innovative
Sensor
Technology

physical · chemical · biological

CORPORATE PRESENTATION



Your supplier and partner for
physical, chemical and biological sensors

Presentation by

About iST

- 500 employees worldwide
- In-house design and manufacturing
- Flexible and responsive project management with short turn-around time
- Small quantities to high volume manufacturing
- Development and production space 13.500 m^2, Clean room >1.000 m^2
- ISO 9001:2015, ISO 14001:2015, ISO 13485:2016

40	200	4.000	>60.000.000
ACTIVE PATENT FAMILIES	NEW PRODUCTS PER YEAR	PRODUCTS IN PORTFOLIO	SENSORS PRODUCED PER YEAR

Company history



Founding of iST in Wattwil, Switzerland

1991



iST in Roznov, Czech Republic

1994

TEMPERATURE

1995

FLOW

1999

HUMIDITY

2004

CONDUCTIVITY



Acquisition of iST by Endress+Hauser

Endress+Hauser

2005



iST in Las Vegas, USA

2007

TECHNOLOGY PARTNER



iST moves to Ebnat-Kappel

2010

DEVELOPMENT GAS SENSORS



Acquisition of Jobst Technologies Freiburg, Germany

2012

BIOSENSORS

2015



Acquisition of Innuscreen Berlin, Germany

2019

DNA / RNA EXTRACTION

2020



Acquisition of Infrasolid Dresden, Germany

2021

MICRO-HEATERS



Acquisition of Senstech Fehraltorf, Switzerland

2022

IR EMITTERS

FORCE

2024

Where to find us

iST USA
Las Vegas
Sales



iST Innuscreen
Berlin, Germany
R&D, Production
Molecular Diagnostics



Infrasolid
Dresden, Germany
R&D, Production
Infrared Emitters



Jobst Technologies
Freiburg, Germany
R&D, Production
Bio Sensors





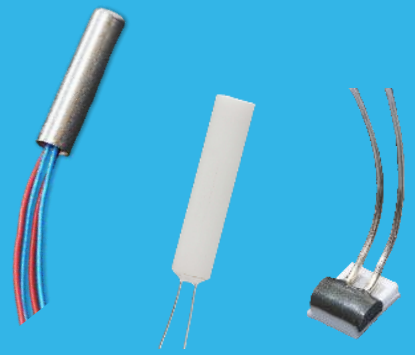
Sales offices
Nevada, Louisiana, Massachusetts
Ireland, Germany, India, China

iST Roznov
Roznov, Czech Republic
Production, R&D, Pastes

iST Headquarters
Ebnat-Kappel, Switzerland
R&D, Production, Sales

Senstech
Fehraltorf, Switzerland
R&D, Production, Sales
Pressure & Force Sensors

TEMPERATURE



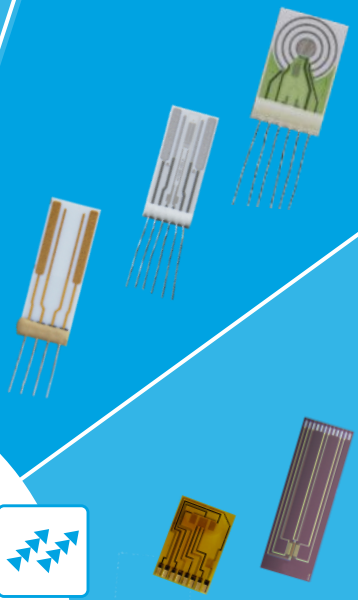
MICRO-HEATERS



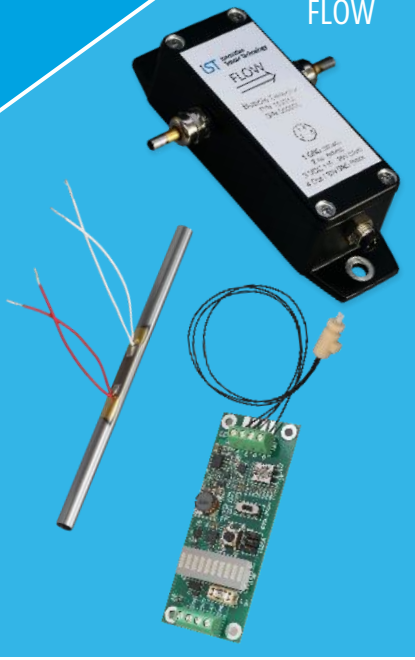
IR EMITTERS



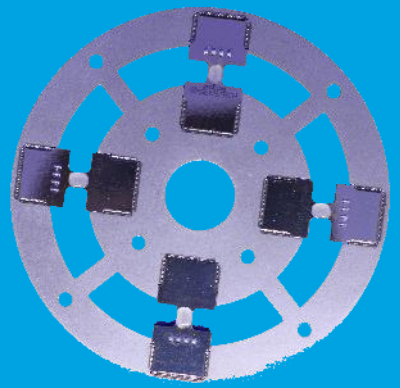
CONDUCTIVITY



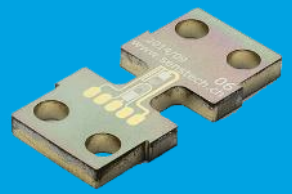
FLOW



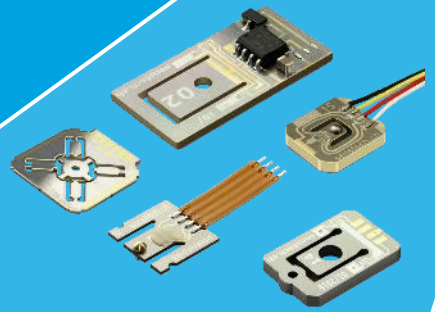
TORQUE



SURFACE STRAIN



FORCE



DNA/RNA EXTRACTION



BIOSENSORS



HUMIDITY



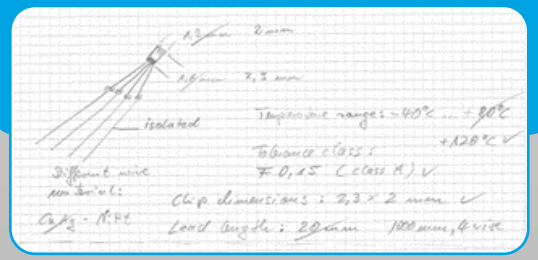
How to build your own sensor



Consulting

1

Define customer's requirements and specifications



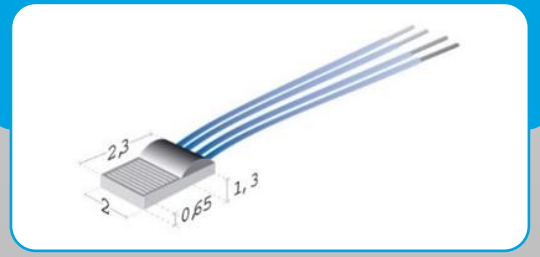


Development

2

Ensure feasibility

Testing of sensor layout and specifications





Production

3

Low and high volume

Production time 4-6 weeks



Sensors tailored to specific applications

Requirements → **Parameter** → **Element** → **Assembly** → **Modelling** → **Electronics** → **Calibration**

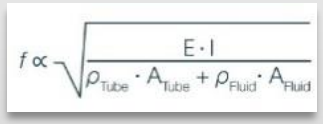
- Sensitivity
- Response time
- Accuracy
- Geometrical constraints
- Operational conditions
- Interfaces

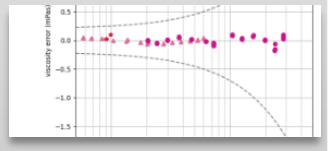
- Temperature
- Humidity
- Mass flow
- Leakage
- Level, foam
- Bubbles
- Density
- Viscosity
- Conductivity
- Calorific value

Co-create your next sensor with iST















Industrialized production with a reliable partner

Sensor technology

- Extremely robust
- Highly accurate
- Low drift
- Long-term-stability
- Easy integration

Thin-film technology



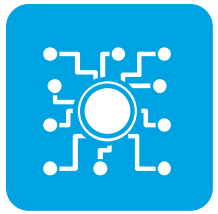
- For robust, corrosion-resistant and long-term stable sensors
- high accuracy and low drift and hysteresis

Thick-film technology



- Metal screen printing and various auxiliary coating techniques
- Application-specific tuning of properties
- PTC materials in combination with thick-film technology

Silicon technology



- Silicon-based sensors using well established MEMS processes
- For annual quantities from a few thousand to several million sensors

HVAC

Sensors for server rooms and high-end HVAC

Extremely robust

Highly accurate



In duct flow transmitter (FS7, Platinum & Nickel RTDs)
Refrigerant leakage detection (HIS550R-B)



Heat meter
(SMDs, paired probes, sensors with metallized backside)



Wall mounted transmitter (HYT RH+T)



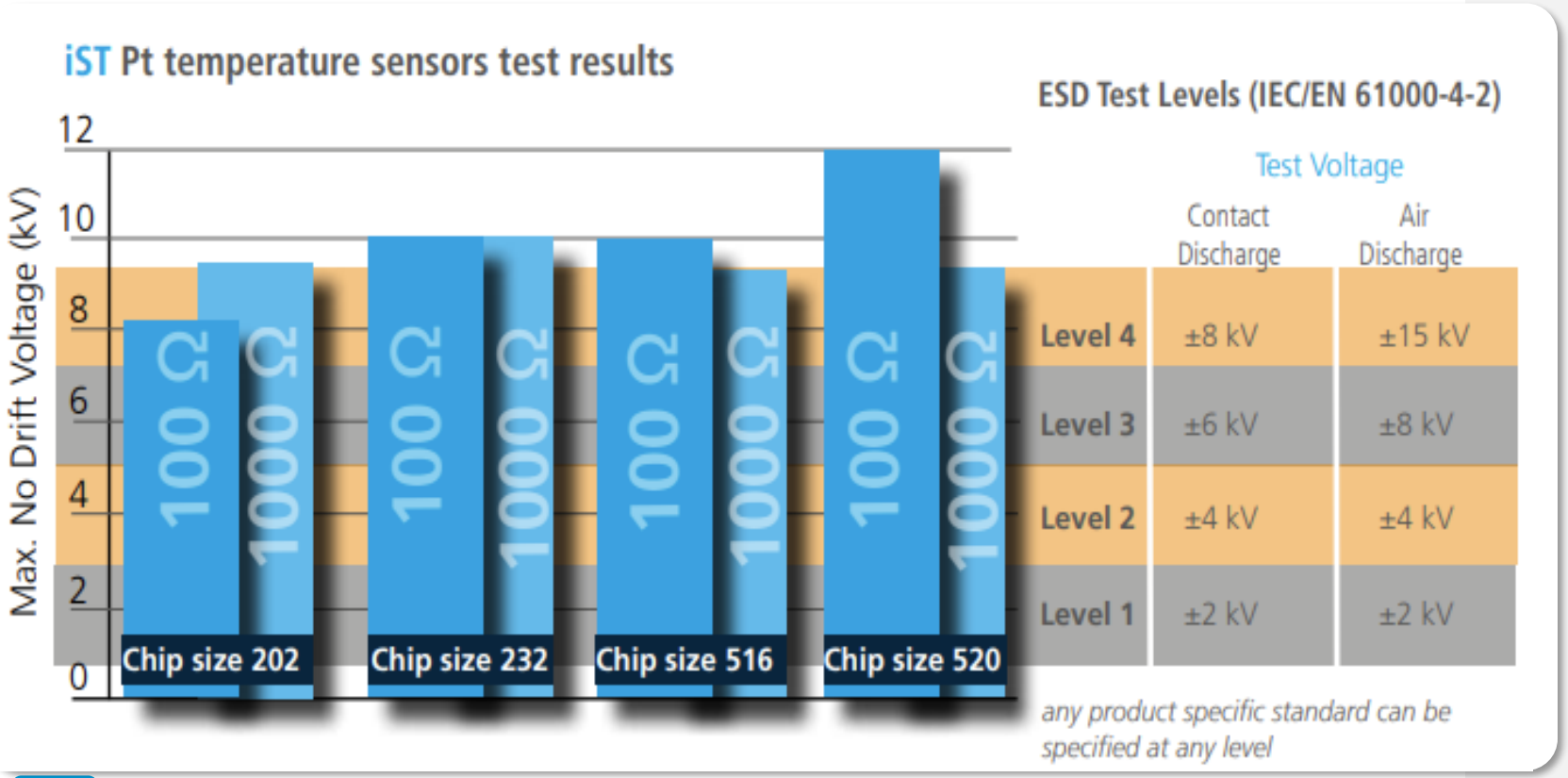
CO_2 monitoring in HVAC (HISsmd)
Aspirating / Smoke Detector (MFS, SFS)

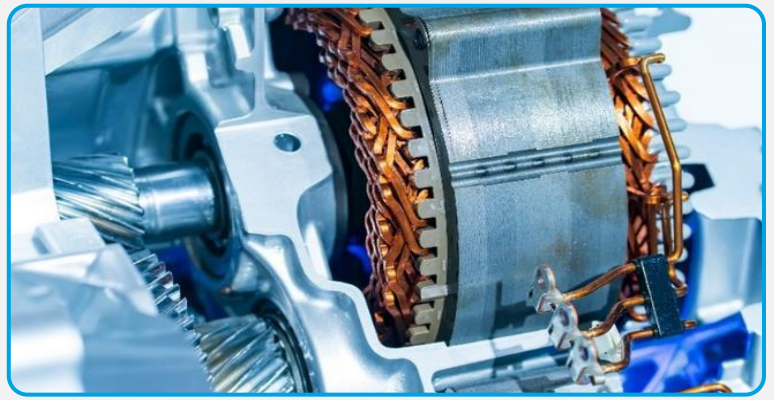


E-Mobility

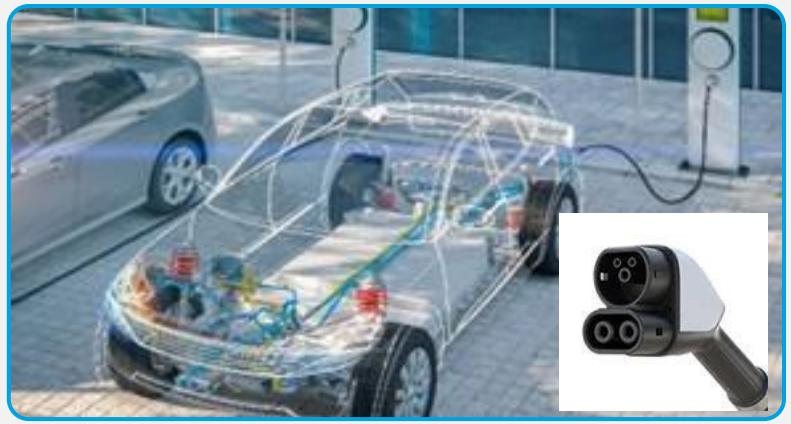
Charging stations, e-Motors

Best in class for max. no-drift voltage





Temperature sensor for stator
(Pt100 ESD optimized)



Temperature sensor for charger
(Pt100 ESD optimized)

physical · chemical · biological

Fuel cells

Fuel cell and e-motor hybrids

Temperature and conductivity of fuel cell cooling system (Coolant conductivity sensor)

Temperature of the stator and power electronics and batteries (Pt100 ESD optimized)

Air inlet humidifier (Humidity + temperature sensor)



Dry gas and compressed air systems

IoT applications



Dew point in insulation gas
(K5 humidity capacitor)



Dew point sensor - compressed air
(Humidity module for dew point monitoring)

iST offers a wide range of sensors based on different technologies suitable for any application.

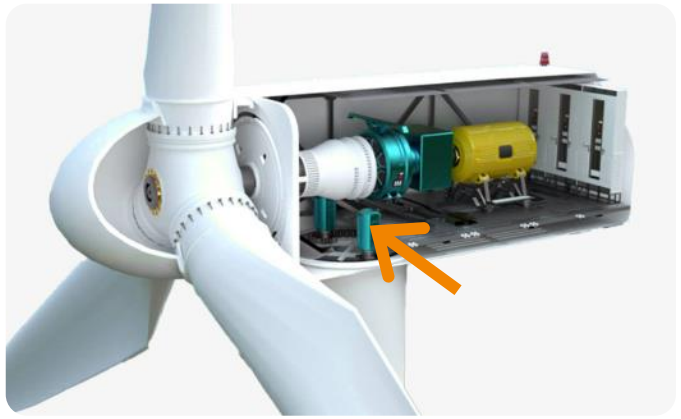
Standard or customized

Hydraulics

Moisture in hydraulic and insulation oils









Transformers, gear and hydraulics [Moisture in oil module]



Environmental & emission monitoring

Infrared emitters for gas analysis



Exhaust gas measurement
CO_x, No_x, HC
HIS550R-A



Dirty and ultrapure water analysis in sewage treatment plants (TOC analysis)
HIS2000R-C300-9 / HIS2000R-A300-9

Emission monitoring
HIS2000R-C300-9

Renewable Energy

Solar and battery production

Standard or customized

Our sensors are key components that contribute to a sustainable environment.

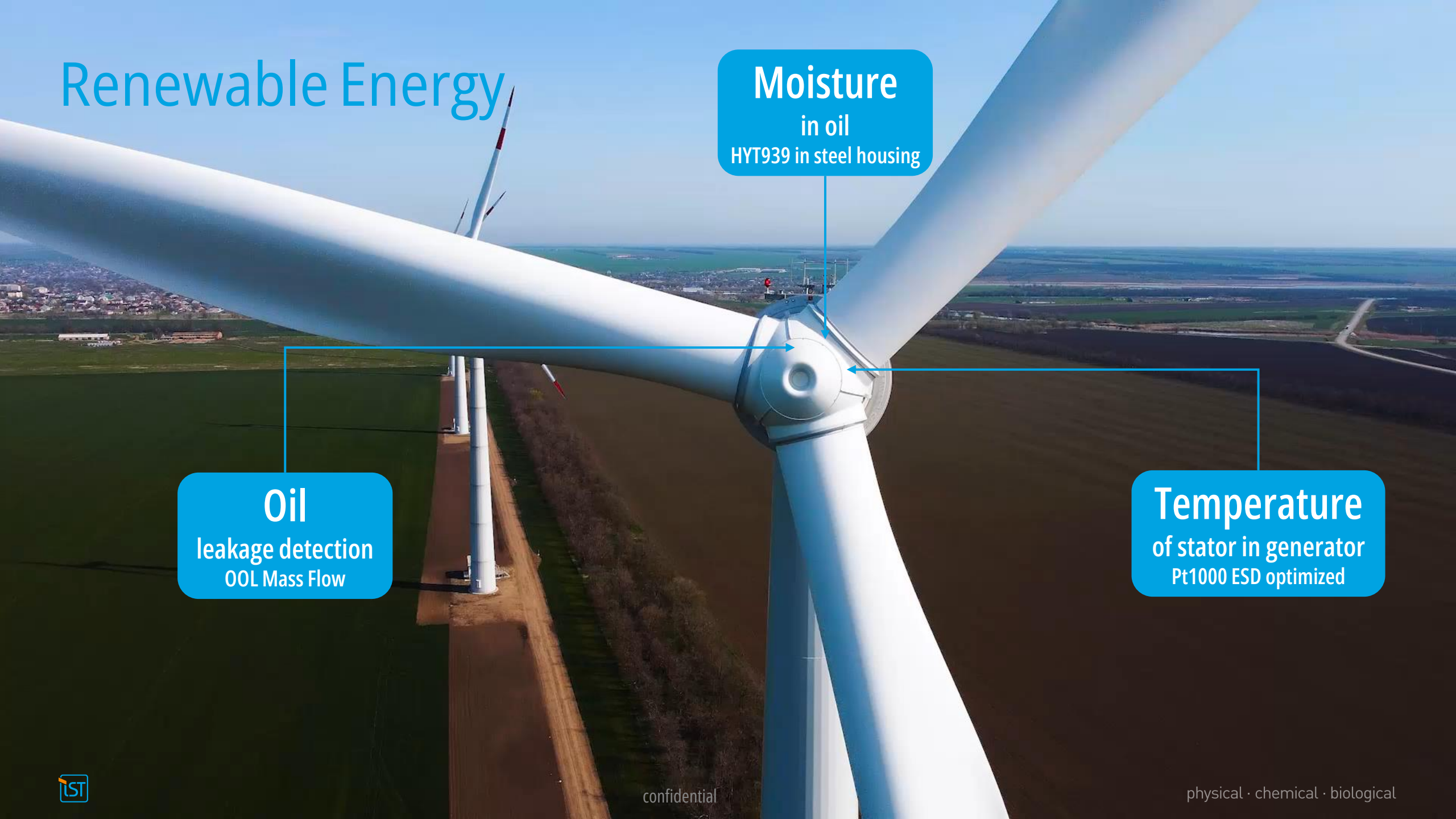


Temperature & RH
(HYT)



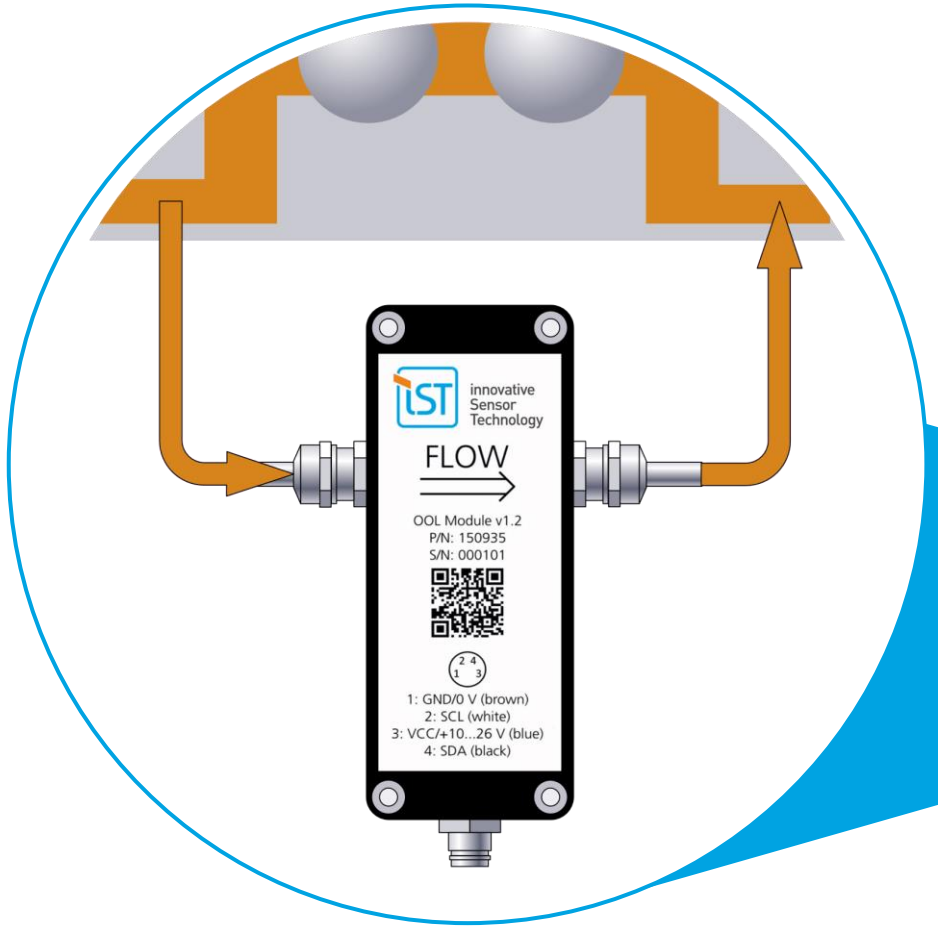
Dry Room for e-battery manufacturing
(Humidity module for dew point monitoring)
Coating process e-car battery
(Flow sensor FS7.A)

Renewable Energy



Oil leakage detection

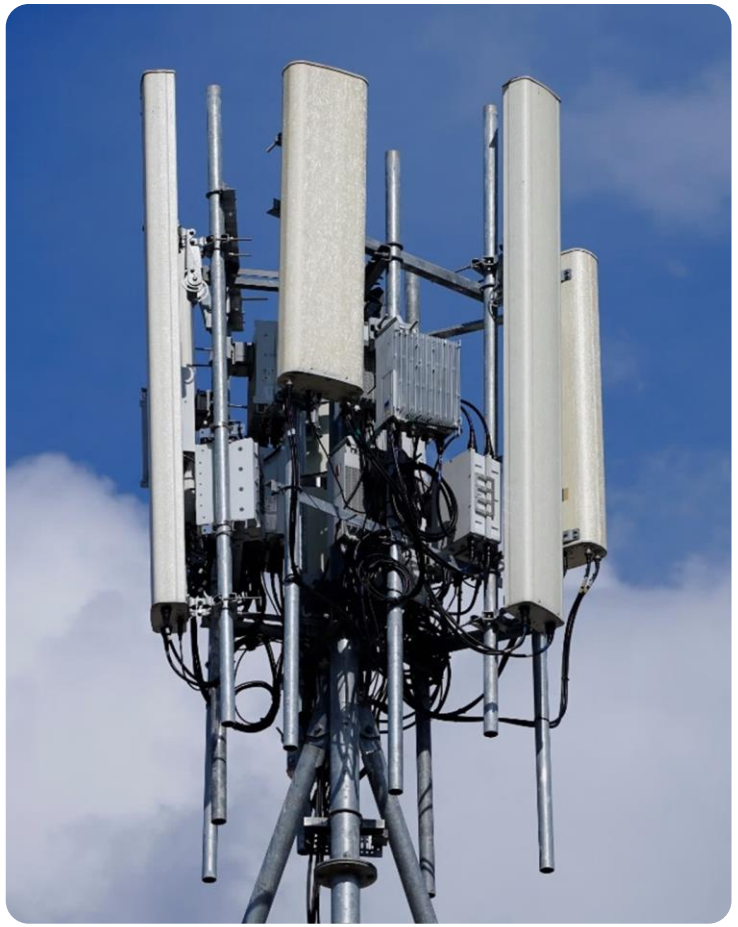
OOL flow sensor application for oil leakage detection in bearings and rotary feedthroughs

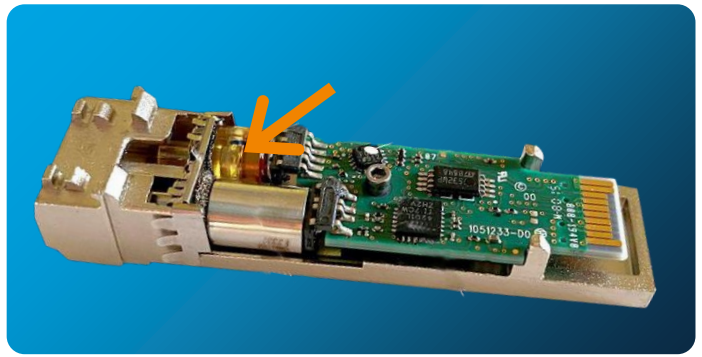


OOL Mass Flow

Optics and lasers

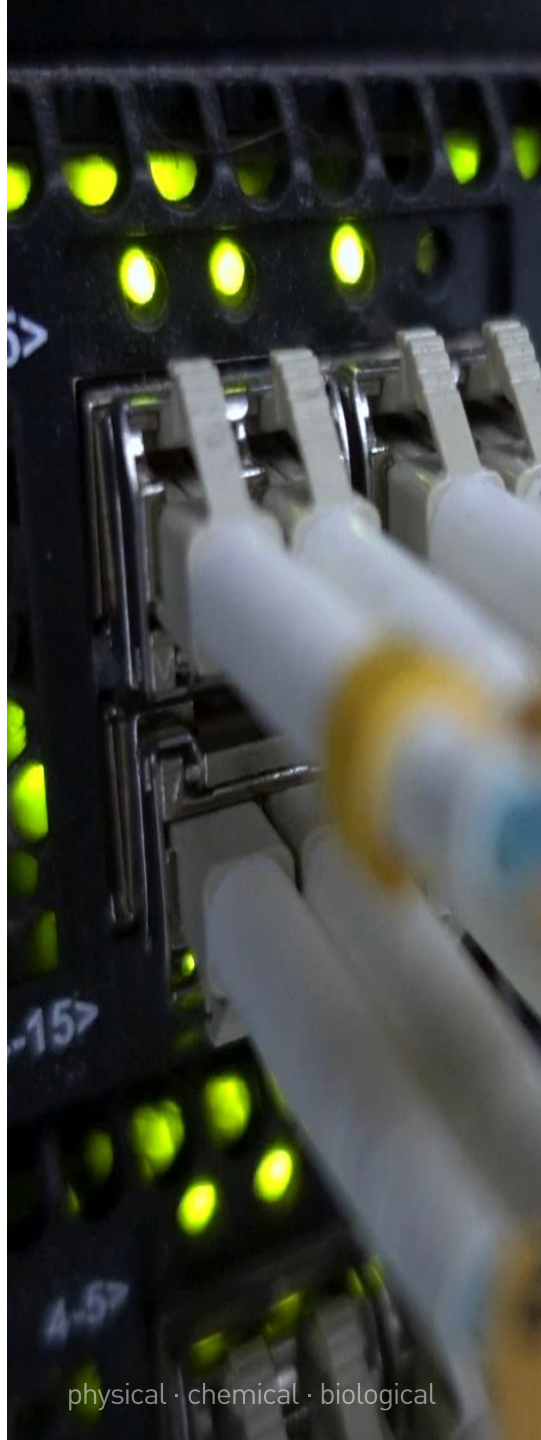
5G & telecommunication, transceivers





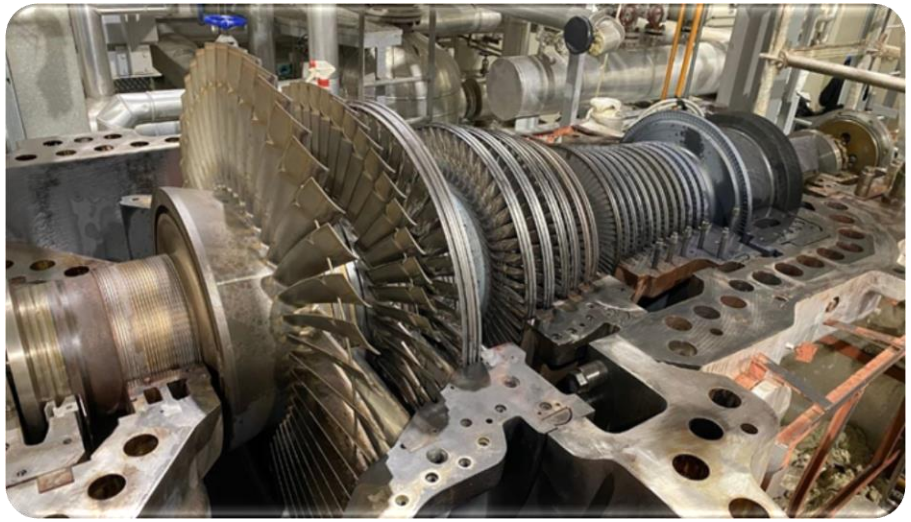
RTD and Heater for optical transceivers
(Micro heater, Bondsens bondable RTD)





Energy, process, industrial lasers

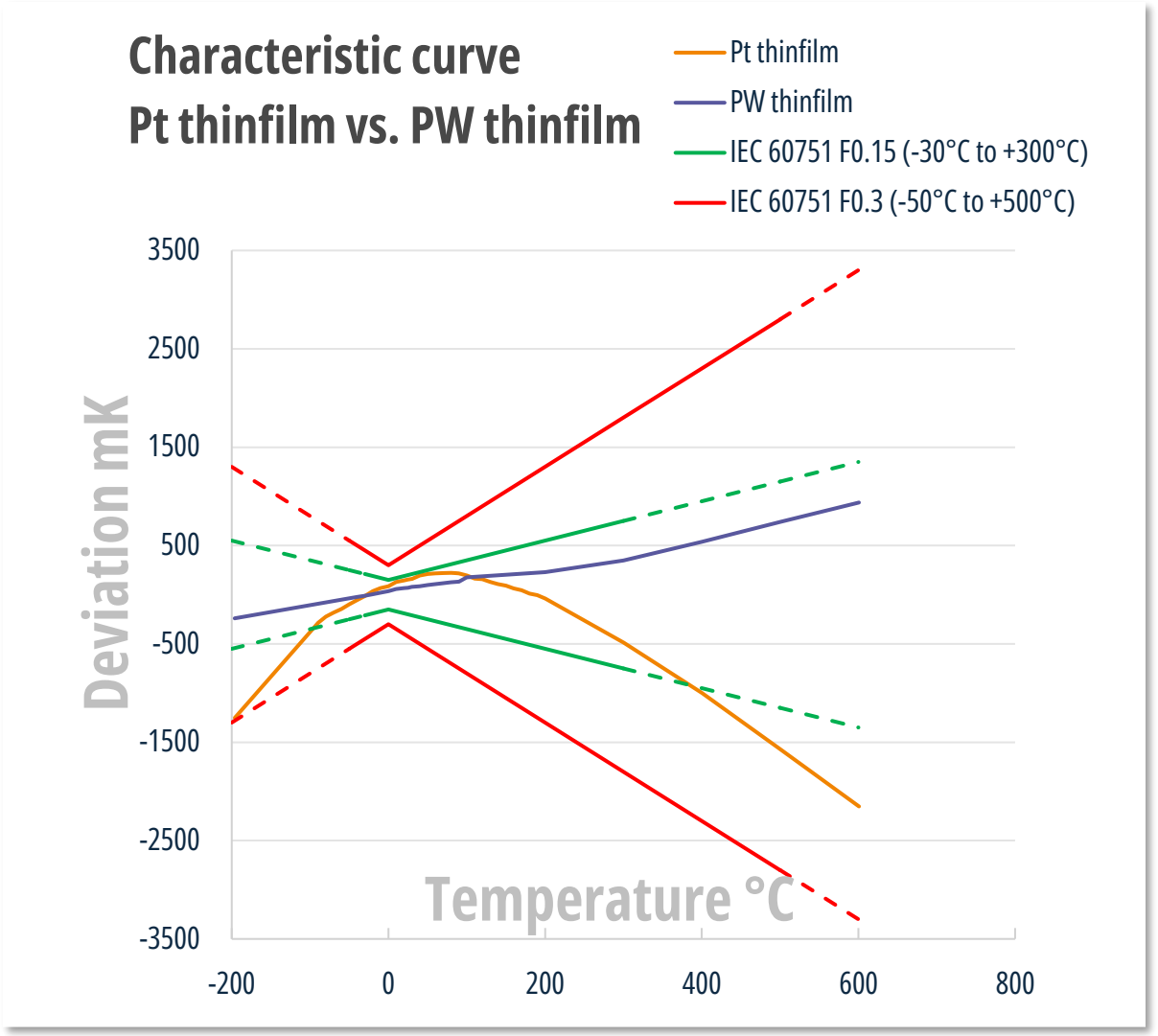
Steam turbines, bearing, solar thermal energy, chemical



High precision Temperature RTD Chip PW Technology:

- Class A from -200°C to + 600°C
- CTE matched materials

Sensor PW



Medical

Point of care

Highly accurate



Flow and RH&T for apnea
(MFS02, FS7)



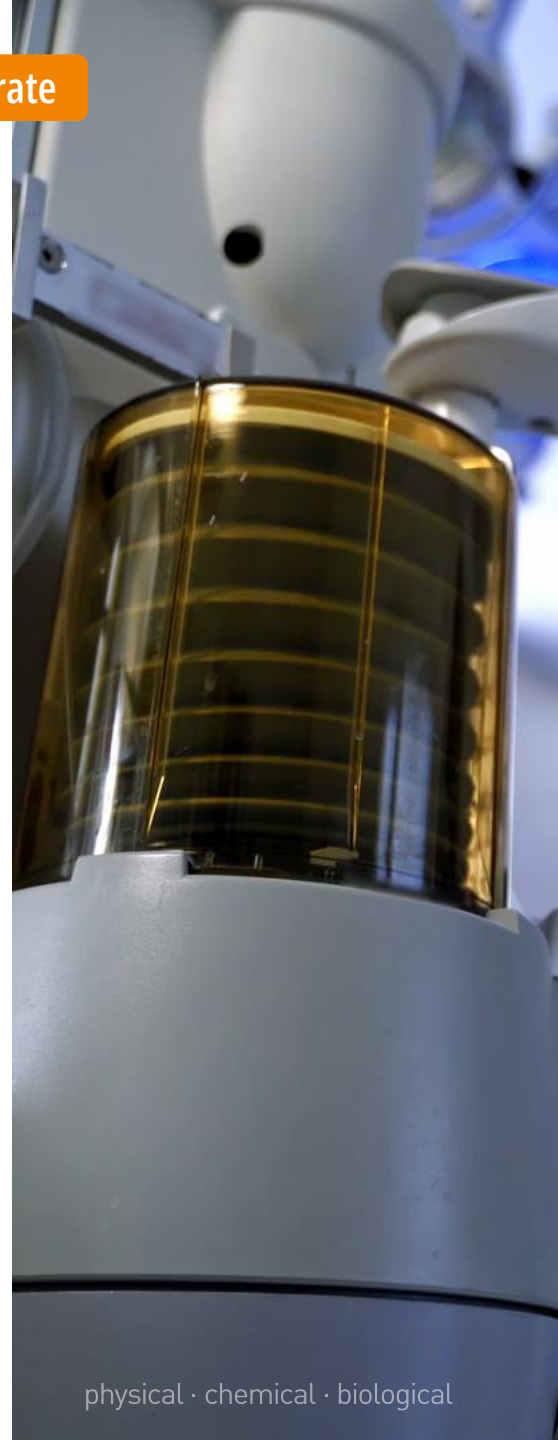
Conductivity of blood for dialysis
(IV4, LFS)



Flow and mist generator for breathalyzer
(MFS02, FS7, HST6R)



Temperature and humidity control
(HYT 221)



Medical

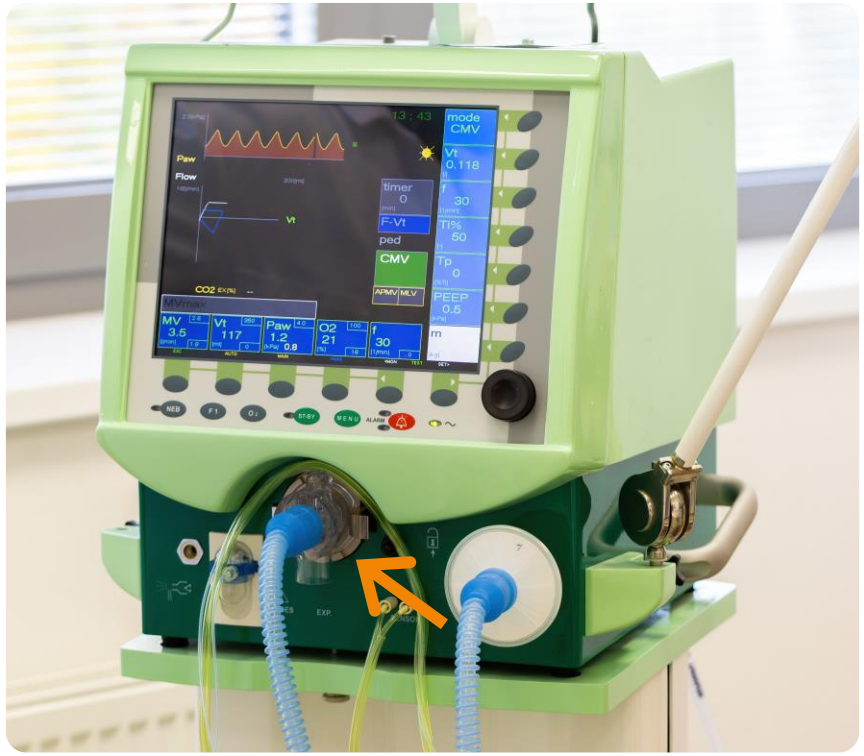
Patient room & intensive care

Standard or customized

We work collaboratively as partners with our customers because we know their success is our success



Infusion pump flow meter, force/pressure
(MFS02, FS7, Force sensor)



Oxygen consumption regulator / monitoring (SFS01, FS7)

Medical

Surgery room



Anesthesia gas blender
(MFS02, FS7)

Ventilators
(SFS01, FS7)

Catheter
(RTD Bondsens, heater)

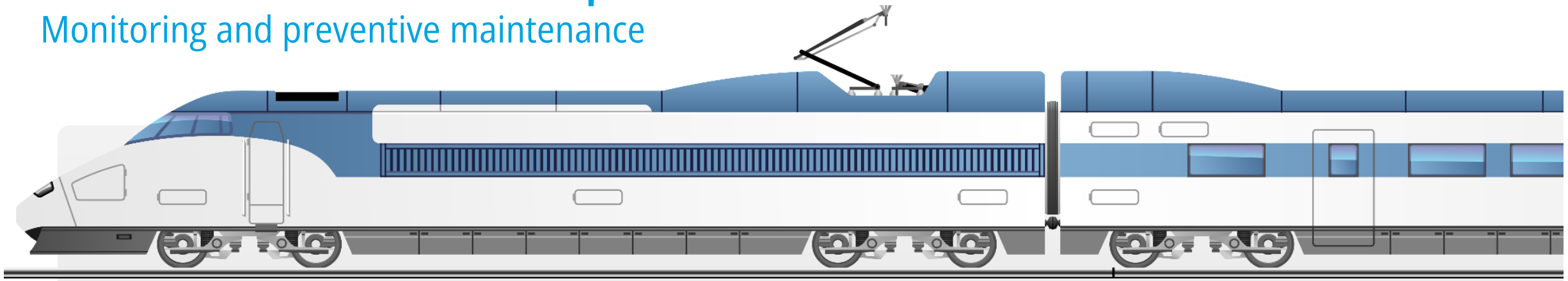
Online glucose monitoring
(IV4)



physical · chemical · biological

Automotive & Transportation

Monitoring and preventive maintenance



Energy & Propulsion

- Transformer (Pt100, m.i.o.)
- Diesel (SFS-DGF)
- Batteries (Pt100)
- Cooling Systems (LFS)
- Hydrogen – Fuel Cell (Pt1000, LFS, RH+T)

Pneumatics & Hydraulics

- Compressor (HYT939 dew point)
- Brakes (HYT 939 moisture in oil)

Cabins, Control & Safety Systems

- HVAC, Air Supply (RH&T, FS7)
- Water supply (Pt100, LFS)

Aerospace

Temperature Sensors



Temperature sensor for pitot tubes
(Ultra fast RTDs)

Temperature sensor for breaks
(High stability RTDs)



Temperature sensor for cabin comfort, water and gas hoses
(High stability RTDs)



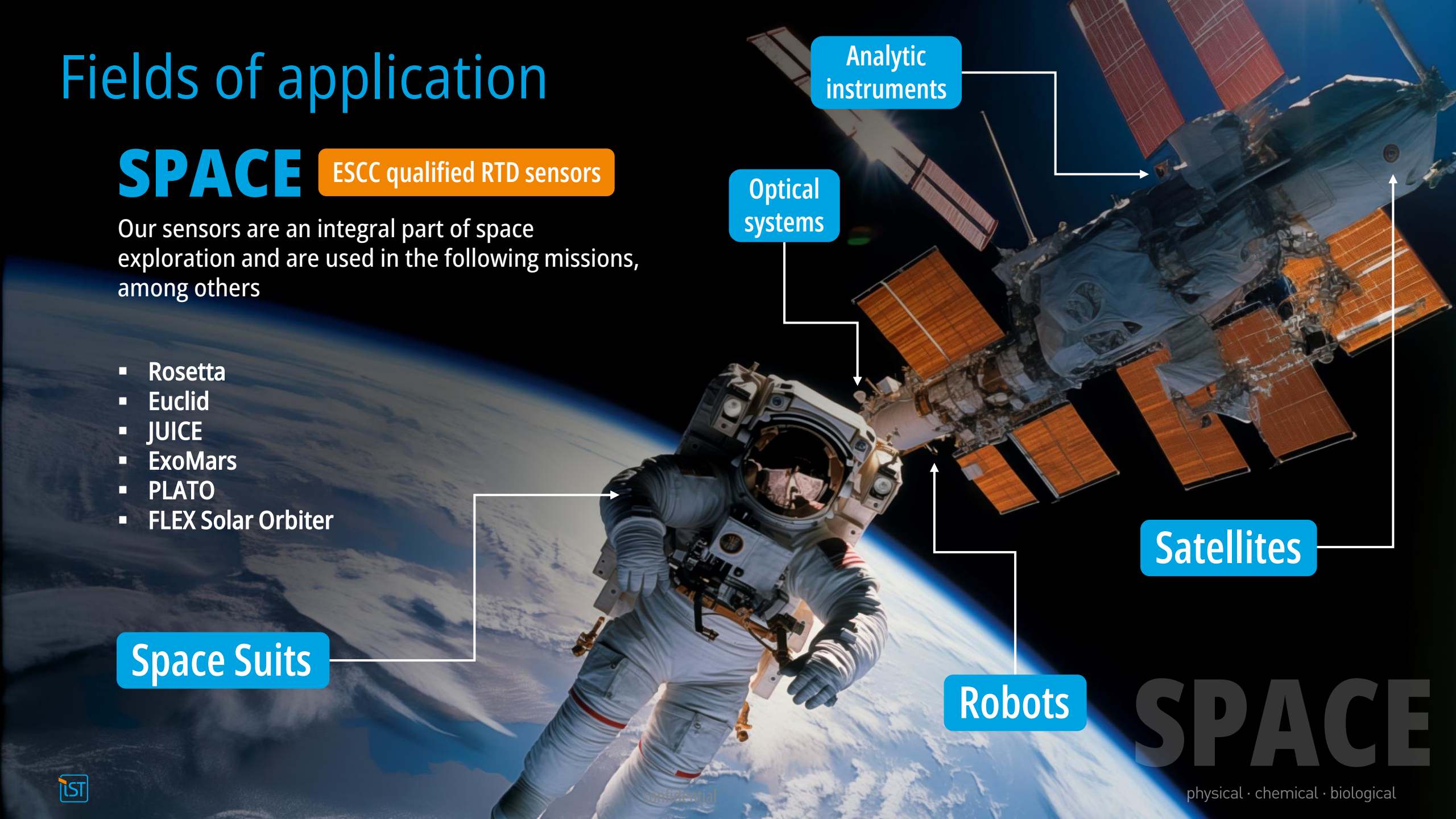
Fields of application

SPACE

ESCC qualified RTD sensors

Our sensors are an integral part of space exploration and are used in the following missions, among others

- Rosetta
- Euclid
- JUICE
- ExoMars
- PLATO
- FLEX Solar Orbiter



SPACE

physical · chemical · biological

confidential

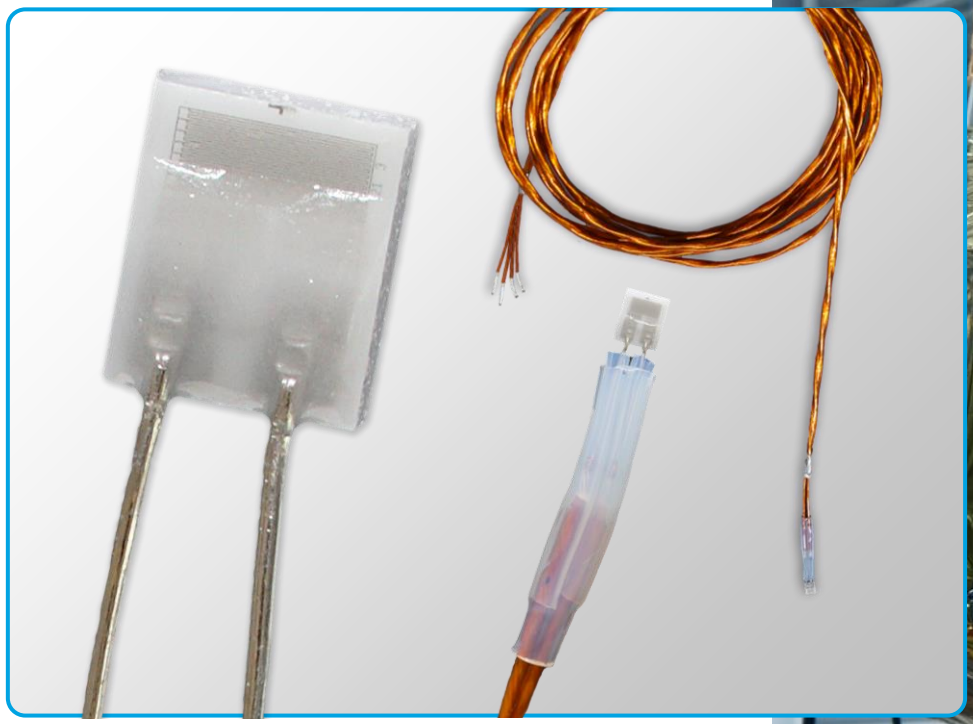
Space

Hi-Rel thin-film temperature sensors

ESCC qualified

RTDs for

- Satellites
- Robots
- Analytical instruments
- Optical systems
- Space suits
  (ESCC qualified sensors)



Flight (FM) or engineering model (EM)
With or without qualified extended wires



OEM Integration

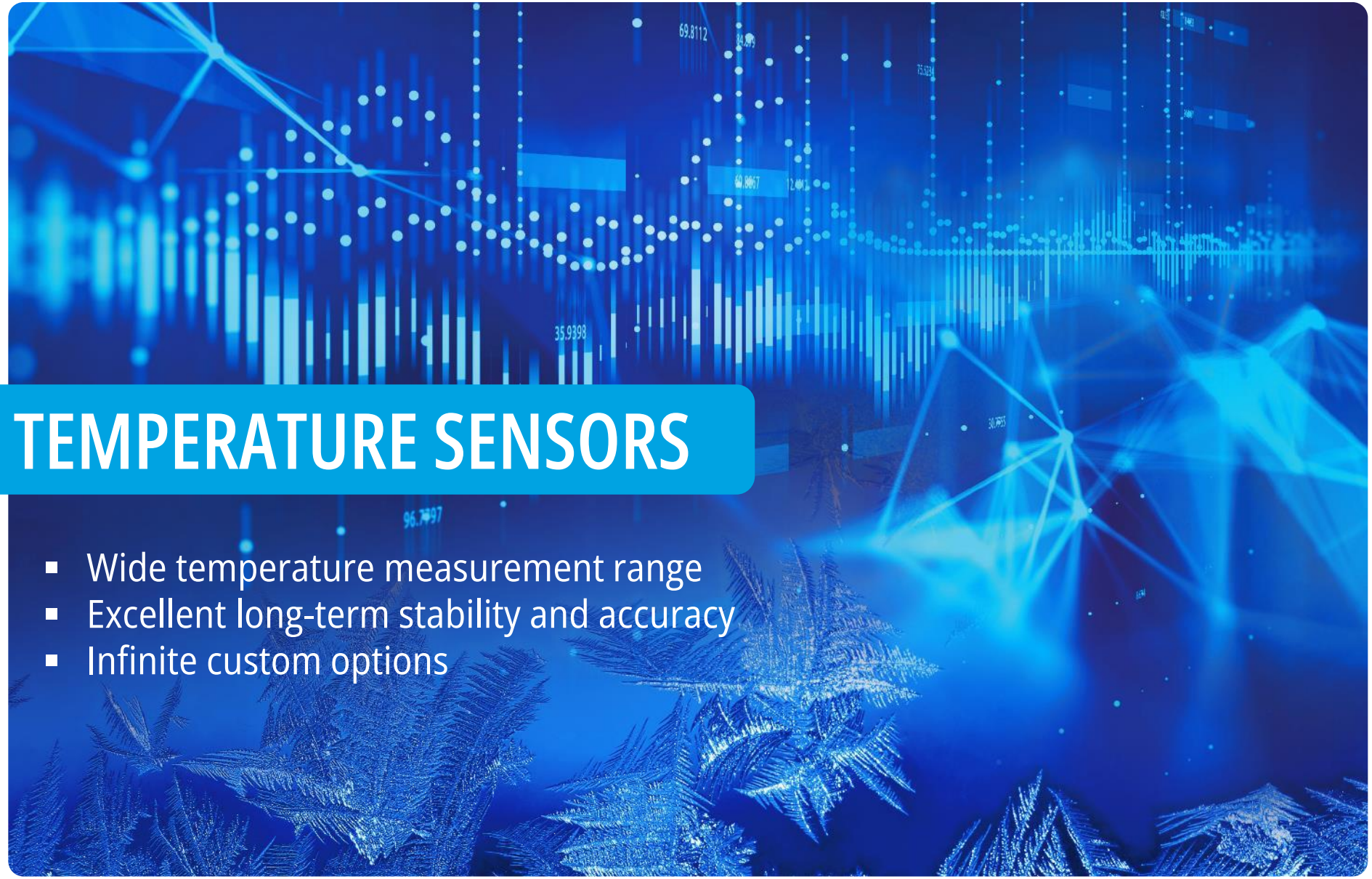
Chip and PCB Sensor integrations for compensation and control

Customized material design

- Various customization options
- Layout, materials, packaging, technology
- High accuracy, fast response time
- 0.5 mm width benchmark

[Customized sensors]





TEMPERATURE SENSORS

- Wide temperature measurement range
- Excellent long-term stability and accuracy
- Infinite custom options

Temperature sensors

Product overview

- Smallest footprint: BondSens
- Fastest responding Platinum RTD
- Most accurate Class A Pt-sensor
- Wide temperature range -200 °C to +1000 °C
- Best in class for ESD stability
- Large range of customization options
- Calibrated digital sensor
- The only manufacturer of Ni and Pt RTDs





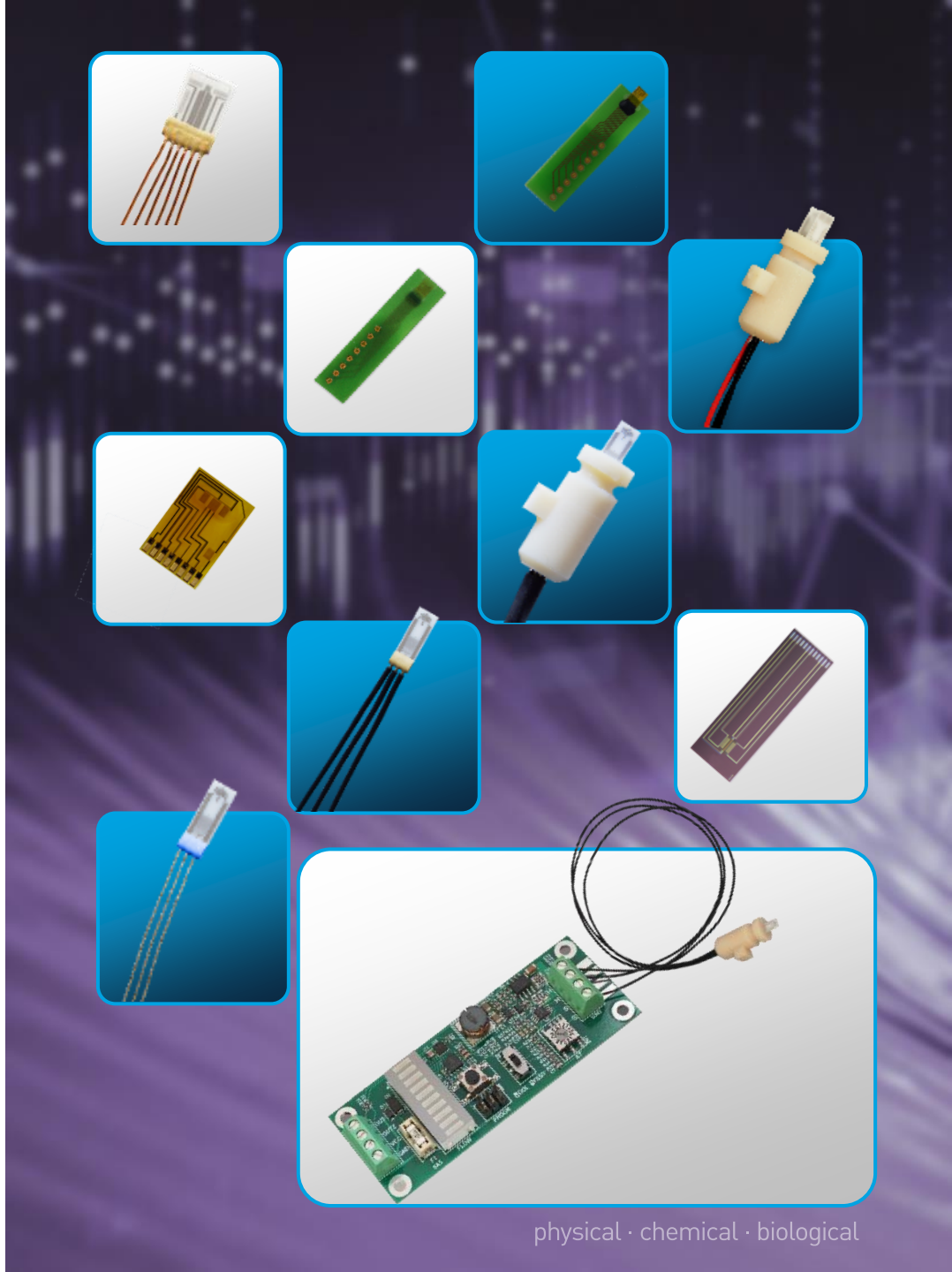
FLOW SENSORS

- Thermal measuring principle for gas and liquids
- Easy integration and signal processing
- Varied customization options

Flow sensors

Product overview

- Thermal-based flow sensors
- For gas and liquid flow measurement
- Highly sensitive at low flow rates
- Components for design-in OEM system integration
- High performance & wide dynamic range
- Detection of flow direction
- Low power consumption
- Demo boards for flow evaluation

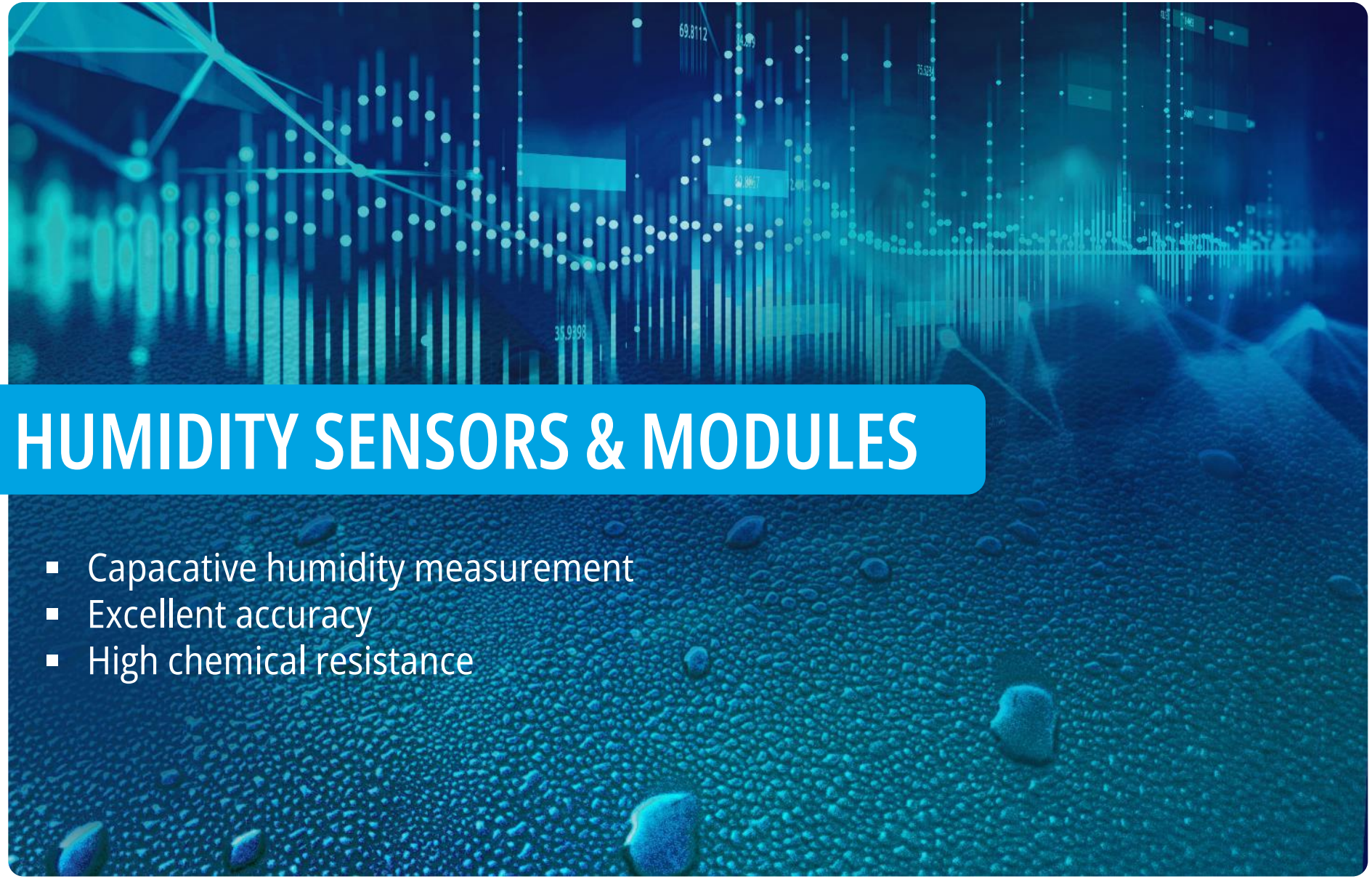


Flow sensors & modules

Product overview

- OOL Out of liquid sensor
  for liquid flow measurement
- High chemical resistance
- Suitable for aggressive and corrosive liquids
- Modules for resistive and conductive loads
- Gas flow module with flow direction detection
- Highly sensitive at low flow rates
- Drip detection
- Bubble detection





HUMIDITY SENSORS & MODULES

- Capacative humidity measurement
- Excellent accuracy
- High chemical resistance

Humidity sensors & modules

Product overview

- Capacitive humidity components for design-in OEM system integration
- Fully (custom) calibrated humidity modules
- Low drift
- High chemical resistance
- Short response times
- Analog and digital versions
- Temperature compensated



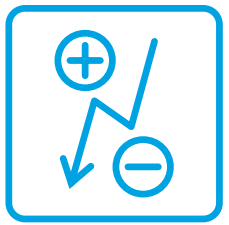


CONDUCTIVITY SENSORS

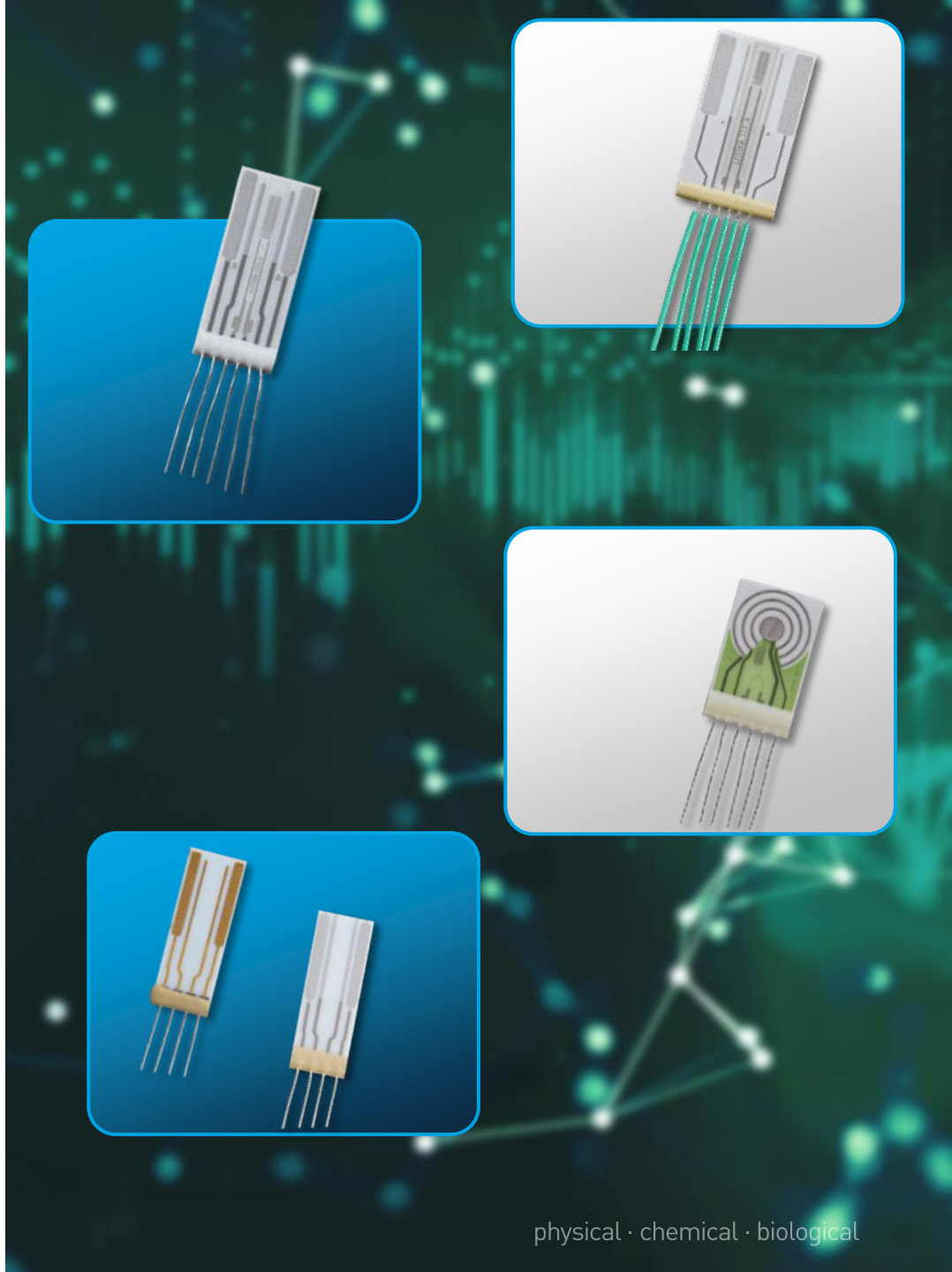
- High chemical resistance
- Optional integrated temperature sensor
- High accuracy

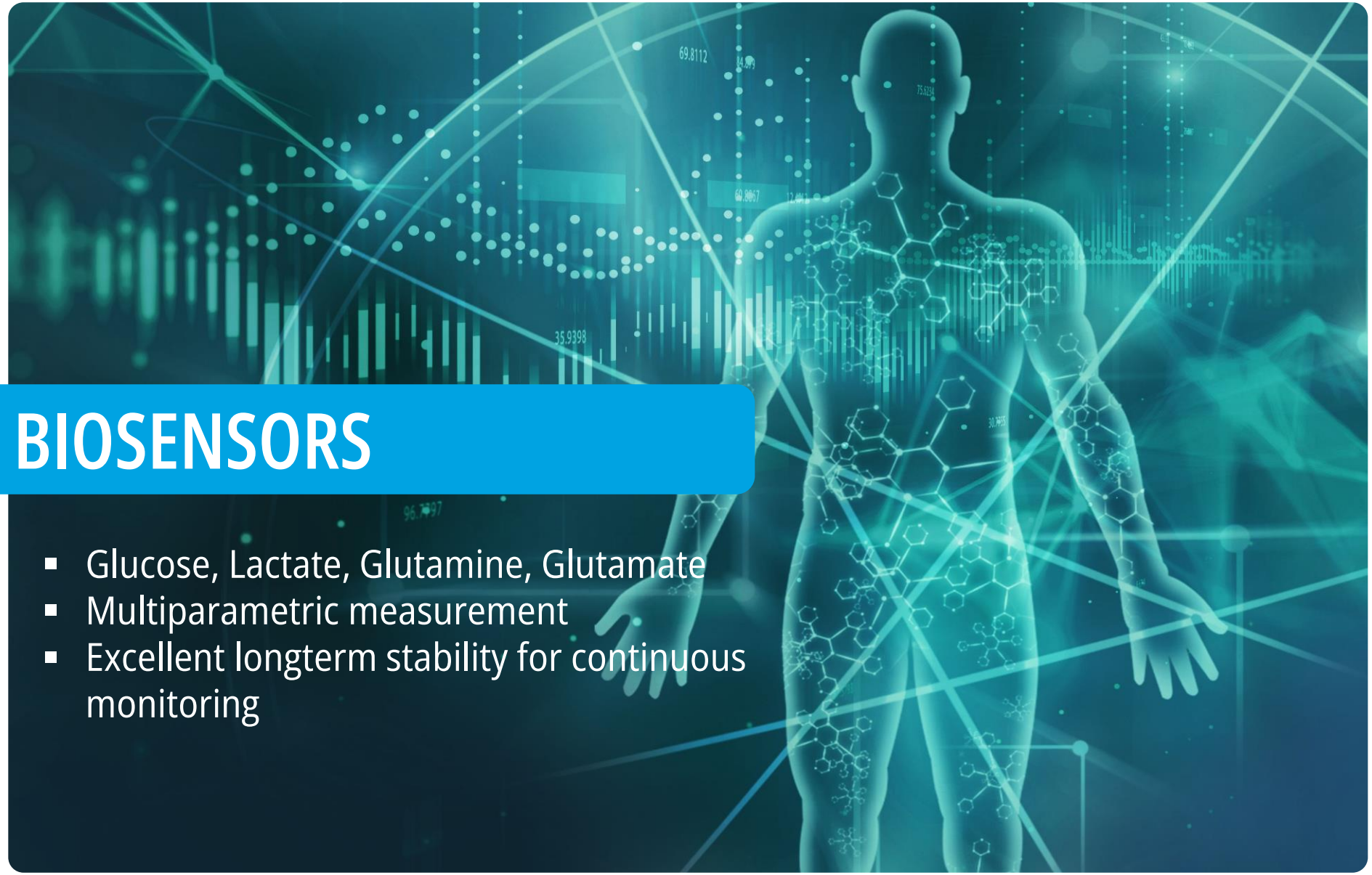
Conductivity sensors

Product overview



- Temperature-compensated conductivity sensors for design-in OEM system integration
- High chemical resistance
- Two or four electrode measurement
- Commodity conductivity sensor
- Ideal for MedTech single-use applications
- Wide conductivity range





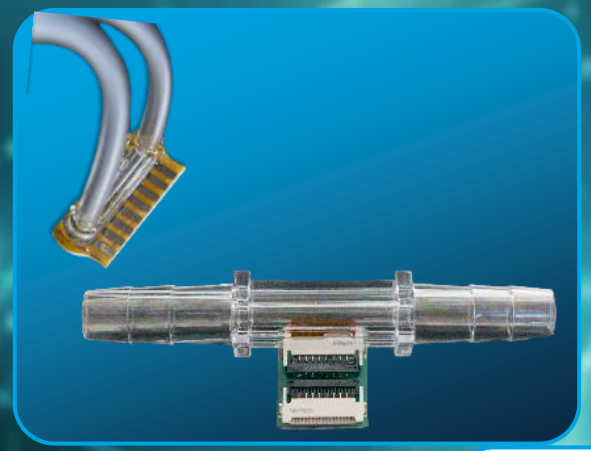
BIOSENSORS

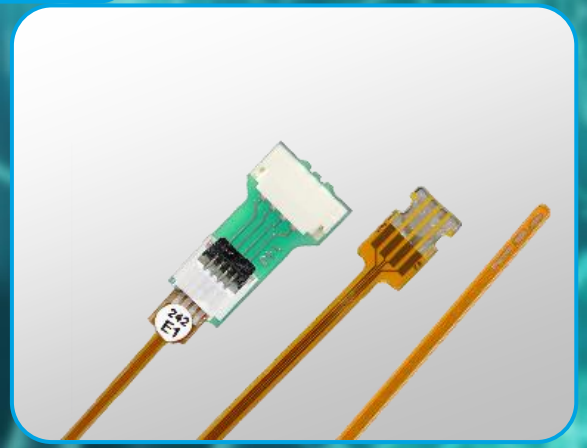
- Glucose, Lactate, Glutamine, Glutamate
- Multiparametric measurement
- Excellent longterm stability for continuous monitoring

Bio sensors

Product overview

- Biosensors for extracorporeal measurement of: Glucose, lactate, glutamine and glutamate
- Suitable for analyzers, single-use applications and bioreactors
- Single or multiple parametric measurement
- Application development
- Microfluidic systems and accessories
- Instrumentation and actuators







Jobst Technologies
small smart solutions



FORCE SENSORS

- Measurement of force
- Torque and surface strain
- OEM pressure sensors

Force sensors

Product overview

- Centered force sensors for force ranges from 18 N to 300 N
- Surface strain sensors for the indirect measurement of large forces on loaded plant parts
- Torque sensor elements for shear stress measurement
- Signal amplifiers



SENSTECH
SENSORS AND APPLICATIONS



MICRO-HEATERS

- Individually designed
- Targeted heating of small spaces
- Heating of solids, liquids and gases

Micro-heaters

Product overview

- Fast response times
- High temperature stability
- Overheating protection
- High-precision targeted heating of small spaces
- Small or high-volume production
- Various substrate materials available
- Tailor-made to fit application’s needs



NUCLEIC ACID EXTRACTION KITS

RNA or DNA extraction kits for
molecular diagnostics



Nucleic acid extraction kits

Product overview

- Solutions for manual or automatic nucleic acid extraction using various technologies:
- Spin filter technology
- Magnetic beads
- Smart modified surface
- Polymer mediated enrichment
- Target concentration technology



iST Innuscreen GmbH

physical · chemical · biological



THERMAL IR EMITTERS

- Gas analysis
- Material detection
- Sprectroscopy

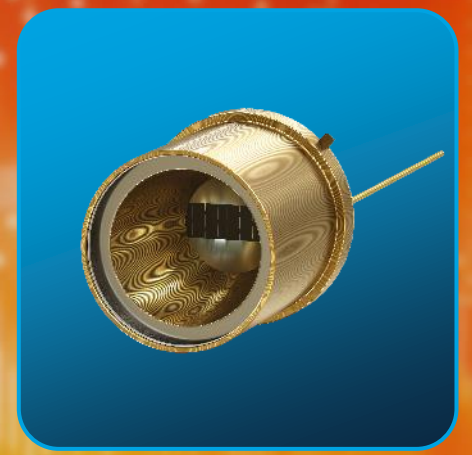
Thermal infrared emitters

Product overview

- Pulsable thermal black-body infrared emitters
- Patented nanostructured radiating element increases efficiency
- Monolithic emitter structure
- High operating temperatures
- High reliability and lifetime
- Wide wavelength range
- Mounted in industry standard TO and SMD packages
- Gas filter cells

INFRASOLID®









Density, viscosity & flow sensors

In cooperation with iST, our sister company TrueDyne has developed a portfolio of sensors for high precision quality and property monitoring

truedyne

- MEMS sensors for determination of density of liquids and/or gases
- Viscosity sensors for liquids for quality and property monitoring
- Mass flow sensors for liquids and gases









GERMAN INNOVATION AWARD '19 WINNER

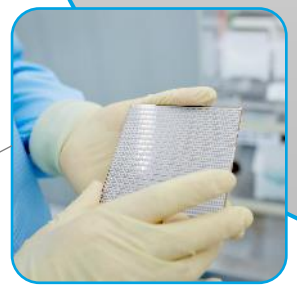


Custom



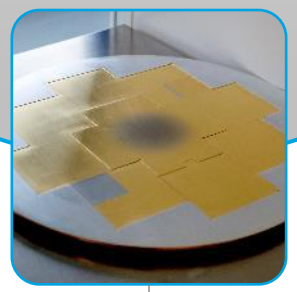
1 Design

- Concept
- Material choice
- Technology choice
- Design of layout



2 Substrates

- Alumina
- Zirconia
- Sapphire
- Steel
- Copper
- Polyimide
- Aluminum nitride
- Silicon



3 Coating

- Metal thin film (Pt, Rh, Ti, Ni, Cr, Ag, Au, Al, W, Mo and alloys
- Dielectic thin film (SiO_2, Si_3N_4, Ta_2O_5, polyimide)
- Metal Thick film (Pt, Ag, Au and alloys)
- Dielectic thick film (glass or organic polymers)
- Polymers, gas membranes and enzymatic layers for different sensor principles



4 Patterning

- Photolithography
- Laser trimming
- Dry and wet etching



5 Assembly

- Dicing
- Bonding
- Glass coating
- Soldering
- Electric final testing
- Optical final testing
- Packaging
- Additional assembly

Quality

ISO 9001:2015

ISO 14001:2015

ISO 13485:2016

Operational Excellence

- FMEA, MSA, Kaizen, 5S, PPAP, Process Capability Study
- Most of our engineers have Six Sigma Green Belt level, resulting in significant systematic improvement of processes and technologies
- Regular reviews evaluate and control the achievement of strategic goals
- Certified according to ISO 9001:2015 (quality) and ISO 14001:2015 (environment), ISO134585:2016 (medical)

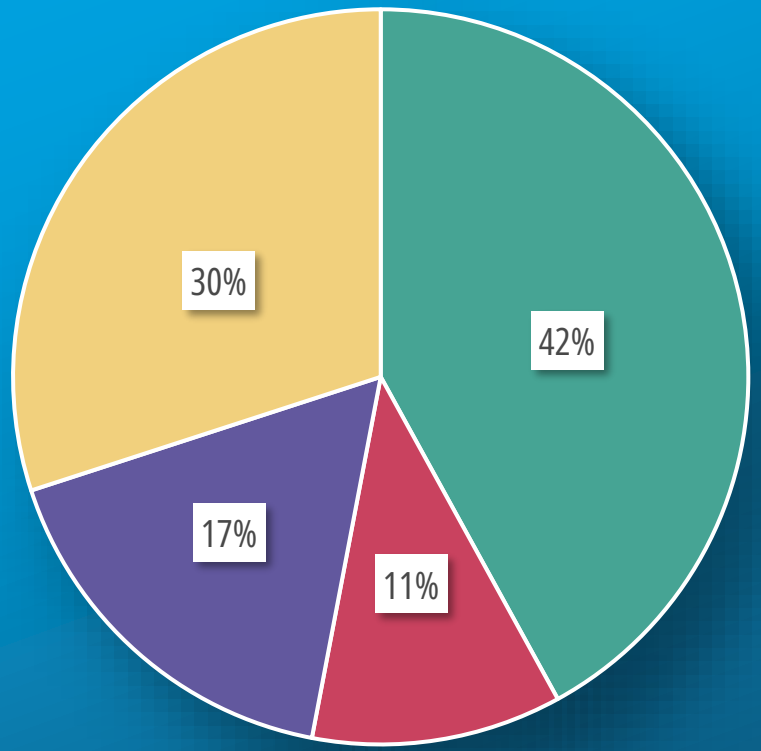
Consulting, production and service quality

- Analysis support using SEM, EDX, X-ray
- Process & measurement database
- Electronic workflow with traceable process and product control
- Qualified materials from reliable suppliers



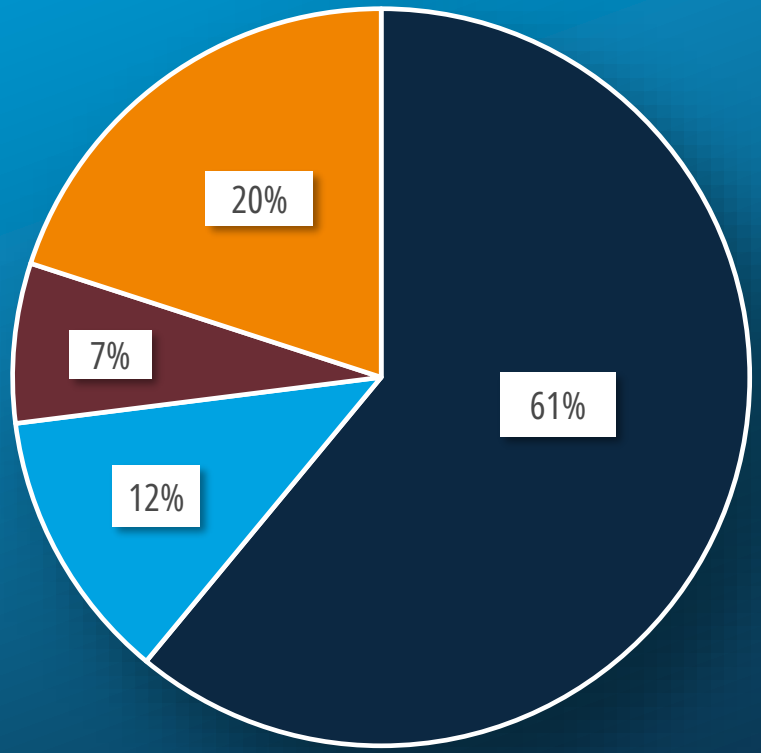
Sales statistics 2023

Customers per region



Europe · Switzerland · Americas · Asia/Africa

Sales shares by product areas



Temperature · Flow · Humidity · Others

Conductivity, Biosensors, Gas, Force, IR emitters, NA extraction

Network & Collaboration

- Universities and Universities of Applied Science
- Institutes

ETH zürich

ZHAW Wädenswil

zh aw Life Sciences and Facility Management

OST Campus Buchs, Rapperswil

IMTEK Freiburg

University of Applied Science Munich

HOCHSCHULE FÜR ANGEWANDTE WISSENSCHAFTEN MÜNCHEN

IMTEK

ETH Zurich

OST Ostschweizer Fachhochschule

Fraunhofer FHG

Fraunhofer

Hahn-Schickard Ges. IMIT and IMAT)

Hahn Schickard

Partner in EU projects and KTI



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Sensor
Technology

physical · chemical · biological

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