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AUTOMATED STARTER FOR SUBMERSIBLE PUMP

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ABSTRACT

One of the main objectives of this dissertation is to investigate the possible efficient techniques towards the energy conservation in Submersible Motors for Agriculture, Irrigation and Domestic. The parameters that influence the silt accumulation and, voltage fluctuation problems, capacity of motor and pumps according to depth of bore well, line rusting of mains, lightning, rusting of rotor, bush Barings and winding insulation packing, wastage of water and ease of usage, cable bursting and starter problems have been considered for the selection of optimum slot model.
Keywords: Submersible motor, Voltage sensor, Current sensor, Arduino

I. INTRODUCTION

India has to conserve energy in electrical utilities so as to overcome the electricity shortage being faced throughout the country. Demand for electrical energy for irrigation purposes has been growing steadily in India. Moreover, water resources in the country have been dropping continuously for the last one decade due to less rain-fall and more usage. The farmers have to be educated in the area of energy conservation and proper utilization of available resources in our country.

Macro-level data clearly suggests that the electricity consumption in agriculture has been increasing along with the increase in the area irrigated by groundwater. The Submersible Induction Motor losses can be reduced by design optimization and bringing in improvements in manufacturing methods. In recent years, researchers have been using soft-computing techniques to determine the parameters for optimum-design of industrial type Induction Motors. In these methods, the optimization of design parameters of Submersible Induction Motor is not feasible due to the cost involved in the manufacturing process.

Persistent use of groundwater has led to wells being bored increasingly deeper, and farmers requiring higher-capacity pumps to lift water. This extraction has not only increased the costs to the farmers and the utilities, but progressively worsened water availability in various regions of the country as assessed by the Central Ground Water Board.

One of the objectives of this dissertation is to investigate the possible efficient techniques towards energy conservation in Submersible Induction Motors for Agriculture and Irrigation. The parameters that influence the silt accumulation and mineral salt present in ground water, voltage fluctuation problems, capacity of motor and pumps according to depth of bore well, line rusting of mains, lightning, rusting of rotor, bush Barings and winding insulation packing, wastage of water and ease of usage, cable bursting and starter problemshave been considered for the selection of optimum slot model. The current and the power drawn from the supply have got reduced. The speed of the pump got increased and hence, there is a corresponding improvement in the discharge and the overall efficiency of the Pump-set. The water discharge of the pump from the bore-well at the time of starting is more due to stagnant water. As the time passes, the water discharge from the pump gets reduced due to poor water-resource.

In such circumstances, the pumps are operated continuously with less discharge, and either a tank or a mud-reservoir is usually employed to store the water. After storage, the water is used to irrigate the field. To avoid this, a flow-based / a discharge-based automatic ON / OFF control of submersible motor has been employed to conserve energy in critical and over-exploited water-resource areas. Irrigation control has been

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incorporated in the motor starter with Flow sensor, Moisture sensors, and Solenoid valves so as to improve the utilization of water and power consumption in the Agriculture Sector. In most of the submersible applications, simple and constant-speed drives, with throttling or damper control, are used resulting in poor efficiency and over-sized drive systems. By implementing variable-speed operation in pumping applications, the energy savings could be increased. Moreover, these motors operate from a DC link voltage; hence, in future, it will be more adaptable to Solar-PV-based-pump applications.

II. OBJECTIVE OF PROJECT

- To reduce the risk in the starter panel occurring repeatedly and to help the former to maintain the stable motor and starter components healthy.
- It will make the former to know about the components quality and life span.
- The former will know about working condition of the whole system and maintain the system healthier and reduce the former risk.

III. PRESENTCRITERIA

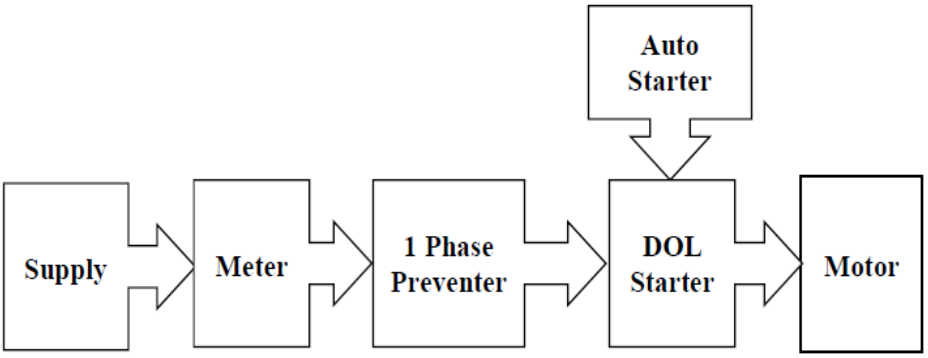

Fig. 1: Present block diagram

Fig. 2: Present working model

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Inpresentstarter'ssingle phasepreventer,Autostarter,are providedseparately,whenthe 3 phasesupply approachestothesystemfunctionofeachmodulecanbecarriedindividually andprotectthesystem.Theprotectionagainstdryworkingcondition,lightningstroke, and condition of the motor can't be predicted silt accumulation ofmotor can't bepredicted this can beovercome byourproposed model.

IV. PROBLEM STATEMENTS

- In the present criteria, the former has to build the starter panels with separate components.eg. 1 phase preventer, auto starter, etc. and they are fail to get the working condition of all the equipments this can be avoided by making the system complete automation.
- During summer the availability of water will go down so that dry run of the motor can be avoided.
- During the operation of the motor. If any silt present in water which the motor to draw a more current which will reduce the life span of the motor. So, that the prevention is not possible.
- In the present criteria the problems persist during the operation the formers are unable to get the information related to the accuracy of fault in the system.

V. PROPOSEDCRITERIA

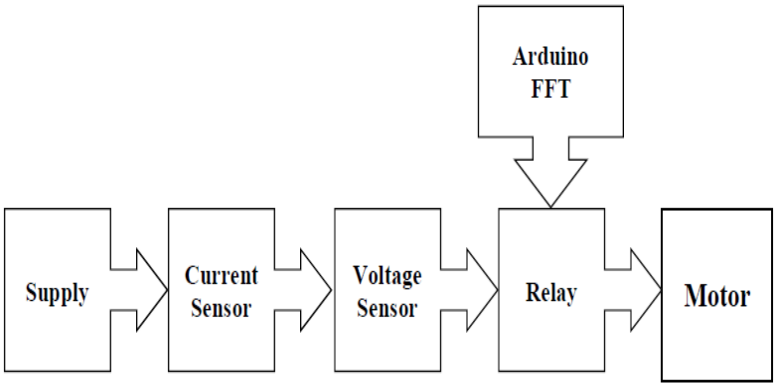

Fig. 3: Proposed block diagram

The above block diagram gives the clear visualisation of how the supply distribution takes place to the sensors. The current sensor and voltage sensor senses the current and voltage and the Arduino is embedded with the relay and processes the signal for the motor during favourable cases.

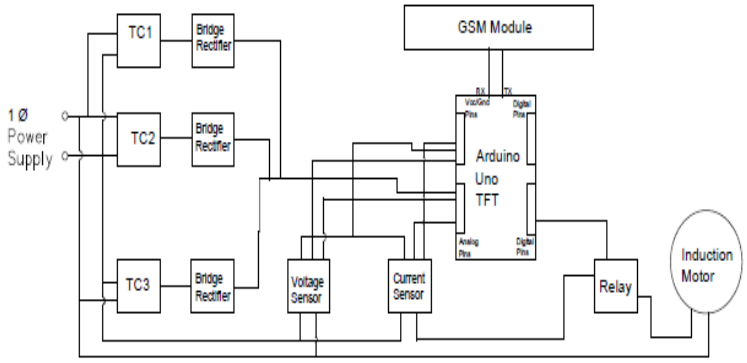

Fig. 4: Proposed circuit diagram

A. Methodology:

In our proposed system the equivalent 3-phase system moduled as 1-phase proto type module the working nature can be manipulated to the 3-phase system submersible pump in feature. Whenever three phase or single phase supply is given to the current sensor and voltage sensor present on the respective line reads current, voltage respectively. These data can be read by controller and depending upon set values in the controller will

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operate the relay. The GSM module will helps in controlling of the whole system through controller from authenticated subscriber. The predefined value in the controller can be taken by conducting the experiment.

EmbeddedSystembasedsubmersible motor controlandprotectiontoprevent over load current due to accumulation andmineral salt present ingroundwater, problem with single phasing, voltagefluctuations, indicating the life span of motor depending upon present-past working condition, problems related with rusting ofrotor, line,bushBarings,winding insulationpacking, moisture dependent control, cablebursting, starterproblems for overload, and dry run.Controlling operation can be carried out using GSMand manual operation. These are all the work to be carried out inthisproject,which canbe usedto controlandmonitorthesubmersiblemotorusedforagricultureanddomestic.ThisprojectprovidesanAutomationofstarter tomake it compact,increaseineaseofusageandtopreventitfromfaultswhichmay generally occurin any ofthesubmersiblepumpsaftershortandlongdurationswhichaimstoprovidehighly efficientautomated starter when compared to alternativesystems.

B. Current Sensor

A current sensor is a device that detects electric current in a wire, and generates a signal proportional to that current. The generated signal could be analog voltage or current or even a digital output. The generated signal can be then used to display the measured current in an ammeter, or can be used for the purpose of control.

C. Voltage Sensor

Sensors a.re basically a device which can sense or identify and identify and react to certain types of electrical or some optical signals. Implementation of voltage sensor and current sensor techniques has become an excellent choice to conventional current and voltage measurement method.

VI. FUTURE SCOPE

- This can be manipulated for the 3-phase system with fully automated predicating the life span of all the components and equivalent life span of the equipment's
- It is purely based for agriculture hence fully automation for all type of starter can be developed likewise a single model can be operated for star-delta, DOL.
- The single model can be implemented for both single phase and 3 phase. It can be possible to control minimum 2-3 motors from a single module could be implemented.

VII. ADVANTAGES

- T h e easeofusageofcontrollingisveryeasyasitinvolvesGSMmoduleandGSM network.
- T h e presenceoflightningarresterpreventsthefaultswhichmayoccurinmotorand starterduringlightning.
- T h e separate voltmeter and ammeterkits are replacedbytouchscreenArduinoUno.

VIII. RESULT

- From proposed methodology we can expect lower end motor (below 5HP single phase motors would be run from a single model with indicating life span and working condition of the motor using arduino).
- We can expect monitoring of the system using GSM from remote place.

IX. CONCLUSION

In the proposed model the most advantages think is automation in 3-phase/1-phase starter. Eliminates the separate connection of single phase preventer, auto starter, meter and the working condition of the system are eliminated it will make the whole system more flexible and informative (information related to the fault, working condition of all components, silt accumulation and as well as the submersible pump).

X. REFERENCE

- Thomas R. Brinner, Life Member, IEEE, Robert H. McCoy, Member, IEEE, and Trevor Kopecky, "Induction Versus Permanent-Magnet Motors for Electric Submersible Pump Field and Laboratory Comparisons" IEEE Transactions On Industry Applications, Vol. 50, No. 1, January/February 2014.
- A. Narayanamoorthy, "MicroIrrigation And Electricity Consumption Linkages In Indian Agriculture": A Field Based Study.
- "Influence Of Flow Control And Cooling On Submersible Induction Motor" chapter-4.
- Xiaodong Liang, Senior Member,IEEE, and Bovina Ilochonwu," Induction Motor Starting in Practical Industrial Applications" IEEE Transactions On Industry Applications, Vol. 47, No. 1, January/February 2011.

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- Ingar Skyberg Landet, Alexey Pavlov, and Ole Molten Amado," Modeling and Control of HeaveInduced Pressure Fluctuations in Managed Pressure Drilling" IEEE Transactions On Control Systems Technology, Vol. 21, No. 4, July 2013.