Use case
Industrial IoT circuit protection

Eaton products provide circuit protection in industrial IoT systems

Increasingly, USB ports are being included in industrial IoT (IIoT) devices and equipment. With USB 3.0, 3.1 and 3.2 having data speeds anywhere from 5 GB/s to 20 GB/s, USB protocols provide the bandwidth and reliability required in virtually all industrial applications.

USB ports provide a link between a host computer and IIoT device (e.g., an industrial controller) for real-time monitoring and control, allowing users to make smarter decisions and increase the productivity of several processes. Reliable transmission of data is imperative for IIoT devices: downtime of even a few minutes can mean thousands of dollars (or more) of losses for many companies.

Power quality issues and overheating in IIoT devices

As the data transmission speed in industrial systems increases, so do the power requirements and the need to reduce signal distortion. Therefore, there is a greater need to protect internal components from power quality issues like overcurrent, Electrostatic discharge (ESD) and overheating common in industrial environments. Adequate circuit protection can minimize downtime in industrial operations, costing up to several thousand dollars per minute.

Overcurrent and overvoltage in IIoT equipment can be due to overloading from power supplies, power surges, or short circuits, which generate significant heat and increase the risk of physical damage or electrical fires.

Moreover, higher temperatures in industrial environments can cause thermal overstress in sensitive components such as ICs - leading to equipment failure. Sources of ESD can be from human contact and interaction, but also moving equipment such as conveyors and automated assembly equipment.

Reliable circuit protection with Eaton's resettable fuses and ESD arrays

Eaton's PTC resettable fuses in compact 0805, 1206, 1210 and 1812 footprints provide reliable overcurrent protection in communications ports of industrial IoT systems. They operate in a wide range of temperatures ideal for maximizing uptime in industrial applications.

Eaton's PTC resettable fuses consist of a special positive temperature coefficient material having an internal resistance that increases greatly in response to overcurrent or overtemperature. When a fault occurs, the fuse works by restricting current flow through the circuit until the fault condition is removed and back within the safe hold current range. Unlike one-time fuses, resettable PTC fuses do not need to be replaced immediately after a trip.

PolySurg arrays are ESD suppressors devices having rapid response times and low clamping voltages to prevent higher potential voltage from flowing through IIoT equipment during ESD strikes. The ultra-low capacitances prevent inadvertent distortion of signals which is imperative with the faster data speeds found in USB 3.0 and higher, but also RF circuits.

Industrial applications include USB peripherals, industrial computers and peripherals (keyboards, printers), disk drives, plug-and-play protection for motherboards, and peripherals. Eaton PTC resettable fuses and ESD arrays are built with eco-friendly materials to reduce carbon waste. All products are lead-free, halogen-free, and RoHS-compliant.

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