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COMPLETE SPECIFICATION

(Section 10 and Rule 13)

Title: AN AUTOMATIC CUT OFF SYSTEM FOR AN ELECTRIC MOTOR PROTECTION

Applicant:

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The following specification particularly describes the invention and the manner in which it is to be performed.

AN AUTOMATIC CUT OFF SYSTEM FOR AN ELECTRIC MOTOR PROTECTION

TECHNICAL FIELD

The present invention relates to the field of an automatic cut off systems and its methods. More specifically, the present invention related to an automatic system for increasing the life of an electric motor by means of a cut off system.

BACKGROUND

In agricultural fields motor pump under the well plays a major role for irrigating water. Whenever we forgot to off the pump, this will cause a wastage of electricity and coils are gone if the pump operates for long time in absence of water level. When the water level in the ground-level in well becomes too low, the pump siphons air and shuts down, requiring a resident to manually prime the water pump to get it running again. Farmers struggle to monitor the water level of the tanks effectively and keep the pump running properly.

The farmers are not able to monitor the water level and pumping capacity continually in the real time implementation. Thus, there is a need to introduce an automatic cut off system for an electric motor protection to reduce the motor damages in affordable price. The present invention will overcome the aforementioned problems, limitations and disadvantages in an effective manner.

OBJECT OF THE INVENTION

The primary object of the present invention is to provide an automatic system for the electric motors to protect it from the damages due to water pumping.

Another object is to protect motor from coil failure and to save the electricity by using the automatic system.

Yet another object is to eliminate the need of operator for monitoring the water level and pumping operations continuously.

Yet another object is to control the generation of heat inside the motor due to running of motor in no water condition.

Yet another object is to cut off the motor when the detection of low power supply, no water condition and heat or the like.

These and other objects and advantages of the present invention will become readily apparent from the following detailed description take in conjunction with the accompanying drawings.

SUMMARY OF THE INVENTION

The various embodiment of the present invention provides an automatic cut off system for an electric motor to increase the life by eliminating the motor damages due to heat, lower supply and waterless conditions. The automatic system comprises a power source and a raindrop sensor. The raindrop sensor is operable by the power source which is

configured to detect the presence/absence of the water by means of change of resistance.

According to an embodiment, the pump is operable by the power source which is configured to pump the water when the detection of water in the raindrop sensor and turn off the pumping process when the detection of absence of water in the bore well. The Arduino is operable by the power source, wherein the Arduino is configured to control the operation of the pump by means of the information received from the raindrop sensor. The raindrop sensor sends the presence/absence of the water information from the bore well to said Arduino.

According to an embodiment, the evaluation module is configured to analyse the weather condition, calculative measures and remote monitoring, while before and after the pumping of water for reducing the wastage of water/energy/electricity. The fault detection module is configured to inspect the sensor and wire connections frequently for providing the continuous operation at any time in the field.

The automatic on/off motor circuit is used to automate the operation of an electrical water pump based on the presence of water on the sensor board. The automatic on/off motor using Arduino circuit can be used as a standalone system and can be interfaced to the existing control panel.

These and other aspects of the embodiments herein will be better appreciated and understood when considered in conjunction with the

following description and the accompanying drawings. It should be understood, however, that the following descriptions, while indicating preferred embodiments and numerous specific details thereof, are given by way of illustration and not of limitation. Many changes and modifications may be made within the scope of the embodiments herein without departing from the spirit thereof, and the embodiments herein include all such modifications.

BRIEF DESCRIPTION OF THE DRAWINGS

The other objects, features and advantages will occur to those skilled in the art from the following description of the preferred embodiment and the accompanying drawings in which:

Fig 1 illustrates the schematic view of the automatic cut off system for an electric motor protection, according to an embodiment of the present invention.

Although the specific features of the present invention are shown in some drawings and not in others. This is done for convenience only as each Feature may be combined with any or all of the other features in accordance with the present invention.

50- An Automatic System, 55-Power Source, 60- Pump, 65- Raindrop Sensor, 70- Arduino, 75- Evaluation Module & 80- Fault Detection Module.

DETAILED DESCRIPTION

The various embodiments and the other advancements and features are illustrated with the reference to the non-limiting details in the following

detailed description. Illustration of processing techniques of well-known components are omitted so as to not unnecessarily obscure the embodiments herein. The examples used herein are intended to facilitate an understanding of ways in which the embodiments herein may be practiced and to further enable those of skill in the art to practice the embodiments herein. Accordingly, the examples should not be construed as limiting the scope of the embodiments herein.

The various embodiment of the present invention provides an automatic cut off system (50) for an electric motor to increase the life by eliminating the motor damages due to heat, lower supply and waterless conditions. The power source is supplying the necessary energy to the automatic system for controlling the operation of the motor. The automatic system comprises a power source and a raindrop sensor. The raindrop sensor (65) is operable by the power source which is configured to detect the presence/absence of the water by means of change of resistance. The pump is operable by the power source which is configured to pump the water when the detection of water in the raindrop sensor and turn off the pumping process when the detection of absence of water in the bore well.

Fig 1 is illustrating the schematic view of the automatic cut off system for an electric motor protection, according to an embodiment of the present invention. The Arduino is operable by the power source, wherein the Arduino is configured to control the operation of the pump by means of the information

received from the raindrop sensor. The raindrop sensor sends the presence/absence of the water information from the bore well to said Arduino. The evaluation module (75) is configured to analyse the weather condition, calculative measures and remote monitoring, while before and after the pumping of water for reducing the wastage of water/energy/electricity. The fault detection module is configured to inspect the sensor and wire connections frequently for providing the continuous operation at any time in the field.

According to an embodiment, in the rainy season the system will not suggest the motor to pump the water. As the rain begins to subside, the system detects that the water level in the area has dropped significantly due to heavy irrigation demands during the downpour. However, the raindrop sensor still registers moisture, indicating that more rain is expected. In this scenario, the system decides to delay pump operation until the rain fully ceases and the tank reaches a certain minimum water level threshold to avoid unnecessary water pumping and conserve resources.

According to an embodiment, in the dry season also the system will suggest the motor to pump the water in various conditions. The dry season, water scarcity is a significant concern for farmers. The pump automation system, equipped with advanced water level monitoring and predictive capabilities, predicts a prolonged period of dry weather based on weather forecasts. To conserve water and optimize irrigation, the system adjusts its

operation by reducing pump frequency and duration, prioritizing watering schedules for critical crops, and implementing drip irrigation techniques. By efficiently managing water resources, the system helps farmers mitigate the effects of drought and maintain crop yields.

According to an embodiment, in the remote monitoring cases the system will provide the multiple options to the user to pumping the water. By using the remote monitoring and control feature of your pump automation system, you access the system's dashboard through your smartphone. The user may observe that the water level in the tank is lower than expected, indicating a potential leak or pump malfunction. With the tap of a button, the user may initiate a system check and receive real-time alerts regarding the issue. The user may remotely adjust pump settings to prevent further water loss and notify your farm manager to investigate and resolve the problem promptly.

According to an embodiment, in the cases of fault detection the system will inspect the sensor and discover a damaged wiring connection caused by rodent activity. Using the fault detection and diagnostic feature of the system, the user may identify the issue and replace the damaged components. The system automatically recalibrates and resumes normal operation, ensuring uninterrupted irrigation service and preventing potential crop damage due to water shortages.

In an aspect, the raindrop sensor is for detecting water presence and absence. The pump is connected to said raindrop sensor. The control circuitry is configured to start the pump automatically upon detection of water presence by the raindrop sensor and stop the pump automatically upon detection of water absence by the raindrop sensor. An electronic water level controller for monitoring and regulating water levels in the irrigation tank, wherein said control circuitry is integrated with said electronic water level controller.

In an aspect, by utilizing the raindrop sensor to detect water levels, automatically starting the pump when water is detected by the raindrop sensor and automatically stopping the pump when water is no longer detected by the raindrop sensor. By monitoring and regulating water levels in the irrigation tank using an electronic water level controller integrated with the pump control system. The remote monitoring and control capabilities for accessing and adjusting pump settings from a distance.

According to an embodiment, the data logging and analysis functionalities for recording pump operation patterns and water usage trends, integration with weather forecast data for predictive irrigation scheduling. The fault detection and diagnostics features for identifying and troubleshooting system issues.

In an aspect, the raindrop sensor is detecting the presence/absence of the water by means of change of resistance. The pump is for pumping the

water when the detection of water in the raindrop sensor and turn off the pumping process when the detection of absence of water in the bore well. The Arduino is controlling the operation of the pump by means of the information received from the raindrop sensor, wherein the raindrop sensor sends the presence/absence of the water information from the bore well to said Arduino. The evaluation module is analysing the weather condition, calculative measures and remote monitoring, while before and after the pumping of water for reducing the wastage of water/energy/electricity. The fault detection module is inspecting the sensor and wire connections frequently for providing the continuous operation at any time in the field.

The present invention is providing a low-cost solution for automating pump operations, making it accessible to farmers and agricultural practitioners with limited resources. The system offers flexibility in its application, allowing it to be integrated with various pump setups commonly found in agricultural settings, including motor pumps submerged in wells. By utilizing a raindrop sensor, the system automates the process of starting and stopping the pump based on water levels, eliminating the need for manual intervention and reducing the risk of human error. By preventing unnecessary pump operation through automated shut-off mechanisms, the project promotes energy efficiency, thereby reducing electricity wastage and operational costs.

The system also helps protect pump components, such as coils, by preventing the pump from operating in the absence of sufficient water levels, thus mitigating the risk of damage caused by dry running. By promoting efficient water usage and reducing energy consumption, the project contributes to sustainable agricultural practices, aligning with broader efforts to conserve resources and minimize environmental impact.

It is noted that the above-described examples of the present invention is for the purpose of illustration only. Although the present invention has been described in conjunction with a specific example thereof, numerous modifications may be possible without materially departing from the teachings and advantages of the subject matter described herein. Other substitutions, modifications and changes may be made without departing from the spirit of the present solution. All of the features disclosed in this specification (including any accompanying claims, abstract and drawings), and/or all of the steps of any method or process so disclosed, may be combined in any combination, except combinations where at least some of such features and/or steps are mutually exclusive.

Although the embodiments herein are described with various specific embodiments, it will be obvious for a person skilled in the art to practice the embodiments herein with modifications.

CLAIMS

We claim,

1. An automatic cut off system (50) for an electric motor protection, comprising:

a power source;

a raindrop sensor (65) is operable by the power source which is configured to detect the presence/absence of the water by means of change of resistance;

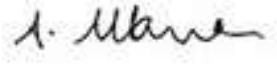
a pump (60) is operable by the power source which is configured to pump the water when the detection of water in the raindrop sensor and turn off the pumping process when the detection of absence of water in the bore well;

an Arduino (70) is operable by the power source, wherein the Arduino is configured to control the operation of the pump by means of the information received from the raindrop sensor, wherein the raindrop sensor sends the presence/absence of the water information from the bore well to said Arduino;

an evaluation module (75) is configured to analyse the weather condition, calculative measures and remote monitoring, while before and after the pumping of water for reducing the wastage of water/energy/electricity; and,

a fault detection module (80) is configured to inspect the sensor and wire connections frequently for providing the continuous operation at any time in the field.

2. The automatic cut off system for an electric motor protection as claimed in claim 1, wherein the proposed system can be integrated with the existing control panels.
3. The automatic cut off system for an electric motor protection as claimed in claim 1, wherein the sensor consists a sensor module with conductive traces which changes the resistance when exposed with water.
4. The automatic cut off system for an electric motor protection as claimed in claim 1, wherein the Arduino (70) delays the pumping operation when the rain is detected by the sensor.
5. The automatic cut off system for an electric motor protection as claimed in claim 1, wherein the watering schedules can be changed by the Arduino control for adjusting the preferences.
6. The automatic cut off system for an electric motor protection as claimed in claim 1, wherein the user may control the operation of the system using the one or more authorized handheld devices.



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ABSTRACT

AN AUTOMATIC CUT OFF SYSTEM FOR AN ELECTRIC MOTOR PROTECTION

The present invention discloses an automatic cut off system for the electric motors protection to increase the life by eliminating the accidents. The automatic cut off system comprises a power source for supplying the necessary energy to the cut off system. The raindrop sensor is operable by the power source which is configured to detect the presence/absence of the water by means of change of resistance. The pump is operable by the power source which is configured to pump the water when the detection of water in the raindrop sensor and turn off the pumping process when the detection of absence of water in the bore well. The Arduino is configured to control the operation of the pump by means of the information received from the raindrop sensor. The raindrop sensor sends the presence/absence of the water information from the bore well to said Arduino. The evaluation module is configured to analyse the weather condition, calculative measures and remote monitoring, while before and after the pumping of water for reducing the wastage of water/energy/electricity. The fault detection module is configured to inspect the sensor and wire connections frequently for providing the continuous operation at any time in the field. The present invention will reduce the accidents/damages of electric motors in an effective manner.

Fig 1