

HIGHEST STANDARDS FOR YOUR DEMANDS

PYROELECTRIC INFRARED DETECTORS FOR GAS
ANALYSIS AND FLAME DETECTION

Who We Are

The People Behind the Technology

Our recipe for success since 1991 – the development of innovative pyroelectric detectors, specifically tailored to customer requirements, manufactured at our headquarters in Dresden.



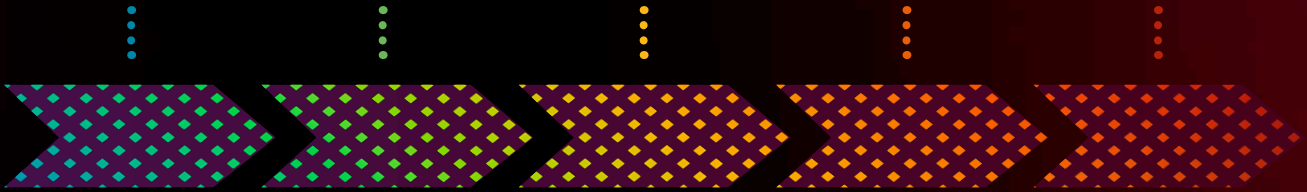
2001

Detectors with CMOS operational amplifier and reduced microphonic effect

2016

PyrIQ® Pyroelectric detectors with digital signal processing

2023



PYROMID® Multi channel detectors with integrated beamsplitter

2004

PYROMID® Miniaturization with innovative stack design

2021

Commissioning of the DLaTGS crystal growing laboratory



Infrared Specialists

The properties of InfraTec pyroelectric detectors are as diverse as your requirements and applications. Our portfolio includes a wide variety of infrared detectors and we offer comprehensive consulting services to help you find the detector that fits your application.

Just like you, we strive for perfection. Knowing that our detectors help determine the utility and quality of your product, you will receive the highest level of precision, reliability and sophistication from us. Our dedicated specialists meet this demand every day for numerous partners from science and industry.

People with Responsibility

To meet our high environmental and ethical standards, we only use substances and quantities that are not subject to any restrictions on use, for example by REACH. In addition, all products meet the criteria of the RoHS Directive.

A Passion for Knowledge

We would like to invite you to get to know InfraTec better. Take a look behind the scenes and learn more about the people at InfraTec, our demand for quality, the creation of an infrared detector as well as the various application possibilities.

In 1991, everything started on about 16 m² in a rented office at the Technical University of Dresden. The co-founders Dr. Matthias Heinze and Dr. Matthias Krauß are still managing directors of InfraTec GmbH Infrarotsensorik und Messtechnik today. But true to the motto that the only constant is change, the number of employees has multiplied significantly since then. In addition, InfraTec now has subsidiaries on three continents, which serve as fixed points of the worldwide distribution network.



Business units, company history and latest news

Please scan the QR code or use the following link: <https://bit.ly/40j634U>

Our Team

Driving Force for Research and Development

Innovation from passion. From this approach, we derive two fundamental questions:

- How do we improve existing detectors?
- Which new solutions will benefit you the most?



More than

240

employees at the
headquarters in
Dresden

The answers are provided by our team of scientists. It...

- takes entire product lines based on completely new concepts through to series production,
- identifies future trends at an early stage and translates knowledge into advance development,
- conducts technology development as a basis for effective manufacturing,
- develops measurement technology for analyzing the product features.

Global Recognition

The fact that this approach is bearing fruit is demonstrated, for example, by the world's first detector with eight measuring channels in a TO8 housing and our PyrIQ® digital pyro-electric detectors. These can be integrated even more easily and quickly into existing customer systems.

It is precisely such developments that underline the expertise of our specialists. They have many years of experience and the knowledge of which detectors are best suited for specific applications. This enables us to offer you optimal solutions for your applications.



The people at InfraTec

Please scan the QR code or use the following link:
<https://bit.ly/3MZKnyi>



48 %

of employees have been with the company for more than 11 years



40 %

employees with an academic degree



45 %

women in the InfraTec team



More than

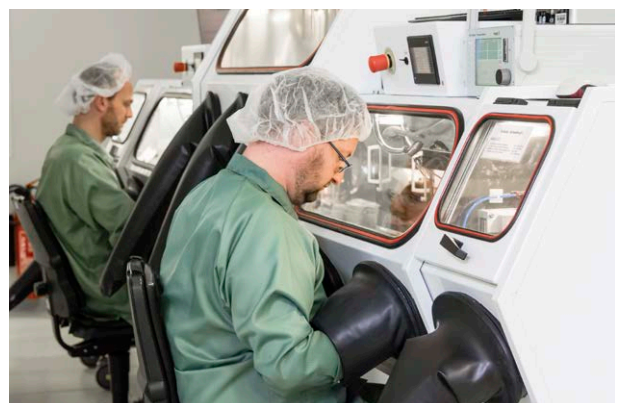
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employees in product management, R&D, customer support

Combining Talents Effectively

When looking for solutions, we pursue several directions and create different options to finally select the best one for you. To achieve this, it is essential to keep the goal in sight at all times. The basis for this path are the diverse skills and abilities of each team member and cooperative collaboration. At our location in Dresden, we provide our creative minds with ideal conditions to actively implement this solution-oriented approach.

And, what is more: The city of Dresden is considered one of the most important university locations in Germany for natural sciences. There are also numerous other universities and research institutes in the region. That is why we additionally rely on active cooperation with universities, Fraunhofer institutes and other scientific partners.



The Heart of Crystal

Functioning of a Pyroelectric Detector

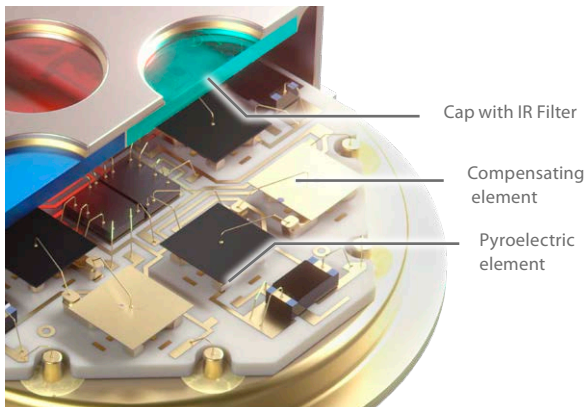
InfraTec develops, produces and distributes optoelectronic components. Its focus is on infrared-sensitive pyroelectric detectors, optimized for the detection of electromagnetic radiation with wavelengths between 2 and 14 μm .

Our infrared detectors contain a receiver chip made of single-crystal lithium tantalate. Due to the very high Curie temperature of 620 $^{\circ}\text{C}$, this crystal material guarantees a very low temperature coefficient with excellent long-term stability of the signal voltage.

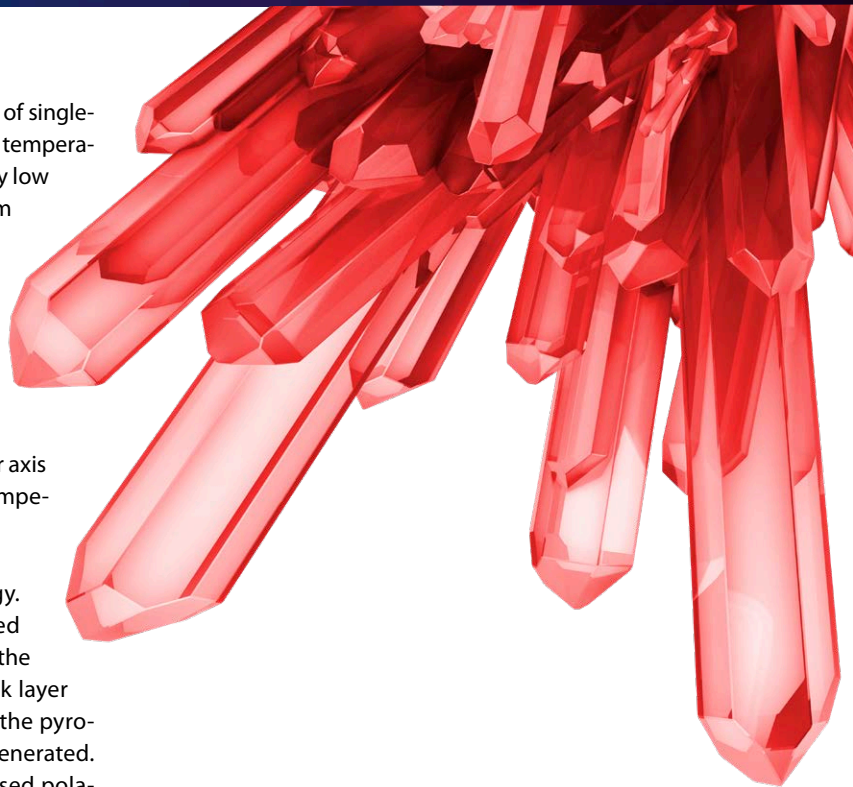
Temperature Changes Generate Charges

Lithium tantalate belongs to the pyroelectric materials. These are special crystals with only one polar axis and no center of symmetry. Therefore, when the temperature changes, their polarization change, too.

This pyroelectric effect is used in sensor technology. For this purpose, a thin pyroelectric crystal is coated with electrodes perpendicular to the polar axis. On the upper electrode of the crystal, an absorbing black layer is applied. When infrared radiation hits this layer, the pyroelectric crystal heats up and surface charges are generated. When the radiation is turned off, charges of reversed polarity are produced. The charges are very low. Before being compensated by the finite internal resistance of the crystal, field-effect transistors or operational amplifiers convert the charges into a signal voltage.



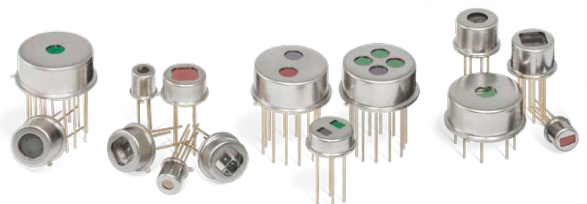
Structure of a four channel detector



Signal Is Created by Modulated Radiation

Since a pyroelectric element responds to changes in infrared radiation, a pyroelectric detector is always operated with a modulated source. An exception are measurement objects that themselves emit rapidly varying radiation, such as flames.

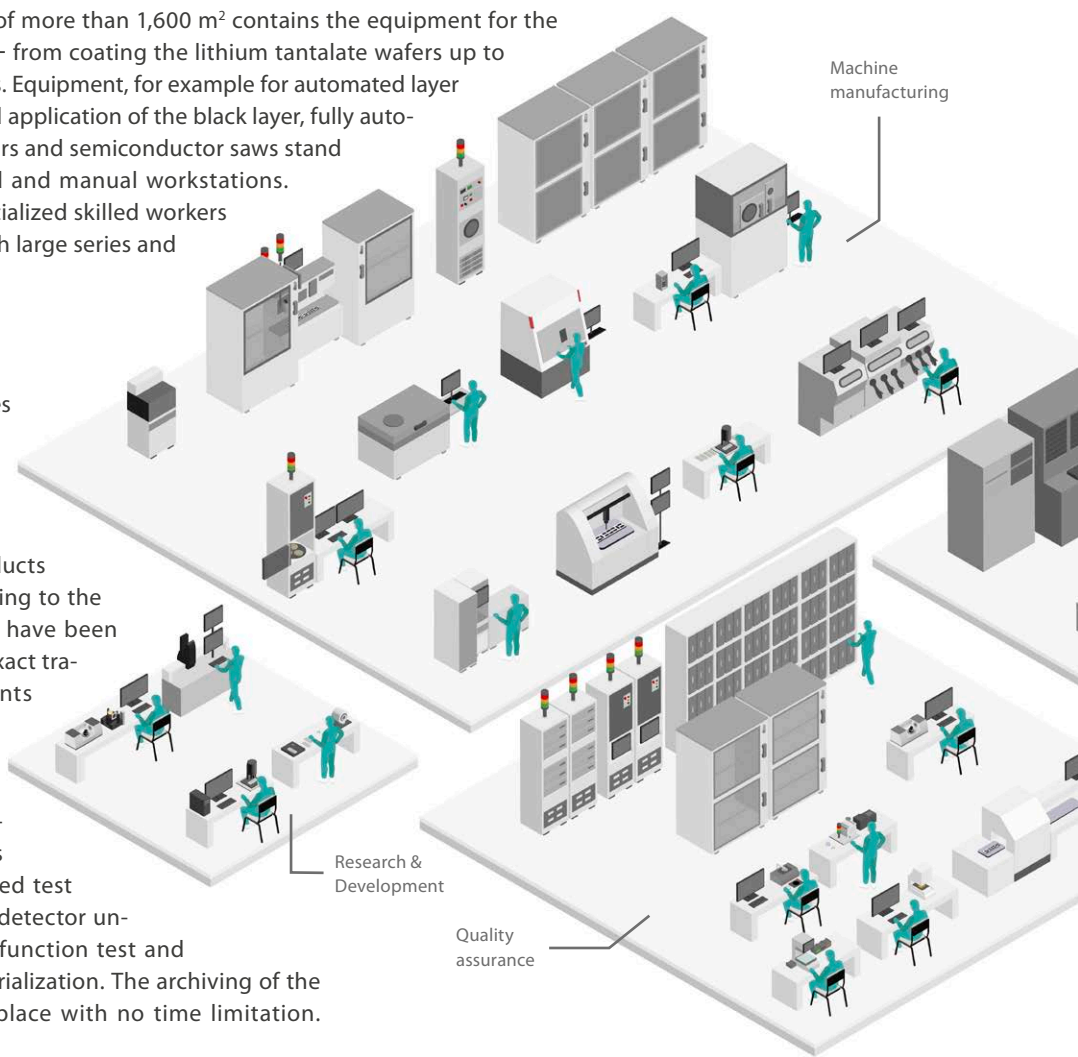
Pyroelectric detectors are characterized by a very broad spectral sensitivity. They are sensitive to radiation starting in the ultraviolet range (300 nm), through the visible and infrared wavelength ranges up to terahertz waves (1,000 μm).



Always 100%

Production and Quality Assurance

How exactly is a detector made at InfraTec and how do we ensure that you can expect the best quality? We won't reveal everything, but we are happy to give you a little insight behind the scenes. Production, quality assurance and shipping take place entirely at our headquarters in Dresden.



An ISO 7 class clean room of more than 1,600 m² contains the equipment for the entire production process – from coating the lithium tantalate wafers up to welding the metal packages. Equipment, for example for automated layer deposition or robot-assisted application of the black layer, fully automated wire and chip bonders and semiconductor saws stand alongside semi-automated and manual workstations. With their help, highly specialized skilled workers and engineers produce both large series and individual samples.

The manufacturing processes are based on defined conditions to ensure that the result meets your expectations. Two cornerstones for high quality of our products are ISO 9001:2015 – according to the latest version of which we have been certified since 2010 – and exact traceability for all components of each manufactured detector. We provide proof of conformity of product and process characteristics by measurements using high-quality calibrated test equipment. Every infrared detector undergoes a standard 100% function test and is provided with its own serialization. The archiving of the measurement data takes place with no time limitation.

Key steps during the manufacturing of a pyroelectric detector:

- Coating and sawing the lithium tantalate wafers
- Assembly and electrical contacting of all components on the circuit boards
- Sawing the IR filter wafers and equipping the caps with IR filters
- Welding of detector base and detector cap



Take a look at our production

To get details about our detector manufacturing, scan the QR code or use the following link: <https://bit.ly/41HbyeW>

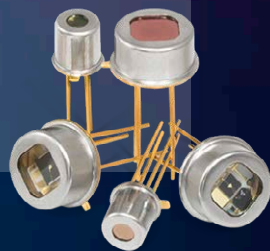
Between Standard and Customization

Detector Diversity as Basis for Customized Solutions

Single Channel Detectors

Detectors for gas analysis, flame detection and radiometry

- Housing types TO18, TO39
- Voltage mode or current mode
- Signal conditioning with JFET or operational amplifier
- With special chip holder to reduce the sensitivity to microphonics
- Thermally compensated



PYROMID® Multi Channel Detectors

Dual, quad and eight channel detectors for gas analysis and flame sensor technology

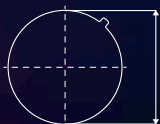
- Analog and digital detectors
- Quad channel detectors in TO39 and TO8 housing
- Eight channel detectors in TO39 and TO8 housing
- Integrated beam splitter or micromechanical frame for very space-saving design
- One aperture opening for all channels
- Internal filters, shared entry window
- Signal conditioning with JFET or operational amplification



5

Standard

of InfraTec



Housing: TO8
Diameter: 15.2 mm
Channels: 2, 4 or 8
Pins: 8 or 12



Housing: TO39
Diameter: 9.2 mm
Channels: 1, 2 or 4
Pins: 3, 4 or 5



Housing: TO18/TO46
Diameter: 5.4 mm
Channels: 1 or 2
Pins: 4

Housing sizes in scale 1:1

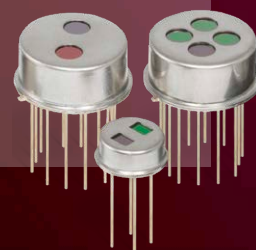
While the external differences between single channel and planar multi channel detectors, PYROMID® and digital PyriQ® detectors and the special detectors are less obvious, a remarkable variety is hidden under the housings. The number of measurement channels, the size and type of filters, reduced microphonics, integrated operational amplifiers and temperature sensors – all this is available and can be individually configured for your requirements due to the modular system of the detectors.

0 d Types Detectors

Planar Multi Channel Detectors

Detectors for gas analysis and flame detection

- Dual, triple or quad spectral channels in one housing
- Signal conditioning with JFET or operational amplifier
- Thermally compensated
- With special chip holder to reduce the sensitivity to microphonics



PyriQ® – Digital Detectors

Digital multi channel detectors for gas analysis and flame detection

- Integrated ASIC with 16-bit A/D converter and signal conditioning
- Easy system integration
- Variable signal processing for more flexibility in the configuration of the detector parameters
- Improved electromagnetic compatibility (EMC)



Special Detectors

Highly specialized single channel detectors for spectroscopy and analytical instruments

- High electro-optical performance
- Short reaction time
- Large active area
- Spectrally extra flat metal black layer



Your Applications

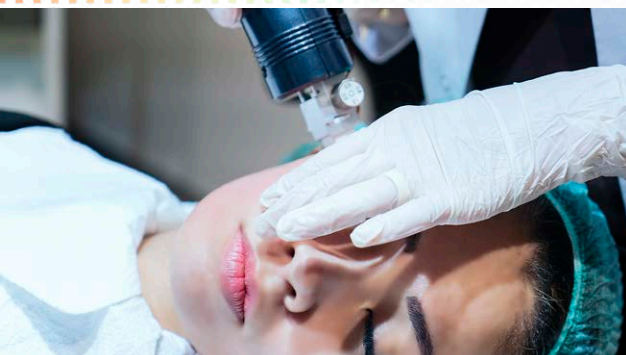
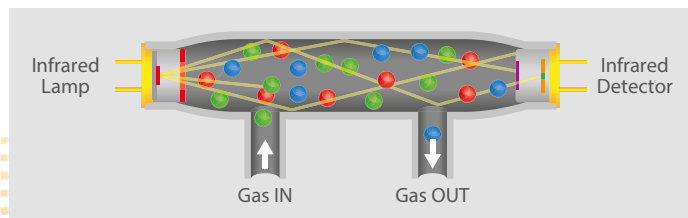
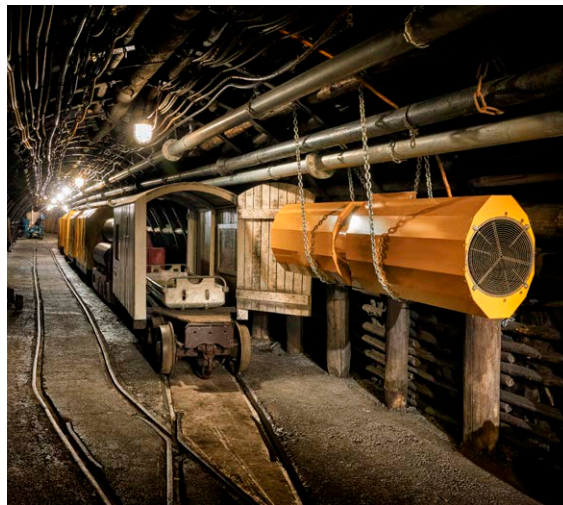
Our Know-how for Your Safety and Security

Due to our detector diversity, we can offer the appropriate pyroelectric detectors for numerous tasks. Are you looking for solutions for gas analysis, flame detection or spectroscopy? In our portfolio you will find what you are looking for. The spectrum ranges from simple solutions such as motion detectors up to energy measurement of pulsed infrared laser radiation at pulses in the nanosecond range.

Gas Analysis

Many gases absorb radiation in the infrared range. They can be reliably detected using pyroelectric detectors based on lithium tantalate. The detectors operate stably for 10 years or more, show hardly any cross-sensitivities and can be operated uncooled between -40 and +85 °C.

- **Safety technology**
Detection of explosive or toxic gases
- **Medical gas analysis**
Diagnostic respiratory gas analysis, anesthesia
- **Industrial gas analysis**
Detection of gas leaks, measurement of exhaust gas concentration
- **Process measurement technology**
Combustion process optimization
- **Environmental protection**
Plant research, automotive exhaust gas analysis
- **Breath alcohol measurement**
Avoidance of alcohol-related traffic accidents



Use of pyroelectric detectors in practice

To read more case studies, scan the QR code or use the following link: <https://bit.ly/41DPIIY>



Flame Detection

When organic materials and other substances burn, flames are formed that emit radiation in typical absorption bands at very specific flicker frequencies. Due to corresponding characteristics, flames can be reliably detected by users with detectors.

- **Flame detection across long distances**
Reliable avoidance of false alarms
- **Flame detector solutions**
Offering high sensitivity, fast response time and large field of vision
- **Fields of application**
Monitoring of outdoor areas and large halls, use on oil platforms, aircraft hangars or refineries

Further Applications

- **Spectroscopy**
Determining the composition of solids, liquids and gases
- **Radiometry**
Measurement of electromagnetic radiation
- **Pyrometry**
Non-contact measurement of surface temperatures
- **Aerospace industry**
Satellite alignment

How to Find Us

Our Locations

Headquarters

InfraTec GmbH

Infrarotsensorik und Messtechnik

Gostritzer Str. 61 – 63

01217 Dresden / GERMANY

Phone +49 351 82876-700

Fax +49 351 82876-543

E-mail sensor@InfraTec.de

Internet www.InfraTec.eu



Network with us:



USA office

InfraTec infrared LLC

Plano, TX / USA

Phone +1 877 797 6748

Fax +1 877 389 2668

E-mail sensor@InfraTec-infrared.com

Internet www.InfraTec-infrared.com

UK office

InfraTec infrared Ltd.

Chesterfield / UK

Phone +44 1246 267562

Fax +44 1246 269381

E-mail sensor@InfraTec.co.uk

Internet www.InfraTec.co.uk

China office

InfraTec Representative Greater China

c/o German Industry & Commerce

Greater China

Shanghai / PEOPLE'S REPUBLIC OF CHINA

Phone +8621 68758536 ext 1633

E-mail sensors@InfraTec.cn

Internet www.InfraTec.cn



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