Fiber Optics for Optical Metrology, Machinery & Sensors
LEONI Fiber Optics is a market leader in the field of high-quality, customer-specific fiber optical solutions for highly complex and demanding industrial and scientific applications:

- Analysis of the optical properties and composition of solids, liquids and gases
- Optical measurement of physical, dynamic and geometric properties (e.g. temperature, pressure, vibration, distance)
- From DUV / UV-VIS up to NIR
- Various numerical apertures, cladding and jacket materials
- Singlemode and multimode applications
- Polarization-maintaining product options available
- Intrinsic and extrinsic sensor cables

Our strengths:

- Customer-specific solutions
- Complete value chain (raw materials, fibers, cables, assemblies, special optical components) with the option of modifications anywhere along the chain
- Specialists for in-house special fiber production and assembly
- Experience in high-end applications for optical metrology such as NASA New Horizons mission, LIGO gravitational wave detector, Cold Atom Lab at the International Space Station
- Experience with high-power laser applications and industrial laser assemblies
- Highest quality standards
- Long experience with product deployment under the harshest environmental conditions
- Experience with tight measurement tolerances
- Excellence in production and logistics

Your advantages:

- Full bandwidth of special optical fibers from in-house production
- One stop shop for manufacturing solutions and research
- OEM and ODM partner
- OEM branding possible
- Joint development of prototypes for high-volume production
- Global presence
- Experience in laboratory and patient-centered medical applications

Fields of use:

- Semiconductor industry
- Quality control
- Process analysis
- Surface and material analysis
- Environmental analysis
- Particle measurement
- Monitoring and control
- Diagnostics in life sciences and healthcare
- Spectroscopy (Raman, atomic and molecular, NIR, MIR, UV-VIS)
- Optical sensor technology
- Optical microscopy
- Reflection sensor systems
- Fluorescence excitation
- Fiber optical detection
- Surface sensor technology
- 3d printing

Products:

- Capillaries
- Singlemode special optical fibers
- Multimode special optical fibers
- HPCS and PCS fibers
- POF
- PCF
- High-temperature fibers
- Radiation-hard fibers
- AmbientFiber
- Silica fiber bundles
- Optical glass fiber bundles
- Hybrid cables
- Sensor cables
- Industrial cables & media-resistant cables
- Cables with approval (UL, DIN V, UL, NPP, etc.)
- Cables with special fibers
- Industrial laser assemblies
- Special fiber assemblies (silica, POF, PCS, LargeCore)
- Optical probes
- Fiber bundle assemblies
- Arrays / Cross-section converters
- Optical switches
- Optical splitters
- Special optical components

Innovative products, solutions and smart services for sensor, analysis and measurement technology
Innovation is part of our DNA » let’s evolve together

We develop and produce innovative products every day.

We are always on the lookout for creative ways to market our products and we love to break new ground with developing new helpful products in cooperation with partners and customers. We share the same pioneering spirit and the pursuit of innovation.

Fiber Optics Experts with strong vertical integration

From development, design and production of the raw materials, special optical fibers, special cables and assemblies, through to the optical components: thanks to our strong vertical integration, we can act at any stage in the production process independently of the need for external support.

Do you have a specific problem related to an application?

We are happy to work together with you as your OEM/ODM development partner and certified Fiber Optics Experts to develop a made-to-measure solution for your use case. Early involvement in the development process offers major advantages for both parties.

Your advantages at a glance:

- Worldwide network for development and production
- Intelligent production processes
- Application-oriented solution proposals
- Combination of Development – Hardware – Digitalization – Predictive Maintenance to improve your application and handling

Range of products & services

- Development and production of raw materials, special optical fibers, special cables, assemblies and optical components.
- Our vertical integration means we can act anywhere along the supply chain being independent from external sources.
- Your OEM development partner: have a specific problem in mind? We are happy to work with you to find the solution. Early involvement in the development process offers major advantages for both parties.
- Engineering
- Architectural design of passive optical networks
- Simulation and software

Applications

- Data Communications & Networks
- Factory Automation
- Energy & Infrastructure
- Optical Metrology, Machinery & Sensors
- Automotive & Truck
- Marine / Maritime
- Transportation
- Healthcare
- Electrical Appliances
- Electromobility

www.leoni-fiber-optics.com
We strive further to understand our customers and their future market needs to join forces from ideation phase to final product and solution implementation in the market to help global players to scale their business.

Our vision!
Processing projects designed to move the future. We want to partner up with global prospects and be the key innovation partner for In Vitro Diagnostics, Spectroscopy, Semiconductor Industry, High Power Laser and Fiber Sensing Technology markets.

Value propositions LEONI Fiber Optics:
- Global footprint
- One stop shop
- Future proof innovations paired with Industry 4.0
- Digital solutions
- Sustainable & scalable business solutions partner
- Premium international innovation technology and local application engineering

Our ambition!
We strive further to understand our customers and their future market needs to join forces from ideation phase to final product and solution implementation in the market to help global players to scale their business.

Learn more about LEONI’s lighthouse projects

Ideas for the future
Innovation is a core component of our corporate strategy. LEONI’s products and systems are regarded as drivers of innovation in many sectors, including the automotive industry, medical technology and telecommunications and our customers can all experience greater success by implementing our ideas with their products.

Research & development – The best investment for the future
Research & Development (R&D) has always enjoyed high priority at LEONI. It not only lays the foundation for innovation but also ensures that we in particular can develop new materials, manufacturing processes and products.

The Technology & Innovation department carries out long-term projects that extend beyond the classic LEONI R&D core competences. This creates new ways of widening our range of products and services and enables us to expand our competitive edge.

LEONI laser cables used in measuring gravitational waves

Cold Atom Lab at International Space Station

New Horizons RALPH visits Pluto

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Digitalization – a word that expresses the most momentous change of our times. Our lives are becoming faster, more interconnected, more digital – in every way.

New technologies, products and services are revolutionizing society at an unprecedented speed. The digital revolution is affecting us all.

Humans and machines are interconnected by data. This drives a rapid development in all industries and business segments, opening up a wide range of opportunities and challenges.

From this, we deduce new value propositions that can impact the entire value chain of a company. It also enables opportunities for new products, solutions and business models which we develop in collaboration with our customers.

The digital transformation is picking up speed – and LEONI is right in its center.

Energy and data are changing our world. LEONI picks up on these megatrends and transforms from being an experienced cable producer to a technology partner offering customers future-oriented energy and data solutions.

The goal
Intelligent, individualized and sustainable solutions plus innovative value propositions for our customers and the world tomorrow.
The creation of new, intelligent products, innovative system solutions and cloud-based services facilitates new kinds of, data-based business models, like the integration of a digital twin of energy and data distribution systems into a continuous improvement process.

Enriched with technological intelligence, this new range of products and services is the basis of our reorientation and the foundation for entirely new value propositions for our customers, both now and in the future – always building on our current core expertise.

We call this **Connected Intelligence**.

With **Connected Intelligence**, LEONI is able to offer its customers a new portfolio of digital products and solutions:

- Integrated intelligence for cables, cable systems and connected components offers the following advantage:
  - Performance monitoring for the entire system in real time
  - Prediction of remaining lifetime based on data analytics
  - Early warnings of system outages
  - Predictive system maintenance and services

- Optimized energy efficiency thanks to specific analysis of reference data during usage

- Scalable data transmission with active connectivity to cable systems (built-in bandwidth)

- Error localization plus automated documentation and service calls

- Functional system simulation and digital twins at the early development stage

- Cost savings due to minimization of failure rates and downtime

- Efficiency optimization based on performance monitoring and failure prediction

- Acceleration of hard- and software development cycles for any electrical systems or connection solutions as well as for adjacent components in the digital eco-system

- Reliable intelligent applications for data transmission

- Data recording and analysis for individually customized smart services

- Reliable product ID
With LEONiQ, we have developed an intelligent cable technology that is capable of recording and analysing a wide range of parameters throughout any kind of cable system.

**LEONiQ** provides feedback on the state of the entire system and its controls and offers recommendations for future development cycles.

This new key technology will make energy and data streams more efficient, more secure and more available. For the first time, not only the networked devices become intelligent but the network itself. In this way, LEONiQ creates wide-ranging opportunities to generate value for customers.

**Examples include**
- Improved plant availability
- More precise recommendations for predictive maintenance intervals
- Targeted fault identification
- Shutdown of critical systems
- Load cycle optimization and monitoring in electromobility

Even at an early stage in development, we use digital functional simulation to achieve a cable solution design that best matches the respective use case. If potential problems are identified during the development stage, integration of sensor systems and electronics along the cable can provide built-in monitoring functionality. Various parameters, including temperature, density, mechanical stress and GPS location, are recorded on a continuous basis, analyzed in the cloud using algorithms we have developed in-house and then made available to customers in the form of a dashboard.

**The LEONI key technology and its three main elements**

- Sensor-integrated, intelligent interconnect solutions
- Digital functional system simulation for energy and data transmission
- Data analytics and data-driven smart services with real added value

This offers a series of smart services including early warning systems, active system control and precisely targeted recommendations for action – effectively offering 100% transparency across all installed cable systems, anywhere in the world and for any application.

Everything that used to be a black box is now clearly visible in a customer application. In addition, recorded data is fed back into the digital functional simulation models. With LEONiQ, this enables the intelligent cable solutions to constantly enhance and optimise themselves as part of a learning system.

**LEONiQ does much more than just transmit – it is offering new benefits for systems and users. In real time!**

We are connecting the product we have been synonymous with for over 100 years to digital intelligence. The first networking with an IQ comes from LEONI: LEONiQ.
Sophisticated modern industrial machinery places high demands on the cables and systems it uses. In the future, quality, functionality and precision will not be the only decisive factors here. With an eye on the continued advance of digitalization, we also see ourselves as partners for systems and solutions business, who work with you to develop future-proof designs. We tackle technological innovations early on and offer you tailor-made products whose functionality we then test under simulated real-world conditions. This reduces downtime and ensures the reliability of your machine pool. This is an area where machine construction is merging with information technology (smart factory).

Alongside the superior electrical and mechanical properties offered by our cables and systems, we can also draw on a wide variety of materials that enables us to provide you with knowledge and consulting services for machinery beyond our standard product range. The starting-point here is the technological enhancement of our products in terms of miniaturisation, sensors and artificial intelligence.

The LEONI group
LEONI is a global provider of products, solutions and services for energy and data management in the automotive sector and other industries. The value chain encompasses wires, optical fibers, standardised cables, special cables and assembled systems as well as intelligent products and smart services. As an innovation partner and solutions provider, LEONI supports its customers with pronounced development and systems expertise. The market-listed group of companies employs more than 92,000 people in 31 countries and generated consolidated sales of EUR 5.1 billion in 2018.

LEONI’s value chain is unique in its sector and offers you invaluable potential and synergy effects. Our approach is based on a comprehensive understanding of the relevant application scenario, combined with long experience and technical know-how.

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Customer benefits with smart services

Whether electric vehicles, industrial robots, high-speed trains or power grids: anywhere and everywhere LEONI’s products are deployed today, digitalization offers the option of increasing productivity.

Intelligent solutions for manufacturing

Market portrait machinery and sensor technology

With innovative hardware and new solutions for transmitting energy and information, more – and better – kinds of data can now be harvested.

After all: value is not created by data alone, but by the way we use it: Be inspired.

Shorter product development cycles: fewer prototypes and redesigns
Learning systems: designed for future data scalability
Greater availability: active system monitoring for more precise predictive maintenance and minimisation of unplanned outages
Lower overall cost per system and lower maintenance costs
Better energy efficiency with active energy management
100% transparency: data-driven insights to improve performance
Global traceability thanks to digital product identification
Usage-driven warranty cycles

… and much more

Your Fiber Optic contact

Fiber Optics for Optical Metrology, Machinery & Sensors

Food and packaging machinery
Machine tools
Printing machines
Manufacturing systems
Specialised machinery
Conveyor systems
Assembly and handling systems
Sensors
Measurement technology
High-frequency technology
Cleanroom technology
Multimedia

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