



# AUTOMATION CONTROLS

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High-Speed Components for High-Speed Industries

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The background of the entire page is a blurred image of server racks in a data center, with several green indicator lights glowing. Overlaid on this are semi-transparent diagrams of network nodes connected by lines. Some nodes are labeled "NODE 01", "NODE 04", "E 05", and "NODE 06".

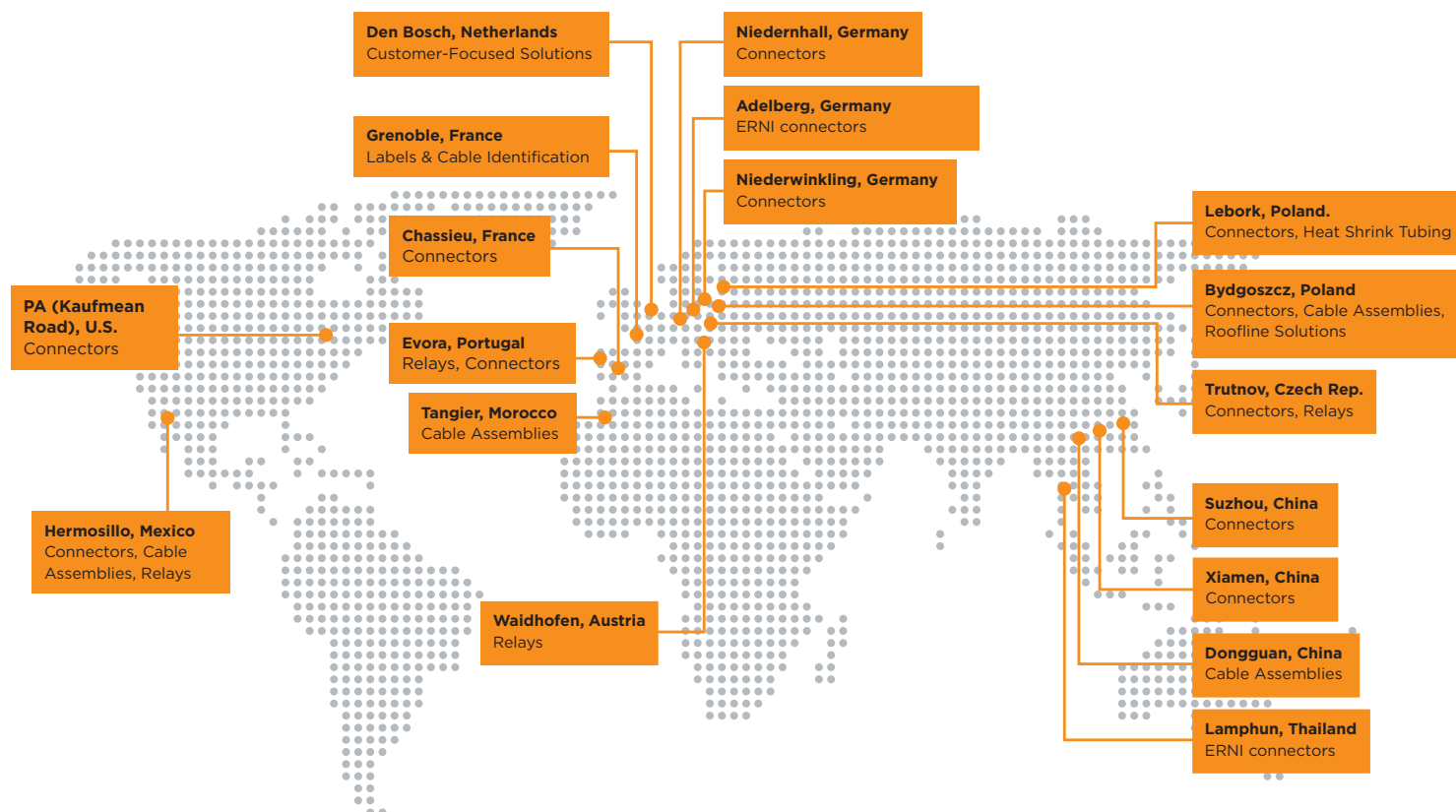
# LET'S CREATE THE CONNECTIONS THAT COUNT.

TE Connectivity (NYSE: TE L) is a \$16 billion global leader in connectivity. The company designs and manufactures products at the heart of electronic connections for the world's leading industries, including automotive, energy and industrial, broadband communications, consumer devices, healthcare, and aerospace and defense. TE Connectivity's long-standing commitment to innovation and engineering excellence helps its customers solve the needs for more energy efficiency, always-on communications, and ever-increasing productivity. With nearly 90,000 employees in more than 50 countries, TE Connectivity makes connections the world relies on to work flawlessly every day.

**To connect with the company, visit [te.com](https://te.com).**

# RELIABLE TECHNOLOGY FOR TODAY AND TOMORROW.

Providing High-Speed, Rugged Connectivity for Reliable Real-Time Communication



TE Connectivity worldwide — our production sites

As a global technical leader in connectors and sensors, TE Connectivity (TE) offers products and integrated solutions that are precisely engineered to meet the strictest requirements of customers in terms of quality and performance excellence. For more than 60 years, we have maintained a partnership with the leading companies in major markets, such as Germany, China, Japan, and the United States.

TE provides customers with high-quality innovative solutions and fast, reliable services in the fields of automation and control, railways, and intelligent buildings. TE offers products that have demonstrated their superior performances in harsh environments, such as high pressure, vibrations, humidity, and high/low voltage.

With the arrival of Industry 4.0, TE plays a key role in the next level of industrial production and is committed to achieving win-win results with customers.

With TE as an innovative partner, you will find virtually everything you need to create and run a highly cost-effective and more reliable production process. We connect materials to final products with smarter, faster, and better technology to cover all the areas of life. To help ensure that each solution is optimized, TE actively rises to every challenge.

Visit [te.com](https://te.com) to call, live chat, or email a product specialist today about your vision and connectivity needs.

# POWERFUL AUTOMATION REQUIRES POWERFUL CONTROLS.

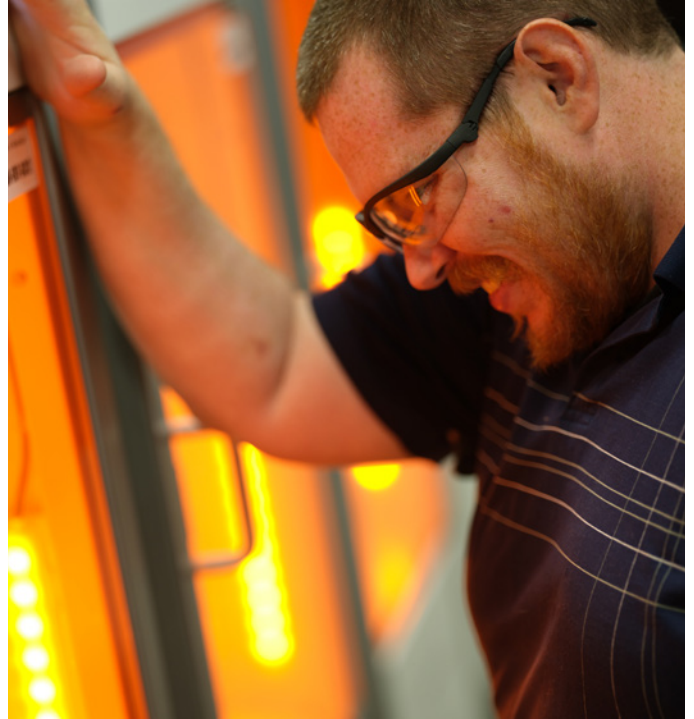
From human-machine interfaces to distributed factory controls, we can help you increase productivity and safety on the floor and throughout production.

As industrial production becomes increasingly automated, the need to effectively integrate and operate numerous devices and systems on the shop floor is growing exponentially. Today's factories require high-speed, smart connectivity products to ensure interoperability and seamlessly manage power and data requirements. As this trend continues, the demand for electromechanical system solutions that integrate power, signal, and data will grow with it.

## **Our Commitment to Automation Controls**

With a vast connectivity portfolio and deep technology expertise in automation controls, TE is strongly positioned to be a strategic, trusted technology partner. We are focused on deep integration with our key customers, including both global and local support from design to production, and engineer-to-engineer collaboration.

We have aligned our departments to the opportunity in automation controls. We will continue to invest in our existing portfolio as well as next-generation technologies to bring the best solutions in connectivity, sensors, switches, relays, and terminal blocks to market.



# TE PROVIDES INDUSTRY-LEADING CONNECTIVITY SOLUTIONS.

Depend on TE to customize the automation control solutions you need for high processing power with a small footprint.

From real-time control to the mass adoption of edge-to-cloud architecture, automation use cases are moving faster than ever, demanding higher data transfer rates, increased reliability, and modularity. You need an engineering partner and component supplier that can keep up with your evolving needs and the fast pace of the industry. Consider TE your go-to expert for the components and solutions that make up the building blocks of today's industrial automation.

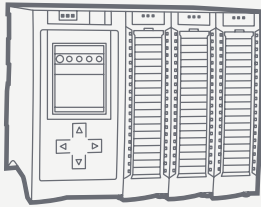
When you partner with TE, you get:

- **Significant electromechanical and safety experience** with deep understanding of communication protocols and requirements to help enable more reliable connectivity solutions in harsh industrial environments.
- **Engagement in standardization committees** for new industry communication standards.
- **Fully integrated system solutions** for power, signal, and data.
- **Stronger, smarter, safer connections.**



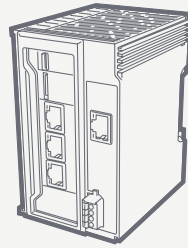
# YOUR SOLUTIONS FOR AUTOMATION CONTROL SUB-APPLICATIONS.

As your go-to engineering partner, we can help simplify your supply chain and provide more reliable, tailor-made components.



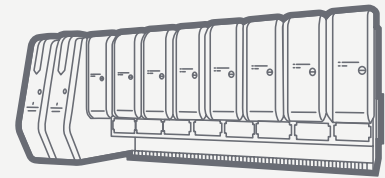
## PROGRAMMABLE LOGIC CONTROLLERS (PLCs)

PLCs monitor the state of input devices and make decisions based upon a custom program to control the state of output devices. Inputs include but are not limited to limit switches, proximity sensors, and temperature sensors. There are several PLC types to meet a diverse set of automation use cases. The previously mentioned types include but are not limited to nano-PLCs, medium-PLCs and safety PLCs.



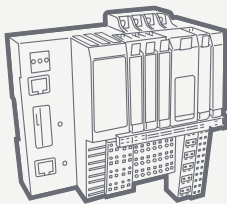
## INDUSTRIAL PCs (IPCs)

IPCs monitor the state of input devices and make decisions based upon a custom program to control the state of output devices. These devices are able to withstand the harsh environment of a production facility, possessing great processing power and memory capabilities able to host a full-fledged operating system.



## DISTRIBUTED CONTROL SYSTEMS (DCSs)

DCSs supervise and coordinate controllers distributed across a plant, orchestrating process-wide operations. Reliability is paramount; therefore, automation companies provide not only control equipment but also supervisory systems and interfaces as an integrated package.



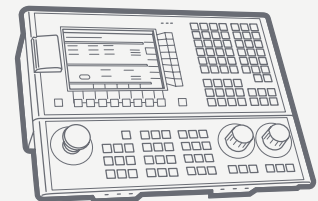
## INPUT OUTPUT MODULES (IO)

IO modules are the building blocks of PLC, DCS, and IPC - based automation, connecting control devices to the outside world. These devices handle discrete and analog signals from sensors, actuators, and other devices. There are several IO module types that enable automation deployment in several areas. The previously mentioned types include but are not limited to modular IO, slice IO, and block IO.



## HUMAN-MACHINE INTERFACE (HMI)

HMIs facilitate human-machine interaction through the usage of tactile buttons and screen. These devices leverage custom software to display production units, allowing interaction with its inputs and outputs.



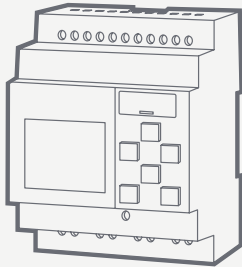
## CNC CONTROLLERS

CNC controllers are industrial computers used to control metal cutting or forming of a work piece by means of a pre-stored program in the systems' memory. These devices interpret a pre-stored program, initiating response through several functions that range from linear to multi-axes motion.

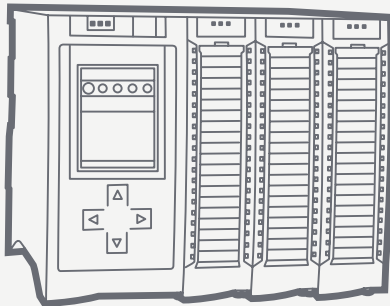
# PROGRAMMABLE LOGIC CONTROLLERS (PLCs)

Used to monitor the state of input devices and make decisions based upon a custom program to control the state of output devices, programmable logical controllers (PLCs) come in a variety of sizes and options.

## SUB-APPLICATIONS

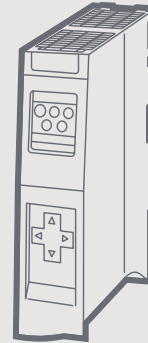


**NANO TO SMALL PLCs**

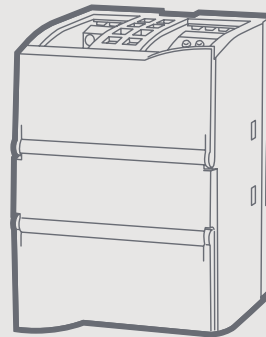


**MEDIUM TO LARGE PLCs**

## COMPONENTS

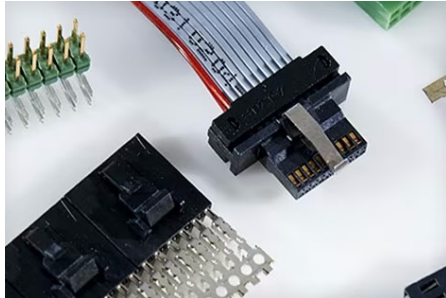


**CPU**



**POWER SUPPLY**

## PRINTED CIRCUIT BOARD (PCB) INTERCONNECTION



Our portfolio of PCB interconnects features high contact density to provide more reliable, high-speed connectivity over the lifetime of the machine.

### BENEFITS:

- Engineered for high signal integrity and high reliability
- Supports modular PCB setup
- Ultra compact to save space
- Available in many configurations for enhanced design flexibility

#### TE featured products:

AMPMODU Connectors  
 ERNI SMC Connectors  
 ERNI MicroCon Connectors  
 ERNI MicroBridge Connectors  
 Terminal Blocks  
 Backplane Connectors  
 High-Speed Backplane Connectors  
 Stacking Connectors  
 MINIPAK Connectors  
 ERNI MicroStac Connectors  
 ERNI MicroSpeed Connectors  
 SAS/Mini-SAS Connectors

## ETHERNET CONNECTIVITY



TE's mini I/O connectors help increase reliability and support the performance buffer in data integrity that reduces package loss.

### BENEFITS:

- 100Mbit to 10Gbit data transmission rates available
- Completely designed for industrial applications
- Excellent vibration resistance
- Easy to install on-site

#### TE featured products:

Mini I/O  
 Industrial RJ45

## RELAYS



Get the reliable switching you need across different loads, including inrush, inductive, and signals.

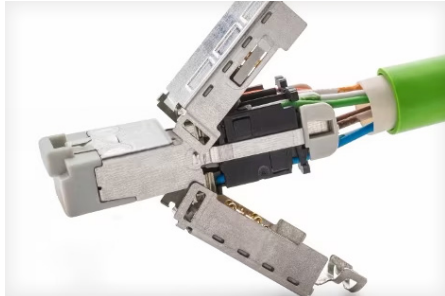
### BENEFITS:

- Excellent reinforced isolation and high contact ratings
- Broad portfolio available with many versions
- Meets established standards for safety
- Slim, small size saves space

#### TE featured products:

RYII Relays  
 RT/RZ Relays  
 IM Relays  
 Safety Relays

## SIGNAL I/O MODULES



Signals from a sensing device to a controller require reliable high-speed signal integrity. Count on TE for the rugged data connectivity you need.

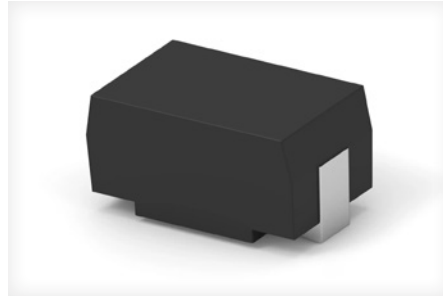
### BENEFITS:

- Fast communication speeds up to Cat5e and Cat6A
- Small size enables flexible PCB design
- Variety of options and positions available
- High retention force to help prevent unmating

#### TE featured products:

**RJ45 Connectors**  
**Mini I/O**  
**D-Sub Connectors**  
**Industrial USB**

## PRECISION & POWER RESISTORS



TE's family of compact resistors help enable high-precision electronics to deliver the performance you demand.

### BENEFITS:

- Highly reliable
- Extremely low tolerances
- Available in many different configurations
- Variety of power dissipation capabilities

#### TE featured products:

**Precision Resistors**  
**Power Resistors**  
**Commodity Resistors**

## SWITCHES



For the reliable board-level and panel control safety stop switches you need, turn to TE.

### BENEFITS:

- Variety of PCB and panel-mount options
- Cost-effective components
- High-performance solutions
- Broad portfolio of switches and switch accessories

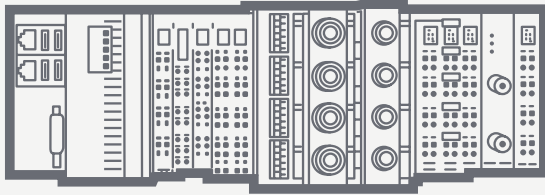
#### TE featured products:

**Switches**

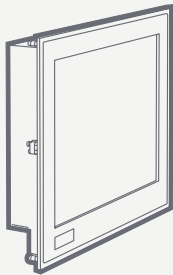
# INDUSTRIAL PCs

Built from similar components as commercial PCs but able to resist the harsh environment of a production facility, industrial PCs (IPCs) possess great processing power and memory capabilities and are capable of working with very short program scan times and multiple I/O points. IPCs also support both high- and low-level programming languages.

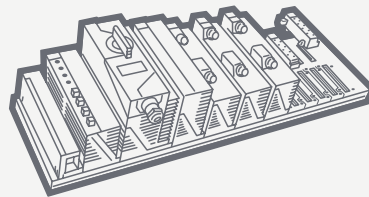
## SUB-APPLICATIONS



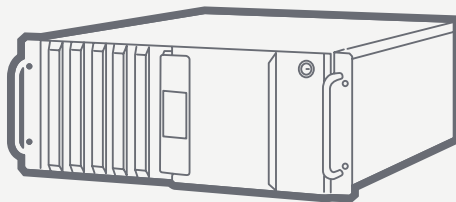
**IP20 RATING**



**PANEL PCs**

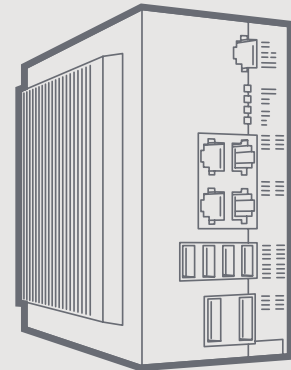


**IP65 AND IP67 RATING**

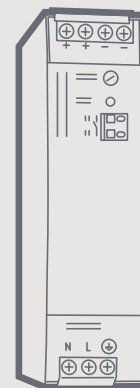


**RACK PCs**

## COMPONENTS

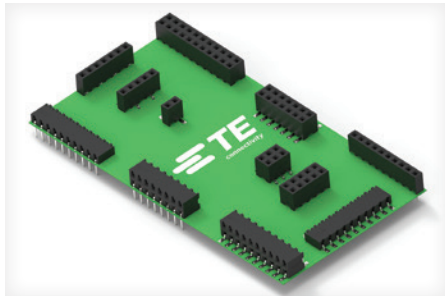


**IP20 RATING**



**IP20 RATING**

## PRINTED CIRCUIT BOARD (PCB) INTERCONNECTION



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### BENEFITS:

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- Available in many configurations for enhanced design flexibility

#### TE featured products:

ERNI MicroSpeed Connectors

AMPMODU Connectors

ERNI SMC Connectors

ERNI MicroCon Connectors

ERNI MicroBridge Connectors

Terminal Blocks

Backplane Connectors

High-Speed Backplane Connectors

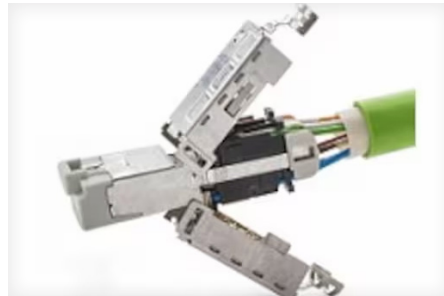
Stacking Connectors

MINIPAK Connectors

ERNI MicroStac Connectors

SAS/Mini-SAS Connectors

## ETHERNET CONNECTIVITY



TE's industrial-grade Ethernet connectors help increase reliability and support the performance buffer in data integrity that reduces package loss.

### BENEFITS:

- 100Mbit to 10Gbit data transmission rates available
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- Excellent vibration resistance
- Easy to install on-site

#### TE featured products:

Mini I/O

Industrial RJ45

## RELAYS



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#### TE featured products:

Safety Relays

RT/RZ Relays

MSR/RV Relays

IM Relays

## SIGNAL I/O MODULES



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#### TE featured products:

**D-Sub Connectors**

**RJ45 Connectors**

**Mini I/O**

**Industrial USB**

## PRECISION & POWER RESISTORS



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**Power Resistors**

**Commodity Resistors**

## SWITCHES



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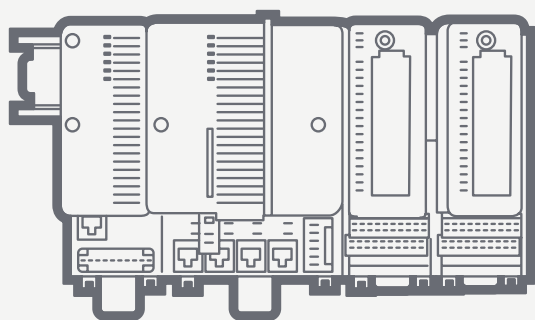
#### TE featured products:

**Switches**

# DISTRIBUTED CONTROL SYSTEMS (DCS)

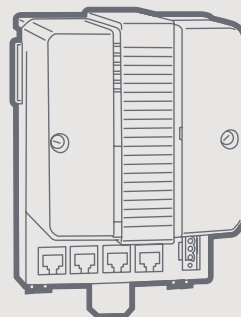
The distributed control system (DCS) supervises and coordinates each of the controllers distributed across a plant, orchestrating process-wide operations. Because reliability is so important, manufacturers provide control equipment plus supervisory systems and interfaces as well so customers buy a complete, integrated package. Given the distributed (rather than centralized) nature of the system, it has grown in popularity as an excellent solution for manufacturers that want something scalable and flexible to suit their needs.

## SUB-APPLICATIONS



CONTROL MODULES

## COMPONENTS

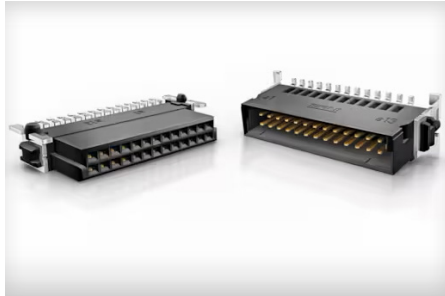


CPU



POWER SUPPLY

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ERNI MicroBridge Connectors

Terminal Blocks

Backplane Connectors

High-Speed Backplane Connectors

Stacking Connectors

MINIPAK Connectors

ERNI MicroStac Connectors

ERNI MicroSpeed Connectors

SAS/Mini-SAS Connectors

## ETHERNET CONNECTIVITY



TE's industrial-grade Ethernet connectors help increase reliability and support the performance buffer in data integrity that reduces package loss.

### BENEFITS:

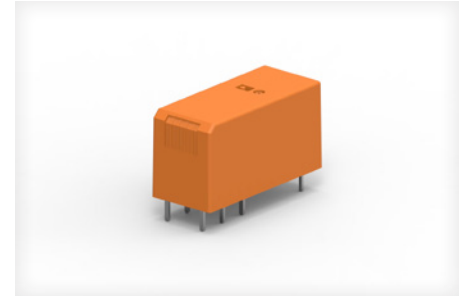
- 100Mbit to 10Gbit data transmission rates available
- Completely designed for industrial applications
- Excellent vibration resistance
- Easy to install on-site

#### TE featured products:

Mini I/O

Industrial RJ45

## RELAYS



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MSR/RVII Relays

IM Relays

Safety Relays

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RJ45 Connectors  
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D-Sub Connectors

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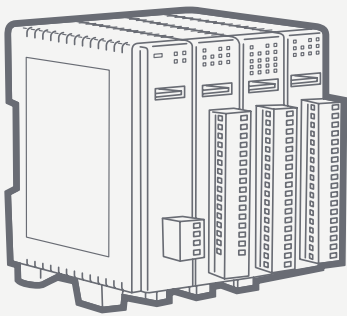
#### TE featured products:

Switches

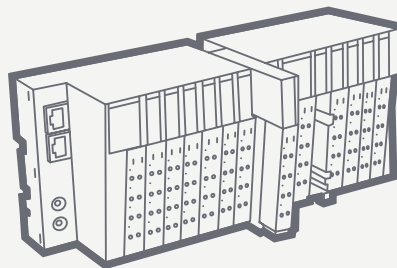
# IO MODULES

IO modules connect control devices to the outside world; they are the building blocks of programmable logic controllers, distributed control systems, and industrial PC automation deployment. Manufacturers rely on IO modules to handle discrete and analog signals from sensors, actuators, and other devices. Certain modules possess capabilities to process specific input types, such as intelligent IO. The devices can be found inside control cabinets or on the shop floor, and can be connected next to the control device (local IO) or, due to vibration and temperature conditions, away from it (remote IO).

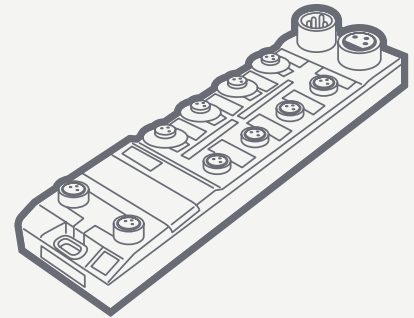
## SUB-APPLICATIONS



**MODULAR IO**



**SLICE IO**



**BLOCK IO**

## I/O MODULES DEVELOPMENT & MANUFACTURING



TE provides in-house I/O design and manufacturing expertise to give you the scalable, modular, and interoperable solutions you need.

### BENEFITS:

- Fully integrated housing
- Reliable termination, connectivity, and mechanical performance
- 30+ years of customer application expertise
- Industry-neutral partner supporting customer's lifetime needs

## PRINTED CIRCUIT BOARD (PCB) INTERCONNECTION



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#### TE featured products:

[ERNI MicroCon Connectors](#)  
[AMPMODU Connectors](#)  
[ERNI SMC Connectors](#)  
[ERNI MicroBridge Connectors](#)  
[Terminal Blocks](#)  
[Backplane Connectors](#)  
[High-Speed Backplane Connectors](#)  
[Stacking Connectors](#)  
[MINIPAK Connectors](#)  
[ERNI MicroStac Connectors](#)  
[ERNI MicroSpeed Connectors](#)  
[SAS/Mini-SAS Connectors](#)

## ETHERNET CONNECTIVITY



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- Completely designed for industrial applications
- Excellent vibration resistance
- Easy to install on-site

#### TE featured products:

[Mini I/O](#)  
[Industrial RJ45](#)  
[M12 Ethernet](#)  
[Mini IO](#)  
[RJ45](#)  
[SPE](#)

## RELAYS



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- Slim, small size saves space

#### TE featured products:

**MSR/RVII Relays**

**RT/RZ Relays**

**IM Relays**

**Safety Relays**

## SIGNAL I/O MODULES



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- Variety of options and positions available
- High retention force to help prevent unmating

#### TE featured products:

**M12 X-Coded Connectors**

**RJ45 Connectors**

**Mini I/O**

**D-Sub Connectors**

**Industrial USB**

**M8M12**

## PRECISION & POWER RESISTORS



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**Power Resistors**

**Commodity Resistors**

## SWITCHES



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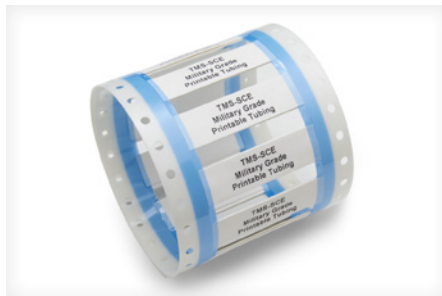
### BENEFITS:

- Variety of PCB and panel-mount options
- Cost-effective components
- High-performance solutions
- Broad portfolio of switches and switch accessories

#### TE featured products:

[Switches](#)

## IDENTIFICATION



We provide durable, more reliable identification solutions that stand up to the harshest industrial conditions.

### BENEFITS:

- Large portfolio of materials, colors, and sizes available
- Time-tested performance
- Cost-efficient
- Variety of adhesive options to match your specifications

#### TE featured products:

[Wrap-Around Labels](#)

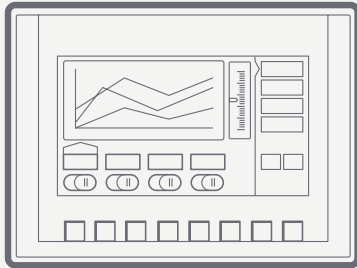
[Printable Tubing](#)

[Standard Labels](#)

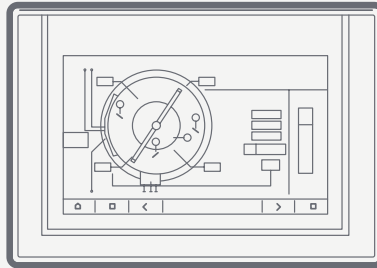
# HUMAN-MACHINE INTERFACE (HMI)

The hardware peripheral that runs customized software to facilitate human-to-machine interaction, the aptly named human-machine interface (HMI), provides a touchscreen and/or push-button display that can be connected directly to industrial PCs, programmable logic controllers, and distributed control systems. Many manufacturers leverage customized software to display production units and allow greater interaction with inputs and outputs.

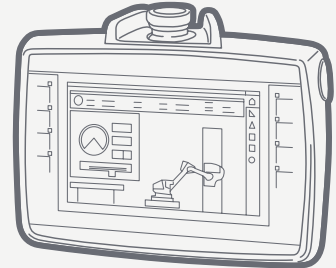
## SUB-APPLICATIONS



**BASIC HMIs**



**ADVANCED HMIs**



**MOBILE HMIs**

## PRINTED CIRCUIT BOARD (PCB) INTERCONNECTION



Our portfolio of PCB interconnects features high contact density to provide more reliable, high-speed connectivity over the lifetime of the machine.

### BENEFITS:

- Engineered for high signal integrity and high reliability
- Supports modular PCB setup
- Ultra compact to save space
- Available in many configurations for enhanced design flexibility

#### TE featured products:

MINIPAK Connectors  
 AMPMODU Connectors  
 ERNI SMC Connectors  
 ERNI MicroCon Connectors  
 ERNI MicroBridge Connectors  
 Terminal Blocks  
 Backplane Connectors  
 High-Speed Backplane Connectors  
 Stacking Connectors  
 ERNI MicroStac Connectors  
 ERNI MicroSpeed Connectors  
 SAS/Mini-SAS Connectors

## ETHERNET CONNECTIVITY



TE's industrial-grade Ethernet connectors help increase reliability and support the performance buffer in data integrity that reduces package loss.

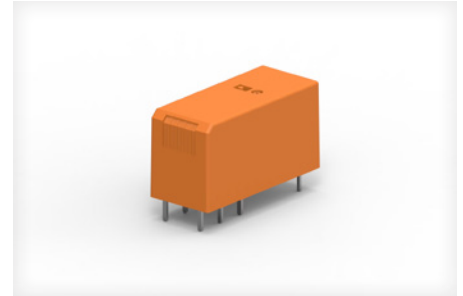
### BENEFITS:

- 100Mbit to 10Gbit data transmission rates available
- Completely designed for industrial applications
- Excellent vibration resistance
- Easy to install on-site

#### TE featured products:

Mini I/O  
 Industrial RJ45

## RELAYS



Get the reliable switching you need across different loads, including inrush, inductive, and signals.

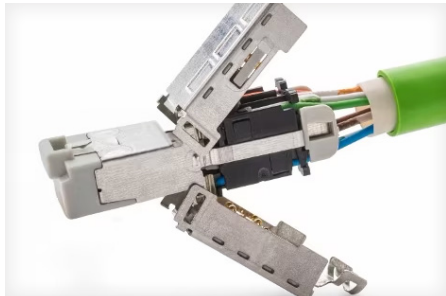
### BENEFITS:

- Excellent reinforced isolation and high contact ratings
- Broad portfolio available with many versions
- Meets established standards for safety
- Slim, small size saves space

#### TE featured products:

RT/RZ Relays  
 MSR/RVII Relays  
 IM Relays  
 Safety Relays

## SIGNAL I/O MODULES



Signals from a sensing device to a controller require reliable high-speed signal integrity. Count on TE for the rugged data connectivity you need.

### BENEFITS:

- Fast communication speeds up to Cat5e and Cat6A
- Small size enables flexible PCB design
- Variety of options and positions available
- High retention force to help prevent unmating

#### TE featured products:

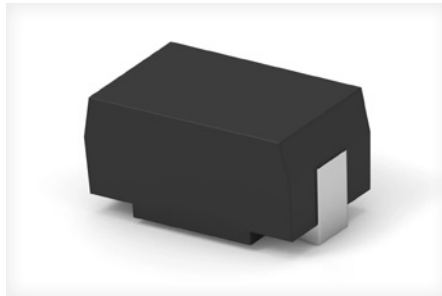
**RJ45 Connectors**

**Mini I/O**

**D-Sub Connectors**

**Industrial USB**

## PRECISION & POWER RESISTORS



TE's family of compact resistors help enable high-precision electronics to deliver the performance you demand.

### BENEFITS:

- Highly reliable
- Extremely low tolerances
- Available in many different configurations
- Variety of power dissipation capabilities

#### TE featured products:

**Precision Resistors**

**Power Resistors**

**Commodity Resistors**

## SWITCHES



For the reliable board-level and panel control safety stop switches you need, turn to TE.

### BENEFITS:

- Variety of PCB and panel-mount options
- Cost-effective components
- High-performance solutions
- Broad portfolio of switches and switch accessories

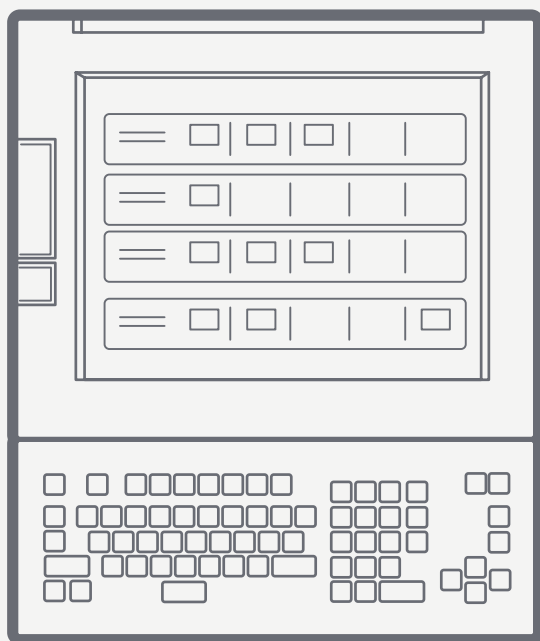
#### TE featured products:

**Switches**

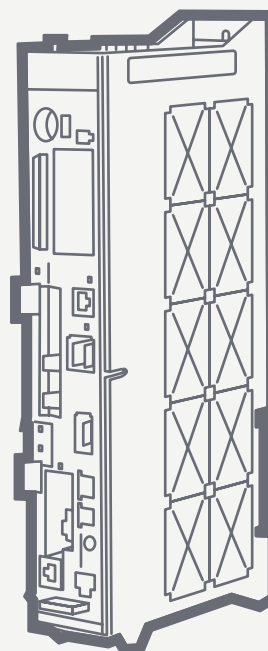
# CNC CONTROLLERS

An industrial computer used to control metal cutting or forming of a work piece via a pre-stored program in the system's memory, the CNC controller is one of the most heavily used pieces of manufacturing equipment today. CNC controllers support computer-aided design (CAD) formats, such as STEP, DWG, and others, and they leverage hardware configurations to meet different use cases and their requirements for processing power, storage, and communication.

## SUB-APPLICATIONS



**METAL-CUTTING CONTROLLERS**



**METAL-FORMING CONTROLLERS**

## POWER CONNECTIVITY



At TE, we deliver highly reliable connectivity solutions in a variety of power levels to suit your application needs.

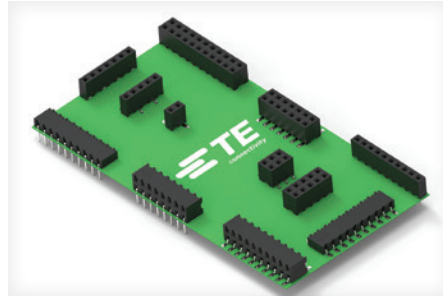
### BENEFITS:

- Multiple contact points to resist vibration
- Modular, flexible design
- Designed for power and signal applications
- Broad portfolio of 3A – 100A solutions available

#### TE featured products:

**Dynamic Series Connectors**

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**ERNI SMC Connectors**  
**ERNI MicroCon Connectors**  
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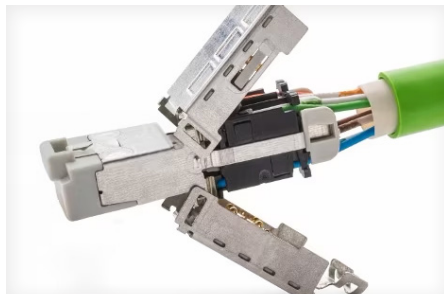
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RT/RZ Relays

IM Relays

Safety Relays

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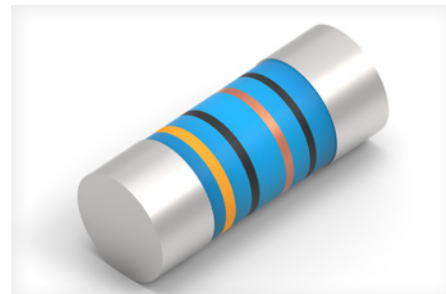
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D-Sub Connectors

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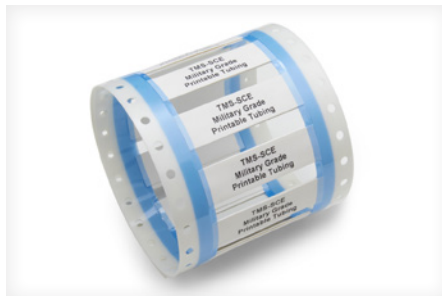
### BENEFITS:

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- Cost-effective components
- High-performance solutions
- Broad portfolio of switches and switch accessories

#### TE featured products:

[Switches](#)

## IDENTIFICATION



We provide durable, more reliable identification solutions that stand up to the harshest industrial conditions.

### BENEFITS:

- Large portfolio of materials, colors, and sizes available
- Time-tested performance
- Cost-efficient
- Variety of adhesive options to match your specifications

#### TE featured products:

[Wrap-Around Labels](#)

[Printable Tubing](#)

[Standard Labels](#)

## CONNECT WITH US.

Get answers to your questions now

We make it easy to connect with our experts and are ready to provide the support you need, including:

- [Automation controls product information](#)
- [Discussions with TE engineers and product experts](#)
- [Project consultations](#)
- [TE design resources](#) and [tools](#)

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2RM 09/23

### BROCHURE

TE Connectivity  
1050 Westlakes Drive  
Berwyn, PA 19312  
Tel +1 610.893.9800