



Senstech

innovative
Sensor
Technology

Force · Pressure · Strain · Torque

OEM SENSOR SOLUTIONS

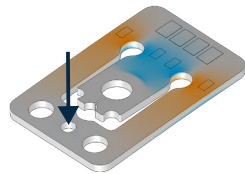


sensing what matters



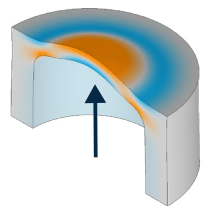
Notes

Force sensors



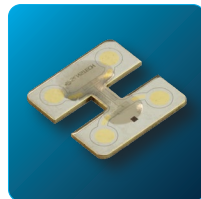
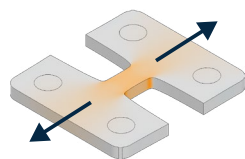
- Measurement range: 0.5 N to 10 MN
- Dimensions: from 4 x 4 mm
- Optional: plastic or metal housing

Pressure elements



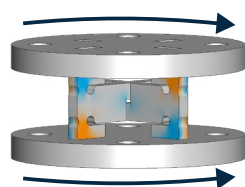
- Measurement range: 2 to 2000 bar
- Dimensions: from Ø 4 mm
- Designed for high performance

Strain sensors



- Measurement range: up to 1000 µm/m
- Higher values possible depending on sensor design
- Dimensions: from 5 x 5 mm

Torque sensors



- Measurement range: from 10 Ncm
- Capable for dynamic processes when combined with appropriate electronics

Signal amplifiers



- Signal conditioning for all our resistive sensor types
- Excellent signal-to-noise ratio

Your benefits at a glance

Max. space efficiency

Thin-film technology achieves footprints as small as 4 x 4 mm

Easy to integrate

Modular design tailored to installation space and mounting situations

Swiss made quality

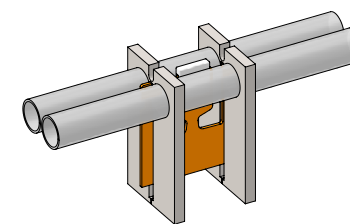
Cost-efficient through automation

High reliability at low forces

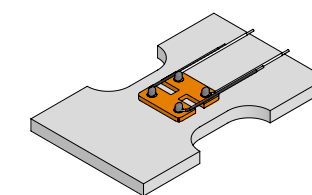
Through optimized sensor geometries

Overload protection

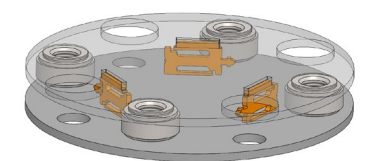
Our sensors withstand loads of up to ten times the nominal measurement range



Non-contact, indirect pressure measurement

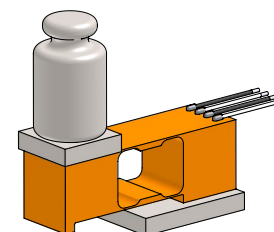


Welded strain sensor for structural health monitoring

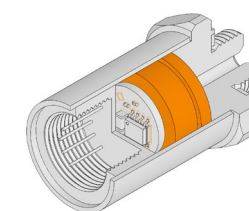


Miniature load platform designed for precision sensing

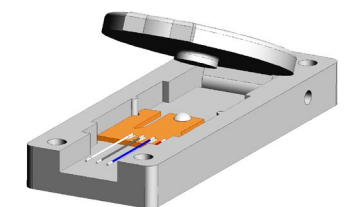
Integration examples



Miniature load cell



Pressure element for pressure transmitter



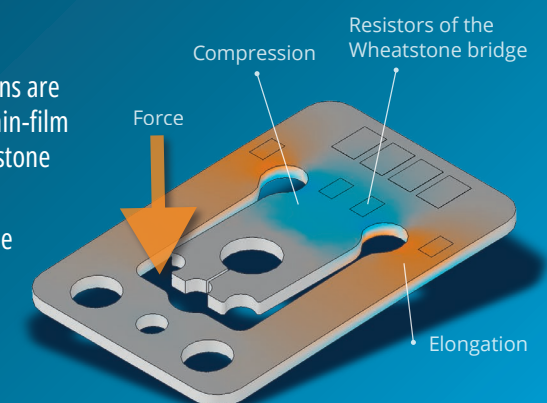
Simplified sensor fixation in engineered plastic parts



Principle of operation

Force creates deformation

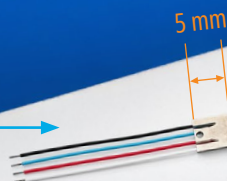
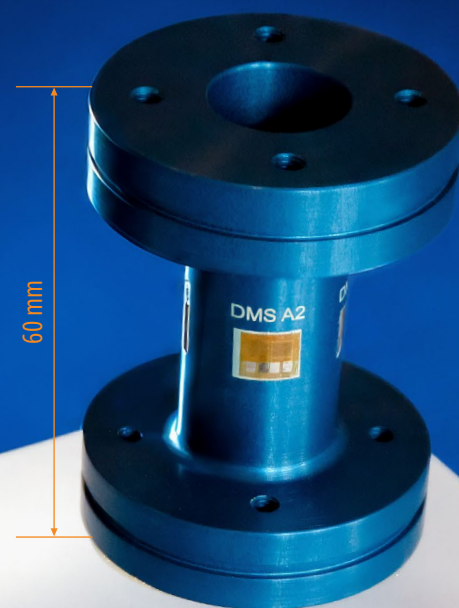
- A strain gauge consists of a carrier substrate onto which fine conductor patterns are either bonded as metal foil strain gauges or deposited by highly automated thin-film processes (thin-film strain gauges). These conductor structures form a Wheatstone bridge and are positioned at defined deformation zones on the substrate.
- Mechanical loading – such as force, pressure or torque – produces strain in the structure, leading to a resistance change in the conductor elements. This change is converted into a voltage signal by the Wheatstone bridge circuit – the sensor signal is generated.
- The signal is used to determine the applied strain and, consequently, the mechanical quantity such as force, pressure, or torque.



The best of both worlds

Thin-film & foil strain gauges

Combining two leading technologies



Thin-film strain gauges

- ✓ **Compact design**
Miniaturization down to 4 x 4 mm
- ✓ **Scalability**
Cost-efficient at high production volumes thanks to a high level of automation
- ✓ **High long-term stability**
No creep effects due to a permanent bond between substrate and functional layer
- ✓ **Battery-powered applications**
Ideally suited due to high bridge resistance
- ✓ **Easy to integrate**
High geometric flexibility with a small sensor footprint

Foil strain gauges

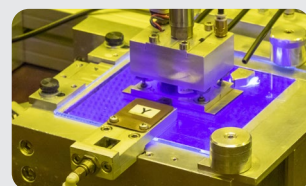
- ✓ **High flexibility**
For spring bodies of nearly any size and form
- ✓ **Cost-efficient manufacturing**
Even for small batch sizes
- ✓ **Short time-to-market**
Prototypes within days due to very low initial effort
- ✓ **Fast installation**
Ad hoc field installation possible
- ✓ **High measurement ranges**
Supports very high measurement ranges > 10 kN



Laser cutting & laser drilling



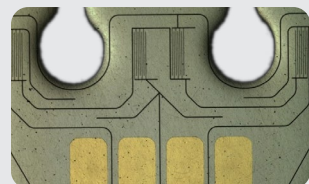
Sputtering



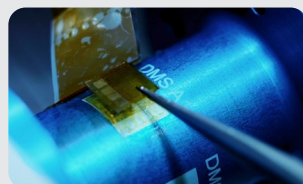
Lithography



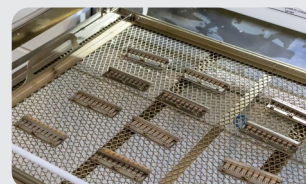
Laser welding



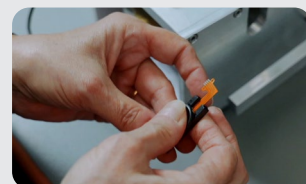
Laser trimming



Adhesive bonding



Soldering



Measurement & control

Based on FEM simulations

Engineering solutions beyond conventional design limits

Our agile iteration loops enable our customers to better understand, adapt and develop their applications more quickly. Whether you have a detailed specification or an early idea, we support you in finding the right sensor.

- Direct collaboration with our engineers from the outset
- Defining the solution through three questions: **WHAT**, **HOW**, and **WHERE** to measure?
- FEM simulations provide the basis for optimal sensor design tailored to your application

Measurable quantities and adjustable parameters

F Force in N M Torque in Nm ϵ Strain in $\mu\text{m/m}$ p Pressure in bar

Rated Force Measurement ranges Overload Breaking load Accuracy class Rated characteristic value
Operating temperature range Output signal Mechanical interface IP rating Certifications

Thin-film

Integration

- Welding
- Screwing
- Clamping

Substrate

- Steels, Al/Ti alloys
- Dimensions:
4 - 50 mm (L x W)
0.3 - 3 mm (H)
- Machined, turned or EDM cut parts

Foil

Integration

- Spring bodies for screw or clamp mounting
- Direct application of strain gauges by adhesive bonding

Spring body

- Steel, aluminium
- IP rating, housing
- Nearly any size and form

Connection

- Stranded wires
- Tinned solder pads
- Various connectors
- Flexible flat cables (FFC) / flexible printed circuits (FPC)

Metal thin-film

- SiO_2 , NiCr, Ni, Au...
- Direct coating of parts:
Thickness max. 20 nm
- Bridge resistance: 1 - 10 k Ω

Connection

- Stranded wires
- Various connectors
- Shielded cables (DIN) or twisted pair

Strain gauge

- 120 - 2'000 Ω
- Single grids, T-grids, Rosette strain gauges
- 45° herringbone pattern

Electrical interfaces

Analog output:

- Standard signals: 0-10 V, ± 10 V, 4-20 mA
- With or without tare function
- With or without calibration feature

Digital:

- Resolution: 12-16 bit
- Sampling rate: 20-4000 Hz
- Interfaces: I²C, SPI, UART, CAN (open)

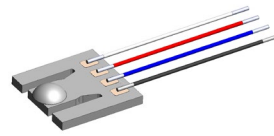
Any further questions? Feel free to contact us.
With us, you speak directly to the developer!

- Temperature sensors
- Humidity sensors
- Flow sensors
- Conductivity sensors
- Biosensors
- Micro-heaters
- Infrared emitters

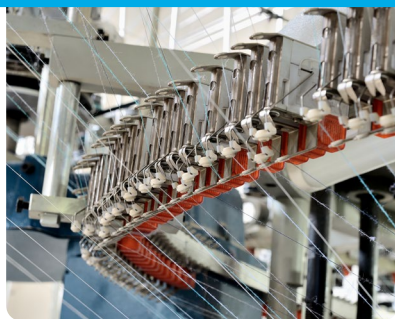
Force measurement in Cardiotocography



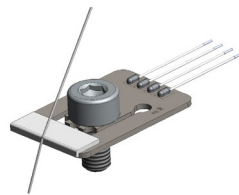
- Challenge**
Reliable detection and monitoring of uterine contractions during childbirth
- Solution**
Compact thin-film force sensor in a plastic housing with a round-head rivet
- Benefits**
Provides precise force feedback for real-time monitoring



Yarn tension measurement



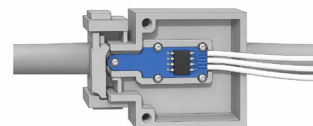
- Challenge**
Reliable measurement of yarn tension in textile production
- Solution**
A customized thin-film strain gauge force sensor that guides the yarn and continuously monitors the applied tension
- Benefits**
High robustness ensured by a metallic substrate and easy integration into textile machinery



Pressure monitoring in peristaltic pumps



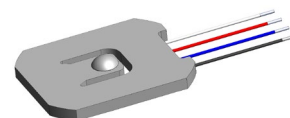
- Challenge**
Early detection of tubing kinks or complications at the puncture site
- Solution**
The tubing is compressed via a plastic housing whose cylindrical extension transfers the applied force onto an elongated sensor tongue
- Benefits**
Reliable measurement of small forces from approx. 0.5 N without contact with the infusion fluid



Accurate dosing in ultra-compact designs



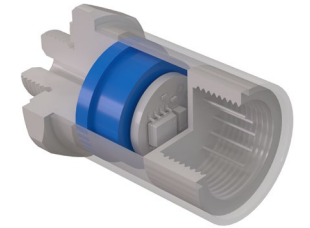
- Challenge**
Ensuring accurate drug delivery within a very limited installation space
- Solution**
A miniature thin-film strain gauge is integrated directly into the pump plunger, where it measures the counterforce generated during the pumping motion
- Benefits**
Exceptional space savings combined with excellent measurement performance



The heart of your pressure transmitter



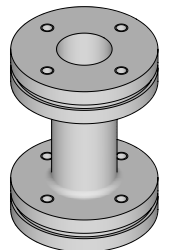
- Challenge**
Reliably delivering signals over millions of pressure cycles
- Solution**
A thin-film strain gauge pressure element featuring a stainless steel diaphragm
- Benefits**
High overpressure and burst pressure capability with a high degree of miniaturization



Multidimensional force sensing for robotic handling



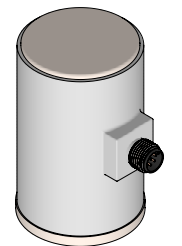
- Challenge**
Detecting whether workpieces with complex geometries have been correctly gripped at defined coordinates
- Solution**
Two-dimensional foil strain gauge sensor with selectable measurement range
- Benefits**
Reliable detection of even the slightest contacts or collisions



Monitoring press forces in joining processes



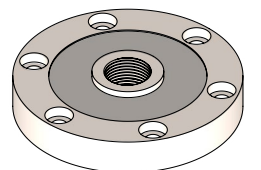
- Challenge**
Determines press-in forces during assembly for ideal process control
- Solution**
Foil based stain sensor in a force shunt with calibrated output signal
- Benefits**
Ensures high process quality, offers excellent fatigue strength, and enables simple plug-and-play integration



Process monitoring in packaging machines



- Challenge**
Measuring contact pressures during film sealing processes
- Solution**
Fast-responding pressure force sensor based on foil strain gauge technology
- Benefits**
Consistent seal quality and stable process control at high production throughput



MEDICAL



SAFETY ENGINEERING



AUTOMATION



PROCESS CONTROL

SENSING WHAT MATTERS



Who we are

- **Manufacturer and developer of thin-film and metal foil strain gauges**
All key development and production steps are carried out in our own facilities in Switzerland
- **Together is how we work best**
With passion and heart, we dive into applications to create solutions that truly fit
- **Reliable partner in MedTech and beyond**
Powering safety and performance in various applications
- **Fast & agile**
With rapid functional prototypes, we support our customers in testing and refining their solutions quickly
- **Part of iST Group**
Experience on global scale

Certified according to
ISO 9001 and ISO 13485



YOUR GLOBAL SUPPLIER OF OEM FORCE SENSORS



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