

Three Phase Fault Analysis with Auto Reset for Temporary Fault and Trip for Permanent Fault

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Abstract: This paper to develop AN automatic tripping mechanism for the 3 part provide system. The project output resets mechanically when a short interruption within the event temporary fault while it remains in tripped condition just in case of permanent fault. These faults lead to substantial damage to the power system equipment. In India it is common, The faults might be LG (Line to Ground), LL (Line to Line), 3L (Three lines) in the supply systems and these faults in 3 part provide system will have an effect on the ability system. To overcome this problem a system is constructed, which can sense these faults and automatically disconnects the supply to avoid massive scale injury to the management gears within the grid sub-stations. This concept low voltage testing of fault conditions is followed because it isn't advisable to form on mains line. 555 timers are used for handling short length and long length fault conditions.

1. Introduction

Various studies have shown that anywhere from seventieth, to as high as ninetieth, of faults on most overhead lines are transient. A transient fault, such as an insulator flashover, may be a fault that is cleared by the immediate tripping of one or more circuit breakers to isolate the fault, and which does not recur when the line is re-energized. Faults tend to be less transient (near the 80% range) at lower, distribution voltages and more transient (near the 90% range) at higher, sub transmission and transmission voltages. Lightning is the most common cause of transient faults, partially resulting from insulator flashover from the high transient voltages induced by the lightning. Other possible causes are swinging wires and temporary contact with foreign objects. Thus, transient faults can be cleared by momentarily de-energizing the line, in order to allow the fault to clear. Autoreclosing can then restore service to the line.

2. Block Diagram

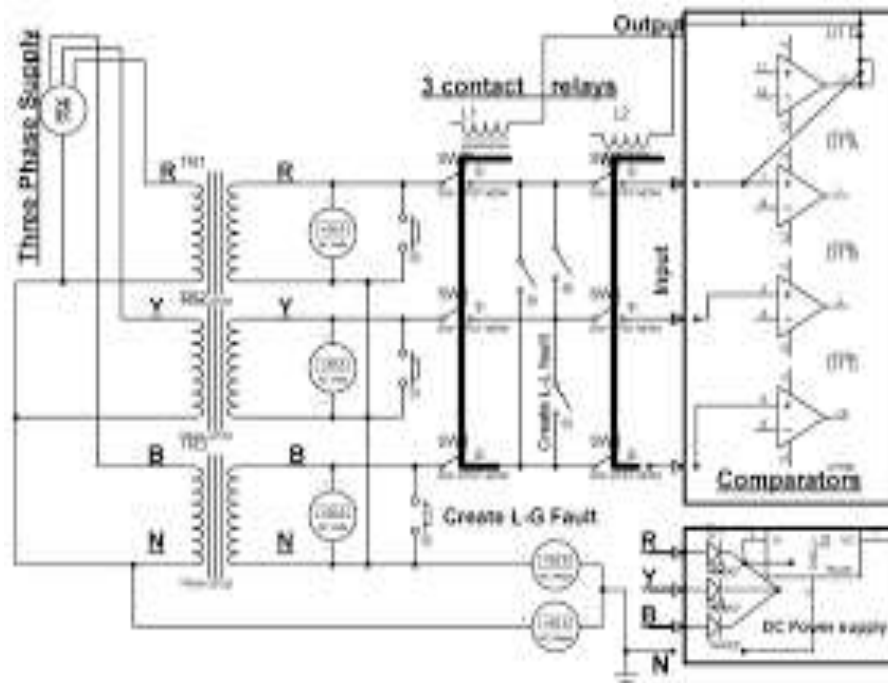


Fig1 (a) Block diagram

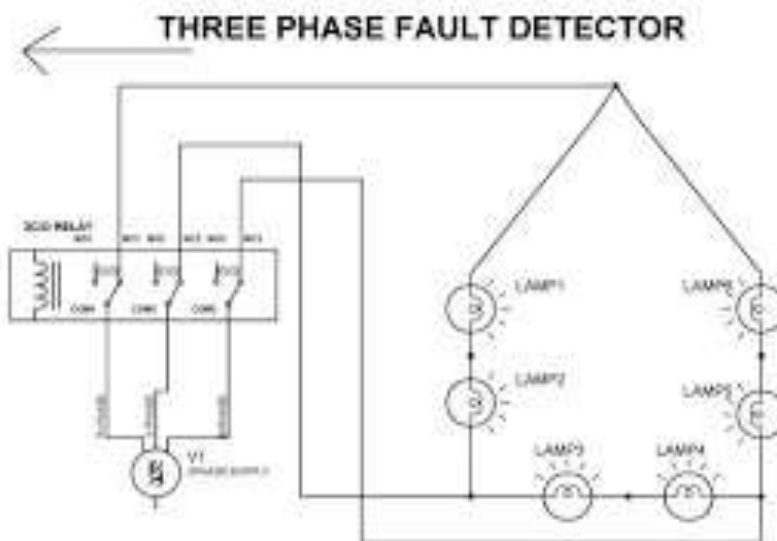


Fig (b) Three phase fault detector

3. Working Principle

The project uses vi numbers stepdown transformers for handling the whole circuit under low voltage conditions of 12v only to check the three section fault analysis. The primaries of 3 transformers are connected to a 3 phase supply in star configuration, while the secondary of the same is also connected in star configuration. The other set of 3 transformers with its primary connected instar to 3 phase have their secondary connected in delta configuration.

The outputs of all the 6 transformers are rectified and filtered individually and are given to 3 relay Fault or 3L Fault. The NC contacts of all the relays are made parallel while all the common points are grounded. The parallel connected point of NC are given to pin2 through a electrical device R5 to a 555 timer i.e. wired in monostable mode. The output of the same timer is connected to the reset pin4 of another 555 timer wired in unstable mode. LED'S are connected at their outputto indicate their status. The output of the U3555 timer frompin3 is given to associate Op-ampLM358 through wire eleven and d12 to the non invertinginput pin3, while the inverting input is unbroken at a set voltage by apotential divider RV2. The voltage at pin2 coming from the potential divider is so held that it's over the pin3 of the Op-amp used as a comparator so that pin1 develops zero logic that fails to operate the relay through the driver transistor Q1. This relay Q1 is 3CO'' relay i.e. is meant for disconnecting the load to indicate fault conditions.

4. Testing and Results



- When push button across RG supplywas pressed and released immediately, the bulbs turned off and turned on automatically after 1.1 second. The message “RG temporary fault” was displayed on the LCD and same message was sent via GSM to the given mobile number. Similar results were obtained for YG/BG/RY/BY/RB temporary faults.

- When push button across RG supply was pressed for around 10 second, the bulbs turned off but the bulbs didn't turned on even after the push button was released. The message "RG permanent fault" was displayed on the LCD and the same message was sent via GSM to the given mobile number. Similar results were obtained for YG/BGRY/BY/RB permanent faults.

5. Future Scope

- Applied in transmission and distributionsystem.
- Used in substation.
- For clearing temporary fault in industriesand commercial sectors.
- Use in Apartments for commercial purpose.

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