OPERATING PRINCIPLES
POTENTIOMETERS

■ CONTACT METHOD TYPE

Potentiometers are displacement sensors that produce electrical output (voltage) in proportion to the mechanical displacement.
They are basically composed of a resistor and a wiper (brush), with the mechanical displacement of the resistor relative to the wiper being accurately converted into electrical voltage output. A voltage is applied to both ends of the resistor, and the wiper is moved. The displacement is measured by the voltage between one terminal of the resistor and the wiper.
Looking at the component structurally, we can see the following: (Fig. 1)
Further, the following formulas apply to the voltage output.

Effective electrical angle (Length): θ f Input voltage: E_i

Displacement (Length, Angle): θ Output voltage: E_0

Linear output $\frac{E_0}{E_i} = \frac{\theta}{\theta f}$ $(0 \leqq \theta \leqq \theta f)$

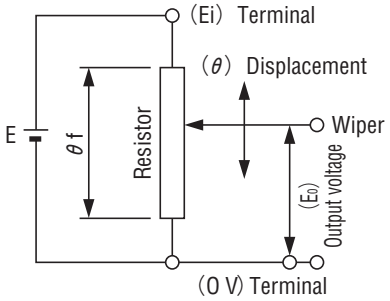
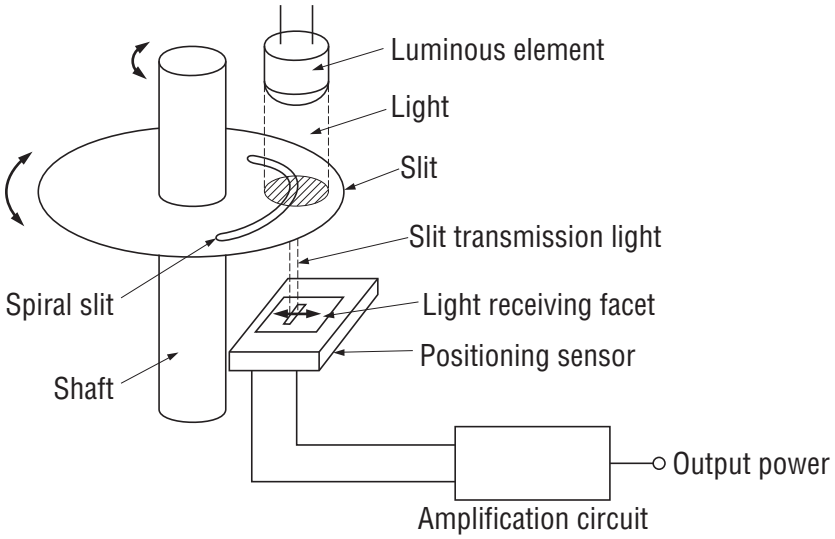


Fig. 1 Schematics diagrams

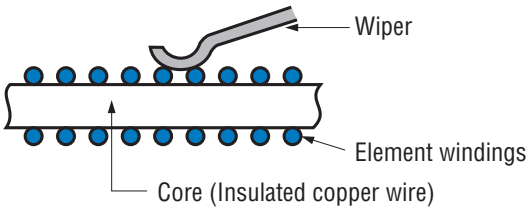
■ OPTICAL CONTACTLESS TYPE

Optical contactless potentiometers shall detect rotational angle at time of shaft rotation by positioning sensor which photo-electrically transfers the displacement of light transmitted through spiral slit that is placed between luminous element and positioning sensor.

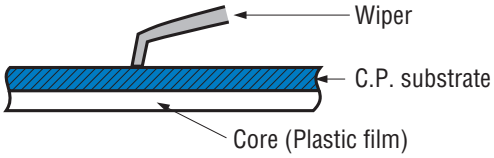


■ CONTACT CONSTRUCTION AND OUTPUT TYPE

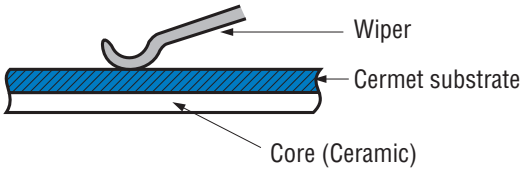
● Wiper for wirewound type



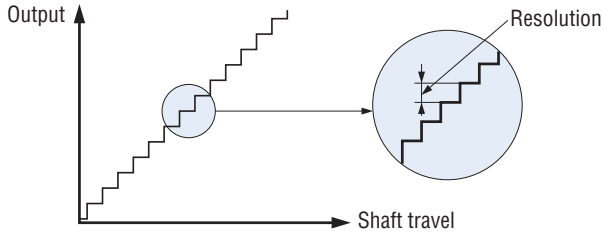
● Wiper for conductive plastic type



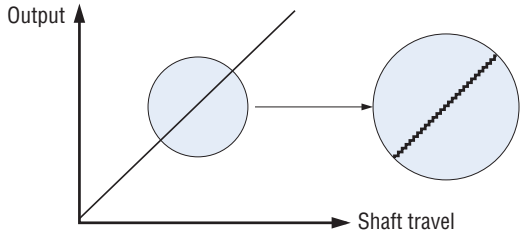
● Wiper for cermet type



● Resolution of wirewound type



● Resolution of conductive plastic, cermet type



■ MODELS

<Wirewound type>

Precision wire winding technology has been used to achieve low noise and long life. Wirewound types include the single turn J series for use in servo drives and the multiturn M series for use in setting.

<Conductive plastic type>

Special film resistors and original contact construction provide long life, with degradation that is theoretically infinitely small.
Conductive plastic types include single turn types and linear types, both for use in servo drives.

<Cermet type>

The use of cermet resistors allows low price. The degradation is theoretically infinitely small. Cermet tyeps are single turn for use in servo drives and for setting.

<Optical contactless type>

Contactless configuration offers much longer life and lower noise compared with the conventional contact method.