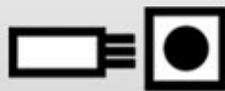


PLASUS

German high-quality plasma spectroscopy
and software solutions



EMICON



PLASMA MONITOR AND
PROCESS CONTROL SYSTEM

- BROADBAND SPECTRUM ACQUISITION
- MULTI-CHANNEL AND HIGH-RESOLUTION SERIES
- REAL-TIME PLASMA EMISSION MONITORING (PEM)
- TURN-KEY SYSTEM FOR INDUSTRIAL APPLICATIONS

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THE EMICON SYSTEM

Process control is essential in industrial plasma applications to ensure reliability and high quality of the process. Here, optical emission spectroscopy is a first choice technique since it does not affect the plasma and since real-time monitoring of several plasma species is possible. The EMICON system is a plasma monitor system (PEM) based on optical emission spectroscopy and comes with all the features you need for analyzing, optimizing and controlling your plasma application.

Broad band spectrum acquisition

The fiber optics spectrometers of the system acquire continuously complete spectra of the plasma light emission from 200 up to 1100 nm. The EMICON MC series features up to 8 independent spectrometer channels necessary e.g. for multi-chamber process control or spatial resolved gas flow control in reactive sputtering applications.

Real time monitoring of plasma emission

Light emission from process relevant plasma particles is observed simultaneously and tracked in real time. This allows a continuous monitoring of plasma conditions and changes are realized instantaneously.

Process analysis

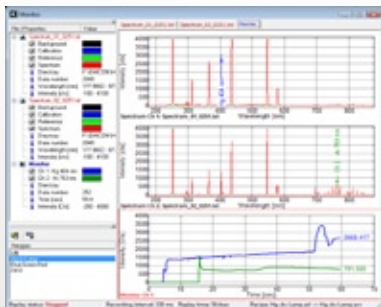
A full analysis of the plasma process is carried out by reviewing recorded spectra and process data.

Process optimization

Real-time monitoring gives the capability to optimize the plasma process by taking advantage of the instant system response on parameter changes.

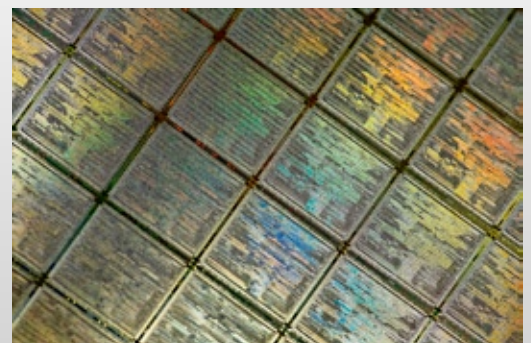
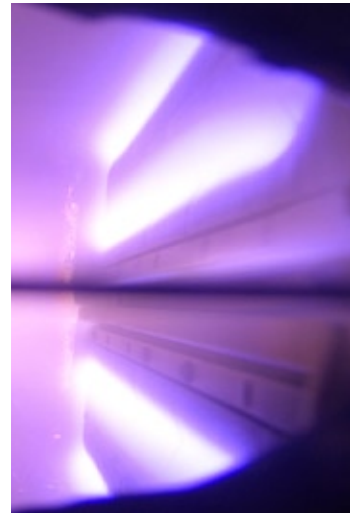
Process control

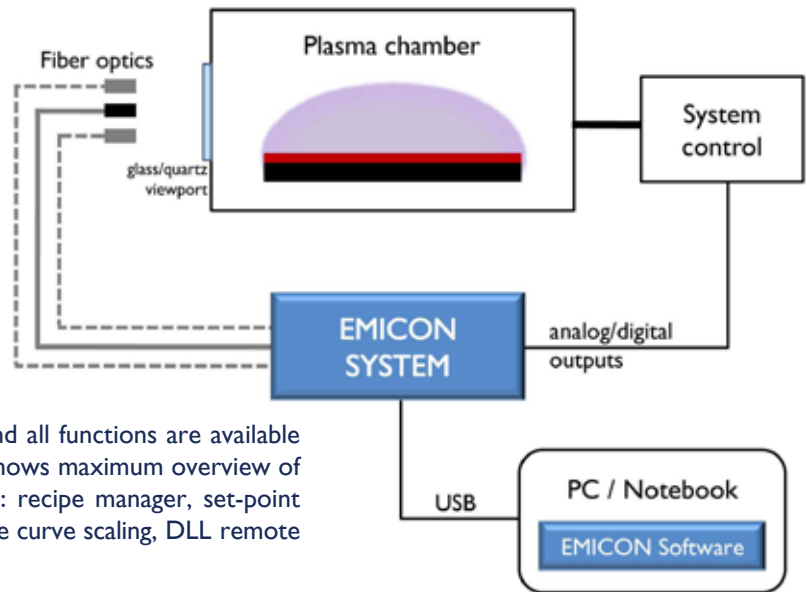
Analog and digital outputs and inputs are available to install open and closed loop control functions. This feature is used for end-point detection or for monitoring deviations from standard plasma process conditions. The integrated PID control function gives direct access to applications where closed loop control is necessary such as gas flow control or power control in reactive sputtering applications.



APPLICATIONS:

- film deposition (PVD, PECVD)
- plasma etching, end-point detection
- reactive magnetron sputtering (control of gas flow and power)
- quality control, fault detection, plasma process diagnostics





Advanced system software

The system is fully software controlled and all functions are available by one click navigation. The split-screen shows maximum overview of all process relevant data. Special features: recipe manager, set-point alarm, PID control with automatic response curve scaling, DLL remote control, administrator/user mode, etc..

Optics

A variety of optical components are available for collecting the plasma radiation: optical fibers, collimator optics and optical feedthroughs for ex-vacuum and in-vacuum use. All in-vacuum optics comes with a protection device to avoid coating of the optical surfaces.

Spectral data analysis tool

For evaluating and analyzing the recorded spectral data the optional SpecLine software package is available: SpecLine comes with an extensive and unique data base for atoms and molecules which is essential for the identification of plasma species and analysis of the recorded spectra.

Main features of EMICON series:

	EMICON MC Multi-Channel	EMICON HR High-Resolution
Number of channels	1 - 8	1
Wavelength range [nm]	200 - 1100	200 - 860
Spectral resolution [nm]	1.4	0.15
Signal resolution	16 Bit	16 Bit
Digital in/out	4/4	2/2
Analog out	8	4
Connectivity	USB 2.0	USB 2.0



For further information please contact:

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PLASUS EMICON MC Series

Data Sheet

	EMICON 1 MC / 2 MC	EMICON 3 MC – 8 MC
Number of spectrometer channels	1 - 2	3 – 8
Spectral range	200 - 1100 nm (totally covered by each spectrometer)	
Number of wavelength channels (monitor tracks)	unlimited (selected by software without hardware modification)	
Analysis of monitor tracks	single, combined (+, -, /, *), ratio, average, integral	
Spectral resolution	1.5 nm FWHM	
Minimum time resolution	approx. 15 ms	
Exposure time	1 ms – 65 sec	
Detector	CCD array with 16 Bit A/D converter	
Optical fiber connector	SMA 905	
Analog outputs*	4 x ±10 volts	8 x ±10 volts
Digital outputs*	2 x TTL	4 x TTL
Digital inputs*	2 x TTL	4 x TTL
Electrical connector*	BNC	
Remote control interfaces (optional)	LAN API, Profibus, Digital inputs	
PC connections	1 x USB	
Power supply	5 VDC 2A	5 VDC 5A
Housing	10" desktop box (3U, 42HP)	19" rack mount box (3U, 84HP)
Dimensions [mm]	240 x 135 x 320	345 x 135 x 320
Weight [kg]	2.5	3.5 – 4.5
Software	EMICON multi-channel software	
System requirements	PC Pentium 4, 2.0GHz, Windows® 7/8/10	
Typical applications	PECVD, (reactive) sputtering, etching, HIPIMS, ATM plasmas	
Field of application	QA/QC, process control/development, endpoint detection, fault detection, plasma analysis	

* Other options are available on request