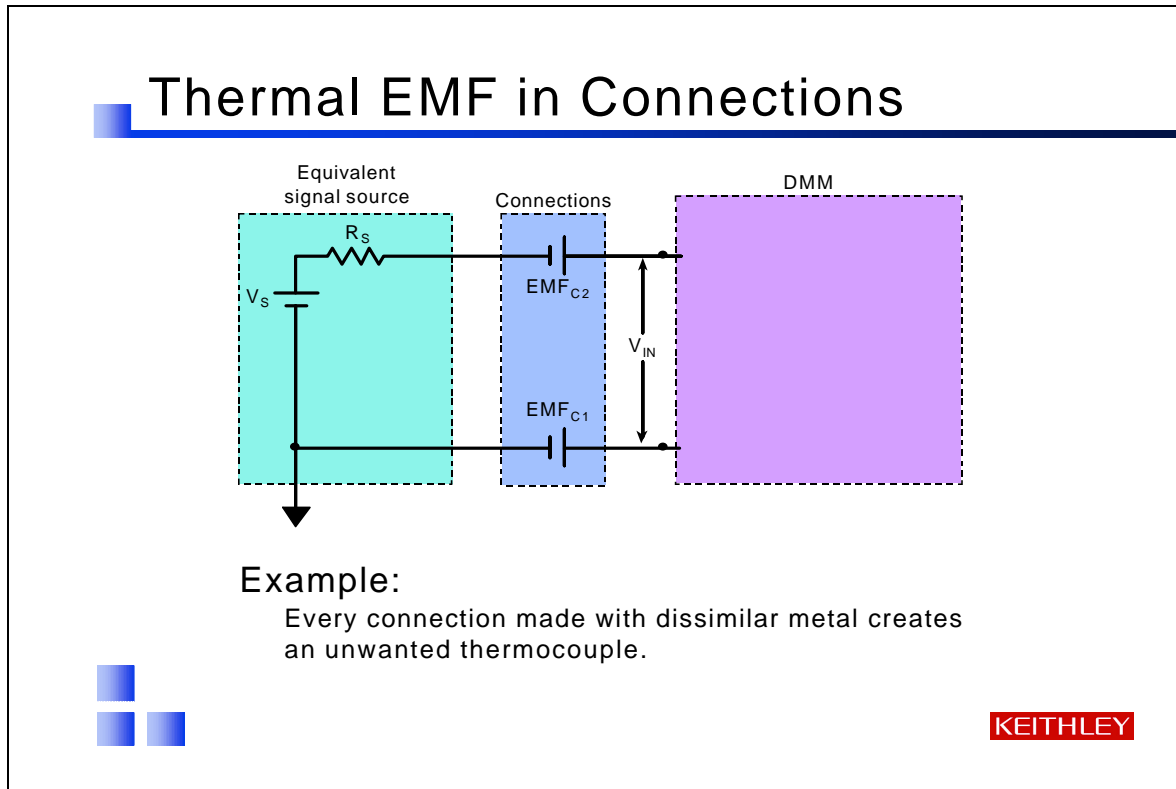


## What is Offset Compensation?

Offset compensation is a measuring technique that reduces or eliminates thermal EMFs in a low level resistance measurements. The presence of thermal EMFs can adversely affect low resistance measurement accuracy.

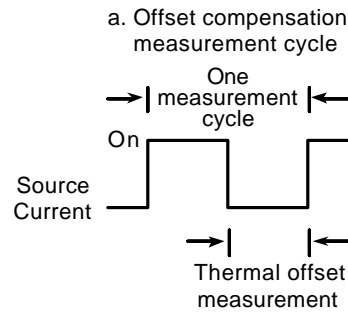


Every connection made with dissimilar metals creates an unwanted thermocouple in the measurement circuit. Each of these unwanted thermocouples generates an error voltage that varies with temperature gradients in the system. These can be on the order of many microvolts that can cause significant errors in thermistor, RTD, strain gauge, and low-ohms measurements.

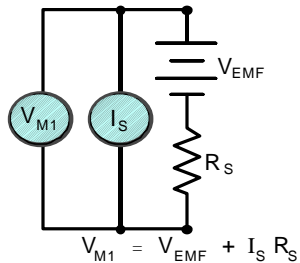
One method of minimizing thermal EMF errors is by using the offset-compensated ohms measurement technique. Using this technique, test current is applied to the circuit and the resulting voltage measurement will include the desired DUT measurement as well as the effect of thermal EMFs.

During the second half of the cycle, however, test current is turned off. The resulting voltage measurement is therefore attributable only to the thermal EMFs present in the circuit. The desired measurement is the difference between the two values. The microprocessor in the DMM compensates for the offset voltage.

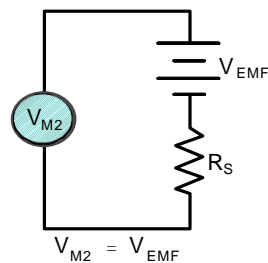
# Thermal EMF Offset Compensated Ohms



b. Voltage measurement with source current on



c. Voltage measurement with source current off



$$V_M = (V_{M1} - V_{M2}) = I_S R_S$$



**KEITHLEY**

Keithley products which provide this offset compensation feature include: 580, 2010, 2001, 2002, 2700, 2750 and the 2400 SourceMeter Series.