7 Benefits of Using Industrial Ethernet Switches

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David Goggins is the toughest man alive. He is the only member of the US Armed Forces to complete SEAL training, US Army Ranger School, and Air Force Tactical Air Controller training. He is also the current Guinness record holder for the most pull-ups in 24 hours and has completed multiple first-place finishes in brutal ultra-endurance events against the most formidable global competitors.

Goggins is the human equivalent of the industrial Ethernet switch, which was developed to link networked devices in rugged locations—regardless of the challenges they face.

Talking Tough: Industrial Ethernet Switches

Industrial-grade Ethernet switches carry an impressive rep. Built to outstrip the specifications of standard Power over Ethernet (PoE) switches, they come with industrial safety certification and approval for use in harsh environmental conditions. Outdoor applications, industrial facilities, and manufacturing plants are all exposed to high vibration levels.

Marine, rail, and other transportation systems regularly navigate extreme temperature fluctuations, and oil, gas, and mining operations are often subject to shock waves caused by explosives used during operations. Industrial PoE switches have been designed specifically to withstand these assaults, and they are manufactured differently from standard switches.

These switches also offer layer 2 or layer 3 networking for systems. In electrically noisy environments like manufacturing plants, fiber optic cables provide backbone connections immune to interference.

7 Benefits of Industrial Ethernet Switches

Industrial ethernet switches can be used to power networks of all sizes. Companies get multiple advantages from using industrial-grade PoE switches. Here are the top benefits associated with these remarkable components.

1. Higher Temperature Ratings

Industrial PoE switches support a pleated metal casing for better temperature protection. This means temperature ratings typically meet or exceed the connected equipment, such as PLCs, Ethernet I/O, and HMIs.

For example, most standard PoE switches have commercial ratings between 0 and 40 degrees Celsius, while industrial switches can work in temperatures from -40C to 85C. The switches themselves are self-cooling and generate heat, enabling operation and storage in complex temperature environments, including 90%+ humidity.

This factor eliminates the need to house network equipment inside expensive, climate-controlled enclosures, reducing costs while increasing reliability.

2. Increased Durability

In addition to the increased temperature ratings, industrial-grade PoE switches exhibit more durability. They are immune to lightning, are waterproof, have anti-corrosion and anti-static qualities, and have an inbuilt ability to absorb shock and vibrations without

loosening.

For example, switches used in highway applications are subject to high traffic activity. Even with multiple trucks and other vehicles rumbling by and vibrating, the switches can withstand the vibrations without components vibrating loose.

In addition, industrial PoE switches carry a Class I Div 2, group ABCD rating, allowing them to function in locations where explosive gases are used.

3. Better Network Determinism

Network determinism means the ability to ensure packets reach their destinations properly. Industrial PoE switches use IGMP filtering protocols to configure a switch's interface on a per-port basis to improve the routing of packets to appropriate ports. This results in higher accuracy, simpler troubleshooting, and quicker communication for industrial control applications.

The switches also have the inbuilt ability to connect Ethernet nodes, providing full bandwidth with storage to a node or group of nodes. These switches eliminate the risk of collisions that make Ethernet non-deterministic.

4. Most Cost-Effective Solution

Industrial Ethernet switches are explicitly designed to have solid anti-interference performance. This enables them to function reliably in plant floor environments, which are often electromagnetic, requiring rugged, industrial-style steel enclosures using Din-Rail or panel mounting to protect them.

The switches use industrial-grade materials in all components, which gives them a service lifecycle of 10 years or more. In the case of ComNet industrial switches, they are covered by a Lifetime warranty.

This is compared with the standard commercial switch that lasts 3 to 5 years. In addition, most commercial switches and media converters cannot mount conveniently inside equipment enclosures, which also increases operating costs.

5. Improved Data Integrity

Commercial switches often use cut-through techniques that can result in bad packets on a network. Industrial-grade PoE switches use store-and-forward technology and carry out cyclic redundancy checks, which maintain the data integrity of the packets in transit.

Industrial Ethernet switches only send data to the appropriate network port or segment identified in the packet's MAC address, not the entire network. The switch identifies

each node's location, establishes a temporary connection with the node, and terminates it once the packet transfer is complete.

6. Redundant Power Supply

Around 35% of equipment failures result from power outages. While commercial switches typically rely on a single power supply, industrial switches run off DC power and have dual power inputs to provide backup. Redundant power inputs are another benefit of using industrial PoE switches.

The switches can form redundant networks quickly and have self-healing times of less than 50 milliseconds, enabling them to recover faster from failed data pathways. This ability ensures maximum uptime and reliable operation in continuity-critical operations, avoiding the risk of costly production line shutdowns and other damaging events.

7. Advanced Management Tools

Managed industrial Ethernet switches also offer advanced capabilities over commercial and non-managed switches. These include:

- Better traffic filtering and protection of data in transit
- Network topography and device mapping
- Advanced network management tools
- Improved troubleshooting and cable diagnostics
- Industrial Protocol Management (Ethernet/IP, Modbus TCP, SNMP)
- Robust network security, with complete control of port settings that enable blocking of unauthorized access.

Since many industrial locations don't have onsite technicians to attend to failures, industrial-grade managed PoE switches deliver higher reliability and lower risk of data losses caused by environmental issues.

The Bottom Line for Industrial Ethernet Switches

Industrial Ethernet switches offer benefits in multiple applications. ComNet switches support almost all industrial automation protocols, including Profinet, CIP/Ethernet IP,

Powerlink, SERCOS III, CC-Link, MODBUS TCP, etc. Our switches also adhere to National Electronics Manufacturers Association (NEMA) standards and specifications.

Like David Goggins, industrial-grade PoE switches don’t stop when they’re tired. They only stop when they’ve finished the job. They enable networks to communicate through a single Ethernet cable and are a cost-effective option in industrial settings needing a reliable and stable connection.