# DID YOU KNOW?

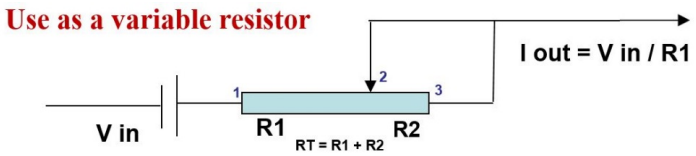
## VOLTAGE DIVIDERS VS VARIABLE RESISTORS

One major difference between panel potentiometers and precision potentiometers is the way they are utilized by end users. Precision potentiometers can only be used as voltage dividers, while panel potentiometers can be used as voltage dividers and variable resistors.

Let's start with the basics. All potentiometers have three output connections. N°1 and N°3 are usually dedicated to the power supply (DC voltage) while N°2 is the wiper output, which varies in relation to the angular shaft position.

### 1) Variable Resistor or Rheostatic Mode

For potentiometers connected as shown in the diagram to the right, a calculation must first be performed to determine if the potentiometer will support the current going through it. The signal is a current signal that depends on the wiper position and the ohmic value. The current changes accordingly to a linear variation versus ratio of ohmic value (wiper position).




Graph N°1

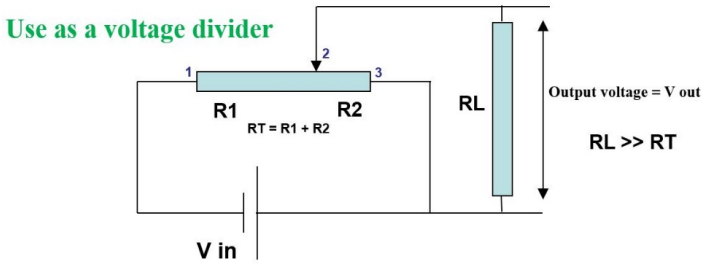
### 2) Voltage Divider

In this type of assembly, the value of the load resistance RL is much greater than the total ohmic value of the potentiometer (frequently 1000 times greater). In this case, the output signal is a DC voltage (rather than a current signal as found in rheostatic mode). The main part of the current remains in the track, so the DC voltage VOUT on the output is defined by the formula below:

VOUT = (VIN x R2.RL) / (R1.RL + R2.RL + R1.R2).

As RL is much larger than R1 and R2, the formula becomes:

VOUT = $V_{IN}$ x R2 / (R1 + R2) = $V_{IN}$ x R2 / RT
**(refer to graph N°2).**




Graph N°2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