



ENABLING Smarter Industrial Product Designs

The shift from analog to digital technology has reshaped modern life, transforming traditional products into smart, connected devices. By integrating digital technologies, sensors, and wireless connectivity, original equipment manufacturers (OEMs) have elevated product capabilities enabling real-time monitoring, data collection, and enhanced safety features. Leveraging technologies like the Internet of Things (IoT), artificial intelligence (AI), 5G, machine learning, and robotics to boost efficiency, cut costs, and enrich user experiences. High-speed connectors are vital in this evolution, supporting OEMs in creating smarter products across sectors, including automotive, consumer electronics, and industrial applications. This article examines connectivity options for smarter industrial product designs.



Application Examples

Smart industrial products feature advanced sensors and connectivity solutions to enable real-time data collection and analysis. These capabilities drive enhanced functionality, automation, and actionable user insights. Common examples include augmented reality (AR) systems, additive manufacturing, industrial robots and cobots, automated guided vehicles (AGVs), and autonomous mobile robots (AMRs). Such products are critical for improving efficiency, boosting productivity, and reducing manufacturing costs.



Connector Requirements

Building a reliable, high-speed network for smart industrial products driven by AI and IoT comes with unique challenges. Many industrial applications operate in harsh environments, requiring solutions that can withstand signal interference (noise), extreme temperatures, dust, moisture, shock, and vibration. Additionally, considerations like size constraints, power capabilities, and compatibility with various communication protocols are essential for ensuring efficient and reliable performance.

Protocol Compatibility

High-speed connectors are engineered to support diverse communication protocols, addressing the rising demand for faster data transmission across industrial applications. Smart industrial products rely on protocols like Modbus, Ethernet/IP, Profibus, Profinet, OPC-UA, EtherCAT, FANUC FOCAS, IO-Link, and CAN bus to enable efficient data exchange and connectivity. These protocols facilitate real-time monitoring, data collection, and advanced functionality in industrial systems. Selecting a protocol often depends on application requirements, existing infrastructure, and vendor preferences. Modern systems frequently support multiple protocols to enhance flexibility.

