



Expertise Applied | Answers Delivered



# PROTECT CONTROL SENSE





PROTECT  
CONTROL  
SENSE





Today's complex, sophisticated, products – and the people who use them – require greater protection against electrostatic discharge, power surges, short circuits, voltage spikes, arc flash and other harmful occurrences. Our strategy to develop new products that handle more power in smaller packages provides innovative circuit protection solutions for you.

# PROTECT

## APPLICATIONS

- Smartphones
- Tablets/Notebooks/ Desktops
- High Definition A/V
- Security Cameras, Surveillance Systems
- Wearable Devices
- Medical Equipment
- Automotive Electronics & Electrical Systems
- Electric Vehicle & Hybrid Electric Vehicle Battery Systems
- LED Lighting
- Renewable/Green Energy
- Home Appliances
- Telecom/Networking Equipment
- Datacenter & Cloud Infrastructure
- Factory Switchgear & Motor Control Centers
- Oil & Gas Refineries
- Water/Wastewater Treatment Plants

## KEY PRODUCTS

- TVS Diode Arrays (SPA® Diodes)
- Through-hole and Surface Mount Fuses
- Fuse Holders
- TVS Diodes
- Positive Temperature Coefficient Devices (PTCs)
- Polymer ESD Suppressors
- Gas Discharge Tubes (GDTs)
- Varistors
- SIDACtor® Protection Thyristors
- Surge Protection Modules
- High Speed Fuses
- Solar Fuses
- Power Fuses
- Arc Flash Relays
- Ground Fault Relays
- Industrial Shock-Block™



To safely and efficiently control power in a wide range of applications, we offer dependable products that mitigate equipment damage, minimize electrical hazards and improve productivity, consolidate inventory, and reduce footprint. Our control products help reduce costs resulting from fault damage, miscalibration and compliance citations.

# CONTROL

## APPLICATIONS

- Automotive Electronics
- Home/Building Automation
- HVAC Systems
- Manufacturing Controls
- Switches
- Motors and Pumps
- Construction
- Data Centers
- Mining, Oil & Gas
- Pulp and Paper
- Water & Wastewater
- Shore-to-Ship Power
- Telecom/Networking Equipment

## KEY PRODUCTS

- Ignition Systems
- Power Distribution Blocks
- Protection Relays
- Timers
- Pump Controllers
- Power Distribution Centers
- Alarm Panels/Coordination Panels
- Electronic Controls
- Switching Thyristors
- IGBT & Rectifier Diode Modules
- Schottky & SiC Schottky Diodes
- Ultrafast Recovery Rectifiers





Around the world, sensing technologies are increasingly used to support complex electronic systems. We have developed a broad platform of technologies that sense proximity, flow, speed and fluid level to help improve product performance, comfort, convenience and safety.

# SENSE

## APPLICATIONS

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- Refrigerator & Garage Doors
- Dishwashers
- Coffee Makers
- Washing Machines
- Vacuum Cleaners
- Fitness Equipment
- Water Heaters
- Hot Tubs
- Vending Machines
- Smoke Alarms
- Smart Meters

- Thermostats
- HVAC Controls
- Door & Window Locks & Alarms
- Server & Networking Equipment
- Seat Belts
- Suspension & Braking Systems
- Lift Gate & Door Open/Close Systems
- Selective Catalytic Reduction (SCR), fluid level & quality

## KEY PRODUCTS

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- Magnetic Actuators
- Speed & Position Sensors
- Arc Detecting Point Sensors
- Fluid Level Sensors
- Solar & Ambient Light Sensors
- Mechanically Operated Position Sensors
- Reed Switches, Sensors & Relays
- Hall Effect Sensors
- Pulsed Waveguide Level Sensors (PWG™)

## GLOBAL LAB SERVICES AND CAPABILITIES

Our ever-expanding footprint includes a network of 15 global labs where we combine comprehensive testing capabilities with our consultative approach. We design next-generation products and solutions, while also providing application support and testing for you and your customers.

Littelfuse is a trusted partner to engineers worldwide who seek our technical expertise to accurately conduct and analyze test results. As part of our robust circuit protection testing, we simulate harsh environments and analyze sensing solutions to assure high performance, reliability, safety and regulatory compliance.

### PRIMARY TESTING CAPABILITIES

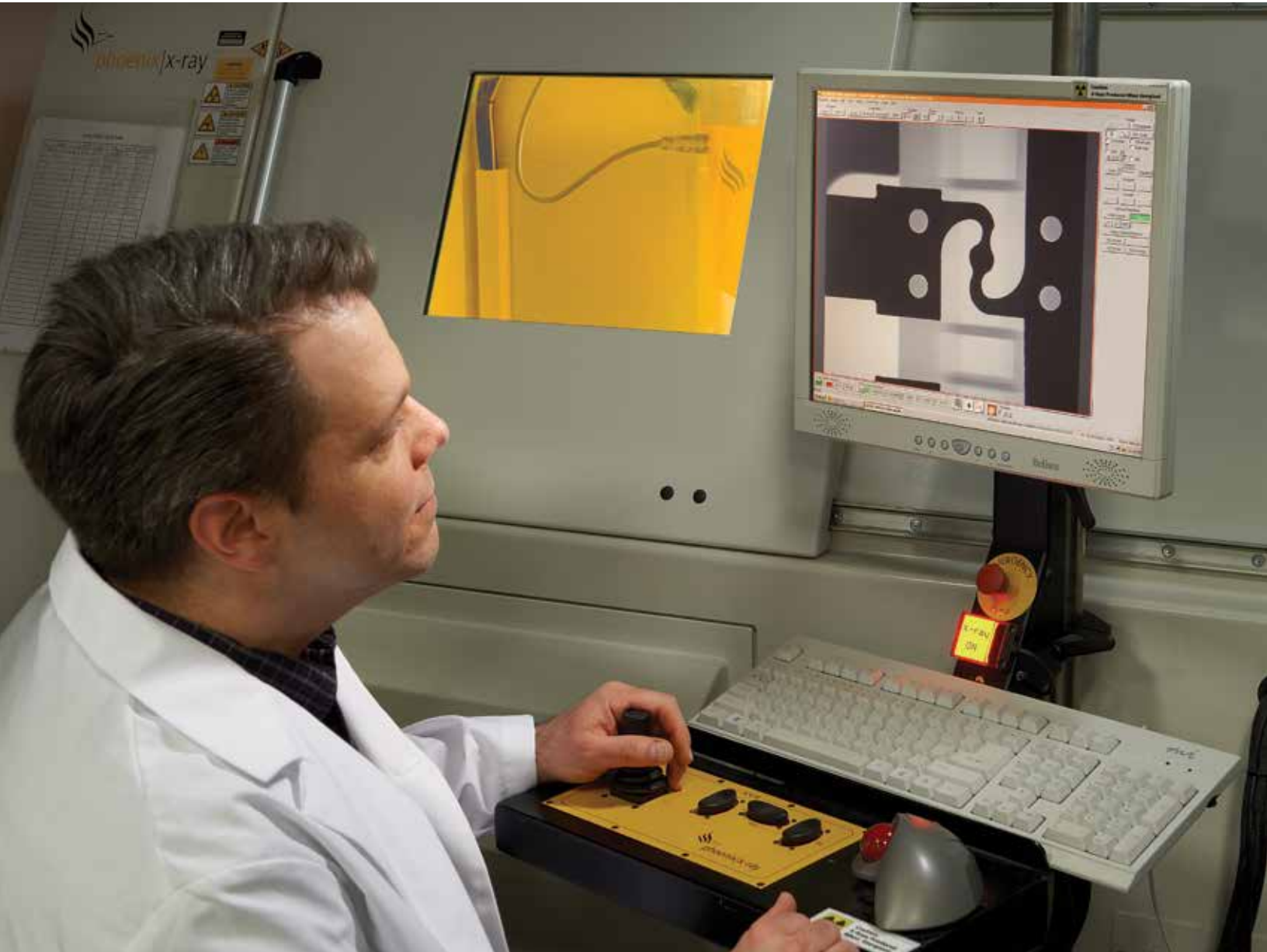
- Overcurrent
- Overvoltage
- ESD
- High-Speed Datacom & Telecom
- Thyristor-Specific
- Temperature
- Vibration
- Humidity
- Failure Analysis
- Material Analysis
- Application Performance
- Regulatory Compliance

LOCATION	TESTING CAPABILITIES
Champaign, Illinois, USA	High Power Lab
Fremont, California, USA	Materials Lab, Product Evaluation, Reliability and Application Lab
Lake Mills, Wisconsin, USA	Product Evaluation, Reliability and Application Lab
Mount Prospect, Illinois, USA	Semiconductors Lab, Materials Lab, Application Lab
Matamoros, Mexico	Product Evaluation and Reliability Lab
Piedras Negras, Mexico	Materials Lab, Product Evaluation, Reliability and Application Lab
Bremen, Germany	Product Evaluation, Reliability and Application Lab
Legnago (Verona), Italy	Product Evaluation, Reliability and Application Lab
Kaunas, Lithuania	Product Evaluation, Reliability and Application Lab
Dongguan, China	Product Evaluation, Reliability, Application Lab and UL-Certified Testing Facility
Shanghai, China	High Power Lab Materials Lab, Product Evaluation, Reliability and Application Lab, Primarily for PPTC, UL and TUV Certified Testing Facility
Suzhou, China	Materials Lab, Product Evaluation, Reliability Lab
Wuxi, China	Semiconductor Lab, Materials Lab
Tsukuba, Japan	Materials Lab, Product Evaluation, Reliability and Application Lab, UL-Certified Testing Facility
Lipa City, Philippines	Materials Lab, Product Evaluation, Reliability and Application Lab



## PARTNERS FOR SUCCESS

Working with Littelfuse, you have access to dedicated application engineers who partner with you to provide design consultation, schedule testing, and confidentially evaluate and present test results. Our experts deliver solutions to today's challenges and anticipate tomorrow's needs for your business.



- High Power Lab – Full-service lab primarily for products requiring short circuit tests up to 50kA; fully rated at direct current for various time constants.
- Product Evaluation, Reliability and Application Labs – Ideally suited for product reliability and evaluation tests; accommodates product development/operations support validations, high current DC testing, environmental testing, regulatory compliance and failure analysis.
- Semiconductor Application Lab – Ideally suited for semiconductor product testing; provides new product and process validations; customer application testing.
- Materials Lab – Ideally suited for material characterization and selection; incoming inspection; in-process evaluation; failure analysis.

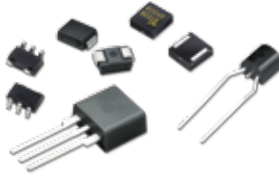
## PRODUCT PORTFOLIO

Our extensive product portfolio is backed by decades of design and manufacturing expertise, along with industry leading technical support, making Littelfuse an unmatched single-source provider, whether your business is around the corner . . . or around the world.



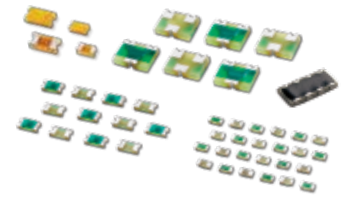
### TVS DIODES

Suppress overvoltage transients, such as Electrical Fast Transients (EFT), inductive load switching and lightning in a wide variety of applications for the computer, industrial, telecom and automotive markets.



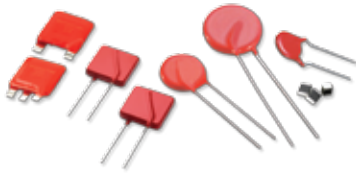
### SIDACtor® DEVICES

Complete line of protection thyristor products specifically designed to suppress overvoltage transients in a broad range of telecom and datacom applications.



### POLYMER ESD SUPPRESSORS

Available in various surface mount and connector array form factors to protect high-speed digital lines without causing signal distortion.



### VARISTORS

Multiple forms, from Metal Oxide Varistors (MOVs) that suppress transient voltages to Multi-Layer Varistors (MLVs) designed for applications requiring protection from various transients in computers and handheld devices as well as industrial and automotive applications.



### GAS DISCHARGE TUBES (GDTs)

Available in small foot-print, leaded and surface mount configurations, Littelfuse GDTs respond fast to transient overvoltage events. They feature high insulation resistance plus low capacitance and leakage, reducing the risk of equipment damage.



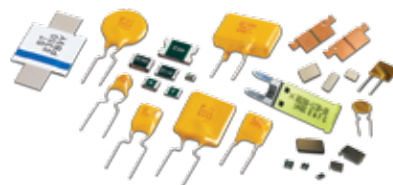
### TVS DIODE ARRAYS (SPA®)

Designed specifically to protect analog and digital signal lines from electrostatic discharge (ESD) and other overvoltage transients.



### FUSES

We have the broadest and most innovative selection of fuses to serve nearly any application. Our deep knowledge of circuit protection allows us to provide solutions for industrial power, automotive and electronic equipment. These technologies range from high speed fuses, cartridge fuses, medium voltage fuses, surface mount to military grade fuses.



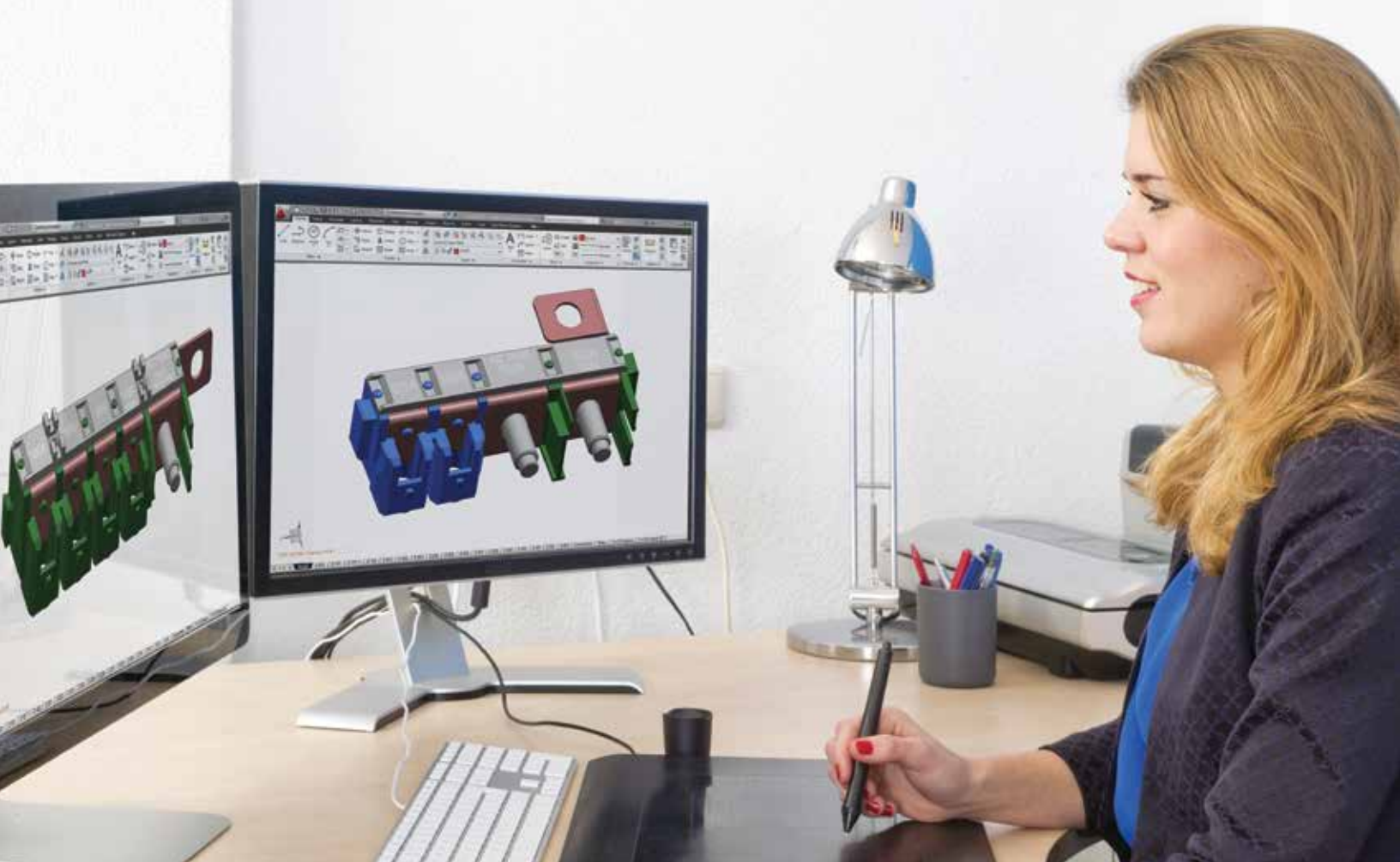
### POSITIVE TEMPERATURE COEFFICIENT (PTC) DEVICES

Littelfuse PolySwitch® and POLY-FUSE® devices are Polymeric Positive Temperature Coefficient (PPTC) devices which offer a resettable overcurrent protection alternative, thereby reducing warranty, service and repair costs. Ideal for situations where frequent overcurrent conditions occur or constant uptime is required.



### MAGNETIC SENSORS AND REED SWITCHES

Littelfuse is a global leader in providing magnetic sensing solutions. Our selection of magnetic sensors includes reed switches, reed sensors, Hall effect sensors, and reed relays, as well as bare and packaged magnetic actuators.



### PROTECTION RELAYS & CONTROLS

Our comprehensive line of electronic- and microprocessor-based protection relays and controls safeguard equipment and personnel to prevent expensive damage, downtime or injury due to electrical faults.



### TIME DELAY RELAYS

Our offering is the broadest in the industry. Our electromechanical and solid-state time delay relays are robust products used in applications from HVAC, tower and lighting, vending and other OEM applications.



### POWER SEMICONDUCTORS

Power semiconductors are discrete or multi-chip switching devices including IGBTs, Ignition IGBTs, and Thyristor technology – intended for high current or high voltage power conversion applications. Our innovative Silicon Carbide-based power semiconductors enable breakthrough advances in thermal and electrical efficiency.



### AUTOMOTIVE SENSORS

With sensing capabilities for proximity, flow, speed, direction, rotation and fluid level, we offer a range of sensors to help improve product safety, reliability and performance. We also provide custom sensing solutions to meet evolving industry needs across a variety of markets.



### POWER DISTRIBUTION AND SWITCHING

Our heavy duty power distribution modules, electromechanical and solid-state switches and relays for DC electrical systems are highly reliable products for the commercial vehicle industry.



### FUSE HOLDERS AND ACCESSORIES

In addition to our broad portfolio of technologies, we offer a wide array of accessories for automotive and industrial applications, including fuse blocks, holders, fuse pullers and more.

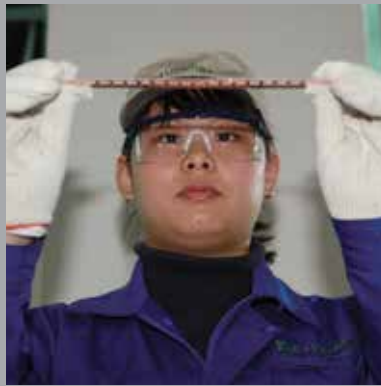
## OUR PEOPLE, OUR CULTURE

At Littelfuse, decades of creating highly reliable, innovative products is just the beginning. Every day, it's our 10,000+ employees who make the difference for your business. They listen to your needs and understand your challenges. They use their knowledge and expertise to develop the best solutions and solve your problems. This customer-first approach is at the heart of our company-wide culture that drives us to build long-lasting relationships and exceed expectations.

### QUALITY AND SERVICE

Littelfuse is firmly committed to manufacturing quality products at a competitive price and providing you with exceptional customer service and technical support. We strive to exceed your expectations every day. In support of this commitment, we:

- Build quality into our products and services, striving for zero defects in everything we do, thereby reducing cost and increasing your total satisfaction.
  - Encourage quality awareness and quality performance in all associates through management leadership.
  - Promote the participation of all associates in making individual contributions to the quality improvement process.
  - Partner with you from design through development to deliver solutions that help you overcome challenges and meet your needs.
  - Develop relationships with suppliers who consistently demonstrate their ability to fulfill quality, price and delivery objectives that are mutually beneficial.
- To further support your needs, Littelfuse offers a wealth of technical information online at [littelfuse.com](http://littelfuse.com). Visit our Technical Resources section to:
- Download datasheets, product manuals, CAD drawings, and more from our vast library of technical documents.
  - Access online design tools, tutorials, demos, videos, catalogs, mobile apps, and other helpful information.
  - Browse our Technical Centers with the latest on Ceramic, Polymers and Fuses; Commercial Vehicle Products; POWR-GARD® fuses; Relays and Controls; Semiconductors; and Sensors.
  - Reference a wealth of application knowledge and experience in our Application Design Center.



## ADDING VALUE

Critical to our sustained growth and success, we are committed to continuous improvement in our products, processes and people. We have embraced award-winning lean enterprise initiatives as the foundation of our operating structure and these principles are core to our culture. Through continuous organizational improvements, we add more value to your business. Our ongoing investments in lean initiatives help to improve productivity, product quality and equipment performance, as well as reduce lead times and inventory. It is our mission to continuously increase value for you and earn your trust as your global supplier of choice.



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