

Noise In Wire Wound Potentiometers. A precision potentiometer is an electro-mechanical transducer dependent upon the relative position of a moving electrical contact (wiper) and a resistance element for its operation. It delivers a voltage output that is some specified function of applied voltage and shaft position. The wire wound potentiometer is manufactured in its simplest form as a three terminal device, as shown schematically in Fig. 1-26. Turns of resistance wire are wound on a form (mandrel), and the wiper can traverse from a point of zero resistance to a resistance value equal to the total resistance of the wire wound element, thus functioning as a voltage divider.

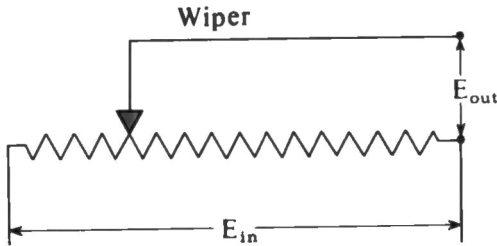


Fig. 1-26. Potentiometer circuit (voltage divider).

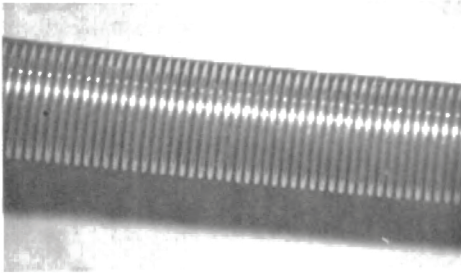


Fig. 1-27. Wire wound resistance element from a potentiometer. Mandrel is round.

Each turn of the resistance wire in a potentiometer has a finite resistance resulting in the situation pictured in Fig. 1-28. As the wiper is moved from one turn to the next, the resistance and output voltage change in steps rather than changing in a smooth linear manner. This steplike change is called “resolution noise.” Resolution noise must be added to the noise caused by other factors, as previously covered.

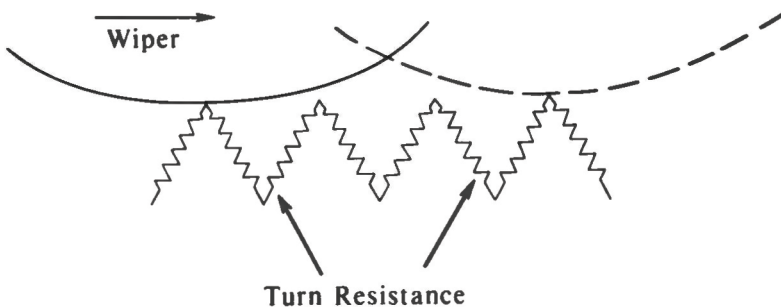


Fig. 1-28. Representation of a wiper on a wire wound potentiometer element.