

Ohm's Law :- Ohm's law states that the current flowing through a conductor is directly proportional to the potential difference applied across its ends, provided that temperature and other ~~parameters~~ physical conditions remain unchanged,
In other words,

$$V \propto I$$

$$\Rightarrow \frac{V}{I} = \text{Constant}$$

$$\Rightarrow \frac{V}{I} = R$$

$$\Rightarrow V = I \cdot R$$

where R is a constant called Resistance of the conductor. The value of this constant depends on the nature, length, Area of Cross section and temperature of the conductor.

Here,

V = Potential Difference in volt (V)

I = Current in Amp. (A)

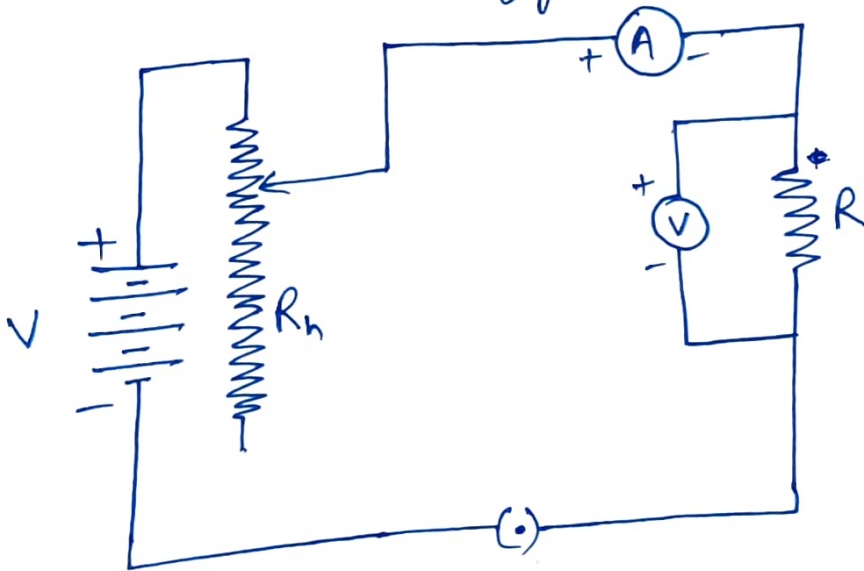
R = Resistance of the conductor

The S.I unit of Resistance is Ohm, denoted by the symbol Omega (Ω)

Verification of Ohm's law :- Let us consider a Nichrome wire of resistance $R \Omega$ is connected to a battery of V volts with the help of Rheostat R_h , so that we can change the potential difference across the Nichrome wire.

Here a voltmeter is connected across the nichrome wire for measuring the potential difference across the nichrome wire, and an Ammeter is connected in series with the Nichrome wire for measuring the value of current through it.

Here a key is connected in the ckt as shown in fig(a)



Fig(a) ckt connection for verification of Ohm's law

* procedure :-

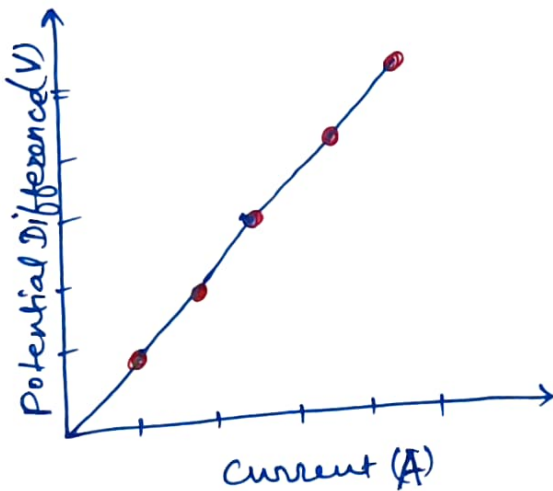
→ Switch on the key and change the potential difference across the Nichrome wire by ~~changing~~ moving the Rheostat contact gradually.

Note down the the reading of Voltmeter & Ammeter carefully. in a table as given below :-

Sr. No.	Potential Difference across the Nichrome wire (Volts)	Current through the Nichrome wire (Amp)	V/I (Volt/Amp)
1.	2 Volts	1 A	2
2.	4 Volts	2 A	2
3.	6 Volts	3 A	2
4.	8 Volts	4 A	2
5.	10 Volts	5 A	2

Here we get V/I constant called Resistance

Now, plot the value of potential difference & current in V-I Graph as shown below



V-I Graph

after plotting the values on V-I graph we get a straight line, which verifies that $V \propto I$, hence Ohm's law is verified.