Setting the Standard for Automation™

POWER AND SIGNAL OVER AN AIR GAP

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Jonathan Jacobs:

- 10+ Years of experience implementing sensor solutions across North America
- Currently the Regional Sales Manager of the South-Eastern U.S. for TR Electronic.

TR ELECTRONIC
. . . Passionate about Sensors.

Basics of Inductive Power

- When current flowing in one wire induces a voltage in another wire without a physical connection, it is known as an inductive coupling

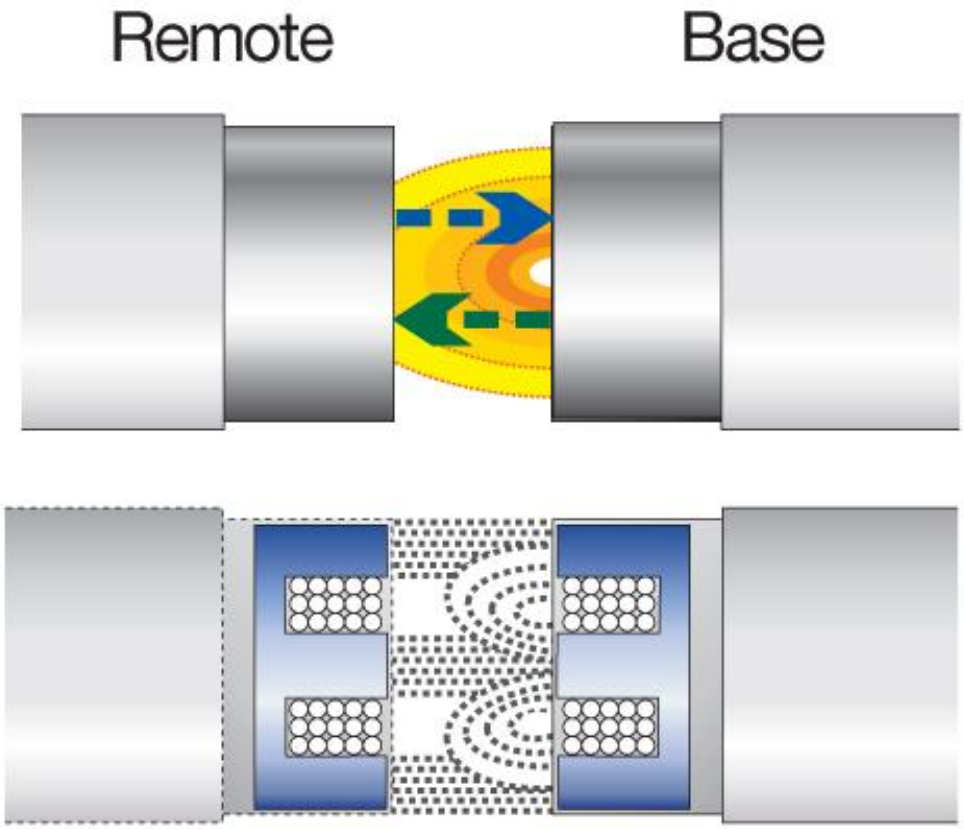
- Also known as Electromagnetic Induction

- Engineers have learned how to harness this inductive power to send power and signal safely and cleanly across a gap for use in automation control

How Inductive Power Coupling Works

- Current moving through a wire naturally causes a magnetic field
- Using a coil of wire amplifies the magnetic field
- If another coil is brought into proximity of the field you can induce a current in the second coil!
- By harnessing this phenomenon – current can be sent over a small gap and used for control automation

Inductive Power Coupling

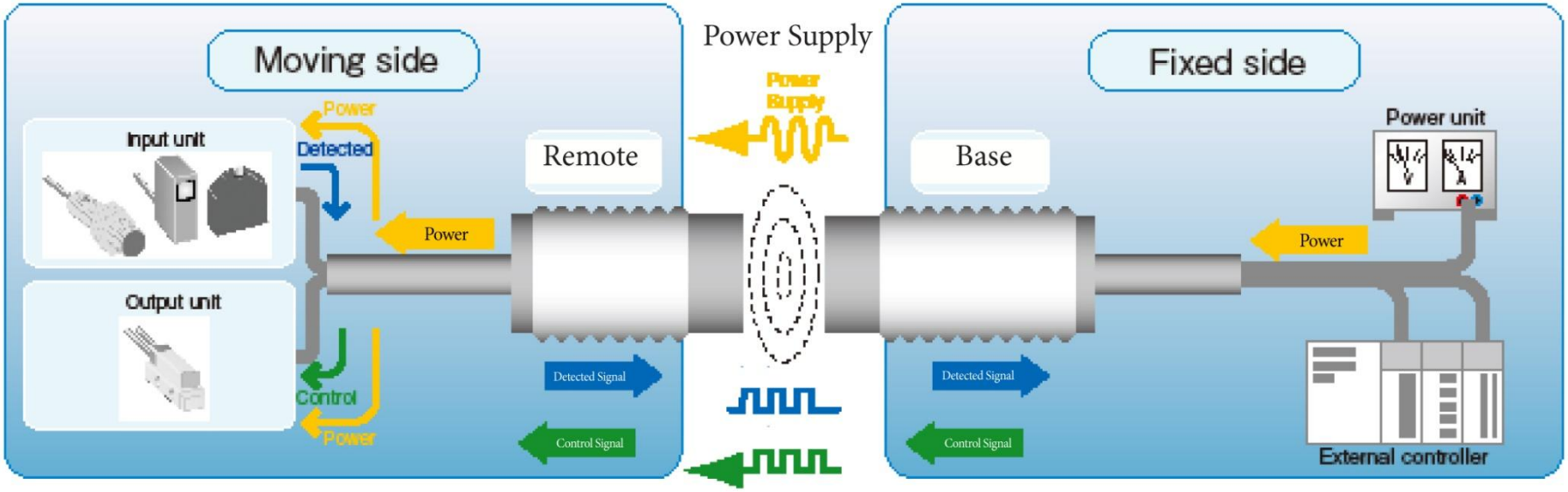


(image of inductive coupling)

Inductive Power Coupling System

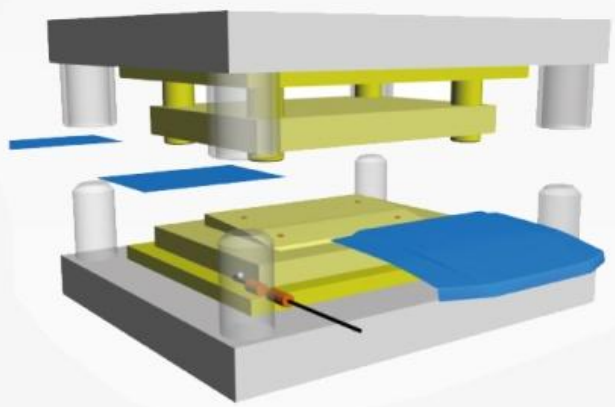
- This technology has been harnessed to make inductive power coupling systems possible.
- A fixed or “base” side is physically connected to power
- A moving or “remote” side is supplied power when its secondary coil comes within the primary coils inductive field.
- By adding signal transfer (digital, thermocouple, fieldbus, or Ethernet) the remote side can be powered and control signals exchanged.

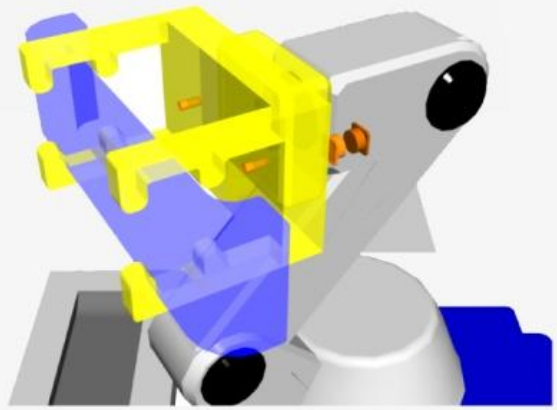
Inductive Power Coupling System



Inductive Power for Quick Change Tooling

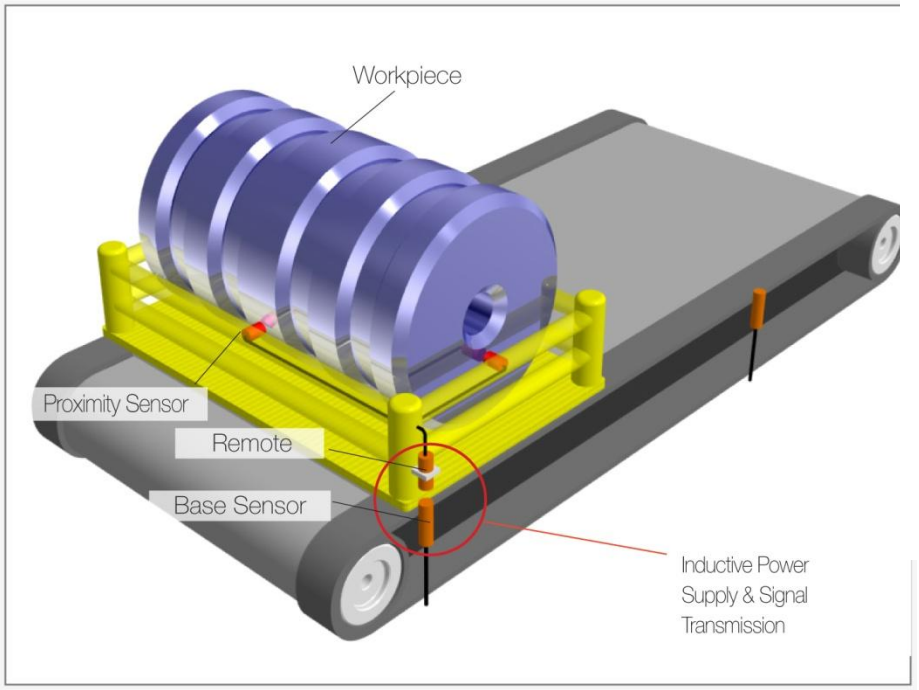
- Inductive power system transfers power and signal to the new tool – no connectors need changing
- Fast change and low down-time on end effectors, stamping dies, and other machine tools

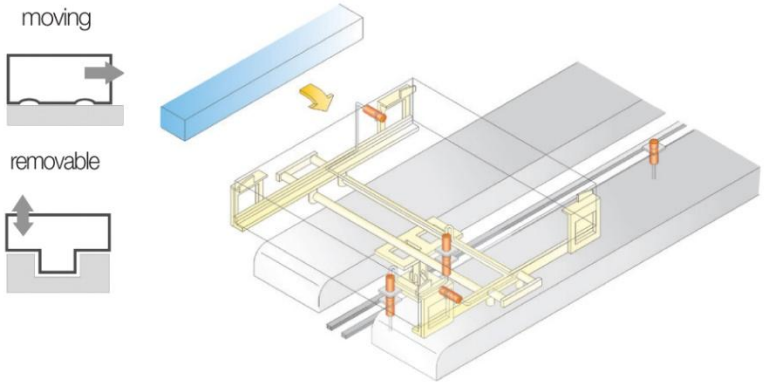




Inductive Power and Signal for Moving Pallets and Fixtures

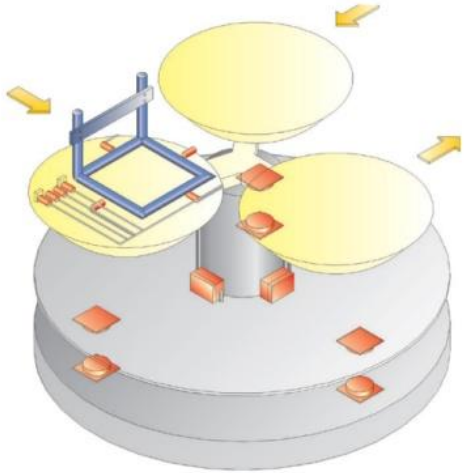
- Power and Signal can be supplied to pallets and fixtures by adding a remote to each unit
- Base units can be stationed throughout the process to read sensors and initialize actuators at key locations

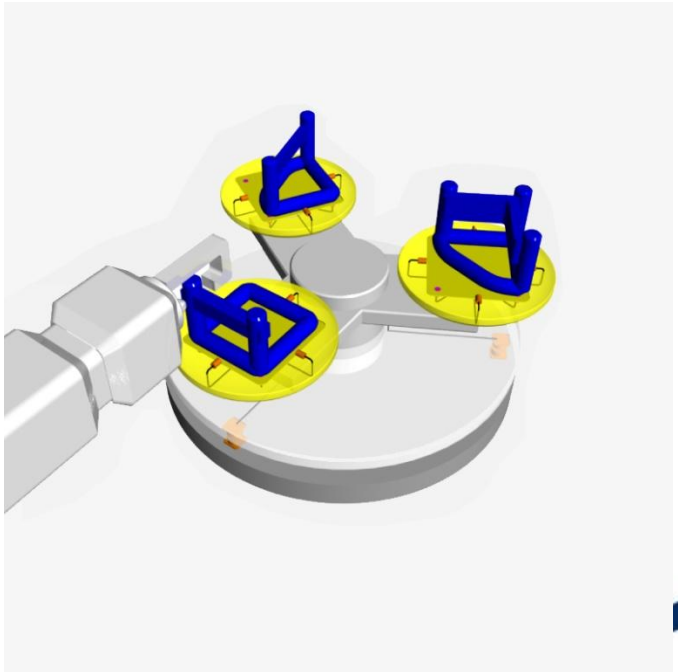




Inductive Power and Signal used as a Slip Ring

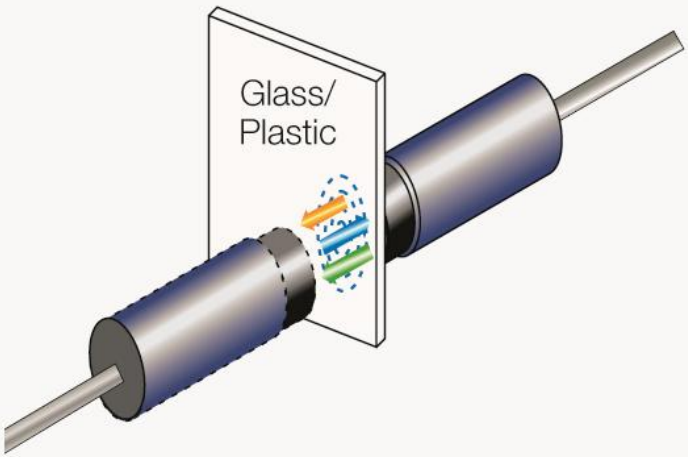
- Slip Rings are mechanical devices that allow power and signal to be passed through a rotating axis using fingers and rings
- A Inductive Power System can provide a non mechanical, non contact replacement for slip rings





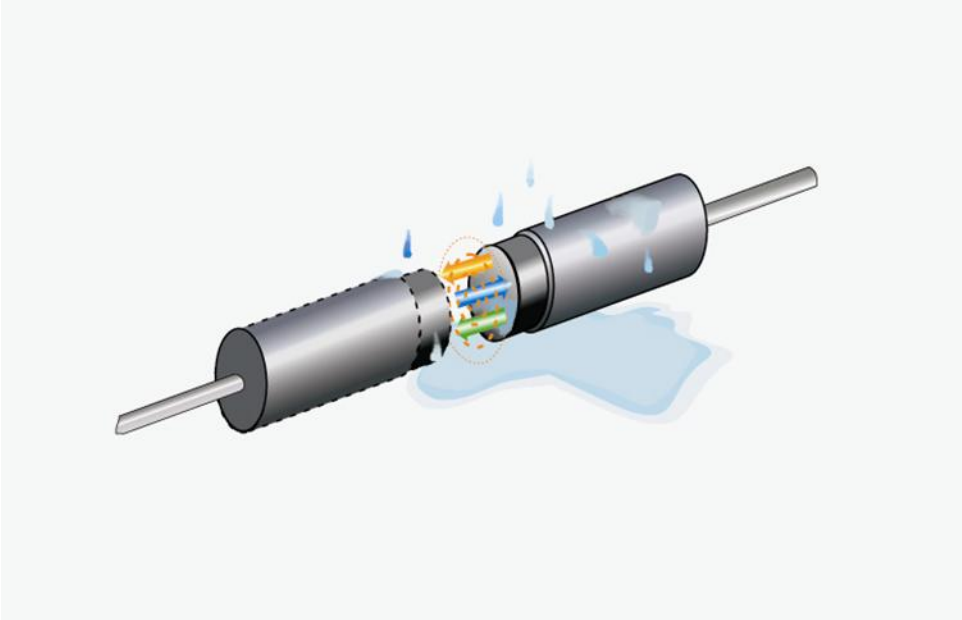
Inductive Power and Signal System to pass through a medium

- Inductive Power Coupling systems can pass power and signal through non metallic materials, such as plastic or glass
- Allows power and signal into vessels where cutting a hole for wiring might be hazardous or otherwise not desired.



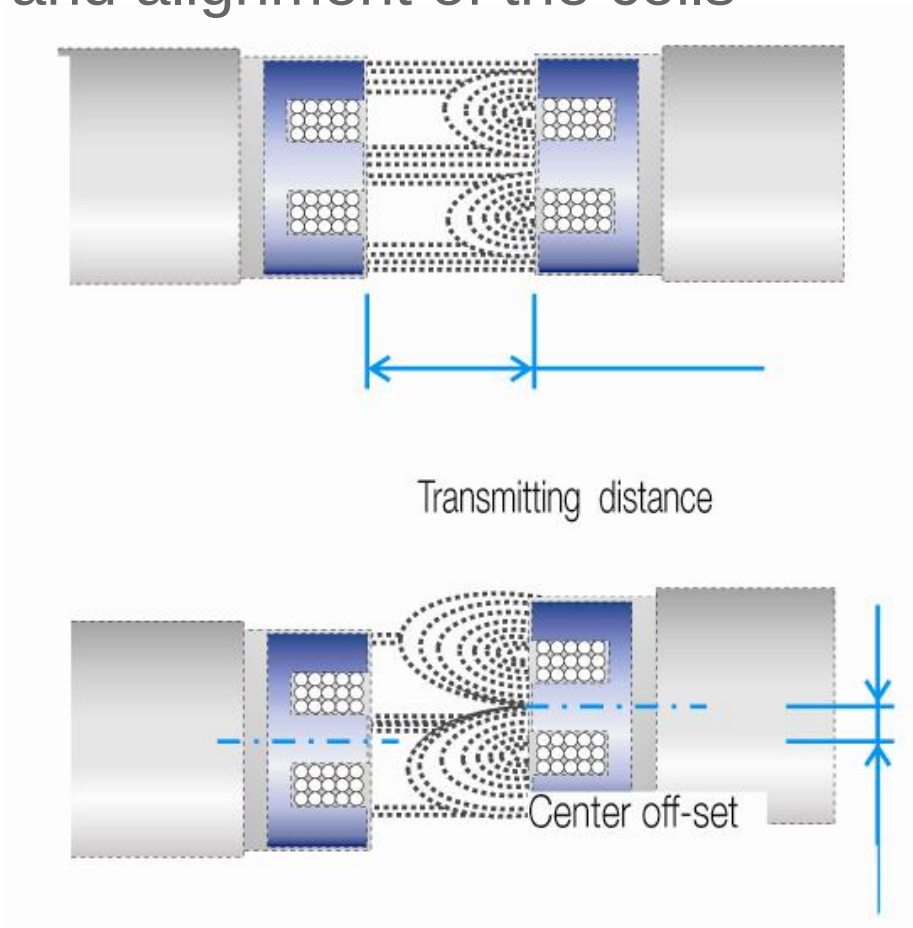
Environmental Advantages

- Inductive Couplings will work in many environments:
  - very low or very high humidity
  - covered in liquid
  - covered in grease, sludge or dirt
  - high pressure environments or in a near vacuum



Alignment and Distance

- Amount of current transferred, and distance in which an inductive power coupling can take place is proportional to the size and alignment of the coils



Conclusion

- Currently Inductive Power Coupling Systems are being used to replace less reliable solutions – i.e. slip rings, connectors, gable glands

- More and more designers are starting to utilize inductive power technology for new applications, incorporating sensors and actuators in areas never before considered

- Inductive Power is in it infancy, and the future will bring designers ever closer to a truly wireless factory.