



Process Mass Spectrometer, Model CO₂-SENSE

On-Line CO₂ Quality Control

Trace Analysis and Quality Control

Minimizing any health risk caused by an unknown contamination or impurity of the product, the food and beverages industry now takes over the responsibility for the quality control of all incoming components into their process.

Driven by a high profile specification in line with more than 15 years of experience in the field of process mass spectroscopy, the model **CO₂-SENSE** reflects the latest developmental step within this range, targeting the highest possible flexibility and dynamic performance. With only one single measurement system, various applications such as the truck filling stations, on-line process control, or certification of single bottles and storages tanks can be monitored either on demand or continuously.

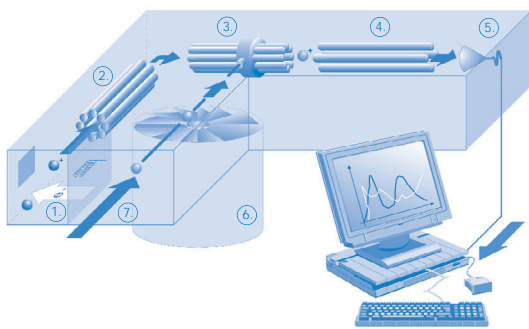
The **CO₂-SENSE** is based on the Ion Molecule Reaction (IMR) mass spectrometer principle. Unlike others, the IMR mass spectroscopy offers ultra fast response time, a wide dynamic range, selective measurements and lowest detectable limits, all simultaneously.

Proven, Flexible and Sound Technology

Minimized service and optimized operational cost, all in line with flexibility, easy to adapt and an user friendly interface have been achieved by combining a well proven technology with state of the art manufacturing capabilities.

Cost effective standard PTFE tubing is used for transporting the probe gas from point of sampling to the analyzer. An optional multi-sample switch can be offered to address a number of sampling points throughout the plant.

Adding a new measurement routine and/or new gas components of interest, the flexible software system allows to add or remove molecules from the list to measure without any hardware changes. This user friendly software package captures all system set up, calibration, statistics and data reporting issues, all being driven by either an internal PC-Controller or an external PLC master. All measurement data is stored in a monthly database in Access format for later use.



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|-------------------------------|-----------------------------|---------------------|
| 1. Primary Ion Source | 3. Charge Exchange Cell | 6. Vacuum System |
| 2. Octopole Separation Device | 4. Quadrupole - Mass Filter | 7. Gas Inlet System |
| 5. Particle Detector | | |

Principle of Operation

Targeting the specific needs within the application, the model **CO₂-SENSE** is based on the measurement principle called Ion Molecule Reaction (**IMR**).

Features Functions Benefits

- Multi component gas analyzer system, Lowest detectable limits,
 - Probe sampling via standard pressureless PTFE tubing, Fast response time,
 - Flexible operation, User friendly adaptation for additional gases to measure

Specification CO₂ Quality Control

Components	Specification EIGA in ppm v/v	LDL CO ₂ -SENSE in ppm v/v	Components	Specification EIGA in ppm V/V	LDL CO ₂ -SENSE in ppm v/v
carbon dioxide	99,9 %		carbon disulfide		0,02
oxygen	< 30	4	methanethiol		0,02
ammonia	< 2,5	0,25	ethanethiol		0,02
carbon monoxide	< 10	5	total sulfur	< 0,1	< 0,1
methane	< 50	1	water	< 50	10
benzene	< 0,02	1 ppb	halogenated HC's		0,17
toluene		1 ppb	chlorinated HC's		0,05
xylene		2 ppb	phenol		0,05
nitric oxide	< 2,5	0,09	hydrogen cyanide		0,1
nitrogen dioxide	< 2,5	0,04	vinylchloride		0,1
sulfur dioxide	< 1,0	0,1	acetaldehyde	< 0,2	0,1
hydrogen sulfide	< 0,1	0,06	methanol	< 10	1
carbon oxysulfide	< 0,1	0,02	ethanol		1
			phosphin	< 0,3	0,1

Technical Data

Mass range	0 - 150 amu	Humidity	max. 80 % (none condensing)
Analysis time	10 – 6500 msec/amu	Gas Inlet temperature	80°C – 190°C
Measurement range	10 ⁴	Multi sampling	Optional 12x Multi sampling
Response time	T90 < 50 msec	Gas consumption	30 – 250 ml / min
Lower detectable limit	< 1 ppb (Benzene in air)	Power	220V / 50Hz (115V / 60Hz), 800 W
Drift	< ± 5% over 12 h (1 ppm Benzene)	Dimensions	590 x 650 x 730 mm
Ambient temperature	20°C - 40°C,	Weight	87 kg
Temperature change	max 1°C/ h		

By using the **IMR** technique, the measurement becomes flexible and easily adaptable to new applications, selectively and free of any interference. Unlike others, no fragmentation or overlapping spectra can damage the interpretation of the detected results.

IMR means using primary ions with lower energy level (10 eV .. 14 eV) to completely ionize the probe gas molecules. The signal/noise ratio will be optimized by the integrated Octopole separator focusing the primary ions and filtering out any interferences.

The quadrupole mass filter (0-500 amu) then separates the molecules for further detection at the fast pulse counter. The temperature and pressure compensated sample gas inlet guarantees the correct measurement and avoids discrimination of the gas. Any contamination due to condensation or particulate matters is minimized by the unique sample inlet design.

