



i-PEN Industrial Process Control Electronic Nose

Intelligent Gas Sensors for the Industry

The gas sensor array systems **i-PEN** are based on our **electronic nose** technology. The devices were developed for operation in hostile industrial environments. With a design compatible with the industry standard for the mechanical packaging of electronic equipment (19" euroboard format) the i-PEN series becomes very flexible. Based on a modular concept each unit can be changed very quickly.

The i-PEN is equipped with a unique fluidic and electrical connector in order to release the units in a very fast and comfortable way.

Different configurations of the i-PEN are available:

The module **i-PEN-MOD** is based on a 10 metal oxide sensor array built into a small volume measuring chamber (1,8ml). The system is microprocessor controlled and has a serial interface in order to send the sensor data to a remote PC. The gas to be analyzed has to be connected to the inlet port.

The process control nose **i-PEN-PCN** consists of a sensor array, gas pumps and a patented sampling system. Due to its particular sampling strategy, very fast data acquisition is possible.

There is also no dependency on the concentration in the pattern obtained and the system delivers very stable data, even for online applications. This technology, named automatic ranging, also prevents an overloading of the sensors.

With the automatic calibration the performance is increased. The nose with a trap **i-PEN-ET** is based on a patented combination of the i-PEN-PCN and an enrichment and desorption unit.

With its A³-technology (automatic ranging, automatic calibration and automatic enrichment) this system is the most versatile and powerful.

The automatic enrichment is based on **adsorbent trapping** and can be used for increasing the performance of the system. One advantage of this technique is that the sensitivity to organic compounds can be increased by some orders of magnitude (detection limits in the low ppb range). Another advantage is that the selectivity can also be increased by choosing the sampling volumes, sampling temperature and the right adsorbent material.

The gas detection devices can be easily adapted to particular requirements in process control applications. Modification and adaptations to your specific application are possible.

Please contact us for further information.

- **Approved in Different Applications**
- **Fast Online Supervision**
- **Compatible to Industrial Environments**
- **Robust Gas Sensor Array Technology**



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Application list

Food

- Rancidity of food
- Control of spices and their dosage in food
- Detection of contamination in recycled bins
- Detection of different kinds and off flavors
- Determination of freshness of meat
- Fruits: testing for freshness, testing for differences in aroma from different sorts of fruits
- Differences in yogurt and yogurt based dressings
- Freshness of milk
- Non alcoholic beverages: differentiation of different kinds of fruit juice
- Alcoholic beverages: differences in aroma
- Condition of grain
- Coffee: determination of origin, supervision of roast process
- Tobacco: quality, test of artificial aroma from pipe tobacco
- Characterization of honey, off flavours

Materials

- Stopper for beverages, determination of off odor
- Paper based packaging material: determination of off odors
- Smell in polymers (automotive industry, packaging material)
- Perfume: quality investigations, degradation of flavours

Environment & Safety

- Waste water treatment: supervision of biologic filters, correlation to smell by olfactometric methods
- Compost plant: supervision of off odor, determination of degradation state
- Determination of solvents at workplace atmosphere
- Detection of artificial odorants (also nonsulfur) in natural gas
- Leakage of natural gas (monitoring of methane, benzene, H₂S)

Medicine

- Identification of bacteria (from agar plates)
- Artificial flavor in medicine
- Supervision of fermentation processes
- Off odors in medicine

AIRSENSE
A N A L Y T I C S

AIRSENSE Analysentechnik GmbH
Hagenower Straße 73 · 19061 Schwerin · Germany
tel: + 49 385 3993 280 · fax: + 49 385 3993 281
email: info@airsense.com · www.airsense.com