



## PEN3 Portable Electronic Nose Intelligent Chemical Sensor

*PEN 3 is our small, fast and flexible identification system for gases and vapors.*

*Single compounds or mixtures of gases can be recognized after a "training" step. With its variety of pattern recognition algorithms the system can be adapted to a broad range of applications.*

**PEN3** is based on a 10 metal oxide gas sensor array built into a small-volume measuring chamber. The user has full access to all parameters of the instrument.

Specialized flow control inside the instrument ensures stability of patterns under rough conditions. A calibration procedure has been developed according to newest technical knowledge and ensures stable operation for a long term operation. Because of its particular sampling strategy, sensor array can be operated in the laboratory as well as online for process control or environmental monitoring applications. Sampling with the auto-ranging sampling system is the favourite technique in mobile or process control applications. In the lab the detector can be used with a headspace autosampler. An optional adsorbent trapping unit (EDU) is also available for the system.

### Software

The instrument provides a quick and easy qualitative answers like good or bad, yes or no, ... . Also qualitative answers can be obtained by training descriptor relations with the sample set into the database: Euclid, Correlation, Neural Networks, Mahalanobis, PCA, LDA, DFA and PLS.

### Applications

**Process Control:** dosage of spices in food production, supervision of industrial cleaning processes, fermentation processes, dosage of artificial odor in natural gas, production of polymer packaging material for food industry, frying or roast process control

**Quality Control:** rancidity of oils, freshness of food, off odor in packaging materials, residual solvents in polymers, degradation of flavors, off odor in medicine, characterization of resins, aroma in beverages

**Environmental & Safety Control:** odor in waste water purification plants or in compost plants (correlation with olfactometry), supervision of filters, solvents at workplace atmosphere, smouldering fires, identification of bacteria, leakage control, combustion emissions

### Advantage of PEN3:

- Small, Fast and Robust
- Sensitive Sensors
- Online Sampling Technique
- Sensor Protection for Long Lifetime
- Optional Enrichment Unit
- Stand - Alone Operation
- A3-Technology: Automatic Ranging, Automatic Calibration, Automatic Enrichment (optional)
- Graphic Colour Display

# Specifications



## Sampling

Inlet Sampler	special fluidic connector
Flow	10 ml/min to 400 ml/min, built-in flow
Sensor technology	hot sensors, working temperature 200°C to 500°C
Sensor array	10 different metal oxides single thick film sensors,
Sensor chamber	volume 1.8 ml, temperature 110°C, stainless steel
Sensor response time	typically: less than 1 second
Measurement cycle time	depending on the application from 4 seconds to some minutes. Typically: 1 min (20 s measurement, 40 s recovery time)
System	2 internal pumps (sampling and zero gas)
Zero gas	air, charcoal filtered or zero gas generator
Calibration	external calibration procedure
Pattern stability	e.g. 1 year for aromatic solvents
Sensitivity	LOD 0,1 to 5 ppm for gases and organic solvents, e.g. H <sub>2</sub> S: 0.1 ppm, benzene: 1 ppm

## Environment Requirements

Temperature	typical: 0°C to 45°C
Humidity (relative)	5% to 95%, non-condensing

## Power Requirement

Main Power	110 to 230VAC or 12VDC (optional), max. 30W
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## Communication

Computer Interface	USB port or serial RS-232 (optional)
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## Device Control / Data Handling

Requirements	Win98SE, ME, 2000, XP
Software	WinMuster for data acquisition and analysis (algorithms)

## System descriptions

Display	60 x 38 mm graphic display, CFC backlight
Dimensions	255 x 190 x 92mm
Weight	2.1 kg

<b>Safety class</b>	Compliant to EN292 Part1 & 2, EN294, EN61010-1, EN1050, EN60204-1, EN 55011 G1 CB, EN50270, EN61326
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<b>Warranty</b>	12 month
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