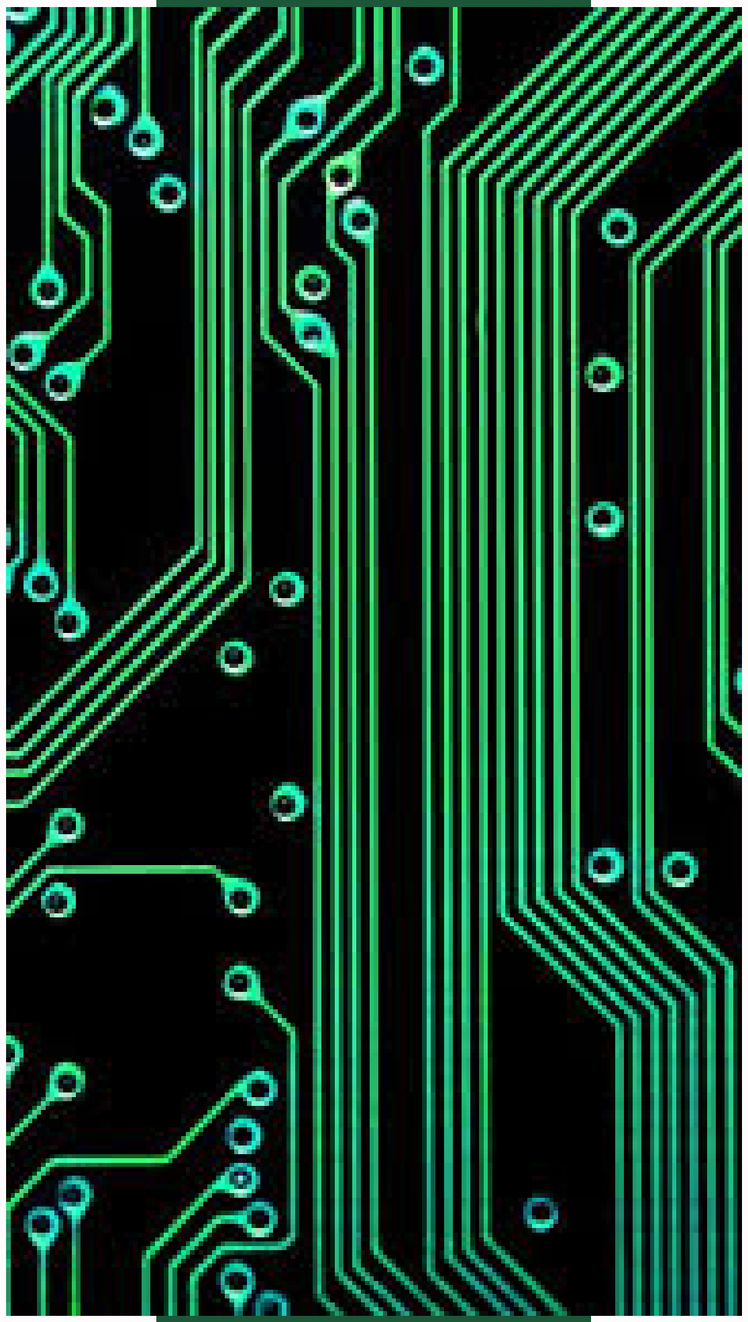
Electrical Engineering

Measurement & Instrumentation

IOT BASED ENERGY METER USING ESP-32



Objectives

Objective 01

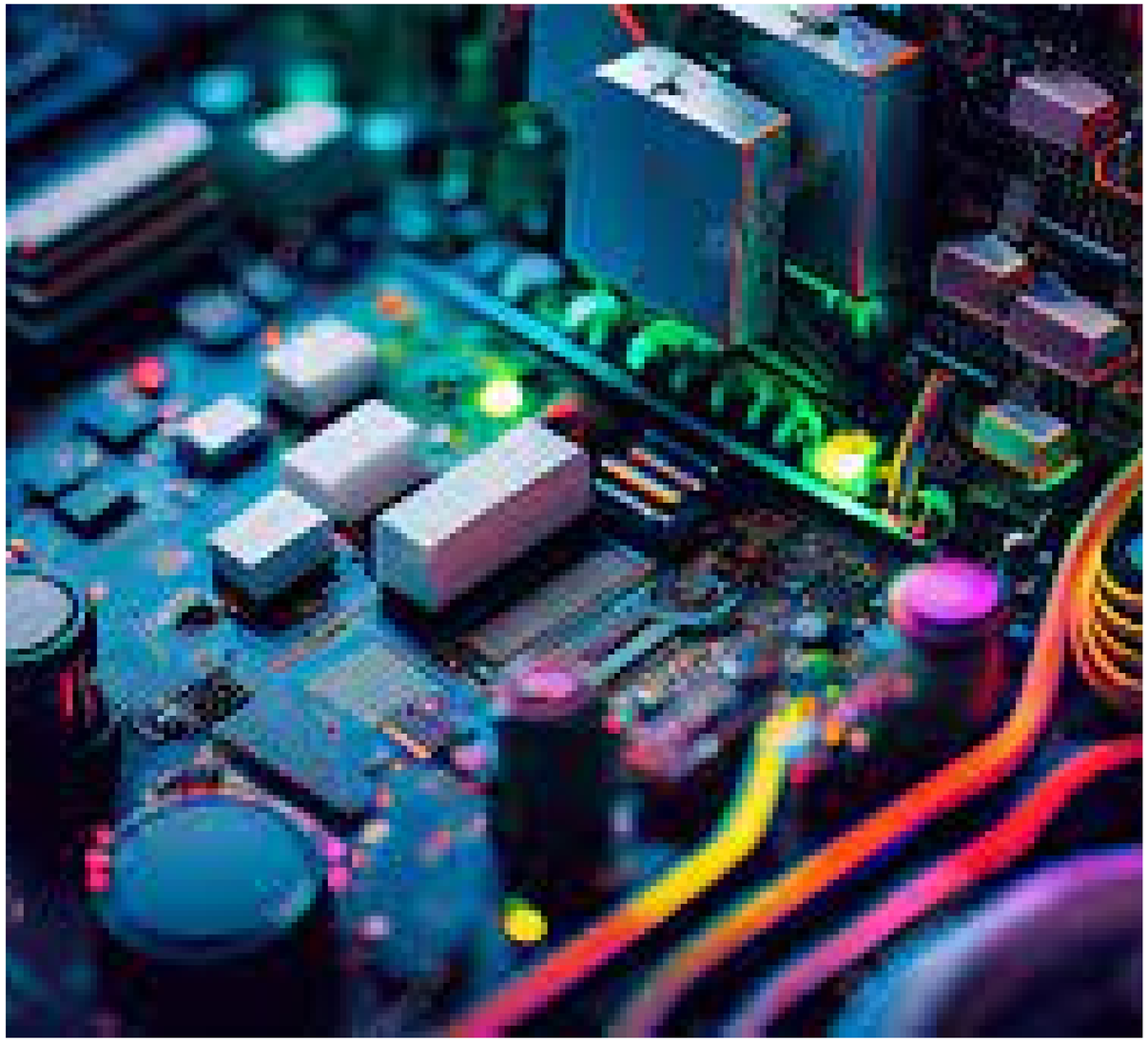
Develop a smart electricity energy meter with IoT integration.

Objective 02

Enable IoT-based monitoring

Objective 03

Provide detailed consumption data via a Node-Red Dashboard.



Components

Components	Min/Max Range	Input Parameters
ESP-32	-	Vs = 5V Imax = 0.5A
zmpt 101 b	V = 0-250V Vs = 0-5V	Vs = 5-30V Imax = 10mA
ACS712T-05B	I = 5A Vs = 2.5-5V	Vs = 4.5-5.5 Imax = 13mA
LCD	-	Vs = 5V Imax = 15-20mA

Overview

01 ESP-32
Voltage Senor

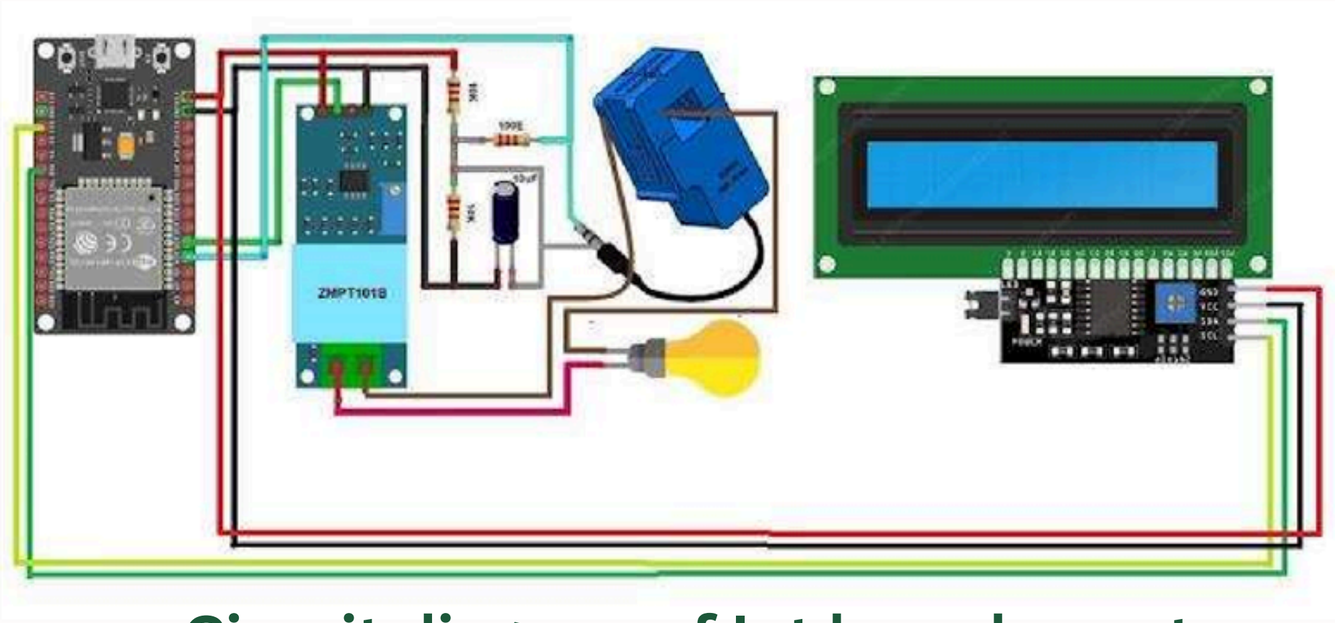
Currwnt Sensor
16*2 lcd with i2C 02

03 Software used
Aurdino IDE
Node Red

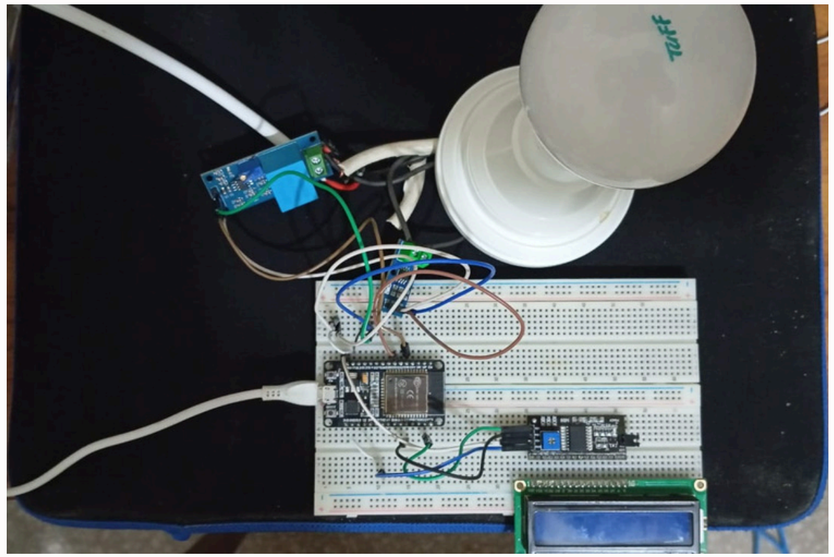
Outputs
Dashboard 04

04 Units Used

Block diagram

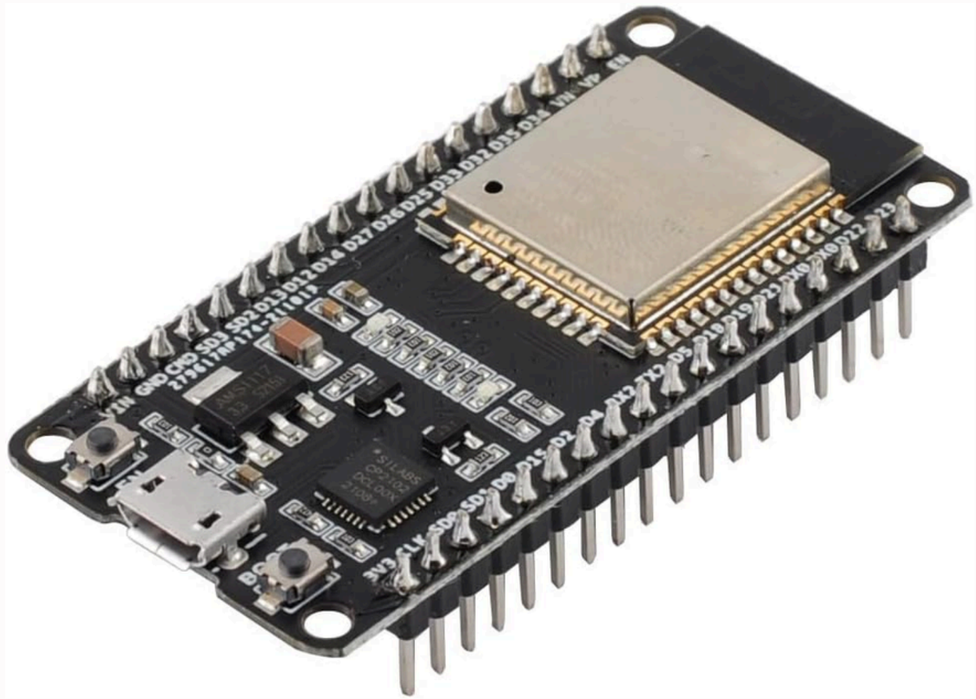


Circuit diagram of Iot based smart energy meter



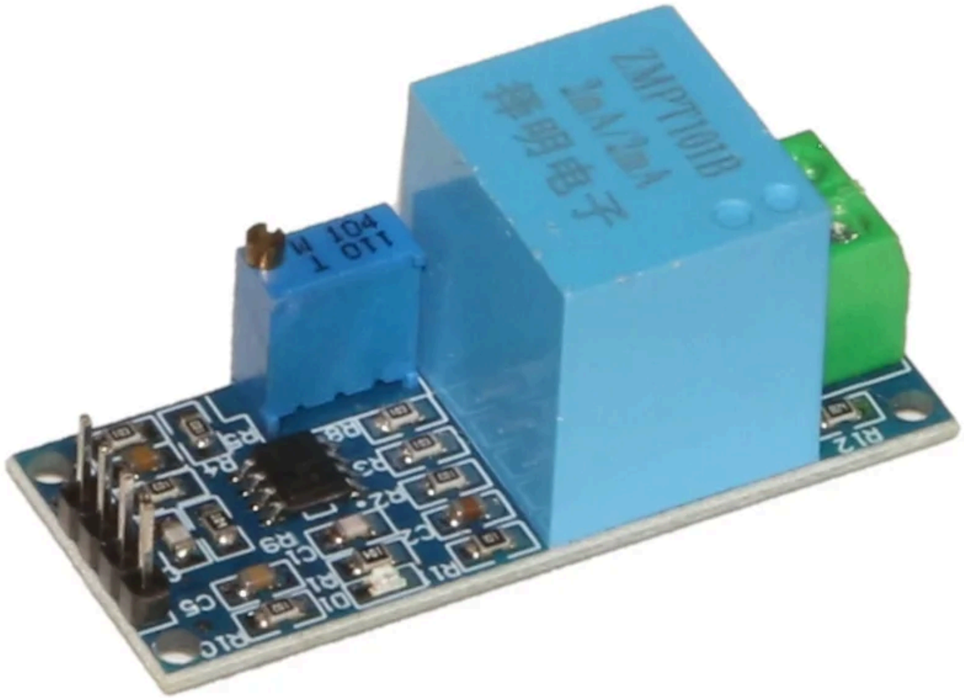
Implementation of Iot based smart energy meter

ESP-32



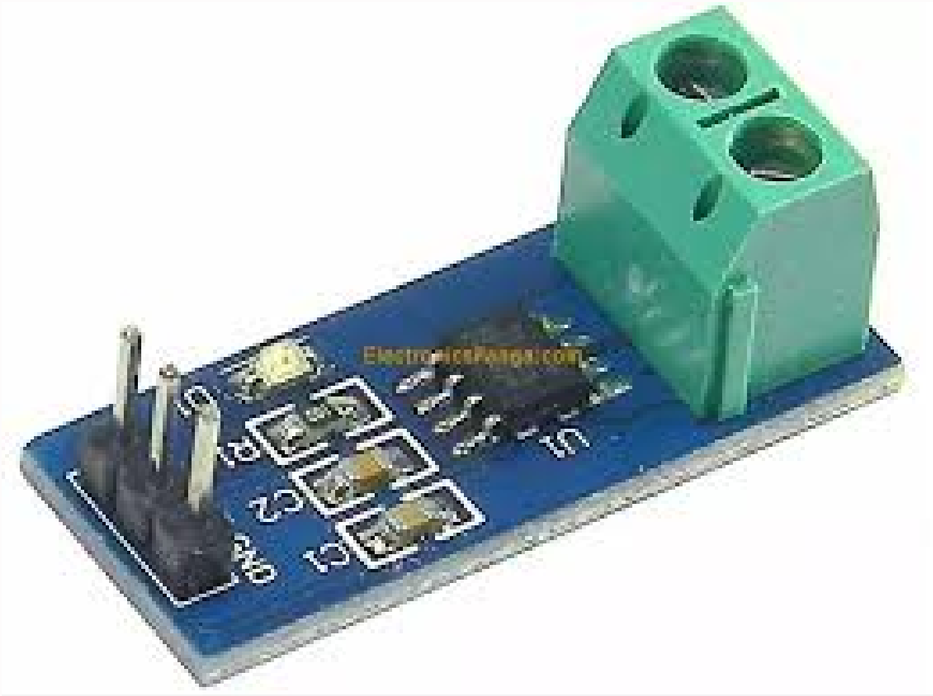
- Supply Voltages 5V
- Supply current 0-0.5A
- Operating Voltages 3.3V
- Bluetooth, Wifi
- 12-bit ADC

zmpt 101b



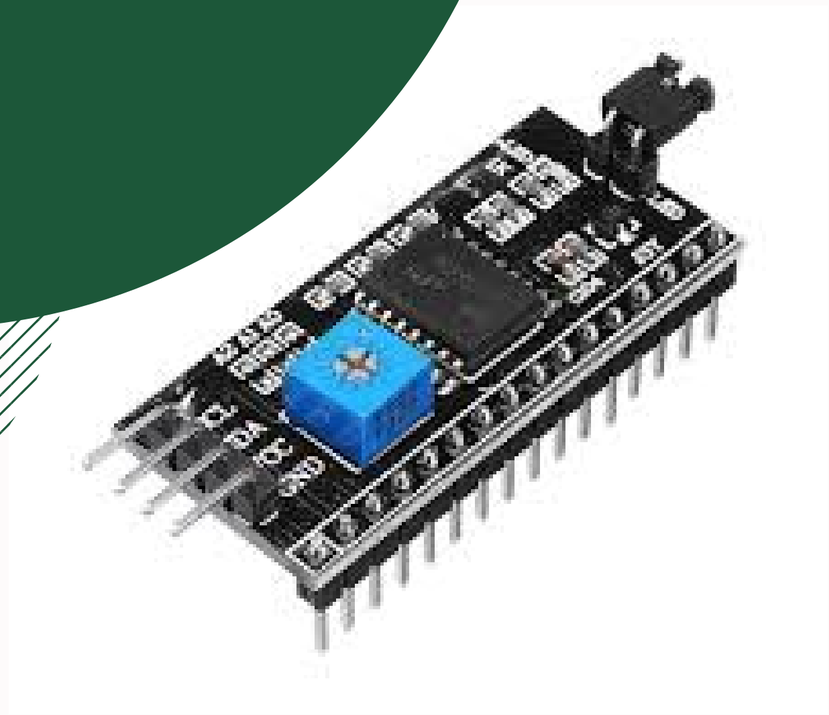
- Supply Voltages 5-30V
- Supply current 0-10mA
- Input Voltages 0-250V
- Sensor Voltages 0-5V

ACS712T-05b



- Supply Voltages 4.5-5.5V
- Supply current 0-13mA
- Input Current 5A
- Sensor Voltages 2.5-5V

Display

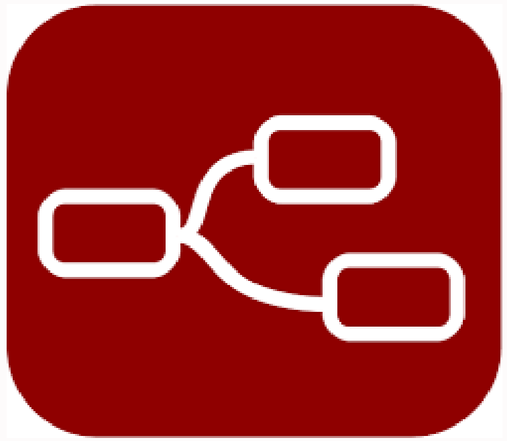


- Supply Voltages 3.3V
- Supply current 12mA
- SDA : Transfers data between devices.
- SCL : Synchronizes the data transfer.

- Supply Voltages 5V
- Supply current 15-20mA

Software

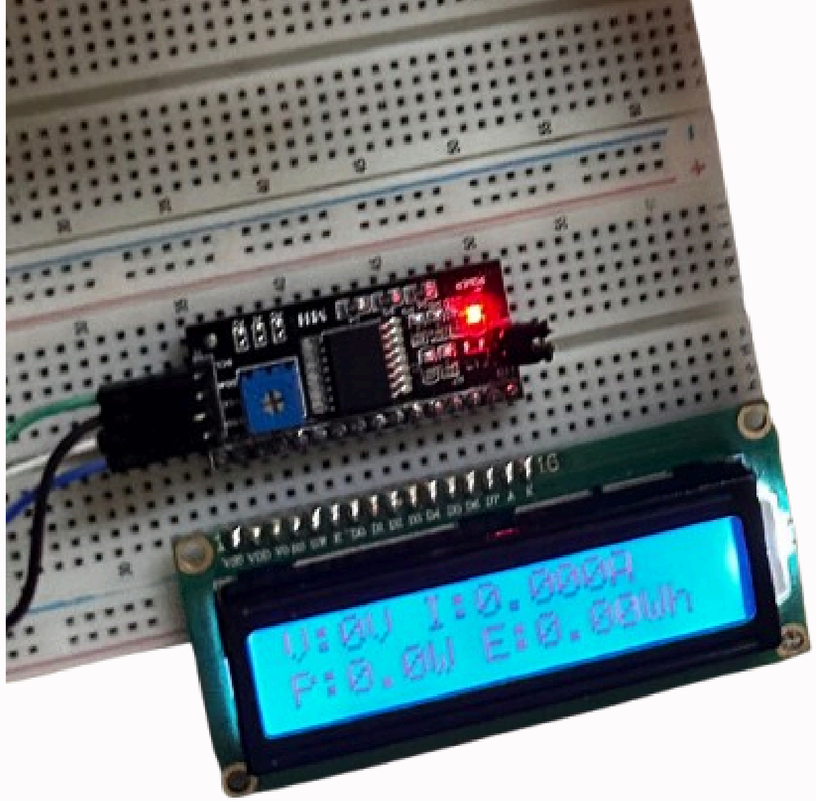
Aurdino IDE



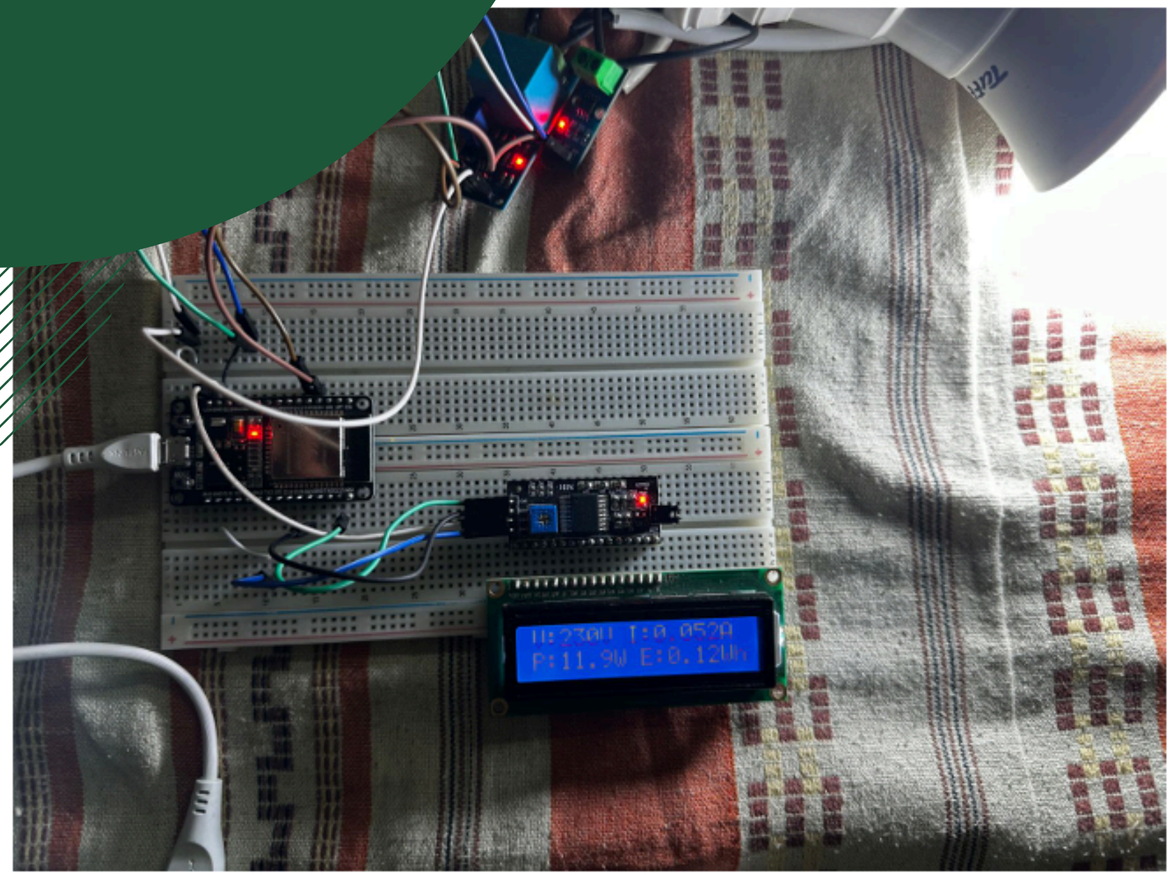
Node Red

Output

Output with no load

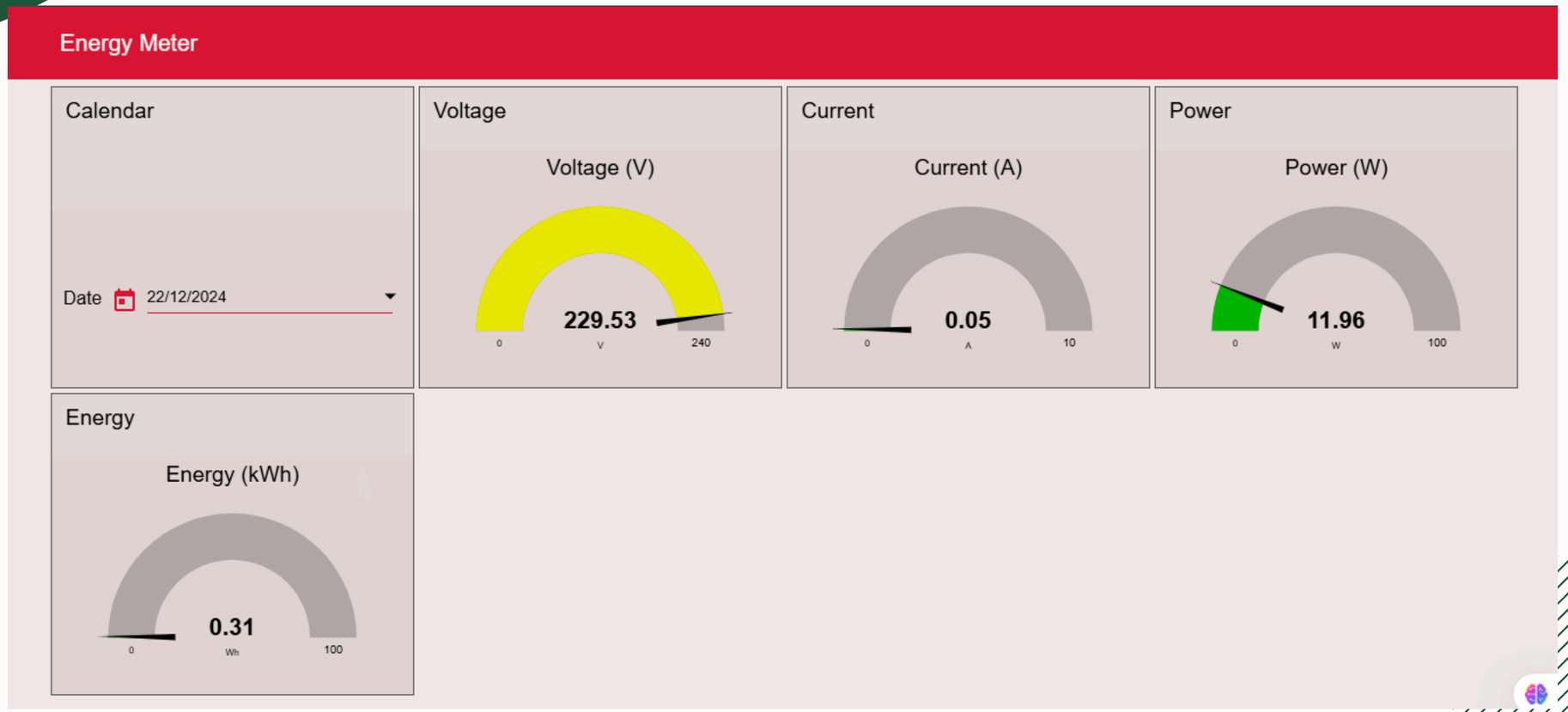


Output with load



Load

Node Red Dashboard showing outputs



Units

Units used for Parameters

- Voltage (Volt V)
- Current (Ampere A)
- Power (Watt w)
- Energy (Watt-hour wh)

THE END

Thank You