Electronics
Variable Resistors (Trimmers)

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Variable resistors
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Often it is useful to have *variable* resistors in a circuit.
Variable resistors

Often it is useful to have *variable* resistors in a circuit. These are sometimes called *potentiometers* or *trimmers*. 
Variable resistors

Usage as voltage dividers

Usage as adjustable resistors

\[ V_{out} = V_{in} \left( \frac{R_2}{R_1 + R_2} \right) \]

True if \( I_{out} \equiv 0 \)

\[ R_1 + R_2 = \text{a constant.} \]
Variable resistors

Usage as voltage dividers
Usage as adjustable resistors

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Electronics Variable Resistors (Trimmers)
Here is a trimmer.
Here is a trimmer. The top line should look familiar.
The potentiometer has three pins.
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The resistance given is between the two end pins.
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The potentiometer has three pins. The resistance given is between the two end pins. The third pin is called the **wiper**. A small screwdriver can be used to move the wiper from one end to the other, or anywhere in between. *The resistance between the two end pins will be constant.* If you want a resistance which varies, just use the wiper and one end pin.
Variable resistors

Usage as voltage dividers
Usage as adjustable resistors

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Here’s a different view.
Here’s a different view. The wiper is in the middle.
From the top, this one has 10 dashes to represent intervals of roughly $R/10$. 
Variable resistors

Usage as voltage dividers
Usage as adjustable resistors
This is a slightly different style.
This is a slightly different style. Note the graphical indication of the wiper.
Usage as voltage dividers
Usage as voltage dividers

The potentiometer can be used for a variable voltage divider.
Usage as voltage dividers

The potentiometer can be used for a variable voltage divider. Connect the two ends of your supply to the two end pins.
Usage as voltage dividers

The potentiometer can be used for a variable voltage divider. Connect the two ends of your supply to the two end pins. Measure the output voltage on the wiper.
Usage as voltage dividers

The potentiometer can be used for a variable voltage divider. Connect the two ends of your supply to the two end pins. Measure the output voltage on the wiper. Adjusting the wiper will change the output voltage from one end of the supply to the other, or to anywhere in between.
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**Usage as adjustable resistors**

The potentiometer can be used for an adjustable resistor. Connect the wiper and one end pin. Leave the other end unconnected. Adjusting the wiper will change the resistance between the two pins from zero to the stated resistance.
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