OPTIMIZATION OF ELECTRICAL ENERGY USING PIR SENSOR

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Abstract: In most of the public places electricity is being wasted as most of the common people do not think of switching off the electricity when they leave the places. Examples: offices, schools, colleges, railway stations and so on. Proposed system monitor the presence of people by means sensing the heat released from the human body. As long as the people exist in the area power to the area will be made available. Once the system detects no people exists after a delay time it switches off the electricity to save the energy.
Thus the sensor detects the human movements and passes the information wirelessly to RF wireless controller to take the necessary action. RF control has in-built off delay timer to achieve the required control

I. INTRODUCTION

In most of the public places electricity is being wasted as most of the common people do not think of switching off the electricity when they leave the places. Examples: offices, schools, colleges, railway stations and so on. Proposed system monitor the presence of people by means sensing the heat released from the human body. As long as the people exist in the area power to the area will be made available. Once the system detects no people exists after a delay time it switches off the electricity to save the energy. Implementation of proposed system does not require cabling, routing and damaging the existing wall to implement the system. This circuit is designed radio frequency based wireless system. Thus the sensor detects the human movements and passes the information wirelessly to RF wireless controller to take the necessary action. RF control has in-built off delay timer to achieve the required control. Thus the sensor detects the human movements and passes the information wirelessly to RF wireless controller to take the necessary action. RF control has in-built off delay timer to achieve the required control.
Power wastage due to unnecessary usage of equipment is the burning problem in today‘s industrial environment. Considering power wastage of one hour per day for some appliances that are used daily.

Appliances	Wastage/day	Wastage/week	Wastage/month	Wastage/year
Ceiling fan	80W	480W	1290W	23040W
Tube light	40W	240W	960W	11520W
Computers	80-150W	480-900W	1920-10800W	23040-129600W
Air conditioner	1KW	6KW	24KW	288KW

RECENT ADVANCEMENTS THAT CAN BE USED FOR POWER SAVING

1. Microcontrollers
2. PLC

MICROCONTROLLERS

A microcontroller (also microcomputer, MCU or µC) is a small computer on a single integrated circuit consisting internally of a relatively simple CPU, clock, timers, I/O ports, and memory and is shown in Fig.1.1. Program memory in the form of NOR flash or OTP ROM is also often included on chip, as well as a typically small amount of RAM. Microcontrollers are designed for small or dedicated applications. Thus, in contrast to the microprocessors used in personal computers and other high-performance or general purpose applications, simplicity is emphasized. Some microcontrollers may use four-bit words and operate at clock rate frequencies as low as 4 kHz, as this is adequate for many typical applications, enabling low consumption (mill watts or microwatts).

2. INTRODUCTION TO PLC

2.1. PROGRAMMABLE LOGIC CONTROLLER

Generally speaking, process control system is made up of a group of electronic devices and equipment that provide stability, accuracy and eliminate harmful transition statuses in production processes. As a result of fast progress in technology, many complex operational tasks have been solved by connecting programmable logic controllers and possibly a central computer. Beside connections with instruments like operating panels, motors, sensors, switches, valves and such, possibilities for communication among instruments are so great that they allow high level of exploitation and process coordination, as well as greater flexibility in realizing a process control system. In automated system, PLC controller is usually the central part of a process control system. With execution of a program stored in program memory, PLC continuously monitors status of the system through signals from input devices. Based on the logic implemented in the program, PLC determines which actions need to be executed with output instruments. To run more complex processes it is possible to connect more PLC controllers to a central computer.

DEFINITION OF PLC

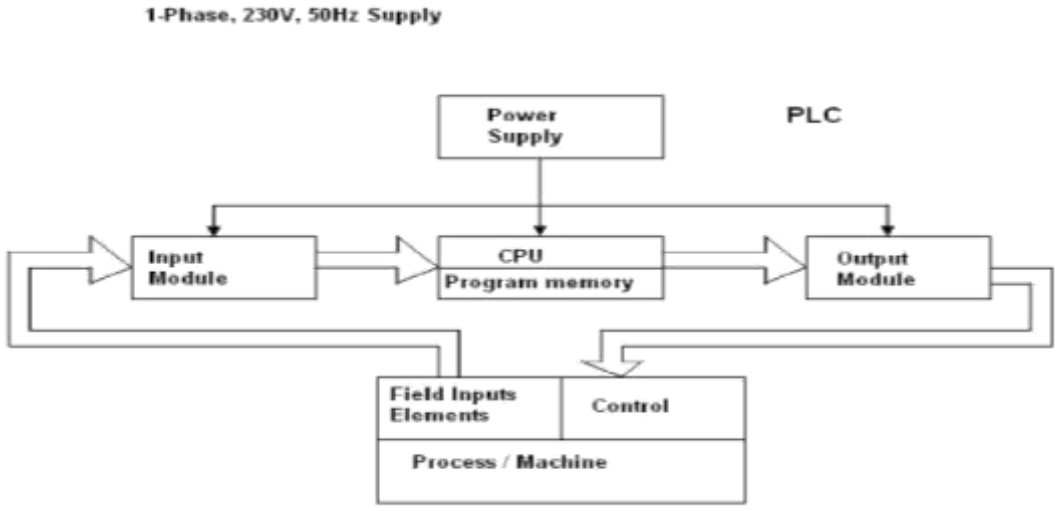
A Programmable Logic Controller (PLC) is an industrial computer that accepts inputs from switches and sensors, evaluates these in accordance with a stored program, and generates outputs to control machines and processes.A Programmable Logic Controller (PLC) is a solid state device that uses soft wired logic contained in the controller‘s memory to duplicate the functions of relays and hardwired solid state control devices. In operation, the memory unit sequentially scans inputs (sensors, limit switches, push buttons, and photocells) in cyclic fashion to determine which outputs (contacts, motor starters, solenoids, pilot lights, converters, etc.) should be turned on or off. A Programmable Logic Controller (PLC) is an electronic device that control machines and processes. It uses a programmable memory to store instructions and execute specific functions that include ON/OFF control, timing, counting, sequencing, arithmetic, and data handling.

ARCHITECTURE OF PLC

The architecture of plc is similar to that of a normal industrial used pc. The major difference that appears is PLC‘s contain input and output devices. Input devices mainly constitute of Limit switches, temp switches, push buttons, A/D, logic and BCD converters. The output comprises of D/A, BCD converters solenoids and alarms. The architecture is well explained in the following section

RESULT:

Hardware consists of Fuses, PLC, RFID wireless receiver, bulb, Dc motor, Ac contactor, Rectifier, Auto/manual switch and Indicator. If the hardware is working under Auto mode the PIR motion detection sensor starts sensing the human motions and if any motion detects it sends a signal to the RFID wireless receiver, this RFID send status High signal to PLC. According logical inputs to the PLC the output is controlled. In this mode the Indicator starts blinking (1sec ON & 1sec OFF) i.e. the circuit is operating under Auto mode




OPTIMIZATION OF ELECTRICAL ENERGY USING PIR SENSOR
DC MOTOR
FUSE
PLC
RFID
BULB
AUTO
SWITCH
MANUAL
AUTO / MANUAL
INDICATOR
AC CONTACTOR
RECTIFIER