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Renewable Unnamed Substation Technology That Gives Power To Knowing Real Time Fault Control and Isolation Of Power System At Any End Of The World If You Are Authorized

Prashant Dange[1], Chetan Gowardipe[2], Mayur Pote[3]

Student, Electrical Engineering, Shri Sai College of Engineering & Technology, Bhadrawati, India[1]

Student, Electrical Engineering, Shri Sai College of Engineering & Technology, Bhadrawati, India[2]

Asst.Prof, Electrical Engineering, Shri Sai College of Engineering & Technology, Bhadrawati, India[3]

Abstract – The "Unmanned Substation- Technology that gives power to knowing real time fault, control and isolation of power system at any end of the world if you are authorized" Describe in these paper. Motive of this project is reduced running cost of the substation, reliability of supply, fault finding time is less and low cost per unit to consumer.

Keywords: Unmanned Substation, Fast isolation due to use of microprocessor, fault finding is fast, control from anywhere if you authorize, low running cost and it will better to consumer.

I. INTRODUCTION

High voltage direct current (HVDC) transmission is an economical option for transmitting a large amount of power over long distances. Back in the early days of electricity supply, AC (alternating current) was adopted for power transmission because it could be stepped up or down as needed by transformers and because it could be interrupted more easily than DC (direct current). High voltage AC grids evolved as an efficient way to connect existing islands of distribution grids and large generation units with industrial and residential loads. It was not until some decades later that the technology for high voltage DC (HVDC) power advanced sufficiently for the first commercial HVDC link to be established. High-voltage direct current (HVDC) will become more prevalent in the power system. Anticipated annual growth rates are in the range of 7-10%. This project is modeling of an automated HVDC substation without any human interevent The microcontroller based numerical relay and SCADA system continuously monitored the system parameter and takes necessary protection actions and provides the real time data and analysis remote The remote operation of substation equipment such as circuit breaker, isolators, etc can be done efficiently and effectively. The substation automation is achieved by using IOT system which transmits the substation data over cloud securely and remote centralized unit receives the real time data from the cloud effectiveThe microcontroller based numerical relay continuously reads the CT/PT values coming from the switchyard and takes necessary action accordingly.

The remote motoring and control system receives real time data of switchyard from IOT system, such as system parameter like Voltage, Current, Power (Active/Reactive) along the alert notification/logs, if any continuously. The protection of substation equipment's also covered in this project such as protection of converter transformer, AC/DC filers, smoothing reactor etc. The microcontroller based SCADA system continuously monitors the switchyard equipment, upon failure any equipment/mal operation or any fault condition the circuit breaker operates which isolates the faulty part from the healthy system. The project also covered the line protection which is a line fault locator. Protection is also used along with the traveling wave method to identify the fault in the HVDC line. It uses a one end high-frequency transient signal to discriminate the internal fault from the external fault and it can also detect the close-up faults. However, it requires a high sampling frequency up to 50 kHz. In the case of a VSC-based HVDC system, the boundary protection may not be capable of differentiating between internal and external faults. In the fault is detected using the characteristics of initial values of the traveling waves. Also, the gradient of the traveling wave is used to discriminate the internal fault from the external fault since it is limited by the DC terminal reactor. The above all mentioned are achieved using a C language code installed in the Arduino which process the data and takes necessary action according to the code.

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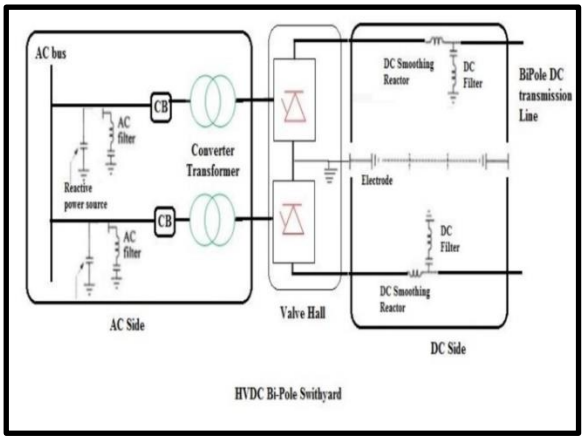
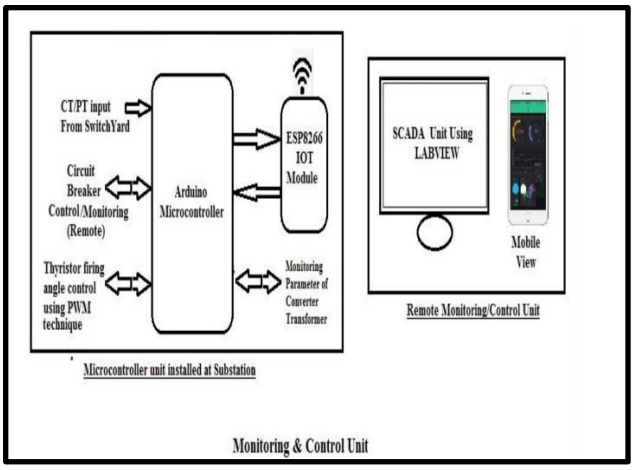
II. OVERVIEW

concept Diagram of project:

In this project we take HVDC transmission line that is to be controlled by the remote in our project.

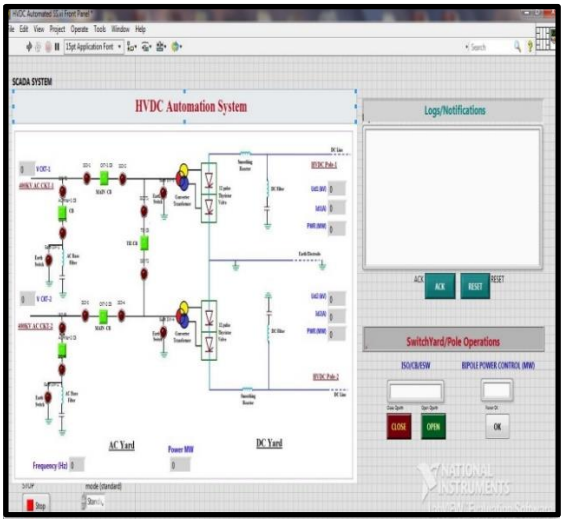


This is the single line diagram of the HVDC Substation. There are filters, circuit breakers, transformer, bays etc.



Monitoring and control unit of the project. Use Arduino Microcontroller, IOT Module etc.

III. HVDC AUTOMATION SYSTEM



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- Single line diagram which can be visible in computer and mobile phone.
- operation of equipment in operating system. Interlock of the system.
- Protection of the system.
- Equipment location & naming in single line diagram.log notification. micro controller connection in system. we use (atmega328p).
- Iot (internet on things) device connection with microcontroller. We use (esp8266)

IV. AC & DC YARD

- In diagram we show all naming of electric equipment installed in Substation. We also provide color to know circuit breaker & isolator open or closed.
- In this diagram we also provide the visual parameters of the system like System voltage, power, supply frequency.
- Also provide single pole parameter in diagram. Like voltage, current & power.

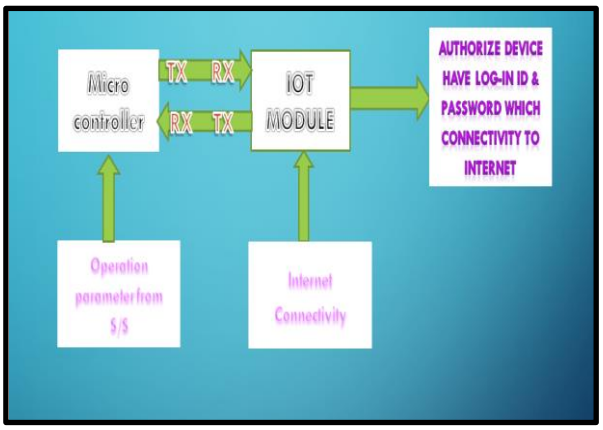
Logs/notification:

- In logs there we know the where fault occur in system.
- We show in logs several fault in system as well as transformer.
- In log window we provide acknowledge and reset Butten.
- This logs window provide us the real time fault occur in system.

Switchyard/pole operation:

- In this window we provide Power ramp up and Ramp down.
- Provide circuit breaker, isolator & earth switch open and close.

Overall working of microcontroller and iot device:



- Micro controller - ATMEGA328P.
- IOT internet on things – ESP8266 (MODULE).
- Operation parameters from S/S.
- Internet connectivity for IOT Device.
- RX- Receiving Data.
- TX- Transmit Data.
- We can understand the working of this project with the help of this diagram.

V. PROGRAMMING

We use graphical programming which is use in our project.

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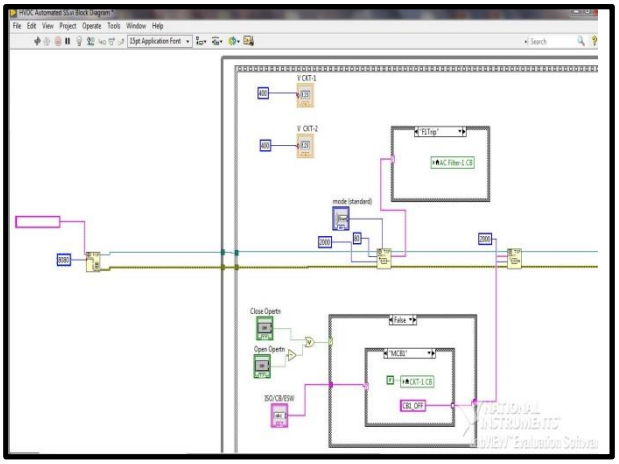
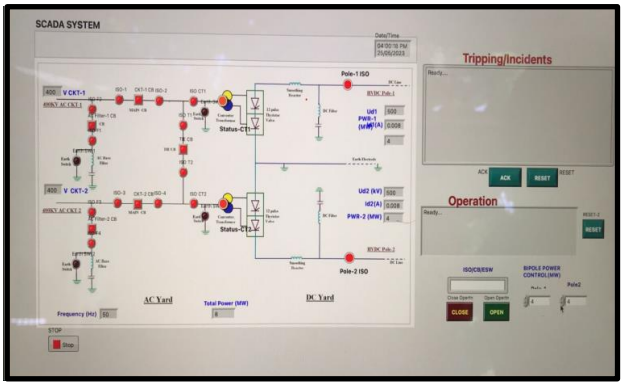
Graphical programming:

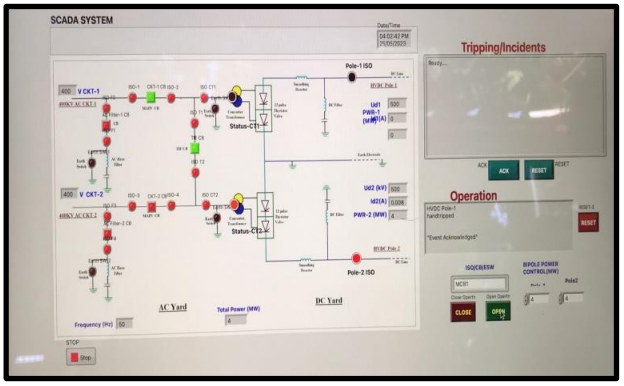


- Three main TCP are use.
- 1st TCP I/P = Transmission control protocol internet protocol.
- Gives all input to the 1st TCP
- 2nd TCP all data analysis to his data base.
- 3rd TCP all data analysis to data base and send the
- particular signal to other device.

Normal Load Condition



When Fault Occur



ADVANTAGES

- Less manpower.
- Low losses.
- High efficiency and accurate.
- Reliable power flow.

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DISADVANTAGE

- High initial cost.
- Required high maintenance.

CONCLUSION

This system can change the operations scenario. One control centre can operate several substations. That's why we reduced the running cost of substation. Efficiency improve, fault clearance time drastically reduced. This all benefits improve the supply quality with low interruption.

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