E-UNIFORM USING SOLAR PANEL WITH BODY PARAMETERS

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1.ABSTRACT:

This project proposes an E-Uniform Jacket for soldiers, it gives better protection to the soldiers who are working in extreme weather conditions.

The LM35 temperature sensor is used for check the temperature whenever. Heart rate sensor is used for check the heartbeat and also respiratory sensor. Collected data's should be transmitted to control room.

ESP32 Microcontroller heart of the circuit as it controls all the functions. LCD is used to monitor the data's.

Peltier is a device that can be used either for heating or for cooling. It can also be used as a temperature controller.

The project is operated in summer mode and winter mode by selecting the mode of operation such that it can drive body heater/cooler.

2.INTRODUCTION

Warriors are the Army's most imperative asset. Warriors assume an important part to make sure one's nation. The term warriors incorporate administration men and ladies from the military, Air Force, Navy, and Marine. While giving security to the country, they could challenge inconveniences in hot/frosty climate conditions. Both exceptionally hot and icy temperatures might be unsafe for well-being. This venture may be a solution for this circumstance. during this venture, an E-Uniform is planned which provides better security to the officers who are working in great climate conditions.In this project we are going to design an E-Uniform which gives better protection to the soldiers who are working in extreme weather conditions.A temperature sensor is employed to see the temperature whenever. The

LM35 is a circuit temperature sensor, whose yield voltage is directly relative to the Celsius (Centigrade) temperature.This paper is gives two modes summer mode and winter mode .By selecting the mode of operation the relays drive body heater/cooler.

3.LITERATURE SURVEY:

3.1Dr.S.M.Kannan, R.Krishnavenishri, S.Kamalika, B.Kanagalakshmi: "Solar and IoT Based Health Monitoring, Controlling and Tracking System for Soldiers", SSRG International Journal of Electrical and Electronics Engineering (SSRG – IJEEE) – Volume 5 Issue 8 – August 2018.

The basic concept of Solar and IoT Based Health Monitoring, Controlling and tracking system for Soldiers is employed to produce chilling and warming effect for soldiers and additionally track the location of soldiers just in case of abnormal heart beat. In India, soldiers are working in various weather conditions such as very hot or terribly cold temperature. In this paper, solar array provides power supply for the entire circuit and it charges the battery. The body heater/cooler is employed to take care of the body temperature. The PIC 18F452 microcontroller receives the information from GPS, GSM and Heart beat detector. LCD is used to display the message and location. The location of the soldiers is traced by GPS Module. The heart rate of the soldiers is sensed by Heart Beat Sensor. When the heart rate is abnormal, the alert messages are going to be sent to the army control unit through the GSM Module.

3.2 Kawad Pranali, Dahiwalkar Gayatri, Pooja Adate, Prof.S.B. Dhekale: "E-UNIFORM", International Journal of Advance Engineering and Research Development Volume 5, Issue 05, May -2018.

The solar-powered E-Uniform gives warriors working in harsh climates greater protection. In order to power the E-uniform's internal circuitry, solarPanels are used.The energy is kept in reserve using a 12 V DC lead acid rechargeable battery. We also use a typical battery charging machine to supply power to the circuits. The LPC2148 tiny controller, which regulates every function, serves as the circuit's beating heart. The system is connected to a voltage sampler using an ADC to display the voltage produced by the battery on a 16X2 liquid crystal display.Both a summer and a winter operating mode is used for the project. By selecting a mode of operation, we are driving the body heater/cooler that the H-Bridge IC was designed to drive.A heater/cooler

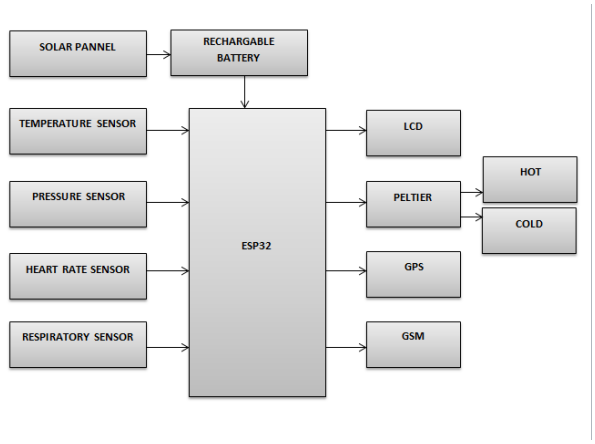
4.EXISTING SYSTEM

- There is no proper method to recover the problem.
- Whatever the climate condition they should be suffer a lot.

5.PROPOSED METHODOLOGY

- In our proposed system we are using Heart beat sensor,respiration sensor,temperature sensor,LCD,GSM,GPS.
- Here we are monitoring the condition of the soldiers along with their own heart rate condition.
- Based on the temperature level the uniform condition will be changed by using peltier module.

5.1 BLOCK DIAGRAM:



5.2 HARDWARE REQUIREMENTS:

- ESP32
- Solar panel
- Battery
- Heart beat sensor
- Pressure sensor
- Respiratory sensor
- GSM
- GPS
- LCD
- Peltier
- Temperature sensor

5.3 SOFRWARE REQUIREMENT

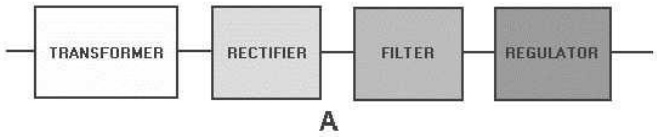
- EMBEDDED C
- ARDUINO IDE 1.8.6

5.4 REQUIREMENTS

5.4.1 HARDWARE POWER SUPPLY UNIT:

5.4.1.1 Definition:

A POWER SUPPLY is a device or system that provides electrical or other types of energy to an output load or group of loads (also known as a power supply unit, or psu). The phrase is most frequently used in reference to electrical energy sources, less frequently to mechanical ones, and infrequently to others.



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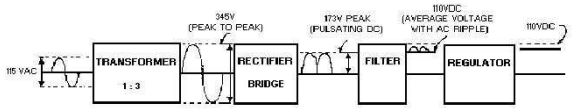


B

A block schematic of a fundamental power source

The transformer isolates the power supply from the power line and steps up or steps down the input line voltage.

The alternating current input signal is changed into pulsating direct current by the RECTIFIER component. However, you will discover as you go further in this chapter that pulsing dc is not preferred. Because of this, pulsating dc is transformed into a purer, more aesthetically pleasing type of dc voltage using a FILTER section

Figure (B): Diagram of a fundamental power source. The REGULATOR, which is the last element, accomplishes exactly what its name suggests. Despite significant fluctuations in load current or input line voltages, it keeps the power supply's output constant .Let's follow an ac signal through the power supply now that you are aware of what each part accomplishes. You need to check how this signal is changed in each part of the power supply right now. You will observe how these changes occur later in the chapter. An input signal of 115 volts ac is applied to the transformer's primary in view B of figure 4-1. Having a step-up transformer design, the turn's ratio of 1:3. The output of this transformer may be calculated by multiplying the input voltage by the proportion of primary to secondary turns; as a result, the output voltage for this transformer is 115 volts ac '3 = 345 volts ac (peak-to-peak). The output of the rectifier will be one-half, or roughly 173 volts of pulsing direct current since each diode in the rectifier portion conducts for 180 degrees of the 360-degree input. The rise and fall times of the changing signal are controlled by the filter section, which is made up of a network of resistors, capacitors, or inductors. As a result, the signal is kept at a more consistent dc level. The discussion of the real filter circuits will help you better understand the filtering procedure. A signal is the filter's output.

5.4.1. Simple digital circuit power supply at 5 volts

Summary of circuit features

- A succinct explanation of how it works emits a well-regulated +5V output with a 100 mA output current capacity.

• Circuit protection: When the regulator IC becomes too hot, built-in overheating protection shuts off the output.

- Circuit complexity: Very simple and easy to build
- Circuit performance: Very stable +5V output voltage, reliable operation
- Availability of components: Easy to get, uses only very common basic components
- Design testing: Based on datasheet example circuit, I have used this circuit

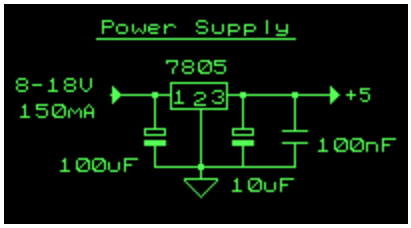
successfully as part of many electronics projects

- Applications: Part of electronics devices, small laboratory power supply
- Power supply voltage: Unregulated DC 8-18V power supply
- Power supply current: Needed output current + 5 mA
- Component costs: a few dollars for the input transformer plus the cost of the electronic components

5.4.2 CIRCUIT DESCRIPTION:

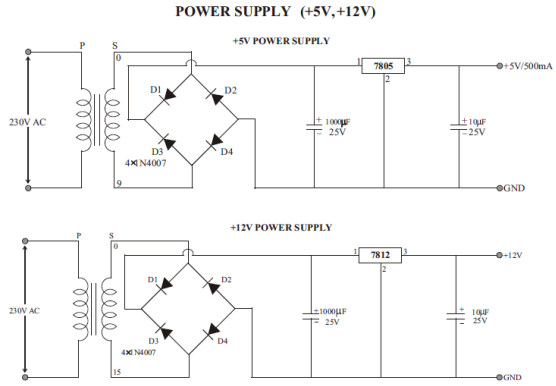
A modest +5V power supply like the one in this circuit is helpful for testing out digital circuits. You may buy small, affordable wall transformers with variable output voltage at any electronics store or large retailer. These transformers are widely accessible, however they often have very poor voltage regulation, making them useless for experimenters with digital circuits unless a stronger regulation can be produced in some way. The solution to the issue is the circuit shown below.

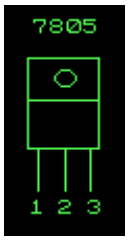
When the 7805 regulator chip is properly cooled, this circuit's +5V output can be boosted to 1 A at a current of roughly 150 mA. Thermal and overload protection are built into the circuit.



5.4.2.1Circuit Diagram of the Power Supply

To securely manage the input voltage supply to the circuit, the capacitors must have a sufficient high voltage rating. It is quite simple to incorporate the circuit, for instance, into a piece of Vero board.





7805 – Voltage regulator IC

1. Unregulated voltage in

2. Ground

3. Regulated voltage out

5.5 COMPONENT LIST:

7805 regulator IC

100 uF electrolytic capacitor with a voltage rating of at least 25V

10 uF electrolytic capacitor with a voltage rating of at least 6V

Ceramic or polyester 100 nF capacitor

6.FUTURE SCOPE

- Growth into new industries: The use of solar-powered e-uniforms in additional sectors where workers are subjected to harsh conditions firefighters, building contractors, and miners are examples of people who operate in extreme temperatures and environments.
- Improvements in Materials Science: Improvements in materials science may result in the creation of increasingly lighter and more robust materials that might be used to build solar-powered e-uniforms.
- Energy Storage and Management: Improving energy storage and management systems could increase their effectiveness and dependabili

7. RESULT & DISCUSSION

7.1 Influence of Body Parameters:

The results revealed that body parameters had a significant impact on energy generation. Participants with higher BMI tended to experience slightly reduced solar panel efficiency, possibly due to the obstruction of sunlight by their bodies. However, this effect was mitigated when participants engaged in physical activities that caused movements, leading to intermittent shading and increased energy generation during motion.

7.2 Practicality and Usability:

Despite the variation in energy generation due to body parameters, the e-uniform system remained practical and wearable. The prototype effectively captured solar energy across a range of activities and body types. This suggests that personalized e-uniforms could cater to diverse user needs while maintaining comfort and functionality.

8.CONCLUSION

Soldiers are one of the important factors in a country. Because they are the forces who protect our country day and night living behind sleep and rest. Solarbased E-Uniform provides better protection to the soldiers who add extreme weather. This Uniform made the soldier work in any kind of environment. So, he could work efficiently without heat stress or cold stress. The

Heart rate sensor,Pressure sensor,temperature sensor, GSM, and GPS are used to monitor the health of soldiers and track their location. If the climate condition is excessively hot then the cooling framework worked and if it is excessively cool then the warming framework worked. This project has a huge part in our everyday life.

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