

The OHM meter

An **ohmmeter** is an electrical instrument that measures electrical resistance, the opposition to an electric current. Micro-ohmmeters (microhmmeter or microohmmeter) make low resistance measurements. Megohmmeters (aka megaohmmeter or in the case of a trademarked device Megger) measure large values of resistance. The unit of measurement for resistance is ohms (Ω).

The original design of an ohmmeter provided a small battery to apply a voltage to a resistance. It uses a galvanometer to measure the electric current through the resistance. The scale of the galvanometer was marked in ohms, because the fixed voltage from the battery assured that as resistance is decreased, the current through the meter would increase. Ohmmeters form circuits by themselves, therefore they cannot be used within an assembled circuit.

A more accurate type of ohmmeter has an electronic circuit that passes a constant current (I) through the resistance, and another circuit that measures the voltage (V) across the resistance. According to the following equation, derived from Ohm's Law, the value of the resistance (R) is given by:

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



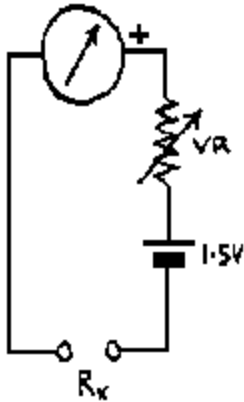


Fig.1

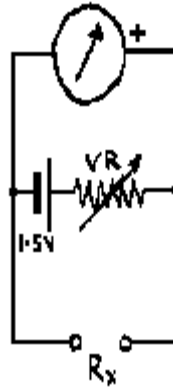


Fig.2

On the ohms ranges of a normal multimeter the unknown resistance is connected in series with a battery and the meter and the scale reads backwards. A variable resistor is included in the circuit so that the meter can be adjusted to read full scale with the test terminals shorted (Fig 1).

In the shunt ohmmeter a battery and variable resistor are connected across a milli ammeter and the resistor is adjusted so that the meter reads full scale with the test terminals are unconnected (Fig.2). Any resistance across the test terminals will bypass some current so the meter reading will fall.

No commercial meter that I have encountered uses this circuit.