



e-ISSN:2582-7219



INTERNATIONAL JOURNAL OF MULTIDISCIPLINARY RESEARCH IN SCIENCE, ENGINEERING AND TECHNOLOGY

Volume 6, Issue 5, May 2023



INTERNATIONAL
STANDARD
SERIAL
NUMBER
INDIA

Impact Factor: 7.54



6381 907 438



6381 907 438



ijmrset@gmail.com



www.ijmrset.com



Fault Protection and Energy Monitoring System for Three Phase Load

S. Sundararaj¹, S. Nazrin Salma², S. Arumuga Kani³, M. Umesh⁴, M. Kalimuthu⁵, V. John Prabakaran⁶

Assistant Professor, Thamirabharani Engineering College, Tirunelveli, TamilNadu, India¹⁻²⁻³

UG Student, Thamirabharani Engineering College, Tirunelveli, TamilNadu, India⁴⁻⁵⁻⁶

ABSTRACT: In our paper protection of three phase induction motor or any three phase devices Protection of three phase operating devices against overvoltage, overload, over temperature, and under voltage, occurring in the course of its operation is very important, because it is used intensively in industry for various purposes. Three phase operating devices can be protected using some components, such as timers, contactors, voltage, and current relays. This classical method involves mechanical dynamic parts. Numerical relay based protection methods have eliminated most of the mechanical components. We are introducing accurate monitoring of the parameter and protecting the load from undesired values of the parameter. We are also providing self-diagnosis. If the parameter recovers then system will auto reset itself? Moreover, the voltages, currents, speed, and temperature values of the device, and the problems occurred in the system, are monitored and warning messages are shown on the computer screen. In our paper we are going to monitor and control the load using single controller with various faults measuring techniques related to the three phase power. We will also give a provision to auto reset the system after faults restores.

I. INTRODUCTION

Protection of three phase operating devices against overvoltage, overload, over temperature, and under voltage, occurring in the course of its operation is very important, because it is used intensively in industry for various purposes. Three phase operating devices can be protected using some components, such as timers, contactors, voltage, and current relays. This classical method involves mechanical dynamic parts. Computer and microcontrollers based protection methods have eliminated most of the mechanical components. We are introducing accurate monitoring of the parameter and protecting the load from undesired values of the parameter. We are also providing self-diagnosis. If the parameter recovers then system will auto reset itself? Moreover, the voltages, currents, speed, and temperature values of the device, and the problems occurred in the system, are monitored and warning messages are shown on the computer screen. Microcontroller had developed less cost, provides higher accuracy as well as safe and visual environment. The three phase devices experiences several types of electrical faults like over/under voltage, over load, open circuit, unbalanced voltage, and single phasing and earth fault. Currently independent systems and controllers are used to monitor and control the load, which results a heavy power consumption and installation space. In our paper we are going to monitor and control the load using single controller with various faults measuring techniques related to the three phase power. We willalso give a provision to auto reset the system after faults restores.

II. METHODOLOGY FOLLOWED

Block diagram:

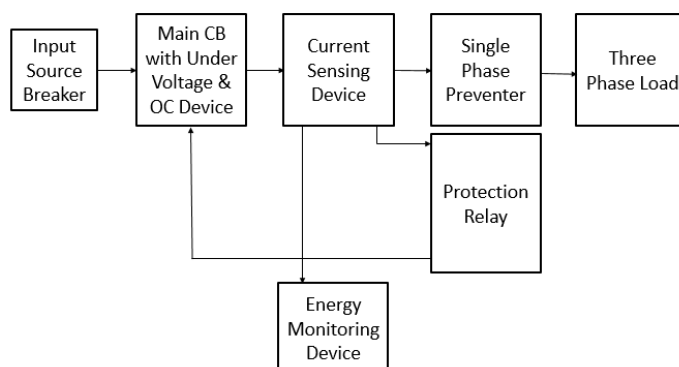


Figure:- Block Diagram of Project



COMPONENTS:

Numerical Relay



The P153 relays offer supervision features such as measurement, monitoring and recording functions. Communication protocols available are site selectable for transmitting relay data to a supervisory control system via communication networks. The operator interface allows reading of measured values and simple configuration of the relay.

Miniature Circuit Breaker



An MCB is an automatically operated electrical switch designed to protect an electrical circuit from damage caused by overload and short circuit. Its basic function is to detect a fault condition and, by interrupting continuity, to immediately discontinue electrical flow. Unlike a fuse, which operates once and then has to be replaced, a circuit breaker can be reset (manually) to resume normal operation.

Molded Case Circuit Breaker





A Molded Case Circuit Breaker (MCCB) is a required component of electrical systems, providing overload protection and short-circuit protection. In most cases, MCCBs are installed in the main power distribution board of a facility, allowing the system to be easily shut down when necessary. MCCBs are available in various sizes and ratings, depending on the size of the electrical system

Multifunction Meter



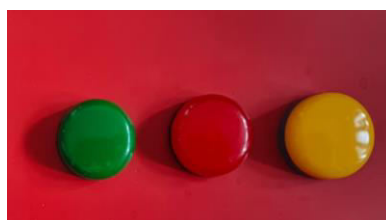
The Elite series is a multi-line three-phase digital panel meter for reliable and accurate true-RMS measurement of electrical parameters (voltage, current, power, frequency etc.) for industrial and commercial applications. It is available in two display types, LED display (Elite 100) and LCD display (Elite 300), with MODBUS communication, pulse output or alarm output as an option.

Current Transformer



A current transformer has a primary winding, a core, and a secondary winding, although some transformers, use an air core. While the physical principles are the same, the details of a "current" transformer compared with a "voltage" transformer will differ owing to different requirements of the application. A current transformer is designed to maintain an accurate ratio between the currents in its primary and secondary circuits over a defined range.

LED





LED are semiconductor device. Like transistor, and other diodes, LED is made out of silicon. LEDs are based on the semiconductor diode. When the diode is forward biased (switched on), electron are able to recombine with holes and energy is released in the form of light. This effect is called electroluminescence and the color of the light is determined by energy gap of the semiconductor.

Single Phase Preventer



Generally single phasing is nothing but a motor runs when one of the supply is disconnected due to open circuit or improper contact in switch or other electrical equipment failure. Normally, the motor runs with the three phase supply and which takes balance current in each phase winding. Consider one of the fuse has blown. But the motor still in a rotating position which tries to rotates at the same speed.

Working:

The three phase supply is applied to this device. This three phase supply is going to the MCCB. Then the output of the MCCB go to the current transformer and the current is step downed. Then the output of CT go to the Multifunction meter and Relay through the terminal blocks. And we can configure the CT ratio in Multifunction meter and Relay to monitoring the current flow and protect from Overcurrent and Earth Fault.

There are 2 fault identify from this system

1. Overcurrent Protection
2. Earth Fault Protection

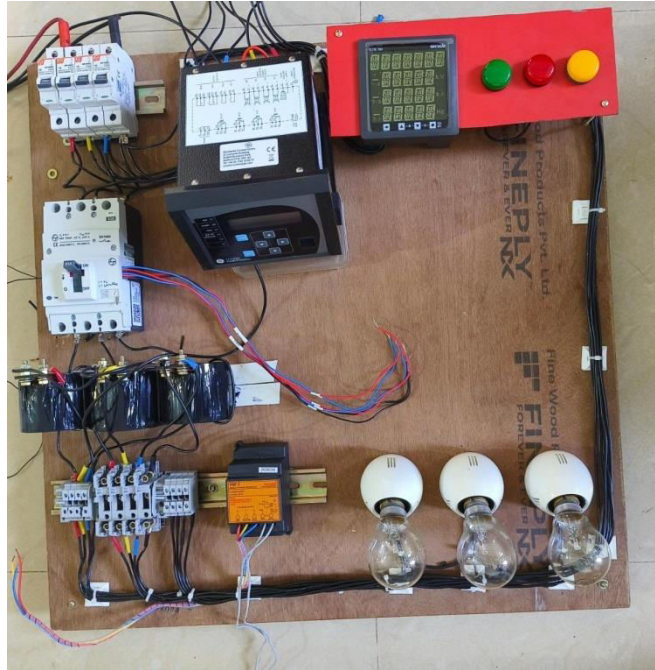
Advantage

1. Power consumption is low.
2. Use for all three phase devices.
3. Self-monitoring.
4. Self-diagnosis.
5. AutoReset.

Application

1. It is used in industry.
2. It is used in colleges.
3. It is used in hospital.
4. It is used in factory.

III. CONCLUSION



Due to daily increased load of power system it is important to maintain system Reliability. A transformer plays an important role in power system by maintaining reliability it is important that we should keep transformer from daily fault occurring in it just by observing its key parameter so that such fault cannot result in bigger failure also apart from these sharing of data information is also essential using new technology at reduced cost. System to expert systems can be used to achieve all the parameters test and analysis of automation every system is automated in order to face new challenges in the present day situation. Automated systems have less manual operations, so that the flexibility, reliabilities are high and accurate. Hence every field prefers automated control systems. Especially in the field of electronics automated systems are doing better performance.

IV. FUTURE SCOPES

System can be monitored using internet using LAN & WAN connectivity Various Systems Can be Monitored Using Single module More than 1 system can be monitored using single monitoring module

REFERENCES

1. IEEE Transactions on Energy Conversion 10/2008; 23(3-23):734 - 741. DOI:10.1109/TEC.2008.921558 . 3.35 Impact Factor
2. M.Sudha and P.Anbalagan, 2009. A Protection Scheme for Three Phase Induction-Motor from Incipient Fault Using Embedded Microcontroller Asian Journal of Scientific Research, 2:28-50
3. GSM based Distribution Transformer Monitoring System, Ashman Sharma (109EE0305), Rajesh Behura (109EE0260), Department of Electrical Engineering, National Institute of Technology Rourkela



INNO SPACE
SJIF Scientific Journal Impact Factor
Impact Factor
7.54

ISSN

INTERNATIONAL
STANDARD
SERIAL
NUMBER
INDIA



INTERNATIONAL JOURNAL OF MULTIDISCIPLINARY RESEARCH IN SCIENCE, ENGINEERING AND TECHNOLOGY

| Mobile No: +91-6381907438 | Whatsapp: +91-6381907438 | ijmrset@gmail.com |

www.ijmrset.com