**POE VS. POE+ VS POE++ INDUSTRIAL ETHERNET SWITCHES**

In beginning your search for an industrial PoE switch, you’ll find three common types – PoE, PoE+ and PoE++. Antaira offers PoE switches that meet all industry (IEEE) standards: 802.3af (PoE), 802.3at (PoE+), and 802.3bt (PoE++).

Traditional PoE switches are designed to power low-power devices, such as IP telephones. This means that there can be some loss of power, and these ports are typically rated at 15.4W and up to 44-57V.

PoE+ switches are backwards compatible with PoE switches, which delivers more power. The transition from 802.3af to 802.3at is relatively simple. A PSE designer will have to spend more time engineering the change to 802.3bt, but Antaira offers compatible industrial switches. A PoE+ port bumps up its rating to 30W and 50-57V to power higher-end devices.

Finally, PoE++ solutions, broken down into Type 3 and Type 4 solutions, take those specs even further to deliver, in Type 4 scenarios, 100W and 52-57V capabilities.

**POWER CAPABILITIES OF THE VARIOUS TYPES OF POWER OVER ETHERNET SWITCHES**

The power provided by an industrial PoE switch, Type 1, uses standardized Ethernet wires twisted into pairs to power devices that use up to 12.95 watts of power in a range of 37V to 57V. This is sufficient power to operate VoIP phones, static surveillance cameras and wireless access points for transmitting information. The technical rating is usually 15.4 watts for devices operating from 44V to 57V based on some loss of power.

POWER OVER ETHERNET TYPE 2

Power over Ethernet Type 2, also known as PoE+, uses a two-pair configuration that can deliver up to 30 watts of power at the port level, and the technology was released by the Institute of Electrical and Electronic Engineers in 2009 under the IEEE 802.3at switch standard. This technology can deliver up to 25.5 watts of power to each connected device, and the higher limit makes it possible to power video IP phones, RFID readers, PTZ cameras and alarm systems. The technology is designed for Cat5 cables or better, and it can also support the devices used in standard Power over Ethernet switches.

POWER OVER ETHERNET TYPE 3

PoE Type 3 switches, also known as PoE++, use all four pairs of copper cables in an Ethernet cable under the standard IEEE 802.3bt switch, which was first published in 2011. This configuration supports up to 60 watts of power to each port, and it can run devices requiring up to 51 watts of power. This is enough power to support multiple radio wireless access points, PTZ cameras, video conferencing equipment and multiple building management devices.

POE TYPE 4

Also known as Power over Ethernet++, Type 4 switches offer the highest level of power for Power over Intern switches -- up to 100 watts of power. The configuration also conforms to the IEEE 802.3bt switch standard, and this level of power can run laptops and flat screen entertainment devices. Technically, the limit of power is 90 watts and up to 70 watts for each device.

**OTHER IMPORTANT DIFFERENCES IN TYPES OF SWITCHES**

The importance to users of different types of switches involves their operational mode and power supply. Using an 802.3af switch, a.k.a. Type 1 PoE switch, requires a power delivery of less than 15.4 watts for sensors, two-antenna wireless access points, meters and simple surveillance cameras. The PoE+ switch is limited by the IEEE 802.3at switch standard of 30 watts of port power and 25.5 watts for each device. That supports cameras that can zoom, tilt and pan a given area.

The higher level of power of PoE++ can run laptops, televisions and complex camera systems. The Ethernet cabling you choose for different types of switches also plays a critical role -- such as whether to use two or four pairs of twisted copper cables or fiber optic cables. You also need to determine whether you need unmanaged, web-smart or managed switches.

Usually, you choose unmanaged switches for simple plug-and-play devices with fixed configurations. These are typically used in small networks and home networks. Medium-sized networks work most efficiently when using web-smart switches with basic levels of management options. These switches also require selection based on other factors if used in demanding environments. You can choose from commercial, industrial, or hardened grades. Commercial grade switches are chosen for operating temperature ranges of 0 to 50°C or 32° to 122°F. The industrial PoE switch was designed for temperature ranges from -10° to 60°C or 14° to 140°F.

Hardened switches are used in the most extreme environmental conditions and temperature ranges from -40° to 75°C or -40° to 167°F. Managed switches allow you to set configuration details to different levels of management such as VLAN, QoS, IGMP snooping and link aggregation. Setting the minimum details reduces switch complexity.