



What is a Slip Ring?

A slip ring (in electrical engineering terms) is a method of making an electrical connection through a rotating assembly. Slip rings, also called rotary electrical interfaces, rotating electrical connectors, collectors, swivels, or electrical rotary joints, are commonly found in electrical generators for AC systems and alternators and in packaging machinery, cable reels, and wind turbines. One of the two rings is connected to one end of the armature winding and other one to the other end of the armature winding.

A slip ring is used to continuously transmit electrical power, signal or data from a stationary source to a rotating destination, or vice versa. They are available in a wide variety of configurations, termination types and materials to fit most applications.

A slip ring consists of a conductive circle or band mounted on a shaft and insulated from it. Electrical connections from the rotating part of the system, such as the rotor of a generator, are made to the ring. Fixed contacts or brushes run in contact with the ring, transferring electrical power or signals to the exterior, static part of the system.

This system is similar to the brushes and commutator, found in many types of DC motors. While commutators are segmented, slip rings are continuous, and the terms are not to be used interchangeably. Slip rings can also be used where electrical power or signals need to be transferred to a rotating device, such as an aerodrome beacon, rotating tank, power shovel or radio telescope. Rotary transformers are often used instead of slip rings in high speed or low friction environments.

Mercury-wetted slip rings, noted for their low resistance and stable connection use a different principle which replaces the sliding brush contact with a pool of liquid metal molecularly bonded to the contacts. During rotation the liquid metal maintains the electrical connection between the stationary and rotating contacts. However, the use of mercury poses safety concerns, as it is a toxic substance. If a slip ring application involves food manufacturing or processing, pharmaceutical equipment, or any other use where contamination could be a serious threat, the choice should be precious metal contacts. Leakage of the mercury and the resultant contamination could be extremely serious.