SL50

SCENTROID SCENTINAL

ODOUR AND AIR QUALITY MONITORING STATION

Scentinal provides ambient odour emission monitoriong based on high accuracy (ppb level) detection of odorous gases such as H2S, Ammonia, VOCs, and SO2. The flexible intelligent station allows live monitoring of plant emissions on Scentroid's cloud servers. Odour emission is reported in OU/m3 based on correlation determined based on periodic measurements using field olfactometry.

Flexible Sensing and Modular Design

The Scentinal product is equipped with an H2S sensor, Photo Ionization Detector (PID), and an Ethelene sensor, however, additional sensing can be added at any time. Ammonia, SO2, NOx, VOC, TRS, PM2.5, PM10, and other chemical compounds can be monitored by adding additional optional modules. The system will allow up to 20 sensors to be optionally incorporated into one Scentinal Package. See the following table for a list of close to 30 sensors that can be selected.

Correlation of Scentroid Chemical Element Measurements to Odour Units

Data from the Scentinal system is processed by Scentroid's chemical and olfactometric correlation system to determine odour impact in terms of odour units at the sensitive receptors. The system uses a neural network learning algorithm to determine odour concentration from chemical readings. Olfactometric measurements, using the Scentroid SM100 Field Olfactometer, are collected periodically (monthly, bi-monthly, or semi-annually) and are inputted into the learning algorithm along with recorded chemical composition. This sophisticated algorithm will then create a non-linear relationship between chemical readings and odour concentration. This data is used to teach the network and enhance the accuracy of odour concentration prediction from chemical composition. The advantage of this system over other competing technologies such as E-Noses is that chemical to odour concentration is based on routinely gathered olfactometric data and therefore is always up to date regardless of changes to the plant processes.

Self-Configuration for Plug and Play Installation

Each sensor node has a microcontroller capable of recording the sensors exact GPS position. This position is sent to the central controller with each data transfer. At the time of the installation the technician simply needs to place the Scentinal unit and power it on. The central computer will automatically recognize the Scentinal unit and know of its exact location. To reconfigure the network the physical sensor can be moved and the system will learn and adapt to this change. Multiple Scentinal units can be configured within one monitoring area.

Time Synchronized Readings

When ambient H2S data or other chemical elements data is collected it is crucial to know exactly when the data was obtained. The entire sensor network must have a synchronized clock. The GPS chip is also used to sync the sensor`s clock to the GPS clock ensuring all recorded data has a perfectly synchronized time stamp. The Scentinal smart sensors are capable of storing data locally for up to 1 year. This data can be polled by the central station as required and if the system communication is lost then the system can recover without any data lost.

USEPA and EU Air Quality Standards

Scentinal ensures air quality data is reliable and robust and traceable back to recognized international standards e.g. USEPA (40 CFR Part 53) and EU (2008/50/EC).

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NEMA4x Cabinet with Optional Air Conditioning and Heating

Each Station is enclosed in a NEMA4x cabinet. This standard package allows the station to operate within an ambient air environment of between 4 and 35 degrees Celsius. Optionally each Station can be equipped with the following cooling and heating systems to keep the unit at optimal temperature and humidity:

- Air Conditioning System for temperatures between 35 and 60 degrees C
- Heating System for temperatures 4 and -30 degrees C
- Combined Air Conditioning and Heating System

The HVAC system has an automated thermostat and smart power management system. The sensor network reports on the temperature and humidity of the cabinet to warn of any HVAC failures. Furthermore, each station has a hardware shut off feature to prevent over temperature failure if the temperature inside the cabinet exceeds 50 degrees C or goes below -30 degrees C due to HVAC failure

Automatic Cleaning and Decontamination of All Lines

It has been reported that low level detection of pollutants in conventional e-noses and other monitoring stations in humid environments are prone to false positives due to contamination of the sampling lines including mold within the PTFE tubes and pumps. The Scentinal product has overcome this issue by installing a compact ozone generator in each monitoring station which is automatically activated once per day to clean and decontaminate all lines.

Local Data Storage and Smart Data Transfer

The Scentinal has a built in SD card that is used to store the collected data locally. While the system frequently sends the data to the central server, keeping a local copy ensures zero data loss even if there are communication issues. The rate of data transfer can also be configured through the central server to minimize GPRS traffic and to save on power.

Scentinal Includes:

- Smart board for data processing and storage
- GPRS chip
- Temperature and humidity sensors
- Min of 3 to maximum of 24 Sensors
- NEMA 4x Cabinet
- Ozone generator which decontaminates all lines automatically once per day

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SPECIFICATIONS

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Manufacturer	SCENTROID
Model	Scentinal SL50
Detected gases (with use of optional sensors)	H2S, NH2, SO2, CO2, CO, CL, C2HO4, H, HCl, HCN, NH3, O3, NO2, PH3, H2S, O2, SO2, CH4, NO, VOCs and more.
Included H2S sensor	Specify sensor ID as H2 or H3 shown in table below
Initiation time	2 min
Additional parameters measured	Temperature, Relative Humidity, GPS position
Operating temperature range with optional HVAC	-30 to 60°C
Storage temperature range	-50 to 80°C
Communication protocol	GPRS, WIFI

The monitoring station is designed to collect all data from the sensors and present the sensor data in an easy to understand graphical interface.

Cloud Based Hosting

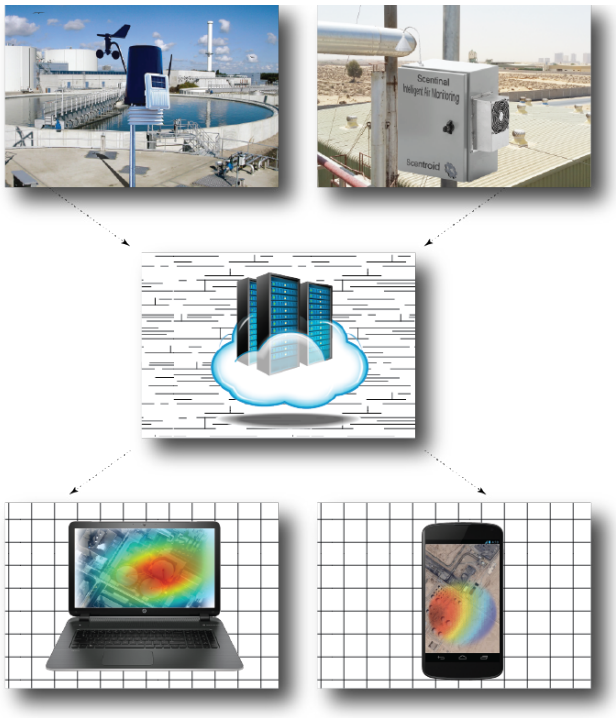
The central monitoring station is hosted on a secure cloud based server allowing remote access via any internet based computer. The access is restricted and the data is encrypted for maximum security. Users are given a password and user name which will define their permission level. Operator access can simply view the results and create reports while administrator access can reconfigure the system and set all parameters.

Graphic Emission Representation and Reporting

The monitoring system continuously provides real-time readings of all sensors in the grid plus has the capability to show data for any defined instance in time. Furthermore reports such as specified period mean, high, low and variance for each sensor can be shown. Other reporting options such as sensor ranking in highest average reading and highest variation can also be requested.

Integration with Optional Total Odour Management System (TOMS)

The second stage of implementing a Scentinal sensing system is to input the data into Scentroid's optional cloud based software TOMS. TOMS offers a complete, integrated suite for odour management. The system provides a perfect integration of real-time odour impact estimation with management of odour complaints from neighboring residents. The simple to use software uses Scentinal sensory data, in field-olfactometry and live weather data to produce real time odour plumes showing you exactly the location and level of odour emissions. Neighboring complaints are automatically logged and compared to odour emissions for fast and efficient validation.



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AVAILABLE SENSORS

Sensor ID	Chemical	Range	Lowest Detection	Resolution (ppm)
CD1	Carbon Dioxide - High Concentration	5,000 to 900,000 ppm	5000 ppm	100 ppm
CD2	Carbon Dioxide - Low Concentration	0-5000ppm	0 ppm	15 ppm
CO1	Carbon Monoxide (low Concentration)	500 ppm	15 ppm	5 ppm
CO2	Carbon Monoxide (high concentration)	10000 ppm	250 ppm	20 ppm
C11	Chlorine	20 ppm	200 ppb	20 ppb
E1	Ethylene Oxide	0-100 ppm	1 ppm	0.1 ppm
H1	Hydrogen	0-5000 ppm	1 ppm	0.8 ppm
HCL1	Hydrogen Chloride	100 ppm	0.1 ppm	0.1 ppm
HCY1	Hydrogen Cyanide	100 ppm	0.1 ppm	0.1 ppm
AM1	Ammonia	100 ppm	0 ppm	1 ppm
ON1	Ozone and Nitrogen Dioxide	O3- 20; NO2- 20 ppm	0 ppb	15 ppb
PH1	Phosphine (low Concentration)	10 ppm	0 ppm	30 ppb
PH2	Phosphine (high Concentration)	2000 ppm	5 ppm	2 ppm
HS1	Hydrogen Sulfide (low Concentration - ppb)	1 ppm	3 ppb	1 ppb
HS2	Hydrogen Sulfide (high Concentration - ppm)	2000 ppm	1 ppm	1 ppm
NO1	Nitrogen Oxide	100	0 ppm	0.1 ppm
CH1	Carbon Monoxide and Hydrogen Sulfide	CO 0-1000, H2S 0 - 100 ppm	0 ppm	CO 1, H2S 0.25 ppm
E2	Ethanol	0-500 ppm	0 ppm	1 ppm
MT1	Methane (LEL)	0-100% LEL	0 ppm	1% LEL
NC1	Nitric Oxide (low Concentration)	20 ppm	0 ppm	80 ppb
NC2	Nitric Oxide (High Concentration)	5000 ppm	0 ppm	1 ppm
ND1	Nitrogen Dioxide (Low Concentration)	20 ppm	0 ppm	0.02 ppm
ND2	Nitrogen Dioxide (high Concentration)	200 ppm	0 ppm	0.1 ppm
O1	Oxygen	0-20%	0 ppm	0.10%
O2	Oxygen	0-100%	0 ppm	1%
PD1	Total VOCs (ppb) - PID	50 ppm (isobutylene)	0 ppm	1 (ppb isobutylene)
PD2	Total VOCs (ppm) - PID	300 ppm (isobutylene)	1 ppm	0.1 (ppm isobutylene)
SD1	Sulfur Dioxide (high Concentration)	2000 ppm	0 ppm	2 ppm
SD2	Sulfur Dioxide (low Concentration)	20 ppm	0 ppb	20 ppb
FM1	Formaldehyde	10 ppm	0.01 ppm	0.01 ppm
PM 1-10	Particulate PM 1, 2.5, 10	0-10,000 Particles/Sec	PM 1	N/A

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