Capacitive Sensing

Inductive Sensing

Label/Package Sensing

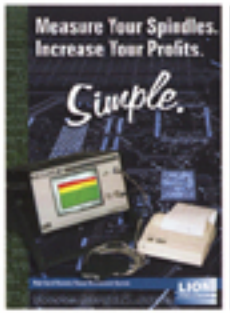
Total Sensing Solutions

High-Speed Drill Test

Spindle Analysis

Corporate Overview

Over forty years of measurement expertise



LION PRECISION

"Lion Precision provided me with a total system solution, and they were a big help in educating me in using it and maximizing its effectiveness. They have really helped me push the envelope of measurement technology."

Klaus Obergfell, Seagate

"Lion Precision enabled us to see deeper into the inner working of spindle error motion and worked with us to develop a set of tools that have allowed us to push the state of the art in ways that were simply not possible before."

Jim Arneson, Professional Instruments

"Krones, Inc. has had great success with Lion Precision sensors. I also cannot express enough how Lion Precision has come through during many a crisis condition. This level of service is rare in industry these days."

Steve Retzlaff, Krones Inc.

LION PRECISION

We Started It All

Lion Precision introduced the world's first capacitive, noncontact measurement system to the commercial market in 1958. Today, companies large and small throughout the world depend on our products for their critical measurements. The addition of our inductive sensing products division has radically increased our ability to assist our customers in their continuing quest for better, more flexible, and more reliable measurement systems.

Looking to the Future

Our floor space has increased by nearly three times what it was in 1995. Our engineering staff has tripled as well. We've invested in people and equipment to position ourselves to help take our customers to the next level.

A Global Outlook

Over 45 percent of our sales are outside the U.S. To help our customers compete in the new global economy, we have adopted the ISO9001 standard and have been registered since 1998. Our customers can be confident that we are deliberate about the quality of our products and processes.

More than a Supplier

Our dedication to customer service has given us a reputation as partners—working alongside our customers to provide unique solutions to their unique measurement problems. A significant portion of our sales includes custom designs to suit customer specifications.

Values

Providing customers with the highest quality products and services possible, in a timely manner

Personalized customer relationships that demonstrate integrity, commitment, and mutual respect

Improving our customer's results by advancing our sensing technology

Anticipation of, and responsiveness to changing marketplace needs

Continuous improvement through careful consideration of customer feedback and the creative ideas of our employees

A family-like work environment built on trust, cooperation, and a sense of pride

A leadership style that creates effective teamwork by embracing personal autonomy, individual empowerment, and open communication

Supporting educational and personal development for every employee

Sharing the company's success through financial incentives for all employees

Profitability that enables us to maintain our pursuit of excellence in every aspect of our business

Being a contributing member of the local community

Mission

Provide high-performance, noncontact sensing solutions which advance our customer's capability and increase their success.

Vision & Strategies

Understand our customers' needs better than the competition.

Advance our technology by creating new products in response to industry demands.

Identify new industries and applications that will benefit from our existing products.

Continually examine our products and processes for every opportunity for improvement.

Demonstrate a commitment to customer service by providing quality, optimized solutions.

LION PRECISION

Research and Development

Our engineering staff combines for over ninety years of sensor and electronic design experience. We maintain close relationships with several research universities, and national laboratories such as Lawrence Livermore National Laboratory. Cooperation with these institutions has advanced measurement technology on several fronts and produced award-winning designs of high-performance measurement systems.

Members of our staff sit on ANSI (American National Standards Institute) committees (B5 and B89), have held office as president of the American Society for Precision Engineering (ASPE), and served as council members of the European Society for Precision Engineering and Nanotechnology (euspen).

Fully Equipped

Serving our customers and advancing our technology require advanced tools. We continue to invest in equipment and facilities that enable us to conquer the design challenges that we face every day and every year. Much of our equipment is designed and built specifically for Lion Precision.

Four ultra-precise calibrators designed to our specifications which provide our customers with NIST traceable factory calibrations

Three computer-controlled environmental chambers providing 10%–90% relative humidity and a –75°C to 200°C temperature range

Computer-controlled, high-vacuum chamber capable of 10^{-7} Torr with a 300amu residual gas analyzer

Sixteen-channel, 24-bit data-acquisition systems

3D inductive-field modeling software

Solid Works and CadKey 3D mechanical design software with standard file format output for use in customer designs

Market-Specific Product Development

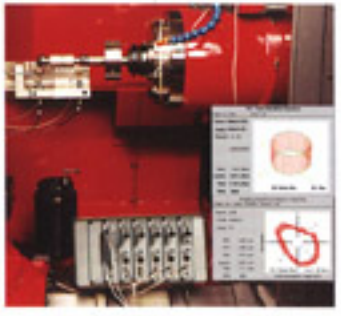
Our commitment to uncovering new noncontact solutions to nagging problems has resulted in the creation of market specific products that have revolutionized entire industries.

1963 — Lion Precision worked with spring makers and developed the world's first "spring gage"—an instrument that measures the length of springs during production. Today, nearly all spring coilers use spring gages and the vast majority of those gages carry the Lion Precision logo.

1992 — Lion Precision, working in conjunction with the University of North Carolina at Charlotte (UNCC), developed the Spindle Error Analyzer (SEA). SEA uses Lion Precision high-performance capacitive sensors to measure precision spindles used in machine tools and hard-disk drives. Proprietary software analyzes the error motions and thermal drift of the spindle to anticipate its ability to perform its designated function. Today, these systems are used worldwide in over a dozen countries.

1994 — The LRD2100, the world's first and most popular clear-label sensor, revolutionized the packaging industry. Users soon discovered that the LRD2100 provided a better solution for opaque labels as well. Today, nearly 10,000 Lion Precision label and packaging sensors are in use throughout the world.

1998 — The TARGA II Dynamic Runout Tester measures high-speed drill spindles for the medical and printed-circuit board industries. High-speed spindle builders and users across the globe use the TARGA II to maintain peak production performance.



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Poland
Portugal
Puerto Rico
Singapore
Slovakia
South Korea
Spain
Sweden
Switzerland
Taiwan
Thailand
United Kingdom
Vietnam
Wales

Associations

American Society for Precision Engineering (ASPE)

American Society of Mechanical Engineers (ASME)

European Society for Precision Engineering and Nanotechnologies (EUSPEN)

Awards

Several respected organizations have recognized and honored Lion Precision's innovative designs with their awards.

In addition to several U.S. Patents, our designs have won:

The Dupont Award

R&D 100 Award

Best of Sensors Bronze Award

Best of Sensors Silver Award

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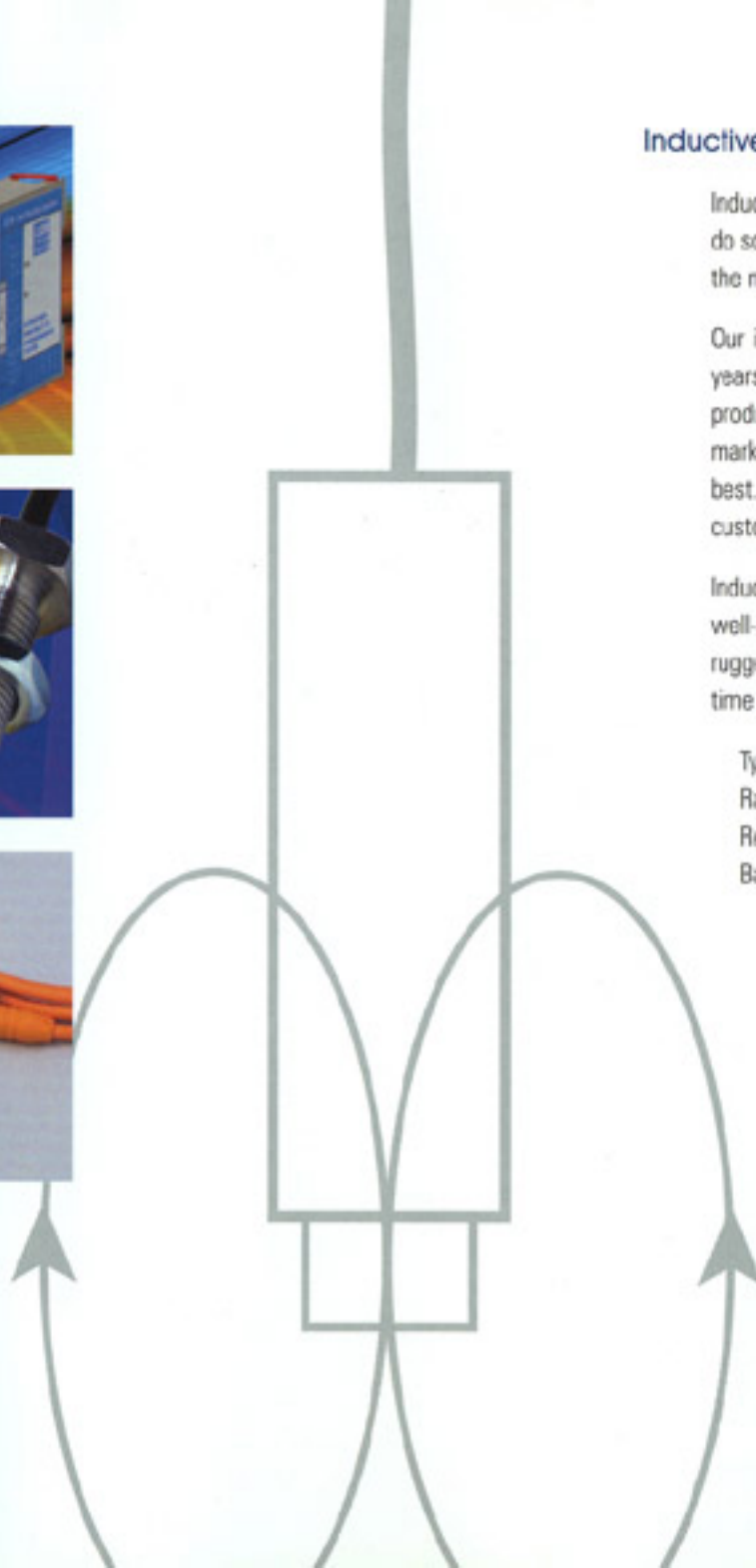
Inductive Products

Inductive sensors provide precision, noncontact measurement—and they can do so in hostile environments where oil, water, dirt, or other contaminants are in the measurement area.

Our inductive division was founded with a team of engineers with over eighty years of inductive sensor experience. The design philosophy for our inductive products is to achieve better overall performance than anything currently on the market. We've been successful. Our combined specifications are an industry best. In addition to our standard inductive products, we're focused on providing custom, optimized solutions for moderate- and high-volume applications.

Inductive sensors, with their tolerance of hostile environments, are particularly well-suited for use in manufacturing and automotive applications. Thanks to the ruggedness of these sensors, they are even installed in running engines for real-time performance tests.

Typical Inductive Sensor Specifications:
Ranges: 0.5mm–15mm
Resolutions: 40nm–1250nm
Bandwidth: 80kHz



$$L = \frac{\sqrt{R^2 - Z^2}}{2\pi f}$$

Capacitive Products

Capacitive sensors are well-known for very high resolutions and are used when maximum measurement performance is critical. They are versatile sensors that can also measure nonconductive targets such as plastic and paper.

In 1958, Lion Precision introduced the first commercial, capacitive noncontact measurement system. Since that time, we have continued to advance capacitive-sensing technology and uncover a myriad of applications for which capacitive sensors are ideal solutions. We listen carefully as our customers explain their sensing needs. We respond by applying our measurement expertise to the creation of new products and the enhancement of existing products.

In addition to position measurement of conductive targets, capacitive sensors are used in nonconductive applications such as coating thickness, double sheet-feed detection, glue sensing, etc. Capacitive sensors perform well in the demanding environments of high-vacuum and space.

Typical Capacitive Sensor Specifications:
Ranges: 0.2mm–10mm
Resolutions: 0.4nm–250nm
Bandwidth: 15kHz

$$C = \frac{\varepsilon_0 \varepsilon_r A}{d}$$

Example Applications

- Deformation Measurement
- Disk-Drive Assembly
- Disk-Drive Spindle Performance
- Film Thickness
- Glue Detection
- Internal Engine Monitoring
- Label Detection
- Material Separation
- Medical Instruments
- Metal Forming
- Missing Assembly Component
- Nanopositioning Stages
- Position
- Printing-Press Drum Runout
- Roller Runout
- Semiconductor Photolithography
- Spindle Error Motion
- Thickness
- Thread Detection/Quality
- Ultrasonic Welders
- Vibration
- Weld Detection

"Please accept my congratulations on your superb capacitive measurement systems. We thank you for your dedication to developing the world's best sensors."

Eric Marsh, Penn State Machine Dynamics Research Lab

"After introducing a Lion sensor to a customer, they always buy. The sensors are not only versatile, but incredibly reliable; to date, we've never had a warranty replacement."

Jason Rochus, RJD Packaging Professionals, Inc.

"Lion Precision came through for us when we were in a pinch. We needed to detect the presence of threads. They provided us with an inexpensive sensor that did the job and backed it up with excellent technical support."

Matt Schroeder, Tier 1 Auto Supplier

LION PRECISION

LL06-0001, 5-2004

Lion Precision's commitment to quality

is unsurpassed in the industry. We've built a reputation on customer service and quality products. We've dedicated ourselves to producing innovative products, designed and built by a workforce motivated to set the standard in noncontact sensing technology.

Contact us today and let us solve your difficult measurement problems.

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