IJIREEICE

ISSN (Online) 2321-2004
ISSN (Print) 2321-5526

International Journal of Innovative Research in
Electrical, Electronics, Instrumentation and Control Engineering

Vol. 9, Issue 6, June 2021

DOI 10.17148/IJIREEICE.2021.9631

Invisible Broken Wire Detector

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Abstract: A circuit to detect the exact location of breakage inside the PVC cover we employ our circuit with a hex inverter CMOS which uses its actions to control an oscillator which in return detects the presence of an AC current and shows the location till which the current is passing.

Keywords: LED, LCD, CMOS, PVC.

I. INTRODUCTION

Portable loads such as flood lights, video cameras, halogen flood lights, electrical irons, hand drillers, grinders, and cutters are powered by connecting long 2- or 3-core cables to the mains plug. Due to the prolonged usage with, the power cord wires are subjected to mechanical strain and stress, which can lead to internal snapping of wires at any point. In such a case most, people go for replacing the core/cable, as finding the exact location of a broken wire is difficult. In 3-core cables, it appears almost impossible to detect a broken wire and the point of break without physically disturbing all the three wires that are concealed in a PVC.

II. REVIEW OF LITERATURE

To detect the exact location of breakage inside the PVC cover we employ our circuit with a hex inverter CMOS which uses its actions to control an oscillator which in return detects the presence of an ac current and shows the location till which the current is PASSING. It is built using hex inverter CMOS CD4069.Gates N3 and N4 are used as a pulse generator that oscillates at around 1000 Hz in audio range. The frequency is determined by timing components comprising resistors R3 and R4 an capacitor C1

III. PROPOSED PLAN

The voltage output pin 10 or gate N2 can enable or enable or inhibit the oscillator circuit. When yhe test probe is away from high voltage ac field output pin 10 of gate N2 remains low. As a result, diode D3 conducts and inhibited the oscillator circuits from oscillator.

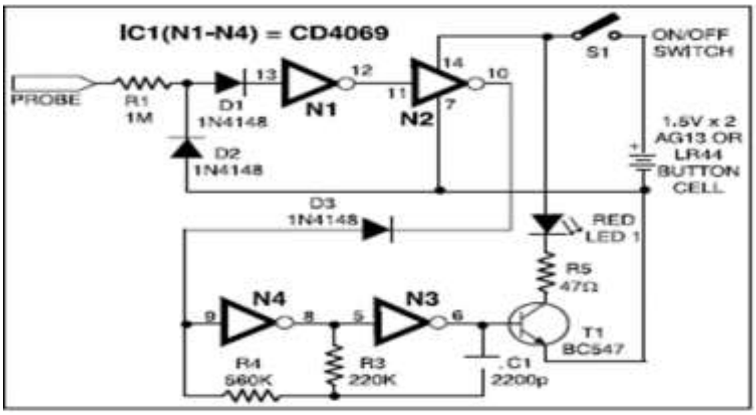

Fig 1 Circuit Illustration

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Simultaneously, the output of gate N3 at pin 6 goes low to cut of transistor T1. As a result, LED 1 goes off. When the test probe is moves to 230V AC, 50Hz mains live wire, during every positive half cycle of cycle, output of 10 goes high. Thus, during every positive half cycle of mains frequency N2 goes high and oscillator circuits is allowed to oscillate at around 1000kHz making LED 1 blink. The voltage of output pin 10 or gate N2 can enable or inhibit the oscillator circuit. When the test probe is away from high voltage ac field output pin 10 of gate N2 remains low. As a results diode D3 conducts and inhibits the oscillator circuit from oscillating. Simultaneously, the output of gate N3 at pin 6 goes low to cut of transistor T1. As a result, LED 1 goes off. When the test probe is moves to 230V AC, 50Hz mains live wire, during every positive half cycle, output of 10 goes high. Thus, during every positive half cycle of mains frequency N2 goes high, and oscillator circuit is allowed to oscillate at ground 1000kHz making LED 1 to blink. This simple circuit lets you run a 1W LED from the battery of your car. IC MC34063 is used here as a buck converter. It is a monolithic switching regulator sub-system intended for use as a DC-DC converter. The device consists of an internal temperature compensated reference, a comparator, a controlled duty-cycle oscillator with an active current-limit circuit, a driver and a high-current output switch. These functions are contained in an 8-pin dual in-line package. Another major advantage of the switching. Then connect 230V AC mains live wire at one end of the faulty wire, leaving the other end free. Connect neutral terminal of the mains AC to the remaining wires at one end. However, if any of the remaining wires is also found to be faulty, then both ends of these wires are connected to neutral. For single-wire testing, connecting neutral only to the live wire at one end is sufficient to detect the breakage point. In this circuit, a 5cm (2-inch) long, thick, single-strand wire is used as the test probe. To detect the breakage point, turn on switch S1 and slowly move the test probe closer to the faulty wire, beginning with the input point of the live wire and proceeding towards its other end. LED1 starts glowing during the presence of AC voltage in faulty wire. When the breakage point is reached, LED1 immediately extinguishes due to the non-availability of mains AC voltage. The point where LED1 is turned off is the exact broken wire point. While testing a broken 3-core rounded cable wire, bend the probe's edge in the form of „J" to increase its sensitivity and\ move the bent edge of the test probe closer over the cable. During testing avoid any strong electric field close to the circuit to avoid false detection. The cable. During testing avoid any strong electric field close to the circuit to avoid false detection.

IV. IMPROVEMENT

We can use an investor in between the LED and the oscillator which will then turn on the LED only when broken point is detected and keeping it off when the wire is not broken by making this change, we can make our detector more user friendly and also consume less power. We can also use a beeper to sound alarm when breakage is detected

V. ANALYSIS OF RESULTS

The circuit presented here can easily and quickly detect a broken/faulty wire and its breakage point in 1-core, 2-core, and 3-core cables without physically disturbing wires. It is built using hex inverter CMOS CD4069. Gates N3 and N4 are used as a pulse generator that oscillates at around 1000 Hz in audio range. The frequency is determined by timing components comprising resistors R3 and R4, and capacitor C1. Gates N1 and N2 are used to sense the presence of 230V AC field around the live wire and buffer weak AC voltage supply is sufficient for powering the whole circuit. AG13 or LR44type button cells, which are also used inside laser pointers or in LED-based continuity testers, can be used for the circuit. The circuit consumes 3 mA during the Sensing of AC mains voltage. For audio-visual indication, one may use a small buzzer (usually built inside quartz alarm time pieces) in parallel with one small (3mm) LCD in place of LED1 and resistor R5. In such a case, the current consumption of the circuit will be around 7 mA. Alternatively, one may use two 1.5V R6- or AA-type batteries. Using this gadget, one can also quickly detect fused small filament bulbs in serial loops powered by 230V AC mains. The whole circuit can be accommodated in a small PVC pipe and used as a\ handy broken-wire detector. Before detecting broken faulty wires, take out any connected load and find out the faulty wire first by continuity method using any mustimeter or continuity tester

VI. CONCLUSION

The circuit made is cheap and best. It would not only be able to reduce wastage of time but also resources. Thus, using just, a hex inverter and few resistors we are able to construct a device which can easily detect a faulty broken wire and thus save the extra cost of user which is incurred on replacing the faulty wire and not repairing it which is difficult. Thus, the circuit was made successfully which can easily detect broken point in the wire inside the PVC cover without disturbing it. The whole circuit can be accommodated in a small PVC pipe and used as a handy broken wire detector. This will 45 make the circuit more compact and easier to handle. The handy broken wire detector can be taken anywhere and everywhere and becomes less prone to damage.

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