A CAN Bus based system for monitoring and fault diagnosis in Wind Turbine

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Abstract- **Electrical energy can be produced using differnet fuels and by using solar,wind turbine,thermal plants this energy is nothing but natural resources. The production of electrical energy using fossil fuels is high costly as compared to natural resources. Solar, wind, thermal and tidal energy are most widely used natural resources to produce electrical energy and that energy use for different purposes Currently wind energy is most useful energy this energy production process happen in the natural environment that's why electrical energy reduce emission of carbon dioxide. The cost of the wind turbine is so much higher and this deployed in harsh environment on mountain,hill for maintain the all record of wind turbine its essential for today. This paper describes the monitoring and fault identification and solved system for wind turbine using CAN bus system.**

Index Terms- **CAN-Controller area netwok**

I. INTRODUCTION

Wind turbine is a rotating mechanical device that converts wind energy into mechanical energy resulting in the production of electricity[1]. Wind turbines are fault prone, that is they are deployed in harsh environment such as desert, plains apart from that they are complex electromechanical system that are located far away from the control center. So the chance of fault occurrence and the side effects will be more, even it leads to power off. It is necessary to develop the remote monitoring and fault diagnosis system to monitor the run time status and the diagnosis of fault to improve the efficiency and the life time service of the wind turbine[2].

Wind turbine monitoring system collects the parameters such as Speed, Temperature, vibration, power,voltage and current from the main components of turbines such as shaft, gear box, generator and nacelle. Depending on the collected data from the monitoring system analysis is done and the fault diagnosis system makes the decision of location and the type of fault to be occurs in the wind turbine. This analysis is uploaded to the mobile web server and an SMS is sent if there is chance of fault occurrence[3].

Can bus is the controller area network use for doing the communication between wind turbine to contol unit all data of the turbine send to control unit. CAN bus is to enable any system to communicate with other system without putting too much load to the main controller. CAN bus is a fast serial bus with the speed of 1 Mbps that is designed to provide an efficient, reliable and economical link between various CAN systems, sensors and actuators.i use CAN to communicate between the Wind turbine and the control center which adopts client/server frame works to implement the monitoring and fault diagnosis system[4][5].

II. INTRODUCTION TO CAN

CAN bus is one the Field bus control system used in automation, intelligence and networking. CAN protocol have been designed by Robert Bosch in1986 for automotive applications as a method for enabling robust serial communication. It defines a standard for efficient and reliable communication between sensor, actuator, controller, and other nodes in real-time applications. CAN is the de facto standard in a large variety of networked embedded control systems. Today, CAN is widely accepted for its high performance and reliability, and is used in a broad range of fields from FA devices and ships to medical and industrial equipment.

Any CAN node on the BUS can detect errors in the message, and force the message to be destroyed and retransmitted… this feature helps to ensure that the message a node does receive contains valid data at the receiver means control unit.

III. FAULT DETECTION IN WIND TURBINE.

Fault detection process is nothing but first monitoring all parameters by using CAN bus system and after Analyzing all data stored at control unit detect the fault where it is occure in wind turbine system

When a failure occurs inside the wind turbine, e.g. high oil temperature in gearbox, the control unit logs the failure directly or registers the consequences of the fault, and responds referring to the type of the malfunction. If the failure is serious, a visual inspection has to be made which can be carried out by the operators or by authorized personnel. Finally whenever a major failure has happened, a report is generated which is helpful to the service engineer.

Incase fault occure atwind turbine it is related to the voltage then Over voltage and under voltage elements are provided to ensure that the generatoris providing power at nominal voltage levels as well as to isolate the generator when system instabilities are causing the abnormal voltages to be induced upon the generator.

IV.ACTUAL SYSTEM

The system consist of wind turbine section like parameters temperature, vibration ,voltage, currant and most important parameter CAN controller of the wind turbine. Microcontroller is the key element in processing module which keeps on monitors the wind turbine parameters and CAN controller communicate wind turbine data in the form of currant, voltage , temperature in the control unit. the sensed data and it will update the parameter values to the central database via GPRS module.
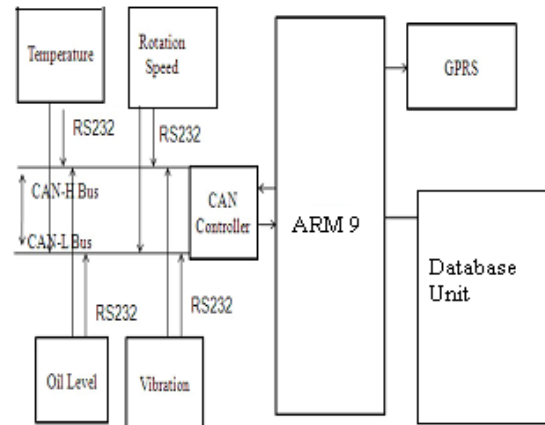

Figure.1 Block diagram of main module

All this parameter data are send to the control room Section via wireless GPRS module. The display unit is placed is in the Wind Turbine section to show the parameters details which acts as the reference for operator in case of checking the working condition, are for any other remaining parts in the Turbine.so overall wind turbine fault detect and diagnosis by using this system

V. CAN INTERFACE MODULE

CAN controller interfaces microcontroller and the wind turbine parameters the CAN bus automotive electronic control system, each controller through the CAN bus interconnected together to exchange information(suchasspeed,enginespeed,temperature,vi brations etc)here communicate all parameter information from wind turbine to database unit because of CAN controller .this can bus system interface wind turbine and ARM 9 controller and after that all information stored at control unit
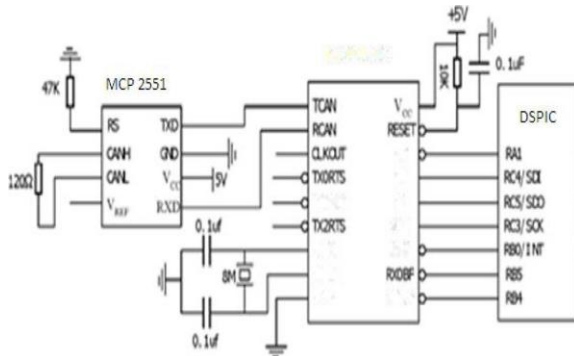
Figure.2CAN interface module

VI.EXPECTED RESULT

To monitors all wind turbine parameters like temperature,vibration,voltage ,current,etc and that data communicate by using CAN bus system in the central database computer and also stop the turbine power automatically off also give the proper indication of fault location to develop the system fully atomized for wind turbine.

VII. CONCLUSION

The effect of harsh condition and the nature of large Electro mechanical system are the causes of fault to be occurred in the wind turbine. It is very important perform the monitoring and fault diagnosis of wind turbine parameters. The CAN protocol which is used for serial communication which provides high data transmission rate and reliability. Therefore in this paper, the design of a remote monitoring and fault diagnosis system based on CAN. Finally the System performance and the efficiency is effective and reliable.

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