

Inductive Coupling for Non-contact Power and Data Exchange

FUNDAMENTALS OF INDUCTIVE COUPLING FOR INDUSTRIAL AUTOMATION

Inductive Coupling

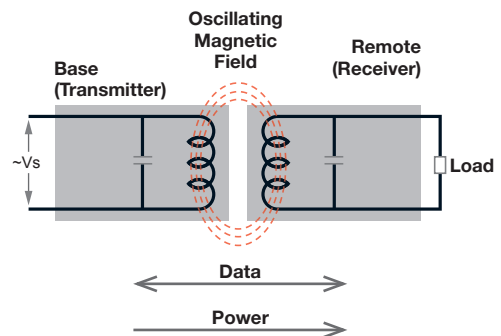
What is it?

Inductive coupling enables transfer of power and data over a air gap. This technology is extremely useful in applications where cables or wiring is difficult or data transfer needs to be carried out across a barrier (wall, or plexi-glass), or even for applications to replace mechanical slip-rings.

Wireless (or portable) charging pads for cell phones or tablets also use this technology.

When an oscillating current is supplied to the “base” (transmitter), it generates an oscillating magnetic field. When the “remote” (receiver) device is brought closer to the base unit, the oscillating magnetic field induces a current—hence the transfer of energy.

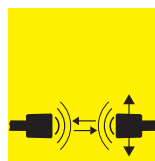
Base and remote circuits are tuned to be resonant at a common frequency to ensure minimal efficiency loss.



Benefits

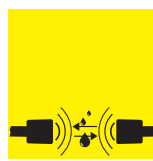
Enhanced Flexibility

- Data transmission to previously inaccessible parts of machine
- Radial coupling with axial rotations without loss of connection



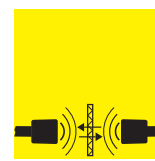
Reliable Connection

- No mechanical wear – No contact chatter
- Insensitive to vibration
- IP67 rated, suitable for harsh environments (no effect of humidity, dust or oil)



Overcome Obstacles

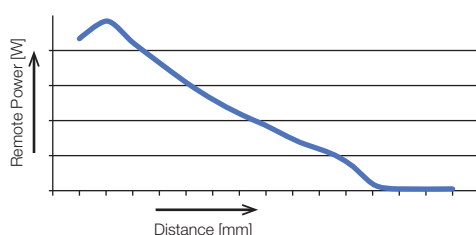
- Establish connection across non-metallic barriers
- Bi-directional data transfer



Gotchas

Distance Limitations

As the power and data transmission occurs due to magnetic induction phenomenon, the remote needs to be in very close proximity of the base.



Metal dust or Metallic barriers

If metal dust or chips accumulate on the surface of the remote or base, transmission can be interrupted. Also, it is not possible to transmit signals across metallic barriers.

