



# MINIATURIZATION

Packing ever-bigger capabilities into ever-smaller components has driven incredible innovations and efficiencies in manufacturing. For industrial robotics, the development of mobile robots, such as automated guided vehicles (AGVs) and autonomous mobile robots (AMRs), and cobots has pushed miniaturization into every element of the robotics package — from relays and sensors to circuit boards and connectors.

## Small tech is key to the IIoT

As robots become increasingly mobile, relays must become smaller and lighter and consume less energy. That is because as end devices shrink, density goes up, making heat dissipation critically important to ensuring the robots' ongoing operation. Designing smaller and lighter relays to meet miniaturization and lower energy consumption needs is essential in the age of Industry 4.0. So too is designing compact, lightweight circuit boards.

In these early days of the IIoT, opportunities will only continue to grow. Compact interconnectivity between devices, components, control systems, and the cloud will be required to enable the seamless real-time communication needed to drive machine learning and artificial intelligence capabilities. OEMs need to ensure they are working with manufacturers that can provide a solution specifically tailored to the application need — all while remaining small and secure.

## Are you interested in learning more about TE Connectivity's expertise in industrial robotics connectivity?

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## PACKING MORE CAPABILITIES INTO A COMPACT PRINTED CIRCUIT BOARD (PCB)

Smaller devices require miniaturized circuit boards, but with no loss in operating speed. Enter high-powered miniaturized connectors such as the AMPMODU interconnect system from TE Connectivity.

A comprehensive family of modular signal interconnects for board-to-board, wire-to-board, and wire-to-wire applications, the AMPMODU 1 mm centerline fine pitch connectors use an ultra-compact 1.00 mm x 1.00 mm (0.050" x 0.050") centerline, crucial to meeting miniaturization demands. In fact, the AMPMODU 1 mm provides a space savings of 85% when compared to standard 2.54 mm (0.100") pitch products.

