Abstract: A system to detect arching faults in an electrical distribution system with a line conductor is designed for the interruption of arc fault current which is occurring in the low voltage system. Conventional controller does not have the arc current interrupt function. Hence, Arc Current Controller is designed for the interruption of arc fault current. Arc Current Controller have unique features and advantages that is simplified functional mechanism, removed bimetal and reduced arc fault occurrence. The system monitors the rate of change of electrical current in the line conductor and produces a signal which represents the rate of change. Proposed Arc Current Controller has been excellent operation of arc current detection in the Arc Fault Circuit Interruption.

Keywords: Arc current, Circuit Breaker, Arc Fault, Circuit interrupter, Ground fault

I. Introduction

Research of arc electric current controller research is centered in electric arc happened in electricity accident that happen in low pressure supply of electric power system. Arc electric current controller has been study arc that happen in 120-250V's low voltage and 5-150A's current. Divide by parallel electric arc that arc electric current happens between line and neutral, serial electric arc that produce multitude in case line has been disconnected or is linked floppily to electric appliance, ground electric arc that happen between neutral and ground. Must select impossible and new detection method by existent detection method to detect arc ingredient in an electric circuit. Arc sensor has to be planed to have 60Hz's value such as frequency of an electric circuit. Also, impedance of sensor should be planed to have suitable value. Electricity fire is happened by leakage of electricity, heat source of Arc, air, oxygen that do occurrence in electric transient state line, electricity device, power line etc. Malfunction and industrial disaster of system that happen by arc are serious problem of system that act by electricity and Research is misgovernment that is gone abuzz. Grasp controller special quality through an arc electric current control experiment by electric current controller that propose and confirmed excellency of controller planning controller for arc electric current control.

II. The Design of Arc controller

Various kinds arc signal does exist in electricity. Usually, it is not easy to use analog circuit and divide arc signal etc. that can be one time arc, arc signal and electricity fire when detect arc electric current signal. Therefore, must analyze much signals that have arc current and different signal to detect arc current. Old current controller has been planed by purpose to control electric shock etc. to human body by leakage current or electricity.

This controller has limit that can not control arc electric current. Characteristic of leakage current or surge current is different from arc current special quality. Must plan controller in new concept for arc electric current control. Usually, must be able to sort electricity thrill used, arc electric current that happen in cross fire of arc form that happen in each kind electric appliance and electricity lead such as vacuum cleaner. This arc electric current controller detects and controller that can intercept plan and compared only arc electric current that happen in electricity leading wire sorting arc electric current that happen in cross fire and electricity lead that happen in this electric appliance.

Arc producer jig planed to display connection for series arc occurrence and parallel arc and ground arc by alteration of electric circuit.

Figure 1 is block diagram of arc electric current controller.
Electric current of arc electric current controller is cut-off department which input department can intercept electric current by mechanical control with input department, have been consisted of processor part that handle delivering detection department which detect arc electric current and data detected. Is displayed piercing arc detection department if electric current is approved through input department, because it flows electric current interception department. Arc electric current detection department when Monitoring and something wrong electric current produced electric current by real time by arc electric current realize if signal sending to detection part. Generate output signaling analyzing signal and signal happened has been consisted of structure that can intercept electric current in trip department by signal is passed at trip.

III. Discussions

Arc electric current controller must detect and data that is detected receive and handle arc electric current electric current intercepts electric current by Input mechanical system. If electric current is biased, it is displayed through sensor via breaker. Output waveform happened by arc approves actuality arc electric current and behaved an experiment planning arc electric current controller that is breaker return trip. Arc electric current is detected as 60Hz such as frequency of electricity that we use and is detected in current and same phase. Compose condition of return trip for efficient detection of arc electric current and behaved an experiment. Experiment condition of arc electric current controller is fixing input voltage 125V in PCB state, voltage change standard voltage 114~118V about subordinate capacity 118V compose by Dimmer's reply angle and composition measured thread subordinate amount that ensue in total subordinate amount by 0.22 on CT 11.8Ω, 100Ω. By measurement point electric wave rectifier of measured value, execute and measured in Zener diode, transistor base, KIA324.

Figure 1 Block diagram of arc electric current controller.

Figure 2 displayed output waveform of when total loading amount, real loading amount and Dimmer each are each 600W, 100W, when is 0°, 600W, 100W, when is 180°, and 600W, 100W, 270°.

Figure 3 Dimmer waveform in total loading 600W, real loading 1000W

(1) 600W, 100W, 0° (2) 600W, 100W, 90°

(3) 600W, 100W, 180° (4) 600W, 100W, 270°

Figure 3 Dimmer waveform in total loading 600W, real loading 300W

(1) 600W, 300W, 0° (2) 600W, 300W, 90°

(3) 600W, 300W, 180° (4) 600W, 300W, 270°

Figure 3 displayed output waveform of when total loading amount, real loading amount and Dimmer each arc each 600W, 300W, when is 0°, 600W, 300W, when is 90°, 600W, 300W, when is 180°, and 600W, 300W, 270°.
Figure 4 displayed output waveform of when total loading amount, real loading amount and Dimmer each are each 600W, 600W, when is 0°, 600W, 600W, when is 90°, 600W, 600W, when is 180°, and 600W, 600W, 270°.

Figure 4 Dimmer waveform in total loading 600W, real loading 600W

Figure 5 Dimmer waveform in total loading 600W, real loading 1000W

Arc electric current controller is fixing input voltage 125V, voltage change standard voltage 114 ~ 118V, 118V compose by Dimmer reply angle and composition measured real loading amount that ensue in total loading amount by 0.22 on CT 11.8Ω, 100Ω.

By measurement point electric wave rectifier of measured value, result that execute and measure in Zener diode, transistor base, KIA324. When breaker controls loading, could relate in loading capacity that voltage that electric current sensor reads has taken to each circuit breaker. Standard voltage can know also that decrease relatively according to loading capacity. Experiment condition of arc electric current controller is fixing input voltage 125V, voltage change standard voltage 114 about loading capacity by 118V, Dimmer's reply angle compose and by inning composition as result that measure real loading amount that ensue in total loading amount by 0.22 on CT 11.8Ω, 100Ω, electric current that breaker enters passing in main when control each loading in plucky fight class in form of waveform style is shared. Therefore, could relate in loading capacity that value of voltage that electric current sensor reads has taken to each breaker and standard voltage also decreases relatively according to loading capacity. Voltage that read in sensors, could know also that decrease as well as depletion of voltage in state that connect Dimmer could know that decrease. Input electric current capacity is considered that voltage's difference that electric current sensor reads must continue an experiment after experiment.

5. Conclusion

This arc designed arc electric current controller that signal of arc waveform that is signal of electricity fire has structure that is increased for measure analysis. Could know that when breaker controls loading relate in loading capacity that voltage value that electric current sensor reads has taken to each breaker and standard voltage also decreases relatively according to loading capacity. Voltage that read in sensors, could know also that decrease as well as depletion of voltage in state that connect Dimmer could know that decrease. In the case of old electric current controller, even if arc electric current happens consecutively, detection and control about arc electric current were impossible but presented control method that can reduce calamity by electricity by controlling arc electric current in that electric current.

References
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