

Sensing Products

Selection Guide

A guide to selecting the right sensing components for your applications



About This Guide

This guide provides an overview of magnetic and temperature sensing technologies, key consideration factors, descriptions of technologies Littelfuse offers, and product selection tables. It is designed to help you quickly find a sensing solution appropriate to your application.

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Specifications, descriptions, and illustrative material in this literature are as accurate as known at the time of publication but are subject to changes without notice. Visit littelfuse.com for more information.



Build with Confidence Using Our Expanding and Customizable Portfolio Supported by Our Design Expertise

Littelfuse: Everywhere, Every Day

Founded in 1927, Littelfuse has become the world's most respected circuit protection brand with well-established and growing platforms in power control and sensing technologies. Today, we are a global company, offering a diverse and extensive product portfolio—fuses, semiconductors, polymers, ceramics, relays, sensors, and more—serving the electronics, automotive, and industrial markets. Each is manufactured to exacting quality standards and backed by an unwavering commitment to technical support and customer service.

Our history of innovation, combined with our customer-first culture, drives us to collaborate with you to develop safer, more reliable products that are energy efficient and compliant with global regulations. We will partner with you to solve complex problems wherever electrical energy is used, bringing design, engineering, and technical expertise to deliver business results.

Your Design Challenges, Solved

Our product designs are backed by experts committed to delivering the best solutions for your specific needs. Our global organization provides:

- Custom sensor designs per customer specifications
- Vertically integrated manufacturing
- In-house magnetic sensing simulation support
- Quick turnaround for custom sensor prototypes

Customer Focus

A customer-first approach is at the heart of our company-wide culture, driving us to build long-lasting relationships and exceed expectations. Every day, it's our 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.

Application Expertise

At Littelfuse, we partner with customers to design, manufacture, and deliver innovative solutions for a wide range of markets including automotive and commercial vehicles, industrial applications, data and telecommunications, medical devices, consumer electronics, appliances, and transportation. Our expertise

involves applying reliable and efficient product solutions, innovative technologies, and global resources to address technical challenges in a variety of applications. Our worldwide network of research teams focuses on product development and support, design-in programs, and application testing in our global labs.

Technology Innovation

Littelfuse offers a diverse magnetic and temperature sensor line. If we do not have a standard sensor that meets your needs, we will work with you to develop a forward-thinking solution that does. When you partner with us, you'll stay focused on making great products, not navigating the offerings of multiple vendors. The breadth and depth of our product portfolio ensure that the ideal solution for your application is readily available.

Global Support

Through our network of global labs in China, Germany, Italy, Japan, Lithuania, Mexico, the Philippines, and the United States, we design innovative solutions and provide customer applications support and testing. Our unique capabilities include performance testing, material analysis, and regulatory compliance testing. The dedication of our global labs ensures the outstanding performance, safety, and reliability of our products and support services for our worldwide customer base.

With more than 12,000 employees in over 50 locations throughout the Americas, Europe, and Asia, Littelfuse products, applications knowledge, and technical support are available around the globe. Our network of regional customer support offices and hundreds of authorized distributors work to help you solve problems quickly.

Operational Excellence

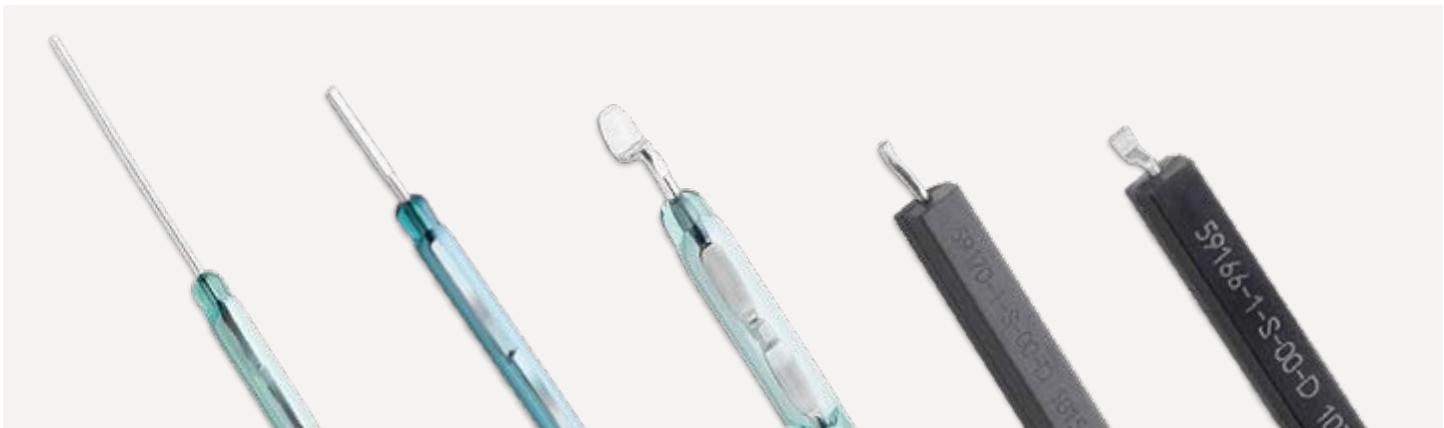
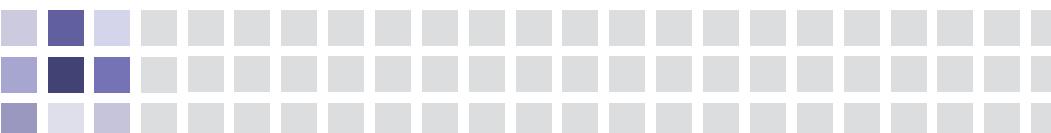
With our global manufacturing footprint, Littelfuse is firmly committed to manufacturing quality products at a competitive price. We build quality into our products and services, striving for zero defects in everything we do, thereby reducing cost and increasing your total satisfaction. We strive to exceed your expectations every day.

Quality Assurance

Our global manufacturing facilities abide by strict quality assurance requirements and hold the following quality management system registrations:

- ISO 9001
- ISO14001
- IATF 16949

Introduction to Magnetic Sensing



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.

Reed Switches

A Reed Switch has two ferromagnetic blades (reeds) contained within a tubular glass envelope that is hermetically sealed at each end. The contacts on each reed blade have a thin layer of precious metal material deposited on them. There is usually nitrogen gas on the inside of the glass envelope to eliminate the presence of oxygen and ensure that the contacts will not oxidize. Reed Switches are activated by a permanent magnet or an electromagnet. The Reed Switch and magnetic field combination is commonly known as the "magnetic circuit."

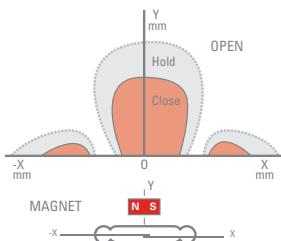


Figure 1-Two-pole linear activation, parallel orientation

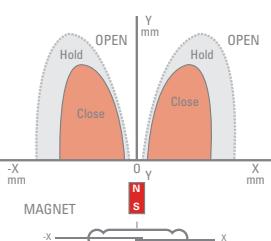
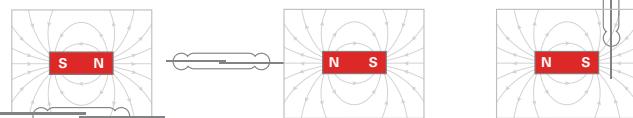


Figure 2-Single-pole linear activation, perpendicular orientation

Figure 3-Magnetic field lines must be aligned parallel to a Reed Switch's contacts in order to open/close the contacts



Reed Sensors

Reed Sensors are Reed Switches that are packaged within an external housing for simplified mounting/connecting and additional protection against environmental influences. These Sensors are typically mounted in mechanical systems. A bare Reed Switch can easily be mounted on circuit boards. However, for an application such as a door security sensor, the Reed Switch needs a protective shell/housing for handling and mounting. These packages offer resistance to mechanical stress by protecting the bare glass of the Reed Switch.

Reed Relays

A Reed Relay is made by combining a Reed Switch with a copper coil. Like other relays, this provides galvanic isolation between the coil input and the controlled contact(s). However, because of the small size and magnetic efficiency of the Reed Switch, the power required to drive the coil is lower than most other types of relays. Other advantages include high insulation resistance, low contact resistance, and long contact life. Reed Relays are used in many applications including automotive, test equipment, security, medical, and process control equipment.

Reed Technology Applications

Reed Switches are very popular for battery-powered applications. The Switches are also used in automotive safety products, such as seatbelt buckle clamping/closure detection sensors and crash sensors for collision detection. Because Reed Sensors can switch AC or DC loads, they are a popular choice for digital on/off applications, such as door closure detection for the security and household appliance markets.

The relative stiffness of the reed blades, along with the small gap and overlap between the two contacts, controls the sensitivity of the Reed Switch. The sensitivity of the switch is the amount of magnetic field that is required to actuate the contact into an open or closed mode. It is measured in units of ampere-turns (AT). Most Reed Switches have a sensitivity range of 10–30 AT, where 10 AT is more sensitive than 30 AT.

Introduction to Magnetic Sensing



Hall Effect Sensors

A Hall Effect device is a semiconductor-based integrated circuit with Hall plates that respond to magnetic fields. Additional circuitry is added for power supply, signal conditioning, temperature compensation, and EMC/ESD protection. Hall Effect devices provide digital or analog output signals that are used for proximity and continuous rotary or linear positioning. Unlike a Reed Switch, a Hall Effect Sensor contains active circuitry, so it always draws a small amount of current. Hall Effect devices come in two- or three-wire versions. Some devices are programmable.

Hall Effect Technology Applications

Digital Hall Effect Sensors are very popular for high-speed sensing applications such as washing machines. Analog Hall Effect Sensors are used in detecting dial position in appliances and as Level Sensors for monitoring fluid levels in appliances such as dishwashers.

| Parameter | Reed Switch | Hall Effect Sensor |
|-------------------------------|-------------|--|
| No-contact sensing element | • | • |
| Current consumption | 0 | ~20mA(Continuous) /6µA (Duty cycle) |
| Sensitivity (Gauss) | 10+ | 42+ |
| Maximum operating temperature | 125 | 150 |
| High-frequency operation | - | • |
| Digital switching | • | • |
| Linear sensing | - | • |
| Integrated circuitry | - | • |
| Electrical load capability | • | - |
| EMC/ESD Immunity | • | - |
| Ultra-small package size | - | • |

Comparing Reed Switch vs. Hall Effect. Although there are differences between Reed Switch and Hall Effect technologies, both platforms offer practical advantages for various applications. Here is a comparison of the benefits of each technology.

Magnetic Actuators

Littelfuse offers a wide range of Magnetic Actuators that are packaged in shapes similar to the relative mating sensors. We also offer a limited family of bare magnets with various grades of materials, including ferrite (ceramic), AlNiCo, and neodymium iron boron (NdFeB) materials.

Customizable Options

- Modifications are available to existing standard product packages, such as adding connectors or changing wire size or length, as well as offering special Reed Switch sensitivities, custom lead forming, bending, and modifications to bare reed switches
- Fully new custom sensor package designs and/or circuitry
- Magnetic circuit (actuator magnet and sensor) design for a variety of applications

Engineering Services

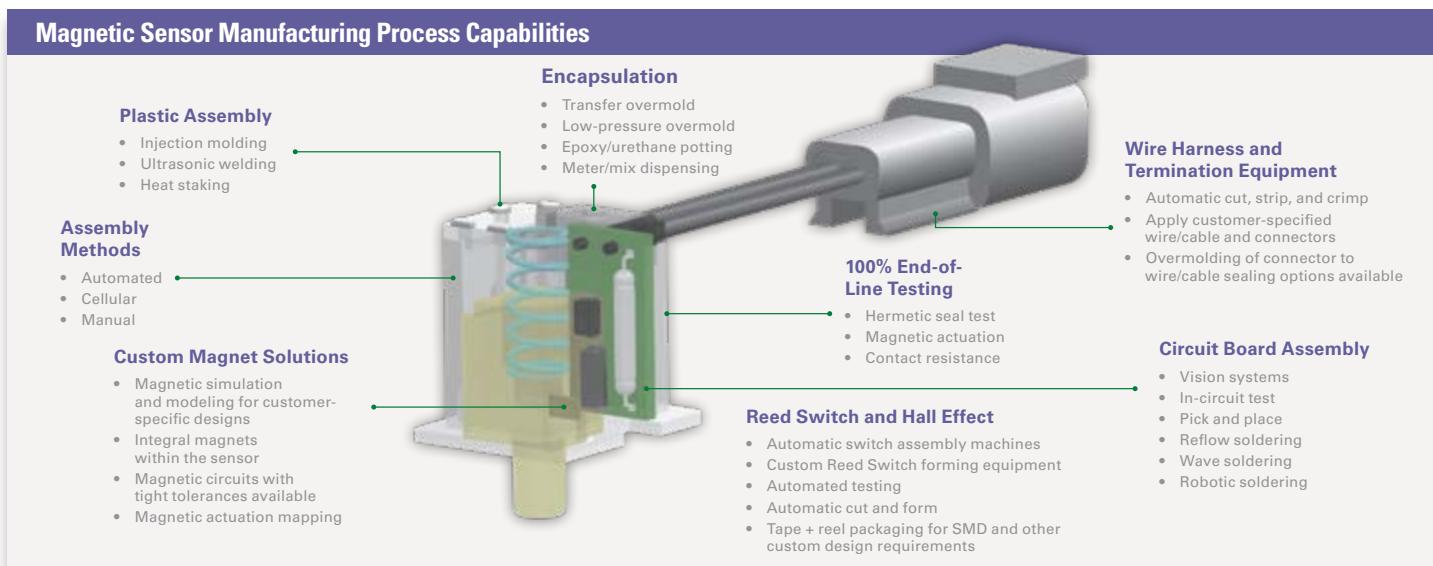
- 3D CAD mechanical design services
- Electronic circuitry design
- Magnetic simulation support analyzing feasibility of the design options
- 3D mapping of magnetic actuation of the sensor
- Rapid prototyping and quick-turn concept parts including 3D printed parts
- Prototype units using prototype tooling
- Reliability/validation testing options
- Fully designed, production-capable sensor and tooling

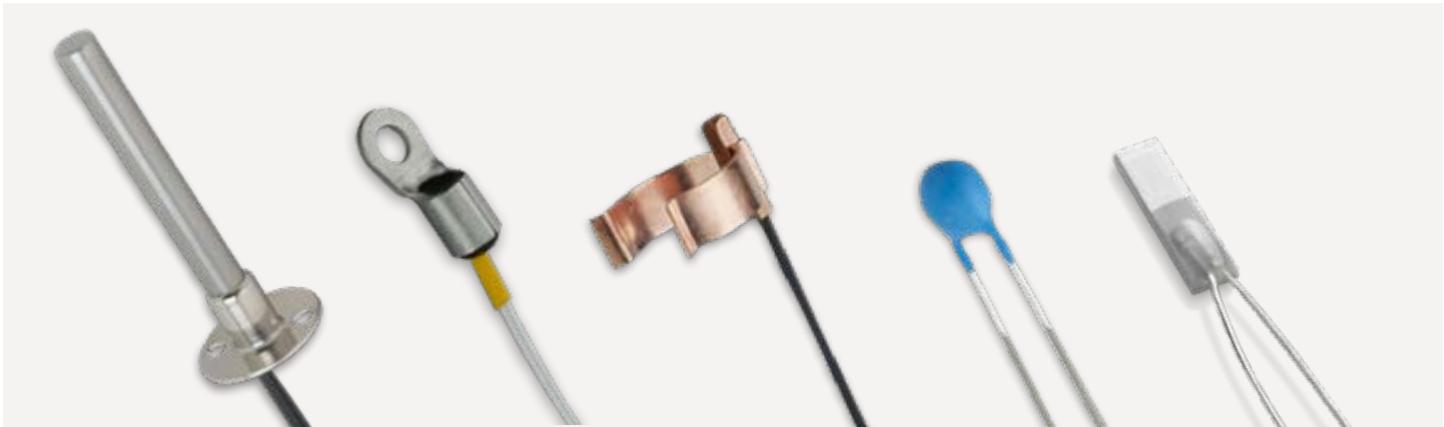
Design Your Custom Magnetic Sensor

Littelfuse specializes in custom design packages that meet our customers' needs for both Reed Switch and Hall Effect Sensor designs. Our manufacturing processes are vertically integrated.

Littelfuse's dedicated application engineers are available to assist you in every step of the custom product development process. Contact our sensor application experts today at littelfuse.com/sensorscontact

Magnetic Sensor Manufacturing Process Capabilities





A Temperature Sensor is a device that detects and measures the average heat or thermal energy in a medium and converts it into an electrical signal. A wide variety of temperature sensing devices are available today. Littelfuse offers a broad range of Thermistors, Resistance Temperature Detectors (RTDs), Digital Temperature Indicators, and probes and assemblies for temperature sensing applications worldwide. Each has its own set of operating principles, features, benefits, considerations, and limitations for optimal use.

Thermistors (NTCs and PTCs)

Thermistors are thermally sensitive resistors whose prime function is to exhibit a large, predictable, and precise change in electrical resistance when subjected to a corresponding change in body temperature. Negative Temperature Coefficient (NTC) thermistors exhibit a decrease in electrical resistance when subjected to an increase in body temperature. Positive Temperature Coefficient (PTC) thermistors exhibit an increase in electrical resistance when subjected to an increase in body temperature.

Applications

Based on the predictable characteristics and their excellent long-term stability, Thermistors are generally accepted to be the most advantageous sensor for many applications including temperature measurement and control.

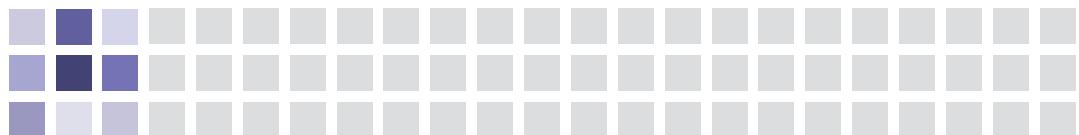
RTDs

Platinum Resistance Temperature Detectors (Pt-RTDs) are temperature sensors that have a positive, predictable, and nearly linear change in resistance when subjected to a corresponding change in their body temperature.

Applications

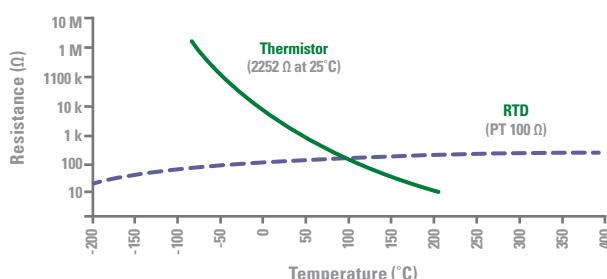
The nearly linear output needed to precisely measure temperature over a very wide range makes RTDs ideal for digital measurement and control applications. Typical applications include industrial controls, medical electronics, HVAC-R, aerospace systems, white goods, small appliances, and food handling.

Introduction to Temperature Sensing



| NTC Thermistors | RTDs (Pt Thin Film) |
|--|--|
| Both are electrical resistors in which resistance changes with temperature | |
| Both require excitation current | |
| Metal oxide on ceramic substrate | Precious metal (typically Pt) on ceramic substrate |
| Very good accuracy suitable for most applications – most commonly used cost-effective temperature sensor | For more-specialized applications requiring very high accuracy (ex. 0.06%/0.15°C) For applications requiring a lot of precision |
| Exponential resistance-temperature curve | Nearly linear resistance-temperature curve provides ease and consistency of measurement |
| Wide operating temperature ranges from -50°C to 300°C | Extremely wide temperature ranges, specifically on the higher end, from -50°C to well above 500°C |
| Resistance values such as 100Ω, up to 5MΩ at 25°C | Resistance values such as 100Ω, 500Ω and 1000Ω at 0°C |

Comparing NTC Thermistors vs. RTDs. Although both technologies sense temperature, they each exhibit different characteristics as shown in the comparison table above. Shown below is a comparison of the resistance-temperature behavior.



Digital Temperature Indicators

Digital Temperature Indicators have a positive relationship between resistance and temperature. The response is very much like a digital signal; below the trip temperature, resistance will be low, above the trip temperature, resistance will be very high. This digital response is ideal for applications where knowing the temperature has increased beyond a specific value is required. With the digital response, no analog to digital conversion is necessary, allowing designers to save time and space.

Applications

Typical applications include USB Type-C cables, power supplies, servers, and other similar systems where monitoring for a specific temperature is required.

Customizable Options

Modifications are available to existing standard product packages, such as adding connectors or changing wire size or length, as well as offering special resistance-temperature (R-T) curves, R-T curve matching, and custom lead forming and bending to discrete thermistors. In addition, the following options and services are available.

- Complete custom sensor packages, including moisture-resistant designs
- Custom resistance-temperature (R-T) characteristics
- Specialized resistance tolerance or temperature accuracy within specified temperature ranges
- Sensing element design for best long-term stability
- Rapid prototyping and quick-turn concept parts including 3D printed parts
- Prototype units using prototype tooling
- Reliability/validation testing options
- Fully designed, production-capable sensor and tooling

Quality and Reliability Testing

In addition to providing custom-designed products, we provide options to evaluate performance and long-term stability for the most demanding applications. Some of our testing capabilities include:

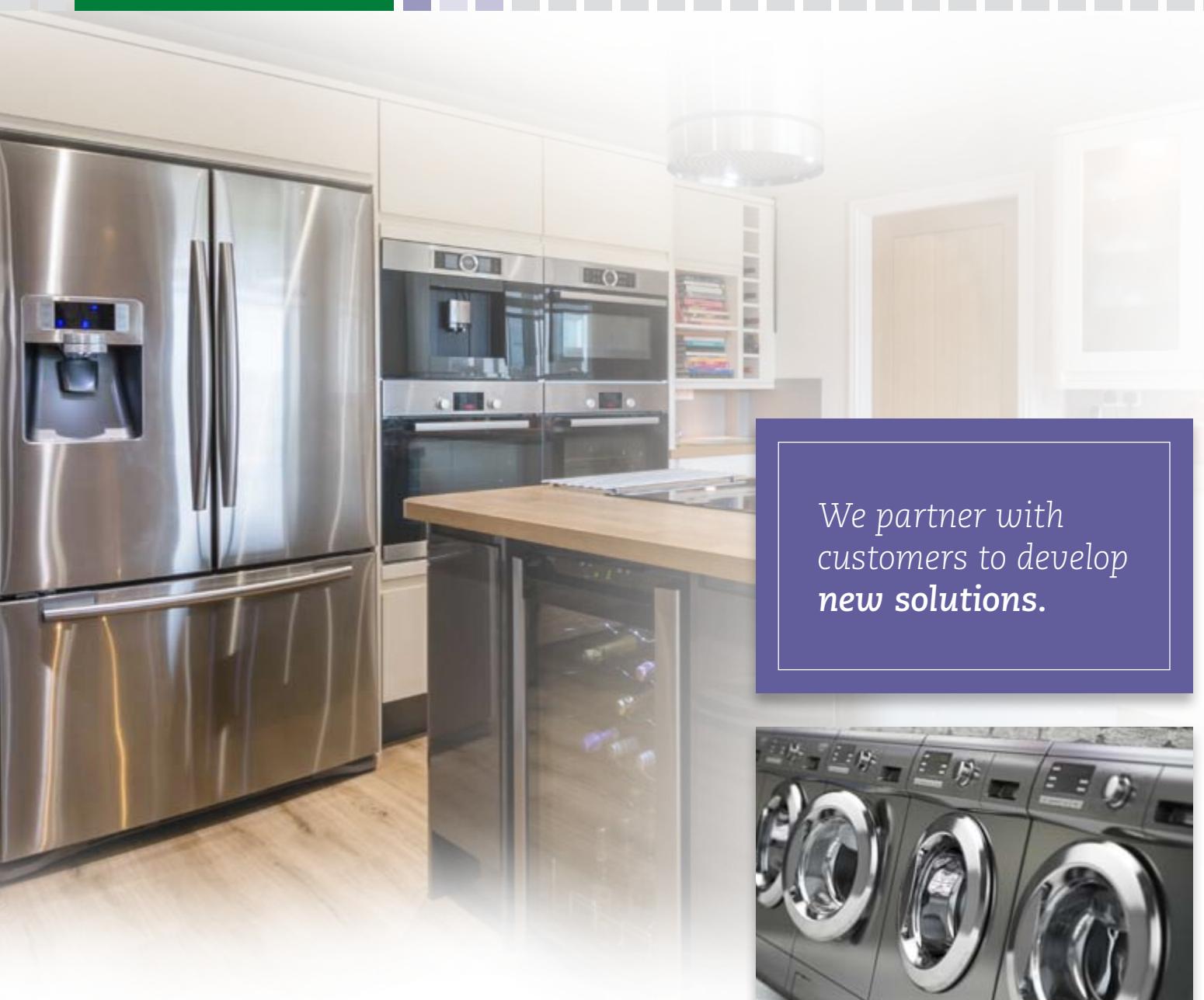
- Salt water immersion
- Freeze/thaw temperature cycling
- Thermal shock
- Sinusoidal vibration

Design Your Custom Temperature Sensor

Littelfuse specializes in custom design packages that meet our customers' needs for both Thermistor and Resistance Temperature Detector (RTD) sensor designs.

If a standard sensor style doesn't meet your needs, contact us for further assistance at littelfuse.com/sensorform. Our application engineers are ready to help design the sensor you need.

Applications



*We partner with
customers to develop
new solutions.*



Electronic Sensor

Application Matrix

Littelfuse Magnetic and Temperature Sensors are used in a wide variety of applications, from position sensing in doors to temperature sensing in electric vehicle battery packs. As applications evolve, we continue to partner with customers to develop new solutions, including customizations to cater to their needs. The following application matrix will help you visualize where Littelfuse can solve design challenges for your specific project.

| Vertical Markets | Applications | Temperature Sensing | | | Magnetic Sensing | |
|---------------------------------|--|--------------------------------|---------------------|--------------------------------|------------------|---------------------|
| | | NTC Thermistors ⁽¹⁾ | RTDs ⁽²⁾ | Digital Temperature Indicators | Reed Switches | Hall Effect Sensors |
| Automotive and Transportation | Temperature sensing EV battery packs | ● | ● | - | - | - |
| | Detect seat belt buckle engagement | - | - | - | - | ● |
| | Position sensing-door/window/kickstand (2- wheeler) | - | - | - | ● | - |
| | Diesel exhaust fluid (AdBlue ⁽³⁾) level measurement | - | - | - | ● | - |
| | Hydraulic arm position sensing | - | - | - | ● | - |
| EV Infrastructure | Position detection of access doors and panels for security | - | - | - | ● | ● |
| | Temperature sensing and fan speed control | ● | - | - | - | - |
| | Temperature sensing for power converter heat sink | ● | - | - | ● | ● |
| Datacenter | Analog temperature sensing | ● | - | - | - | - |
| | MCU cooling fan on/off controls | - | - | ● | ● | - |
| | MCU cooling fan speed controls | ● | - | - | ● | - |
| | Position sensing for racks-door/safety/access interlocks | - | - | - | ● | - |
| | Temperature sensing and fan speed control | ● | - | ● | ● | - |
| | Position sensing for module activation and safety interlocks | - | - | - | ● | - |
| Consumer and Mobile Electronics | Paper tray position detection | - | - | - | ● | - |
| | Charging cradle detection | - | - | - | ● | - |
| | Lens rotation detection | - | - | - | ● | - |
| | Battery pack temperature monitoring | ● | - | ● | - | - |
| | USB-C connector overheating detection | - | - | ● | - | - |
| | Power supply temperature indication | - | - | ● | - | - |
| Appliances | Open/closed sensing for doors | - | - | - | ● | ● |
| | Position of compartments and drawers | - | - | - | ● | ● |
| | General fluid level sensing (e.g., water, detergent) | - | - | - | ● | ● |
| | Temperature-sensing air/liquids/refrigerants | ● | ● | - | - | - |
| | Battery pack temperature monitoring | ● | - | ● | - | - |
| | Motor or power semiconductor temperature monitoring | ● | - | ● | - | - |
| | General safety and functional interlocks | - | - | - | ● | ● |
| Industrial | Temperature measurement and general process controls | ● | ● | - | - | - |
| | Position and speed sensing on robotic arms | - | - | - | ● | ● |
| | Temperature sensing to monitor semiconductor performance | ● | - | ● | - | - |
| | Fan/cooling system speed controls | ● | - | - | - | - |
| | Fan/cooling system activation controls | - | - | ● | - | - |
| | Level sensing for fluid flow | ● | ● | - | ● | ● |
| Building Automation | HVAC ⁽⁴⁾ and water heating systems temperature controls | ● | ● | - | - | - |
| | Building temperature controls | ● | - | - | - | - |
| | Smart meter anti-tamper detection | - | - | - | ● | - |
| | Smart meter gas and water flow measurement | - | - | - | ● | - |
| | General fluid flow measurement | - | - | - | ● | ● |
| | Access control IoT systems | - | - | - | ● | - |
| | Door and window position detection | - | - | - | ● | ● |
| | Temperature detection in fire and safety systems | ● | - | - | - | - |

Notes: (1) NTC – Negative Temperature Coefficient (2) RTD – Resistance Temperature Detectors (3) AdBlue (AUS 32) is a registered trademark of the German Association of the Automotive Industry (VDA)
(4) HVAC – Heating, ventilation, and air conditioning

Reed Switches

| Leads | | | | | | | | | | | | | |
|----------------|-------------|------------|-----------------------|----------------------------|---------------------|-----------------------|----------------------------------|---------------------------------------|------------------------|----------------------------|---------------------------|------|--|
| Product Series | Switch Type | Package | Body Length mm (inch) | Lead-Lead Length mm (inch) | Switching Power (W) | Switching Voltage (V) | Breakdown Voltage** (Vdc - min.) | Switching Current (A) | Contact Resistance (Ω) | Operating Temperature (°C) | Magnetic Sensitivity (AT) | RoHS | |
| MITI-7 | A: SPST-NO | Glass | 7.00 (.276) | 40.38 (1.590) | 10 | 170 Vdc, 120 Vac | 175 | 0.25 Adc, 0.18 Aac | 0.15 | -40 to +125 | 6-20 | • | |
| MDSR-10 | A: SPST-NO | Glass | 10.16 (.400) | 40.38 (1.590) | 10 | 200 Vdc, 140 Vac | 250 | 0.5 Adc, 0.35 Aac | 0.12 | -40 to +125 | 10-25 | • | |
| MDSR-7 | A: SPST-NO | Glass | 12.70 (.500) | 40.38 (1.590) | 10 | 200 Vdc, 140 Vac | 250 | 0.5 Adc, 0.35 Aac | 0.1 | -40 to +125 | 10-25 | • | |
| FLEX-14 | A: SPST-NO | Glass | 14.00 (.551) | 44.30 (1.744) | 10 | 200 Vdc, 140 Vac | 250 | 0.5 Adc, 0.35 Aac | 0.1 | -40 to +125 | 10-30 | • | |
| MDCG-4 | A: SPST-NO | Glass | 15.24 (.600) | 40.38 (1.590) | 10 | 200 Vdc, 140 Vac | 250 | 0.5 Adc, 0.35 Aac | 0.1 | -40 to +125 | 12-38 | • | |
| MACD-14 | A: SPST-NO | Glass | 14.00 (.551) | 44.30 (1.744) | 10 | 200 Vdc, 140 Vac | 200 | 0.5 Adc, 0.35 Aac | 0.1 | -40 to +125 | 10-30 | • | |
| MDRR-DT | C: SPDT-CO | Glass | 14.73 (.580) | 51.66 (2.034) | 5 | 175 Vdc, 120 Vac | 200 | 0.25 Adc, 0.18 Aac | 0.1 | -40 to +125 | 15-30 | • | |
| 59045-1 | A: SPST-NO | Overmolded | 17.78 (.700) | 15.24 (.600) | 10 | 200 Vdc, 140 Vac | 250 | 0.5 Adc, 0.35 Aac | 0.2 | -40 to +105 | 15-30 | • | |
| 59050-1 | A: SPST-NO | Overmolded | 22.86 (.900) | 20.32 (.800) | 10 | 200 Vdc, 140 Vac | 250 | 0.5 Adc, 0.35 Aac | 0.2 | -40 to +105 | 12-33 | • | |
| HA15-2 | A: SPST-NO | Glass | 15.24 (.600) | 40.38 (1.590) | 20 ^t | 200 Vdc, 265 Vac | 400 450 | 0.4 Adc, 0.3 Aac 0.5 Adc, 0.35 Aac | 0.1 | -20 to +125 | 17-23 22-33 | • | |
| MLRR-4 | A: SPST-NO | Glass | 15.24 (.600) | 40.38 (1.590) | 20 | 200 Vdc, 140 Vac | 250 | 1.0 Adc, 0.7 Aac | 0.1 | -40 to +125 | 17-38 | • | |
| MLRR-3 | A: SPST-NO | Glass | 15.24 (.600) | 56.64 (2.230) | 20 | 200 Vdc, 140 Vac | 250 | 1.0 Adc, 0.7 Aac | 0.1 | -40 to +125 | 17-38 | • | |
| MVSR-20 | A: SPST-NO | Glass | 19.69 (0.775) | 56.77 (2.235) | 10 | 1000 Vdc | 2000 | 0.5 Adc, 0.35 Aac | 0.1 | -75 to +125 | 17-38 | • | |
| 59050-2 | A: SPST-NO | Overmolded | 22.86 (.900) | 20.32 (.800) | 20 | 200 Vdc, 265 Vac | 400 | 0.5 Adc, 0.35 Aac | 0.2 | -20 to +105 | 17-33 | • | |
| MRPR-20 | A: SPST-NO | Glass | 20.32 (.800) | 56.64 (2.230) | 50 | 250 Vdc, 265 Vac | 750 | 1.5 Adc, 1.1 Aac | 0.1 | -20 to +125 | 17-43 | • | |
| DRS-50 | A: SPST-NO | Glass | 50.80 (2.000) | 82.55 (3.250) | 100 | 280 Vac, 400 Vdc | 600 | 3.0 Adc, 2.1 Aac | 0.1 | -40 to +125 | 42-83 | • | |
| DRS-DTH | C: SPDT-CO | Glass | 39.67 (1.562) | 85.73 (3.375) | 30 | 350 Vac, 500 Vdc | 1200 | 0.50 Adc, 0.35 Aac | 0.125 | -20 to +125 | 50-80 | • | |

| Surface Mount | | | | | | | | | | | | | |
|----------------|-------------|---------|-----------------------|----------------------------|---------------------|-----------------------|----------------------------------|-----------------------|------------------------|----------------------------|---------------------------|------|--|
| Product Series | Switch Type | Package | Body Length mm (inch) | Lead-Lead Length mm (inch) | Switching Power (W) | Switching Voltage (V) | Breakdown Voltage** (Vdc - min.) | Switching Current (A) | Contact Resistance (Ω) | Operating Temperature (°C) | Magnetic Sensitivity (AT) | RoHS | |
| MDSM-10 | A: SPST-NO | Glass | 7.00 (.276) | 13.72 (.540) | 10 | 170 Vdc, 120 Vac | 175 | 0.25 Adc, 0.18 Aac | 0.15 | -40 to +125 | 6-20 | • | |
| MDSM-DT | C: SPDT-CO | Glass | 10.16 (.400) | 15.62 (.615) | 10 | 200 Vdc, 140 Vac | 250 | 0.5 Adc, 0.35 Aac | 0.12 | -40 to +125 | 10-25 | • | |
| MDSM-4 | A: SPST-NO | Glass | 15.24 (.600) | 19.30 (.760) | 10 | 200 Vdc, 140 Vac | 250 | 0.5 Adc, 0.35 Aac | 0.1 | -40 to +125 | 12-38 | • | |
| MASM-14 | A: SPST-NO | Glass | 14.00 (.551) | 44.30 (1.744) | 10 | 200 Vdc, 140 Vac | 200 | 0.5 Adc, 0.35 Aac | 0.1 | -40 to +125 | 10-30 | • | |
| MDSM-DT | C: SPDT-CO | Glass | 14.73 (.580) | 25.40 (1.00) | 5 | 175 Vdc, 120 Vac | 200 | 0.25 Adc, 0.18 Aac | 0.1 | -40 to +125 | 15-30 | • | |
| MLSM-4 | A: SPST-NO | Glass | 15.24 (.600) | 19.56 (.770) | 20 | 200 Vdc, 140 Vac | 250 | 1.0 Adc, 0.7 Aac | 0.1 | -40 to +125 | 17-38 | • | |
| MLSM-3 | A: SPST-NO | Glass | 15.24 (.600) | 19.56 (.770) | 20 | 200 Vdc, 140 Vac | 250 | 1.0 Adc, 0.7 Aac | 0.1 | -40 to +125 | 17-38 | • | |

For details on electrical specifications, visit littelfuse.com.

A:SPST-NO = Single Pole Single Throw – Normally Open.
C:SPDT-CO = Single Pole Double Throw – Change Over.
NO = Normally Open.

All Reed Switches are RoHS compliant.
Certification: Contact Littelfuse for certified ratings.

**Breakdown Voltage – per MIL-STD-202, Method 301. '20 W for 100-265 VAC loads, 10 W for all other loads.

Reed Switches (Continued)

| Overmolded | | | | | | | | | | | | | |
|----------------|-------------|------------|-----------------------|----------------------------|---------------------|-----------------------|----------------------------------|-----------------------|------------------------|----------------------------|---------------------------|------|--|
| Product Series | Switch Type | Package | Body Length mm (inch) | Lead-Lead Length mm (inch) | Switching Power (W) | Switching Voltage (V) | Breakdown Voltage** (Vdc - min.) | Switching Current (A) | Contact Resistance (Ω) | Operating Temperature (°C) | Magnetic Sensitivity (AT) | RoHS | |
| 59165 | A: SPST-NO | Overmolded | 16.00 (.630) | 20.20 (.795) | 10 | 200 Vdc, 140 Vac | 250 | 0.5 Adc, 0.35 Aac | 0.1 | -40 to +125 | 10-25 | • | |
| 59166 | A: SPST-NO | Overmolded | 16.00 (.630) | 19.51 (.768) | 10 | 200 Vdc, 140 Vac | 250 | 0.5 Adc, 0.35 Aac | 0.1 | -40 to +125 | 10-26 | • | |
| 59170 | A: SPST-NO | Overmolded | 11.43 (.450) | 16.25 (.640) | 10 | 200 Vdc, 140 Vac | 250 | 0.5 Adc, 0.35 Aac | 0.15 | -40 to +125 | 10-25 | • | |

Reed Sensors

| Float | | | | | | | | | | | | | |
|----------------|--|--|--|-------------------------------|--|--|----------------|-------------------|-------------------|-------------------|-----------------------------|------|--|
| Product Series | Description | | | Overall Dimensions | | | Contact Rating | Switching Voltage | Breakdown Voltage | Switching Current | Contact Resistance, Initial | RoHS | |
| | | | | mm (inch) | | | W | Vdc | Vdc | A | Ohms | | |
| | | | | Ø x L | | | Max. | Max. | Min. | Max. | Max. | | |
| 59630 | Float Sensor, Normally Open | | | 23.70 (0.930) x 43.70 (1.720) | | | 10 | 200 | 250 | 0.5 | 0.2 | • | |
| | Float Sensor, Normally Open High Voltage | | | 23.70 (0.930) x 43.70 (1.720) | | | 10 | 300 | 450 | 0.5 | 0.2 | • | |
| | Float Sensor, Changeover | | | 23.70 (0.930) x 43.70 (1.720) | | | 5 | 175 | 200 | 0.25 | 0.2 | • | |
| | Float Sensor, Normally Closed | | | 23.70 (0.930) x 43.70 (1.720) | | | 10 | 200 | 250 | 0.5 | 0.2 | • | |
| 59300 | Level Sensor, Normally Open (Float Not Included) | | | 19.90 (0.783) x 67.55 (2.660) | | | 10 | 200 | 250 | 0.5 | 0.2 | • | |

| Vane | | | | | | | | | | | | | |
|----------------|--|--|--|---|--|--|----------------|-------------------|-------------------|-------------------|-----------------------------|------|--|
| Product Series | Description | | | Overall Dimensions | | | Contact Rating | Switching Voltage | Breakdown Voltage | Switching Current | Contact Resistance, Initial | RoHS | |
| | | | | mm (inch) | | | W | Vdc | Vdc | A | Ohms | | |
| | | | | L x W x H | | | Max. | Max. | Min. | Max. | Max. | | |
| 59085 | Vane Sensor, Normally Open | | | 25.40 (1.000) x 19.05 (0.750) x 6.35 (0.250) | | | 5 | 175 | 200 | 0.25 | 0.2 | • | |
| | Vane Sensor, Changeover | | | 25.40 (1.000) x 19.05 (0.750) x 6.35 (0.250) | | | 5 | 175 | 200 | 0.25 | 0.2 | • | |
| | Vane Sensor, Normally Closed | | | 25.40 (1.000) x 19.05 (0.750) x 6.35 (0.250) | | | 10 | 200 | 250 | 0.5 | 0.2 | • | |
| | Vane Sensor, Normally Closed High Voltage | | | 25.40 (1.000) x 19.05 (0.750) x 6.35 (0.250) | | | 10 | 300 | 450 | 0.5 | 0.2 | • | |
| 59086 | Vane Sensor, Normally Open | | | 25.40 (1.000) x 19.05 (0.750) x 6.35 (0.250) | | | 5 | 175 | 200 | 0.25 | 0.2 | • | |
| | Vane Sensor, Changeover | | | 25.40 (1.000) x 19.05 (0.750) x 6.35 (0.250) | | | 5 | 175 | 200 | 0.25 | 0.2 | • | |
| | Vane Sensor, Normally Closed | | | 25.40 (1.000) x 19.05 (0.750) x 6.35 (0.250) | | | 10 | 200 | 250 | 0.5 | 0.2 | • | |
| | Vane Sensor, Normally Closed High Voltage | | | 25.40 (1.000) x 19.05 (0.750) x 6.35 (0.250) | | | 10 | 300 | 450 | 0.5 | 0.2 | • | |
| 59090 | Heavy Duty Vane Sensor, Normally Closed | | | 32.50 (1.280) x 32.25 (1.271) x 23.25 (0.915) | | | 10 | 200 | 250 | 0.5 | 0.2 | • | |
| | Heavy Duty Vane Sensor, Normally Closed High Voltage | | | 32.50 (1.280) x 32.25 (1.271) x 23.25 (0.915) | | | 10 | 300 | 450 | 0.5 | 0.2 | • | |
| | Heavy Duty Vane Sensor, Changeover | | | 32.50 (1.280) x 32.25 (1.271) x 23.25 (0.915) | | | 5 | 175 | 200 | 0.25 | 0.2 | • | |

For details on electrical specifications, visit littelfuse.com.

A:SPST-NO = Single Pole Single Throw – Normally Open.
C:SPDT-CO = Single Pole Double Throw – Change Over.
NO = Normally Open.

All Reed Switches are RoHS compliant.
Certification: Contact Littelfuse for certified ratings.

**Breakdown Voltage – per MIL-STD-202, Method 301. ¹20 W for 100-265 VAC loads, 10 W for all other loads.

Reed Sensors (Continued)

| | | Seat Occupancy | | | | | | |
|----------------|--------------------------------|--|--|----------------|-------------------|-------------------|-------------------|-----------------------------|
| Product Series | Description | Overall Dimensions | | Contact Rating | Switching Voltage | Breakdown Voltage | Switching Current | Contact Resistance, Initial |
| | | mm (inch) | | W | Vdc | Vdc | A | Ohms |
| | | L × W × H | | Max. | Max. | Min. | Max. | Max. |
| 59250 | Push-button Seat Sensor (Reed) | 32.51 (1.280) × 26.67 (1.050) × 37.34 (1.470) | | 10 | 200 | 250 | 0.5 | 0.2 |
| 59251 | Seat Sensor with Dome (Reed) | 108.20 (4.260) × 69.85 (2.750) × 39.88 (1.570) | | 10 | 200 | 250 | 0.5 | 0.2 |

| Firecracker | | | | | | | | |
|----------------|---|------------------------------------|--|----------------|-------------------|--------------------|-------------------|-----------------------------|
| Product Series | Description | Overall Dimensions | | Contact Rating | Switching Voltage | Break-down Voltage | Switching Current | Contact Resistance, Initial |
| | | mm (inch) | | W | Vdc | Vdc | A | Ohms |
| | | Ø × L | | Max. | Max. | Min. | Max. | Max. |
| 59010 | Ultra-Mini Firecracker | 3.13 (0.123) × 9.00 (0.354) | | 5 | 170 | 175 | 0.25 | 0.25 |
| 59020 | Mini Firecracker | 5.10 (0.201) × 15.24 (0.600) | | 10 | 170 | 175 | 0.25 | 0.25 |
| 59021 | Aluminum Mini Firecracker | 5.10 (0.201) × 15.24 (0.600) | | 10 | 170 | 175 | 0.25 | 0.25 |
| 59022 | Firecracker, Normally Open | 5.80 (.228) × 25.4 (1.000) | | 10 | 200 | 250 | 0.5 | 0.2 |
| | Firecracker, Changeover | 5.80 (.228) × 25.4 (1.000) | | 5 | 175 | 200 | 0.25 | 0.2 |
| | Firecracker, Normally Closed | 5.80 (.228) × 25.4 (1.000) | | 5 | 175 | 200 | 0.25 | 0.2 |
| 59025 | Firecracker, Normally Open | 6.22 (0.245) × 25.40 (1.000) | | 10 | 200 | 250 | 0.5 | 0.2 |
| | Firecracker, Normally Open High Voltage | 6.22 (0.245) × 25.40 (1.000) | | 10 | 300 | 450 | 0.5 | 0.2 |
| | Firecracker, Changeover | 6.22 (0.245) × 25.40 (1.000) | | 5 | 175 | 200 | 0.25 | 0.2 |
| 59030 | Firecracker, Normally Closed | 6.22 (0.245) × 25.40 (1.000) | | 5 | 175 | 200 | 0.25 | 0.2 |
| | Firecracker, Normally Open | 6.22 (0.245) × 38.10 (1.500) | | 10 | 200 | 250 | 0.5 | 0.2 |
| | Firecracker, Normally Open High Voltage | 6.22 (0.245) × 38.10 (1.500) | | 10 | 300 | 450 | 0.5 | 0.2 |
| 59040 | Firecracker, Changeover | 6.22 (0.245) × 38.10 (1.500) | | 5 | 175 | 200 | 0.25 | 0.2 |
| | Firecracker, Normally Closed | 6.22 (0.245) × 38.10 (1.500) | | 5 | 175 | 200 | 0.25 | 0.2 |
| | Press-Fit Firecracker, Normally Open | 9.5 (0.375) Hole Ø × 31.00 (1.220) | | 10 | 200 | 250 | 0.5 | 0.2 |
| 59040 | Press-Fit Firecracker, Changeover | 9.5 (0.375) Hole Ø × 31.00 (1.220) | | 5 | 175 | 200 | 0.25 | 0.2 |
| | Press-Fit Firecracker, Normally Closed | 9.5 (0.375) Hole Ø × 31.00 (1.220) | | 5 | 175 | 200 | 0.25 | 0.2 |

How is the Sensor Used Here?

59090 Reed Sensor

Our Reed Vane Sensor 59090 senses when the grass bag is in the proper position on the electric powered lawn mower. If not sensed, the mower will not activate.



Reed Sensors (Continued)

| Threaded Barrel | | | | | | | | | |
|-----------------|--|-----------------------------------|------|----------------|-------------------|-------------------|-------------------|-----------------------------|-----------------|
| Product Series | Description | Overall Dimensions | | Contact Rating | Switching Voltage | Breakdown Voltage | Switching Current | Contact Resistance, Initial | Mating Actuator |
| | | mm (inch) | | W | Vdc | Vdc | A | Ohms | |
| | | Thread Pitch x L | Max. | Max. | Min. | Max. | Max. | Max. | |
| 59060 | Stainless Steel Threaded Barrel Sensor, Normally Open | M8 x 1.25 Pitch x 36.00 (1.420) | 10 | 200 | 250 | 0.5 | 0.2 | 0.2 | 57060 |
| | Stainless Steel Threaded Barrel Sensor, Normally Open High Voltage | M8 x 1.25 Pitch x 36.00 (1.420) | 10 | 300 | 450 | 0.5 | 0.2 | 0.2 | |
| | Stainless Steel Threaded Barrel Sensor, Changeover | M8 x 1.25 Pitch x 36.00 (1.420) | 5 | 175 | 200 | 0.25 | 0.2 | 0.2 | |
| 59065 | Stainless Steel Threaded Barrel Sensor, Normally Closed | M8 x 1.25 Pitch x 36.00 (1.420) | 5 | 175 | 200 | 0.25 | 0.2 | 0.2 | 57065 |
| | Threaded Barrel Sensor (Standard), Normally Open | (5/16 x 24) Pitch x 38.10 (1.500) | 10 | 200 | 250 | 0.5 | 0.2 | 0.2 | |
| | Threaded Barrel Sensor (Standard), Normally Open High Voltage | (5/16 x 24) Pitch x 38.10 (1.500) | 10 | 300 | 450 | 0.5 | 0.2 | 0.2 | |
| 59070 | Threaded Barrel Sensor (Standard), Changeover | (5/16 x 24) Pitch x 38.10 (1.500) | 5 | 175 | 200 | 0.25 | 0.2 | 0.2 | 57070 |
| | Threaded Barrel Sensor (Standard), Normally Closed | (5/16 x 24) Pitch x 38.10 (1.500) | 5 | 175 | 200 | 0.25 | 0.2 | 0.2 | |
| | Threaded Barrel Sensor (Metric), Normally Open | M8 x 1.25mm Pitch x 38.10 (1.500) | 10 | 200 | 250 | 0.5 | 0.2 | 0.2 | |
| 59075 | Threaded Barrel Sensor (Metric), Normally Open High Voltage | M8 x 1.25mm Pitch x 38.10 (1.500) | 10 | 300 | 450 | 0.5 | 0.2 | 0.2 | 57075 |
| | Threaded Barrel Sensor (Metric), Changeover | M8 x 1.25mm Pitch x 38.10 (1.500) | 5 | 175 | 200 | 0.25 | 0.2 | 0.2 | |
| | Threaded Barrel Sensor (Metric), Normally Closed | M8 x 1.25mm Pitch x 38.10 (1.500) | 5 | 175 | 200 | 0.25 | 0.2 | 0.2 | |
| 59210 | Heavy Duty Threaded Barrel, Normally Open | M12 x 1mm Pitch x 46.00 (1.810) | 10 | 200 | 250 | 0.5 | 0.2 | 0.2 | 57075 |
| | Heavy Duty Threaded Barrel, Normally Open High Voltage | M12 x 1mm Pitch x 46.00 (1.810) | 10 | 300 | 450 | 0.5 | 0.2 | 0.2 | |
| | Heavy Duty Threaded Barrel, Changeover | M12 x 1mm Pitch x 46.00 (1.810) | 5 | 175 | 200 | 0.25 | 0.2 | 0.2 | |
| | Heavy Duty Threaded Barrel, Normally Closed | M12 x 1mm Pitch x 46.00 (1.810) | 5 | 175 | 200 | 0.25 | 0.2 | 0.2 | |

Lever Arm

| Lever Arm | | | | | | | | | |
|----------------|------------------|--------------------------------------|------|----------------|-------------------|-------------------|-------------------|-----------------------------|-----------------|
| Product Series | Description | Overall Dimensions | | Contact Rating | Switching Voltage | Breakdown Voltage | Switching Current | Contact Resistance, Initial | Mating Actuator |
| | | mm (inch) | | W | Vdc | Vdc | A | Ohms | |
| | | L x W x H | Max. | Max. | Min. | Max. | Max. | Max. | |
| 59210 | Lever Arm Sensor | 24 (0.945) x 23 (0.906) x 10 (0.394) | 10 | 200 | 250 | 0.5 | 0.2 | 0.2 | 57075 |

How is the Sensor Used Here?

59145 Reed Sensor

There are four magnets on the dust filter and one Sensor on the vacuum cleaner. If the dust filter is assembled, the Sensor will be actuated by the magnet, and the vacuum cleaner is ready to be used.



Reed Sensors (Continued)

| Flange/Flat Pack | | | | | | | | | |
|------------------|---|--|--|----------------|-------------------|-------------------|-------------------|-----------------------------|-----------------|
| Product Series | Description | Overall Dimensions | | Contact Rating | Switching Voltage | Breakdown Voltage | Switching Current | Contact Resistance, Initial | Mating Actuator |
| | | mm (inch) | | W | Vdc | Vdc | A | Ohms | |
| | | L × W × H | | Max. | Max. | Min. | Max. | Max. | |
| 59105 | Terminal Flange Mount Sensor, Normally Open | 40.17 (1.582) × 19.05 (0.750) × 6.60 (0.260) | | 10 | 200 | 250 | 0.5 | 0.2 | 57105 |
| | Terminal Flange Mount Sensor, Normally Open High Voltage | 40.17 (1.582) × 19.05 (0.750) × 6.60 (0.260) | | 10 | 300 | 450 | 0.5 | 0.2 | |
| | Terminal Flange Mount Sensor, Normally Closed | 40.17 (1.582) × 19.05 (0.750) × 6.60 (0.260) | | 5 | 175 | 200 | 0.25 | 0.2 | |
| 59125 | Pinned Flange Mount Sensor, Normally Open | 28.57 (1.125) × 19.05 (0.750) × 6.35 (0.250) | | 10 | 200 | 250 | 0.5 | 0.2 | 57125 |
| | Pinned Flange Mount Sensor, Normally Open High Voltage | 28.57 (1.125) × 19.05 (0.750) × 6.35 (0.250) | | 10 | 300 | 450 | 0.5 | 0.2 | |
| | Pinned Flange Mount Sensor, Normally Closed | 28.57 (1.125) × 19.05 (0.750) × 6.35 (0.250) | | 5 | 175 | 200 | 0.25 | 0.2 | |
| 59135 | High-Temp Flange Mount Sensor, Normally Open | 28.57 (1.125) × 19.05 (0.750) × 6.35 (0.250) | | 10 | 200 | 250 | 0.5 | 0.2 | 57135 |
| | High-Temp Flange Mount Sensor, Normally Open High Voltage | 28.57 (1.125) × 19.05 (0.750) × 6.35 (0.250) | | 10 | 300 | 450 | 0.5 | 0.2 | |
| | High-Temp Flange Mount Sensor, Changeover | 28.57 (1.125) × 19.05 (0.750) × 6.35 (0.250) | | 5 | 175 | 200 | 0.25 | 0.2 | |
| | High-Temp Flange Mount Sensor, Normally Closed | 28.57 (1.125) × 19.05 (0.750) × 6.35 (0.250) | | 5 | 175 | 200 | 0.25 | 0.2 | |
| 59140 | Mini Flange Mount Sensor, Normally Open | 23.0 (0.906) × 14.00 (0.551) × 6.00 (0.236) | | 10 | 200 | 250 | 0.5 | 0.2 | 57140 |
| | Mini Flange Mount Sensor, Normally Open High Voltage | 23.0 (0.906) × 14.00 (0.551) × 6.00 (0.236) | | 10 | 300 | 450 | 0.5 | 0.2 | |
| | Mini Flange Mount Sensor, Changeover | 23.0 (0.906) × 14.00 (0.551) × 6.00 (0.236) | | 5 | 175 | 200 | 0.25 | 0.2 | |
| | Mini Flange Mount Sensor, Normally Closed | 23.0 (0.906) × 14.00 (0.551) × 6.00 (0.236) | | 5 | 175 | 200 | 0.25 | 0.2 | |
| 59141 | Mini Flange Mount Sensor, Normally Open | 23.0 (0.906) × 14.00 (0.551) × 6.00 (0.236) | | 10 | 200 | 250 | 0.5 | 0.2 | 57140 |
| | Mini Flange Mount Sensor, Normally Open High Voltage | 23.0 (0.906) × 14.00 (0.551) × 6.00 (0.236) | | 10 | 300 | 450 | 0.5 | 0.2 | |
| | Mini Flange Mount Sensor, Changeover | 23.0 (0.906) × 14.00 (0.551) × 6.00 (0.236) | | 5 | 175 | 200 | 0.25 | 0.2 | |
| | Mini Flange Mount Sensor, Normally Closed | 23.0 (0.906) × 14.00 (0.551) × 6.00 (0.236) | | 5 | 175 | 200 | 0.25 | 0.2 | |
| 59145 | Flange Mount Sensor, Normally Open | 28.57 (1.125) × 19.05 (0.750) × 6.35 (0.250) | | 10 | 200 | 250 | 0.5 | 0.2 | 57145 |
| | Flange Mount Sensor, Normally Open High Voltage | 28.57 (1.125) × 19.05 (0.750) × 6.35 (0.250) | | 10 | 300 | 450 | 0.5 | 0.2 | |
| | Flange Mount Sensor, Changeover | 28.57 (1.125) × 19.05 (0.750) × 6.35 (0.250) | | 5 | 175 | 200 | 0.25 | 0.2 | |
| | Flange Mount Sensor, Normally Closed | 28.57 (1.125) × 19.05 (0.750) × 6.35 (0.250) | | 5 | 175 | 200 | 0.25 | 0.2 | |
| 59150 | Flange Mount Sensor, Normally Open | 28.57 (1.125) × 19.05 (0.750) × 6.35 (0.250) | | 10 | 200 | 250 | 0.5 | 0.2 | 57150 |
| | Flange Mount Sensor, Normally Open High Voltage | 28.57 (1.125) × 19.05 (0.750) × 6.35 (0.250) | | 10 | 300 | 450 | 0.5 | 0.2 | |
| | Flange Mount Sensor, Changeover | 28.57 (1.125) × 19.05 (0.750) × 6.35 (0.250) | | 5 | 175 | 200 | 0.25 | 0.2 | |
| | Flange Mount Sensor, Normally Closed | 28.57 (1.125) × 19.05 (0.750) × 6.35 (0.250) | | 5 | 175 | 200 | 0.25 | 0.2 | |

For details on electrical specifications, visit littelfuse.com.

Reed Relays

Single-in-Line (SIL)



HE3300 Series

| Product Series | Description | Overall Dimensions | | | Coil Voltage | | Coil Resistance | Contact Ratings, Switching | | | Contact Form |
|----------------|--|---|--|---|--------------|------|-----------------|----------------------------|------|------|--------------|
| | | Transfer Molded Body | | External Shield Body | | | | Vdc | A | W | |
| | | mm (inch) | | mm (inch) | Nominal | Max. | Nominal | Max. | Max. | Max. | |
| | | L × W × H | | L × W × H | Nominal | Max. | Nominal | Max. | Max. | Max. | |
| HE3321A0400 | | | | | 5 | 22 | 500 | | | | |
| HE3321A1200 | Reed Relay, SIL, SPST-NO | 24.13 (0.950) × 7.00 (0.276) × 7.40 (0.291) | | 24.90 (0.980) × 7.60 (0.299) × 7.80 (0.307) | 12 | 22 | 500 | 200 | 0.5 | 10 | Form A |
| HE3321A2400 | | | | | 24 | 44 | 2000 | | | | |
| HE3321C0500 | | | | | 5 | 11 | 125 | | | | |
| HE3321C1200 | Reed Relay, SIL, SPDT-CO | 24.13 (0.950) × 7.00 (0.276) × 7.40 (0.291) | | 24.90 (0.980) × 7.60 (0.299) × 7.80 (0.307) | 12 | 22 | 500 | 175 | 0.25 | 5 | Form C |
| HE3321C2400 | | | | | 24 | 44 | 2000 | | | | |
| HE3351A0500 | | | | | 5 | 14 | 125 | | | | |
| HE3351A1200 | Reed Relay, SIL, SPST-NO, High Voltage | 24.13 (0.950) × 7.00 (0.276) × 7.40 (0.291) | | 24.90 (0.980) × 7.60 (0.299) × 7.80 (0.307) | 12 | 22 | 500 | 300 | 0.5 | 10 | Form A |
| HE3351A2400 | | | | | 24 | 44 | 2000 | | | | |

Miniature Single-in-Line (SIL)



HE3600 Series

| Product Series | Description | Overall Dimensions | | | Coil Voltage | | Coil Resistance | Contact Ratings, Switching | | | Contact Form |
|----------------|--------------------------|---|--|---|--------------|------|-----------------|----------------------------|------|------|--------------|
| | | Transfer Molded Body | | External Shield Body | | | | Vdc | A | W | |
| | | mm (inch) | | mm (inch) | Nominal | Max. | Nominal | Max. | Max. | Max. | |
| | | L × W × H | | L × W × H | Nominal | Max. | Nominal | Max. | Max. | Max. | |
| HE3621A0500 | | | | | 5 | 14 | 500 | | | | |
| HE3621A1200 | Reed Relay, SIL, SPST-NO | 19.05 (0.750) × 5.08 (0.200) × 7.45 (0.293) | | 19.70 (0.776) × 5.65 (0.222) × 7.87 (0.310) | 12 | 22 | 1000 | 200 | 0.5 | 10 | Form A |
| HE3621A2400 | | | | | 24 | 31 | 2150 | | | | |

How is the Sensor Used Here?

59141 Reed Sensor

There are two Sensors in the coffee machine: one is to detect if the coffee machine top lid is open or closed; the other one does the same for the rotating door.



Reed Relays (Continued)

Dual-in-Line (DIL)



HE700 Series

| Product Series | Description | Overall Dimensions | | | | Coil Voltage | | Coil Resistance | Contact Ratings, Switching | | | Contact Form |
|----------------|--|--|--|---|--|--------------|------|-----------------|----------------------------|------|------|--------------|
| | | Transfer Molded Body | | External Shield Body | | | | | Vdc | A | W | |
| | | mm (inch) | | mm (inch) | | Nominal | Max. | Nominal | Max. | Max. | Max. | |
| | | L × W × H | | L × W × H | | | | | | | | |
| HE721A050 | | | | | | 5 | 12 | 500 | | | | |
| HE721A120 | Reed Relay, DIL, SPST-NO | 19.05 (.750) × 7.22 (0.284) × 5.50 (0.217) | | 20.14 (0.793) × 7.62 (0.300) × 5.82 (0.229) | | 12 | 31 | 1000 | 200 | 0.5 | 10 | Form A |
| HE721A240 | | | | | | 24 | 46 | 2150 | | | | |
| HE721B050 | | | | | | 5 | 6.5 | 500 | | | | |
| HE721B120 | Reed Relay, DIL, SPST-NC | 19.05 (.750) × 7.22 (0.284) × 5.50 (0.217) | | 20.14 (0.793) × 7.62 (0.300) × 5.82 (0.229) | | 12 | 14 | 500 | 200 | 0.5 | 10 | Form B |
| HE721B240 | | | | | | 24 | 28 | 2150 | | | | |
| HE721C050 | | | | | | 5 | 14 | 200 | | | | |
| HE721C120 | Reed Relay, DIL, SPDT-CO | 19.05 (.750) × 7.22 (0.284) × 5.50 (0.217) | | 20.14 (0.793) × 7.62 (0.300) × 5.82 (0.229) | | 12 | 22 | 500 | 175 | 0.25 | 5 | Form C |
| HE721C240 | | | | | | 24 | 44 | 2000 | | | | |
| HE721E050 | | | | | | 5 | 14 | 200 | | | | |
| HE721E120 | Reed Relay, DIL, SPDT-CO | 19.05 (.750) × 7.22 (0.284) × 5.50 (0.217) | | 20.14 (0.793) × 7.62 (0.300) × 5.82 (0.229) | | 12 | 22 | 500 | 175 | 0.25 | 5 | Form C |
| HE721E240 | | | | | | 24 | 44 | 2000 | | | | |
| HE721R050 | | | | | | 5 | 14 | 200 | | | | |
| HE721R120 | Reed Relay, DIL, SPDT-CO | 19.05 (.750) × 7.22 (0.284) × 5.50 (0.217) | | 20.14 (0.793) × 7.62 (0.300) × 5.82 (0.229) | | 12 | 22 | 500 | 175 | 0.25 | 5 | Form C |
| HE721R240 | | | | | | 24 | 44 | 2000 | | | | |
| HE722A050 | | | | | | 5 | 12 | 200 | | | | |
| HE722A120 | Reed Relay, DIL, DPST-NO | 19.05 (.750) × 7.22 (0.284) × 5.50 (0.217) | | 20.14 (0.793) × 7.62 (0.300) × 5.82 (0.229) | | 12 | 22 | 500 | 200 | 0.5 | 10 | Form A |
| HE722A240 | | | | | | 24 | 46 | 2150 | | | | |
| HE751A050 | | | | | | 5 | 12 | 500 | | | | |
| HE751A120 | Reed Relay, DIL, SPST-NO, High Voltage | 19.05 (.750) × 7.22 (0.284) × 5.50 (0.217) | | 20.14 (0.793) × 7.62 (0.300) × 5.82 (0.229) | | 12 | 31 | 1000 | 300 | 0.5 | 10 | Form A |
| HE751A240 | | | | | | 24 | 46 | 2150 | | | | |

Hall Effect Sensors

Flat Flange Mount



| Product Series | Description | Overall Dimensions | | Operating Supply Voltage | Operating Supply Current | Output Type | Output High | Output Low | Temperature Rating | | | | | | | |
|----------------|-------------------------------------|---|------------|--------------------------|--------------------------|------------------------|---------------|-------------|--------------------|-------------|---------|--|--|--|--|--|
| | | mm (inch) | | | | | | | °C | | | | | | | |
| | | L × W × H | Vdc | | | | | | Max. | Operating | Storage | | | | | |
| 55100 | Miniature Flange Mount Hall, 2-Wire | 25.50 (1.004) × 11.00 (0.433) × 3.00 (0.118) | 3.75 to 24 | N/A | Current | N/A | N/A | N/A | -40 to +100 | -65 to +105 | | | | | | |
| | Miniature Flange Mount Hall, 3-Wire | 25.50 (1.004) × 11.00 (0.433) × 3.00 (0.118) | 3.8 to 24 | N/A | Voltage | Sinking/Open Collector | 0.4 V @ 10 mA | -40 to +100 | -65 to +105 | | | | | | | |
| | Miniature Flange Mount Hall, Analog | 25.50 (1.004) × 11.00 (0.433) × 3.00 (0.118) | 4.5 to 5.5 | N/A | Analog Voltage | 4.65 V | 0.35 V | -40 to +100 | -65 to +105 | | | | | | | |
| 55110 | LED Flange Mount Hall | 34.00 (1.399) × 14.00 (0.551) × 10.00 (0.394) | 3.8 to 24 | N/A | Voltage | Vdd-2 @ 0.1 mA | 0.4 V @ 20 mA | -40 to +85 | -65 to +85 | | | | | | | |

For details on electrical specifications, visit littelfuse.com.

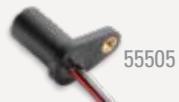
A:SPST-NO = Single Pole Single Throw – Normally Open.
C:SPDT-CO = Single Pole Double Throw – Change Over.
NO = Normally Open.

Hall Effect Sensors (Continued)

Flat Pack

| Product Series | Description | Overall Dimensions | | Operating Supply Voltage | Operating Supply Current | Output Type | Output High | Output Low | Temperature Rating | | |
|----------------|---------------------------|--|--|--------------------------|--------------------------|-----------------------|------------------------|---------------|--------------------|-------------|---------|
| | | mm (inch) | | | mA | | | | °C | Operating | Storage |
| | | L × W × H | | Vdc | Max. | | | | Max. | Max. | Max. |
| 55140 | Flange Mount Hall, 2-Wire | 23.00 (0.906) × 14.00 (0.551) × 6.00 (0.236) | | 3.75 to 24 | N/A | Current | N/A | 2.2 - 5.6 mA | -40 to +100 | -65 to +105 | |
| | Flange Mount Hall, 3-Wire | 23.00 (0.906) × 14.00 (0.551) × 6.00 (0.236) | | 3.8 to 24 | N/A | Voltage | Sinking/Open Collector | 0.4 V @ 20 mA | -40 to +100 | -65 to +105 | |
| | Flange Mount Hall, Analog | 23.00 (0.906) × 14.00 (0.551) × 6.00 (0.236) | | 4.5 to 5.5 | N/A | Analog Voltage | 4.65 V | 0.35 V | -40 to +100 | -65 to +105 | |
| 55300 | Flat Pack Rotary Hall | 28.50 (1.122) × 20.40 (0.803) × 6.35 (0.250) | | 4.5 to 5.5 | 16 | Analog Voltage or PWM | 4.5 V | 0.5 V | -40 to +105 | -65 to +105 | |
| 55310 | Flat Pack Digital Hall | 28.50 (1.122) × 20.40 (0.803) × 6.35 (0.250) | | 4.75 to 24 | 6 | Current | N/A | 20 mA | -40 to +105 | -65 to +105 | |

Round Flange Mount



55505

| Product Series | Description | Overall Dimensions | | Operating Supply Voltage | Operating Supply Current | Output Type | Output High | Output Low | Temperature Rating | | |
|----------------|-----------------------------|---|--|--------------------------|--------------------------|-------------|-------------|---------------|--------------------|-------------|---------|
| | | mm (inch) | | | mA | | | | °C | Operating | Storage |
| | | L × W × H | | Vdc | Max. | | | | Max. | Max. | Max. |
| 55505 | Flange Mount Geartooth Hall | 17.86 (0.703) × 36.75 (1.447) × 41.40 (0.551) | | 4.75 to 24 | N/A | Digital | Vdd-2 | 0.6 V @ 20 mA | -40 to +125 | -65 to +125 | |

Threaded Barrel



55075

| Product Series | Description | Overall Dimensions | | Operating Supply Voltage | Operating Supply Current | Output Type | Output High | Output Low | Temperature Rating | | |
|----------------|------------------------------------|-------------------------------|--|--------------------------|--------------------------|-------------|-------------|---------------|--------------------|------------|---------|
| | | mm (inch) | | | mA | | | | °C | Operating | Storage |
| | | Thread Pitch × L | | Vdc | Max. | | | | Max. | Max. | Max. |
| 55075 | Stainless Steel M12 Geartooth Hall | M12 × 1 Pitch × 46.00 (1.811) | | 4.75 to 25.2 | N/A | Digital | Vdd-2 | 0.6 V @ 20 mA | -40 to +85 | -65 to +85 | |

Rotary/Angular



55250

| Product Series | Description | Overall Dimensions | | Operating Supply Voltage | Operating Supply Current | Output Type | Output High | Output Low | Temperature Rating | | |
|----------------|-------------|---|--|--------------------------|--------------------------|-----------------------|-------------|------------|--------------------|-------------|---------|
| | | mm (inch) | | | mA | | | | °C | Operating | Storage |
| | | L × W × H | | Vdc | Max. | | | | Max. | Max. | Max. |
| 55250 | Rotary Hall | 50.00 (1.968) × 37.30 (1.469) × 28.25 (1.112) | | 4.5 to 5.5 | 16 | Analog Voltage or PWM | 4.5 V | 0.5 V | -40 to +125 | -65 to +125 | |

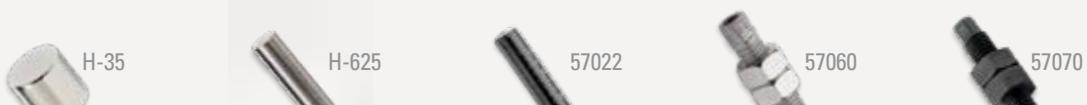
Magnetic Actuators

Rectangular



| Product Series | Description | Overall Dimensions | Material | Recommended Operating Temp. |
|-----------------------|--|--|-----------|-----------------------------|
| | | mm (inch) | | °C |
| | | L x W x H | | Max. |
| H-31 | AlNiCo Magnet | 12.70 (0.500) x 1.60 (0.062) x 1.60 (0.062) | AlNiCo-5 | 450 |
| H-32 | AlNiCo Magnet | 25.40 (1.000) x 4.80 (0.190) x 4.80 (0.190) | AlNiCo-5 | 450 |
| H-33 | AlNiCo Magnet | 19.10 (0.750) x 3.20 (0.120) x 3.20 (0.120) | AlNiCo-5 | 450 |
| H-34 | AlNiCo Magnet | 25.40 (1.000) x 6.35 (0.250) x 6.35 (0.250) | AlNiCo-5 | 450 |
| H-40 | Neodymium Magnet | 7.62 (0.300) x 3.18 (0.125) x 3.18 (0.125) | NdFeB 45H | 120 |
| H-41 | Neodymium Magnet | 19.05 (0.750) x 3.18 (0.125) x 3.18 (0.125) | NdFeB 35H | 120 |
| H-58 | Neodymium Magnet | 21.00 (0.827) x 7.00 (0.276) x 4.70 (0.185) | NdFeB 35H | 120 |
| 57105 | Actuator for Terminal Flange Mount Sensor | 28.57 (1.125) x 19.05 (0.750) x 6.35 (0.250) | AlNiCo-5 | 105 |
| 57125 | Actuator for Pinned Flange Mount Sensor | 28.57 (1.125) x 19.05 (0.750) x 6.35 (0.250) | AlNiCo-5 | 105 |
| 57135 | Actuator for High-Temp Flange Mount Sensor | 28.57 (1.125) x 19.05 (0.750) x 6.35 (0.250) | AlNiCo-5 | 150 |
| 57140 | Actuator for Mini Flange Mount Sensor | 23.00 (0.906) x 14.00 (0.551) x 6.00 (0.236) | AlNiCo-5 | 105 |
| 57141 | Actuator for Mini Flange Mount Sensor | 23.00 (0.906) x 14.00 (0.551) x 6.00 (0.236) | AlNiCo-5 | 105 |
| 57142 | Actuator for Mini Flange Mount Sensor | 23.00 (0.906) x 14.00 (0.551) x 6.00 (0.236) | NdFeB 35H | 105 |
| 57145 | Actuator for Flange Mount Sensor | 28.57 (1.125) x 19.05 (0.750) x 6.35 (0.250) | AlNiCo-5 | 105 |
| 57150 | Actuator for Flange Mount Sensor | 28.57 (1.125) x 19.05 (0.750) x 6.35 (0.250) | AlNiCo-5 | 105 |
| 57045 | Actuator for Mini PCB Mount Overmolded | 17.78 (0.700) x 3.30 (0.130) x 4.32 (0.170) | AlNiCo-5 | 105 |
| 57050 | Actuator for PCB Mount Overmolded | 22.86 (0.900) x 4.57 (0.180) x 4.57 (0.180) | AlNiCo-5 | 105 |

Cylindrical



| Product Series | Description | Overall Dimensions | Material | Recommended Operating Temp. |
|-----------------------|--|-----------------------------------|------------|-----------------------------|
| | | mm (inch) | | °C |
| | | ø x L | | Max. |
| H-35 | Neodymium Magnet | 6.35 (0.250) x 6.35 (0.250) | NdFeB 35H | 120 |
| H-48 | Neodymium Magnet | 4.40 (0.173) x 6.00 (0.236) | NdFeB 35SH | 150 |
| CM-1 | Ceramic Magnet | 12.70 (0.500) x 5.08 (0.200) | Ceramic-5 | 250 |
| H-36 | AlNiCo Magnet | 4.60 (0.182) x 25.40 (1.000) | AlNiCo-5 | 450 |
| H-315 | AlNiCo Magnet | 3.00 (0.118) x 15.00 (0.590) | AlNiCo-5 | 450 |
| H-420 | AlNiCo Magnet | 4.00 (0.157) x 20.0 (0.787) | AlNiCo-5 | 450 |
| H-625 | AlNiCo Magnet | 6.00 (0.236) x 25.0 (0.984) | AlNiCo-5 | 450 |
| 57020 | Actuator for Mini Firecracker | 5.10 (0.201) x 15.24 (0.600) | AlNiCo-5 | 105 |
| 57022 | Actuator for Firecracker | 5.80 (0.228) x 25.40 (1.000) | AlNiCo-5 | 105 |
| 57025 | Actuator for Firecracker | 6.22 (0.245) x 25.40 (1.000) | AlNiCo-5 | 105 |
| 57030 | Actuator for Long Firecracker | 6.22 (0.245) x 38.10 (1.500) | AlNiCo-5 | 105 |
| 57040 | Actuator for Firecracker with Retaining Ribs | 9.5 (0.375) x 31.00 (1.220) | NdFeB 35H | 105 |
| 57060 | Actuator for Stainless Threaded Barrel Sensor | M8 x 1.25 Pitch x 36.00 (1.420) | AlNiCo-5 | 105 |
| 57065 | Actuator for Threaded Barrel Sensor (Standard) | (5/16 x 24) Pitch x 38.10 (1.500) | AlNiCo-5 | 105 |
| 57070 | Actuator for Threaded Barrel Sensor (Metric) | M8 x 1.25 Pitch x 38.10 (1.500) | AlNiCo-5 | 105 |
| 57075 | Actuator for Heavy Duty Threaded Barrel | M12 x 1.00 Pitch x 46.00 (1.810) | Ceramic-2 | 105 |

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Leaded Thermistors

Epoxy Coated Thermistors



| Product Series | Description | Overall Dimensions | Resistance | Resistance Tolerance | R-T Curve | Temperature Coefficient | Beta Nominal | Dissipation Constant, Nominal | Thermal Time Constant, Max. - Still Air | Thermal Time Constant, Max. - Well-Stirred Oil | Temperature Rating |
|----------------|--|--------------------|------------------|----------------------|---------------------|-------------------------|--------------|-------------------------------|---|--|--------------------|
| | | Inches | Ohms | ± % | | % / °C | K | mW / °C | Seconds | Seconds | °C |
| | | Bead W × Lead L | @ 25°C | @ 25°C | | @ 25°C | 0-50°C | | | | |
| KC | Miniature Leaded Epoxy Coated Thermistors (135°C), Kynar Insulated Lead Wire | 0.095 × 1.5 | 100 - 100,000 | 1; 10 | B, F, G, J, N1, R | 3.3 - 4.68 | 2941 - 4140 | 1 | 10 | 1 | -55 to +135 |
| LC | Miniature Leaded Epoxy Coated Thermistors (150°C), Tinned Solderable Wire | 0.095 × 1.5 | 100 - 100,000 | 2; 5; 10 | B, E, F, G, H, J, R | 3.3 - 4.68 | 2941 - 4140 | 1 | 10 | 1 | -55 to +150 |
| SC | Miniature Leaded Epoxy Coated Thermistors (150°C), Tinned Solderable Wire | 0.095 × 1.5 | 50,000 - 100,000 | 5 | J | 4.4 - 4.5 | 3892 | 2 | 10 | --- | -55 to +150 |
| TC | Miniature Leaded Epoxy Coated Thermistors (150°C), Teflon Insulated Wire | 0.095 × 1.5 | 100 - 100,000 | 10 | B, F, G, J, R | 3.3 - 4.68 | 2941 - 4140 | 1 | 10 | 1 | -55 to +150 |
| AC | Miniature Leaded Epoxy Coated Thermistors (125°C), Tinned Solderable Lead Wire | 0.140 × 0.675 | 10,000 | 1 | E1, J | 4.4 | 3892 | 2 | 15 | 3 | -55 to +125 |
| DC | Miniature Leaded Epoxy Coated Thermistors (150°C), Tinned Solderable Lead Wire | 0.125 × 1.0 | 100 - 100,000 | 1; 2; 10 | B, F, G, J, R | 3.3 - 4.68 | 2941 - 4140 | 3 | 15 | 2 - 3 | -55 to +150 |

Glass Probe Thermistors



| Product Series | Description | Overall Dimensions | Resistance | Resistance Tolerance | R-T Curve | Temperature Coefficient | Beta Nominal | Dissipation Constant, Nominal | Thermal Time Constant, Max. - Still Air | Thermal Time Constant, Max. - Well-Stirred Oil | Temperature Rating |
|----------------|---|--------------------|------------|----------------------|-----------|-------------------------|--------------|-------------------------------|---|--|--------------------|
| | | Inches | Ohms | ± % | | % / °C | K | mW / °C | Seconds | Seconds | °C |
| | | Body ø × Body L | @ 25°C | @ 25°C | | @ 25°C | 25-85°C | | | | |
| GL | High-Temperature Glass Housing Thermistors (300°C), Tinned Solderable Lead Wire | 0.070 × 0.500 | 2252 | 10 | J | 4.4 | 3977 | --- | --- | --- | -55 to +250 |

For details on electrical specifications, visit littelfuse.com.



Product Overview

Thermal Sensing Solutions: Thermistors, RTDs, Probe Assemblies

Littelfuse offers a broad range of thermistors, RTDs, probes, and assemblies for demanding temperature sensing applications worldwide. To learn more, download the Temperature Sensors Product Overview.



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Leaded Thermistors (Continued)

| Glass Coated Chip Thermistors | | | | | | | | | | | | |
|-------------------------------|---|--------------------|-------------------|----------------------|-------------------------|-------------------------|--------------|-------------------------------|---|--|--------------------|--|
| Product Series | Description | Overall Dimensions | Resistance | Resistance Tolerance | R-T Curve | Temperature Coefficient | Beta Nominal | Dissipation Constant, Nominal | Thermal Time Constant, Max. - Still Air | Thermal Time Constant, Max. - Well-Stirred Oil | Temperature Rating | |
| | | Inches | Ohms | ± % | | % / °C | K | mW / °C | Seconds | Seconds | °C | |
| | | Bead ø × Lead L | @ 25°C | @ 25°C | | @ 25°C | 25-85°C | | | | | |
| <u>GQ</u> | Radial Leaded Glass Coated Chip Thermistors (0.140" Dia.), Solderable Lead Wire | 0.140 × 1.00 | 2252 | 10 | J | 4.4 | 3977 | --- | --- | --- | -55 to +250 | |
| <u>GR</u> | Radial Leaded Glass Coated Chip Thermistors (0.090" Dia.), Solderable Lead Wire | 0.090 × 1.00 | 100 - 100,000 | 10; 20 | B7, E1, F, J, R | 3.18 - 4.68 | 2826 - 4263 | 1.3 | 14 | --- | -55 to +300 | |
| <u>GS</u> | Radial Leaded Glass Coated Chip Thermistors (0.060" Dia.), Solderable Lead Wire | 0.060 × 1.00 | 200 - 1,000,000 | 10 | E1, G, J, R | 3.38 - 5.25 | 3047 - 4668 | 0.7 | 5 | --- | -55 to +300 | |
| <u>GT</u> | Radial Leaded Glass Coated Chip Thermistors (0.039" Dia.), Solderable Lead Wire | 0.039 × 1.00 | 1,000 - 1,000,000 | 10 | B, E1, F, J, L1, N1, U1 | 3.3 - 4.52 | 3009 - 4350 | 0.45 | 2.5 | --- | -55 to +300 | |

| Glass Encapsulated Thermistors | | | | | | | | | | | | |
|--------------------------------|---|--------------------|------------------|----------------------|---|-------------------------|--------------|-------------------------------|---|--|--------------------|--|
| Product Series | Description | Overall Dimensions | Resistance | Resistance Tolerance | R-T Curve | Temperature Coefficient | Beta Nominal | Dissipation Constant, Nominal | Thermal Time Constant, Max. - Still Air | Thermal Time Constant, Max. - Well-Stirred Oil | Temperature Rating | |
| | | Inches | Ohms | ± % | | % / °C | K | mW / °C | Seconds | Seconds | °C | |
| | | Body ø × Body L | @ 25°C | @ 25°C | | @ 25°C | 0-50°C | | | | | |
| <u>DO-34 Standard</u> | Glass Encapsulated Thermistors (300°C), DO-34 Package, Tinned CCS Lead Wire | 0.065 × 0.110 | 2,000 - 330,000 | 10 | F, J, N1, R | 3.86 - 4.68 | 3419 - 4263 | 2 | 5 | 0.5 | -55 to +300 | |
| <u>DO-35 Standard</u> | Glass Encapsulated Thermistors (300°C), DO-35 Package, Tinned CCS Lead Wire | 0.075 × 0.160 | 500 - 5,000,000 | 1; 2; 3; 5; 10 | B, E, E1, F, F13, G, H, J, L1, N1, R, V3, V4, Y, Y1 | 3.3 - 5.33 | 2941 - 4640 | 2 | 2 - 8 | 0.5 - 1 | -55 to +300 | |
| <u>DO-41 Standard</u> | Glass Encapsulated Thermistors (300°C), DO-41 Package, Tinned CCS Lead Wire | 0.110 × 0.170 | 100 - 33,000 | 10 | B, F, J, R | 3.31 - 4.68 | 2941 - 4140 | 3 | 8 | 2 | -55 to +300 | |
| <u>JL</u> | Interchangeable Glass Encapsulated Thermistors, DO-35 Package, ± 0.5°C Accuracy | 0.075 × 0.160 | 10,000 - 100,000 | --- | J | 4.4 | 3892 | 2 | 5 | 0.5 | -55 to +300 | |
| <u>JM</u> | Interchangeable Glass Encapsulated Thermistors, DO-35 Package, ± 1.0°C Accuracy | 0.075 × 0.160 | 10,000 - 100,000 | --- | J | 4.4 | 3892 | 2 | 5 | 0.5 | -55 to +300 | |
| <u>USUG1000</u> | UL Recognized Glass Encapsulated Thermistors, DO-35 Package | 0.075 × 0.160 | 10,000 - 250,000 | 2; 5; 10 | J | 3.67 | 3892 | 2 | --- | --- | -40 to +150 | |

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Leaded Thermistors (Continued)

| Interchangeable Thermistors | | | | | | | | | | | | | |
|-----------------------------|---|--------------------|-----------------|------------|------------|-------------|-------------------------|--------------|-------------------------------|---|--|--------------------|---|
| Product Series | Description | Overall Dimensions | | Resistance | Accuracy | R-T Curve | Temperature Coefficient | Beta Nominal | Dissipation Constant, Nominal | Thermal Time Constant, Max. - Still Air | Thermal Time Constant, Max. - Well-Stirred Oil | Temperature Rating | Max. Storage & Operation Temperature for Best Long-Term Stability |
| | | Inches | Ohms | ± °C | % / °C | K | mW / °C | Seconds | Seconds | °C | | | |
| | | Bead W x Bead L | @ 25°C | 0-70°C | | | | | | | | | |
| KS | Standard Precision Interchangeable Thermistors (135°C), ± 0.1°C Accuracy, Kynar Insulated Leads | 0.095 x 1.5 | 1,000 - 100,000 | ±0.1°C | G, J, R | 4.04 - 4.68 | 3575 - 4140 | 1 | 10 | 1 | -80 to +135 | -80 to +75 | |
| KT | Standard Precision Interchangeable Thermistors (135°C), ± 0.2°C Accuracy, Kynar Insulated Leads | 0.095 x 1.5 | 1,000 - 100,000 | ±0.2°C | G, J, R | 4.04 - 4.68 | 3575 - 4140 | 1 | 10 | 1 | -80 to +135 | -80 to +120 | |
| KW | Precision Interchangeable Thermistors (135°C), ± 0.5°C Accuracy, Kynar Insulated Leads | 0.095 x 1.5 | 1,000 - 100,000 | ±0.5°C | G, J, R | 4.04 - 4.68 | 3575 - 4140 | 1 | 10 | 1 | -80 to +135 | -80 to +120 | |
| KX | Precision Interchangeable Thermistors (135°C), ± 1.0°C Accuracy, Kynar Insulated Leads | 0.095 x 1.5 | 1,000 - 100,000 | ±1.0°C | G, J, R | 4.04 - 4.68 | 3575 - 4140 | 1 | 10 | 1 | -80 to +135 | -80 to +120 | |
| PR | Ultra Precision Interchangeable Thermistors (80°C), ± 0.05°C Accuracy, Uninsulated Leads | 0.095 x 1.5 | 2,252 - 50,000 | ±0.05°C | J | 4.4 | 3892 | 1 | 10 | 1 | -55 to +80 | -55 to +50 | |
| PS | Standard Precision Interchangeable Thermistors (150°C), ± 0.1°C Accuracy, Uninsulated Leads | 0.095 x 1.5 | 1,000 - 100,000 | ±0.1°C | G, J, R | 4.04 - 4.68 | 3575 - 4140 | 1 | 10 | 1 | -80 to +135 | -80 to +75 | |
| PT | Standard Precision Interchangeable Thermistors (150°C), ± 0.2°C Accuracy, Uninsulated Leads | 0.095 x 1.5 | 1,000 - 100,000 | ±0.2°C | G, J, R | 4.04 - 4.68 | 3575 - 4140 | 1 | 10 | 1 | -80 to +135 | -80 to +120 | |
| PW | Precision Interchangeable Thermistors (150°C), ± 0.5°C Accuracy, Uninsulated Leads | 0.095 x 1.5 | 1,000 - 100,000 | ±0.5°C | E, G, J, R | 3.67 - 4.68 | 3263 - 4140 | 1 | 10 | 1 | -80 to +135 | -80 to +120 | |
| PX | Precision Interchangeable Thermistors (150°C), ± 1.0°C Accuracy, Uninsulated Leads | 0.095 x 1.5 | 1,000 - 100,000 | ±1.0°C | E, G, J, R | 3.67 - 4.68 | 3263 - 4140 | 1 | 10 | 1 | -80 to +135 | -80 to +120 | |

Surface Mount Thermistors

| End-Banded Chip Thermistors | | | | | | | | |
|-----------------------------|--|-------------------------|------------------|------------|----------------------|-------------------------|--------------|-------------------|
| Product Series | Description | Overall Dimensions | | Resistance | Resistance Tolerance | Temperature Coefficient | Beta Nominal | Max. Power Rating |
| | | Inches | Ohms | ± % | A | K | mW | °C |
| | | L x W x T | @ 25°C | @ 25°C | @ 25°C | 25-85°C | | |
| RA | Surface Mount End-Banded Chip Thermistors 0402 Style (125°C) | 0.0394 x 0.0197 x 0.208 | 10,000 - 200,000 | 1; 5 | -4.4 | 3800 - 4250 | 40mW | -40 to +125 |
| RB | Surface Mount End-Banded Chip Thermistors 0603 Style (125°C) | 0.063 x 0.0315 x 0.0395 | 1,000 - 200,000 | 5 | -4.4 | 3250 - 4250 | 150mW | -40 to +125 |
| KR | Surface Mount End-Banded Chip Thermistors 0805 Style (125°C) | 0.0787 x 0.0492 x 0.050 | 1,000 - 200,000 | 5 | -4.4 | 3250 - 4250 | 300mW | -40 to +125 |
| LR | Surface Mount End-Banded Chip Thermistors 1206 Style (125°C) | 0.126 x 0.063 x 0.050 | 1,000 - 500,000 | 5 | --- | 3250 - 4250 | 320 - 400 mW | -40 to +125 |

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Surface Mount Thermistors (Continued)

Leadless Top-Bottom Terminated Chip Thermistors



| Product Series | Description | Overall Dimensions | Resistance | Resistance Tolerance | R-T Curve | Temperature Coefficient | Beta Nominal | Dissipation Constant, Nominal | Thermal Time Constant, Max. - Still Air | Temperature Rating |
|----------------|---|--------------------|---------------|----------------------|------------|-------------------------|--------------|-------------------------------|---|--------------------|
| | | Inches | Ohms | ± % | | % / °C | K | mW / °C | Seconds | °C |
| | | L × W × T | @ 25°C | @ 25°C | | @ 25°C | 0-50°C | | | |
| BC | Leadless Top/Bottom Terminated Chip Thermistors (150°C) | Various Sizes | 100 - 100,000 | 10 | B, F, J, R | -4.68 to -3.31 | 2941 - 4140 | 1 | 2 | -55 to +150 |

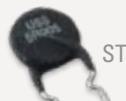
MELF Style Thermistors



| Product Series | Description | Overall Dimensions | Resistance | Resistance Tolerance | R-T Curve | Temperature Coefficient | Beta Nominal | Dissipation Constant, Nominal | Thermal Time Constant, Max. - Still Air | Temperature Rating |
|----------------|--|--------------------|------------------|----------------------|------------------------------|-------------------------|--------------|-------------------------------|---|--------------------|
| | | Inches | Ohms | ± % | | % / °C | K | mW / °C | Seconds | °C |
| | | ø × L | @ 25°C | @ 25°C | | @ 25°C | 0-50°C | | | |
| MM | Surface Mount NTC LL-31 MicroMELF Style (220°C) | 0.049 × 0.075 | 2,186 - 200,000 | 1; 10 | E1, F, G, J, R | -4.68 to -3.82 | 3320 - 4140 | 1 | 5 | -55 to +220 |
| HM | Surface Mount NTC LL-34 MiniMELF Interchangeable (220°C) ±0.5°C Accuracy | 0.0603 × 0.135 | 10,000 - 100,000 | 0.5 | J | -4.4 | 3892 | 2 | 8 | -55 to +220 |
| SM | Surface Mount NTC LL-34 MiniMELF Style (220°C) | 0.060 × 0.135 | 500 - 1,000,000 | 1; 10 | B, D2, E, E1, F, G, J, R, V3 | -4.93 to -3.3 | 2941 - 4369 | 2 | 8 | -55 to +220 |
| WM | Surface Mount NTC LL-34 MiniMELF Interchangeable (220°C) ±1.0°C Accuracy | 0.060 × 0.135 | 10,000 - 100,000 | --- | --- | -4.4 | 3892 | 2 | 8 | -55 to +220 |
| SB | Surface Mount NTC LL-41 MELF Style (220°C) | 0.060 × 0.135 | 1,000 - 20,000 | 10 | F, J, R | -4.68 to -3.68 | 3419 - 4140 | 3 | 8 | -55 to +220 |

Power Thermistors

Inrush Current Limiting Thermistors



| Product Series | Description | Disc Dimensions | Resistance | Resistance Tolerance | Max Steady State Current | Nominal Resistance @ Max. Current | Lead Diameter Nominal |
|----------------|---|-----------------|------------|----------------------|--------------------------|-----------------------------------|-----------------------|
| | | Inches | Ohms | ± % | A | Ohms | Inches |
| | | Diameter | @ 25°C | @ 25°C | I _{max} | R _{I_{max}} | |
| ST | Inrush Current Limiters (Power Thermistors) | 0.275 - 1.475 | 0.7 - 200 | 15; 20; 25; 30 | 0.1 - 30 | 0.015 - 6.3 | 0.018 - 0.04 |

Technical Information

What is a Thermistor?

Thermistors are thermally sensitive resistors whose prime function is to exhibit a large, predictable, and precise change in electrical resistance when subjected to a corresponding change in body temperature. To learn more, visit the Thermistor Technical Information page.



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Leaded RTDs

Thin-Film Plated RTD Sensors



| Product Series | Description | Overall Dimensions | | Resistance | Resistance Tolerance | DIN 43760 Class | IEC 60751 Class | Temperature Deviation | Temperature Coefficient of Resistance | Dissipation Constant, Nominal | Thermal Time Constant, Max. - 1 m/s Moving Air | Temperature Rating |
|----------------|-------------------------|--|------------|------------------|----------------------|-----------------|-----------------|-----------------------|---------------------------------------|-------------------------------|--|--------------------|
| | | Inches | | Ohms | ± % | | | ± °C | ppm / °C | mW / °C | Seconds | °C |
| | | Body L × W × T | | @ 0°C | @ 0°C | | | @ 0°C | ppm / °C | mW / °C | Seconds | °C |
| PPG | Thin-Film Platinum RTDs | 0.0315 × 0.1181 × 0.049 or 0.0472 × 0.063 × 0.049 or 0.118 × 0.079 × 0.049 | 100 - 1000 | 0.06; 0.12; 0.24 | B, C | F 0.15 | 0.15 - 0.6 | 3750 - 3850 | 1.8 - 2.2 | 1.2 - 15 | | -200 to +600 |

Digital Temperature Indicators

Digital Temperature Indicators



| Product Series | Description | Overall Dimensions | Indicating Temperature | | | Resistance | | Hold Current | Trip Current | Withstand Voltage | Max. Fault Current | Power Dissipated | Time-to-Trip Current | Time-to-Trip | R _{min} | R _{max} | Temperature Rating |
|----------------|--|-----------------------|------------------------|---------|---------|-------------|------------|--------------|--------------|-------------------|--------------------|------------------|----------------------|--------------|------------------|------------------|--------------------|
| | | Inches | °C | | Ohms | | A | A | Vdc | A | W | A | Seconds | Ohms | Ohms | °C | |
| | | L × W × T | Minimum | Typical | Maximum | Max. @ 25°C | Indicating | | Maximum | Maximum | Typical | Maximum | Minimum | Maximum | | | |
| setP™ | Digital Temperature Indicators, Surface Mount, 0805 Size | 0.087 × 0.059 × 0.024 | 90 | 100 | 110 | 6; 12 | 35,000 | 0.06 - 0.075 | 0.25 - 0.30 | 6 | 1 | 0.6 | 0.3 | 1 - 5 | 0.5 | 6 - 12 | -40°C to +85°C |

For details on electrical specifications, visit littelfuse.com.

How is the Sensor Used Here?



USP10973 NTC Thermistor Probe with Copper Housing

At least two sensors per system are measuring the refrigerant line temperature in the water source heat pump.

Thermistor Probes and Assemblies

Straight/Cylindrical

| | | USP3275 | USP8528 | USP11492 | USP11491 | USP12920 | | | | | |
|--------------------------|---|--------------------|-------------------|--------------------|----------------------|----------------------|-----------|-------------------------|--------|-----------------------|---|
| Product Series | Description | Overall Dimensions | | Nominal Resistance | Resistance Tolerance | Temperature Accuracy | R-T Curve | Temperature Coefficient | Beta | Operating Temperature | Max. Storage & Operation Temperature for Best Long-Term Stability |
| | | Inches | Probe Ø x Probe L | Ohms | ± % | ± °C | | % / °C | K | °C | °C |
| | | | | @ 25°C | @ 25°C | 0-70°C | | @ 25°C | 0-50°C | °C | Maximum |
| USP3275 | Stainless Steel Housing - Pointed Tip, Teflon Insulated Lead Wire | 0.188 x 10.00 | | 10,000 | 5 | --- | J | -4.4 | 3892 | -55 to +105 | --- |
| USP7806 | Stainless Steel Housing, PFA Insulated Zip Cord | 0.125 x 1.500 | | 100,000 | 4.78 | 1.0 (+25°C) | V | -4.78 | --- | -55 to +150 | --- |
| USP8528 | Stainless Steel Housing and Spring, PFA Insulated Lead Wire | 0.188 x 2.250 | | 10,000 | --- | 0.20 (+25 to +80°C) | J | -4.4 | 3892 | -55 to +125 | --- |
| USP10972 | Stainless Steel Housing, PVC Insulated Zip Cord, Moisture Resistant | 0.250 x 2.00 | | 10,000 | 1 | --- | J | -4.4 | 3892 | -55 to +105 | --- |
| USP11491 | Stainless Steel Housing, Teflon Insulated Lead Wire | 0.125 x 2.50 | | 10,000 | --- | 0.20 | J | -4.4 | 3892 | -55 to +150 | +120 |
| USP11492 | Stainless Steel Housing, Teflon Insulated Lead Wire | 0.188 x 1.50 | | 10,000 | --- | 0.20 | J | -4.4 | 3892 | -55 to +150 | +120 |
| USP12920 | Stainless Steel Housing, Glass Braid Insulated, Glass Braid Jacketed Wire | 0.250 x 2.00 | | 100,000 | 1 | --- | J | -4.4 | 3892 | -55 to +300 | --- |

Flanged

| | | USP9728 | USP10979 | USP12836 | | | | | | |
|--------------------------|---|--------------------|---------------------|-----------------|--------------------|----------------------|-----------|-------------------------|--------|-----------------------|
| Product Series | Description | Overall Dimensions | | | Nominal Resistance | Resistance Tolerance | R-T Curve | Temperature Coefficient | Beta | Operating Temperature |
| | | Inches | | | Ohms | ± % | | % / °C | K | °C |
| | | Probe Ø x Probe L | Flange L x Flange W | | @ 25°C | @ 25°C | | @ 25°C | 0-50°C | |
| USP9728 | Stainless Steel Housing, #6 Stud Mounting Holes, Glass Braid Insulated, Glass Braid Jacketed Wire | 0.250 x 2.250 | | 0.815 Ø | 100,000 | 2 | J | -4.4 | 3892 | -55 to +300 |
| USP10979 | Stainless Steel Housing, #6 Stud Mounting Holes, Moisture Resistant | 0.250 x 2.250 | | 0.815 Ø | 10,000 | 1 | J | -4.4 | 3892 | -55 to +105 |
| USP12836 | Stainless Steel Housing, 0.1772" Dia. Mounting Hole, PVC Zip Cord Lead Wire | 0.1772 x 1.1811 | | 0.7874 x 0.4724 | 10,000 | 1 | J | -4.4 | 3977 | -55 to +105 |

For details on electrical specifications, visit [littelfuse.com](#).

Technical Information

Thermistor Terminology and Technical Vocabulary

Thermistors have specific terminologies and definitions related to their unique types, characteristics, and measurements. Littelfuse created a glossary page defining these terms. Read on to learn more.



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Thermistor Probes and Assemblies (Continued)

Plastic

| Product Series | Description | Plastic | | | | | | | Max. Storage & Operation Temperature for Best Long-Term Stability | | |
|--------------------------|--|--------------------|-------------------|--------------------|----------------------|----------------------------|-----------|-------------------------|---|-----------------------|---------|
| | | Overall Dimensions | | Nominal Resistance | Resistance Tolerance | Temperature Accuracy | R-T Curve | Temperature Coefficient | Beta | Operating Temperature | |
| | | Inches | Probe Ø × Probe L | Ohms | ± % | ± °C | | % / °C | K | °C | |
| | | | | @ 25°C | @ 25°C | | | @ 25°C | 0-50°C | | Maximum |
| USP4065 | Vinyl Housing, PVC Insulated Zip Cord | 0.225 × 0.580 | | 2,000 | --- | 1.67 (-26.1 to +4.4°C) | F | -3.86 | 3419 | -40 to +100 | --- |
| USP7537 | Polyimide Tube Housing, Kynar Insulated Lead Wire | 0.060 × 0.250 | | 2,500 | --- | 0.05 (0 to +50°C) | J | -4.4 | 3892 | -55 to +80 | +50 |
| USP10680 | Vinyl Housing, PVC Insulated Zip Cord | 0.290 × 1.060 | | 10,000 | --- | 0.56 (+18.3 to +29.4°C) | J | -4.4 | 3892 | -40 to +105 | --- |
| USP10975 | Plastic Housing, Kynar Insulated Lead Wire | 0.100 × 0.215 | | 10,000 | 1 | --- | J | -4.4 | 3892 | -55 to +125 | --- |
| USP10982 | Vinyl Housing, PVC Insulated Lead Wire, Moisture Resistant | 0.230 × 1.350 | | 10,000 | 1 | --- | J | -4.4 | 3892 | -40 to +80 | --- |
| USP11493 | Vinyl Housing, PVC Insulated Zip Cord | 0.225 × 0.580 | | 2,252 | --- | 0.10 (0 to +70°C) | J | -4.4 | 3892 | -40 to +105 | +75 |
| USP12838 | Vinyl Housing, PVC Insulated Lead Wire | 0.089 × 0.340 | | 10,000 | 1 | --- | J | -4.4 | 3892 | -40 to +80 | --- |
| USP14439 | Polyimide Tube Housing, Two Conductor PVC Insulated Lead Wire | 0.085 × 0.375 | | 10,000 | --- | 0.10 (0 to +50°C) | J | -4.4 | 3892 | -40 to +105 | +75 |
| USP14579 | Positive Temperature Coefficient Thermistor, Plastic Housing, Teflon Insulated Lead Wire | 0.155 × 0.500 | | 1,000 | 2 | --- | --- | --- | --- | -40 to +105 | --- |
| USP17957 | Positive Temperature Coefficient Thermistor, Plastic Housing, Teflon Insulated Lead Wire | 0.140 × 0.380 | | 1,000 | 2 | --- | --- | --- | --- | -40 to +105 | --- |

Micro Probes



| Product Series | Description | Micro Probes | | | | | | | Max. Storage & Operation Temperature for Best Long-Term Stability | | |
|--------------------------|--|--------------------|-------------------|--------------------|----------------------|----------------------|-----------|-------------------------|---|-----------------------|---------|
| | | Overall Dimensions | | Nominal Resistance | Resistance Tolerance | Temperature Accuracy | R-T Curve | Temperature Coefficient | Beta | Operating Temperature | |
| | | Inches | Probe Ø × Probe L | Ohms | ± % | ± °C | | % / °C | K | °C | |
| | | | | @ 25°C | @ 25°C | 0-70°C | | @ 25°C | 0-50°C | | Maximum |
| USP12837 | Polyimide Tube Housing, Poly-Nylon Insulated Lead Wire | 0.020 × 0.150 | | 10,000 | 1 | --- | J | -4.4 | 3892 | -55 to +125 | +100 |

Laboratory Grade



| Product Series | Description | Laboratory Grade | | | | | | | Operating Temperature | | |
|-------------------------|---|--------------------|-------------------|--------------------|--------|------------------------|----------------------|-----------|-------------------------|-------------|----|
| | | Overall Dimensions | | Nominal Resistance | | Resistance Tolerance | Temperature Accuracy | R-T Curve | Temperature Coefficient | Beta | |
| | | Inches | Probe Ø × Probe L | Ohms | ± % | ± °C | % / °C | | K | | |
| | | | | @ 25°C | @ 25°C | -20 to +70°C | | @ 25°C | 0-50°C | | °C |
| USP3021 | Stainless Steel Housing, PVC Insulated Zip Cord, Supplied with NIST Traceable Calibration Certificate | 0.250 × 9.50 | | 10,000 | 2 | 0.01 (-20 to +70°C) | J | -4.4 | 3892 | -55 to +105 | |
| USP3986 | Stainless Steel Housing, PVC Insulated Zip Cord, Supplied with NIST Traceable Calibration Certificate | 0.250 × 9.50 | | 100,000 | --- | 0.01 (0 to +105°C) | J | -4.4 | 3892 | -55 to +105 | |

Thermistor Probes and Assemblies (Continued)

| Surface Temperature Sensing | | | | | | | | | | | |
|-----------------------------|---|-----------------------|-----------------|--------------------|----------------------|----------------------|-----------|-------------------------|---------|-----------------------|---|
| Product Series | Description | Overall Dimensions | | Nominal Resistance | Resistance Tolerance | Temperature Accuracy | R-T Curve | Temperature Coefficient | Beta | Operating Temperature | Max. Storage & Operation Temperature for Best Long-Term Stability |
| | | Inches | | Ohms | ± % | ± °C | | % / °C | K | °C | °C |
| | | Body L × W × T | @ 25°C | @ 25°C | 0-70°C | @ 25°C | 0-50°C | 0-50°C | Maximum | | |
| TO-220 | TO-220 Package Thermistors | 0.595 × 0.400 × 0.165 | 5,000 - 10,000 | 1; 5; 10 | --- | --- | J | -4.4 | 3892 | -55 to +150 | --- |
| USUR1000 | UL Recognized NTC Thermistor Assemblies with #6 Ring Lug Housing | 0.615 × 0.280 × 0.215 | 1,000 - 100,000 | 2; 3; 5; 10 | --- | --- | J | -4.4 | 3892 | -40 to +125 | --- |
| USP4261 | Ring Lug Housing, #6 Mounting Hole, PVC Insulated Zip Cord | 0.615 × 0.280 × 0.215 | 10,000 | 1 | --- | --- | J | -4.4 | 3892 | -40 to +105 | --- |
| USP5510 | Flag Terminal Housing, #6 Mounting Hole, Teflon Insulated Lead Wire | 0.310 × 0.645 × 0.220 | 10,000 | --- | 0.50 (0 to +70°C) | --- | J | -4.4 | 3892 | -55 to +150 | --- |
| USP6295 | Ring Lug Housing, #4 Mounting Hole, Kynar Insulated Lead Wire | 0.620 × 0.281 × 0.215 | 10,000 | 5 | --- | --- | J | -4.4 | 3892 | -55 to +125 | --- |
| USP6998 | Ring Lug Housing, 1/4" Mounting Hole, Teflon Insulated Lead Wire, Harwin Connector | 1.270 × 0.445 | 200,000 | 1 | --- | --- | R | -4.68 | 4140 | -55 to +150 | --- |
| USP7570 | Ring Lug Housing, #6 Mounting Hole, Teflon Insulated Lead Wire | 0.620 × 0.281 × 0.215 | 10,000 | --- | 5.0 (+60 to +100°C) | --- | J | -4.4 | 3892 | -55 to +135 | --- |
| USP10976 | Ring Lug Housing, #6 Mounting Hole, Teflon Insulated Lead Wire | 0.620 × 0.281 | 10,000 | 1 | --- | --- | J | -4.4 | 3892 | -55 to +150 | +120 |
| USP7765 | Overmolded Plastic Housing, UL1015 Style Lead Wire, Moisture Resistant | 1.300 × 0.400 × 0.250 | 10,000 | 1 | --- | --- | J | -4.4 | 3892 | -40 to +105 | --- |
| USP7766 | Copper Housing, Supplied with 3 Copper-Plated Clips for Mounting to 0.3125"; 0.375" & 0.500" Dia. Pipes, PVC Insulated Zip Cord, Moisture Resistant | 0.787 × 0.164 | 10,000 | 1 | --- | --- | J | -4.4 | 3892 | -40 to +105 | --- |
| USP8798 | Copper Housing, Copper-Plated Clip for Mounting to 0.250" Dia. Pipe, PVC Insulated Zip Cord, Moisture Resistant | 0.787 × 0.220 × 0.167 | 10,000 | --- | 0.50 (+20 to +35°C) | --- | J | -4.4 | 3892 | -40 to +105 | --- |
| USP10973 | Copper Housing, PVC Insulated Zip Cord, Moisture Resistant | 0.787 × 0.177 × 0.164 | 10,000 | 1 | --- | --- | J | -4.4 | 3892 | -40 to +105 | --- |
| USP18967 | Copper Housing, Copper-Plated Clip for Mounting to 0.875" Dia. Pipe, PVC Insulated Zip Cord, Moisture Resistant | 0.787 × 0.233 × 0.164 | 10,000 | 1 | --- | --- | J | -4.4 | 3977 | -40 to +105 | --- |

| Threaded | | | | | | | | | | | |
|--------------------------|---|--------------------|---------------------|--------|--------------------|----------------------|-----------|-------------------------|-------------|-----------------------|--|
| Product Series | Description | Overall Dimensions | | | Nominal Resistance | Resistance Tolerance | R-T Curve | Temperature Coefficient | Beta | Operating Temperature | |
| | | Inches | | Ohms | ± % | % / °C | | K | °C | °C | |
| | | Probe ø × Probe L | Hex Head W × Plug L | @ 25°C | @ 25°C | @ 25°C | | 0-50°C | | | |
| USP3121 | Aluminum Hex Housing, 6-32 Thread, Kynar Insulated Lead Wire | --- | 0.250 × 0.625 | 10,000 | 5 | -4.4 | J | 3892 | -55 to +125 | | |
| USP10978 | Brass Housing, 1/4"-18 NPT Thread, PVC Insulated Lead Wire | 0.250 × 0.650 | 0.562 × 0.880 | 10,000 | 1 | -4.4 | J | 3892 | -55 to +105 | | |
| USP10981 | Stainless Steel Housing, 1/8"-27 NPT Thread, PVC Insulated Zip Cord, Moisture Resistant | 0.250 × 1.250 | 0.4375 × 0.625 | 10,000 | 1 | -4.4 | J | 3892 | -55 to +105 | | |
| USP10997 | Brass Plug, 1/8"-27 NPT Thread, PVC Insulated Lead Wire | --- | 0.4375 × 0.560 | 10,000 | 5 | -4.4 | J | 3892 | -55 to +105 | | |
| USP12755 | Stainless Steel Housing, 5/16"-24 UNJF-3A Thread, PVC Insulated Lead Wire | 0.188 × 0.500 | 0.500 × 0.650 | 10,000 | --- | --- | E1 | 3435 | -55 to +105 | | |
| USP12840 | Stainless Steel Hex Head Screw, 10-32 Thread, Kynar Insulated Lead Wire | --- | 0.3125 × 0.370 | 10,000 | 1 | -4.4 | J | 3892 | -55 to +125 | | |

Thermistor Probes and Assemblies (Continued)

| Special Probes | | | | | | | | | | | | |
|----------------|---|-----------------------|--------------------|----------------------|----------------------|-----------|-------------------------|--------|-------------------------------|--|-----------------------|--|
| Product Series | Description | Overall Dimensions | Nominal Resistance | Resistance Tolerance | Temperature Accuracy | R-T Curve | Temperature Coefficient | Beta | Dissipation Constant, Nominal | Thermal Time Constant, Nominal - Still Air | Operating Temperature | |
| | | Inches | Ohms | ± % | ± °C | | % / °C | K | mW / °C | Seconds | °C | |
| | | Body L × W × T | @ 25°C | @ 25°C | 0-70°C | | @ 25°C | 0-50°C | | | | |
| USP16673 | Ultra-Thin Polyimide Insulation Film, Solderable Lead Wires | 1.260 × 0.197 × 0.040 | 10,000 | 1 | --- | E1 | --- | 3435 | 0.7 | 5 | -30 to +90 | |

RTD Probes and Assemblies

| Threaded | | | | | | | | | | |
|----------------|--|--------------------|---------------------|--------|--------------------|----------------------|-----------------|---------------------------------------|-----|--------------------|
| Product Series | Description | Overall Dimensions | | | Nominal Resistance | Resistance Tolerance | DIN 43760 Class | Temperature Coefficient of Resistance | | Temperature Rating |
| | | Inches | | | Ohms | % | | ppm / °C | °C | |
| | | Probe ø × Probe L | Hex Head W × Plug L | @ 25°C | @ 25°C | | | Maximum | | Maximum |
| USW3483 | Stainless Steel Housing, 3/8"-18 NPT Thread, PVC Insulated Lead Wire | 0.250 × 3.00 | 0.6875 × 0.750 | 1,000 | 0.06 | A | | 3850 | 105 | |

| Plastic | | | | | | | | | |
|----------------|---|--------------------|--------------------|----------------------|-----------------|---------------------------------------|-----|--------------------|--|
| Product Series | Description | Overall Dimensions | Nominal Resistance | Resistance Tolerance | DIN 43760 Class | Temperature Coefficient of Resistance | | Temperature Rating | |
| | | Inches | Ohms | % | | ppm / °C | °C | | |
| | | Probe ø × Probe L | @ 25°C | @ 25°C | | Maximum | | | |
| USW2883 | Polyimide Housing, Uninsulated Nickel Lead Wire | 0.110 × 0.220 | 500 | 0.12 | B | 3850 | 150 | | |

| Surface Temperature Sensing | | | | | | | | | |
|-----------------------------|--|-------------------------|--|--------------------|----------------------|-----------------|-----------------|---------------------------------------|-----|
| Product Series | Description | Overall Dimensions | | Nominal Resistance | Resistance Tolerance | DIN 43760 Class | IEC 60751 Class | Temperature Coefficient of Resistance | |
| | | Inches | | Ohms | % | | | ppm / °C | °C |
| | | Ring Lug L × Ring Lug W | | @ 0°C | Maximum | | | | |
| USW2295 | Ring Lug Housing, #6 Mounting Hole, Teflon Insulated Lead Wire | 0.620 × 0.281 | | 100 | 0.24 | C | --- | 3850 | 150 |
| USW2299 | Ring Lug Housing, #8 Mounting Hole, Teflon Insulated Lead Wire | 0.720 × 0.312 | | 1,000 | 0.12 | B | --- | 3850 | 105 |
| USW3866 | Ring Lug Housing, #10 Mounting Hole, PVC Insulated Lead Wire | 0.750 × 0.375 | | 1,000 | 0.12 | B | F 0.3 | 3850 | 105 |

For details on electrical specifications, visit littelfuse.com.

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Overcurrent Protection

- Fuses
- Resettable Positive Temperature Coefficient (PPTC) Devices

Overvoltage Suppression

- Gas Discharge Tubes (GDTs)
- TVS Diode Arrays
- PLED Series Open LED Protectors
- SIDACtor® Protection Thyristors
- PulseGuard® ESD Suppressors
- Switching Thyristors
- TVS Diodes
- Varistors
- Power Control
- TRIAC Thyristors

Power Semiconductors

- Bipolar Devices
- IGBTs
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- High Power Devices
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- Bare Die Devices
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- High-Voltage ICs
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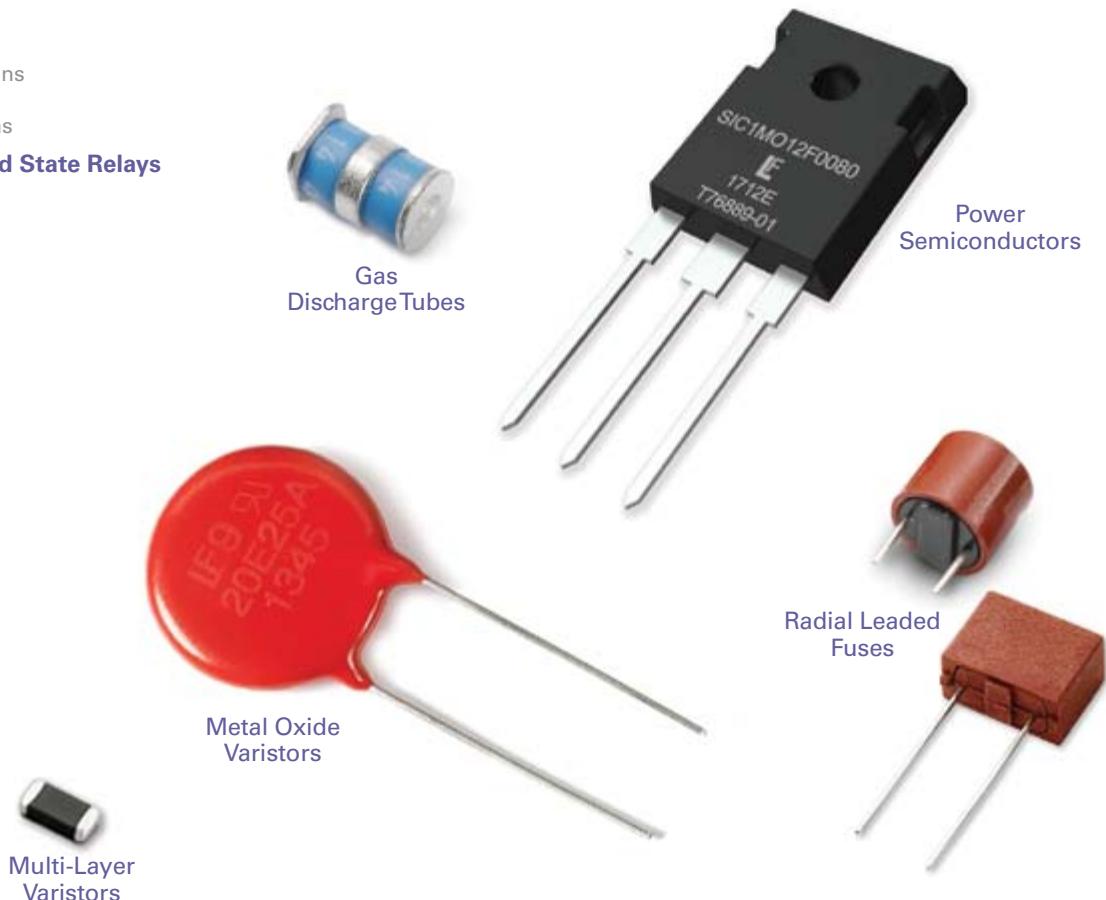
Global Footprint

At Littelfuse, our mission is to develop innovative circuit protection, power control, and sensing solutions that meet our customers' unique needs. This customer-focused philosophy has helped us become the top circuit protection brand in the world.

Our industry-leading product portfolio includes reliable circuit protection, power control, and sensing products that are designed for a variety of markets and applications. We have assembled unparalleled expertise and developed a global footprint that puts our facilities close to our customers and target markets. As our global manufacturing and R&D teams objectively recommend the best circuit protection, power control, or sensing solution for each customer application, they form partnerships that will lead to the development of the next generation of advanced products.

Littelfuse provides:

- Application Expertise
- Global Support
- Operational Excellence
- Technology Innovation
- Collaboration
- Customer Focus



Additional Resources



Circuit Protection Products Selection Guide

This guide provides a summary of key circuit protection consideration factors, descriptions of the technologies Littelfuse offers, and product selection tables. It is designed to help you quickly find a protection solution appropriate to your application.



Power Semiconductor Catalog

This catalog represents the powerful combination of IXYS: A Littelfuse Technology. It offers a comprehensive portfolio of advanced power semiconductor technologies, including silicon and wide band gap solutions in discrete and module packages.



Datacenter Selection Guide

This guide contains an overview of the components needed to keep datacenters operating efficiently and reliably in order to protect their assets.

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Littelfuse engineers are a phone call away to help identify potential issues and provide product recommendations to solve problems.

Application and Field Support

Our experienced product and application engineers work step-by-step with customers from design to installation to determine the best solution.

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Global Lab Capabilities



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TESTING CAPABILITIES

Environmental

- Autoclave
- Dust
- H3TRB
- HAST
- High & Low Temperature Storage
- High Temperature Loading
- Ingress Protection (IP)
- HTGB
- HTRB
- Temperature & Humidity
- Temperature Cycling
- Thermal Shock
- Salt Fog

Physical-Mechanical Characteristics

- Acceleration
- Die Shear
- Leak Detection
- Mechanical Shock
- Resistance to Soldering Heat (Dip, Reflow, Wave)
- Resistance to Solvents
- Solderability
- Terminal Strength (Push, Pull, Bend)
- Vibration
- Wetting Balance
- Wire Pull

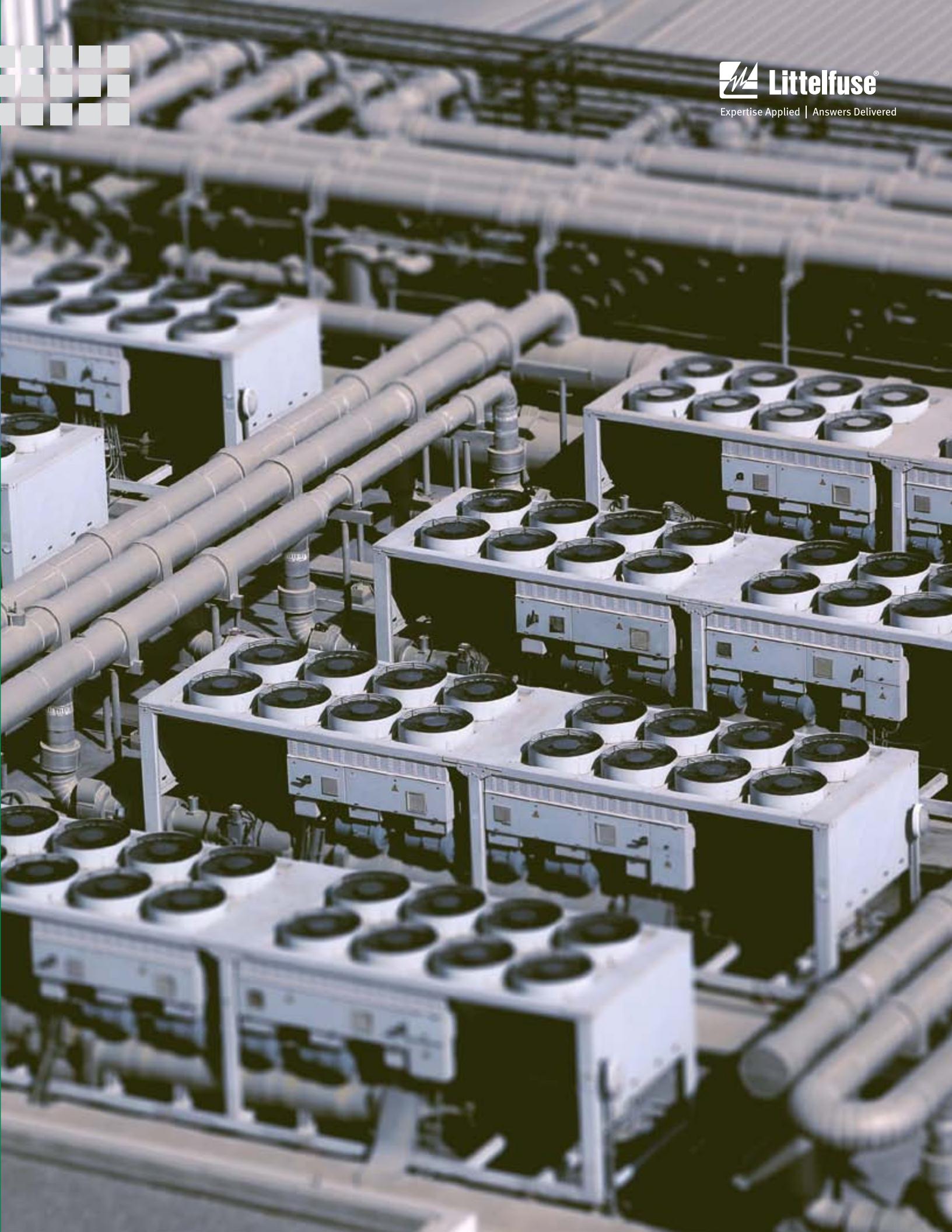
Electrical

- BCI
- Capacitance
- EFT
- ESD
- Impedance
- Insulation Resistance
- I-V
- Life
- Lightning Surge
- Overload
- Parametric Tests
- Power-Cross
- Power Cycling
- Ring Wave
- R-T
- S-Parameter Measurements (Insertion Loss, Isolation, Reflection)
- Short Circuit
- Step Current
- Surface Resistivity
- Surge
- TDR (Eye Diagram)
- Telecom
- Thermal Cut-Off
- Time-to-Trip
- TLP
- Transient
- Trip Cycle
- Trip Endurance
- Voltage Drop



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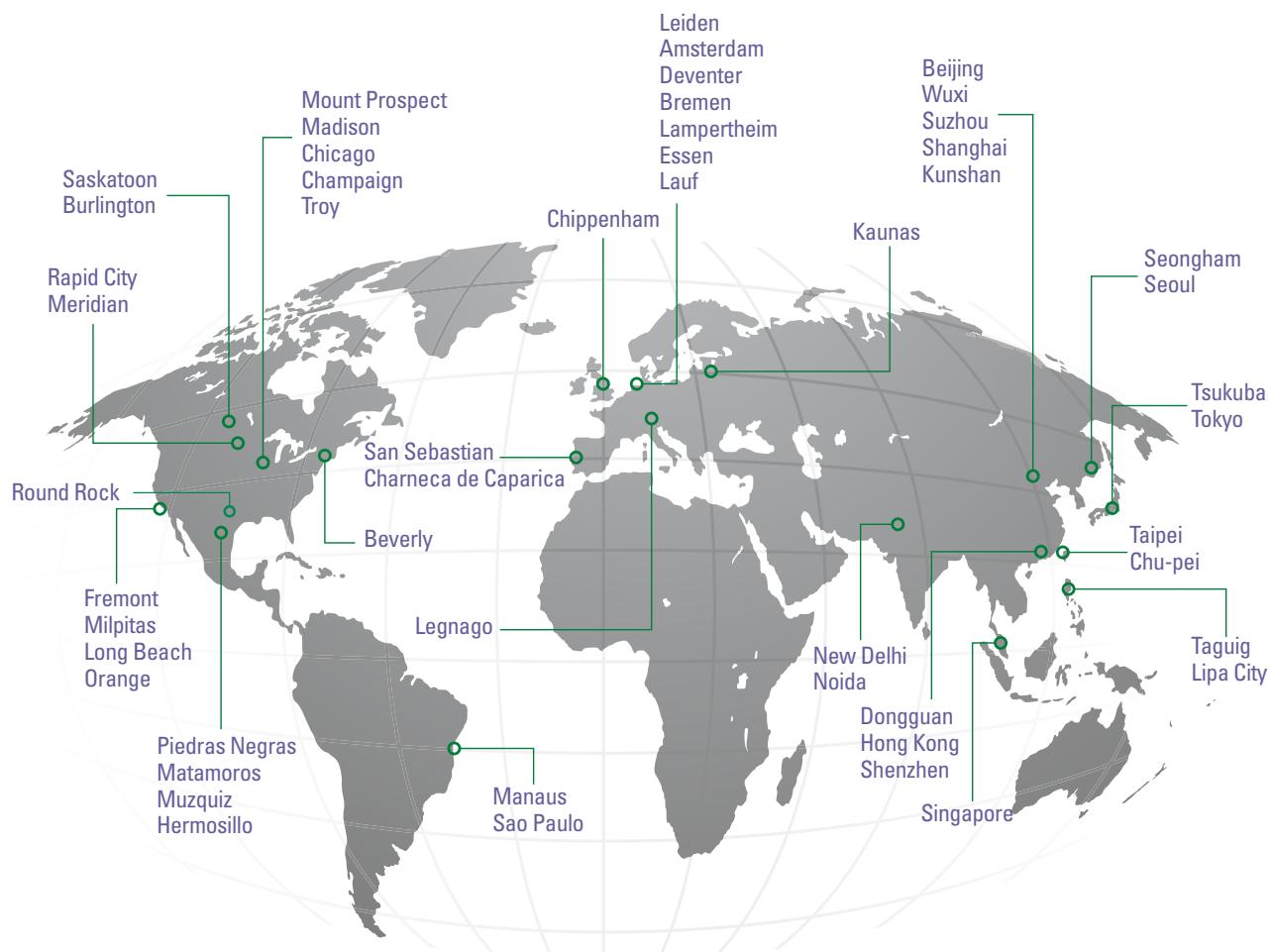
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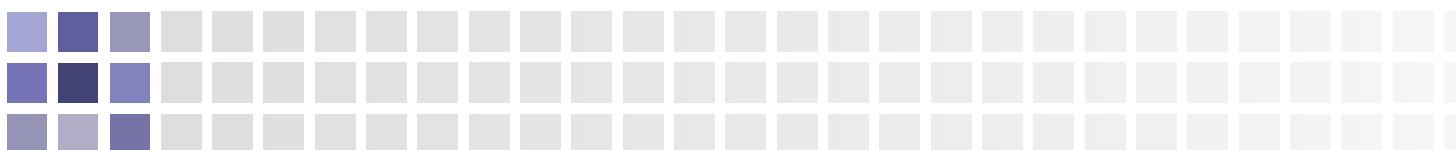
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