* MPPT (maximum power point tracking) charge controller is a DC-to-DC converters that take the voltage output from solar panels and convert them to a more suitable voltage to charge a battery bank.
* The main difference between MPPT and PWM charge controllers is that MPPT charge controllers allow the PV (photovoltaic) array output voltage to be higher than that of the battery bank without losing power.
* MPPT checks output of PV module, compares it to battery voltage then fixes what is the best power that PV module can produce to charge the battery and converts it to the best voltage to get maximum current into battery. Typically, this means that it will lower the voltage, while increasing the current at the same time and maintaining most of the overall output power.

Chart

Description automatically generated

* As shown in the figure, MPPT charger detects the maximum power point of the PV array with different conditions and extracts that power to charge the battery.
* Maximum power point tracking (MPPT) operates using an algorithm, which is basically a series of steps or procedures that is used to accomplish a desired result.

Chart, line chart

Description automatically generated

* As shown in the figure, one method is moving the solar module output voltage along the I-V curve is to vary the load on the module incrementally until the maximum power point (MPP) is located. This can be accomplished by using a microcontroller.

Diagram

Description automatically generated

* As shown in the block diagram, we can use a transformer to isolate the input electricity from the output so that we can control the output DC voltage independent of the solar module.