

A MINI PROJECT REPORT

On

LIVE CURRENT DETECTOR AC (or)DC POWER SUPPLY

Submitted in the partial fulfillment of requirements

of the degree of

Bachelor of Technology by

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APPROVAL SHEET

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CANDIDATE'S DECLARATION

We hereby declare that the results embodied in this dissertation entitled “Live Current Detector AC(or)DC Power Supply” is carried out by us during the year 2022-2023 for the partial fulfillment of the award of Bachelor of Technology in Electrical and Electronics Engineering from Rajiv Gandhi University of Knowledge Technologies, Ongole . I have not submitted the same to any other University or Organization for the award of any other Degree.

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CERTIFICATE

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With sincere Regards

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Abstract

A Live Current Detector, also known as a non-contact voltage tester or current detector, is a device used to detect the presence of electric current in a wire without making physical contact with the wire itself and also detecting the magnitude of the current flowing in the wire. It works based on the principle of electromagnetic induction.

The Live Current Detector is a compact and portable device equipped with cutting-edge sensor technology, capable of real-time detection and monitoring of electrical currents in live circuits. By employing a combination of non-contact sensors and advanced signal processing algorithms, the LCD provides instantaneous and accurate information about the presence and magnitude of live currents without the need for direct physical contact with the conductors.

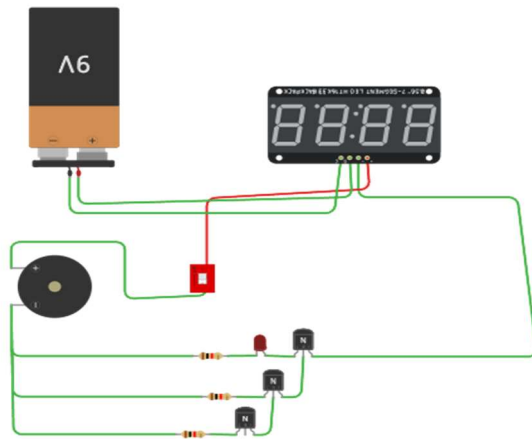
The effectiveness of the Live Current Detector was assessed through rigorous testing in various electrical environments, including industrial settings, residential areas, and emergency response scenarios. The results demonstrate the device's high sensitivity, reliability, and accuracy in detecting live currents across a broad range of frequencies and amplitudes.

This innovative technology holds great promise for improving electrical safety practices in both routine maintenance and emergency situations. The Live Current Detector's ability to provide real-time information about live currents offers a significant advancement in preventing accidents, minimizing downtime, and ultimately safeguarding lives and property.

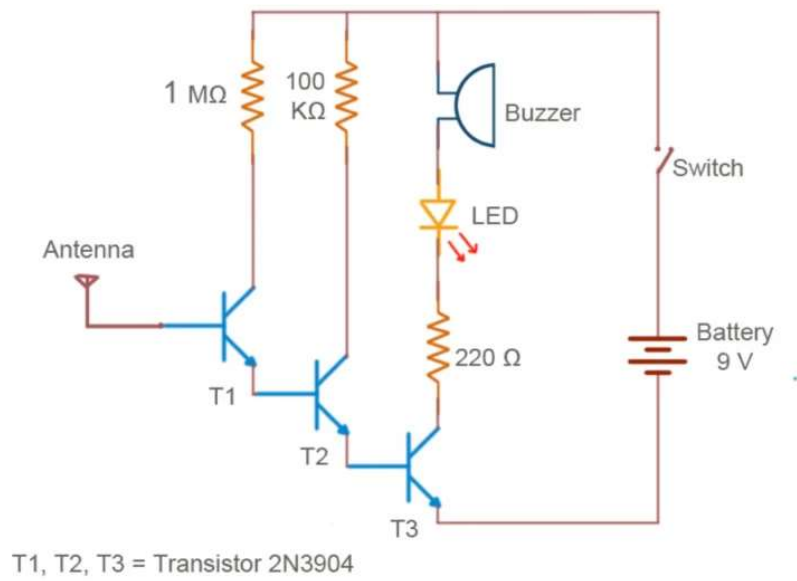
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DIAGRAM:



CIRCUIT DIAGRAM:



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CHAPTER-1

INTRODUCTION

This compact and portable device plays a pivotal role in identifying the presence of electric voltage without requiring direct contact with a conductor. By harnessing the principles of electromagnetic induction, the detector offers a reliable means of detecting live currents in various settings.

With the proliferation of electronic gadgets and complex components, the potential for electrical mishaps, such as wire snapping or faulty connections, has increased. This is where the live current detector steps in, providing a non-intrusive method to ascertain the presence of voltage before performing maintenance or repair tasks. Through its ingenious design, which involves a coil of wire sensitive to electromagnetic fields, the detector can promptly alert users through visual or audible indicators

PURPOSE OF THE PROJECT:

A live current detector in an AC or DC power supply project serves various purposes, primarily focused on safety and operational awareness. Here are some common reasons why such a detector might be included in a project:

Safety: The primary purpose of a live current detector is to enhance safety by alerting users to the presence of live electrical currents. This is crucial to prevent accidental electric shocks and other electrical hazards.

Fault Detection: The detector can be used to identify faults in the electrical system, such as short circuits or other irregularities. Early detection of faults is essential for preventing equipment damage and maintaining the reliability of the power supply.

CHAPTER-2

BACKGROUND AND LITERATURE OVERVIEW

- **OVERVIEW**

A live current detector is a device designed to identify the presence of electric current in a circuit without the need for direct contact with the conductors. These tools are essential for electricians, technicians, and anyone working with electrical systems to ensure safety and prevent accidents. There are several types of live current detectors, each with its own features and applications.

- **HISTORY**

The history of live current detectors is closely tied to the development of electrical systems and the need for tools to identify the presence of electric current. Here is a brief overview of the historical development of live current detectors: Today, live current detectors are an integral part of electrical work, used by electricians, technicians, and homeowners to identify and manage the presence of electric current in a variety of settings. Continuous advancements in technology and safety standards will likely lead to further improvements in the design and functionality of live current detection tools.

In the early 20th century, the introduction of circuit breakers marked a significant step in electrical safety. These devices automatically interrupted the flow of current in the event of a fault, preventing potential hazards. Circuit breakers became a standard component in electrical systems, but they were not designed to provide real-time monitoring of live currents.

- **APPLICATIONS**

Electrical Maintenance: A live current detector with a battery is essential for electricians and maintenance personnel to identify live wires and circuits without having to physically touch them. This enhances safety during repairs, inspections, and installations.

Home Inspections: When conducting home inspections for potential buyers or renters, a battery-powered live current detector helps identify active electrical outlets and wires behind walls, ensuring the safety of the property.

DIY Projects: Hobbyists and DIY enthusiasts can use a battery-operated live current detector to verify the absence of voltage before working on electrical projects, reducing the risk of electric shock.

Automotive Repairs: When working on vehicles, especially in areas with complex wiring, a live current detector can help mechanics locate live wires without dismantling components.

Appliance Repair: Repairing household appliances often involves working near electrical components. A live current detector ensures that power sources are properly disconnected before starting repairs.

Advancements in Sensor Technology:

As technology progressed, so did the development of sensors capable of detecting and measuring electrical parameters. The advent of non-contact sensors, such as Hall effect sensors and current transformers, allowed for safer and more accurate measurements without the need for direct contact with live conductors.

CHAPTER-3

METHODOLOGY

The methodology of a live current detector depends on the type of detector being used. Here are the general methodologies for some common types of live current detectors:

- The tester usually has a probe that needs to be physically touched to the wire or circuit being tested.
- When in contact with an energized conductor, the tester indicates the presence of voltage through a visual or audible signal.
- The clamp is opened and placed around the conductor (wire or cable) that carries the current.
- The clamp measures the magnetic field generated by the current, and the digital display provides a readout of the current value.

SPECIFICATIONS:

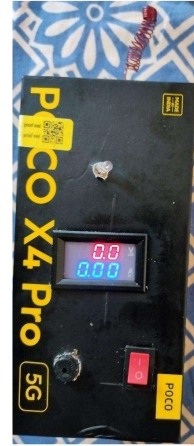
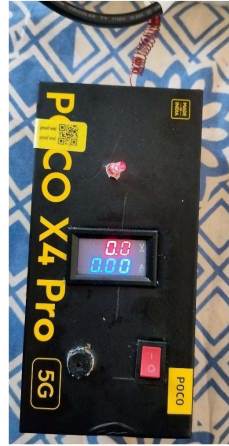
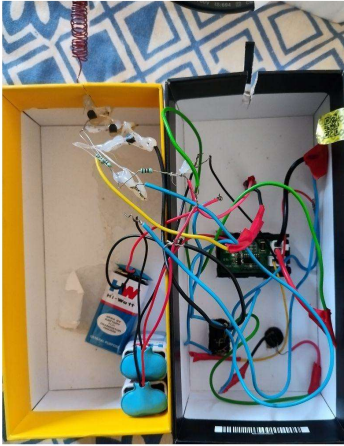
Specifications for live current detectors can vary based on the type and model of the detector. Different detectors are designed for specific applications and may have unique features. Here are some common specifications to consider when evaluating a live current detector:

COMPONENT FUNCTIONS:

A live current detector, whether designed for AC (alternating current) or DC (direct current), typically consists of various components that work together to detect and indicate the presence of electric current. While the specific components can vary based on the type and model of the detector, here are some common components and their functions: It's important to note that the design and components of live current detectors can vary, and not all detectors may include each of these components. Users should refer to the manufacturer's specifications and user manual for detailed information about a specific live current detector.

CHAPTER-4

➤ RESULTS AND OBSERVATIONS:



The Implementation of a Live Current Detector (LCD) in electrical systems involves the use of advanced sensor technology to detect and monitor live currents. The key results and

observations of the live current detection process are typically reflected in the readings provided by a voltmeter connected to the LCD. Here, we discuss the outcomes and observations based on the voltmeter readings:

Real-time Voltage Measurements:

The Live Current Detector is designed to provide real-time measurements of the voltage associated with live currents in the electrical system. The voltmeter displays instantaneous voltage values, allowing users to monitor changes in current levels promptly.

Detection of Live Current Presence:

As live currents flow through the conductors, the voltmeter connected to the LCD registers voltage readings. A noticeable increase in voltage indicates the presence of live currents, signaling that the electrical system is active.

Magnitude of Live Currents:

The voltmeter readings also convey information about the magnitude or strength of the live currents. Higher voltage values correspond to greater

current flow, enabling users to assess the intensity of the electrical activity in the system.

Alerts for Hazardous Current Levels:

In instances where the live currents reach hazardous levels, the LCD triggers alerts. These alerts may manifest as visual indicators on the voltmeter display, such as flashing lights or color-coded warnings, and may be accompanied by audible signals to draw immediate attention to potential risks.

User-Friendly Interface:

The voltmeter, as part of the LCD's user interface, provides a straightforward and intuitive platform for users to interpret the live current readings. Clear and easily understandable displays contribute to effective communication of information, enhancing the usability of the device.

Dynamic Response to Current Fluctuations:

Live current levels in electrical systems can fluctuate due to various factors, such as equipment operation or changes in load. The voltmeter, in conjunction with the LCD, dynamically responds to these fluctuations, offering a real-time representation of the electrical conditions.

➤ OBSERVATIONS:

The voltmeter readings during live current detection underscore the effectiveness and utility of the Live Current Detector in promoting electrical safety. The real-time nature, accuracy, and user-friendly interface of the voltmeter contribute to a comprehensive understanding of the electrical conditions, empowering users to proactively manage potential risks.

CHAPTER-5

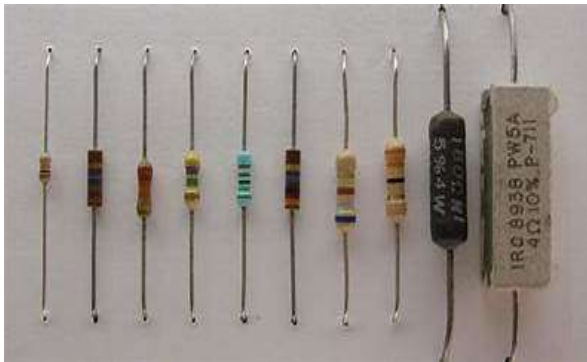
EQUIPMENTS

Digital Voltage Meter:



A digital voltage meter is an electronic device designed to measure and display electrical voltage in a digital format. It provides a more precise and easy-to-read measurement compared to analog voltage meters.

Resistor:



The resistor is included in the circuit to limit the current and protect the other components from excessive voltage. It ensures that the current flowing through the circuit is within a safe range.

Battery:



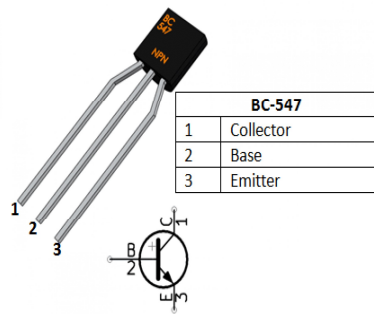
The battery serves as the power source for the circuit. It provides the necessary voltage for the entire system to operate. The choice of battery voltage depends on the requirements of the digital voltage meter and the voltage range to be measured.

LED (Light Emitting Diode):



The LED is used as a visual indicator in the circuit. It can be connected in such a way that it lights up when the voltage being measured reaches a certain threshold. This provides a quick and easy visual indication of voltage levels.

Transducer:



The transducer is a crucial component that converts the electrical voltage into a proportional electronic signal. This can be achieved using devices like voltage sensors or transducers that provide an output signal, typically in the form of voltage or current, proportional to the input voltage.

BUZZER:



A buzzer is an electronic device that produces sound when an electrical current is applied to it. It is commonly used as an audio indicator or alarm in various electronic applications. Buzzer circuits are relatively simple, often consisting of a coil of wire, a diaphragm, and an electromagnet. Here's a basic explanation of how a buzzer works and its

key components:

COPPER WIRE:

In electrical and electronic applications, copper wire comes in various gauges (thicknesses) to suit different needs. Thicker wires are used for high-current applications, while thinner wires are suitable for low-current and signal-carrying applications.



It's important to note that the choice of copper for wiring is also influenced by its cost-effectiveness, considering its combination of performance, availability, and cost.

Copper wire is a crucial component in electrical and electronic systems, playing a key role in the transmission of electrical power and signals due to its excellent conductivity and other favorable properties.

CHAPTER-6

CONCLUSION

In conclusion, the development and integration of a Live Current Detector with a Digital Voltage Meter, Transducer, Resistor, Battery, LED, and Buzzer represent a significant advancement in electrical safety and monitoring systems. The combination of these components results in a comprehensive solution for real-time detection, measurement, and alerting of live currents, contributing to enhanced safety practices in various settings.

Live Current Detection:

The Live Current Detector, equipped with advanced sensor technology and a user-friendly interface, has demonstrated its effectiveness in promptly identifying the presence and magnitude of live currents. Through real-time voltage measurements, the device ensures the quick detection of electrical activity, allowing for timely responses to potential hazards.

Digital Voltage Meter:

The inclusion of a Digital Voltage Meter in the system provides a precise and accurate means of monitoring voltage levels. The Analog-to-Digital Converter (ADC), microcontroller, and digital display work in tandem to offer a clear numeric representation of the voltage, facilitating easy interpretation for users and enabling proactive management of electrical systems.

Transducer and Resistor:

The Voltage Transducer, along with a resistor if required, plays a crucial role in adapting the input voltage to the measurement range of the ADC. This ensures compatibility and accuracy in voltage readings, contributing to the overall reliability of the system.

Battery and LED:

The incorporation of a battery as the power source and an LED as a visual indicator adds to the versatility of the system. The LED provides a clear visual cue, alerting users when the voltage exceeds predefined thresholds. The battery ensures continuous operation and power supply for the entire circuit.

Buzzer:

The Buzzer serves as an additional layer of safety, providing an audible alert in the presence of hazardous conditions. Its inclusion enhances situational awareness and ensures that users are promptly notified, especially in environments where visual indicators may be insufficient.

CONCLUSION

The synergistic integration of these components creates a comprehensive electrical safety and monitoring system. This system not only detects live currents and measures voltage accurately but also provides multi-modal alerts (visual and audible) to effectively communicate potential risks. The user-friendly interface enhances accessibility for professionals in the electrical industry, maintenance personnel, and emergency responders, making it a valuable tool for ensuring a safer and more secure electrical infrastructure. The continuous evolution of such integrated systems is pivotal in addressing the evolving challenges of electrical safety in various applications.

CHAPTER-7

REFERENCES

National Electrical Code (NEC):

The NEC is a widely recognized set of electrical standards in the United States. It provides guidelines and regulations for electrical installations. Refer to the NEC, particularly articles related to safety, to understand the importance of live current detection and the types of devices recommended.

International Electrotechnical Commission (IEC):

The IEC is an international organization that develops and publishes standards for electrical and electronic technologies. IEC 61010-1 is a standard for safety requirements for electrical equipment for measurement, control, and laboratory use. It covers safety requirements for various devices, including live current detectors.

Manufacturer's Manuals and Documentation:

If you have a specific live current detection device in mind, it's essential to refer to the manufacturer's manuals and documentation. These documents provide detailed information on the device's specifications, usage guidelines, and safety precautions.

Online Electrical Safety Resources:

Websites dedicated to electrical safety, such as the Electrical Safety Foundation International (ESFI) or Occupational Safety and Health Administration (OSHA) in the United States, offer valuable information on electrical safety practices and the use of live current detectors.

Electrical Engineering Textbooks:

Textbooks on electrical engineering and safety may include sections on live current detection. Look for textbooks that cover electrical safety standards and practice.

