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Implementation of GSM Based Automatic Change over System for Electric Generators

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ABSTRACT: When the power failure, in most of the industries, factories and educational institutions are using generators. Manually there are ON and OFF control in the generator. Here the man power is must to do this operation. For example in a factory, it have many sections and the generator placed in distance place so the process of ON the generator get some time delay, doing this by manually means, some important works get delay. This process is not suitable for all the time like any important function in a factory, because we take the time to ON the generator by the distance place. For overcome this problems we introduce this proposal. This venture relates to data protection systems for computer systems and more particularly to machines in industries and method of adaptive power failure recovery that ensures that there is no data loss or less production due to a pending power loss. Here a power failure detection system is connected to microcontroller which finds out the power failure through the output of that system. The generator output control also connected to the microcontroller through relay and driver circuit. When it gets the message turns on the relay otherwise it will OFF. The generator to be stopped and its put off load from the generator panel in the Engine control room. The load is reduced slowly by the governor control on the panel. The load is reduced until the load comes on the panel below 100 KW.

KEYWORDS: Generator-GSM module-power failure detector-relay-PIC microcontroller.

I. INTRODUCTION

Present industry is increasingly shifting towards automation. Two principle components of today's industrial automations are programmable controllers and robots. In order to aid the tedious work and to serve the mankind, today there is a general tendency to develop an intelligent operation. PIC Microcontroller is the heart of the device which handles all the sub devices connected across it. We have used as microcontroller. It has flash type reprogrammable memory. It has some peripheral devices to play this project perform. It also provides sufficient power to inbuilt peripheral devices. We need not give individually to all devices. The peripheral devices also activates as low power operation mode. These are the advantages are appear here.

These generators are cheap and come equipped with a self-start mechanism built into the generator. On the push of a button, the user can start the generator easily. In the cities, normally these generators are used for a short period of time when the power from the grid is not available. When the power from the grid is not available the user starts the generator and connects the load to the generator manually. When the power from the grid becomes available, the user disconnects the generator from the load, turns off the generator and connects the load to the grid manually. Normally this function is performed manually and requires the engagement of the user for turning the generator on and off and shifting the load between the generator and the grid. In this paper we propose a controller which performs these tasks automatically. The controller monitors the grid voltage and when there is no voltage, the controller disconnects the load from the grid, starts the generator and shifts the load to the generator. The controller keeps on monitoring the grid voltage and when it comes back on the system turns off the generator and transfers the load to the grid. This system is very useful in the high rate of power failure crisis occurring in Pakistan and relieves the user from the tedious selection describes the manual operation of the generator and builds the background for implementing the automatic controller.

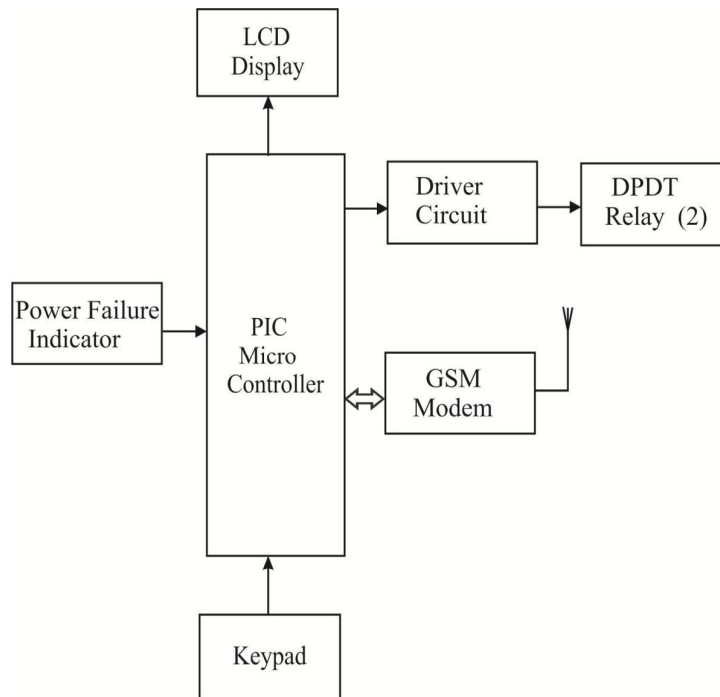
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II. GSM TECHNIQUE AND OPERATION

When the power failure occurs this system will send one SMS to the particular person. "POWER is OFF". If loads get the power from main means the SMS is send as "MAIN POWER is ON". We can control the generator ON/OFF by using the GSM. If we have more than one generator means we can select any one for the particular time, based upon the DEMAND by fixing this kit for every Generator.



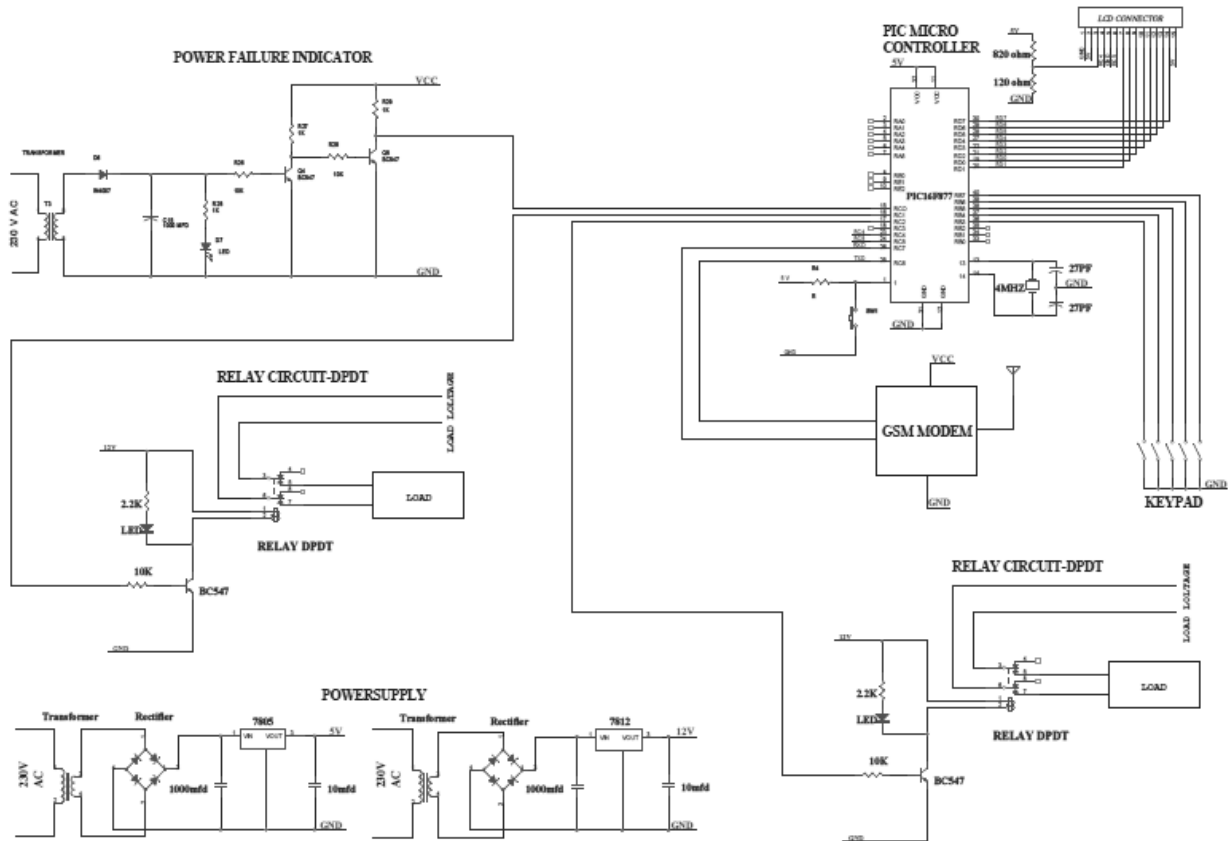
Block diagram of GSM based generator control

Power failure detector is used to detect the power is in ON or OFF. When the power failure occurs this detector will give the signal to the PIC microcontroller. Depend upon this signal the controller will on work. When receive the power failure detector signal the controller will be operate the change over relay driver circuit. At the same time the GSM unit send the SMS to the particular number by the controller signal. When they reply to that GSM that time the controller operate the prime mover through the relay. Now the generator starts and gives power to the load. Here we no need to start the generator with near place. We can operate the generator from any place. An electric generator is a device that converts mechanical energy obtained from an external source into electrical energy as the output. It is important to understand that a generator does not actually 'create' electrical energy. Instead, it uses the mechanical energy supplied to it to force this movement of electric charges present in the wire of its windings through an external electric circuit. This flow of electric charges constitutes the output electric current supplied by the generator. This mechanism can be understood by considering the generator to be analogous to a water pump, which causes the flow of water but does not actually 'create' the water flowing through it.

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Circuit Diagram of GSM based Generator Control

The modern-day generator works on the principle of electromagnetic induction discovered by Michael Faraday in 1831-32. Faraday discovered that the above flow of electric charges could be induced by moving an electrical conductor, such as a wire that contains electric charges, in a magnetic field. This movement creates a voltage difference between the two ends of the wire or electrical conductor, which in turn causes the electric charges to flow, thus generating electric current. This flow of electric charges constitutes the output electric current supplied by the generator. This mechanism can be understood by considering the generator to be analogous to a water pump, which causes the flow of water but does not actually 'create' the water flowing through it. This mechanism can be understood by considering the generator to be analogous to a water pump, which causes the flow of water but does not actually 'create' the water flowing through it. The start function of a generator is battery-operated. The battery charger keeps the generator battery charged by supplying it with a precise 'float' voltage. If the float voltage is very low, the battery will remain undercharged. If the float voltage is very high, it will shorten the life of the battery. Battery chargers are usually made of stainless steel to prevent corrosion. They are also fully automatic and do not require any adjustments to be made or any settings to be changed. The DC output voltage of the battery charger is set at 2.33 Volts per cell, which is the precise float voltage for lead acid batteries.

If the EB power came means the relay of the prime mover will be stop the prime mover and change over relay will connect the load with EB line and that time we can get the SMS whether the POWER is NORMAL.

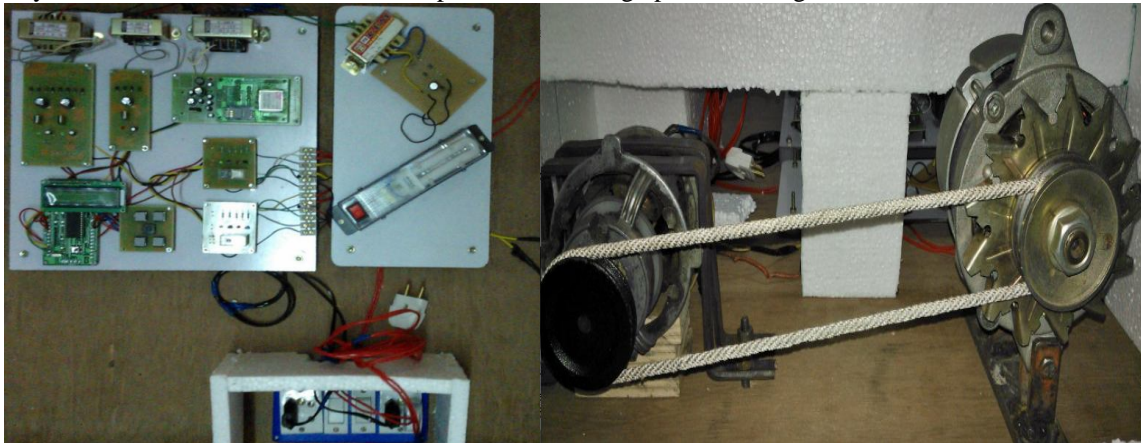
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III. RESULT

This venture, Implementation of GSM based automatic change over system for electric generators has observed a performance in Hardware kit. This is more advanced than the other existing system. All over that it is flexible for future enhancement. Experimental results shows that greater Peak Over Shoot, Less Man Power Competently, it will control the Generator with a perfect controlling operation using GSM.



Hardware implementation of GSM based generator control

The manual start/stop and load transfer panel on the generator can still be used after the addition of the automatic controller. There is no feedback in the circuit to sense whether the generator has started. The reliability of the controller is also very high due to the small number of components used in the circuit. The controller also takes very small time to put together and install on a household generator. The circuit is ideal for the countries with high rate of grid power failures.

The change over system for generator is can be done by using relay circuits. But here man power is required to start and stop the generator. Microcontroller based generator controller is used to start the generator when power failure at all the times if not necessary times also. That time we need man power to stop the generator. This method is not applicable for the educational institutions. So we implement this following method to overcome this problem.

Major components	Rating	Efficiency	Remarks
GSM, PIC microcontroller, Relay	24v	97%	We want to change the relay depends upon the generator rating

IV. CONCLUSION

The progress in science and technology is a non-stop processes a new things and new technology being invented. As the technology grows day by day, we can imagine about the future in which thing we may occupy every places. The proposed system based on PIC Controller is found to be more compact, user friendly and less complex, which can readily be used in order to perform. Though it is designed keeping in mind about the need for industry, it can extended for other purpose such as commercial and research applications. Due to probability of GSM technology used in this Automatic Change over System for Generator is fully software controlled with less hardware circuit. The feature makes this system is the base for future system.

The principle of the development of science is that "nothing is impossible". So we shall look forward to a bright and erudite world. In our venture we are using

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GSM and Controller for the efficient output. In future we may use any other controller and module for the improvement and better Efficiency. Now we do the operation of generator control by using GSM.

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