



SENSE²

**Sulfur/Nitrogen Selective Detector for
Gas Chromatography Applications**

SULFUR/NITROGEN CHEMILUMINESCENCE DETECTOR FOR GAS CHROMATOGRAPH SYSTEMS

Sulfur and nitrogen detection are critical in many different processes in diverse market spaces. In both cases, reporting the total content is not enough; speciation is often a requirement.

The SeNSE² chemiluminescence detector continues PAC's illustrious industry standard for detecting sulfur and nitrogen. With the SeNSE², we have engineered an enhanced detector that provides cutting-edge sensitivity, stability, equimolarity, and optimized flexibility to fit into your laboratory. Focusing on customer use in the laboratory, speciated sulfur, and nitrogen detection has never been simpler than ensuring compliance with stringent environmental regulations, safeguarding your catalysts, enhancing product quality, and promoting a safer working environment.



KEY FEATURES



MAINTENANCE AND EASE OF USE

- Ingenious G-Cal Service module used for testing the function of the detector without disassembling the configuration
- Simplified preventative maintenance with removable panels and fast ceramics replacement
- 7" Touchscreen interface providing both standalone operation and providing insight into your detector diagnostics and error logs
- Able to be installed on most manufacturers GCs
- All routine maintenance, including GC column replacement, can be achieved without shutting down the system



PERFORMANCE

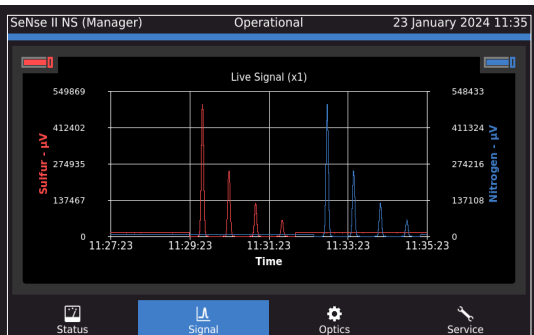
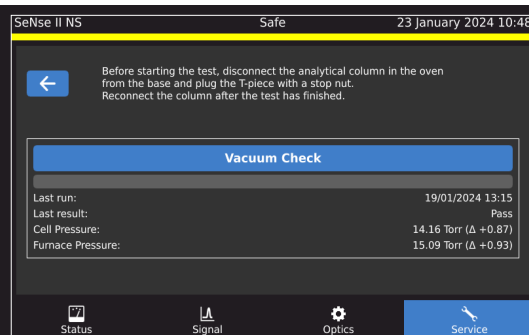
- Excellent long-term stability and equimolarity
- Heavy duty insulation to maintain furnace temperature at 950°C leading to improved temperature accuracy across the whole furnace
- Integrated filters to purify incoming gases boosting data integrity
- Standalone automated pressure and leak check to guarantee leak-free performance
- For sulfur analysis, system choice of oxygen or air as an oxidant based on laboratory need



TURNKEY SOLUTIONS

- ASTM D5504: Determination of Sulfur Compounds in Natural Gas and Gaseous Fuels by Gas Chromatography and Chemiluminescence
- ASTM D5623: Sulfur Compounds in Light Petroleum Liquids by Gas Chromatography and Sulfur Selective Detection
- ASTM D7011: Determination of Trace Thiophene in Refined Benzene by Gas Chromatography and Sulfur Selective Detection
- ASTM D7807: Determination of Boiling Range Distribution of Hydrocarbon and Sulfur Components of Petroleum Distillates by Gas Chromatography and Chemiluminescence Detection
- Custom Application like carbonyl sulfide in propylene gas, nitric oxide in ethylene and more

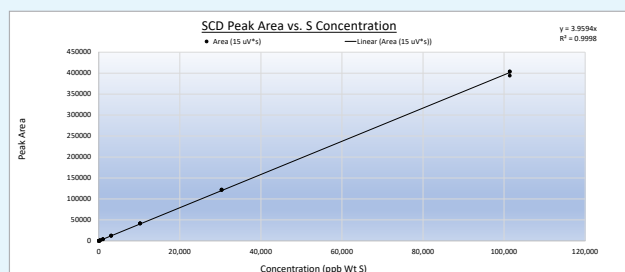
Standalone Operation with 7" HMI



FITTING THE NEEDS OF THE LABORATORY

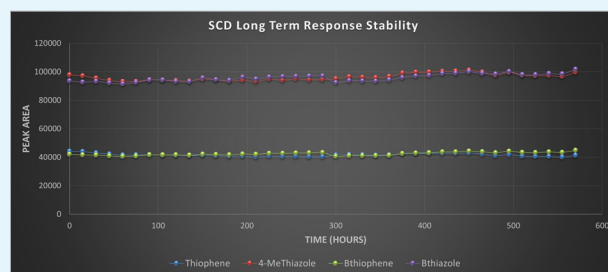
Sulfur and nitrogen species are known for their detrimental effects on catalysts in refining processes, even at the lowest levels, so constant monitoring of these species throughout the complete process is critical. This requires solutions that are fast, sensitive, and, above all, very robust in time, so they can do what they were designed for: produce the correct value.

LOW LIMIT DETECTION AND LINEARITY



The detector's ability to handle a wide range of concentrations and achieve the lowest detection is important.

STABILITY



The SeNSE² also provides users with a new standard of system stability. With ultra-clean tubing, integrated filters, and more, it has never been easier to achieve system stability and sensitivity quickly and over a long period.

With this sensitivity, linearity, sulfur and nitrogen selectivity, and its long-term stability, the SeNSE² provides unparalleled detection of sulfur and nitrogen.

G-CAL – PERMEATION DEVICE TO VERIFY DETECTOR FUNCTIONALITY

The SeNSE² is equipped with a new module known as the G-Cal device. This is an onboard permeation device used to verify the detector functionality.

It operates like a standard permeation tube; however, the device is always installed on the system and can be added, inline, at a moment's notice. A constant stream of a sulfur or nitrogen component is permeated from the G-Cal device through an inline sample loop delivered to the furnace base. The standard from the G-Cal then follows the same chemiluminescence process as the sample. The detector finally determines how much sulfur or nitrogen has been injected by an automatic calculation done within the hardware, except it doesn't run through the GC, which makes the evaluation of the detector possible.

This fully automated check can be performed stand-alone on the SeNSE² touchscreen without using the GC or any GC software. The G-Cal device allows users to separate their analysis from this complex detector, simplifying troubleshooting of the chromatography system and detector. With this, you will have an automated troubleshooting tool at your fingertips.

■ SERVICES, SUPPORT & TRAINING

Our individualized instrument service programs help our customers ensure maximum quality and repeatability while complying with standards and regulatory requirements. In addition to service programs, we also offer individual services for preventative maintenance, calibration, and relocation services. Our Service Repair Centers, located around the world, are ISO-9001 accredited. Skilled certified service technicians perform all the work.

PAC offers a wide selection of training and educational programs to support our customers throughout the range of industries that our instruments serve. Our training programs may occur in one of our PAC facilities worldwide or at the customer's facility. We also offer webinars of some of our key technologies online.



TECHNICAL SPECIFICATIONS

Single Channel SCD

	Zero Air as Oxidant	Pure O ₂ as Oxidant	Units
Sensitivity	0.30	0.15	pg S / s
Selectivity	5.0E+07	5.0E+07	---
Linearity	4	4	Decades
Stability	2.5	2.5	% RSD
Equimolarity	8	8	% RSD over response factors

Single Channel NCD

	Pure O ₂ as Oxidant	Units
Sensitivity	3	pg N / s
Selectivity	2.0E+07	---
Linearity	4	Decades
Stability	2.5	% RSD
Equimolarity	8	% RSD over response factors

Dual Channel SCD and NCD

	SCD O ₂ Oxidant	NCD O ₂ Oxidant	Units
Sensitivity	0.15	3	pg S or N / s
Selectivity	5.0E+07	2.0E+07	---
Linearity	4	4	Decades
Stability	2.5	2.5	% RSD
Equimolarity	8	8	% RSD over response factors

*Specifications listed above are based on a standard check sample and GC conditions.



Contact us today to learn
more about SeNSE²



ABOUT PAC

PAC is a leading global solution provider of advanced analytical instruments for laboratories and online process applications. Our solutions are from industry-leading brands: AC Analytical Controls, Advanced Sensors, Alcor, Antek, Cambridge Viscosity, Herzog, Icon Scientific, ISL, Phase Technology, and Uson.

We are committed to delivering superior local customer service worldwide. With 15 office locations and a network of over 50 distributors, PAC operates as a unit of Indicor, LLC, a diversified technology company that is a constituent of the S&P 500, Fortune 1000, and Russell 1000 indices.

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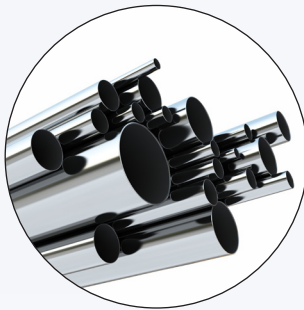
THE FACTS ABOUT

SENSE²

1 VERTICAL BURNER

(2 for a dual system), containing 2-ceramic tubes

The inner ceramic tube functions as the catalytic reduction zone and the outer ceramic tube is a high-temperature resistant container where all the reactions take place.



15 PIECES OF INERT

coated tubing spanning 8.5m are required

This is to prevent sulfur from interacting with the stainless-steel.

ADDING H₂ TO MAKE-UP GAS

provides a temporarily super-hot flame/plasma at the base of the furnace

This ensures all organic components are completely decomposed.



UPKEEP and proper maintenance in timely intervals help keep your system running, preventing unnecessary downtime.



DUAL ZONE HEATING

with an **oxidation** zone at 950°C and a **reduction** zone at 650°C



A Photomultiplier Tube (PMT) with appropriate filter is used for **ANALYZING WAVELENGTHS** 300-400nm for sulfur compounds (blue) or 185-850 nm for nitrogen compounds (red).