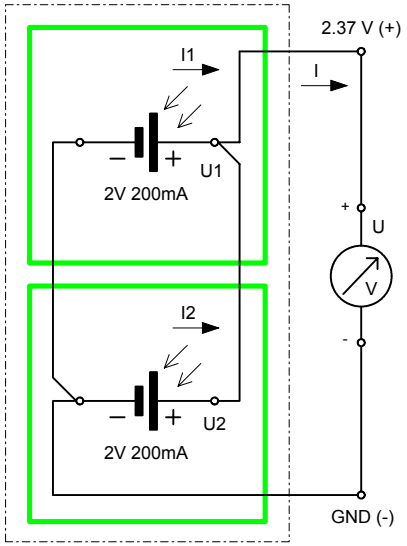


PARALLEL CONNECTION (1st. KIRCHHOFF'S LAW)

Kirchhoff's Current Law (KCL): This law states that the sum of currents flowing into any junction or node in a circuit is equal to the sum of currents flowing out of that junction. In simple terms, it means that the total amount of current entering a junction is equal to the total amount of current leaving that junction.

I = I1 + I2 | I = I1 + I2 + I3 + I... | I = Current (A)

EXAMPLE WITH RATED MAX. CURRENT VALUES:
I = 0.2 A + 0.2 A = 0.4 A = 400 mA

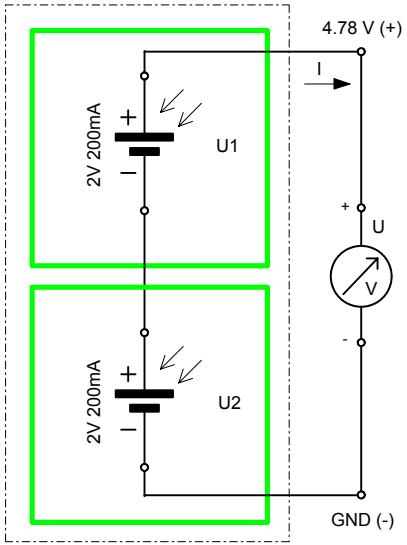
When solar panels are connected in parallel or in series, it refers to how their positive and negative terminals are connected together to form an electrical circuit. These connections affect the overall voltage and current characteristics of the solar panel system.

Parallel Connection:
When solar panels are connected in parallel, the positive terminals of all the panels are connected together, and the negative terminals are also connected together. This results in a configuration where the voltage across each panel remains the same, but the total current increases.

Voltage:
The voltage across each panel remains the same as the individual panel's voltage.

Current:
The current adds up, meaning that the total current output of the parallel-connected panels is the sum of the current produced by each panel.

Power Output:
The power output of the parallel-connected panels is higher than that of a single panel since power is the product of voltage and current. The increased current allows for a greater power output. Parallel connections are often used when there is a need for higher current output, such as in situations with larger energy demands or when connecting multiple solar panels to charge a battery bank.



SERIES CONNECTION (2nd. KIRCHHOFF'S LAW)

Kirchhoff's Voltage Law (KVL): This law states that the sum of all the voltage drops (or rises) around any closed loop in a circuit is equal to the sum of all the voltage sources in that loop. In other words, the total voltage around a closed loop is zero.

U = U1 + U2 | U = U1 + U2 + U3 + U... | U = Voltage (V)

EXAMPLE WITH RATED MAX. VOLTAGE VALUES:
U = 2 V + 2 V = 4 V

Series Connection:
When solar panels are connected in series, the positive terminal of one panel is connected to the negative terminal of the next panel, forming a chain-like configuration. This results in a configuration where the total voltage increases, while the current remains the same.

Voltage:
The voltages of each panel add up, resulting in a higher total voltage across the series-connected panels.

Current:
The current remains the same throughout the series-connected panels, as the current through a series circuit is constant.

Power Output:
The power output of the series-connected panels is determined by the voltage and current of the lowest performing panel in the series. If one panel in the series is shaded or underperforming, it can limit the power output of the entire series-connected system.
Series connections are often used when there is a need for higher voltage output, such as in grid-tied systems or applications where the voltage requirement is higher.

It's important to note that the choice between parallel and series connections depends on the specific requirements of the solar panel system, such as the voltage and current needed for the load or the system's compatibility with inverters, batteries, or grid connections. Proper sizing and configuration considerations are essential to ensure optimal performance and safety of the solar panel system.

FIGURES ARE APROXMEDIATELY, DUE TO COMPONENT TOLERANCES!
FOR FULLY COMPONENT SPECS. SEE MANUFACTURER DATASHEETS.
BRANDS AND NAMES ARE MENTIONED PURELY FOR INFORMATION PURPOSES.

STEM-S02	A4	udo@elgers.com	ue-ERT20230622-04	22-JUN-2023
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