UV3000

Accurate, precise, and portable ambient gas point analyzer

The Cerex UV3000 is a multifunction analyzer designed to detect part per billion (ppb) to percent level concentrations of multiple gases within a mixture. The UV3000 measures gas concentrations utilizing light absorption from a long path beam of UV radiation coupled to a variety of external sample cells and probes. A broadband miniature spectrometer collects the gas fingerprint data and the advanced software compares the results to a calibrated reference, or "library spectra". Ultraviolet spectroscopy principles are similar to common infrared methods, but offer lower detection capability for many chemicals associated with impact on Human Health.   An onboard or external PC reports reliable real-time concentration data up to once per second and stores all spectral data for later post processing or archiving.

Common applications for the UV3000 include measuring Ammonia (NH_3), Chlorine (CL_2), Sulfur Dioxide (SO_2), and BTEX amongst many more. The UV3000 comes in a NEMA4 rated enclosure for outdoor environments, or a 19 inch rack mount enclosure.

Easy Operation

The UV3000 is a versatile device ready for gas detection and analysis with the flip of a switch. Within seconds the sampling system is operating and reporting data on the built in touch-screen. Despite the advanced detection system employed in the UV3000 series, accurate results can be achieved out of the box. No "Lab Experts" required here. The hard work is performed automatically inside the UV3000 so you don't have to.

Detection Method

The UV3000 detects gas concentrations by measuring UV absorption – the unique drop in the UV intensity within a particular wavelength region where the target gas or liquid absorbs. The sample is measured in a fiber coupled external cell connected to a process stream, or drawn into the cell using the optional sample pump. Also available is a zero air or calibration gas port for easy calibration verification and cell purging. The UV3000 uses a miniature spectrometer fiber coupled to an external optical sample cell to acquire and measure the spectral finger print of each target compound within a mixture for accurate qualitative and quantifiable analysis.

Identification and Quantification

The sampled gases create a unique absorption pattern in the UV spectrum when referenced to a UV spectrum without the gases. Using a proprietary algorithm, the absorption pattern, spectra, is compared with calibrated reference libraries to analyze the match, or fit, of the sampled gas spectra. The concentration is determined by taking the amount of UV absorption of the sample and comparing it to the concentration of the calibrated library spectra. The degree of fit is reported with an R^2 value for qualification along with the computed concentration in ppb.

Forget waiting on lab results. Precise gas identification and reporting in real-time.

Model Information

The UV3000 is available with a variety of options based on detection level capabilities. Available options include a sample pump and purge port, wireless serial transmission, 4-20mA outputs, and relay controlled outputs.

Specifications

Parameter	
Input Voltage	100VAC to 240VAC , Single Phase 47-63Hz
Input Current	4A Max
Operating Ambient Temperature	0 to +45°C
Storage Temperature	-10 to 60 ^{o}C
Operating and Storage Humidity	Below 80% (Non-condensing)
Dimensions (Rackmount)	19.00" x 22.00" x 6.98" (48.3 x 55.9 x 17.7 cm)
Dimensions (NEMA4)	20.00" x 20.00" x 6.00" (50.8 x 50.8 x 15.2 cm)
Deuterium Lamp Life[1]	2000 Hours Minimum
Xenon Lamp Life	2000 Hours Minimum
Xenon Flash Life	10^9 Flashes (Approx. 2-3 Years)
Available Spectral Range	185nm – 1100nm
Spectral Resolution	0.05 – 0.5nm
Drift	±0.3%/hr Typ.
Accuracy	±1-3% Typ.[3]
Precision	±1% Typ.[3]
Minimum Response Time	1 Hz
Sample Pump Rate[2]	6 LPM
Sample Pump Life[2]	20,000 Hours
Wetted Cell Materials	Aluminum, 304SS, 316SS, Glass, PVDF, or PTFE

[1]4000hr lamp available. [2]Included with optional sample pump. [3]Accuracy and Precision values are installation specific.

Data Quality Assurance

Our advanced software utilizes a proprietary photometric Differential Optical Absorption Spectroscopy (DOAS) algorithm, which eliminates the need to take clean air backgrounds. All the calculations are performed on an onboard or external PC which runs user-familiar Windows XP. The system can be span checked at any time, however, the measurement and analysis method employed in this system has the true calibration inherent in the fixed library references. Unless there is a system fault, calibration is never needed. The system is self-compensating for all normal sources of drift found in analyzers including temperature, aging of the lamp, degradation of the optics, etc.

Data Output

The UV3000 reports real-time data on the optional front panel display, or remotely through Virtual Network Computing, VNC, using wired Ethernet or Wi-Fi, or optional onboard server software. Additionally, concentration data is available through wired or wireless serial transmission, 4-20mA output, and 0-5VDC analog voltage. All spectral data is also stored locally on the internal solid state disk which can be copied onto a standard USB key.

Software Features

All Cerex analyzers come with proprietary Continuous Monitoring Software, CMS, for data collection, analysis, and charting. CMS provides operators with stand alone process monitoring and control with sample specific integrated programmable relays and analog outputs. For quality assurance, control, and calibration checks, the user friendly interface features real-time charting of all analyzer functions and stores all raw sensor data for records or post processing analysis.

Laboratory quality results in an easy to use analyzer!

Product Quality Assurance

Cerex places customer service and support as its highest priority. We encourage the customer to be informed upfront of the pros and cons of each system and competing technologies. Cerex is committed to long standing relationships with their customers that do not end after the sale of an analyzer. This commitment to customer satisfaction combined with our rugged and reliable analyzers is unmatched. Additionally, due to the high level of skilled handwork in the production of our analyzers, Cerex offers custom designed and built analyzers to its customers at no additional charge. Combined with our manufacturing efficiency, Cerex provides ideal analyzers for your application quickly and at reasonable cost.

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Detection Capabilities[*]

Compound	Path Integrated MDL	20 Meter Cell	10 Meter Cell	5 Meter Cell	1 Meter Cell	0.5 Meter Cell	0.25 Meter Cell
	PPM-M	PPM	PPM	PPM	PPM	PPM	PPM
Ammonia (NH_3)	0.200	0.01	0.02	0.04	0.2	0.4	0.8
1,3 Butadiene	0.200	0.01	0.02	0.04	0.2	0.4	0.8
Benzene MDL	0.267	0.01335	0.0267	0.0534	0.267	0.534	1.068
Carbon Disulfide	13.310	0.6655	1.331	2.662	13.31	26.62	53.24
Chlorine (Cl_2)	5.000	0.25	0.5	1	5	10	20
Ethyl Benzene	0.300	0.015	0.03	0.06	0.3	0.6	1.2
Formaldehyde	3.200	0.16	0.32	0.64	3.2	6.4	12.8
Hydrogen Sulfide (H_2S)	0.510	0.0255	0.051	0.102	0.51	1.02	2.04
Mercury (Hg)	0.000020	0.000001	0.000002	0.000004	0.00002	0.00004	0.00008
Naphthalene	0.200	0.01	0.02	0.04	0.2	0.4	0.8
Nitrogen Oxide (NO)	0.292	0.0146	0.0292	0.0584	0.292	0.584	1.168
Nitrogen Dioxide (NO_2)	4.040	0.202	0.404	0.808	4.04	8.08	16.16
Ozone (O_3)	2.000	0.1	0.2	0.4	2	4	8
O-Xylene	3.770	0.1885	0.377	0.754	3.77	7.54	15.08
M-Xylene	0.350	0.0175	0.035	0.07	0.35	0.7	1.4
P-Xylene	0.237	0.01185	0.0237	0.0474	0.237	0.474	0.948
Sulfur Dioxide (SO_2)	0.320	0.016	0.032	0.064	0.32	0.64	1.28
Toluene	0.838	0.0419	0.0838	0.1676	0.838	1.676	3.352
Path Length (m)	1.000	20	10	5	1	0.5	0.25

*Minimum detection limits are based on path length. Contact Cerex for additional cell lengths and options.

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UV Absorbing Compounds

1,3 Butadiene	C_4H_6	Nitric oxide	NO	Ethane	C_2H_6
Acetaldehyde	C_2H_4O	Nitrogen dioxide	NO_2	Ethanol	C_2H_6O
Ammonia	NH_3	Nitrous acid	HNO_2	Ethene	C_2H_4
Acetone	CH_3COCH_3	Nitric acid	$HONO_2$	Isoprene	C_5H_8
Acrolein	C_3H_4O	Nitrous oxide	N_2O	Naphthalene	$C_{10}H_8$
Benzene	C_6H_6	Oxygen	O_2	Phenol	C_6H_5OH
Bromine	Br_2	Ozone	O_3	Styrene	$C_6H_5C_2H_3$
Carbon disulfide	CS_2	Phosgene	$COCl_2$	Trimethylbenzene	$C_6H_3(CH_3)_3$
Chlorine	Cl_2	Sulfur dioxide	SO_2	And many more!	
Chlorine dioxide	ClO	Sulfur trioxide	SO_3		
Ethyl Benzene	C_8H_{10}	Toluene	C_7H_8		
Formaldehyde	CH_2O	O-Xylene	C_8H_{10}		
Hydrogen Sulfide	H_2S	M-Xylene	C_8H_{10}		
Mercury	Hg	P-Xylene	C_8H_{10}		

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