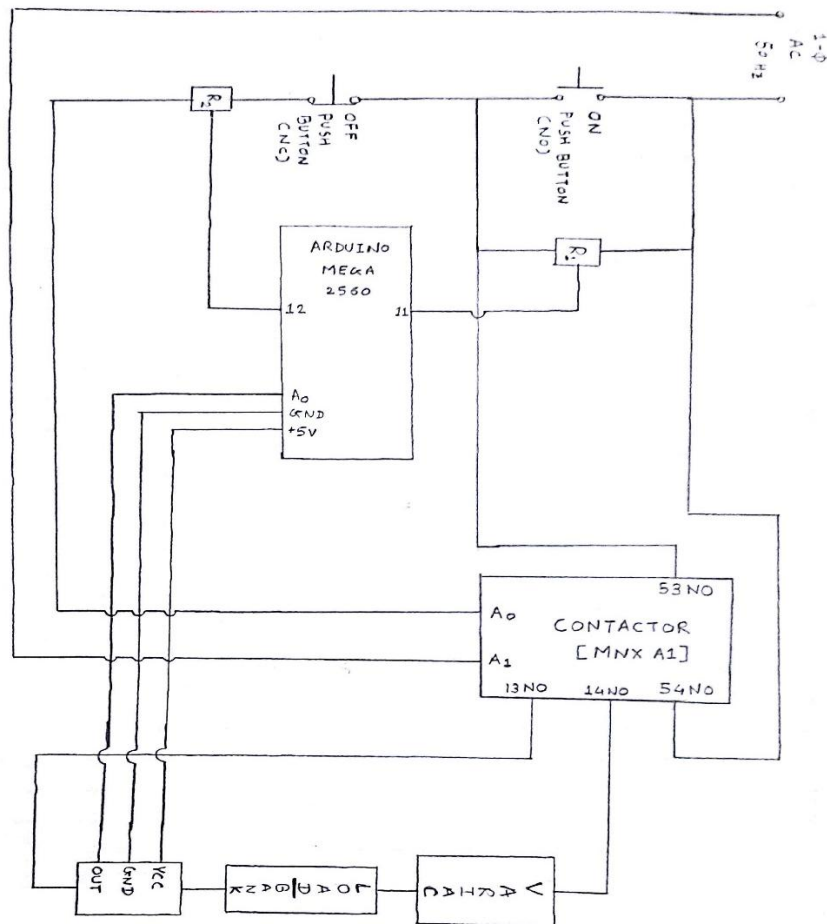
4.CONTROL CIRCUIT



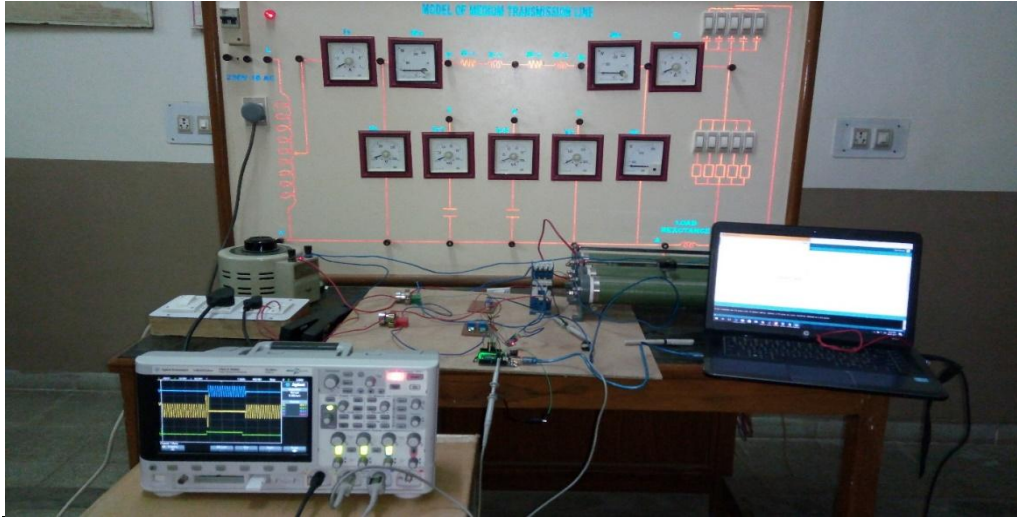
5. INTERFACING OF CURRENT SENSOR



6. CIRCUIT DIAGRAM



7. PROTOTYPE



8. WORKING

- This project is about the basic operation of relay. In power system most of fault is transient and whole system is interrupted. When any transient or permanent fault occurs the circuit interrupts. In our project we reclose the circuit to check the fault is persisting or not if it is persist than it disconnects the supply.
- When we press the ON push button than supply is connect. In parallel with ON push button the auxiliary connection is provided to provide hold on path. Another NO relay is in parallel with ON push button so, we can reclose the system. NC relay is connected in series with OFF push button and another terminal of NC relay is connected to the contactor coil.
- When the fault occurs current in circuit is greater than it's predetermine value and relay NC contact will open so circuit is open. After some time interval NO relay will close for some time using Arduino and relay NC will reset (close) and check whether the fault is persisting or not if the fault is still there than relay operates and disconnects the supply the process is repeated twice. After 3rd tripping the system is in the black-out condition and for temporary fault the system is come again in healthy condition.

9. SUMMARY OF INVENTION

- Temporary faults created because of switching or lightning can be cleared by momentarily de-energizing the line.
- Automatic reclosing system can be used to improve service continuity and stability of a power system.
- Long EHV transmission lines utilizes various reclosing schemes such as single /three phase auto reclosing schemes and single and multishot auto reclosing relays based on high speed or low speed operations.
- Supervision of closing operation of a circuit breaker is carried out by synchronism check relay.
- The synchronism check relay controls the phasor values of the voltage appearing across the contacts of the breaker by several methods such as phasing voltage method and angular method.
- During the selection of a reclosing relay various factors such as choice of zone in case of distance relay, dead time and reclaim time should be considered.

10. FUTURE SCOPE

- This is all about single phase auto reclosing scheme. In future we will make this scheme for 3 phase configuration. Because in 3 phase system different types of fault can be created like L-L-L, L-L-G, L-L.
- We are implement this auto-reclosing scheme in small level but we can also implement this scheme for real time power system. For real time power system synchronous check relay used. In that relay it will check the synchronism between two ends of power system and then it will connect.

5. REFERENCE

- [1] Richard C. Dorf, ed. (1993), *The Electrical Engineering Handbook*, Boca Raton: CRC Press, p. 1319, [ISBN 0-8493-0185-8](#)
- [2] <https://patents.google.com/patent/US6239960B1/en?q=controller&q=based&q=auto+reclosing&q=circuit+breaker>