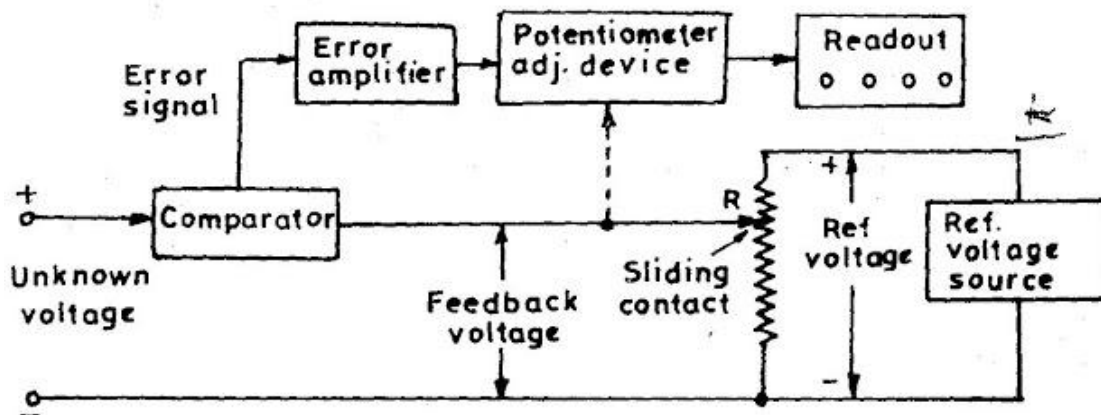


POTENTIOMETRIC TYPE DIGITAL VOLTMETER

- A potentiometric type of DVM employs voltage comparison technique. In this DVM the unknown voltage is compared with reference voltage whose value is fixed by the setting of the calibrated potentiometer.
- The potentiometer setting is changed to obtain balance (i.e. null conditions).
- When null conditions are obtained the value of the unknown voltage, is indicated by the dial setting of the potentiometer.
- In potentiometric type DVMs, the balance is not obtained manually but is arrived at automatically.
- Thus, this DVM is in fact a self- balancing potentiometer.
- The potentiometric DVM is provided with a readout which displays the voltage being measured.



(Fig.) Basic block diagram of a potentiometric DVM.

- The block diagram of basic circuit of a potentiometric DVM is shown.
- The unknown voltage is filtered and attenuated to suitable level.
- This input voltage is applied to a comparator (also known as error detector).
- This error detector may be chopper.
- The reference voltage is obtained from a fixed voltage source.
- This voltage is applied to a potentiometer.
- The value of the feedback voltage depends up the position of the sliding contact.
- The feedback voltage is also applied to the comparator.
- The unknown voltage and the feedback voltages are compared in the comparator.
- The output voltage of the comparator is the difference of the above two voltages.
- The difference of voltage is called the error signal.
- The error signal is amplified and is fed to a potentiometer adjustment device, which moves the sliding contact of the potentiometer.
- This magnitude by which the sliding contact moves depends upon the magnitude of the error signal.
- The direction of movement of slider depends upon whether the feedback voltage is larger or the input voltage is larger.

- The sliding contact moves to such a place where the feedback voltage equals the unknown voltage.
- In that case, there will not be any error voltage and hence there will be no input to the device adjusting the position of the sliding contact and therefore it (sliding contact) will come to rest.
- The position of the potentiometer adjustment device at this point is indicated in numerical form on the digital readout device associated with it.

Since the position at which no voltage appears at potentiometer adjustment device is the one where the unknown voltage equals the feedback voltage, the reading of readout device indicates the value of unknown voltage.

Source: <http://mediatoget.blogspot.in/2012/01/potentiometric-type-digital-voltmeter.html>