Power over Ethernet (PoE) technology describes a method of transmitting electrical power, along with data, to remote devices using standard CAT-5 Ethernet cabling.

**PoE Specifications**
- Invented in the late 1990s for the Telecom industry, and now widely accepted.
- Established standard by IEEE in 2003 as 802.3af.
- Also called “Power over LAN” and “Inline Power”.
- Uses standard CAT-5 Ethernet cabling.
- Supports 10/100 megabit and gigabit Ethernet.
- Nominally 48VDC power with wide input voltage tolerance of 37V - 57V.
- Standard allows for devices up to 12.95W.
- Building automation and factory automation are beginning to adopt PoE.

**Common PoE Devices (Powered Devices)**
- Wireless access points.
- Voice over Internet Protocol (VoIP) phones.
- Security and web cameras.
- Security card readers.
- Gibson guitars and electric razors.
- In-Sight Micro vision systems.

**Advantages of PoE**

**Reduction of Cabling**
- Reuse existing Ethernet cables.
- Provide power and communications through only one connection.

**Universal Compatibility**
- RJ-45 Ethernet jack is now the first worldwide standard power plug.

**Safety**
- PoE insulates devices from AC line surges or spikes.
- Low voltage DC is safer for personnel.

**Power Management**
- Can use centralized Uninterruptible Power Supplies (UPS).
- Manage power consumption remotely.
The In-Sight Micro Vision System & PoE

In-Sight Micro Vision System - PoE Connector (M12 Connector)

- Powers the In-Sight Micro vision system via industry-standard PoE.
- Ethernet communications.
- Same Ethernet cabling as the In-Sight 5000 series.

Cognex PoE Offerings

- The Cognex VisionView™ provides 4 built-in Vision Sensor Ports that can supply PoE to the In-Sight Micro vision system.
- Low-cost AC injector.

Powered Device (PD) – In-Sight Micro Vision Systems

Power Levels Available (PoE Class)
The In-Sight Micro is classified as a Class 2 device.

- **Class 1**: 0.44W - 3.84W.
- **Class 2**: 3.84W - 6.49W.
- **Class 3**: 6.49W - 12.95W.

Power Sourcing Equipment (PSE) – VisionView and AC Injector

Power Transmission Modes
In-Sight supports both Type A and Type B power transmission modes.

- **Type A**: 4- or 8-wire cable (VisionView or endspan injectors).
- **Type B**: 8-wire cable (AC injector).

Types of PSEs

- **PoE Switches**: Endspan devices (VisionView) that provides Ethernet switch and power.
- **PoE Injectors**: Midspan devices (AC injector) that “injects” power between the switch and the device.

Questions and Answers

**Q**: Will I damage anything if I plug non-PoE devices/switches into PoE devices/switches?

**A**: No. Upon insertion, the PoE supply will first check the cable for a resistance value corresponding to PoE and the class of wattage the product consumes. Only after it has been validated, will the PoE device/switch provide power. Consequently, no power will be seen by non-PoE devices.

**Q**: Are there noise problems or voltage drops when applying power with Ethernet?

**A**: No. The nature of the PoE architecture and CAT-5 wiring minimizes any noise on the line, and the architecture is designed to account for large voltage drops or large power supply variations. This is so much so, that the input supply can handle an even larger voltage than the In-Sight 5000 series sensors.

**Q**: Are there special PoE cable requirements?

**A**: No. PoE was designed to work with standard CAT-5 installations in cable type and length.
Q: Is there a maximum cable length for PoE?
A: Yes, 328 feet (100m). However, PoE was designed specifically to fit within existing CAT-5 Ethernet installations, so it is exactly the same as standard Ethernet installations. On an additional note, this is significantly longer than any Ethernet cable that Cognex currently sells.

Q: Can I use a pre-existing Ethernet switch with PoE?
A: Yes. However, a single port midspan “power injector” will need to be used in order to power each vision system. These are available from Cognex in addition to the VisionView.

Q: Do I route the PoE cable in the data bundle or the power bundle in my installation?
A: Route the PoE cable in the data bundle. PoE conforms to Telecom standards for data/voice, and all In-Sight data cables are shielded for additional immunity.

Q: Are PoE Ethernet switches expensive?
A: No. There are many commercially available PoE 4 - 8 port switches, ranging in price from $100 to $300 USD, in addition to the currently available single port power injector and 4-port VisionView, available from Cognex.

Q: Why isn’t PoE on the plant floor?
A: PoE may already be on the plant floor, as many wireless Ethernet access points are using this technology. The Telecom industry adopted this technology many years ago to reduce cabling installation costs, so adoption in the industrial environment is expected soon.

Q: If the In-Sight Micro vision system is powered by PoE, why isn’t the VisionView as well?
A: Since the VisionView has an integrated endspan PoE switch with 4 ports, it must supply power to 4 “Class 2” PoE In-Sight Micro vision systems. Powering an endspan PoE switch is both non-standard and exceeds the current carrying capability of the 802.3af specifications for CAT-5 cables.