MCB Central Control Monitoring System

Abhijit Patil[1], Vineet Ghorpade[2], D R Shende[3]
[1, 2] Dept of Instrumentation Engineering
[3] Professer, Dept of Instrumentation Engineering
[1, 2, 3] Aissms's Institute Of Information Technology, Pune, Maharashtra, India

Abstract- *MCB plays an important role in switching and protection in different electric fields. It makes process of monitoring of MCBs connected in different areas where physically monitoring is not feasible just in case of nuclear power plant where due to radiations there are limitations to reach every part of that power plant. We use it to trip the electricity in faulty condition. Number of MCBs are used in different areas according to its necessity. In power generating stations MCBs used are in thousands in numbers. MCB status monitoring system can be helpful in monitoring the status of these thousands and more MCBs.*

Keywords- MCB, SCADA, LCM

I. INTRODUCTION

This SCADA and embedded based project of monitoring status of miniature circuit breakers (MCBs) is the solution of monitoring the MCBs connected in the areas where the physically appearance of human is restricted or is not possible. Nuclear power plant where due to radiations present human existence is restricted. But if any fault occurred and MCB is tripped in such areas, instead of going there we can monitor the status of the MCBs tripped and the cause of them to tripped out on SCADA screen and can send the information remotely to desired location. Remote display unit has made possible to monitor the status of MCBs from remote location [3]. If MCBs in sensitive areas are tripped, the alarm can be set for them with remote alarms. The tripping data of MCB can be further studied by printing it out because of the provision to connect the printer.

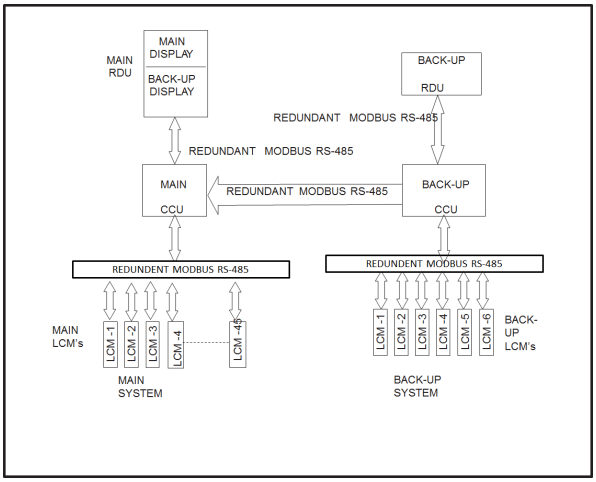
II. MINIATURE CIRCUIT BREAKER (MCB)

MCBs or Miniature Circuit Breakers are electromechanical devices which protect an electrical circuit from an overcurrent. The overcurrent, in an electrical circuit, may result from short circuit, overload or faulty design. An MCB is a better alternative to a Fuse since it does not require replacement once an overload is detected. Unlike fuse, an MCB can be easily reset and thus offers improved operational safety and greater convenience without incurring large operating cost.

The principal of operation is simple. An MCB functions by interrupting the continuity of electrical flow through the circuit once a fault is detected. In simple terms MCB is a switch which automatically turns off when the current flowing through it passes the maximum allowable limit. Generally MCB are designed to protect against over current and over temperature faults. [2]

III. BLOCK DIAGRAM

The MCB Status monitoring system consists of Local Control Modules (LCM), Central Controlling Unit and Remote Alarms & Remote Display Unit. The system scans the status of 48V DC and 240V AC miniature circuit breakers mounted in various control power distribution panels, stores & lists the details of MCBs which are in tripped condition and display these details on a local display unit and a remote display unit. The system also has provision of a connecting a serial printer, for taking printout of details of tripped MCBs, and relay output for remote alarms annunciation. The input to the system is taken from each MCBs potential free changeover auxiliary contact. Each local control module is capable of accepting 96 inputs.



IV. LOCAL CONTROL MODULE

Local Control Module (LCM) consists of multiplexer circuits that converts change of state of auxiliary contact of MCB to voltage/current signal, amplify, buffer and transmit to CPU. The address of the multiplexer and advancing of address are controlled by CPU. Number of wires connecting LCM and CPU are restricted to a few wires due to use of multiplexer circuit. Local control modules are located in various control power distribution panels in which MCBs are mounted. Auxiliary contacts of MCBs will be connected to the local control modules. LCM has indication for power supply, system ok, and presence of input sensing cards. All components of LCM are located on PCBs.[3]

V. SCADA

The SCADA is 'Supervisory Control and Data Acquisition'. The major function of SCADA is for acquiring data from remote devices such as valves, pumps, transmitters etc. and providing overall control remotely from a SCADA Host software platform. This provides process control locally so that these devices turn on and off at the right time, supporting your control strategy and a remote method of capturing data and events (alarms) for monitoring these processes. SCADA Host platforms also provide functions for graphical displays, alarming, trending and historical storage of data.

Controlling Unit:

The controlling unit is responsible for controlling transmission bus and all other cards connected to the bus and can be functionally split into the following sections [2].

1) CPU
2) Time card
3) Serial transmission card 4) Relay card
4) PROM programming card
5) Front panel drive keyboard and display
6) Printer card.

VI. CONCLUSION

MCBs are used to monitor their status also to control the system and give ease of access to monitor and control large number of MCBs with central controlling unit or from remote location connected in the areas where human being is not reachable easily. In case of nuclear power plant it makes much easier to monitor MCBs and to avoid human contact in zone.

REFERENCES

[1] MCB status monitoring system, Data Sheet.
[2] MCB status monitoring system, System Manual.
[3] Local Control Module data sheet
[4] MCB status monitoring, Vol. 3, Issue 02, 2015 | ISSN (online): 2321-0613