Chapter 3

IMPLEMENTATION

1. CURRENT SENSING USING WCS1700 SENSOR:

In this project, the WCS1700 current sensor was utilized to sense both DC and AC currents, ranging from 0 to 70A DC and up to 35A RMS AC. The WCS1700 sensor operates on the principle of Hall effect sensing, where the magnetic field generated by the flowing current induces a voltage across the sensor's output. This voltage is proportional to the current passing through the core of the sensor.
Configuration for Sensing Current.

1. DC Current Measurement:

For accurate DC current measurement, only the positive wire must be passed through the core of the WCS1700 sensor. If both the positive and negative wires are passed through the core, the magnetic fields generated by the currents in these wires cancel each other out, resulting in no net magnetic field and thus no current detection. This cancellation occurs because the current flows in opposite directions in the positive and negative wires, leading to opposite magnetic fields that negate each other.

2. AC Current Measurement:

In the case of AC current, the live wire must be passed through the sensor's core for proper measurement. Passing the neutral and earthing wires along with the live wire would result in the same cancellation effect due to opposing magnetic fields, rendering the sensor unable to detect the current.

Extension Setup Using a 16A Plug and Junction Box:

A 16A Plug was used to connect the extension to the main power supply.
The Universal Switch Socket Combined with Junction Box (6A/16A, 240V) provided an interface to connect various devices or appliances to the power supply.
2.5 Sq. Inch Electrical Wires(3 wires of 2m each) were utilized as they can handle the required current without overheating or causing safety issues.

Wiring Process:

The live wire from the 16A plug was passed through the core of the WCS1700 sensor before being connected to the switch in the junction box. This ensured that only the live wire's current would be detected by the sensor.
These wires were directly connected from the plug to the socket in the junction box without passing through the sensor. This prevented any potential magnetic field cancellation.

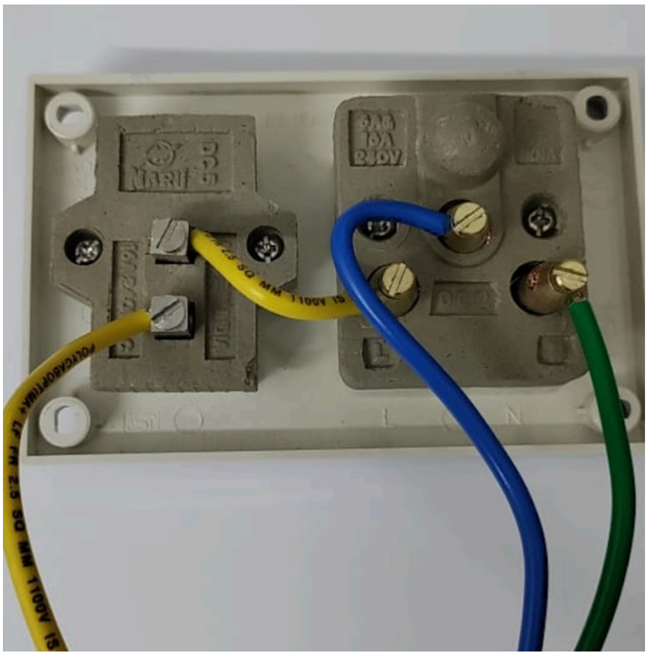

Figure 3.1.1 & Figure 3.1.2

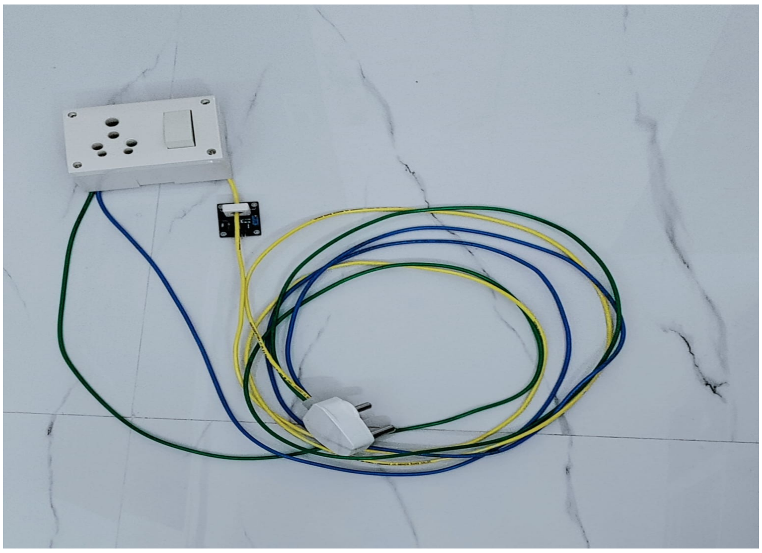

Figure 3.1.3

Safety Measures:

Every wire in the setup was meticulously insulated, ensuring that no part of the conductor was exposed. This attention to detail was crucial for a number of safety and functional reasons. When wires are left uncovered or improperly insulated, there is a significant risk of a short circuit. Short circuits happen when two exposed wires or conductive parts come into contact, allowing current to flow along an unintended path. This can lead to overheating, damaging the connected devices, and in severe cases, starting an electrical fire. Insulating the wires effectively prevents this by creating a protective barrier that keeps electrical currents confined to their designated circuits.

Furthermore, insulation is critical for safeguarding individuals from the risk of electric shock. Exposed wires carry live currents that can cause severe injury or even death if touched. Proper insulation ensures that even if someone inadvertently touches the wiring, they are shielded from the electrical flow. This is especially important in environments where multiple people may be in contact with the setup or where the wiring is exposed to the open air.