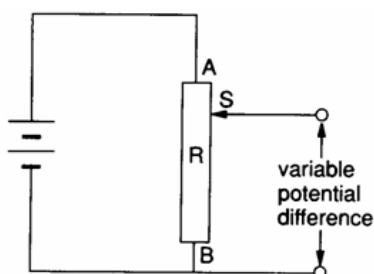


Potentiometer

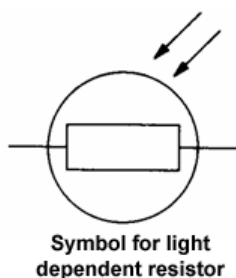
A potentiometer (or variable potential divider) regulates the potential difference across a device. It allows the p.d. to be varied continuously, right down to zero. As shown in the figure, **R** is a resistor (normally a piece of high resistance wire) connected across the terminals of a battery. **S** is a slider that can be moved from **A** (maximum p.d.) to **B** (zero p.d.). Any required fraction of the total p.d. can be tapped off between the sliding contact and end **B** of the wire.



A potentiometer provides a variable potential difference.

Light Dependent Resistor (LDR)

The *l.d.r.* has resistance that varies with the amount of light incident on it. The resistance decreases as the amount of light shining on the *l.d.r.* increases. Under bright lighting, the *l.d.r.* would have very low resistance. In the dark, the *l.d.r.* has a very high resistance.

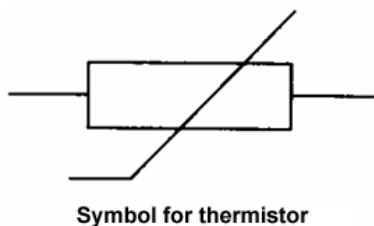


Symbol for light dependent resistor

Graph

Thermistor

The thermistor is a device whose resistance is affected by temperature. The resistance of a thermistor decreases with increasing temperature. The thermistors are used in applications such as temperature control, temperature measurement and fire alarms.



Symbol for thermistor

Graph

Transducers

Transducers are electronic devices that convert energy from one form to another.

There are two types of transducers:

- input transducers
- output transducers

Input transducers are electronic devices that convert **non-electrical energy** to **electrical energy**.

- They respond to changes in the physical environment.
- They can be used in potential dividers to vary output voltages. Therefore, they allow electronic devices to respond to changes in the environment.
- Example: thermistor, LDR

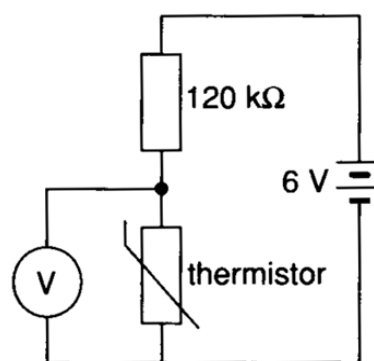
Output transducers are electronic devices that convert **electrical energy** to **non-electrical energy**.

- Example: LED (light-emitting diode)

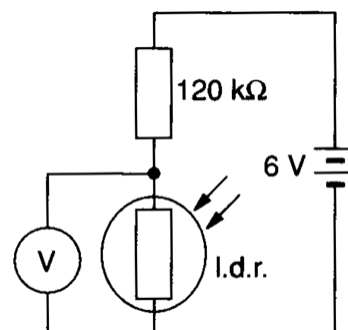
Applications

The following two figures show both the thermistor and *l.d.r.* in a simple series circuit with a resistor and a voltmeter connected across the *l.d.r.* or thermistor to measure the voltage across them. The circuits make use of the physical variables of the thermistor and *l.d.r.* and convert them into electrical signals (voltage). Such devices are called input transducers.

As shown in the figure, the circuit can function as a thermometer. When the temperature increases, the resistance of the thermistor decreases. This would decrease the p.d. across the thermistor and hence the reading on the voltmeter would decrease. Thus, the voltmeter readings can be converted into temperature readings.



As shown in the figure, the resistance of the *l.d.r.* decreases with increasing light intensity. Again, the voltmeter would register a lower reading since the p.d. across the *l.d.r.* would decrease. Hence the change in light intensity gives rise to changes in voltage and is recorded by the voltmeter. One application of this is in the photographic exposure meter which measures light intensity.



----- end -----