Fast-acting, adjustable over-current protection circuit using Winson WCS1600 Current Sensor.

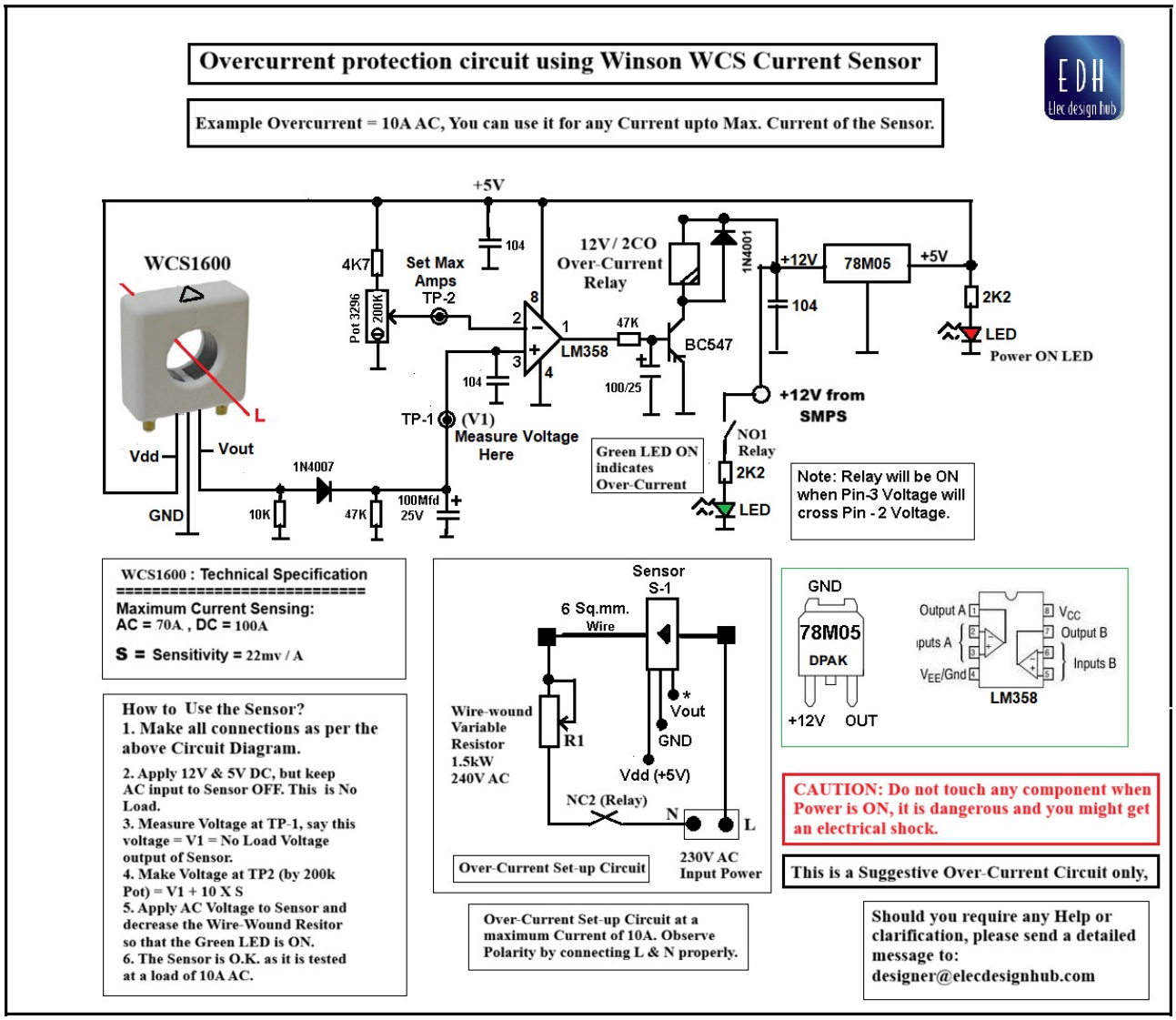
Elec Design Hub has provided an "Easy to Build" Over-current protection Circuit using Winson WCS1600 Current Sensor. The circuit is free and a good gesture to OEMS, Young Electronics Engineers and also useful for professional electronics engineers. This is a tested circuit.

A short note about the Sensor from the PDF File provided by the manufacturer:

The Winson **WCS1600** current sensor provides economical and precise solution for both DC and AC current sensing in industrial, commercial and communications systems. The unique package provides easy implementation without breaking original system and makes current sensing possible. Typical applications include motor control, load detection and management, over-current fault detection and any intelligent power management system etc.

The **WCS1600** consists of a precise, low-temperature drift linear hall sensor IC with temperature compensation circuit and a diameter **9.0mm** through hole. Users can use system's own electric wire by pass it through this hole to measure passing current. This design allows system designers to monitor any current path without breaking or changing original system layout at all. Any current flowing through this hole will generate a magnetic field which is sensed by the integrated Hall IC and converted into a proportional voltage.

The terminals of the conductive path are electrically isolated from the sensor leads. This allows the **WCS1600** current sensor to be used in applications requiring electrical isolation without the use of opto-isolators or other costly isolation techniques and make system more competitive in cost.



[Note: If you find it difficult to read the above circuit, click the "+" button to enlarge it.]

About the Over-current Protection Circuit: WCS Sensors are mainly is mainly used in Over-Current Protection purpose.

The **WCS Hall effect sensor, LM358 operational amplifier, and a 12V / 2CO DC relay** can be combined to create a fast-acting, adjustable over-current protection circuit. The **WCS** outputs an analog voltage proportional to detected current, the LM358 acts as a voltage comparator to detect when that current exceeds a safe limit, and the relay disconnects the load when tripped.

Circuit Diagram Overview

- **WCS Sensor Pins:** Connect Vdd to 5V, GND to GND, and Vout (Analog Output) to 10k & 1N4007 AC to DC Conversion circuit. At **TP1,** DC Voltage proportional to the current flowing through the Sensor will be available, which is ultimately connected to the Non-Inverting Input (Pin 3) of the LM358.
- **LM358 Setup:** Connect VCC (Pin 8) to 5V and GND (Pin 4) to GND. Connect a 200 kΩ potentiometer's wiper to the Inverting Input (Pin 2) through a 4.7k resistor to +5V to set the current threshold reference voltage at TP-2.
- **Output Driver:** Connect the LM358 Output (Pin 1) through a 47kΩ resistor and a 100mfd / 25V Capacitor to the base of an NPN transistor BC547.
- **Relay Stage:** Connect the transistor's collector to one of the terminal of the 12V relay coil, and the transistor's emitter to GND. Connect the other terminal of the relay coil to +12V DC. Wire a 1N4001 freewheeling diode in parallel with the relay coil.

How to do Set-Up: See “How to use the Sensor” in the Circuit Diagram – it’s explained in details.

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Should you require any Help or Clarifications, please send a detailed mail to: designer@elecdesignhub.com

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Thanks for reading this document.

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