ABSTRACT

Current renewable energy such as solar cells is a field of technology and research related to converting sunlight into electrical energy. This electrical energy generated by solar panels depends on the intensity of sunlight and the temperature on the surface of the solar panels. However, when the sun is bright, the amount of power generated is large, so a solar regulator is needed to control the amount of power generated by the solar panels.

Using a solar cell type Cell GH 50P-18 with a power specification of 50 watts which has a voltage of 17.3 volts and a current of 2.81 amperes. The load used uses a battery that has specifications of 6 volts and 4.2 Ah. To protect battery cycles with these specifications and increase the efficiency of the solar output panel then use a solar regulator. The solar controller uses the MPPT (Maximum Power Point Tracking) process to ensure the solar modules produce maximum power. MPPT is a way to find the maximum characteristic point of voltage and input current (VI) in solar module applications.

The maximum point of this feature is by searching for power points using the Perthub & Observe (P&O) algorithm. From this algorithm, the value obtained from the results of the effect of voltage and current on the solar cell module. MPPT with a synchronous buck converter will be used to observe the output power. To observe the value of power, voltage and current this research use the INA219 sensor. This controller device is designed from several subsystems to obtain research results which obtain an average input power of around 4,88 W and an output power of around 4,52 W. From the power results, the average efficiency in testing the MPPT synchronous buck converter using the P&O method reaches 92,6%.

Keywords: *Synchronous Buck converter, Solar Panel, INA219 Sensor*