CEREX
MONITORING SOLUTIONS, LLC.

MICRO HOUND

Ability to effectively analyze individual gases in mixtures such as BTEX.

Real-time results with battery powered portability.

The Cerex Monitoring Solutions Micro Hound is a point analyzer designed to detect part per billion (ppb) to percent level concentrations of multiple gases within a mixture.

The Micro Hound measures gas concentrations using ultraviolet light absorption. Individual gas fingerprints are compared against calibrated library spectra for an accurate detection and quantification of each gas within a mixture. UV, absorption utilizes similar principles as infrared, but offers greater detection sensitivity for many chemicals and no effect by humidity. The UVDOAS method needs no calibration.

The touchscreen interface reports reliable concentration data up to once per second and stores all spectral data for later post processing or archiving. Our CMS software allows for easy data collection with instant trend-charting of concentrations.

The Micro Hound is also completely portable with the use of internal battery power. This allows analysis of previously unmonitored areas. Detachable sample tube enables monitoring of confined area spaces, tanks, drums, and restricted areas that are otherwise inaccessible.

Easy Operation

The Hound series are handheld devices 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 Hound series, accurate results can be achieved out of the box.

Detection Method

The Hound detects gas concentrations by measuring UV absorption – the unique drop in the UV intensity within a particular wavelength region where the gas of interest absorbs. The Hound uses a miniature spectrometer coupled to an optical sample cell to acquire and measure the spectral finger print of each gas within a mixture for accurate quantitative 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. The absorption pattern is compared with calibrated 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.

Remote Internet Access

Cerex analyzers have the ability to be accessed from any pc worldwide, via the internet. A local internet line is required for the analyzer. The system can utilize an optional USB cellular modem to allow internet connectivity and remote access. Gas alarms and data may be sent to any device capable of receiving email.

Laboratory quality results in an easy to use handheld analyzer!

Model Information

The Hound is available in a variety of models based on lower detection capabilities. All models come standard with a touch-screen interface, wireless connectivity, programmable audible alarm, software based library references, and one year warranty. Available options include a sample pump and probe, wireless serial transmission, 4-20mA outputs, and relay controlled outputs. The UV Micro Hound allows for all the same features of a full sized UV Hound in a much smaller package with minimal tradeoff in detection capabilities.

Specifications

Parameter	
Input Voltage (Charger)	100VAC to 240VAC , Single Phase 47-63Hz
Input Current	4A Max
Operating Ambient Temperature	0 to +45^{o}C
Storage Temperature	-10 to 60 ^{o}C
Operating and Storage Humidity	Below 80% (Non-condensing)
Dimensions	19.78" x 15.77" x 7.41" (50.2 x 40 x 18.8 cm)
Lamp Life*	4000 Hours Minimum
Battery Life	3.5 Hours STD, 14.5 Hour Optional
Path Length	2 meters
Spectral Range	185nm to 400nm
Spectral Resolution	0.05nm or 0.20nm
Intake Particulate Filter	< 25 Micron
Sample Intake Rate	15 CFM

Data Quality Assurance

Our advanced software utilizes a proprietary photometric Differential Optical Absorption Spectroscopy (DOAS) algorithm for gas quantification. All the calculations are performed on an onboard PC which runs user-familiar Windows 7®. The system can be span checked at any time with an optional QA cell. However, the measurement and analysis method used by Hound Series analyzers has the true calibration inherent in the fixed library reference. 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 Hound reports real-time data on the front panel display, or remotely through Virtual Network Computing, VNC, using wired Ethernet or integrated Wi-Fi, or optional onboard server software. 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.

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Ruggedized for harsh field conditions.

Product Quality Assurance

Cerex places customer service and support as its highest priority. We encourage the customer to be informed of the capabilities of our analyzers and competing technologies. Cerex is committed to long standing relationships 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 manufactured analyzers at no additional charge. Call us at any time to discuss how our application specific analyzers may benefit your monitoring projects.

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Minimum Detection Capabilities

Currently there are a number of definitions of "detection limits" used to characterize the performance of air monitoring systems. A common definition of is the magnitude of the absorbance spectra that is twice the system noise. The Environmental Protection Agency's "Compendium of Methods for the Determination of Toxic Organic Compounds in Ambient Air - Second Edition Compendium Method TO-16 Long-Path Open-Path Fourier Transform Infrared Monitoring Of Atmospheric Gases" defines detection limits as the following:

The detection limit of the UV Hound systems is a dynamic quantity that will change as the atmospheric conditions change. The variability of the target gas, and all of the other interfering species concentrations contributes to the variability of this measurement. The detection limit as determined in this procedure is the result of a calculation using a set of 15 individual absorption spectra. The 16 individual single beam spectra used for this determination are acquired in 5-min intervals and no time is allowed to elapse between them. The absorption spectra are then created by using the first and the second single beam spectra, the second and the third, and the third and the fourth, and so on until the 15 absorption spectra are obtained. These absorption spectra are analyzed in exactly the same way that all field spectra are to be analyzed and over the same wave number region. The analysis should result in a set of numbers that are very close to zero because most of the effects of the gas variability have been removed. The numerical results should be both positive and negative and for a very large set of data should average to zero. Three times the standard deviation of this calculated set of concentrations is defined to be the detection limit.

Although Method TO-16 was written for open path FTIR, the Cerex UV Hound system is unique among UV systems in that the raw data is essentially identical to an FTIR "Single beam" file. Hence the direct correlation drawn to TO-16. Using the detection limit definition described in TO-16, CEREX developed the detection limits that are listed above However it should be noted that the actual detection limits achieved in the field will vary. This is primarily due to the fact that variations in interfering species will result in variability in detection limits. Cerex considers the detection limits listed to be a very conservative estimate. The end-user of the equipment will likely achieve much better results in the field. Cerex believes it is a good policy to not oversell a capability to our potential customers.

Example MDLs
Under optimum conditions, the following LDL's can be achieved. (More compounds are included standard)

Parameter	HOUND-FR	MINI HOUND-FR	MICRO HOUND	Units
Ammonia (NH_3) MDL	12	24	100	ppb
1,3 Butadiene MDL	12	24	100	ppb
Benzene MDL	16	31	134	ppb
Carbon Disulfide MDL	12	24	100	ppb
Chlorine (Cl_2) MDL	294	588	2500	ppb
Ethyl Benzene MDL	18	35	150	ppb
Formaldehyde MDL	188	376	1600	ppb
Hydrogen Sulfide (H_2S) MDL	29	59	250	ppb
Mercury (Hg) MDL	6	12	50	ppb
Napthalene MDL	12	24	100	ppb
Nitrogen Oxide (NO) MDL	17	34	146	ppb
Nitrogen Dioxide (NO_2) MDL	238	475	2020	ppb
Ozone (O_3) MDL	118	235	1000	ppb
o-xylene MDL	222	444	1885	ppb
m-xylene MDL	21	41	175	ppb
p-xylene MDL	14	28	119	ppb
Sulfur Dioxide (SO_2) MDL	19	38	160	ppb
Toluene MDL	49	99	419	ppb
Accuracy (TYP)	±3	±3	±3	%FS
Path Length	17.00	8.50	2.0	Meters

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UV Absorbing Compounds

1,3 Butadiene	C_4H_6	Nitric oxide	NO	Isoprene	C_5H_8
Acetaldehyde	C_2H_4O	Nitrogen dioxide	NO_2	Naphthalene	$C_{10}H_8$
Ammonia	NH3	Nitrous acid	HNO_2	Phenol	C_6H_5OH
Acrolein	C_3H_4O	Nitric acid	$HONO_2$	Styrene	$C_6H_5C_2H_3$
Benzene	C_6H_6	Nitrous oxide	N_2O	Trimethylbenzene	$C_6H_3(CH_3)_3$
Bromine	Br_2	Oxygen	O_2	Acetone	C3H6O
Carbon disulfide	CS_2	Ozone	O_3		
Chlorine	Cl_2	Phosgene	$COCl_2$		
Chlorine dioxide	ClO	Sulfur dioxide	SO_2		
Ethyl Benzene	C_8H_{10}	Sulfur trioxide	SO_3		
Formaldehyde	CH_2O	Toluene	C_7H_8		
Hydrogen Sulfide	H2S				
Mercury	Hg				

More available upon request

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