O₃
CO
SO₂
H₂S
NO
NO₂
NOₓ
VOC
PM10
PM2.5
IAQ
Next Generation Air Quality Monitoring

Air quality experts have come to the understanding that ambient air quality particularly for health critical pollutants is clearly a topic of small-scale assessment. Local microclimatic conditions regarding pollutant transport, cross reactions etc. may create an air quality situation differing significantly from a more aggregate observation. Adding short term pollution exposure risks as they have been proven in many epidemiological studies to the geographical small scale, makes it easy to see why a new generation of monitoring systems was needed: Portable, with minimum space and supply requirements, continuous high quality measurement using reference method sensors wherever possible; in short: the airpointer®.

Miniaturization and high level system integration has many benefits both to the user and to the public, from a rather measurement requirement driven definition of the monitoring location as compared to space availability or reduced visual obtrusion in public spaces, ultrashort set-up time and lower operating expenses and minimized energy consumption.

Next generation monitoring system also extends to the results. Operating ambient air quality monitoring networks typically required proprietary systems and software for data access and integration. No longer: The airpointer® is continuously „live on air“ as a web server enabling anybody with an internet connection and a web browser and, of course, the correct access privileges, to read and analyze data, look at maintenance and calibration logs, update the system conveniently from anywhere in the world or respond to predefinable push services ranging from maintenance information for service staff to local „broadcasting“ of environmental data.

The airpointer® as the leader of the new generation of monitoring systems offers a unique opportunity: First class air quality measurement at hot spots or any other point of interest utilizing turn-key systems features that enable cost effective monitoring by a much larger community of users as it is simple to set up, operate and maintain. As one industry expert did put it after having learned about the airpointer®:

„Ambient air monitoring has finally arrived in the 21st century“.

airpointer® at a glance

• Gather air quality data more quickly with the world's first „out-of-the-box plug-and-play“ compact multi gas air quality monitoring system.
• Measure anywhere you want due to very compact dimensions.
• Measure a wide variety of pollutants in a modular platform - with up to seven ambient air analyzers measuring CO*, NO/NO2/NOX*, O3*, SO2*, H2S, VOC and new: PM10 and PM2.5 as well as a variety of Indoor Air Quality Sensors. Tailor it to your specific needs with our unique SIP sensor interface platform.
• Access the monitoring and raw data without special software - standard internet connection and web browser will do.
• Profit from the lowest operating cost in the industry and modular upgradable architecture.
• Reduce maintenance effort based on remote diagnostics and update capability as well as automatic data back-up services, easy on-site maintenance access while still offering a burglar proof design.
• Blend-in easily or stand out prominently in any environment by unlimited design possibilities

* Sensors using Reference Methodology!
Platform Base Unit

**Sample Flow Rate:**<br> < 3000 cc/min depending on configuration + 2000 cc/min for Particulate Matter Monitor

**Operating Temperature Range:**<br> -20 to +40° C (sensor specs valid within this range)<br> Optional heater for - 40° C available.<br> For higher temperatures an additional shelter with additional air conditioner is available.

**Dimensions (WxDxH):**<br> Base Unit 2D (up to two drawers): 740x352x831mm/29.1x13.9x32.7in<br> Base Unit 4D (up to four drawers): 740x352x1067mm/29.1x13.9x42in

**Weight:**<br> airpointer Base unit 2D: 65.8 kg / 145 lb<br> airpointer Base unit 4D: 73.9 kg / 162.9 lb<br> O₃ Analyzing Module: 5.8 kg / 12.8 lb<br> SO₂ Analyzing Module: 8.5 kg / 18.7 lb<br> CO Analyzing Module: 9.0 kg / 19.8 lb<br> NO/NO₂/NOₓ Analyzing Module: 12.0 kg / 26.5 lb<br> PM Analyzing Module: < 4.0 kg / 8.8 lb

**Power:**<br> 230VAC/50Hz, typically 500W, peaks up to max. 670W<br> 110VAC/60Hz, typically 500W, peaks up to max. 670W<br> (for average airpointer® with 4 analyzing modules)

**Configuration:**<br> Any combination of 1 to 7 analyzer modules and various meteorological and other sensors is possible, upgradable.

**Main Features:**<br> Shelter made of double-wall coated aluminum plate providing excellent isolation against temperature and electrical radiation.<br> Two standard cylinder locks for main door and maintenance access door, which could also be part of a key system.<br> Internal air conditioner and temperature management system providing optimized energy consumption.<br> Rugged, unobtrusive and burglar proof design to allow applications in public rooms.<br> Analyzing modules on drawers for easy expansion of the system as well as good serviceability. Cables and tubing protected against mechanical damage.<br> Internal zero air supply for periodical zero check or calibration. Optional span gas supply available.

The powerful data management systems allows implementation of additional monitoring devices including particulate matter monitors like the TEOM/FDMS or a Beta-gauge.

www.recordum.com
Dedicated for on-site application

Easy transportation with the airpointer® mobile lift. (Unit is mounted on the lift). airpointer® may be moved up and down using a hydraulic lift.

Two different sizes available: 4D for 4 analyzing modules and 2D for up to 2 modules, each with space for additional sensors.

Brackets with variable diameter for mast mounting.

Brackets with fixed 60mm diameter for mast mounting.

Brackets for wall mounting.

Various options for wall and mast mounting, workshop stands, transportation devices as well as hoists available on request.

Optional mast lift, airpointer® may be moved up and down using an electrical lift. So on-site maintenance may be performed without using a ladder.

Separate Maintenance Door

The front of the airpointer® may have custom design e.g. based on the company logo and color of the owner or of the sponsor, or designed by an artist.
**airpointer® in industry and transportation**

- Road tunnel pollution control
- Scientific tunnel measurements
- Underground stations
- Rail tunnel monitoring
- Monitoring during construction

The airpointer® is the ideal tool for fenceline-type monitoring of combustion gas and volatile emissions. It is able to measure CO, O₃, SO₂, and NO/NO₂/NOₓ with its standard reference method sensors over a wide range of concentration. Due to its open platform design other sensors can easily be added. Meteorological parameters such as wind speed and wind direction are determined, too. To be able to react quickly and prudently in case of accidents, the airpointer® continuously provides real time information.

Fast response time allows to characterize changes and peaks in tunnel air pollution.

**Hot Spots and other Points of Interest**

**airpointer® on site**

With the airpointer®, building a network of air monitors is just a few clicks away.

Simply put an airpointer® onto the measuring site, it will operate continuously, storing every data with multi-year capacity on its own hard disk. Access to the data and the internal parameters is given remote controlled by Modem (GSM, GPRS, UMTS) or LAN (directly, cable or wireless).

Its rugged outdoor shelter is temperature controlled and equipped with the infrastructure of a complete traditional measurement station.

The airpointer® is operated simply via your web browser. Easy installation „plug and play“ design and its mobility makes the airpointer® your analyzer of choice for modern ambient air monitoring.

Its modular layout and advanced user interface gives you the flexibility to fulfill today’s and future needs.

**airpointer® at a remote site in the Alps.**

**airpointer® monitoring pollution caused by traffic at a highway.**

Data may be used to operate traffic control system.

**airpointer® monitoring air quality in a historical city center.**

No other monitoring system could be placed at such narrow places.
About Ozone

Ozone is a highly toxic corrosive substance and a common pollutant. Ozone is formed in the atmosphere by reaction of nitrogen oxides, hydrocarbons, and sunlight. Some kinds of electrical equipment, e.g. television sets, photocopiers and electric motors (which use brushes), generate such an amount of ozone that a person can easily smell it.

Health and Environmental Effects

Acute effects include respiratory symptoms, changes in pulmonary function, increased respiratory sensitivity and respiratory inflammation. Ozone damages the leaves of trees and other plants (photooxidation), ruining the appearance of cities, national parks, and recreation areas.

Measuring Principle: Ultraviolet Photometry (EN 14625)

O₃ / Ultraviolet Photometry

From a high energy UV lamp a beam goes alternately through two tubes, which are filled with the sample gas alternately with the ozone sample and with a sample where the ozone is filtered. The decrease of the light's density, resulting from the presence of ozone, is measured with two detectors at the end of the tubes. Two-path design ensures correction of possible changes in light intensity.

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Sources:
About Carbon Monoxide

Carbon monoxide is a highly toxic and flammable gas, which is a major product of the incomplete combustion of carbon and carbon-containing compounds. Environmental tobacco smoke in dwellings, offices, vehicles and restaurants can raise the average carbon monoxide concentrations as well.

Health and Environmental Effects

A sufficient exposure to carbon monoxide can reduce the amount of oxygen taken up by the brain to the point that the person becomes unconscious and can suffer brain damage from shortness of oxygen. Carbon monoxide may contribute to the greenhouse effect and global warming.

Sources: WHO Regional Publications, European Series, No. 91, “Air quality guidelines for Europe”, 3rd edition, 2000; GESTIS Stoffdatenbank (http://www.hvbg.de/d/ba/fac/stoffdb/index.html); U.S. Environmental Protection Agency (www.epa.gov)

Measuring Principle: Non-dispersive Infrared (NDIR) (EN 14626)

CO / Non-dispersive Infrared
A beam from an infrared source goes through a chamber filled with sample gas. Carbon monoxide absorbs light and this decrease is measured by a photo-detector.

Schematic Flow of the Carbon Monoxide Analyzing Module
A CO scrubber (catalytic converter) removes CO out of the sample, so a zero point check can be performed periodically e.g. once a day. An internal CO source is optionally available for a periodical span point check.

<table>
<thead>
<tr>
<th>Component</th>
<th>Carbon Monoxide CO</th>
</tr>
</thead>
<tbody>
<tr>
<td>EU Directive / EPA Methode</td>
<td>Non-dispersive Infrared (NDIR) (EN 14626)</td>
</tr>
<tr>
<td>Measuring Principle</td>
<td>Non-dispersive Infrared (NDIR)</td>
</tr>
<tr>
<td>Range</td>
<td>Dynamic, up to 1,000 ppm</td>
</tr>
<tr>
<td>Zero Noise</td>
<td>0.02 ppm RMS</td>
</tr>
<tr>
<td>Lower Detectable Limit</td>
<td>0.04 ppm</td>
</tr>
<tr>
<td>Zero Drift (24 hour):</td>
<td>&lt; 0.1 ppm</td>
</tr>
<tr>
<td>Span Drift (24 hour):</td>
<td>+/-1% of reading &gt; 10 ppm</td>
</tr>
<tr>
<td>Response Time</td>
<td>&lt; 60 seconds</td>
</tr>
<tr>
<td>Precision</td>
<td>+/- 0.1 ppm</td>
</tr>
<tr>
<td>Linearity</td>
<td>+/-1% of reading &lt; 1000 ppm</td>
</tr>
<tr>
<td>Sample Flow Rate:</td>
<td>approx. 500 ml/min</td>
</tr>
</tbody>
</table>
About Sulfur Dioxide and Hydrogen Sulfide

Sulfur dioxide (SO₂) is an acid tasting, colorless, pungent smelling and toxic gas. Major sources are heat and power generation facilities that use poor quality oil or coal containing sulfur.

Hydrogen Sulfide (H₂S) is a highly toxic and corrosive gas with a bad smell. H₂S is a product of biogenous digestion. It can be found in refineries, blast furnaces, pulp and paper industry, gasworks, coking-, wastewater treatment- and biogas plants.

Health and Environmental Effects

The effects observed include reductions in pulmonary volume, increases in breathing resistance and symptoms such as wheezing, chest tightness or shortness of breath. It also could lead to headache and nausea.

Sulfur dioxide is one of the major precursors of acid rain, which accelerates corrosion of buildings and monuments as well as it acidifies soils, lakes and streams. Furthermore, it leads to reduced visibility.

H₂S destroys hemoglobin and paralyzes the intracellular respiration. In contact with humidity at mucus membranes it converts to alkaline sulfides causing heavy irritations in eyes, nose, throat and lung. H₂S is neurotoxic. The bad smell of H₂S is unbearable. The lower limit of detection by humans may be as low as 2 ppb. Because of its acidity H₂S is a very corrosive gas. It damages switchpanels and other electronics in the plants.


SO₂ Measuring Principle: Ultraviolet Fluorescence (EN 14212)

The sample gas is lighted with an UV lamp, which causes the sulfur dioxide part of the gas to absorb energy. The absorbed energy is emitted as a light pulse (photon) shortly afterwards, which is measured with a photo multiplier tube.

H₂S Measuring Principle: Thermal Conversion to SO₂

SO₂ is scrubbed from the sample gas. H₂S is thermally converted to SO₂ and measured by UV-fluorescence. Equipped with an H₂S-module the airpointer® is capable to measure H₂S only, SO₂ only or both cycling with a minimum switching time of 5 minutes.

A zero air source is included in every airpointer®, so a zero point check can be performed periodically e.g. once a day. An internal SO₂ and/or H₂S source is optionally available for a periodical span point check.
About Nitrogen Oxides

The nitric oxide (NO) molecule is quite reactive and unstable. In ambient air, it reacts with oxygen to form the toxic nitrogen dioxide (NO₂). Human activity has drastically increased the production of nitric oxide in combustion chambers, e.g. car engines and power plants. The phase in of new NO₂ thresholds values will make the nitrogen oxides a subject of major public interest.

Health and Environmental Effects

Nitric oxide has a multitude of effects, primarily in the lung but also in other organs, such as the spleen and the liver. In the blood it leads to the creation of metahemoglobin, which cannot transport oxygen. Nitric oxide in the air may later convert to nitric acid in acid rain. Furthermore, both NO and NO₂ participate in the ozone layer reduction.

Measuring Principle: Chemiluminescence (EN14211)

NO/NO₂/NOX / Chemiluminescence

Nitric Oxides in the sample gas react with ozone and this reaction results in electrically excited molecules. These molecules release their excess energy by emitting photons, which are measured by a photomultiplier tube. The airpointer® NOX Module is equipped with a delay loop to allow NO and NO₂ results from the identical sample.

A zero air source is included in every airpointer®, so a zero point check can be performed periodically e.g. once a day. An internal NO₂ source is optionally available for a periodical span point check.

<table>
<thead>
<tr>
<th>Component</th>
<th>Nitrogen Oxides NO/NO₂/NOX</th>
</tr>
</thead>
<tbody>
<tr>
<td>EU Directive / EPA Methodology</td>
<td>Chemiluminescence (EN14211)</td>
</tr>
<tr>
<td>Measuring Principle</td>
<td>Chemiluminescence</td>
</tr>
<tr>
<td>Range</td>
<td>Dynamic, up to 20 ppm</td>
</tr>
<tr>
<td>Zero Noise</td>
<td>0.2 ppb RMS</td>
</tr>
<tr>
<td>Lower Detectable Limit:</td>
<td>0.4 ppb</td>
</tr>
<tr>
<td>Zero Drift (24 hour):</td>
<td>&lt; 0.4 ppb</td>
</tr>
<tr>
<td>Span Drift (24 hour):</td>
<td>+/-1% of reading &gt; 100 ppb</td>
</tr>
<tr>
<td>Response Time:</td>
<td>&lt; 60 seconds</td>
</tr>
<tr>
<td>Precision:</td>
<td>1% of reading or 1 ppb (whichever is greater) @&lt;500ppb</td>
</tr>
<tr>
<td>Linearity:</td>
<td>+/-1% of reading &gt; 100 ppb</td>
</tr>
<tr>
<td>Sample Flow Rate:</td>
<td>1000 ml/min</td>
</tr>
</tbody>
</table>
About particulate matter (PM10 / PM2.5)

PM10 and PM2.5 are not a single compound but the mass concentration of all particles smaller than 10µm (PM10) or 2.5µm (PM2.5) in diameter suspended in the ambient air. Especially in areas with high traffic related pollution the threshold values for this pollutants are frequently exceeded, which makes them pollutants of major public interest.

Health and Environmental Effects

A number of studies have shown short term cardiovascular effects related to PM, a direct relation between the number of heart attacks and the PM-concentration has been proven. Long term effects are the toxicity of the particles itself, their potential to carry and hold toxic compounds in the respiration system and irritation of the immune system due to their continuance deep in lungs and bronchial tubes.

Sources: WHO Regional Publications, European Series, No. 91, “Air quality guidelines for Europe”, 2nd edition, 2000; GESTIS Stoffdatenbank (http://www.hvbg.de/d/de/fac/stoffdb/index.html); U.S. Environmental Protection Agency (www.epa.gov)

Measuring Principle: Nephelometry

Nephelometer

The airpointer PM module uses a well proven optical method, the nephelometry. A sample heater minimizes humidity effects. It uses a light-scattering photometer with a near-IR LED, a silicon detector hybrid preamplifier and a source reference detector.

The light scattered is proportional to the particle concentration. This is the fastest particle concentration measurement with high precision and very low detection limit. There might be a dependency on particle properties for the calculation of the mass concentration.

The airpointer® PM module equipped with a TSP head. To switch to PM10 or PM2.5 measurements the operator simply has to change to size selective sample inlets which are optionally available.

Component | Particulate Matter PM
--- | ---
EU Directive / EPA Methodology | Filter sampling followed by gravimetric analysis
Measuring Principle | Nephelometry
Range | Dynamic, up to 2500 µg/m³
Lower Detectable Limit: | < 1 µg/m³
Zero Drift (24 hour): | < 1 µg/m³
Span Drift (24 hour): | +/-1% of reading
Response Time : | < 60 seconds
Precision: | 1 µg/m³
Sample Flow Rate: | 2 l/min
Component Volatile Organic Compounds (VOC) Measurement Principle Photo Ionization Detection with special long life 10.6 eV-UV-lamp

Range 0.01 ppm to 20 ppm Isobutylene-equivalent

Unit ppm

Examples for additional sensors:

**Photo Ionization Detector (PID) for VOC**

VOCs (volatile organic compounds) are not a specific pollutant but a class of chemical compounds which are present almost everywhere (e.g. acetone, benzene, toluene, cyclohexane, n-hexane, formaldehyde, styrene, chlorinated solvents and several other organic solvents). Some of them are toxic and some are not. High VOC levels can be typically observed near chemical industry and where fuel is not completely burned. Almost all VOCs can be detected by a PID sensor.

<table>
<thead>
<tr>
<th>Component</th>
<th>Volatile Organic Compounds (VOC)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Measurement Principle</td>
<td>Photo Ionization Detection with special long life 10.6 eV-UV-lamp</td>
</tr>
<tr>
<td>Range</td>
<td>0.01 ppm to 20 ppm Isobutylene-equivalent</td>
</tr>
<tr>
<td>Unit</td>
<td>ppm</td>
</tr>
</tbody>
</table>

**Traffic Data Sensor**

The airpointer® Traffic Data Sensor is based on a brand new technology. It contains an array of autonomous, self-signaling pixels which individually respond in real-time to relative changes in light intensity. As a result it is particularly suitable for the detection of moving objects such as vehicles. Even more, the sensor operates largely independent of scene illumination, a known problem with standard CMOS/CCD camera systems.

The acquired data are processed in an embedded system containing the sensor and a DSP.

**Features**

- Inbound and outbound traffic
- Up to 4 lanes simultaneously
- Results for each vehicle: Date, Time stamp, Lane number, Vehicle length, Time-gap in milliseconds, Classification (car / truck)
- Statistical processing of traffic data in preset time intervals
- Lane occupation (%)
- Detection of various traffic flow modes
- Warnings issued in case of decreasing average velocity or separation

**Further examples for implemented sensors and devices**

Traffic and public space:
- Sound level
- Pedestrian counter
- Particulate Matter Sampler
- Particulate Matter Monitor
- Global Positioning System GPS
- UV-radiation

Industrial Hygiene
- Toxic Vapors

Indoor Air Quality (see also page 22):
- CO
- Formaldehyde
- Humidity, Temperature
- Illumination

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1) Names and brands are the property of the respective company.
Indoor Air Quality

Nowadays the majority of the population spends more than 80% of their time indoors. The regulation of the indoor air quality has, however, not yet reached the level of sophistication of outdoor air quality. In part, this may be attributed to the fact that workplaces perceived as having dangerous conditions were regulated with workplace standards (OSHA, MAK, etc.) and that for other indoor applications the scientific evidence that the air quality may actually not be better than the outdoor air quality is relatively new.

From a public health policy point of view it needs to be remembered, that unfortunately low indoor air quality typically affects those parts of the population most that are already most likely to experience negative effects such as children, elderly or people with illnesses, particularly those of a chronic nature.

Looking at the scientific data presented to date, it becomes clear that nearly all results are based on targeted studies often looking at very specific issues or pollutants using data from measurement campaigns which are limited both in duration and in qualitative and quantitative scope. The airpointer® platform can change this as it makes long term studies possible, offering a wide range of analyzers being used to create a real time integrated database.

What is affecting Indoor Air Quality?

Indoor air quality is significantly influenced by outdoor air quality and thus the micro-environment of the point of interest. Detailed studies of Indoor/Outdoor (IO)-ratios, however, reveal that the infiltration and exfiltration process is strongly influenced by building standards, the climatic and topographic situation, making it possible that the distribution of pollutants, e.g. in the case of particulate matter changes possibly turning worse by leaving only fine and ultra fine particles inside the building. Another major factor is certainly the type of ventilation, the quality of its design and maintenance.

Next there are indoor sources of pollution which vary according to the primary utilisation and indoor activity. Whereas tobacco smoke is more and more restricted to private residences where one also will find cooking to be a significant parameter as may be firesides, office areas may be more susceptible to sources like printers and copying machines or redistribution effects due to higher traffic frequencies or the type of cleaning agents used in professional environments.

Furthermore, there are indoor sources related to the furniture and decoration, their contributing elements ranging from carpet fibres to solvent vapors from paints and adhesives or e.g. formaldehyde from pressed wood components and the impregnation of insulation materials with pesticides.

Finally there are biological contaminants that may be bred indoor in poorly ventilated areas, water damaged ceilings or walls and carpets.

Health Effects

Generally health effects of indoor air quality problems are frequently underestimated since they are typically reported in a subjective nonspecific form often starting with a few rather sensitive people complaining. But cases where whole buildings had to be evacuated and problems corrected before the facility could be used again are also documented.

Scientists and physicians are broadly classifying complaints in two categories:

The Sick Building Syndrome, where residents or users of a facility report conditions of discomfort, among others dizziness, irritation of eyes or the respiratory system as well as rapid onset of fatigue. Building related illnesses are clinically defined with causes being well established, and do comprise infections such as legionellosis or certain allergic reactions.

Where should Indoor Air Quality be monitored?

In line with the sensitivity of its population, indoor air quality should be looked at in areas with a high number of children of all age (Kindergarten, school classrooms) or hospitals and nurseries as well as rehabilitation centres. Large office centres, shopping malls or event locations (Cinemas, theaters etc.) as well as manufacturing areas are relevant measurement targets also. If amplification can be expected from special topographic or outdoor conditions (e.g. nearby highway or major intersection) indoor air quality monitoring over complete seasonal cycles may also be advisable as is the case if there is an increase of reports of discomfort.

The unobtrusive, portable design of the airpointer® makes it an ideally suited device to run short or long term measurement campaigns on indoor air quality. Its low noise signature enables concentrated work even at close proximity. The integrated data processing may even be used to communicate with building automation systems or facility management contractors.
The airpointer is developed by practical experienced experts. Special care was taken to ensure the highest level of data quality.

**Calibration check**

An internal zero air supply for the automatic or manual zero check is standard in the airpointers base unit. The user can select this check being either an audit or a zero calibration.

In addition, a daily span check for the main airpointer analyzing modules is available. All ambient gas modules (CO, NO/NO₂, SO₂/H₂S, O₃) can be optionally equipped with span check systems integrated on their drawer.

The CO analyzing module is checked by small user refillable calibration bottle mounted at the module angle.

An internal permeation system is used with Nitric Oxide and the Sulfur Dioxide/Hydrogen Sulfide analyzing module. This system applies permeation tubes which contain pure gas under high pressure. At a constant temperature a specific amount of gas is flowing across a membrane at the permeation tube, which is mixed with a constant flow of zero air.

This enables a precise and reliable span gas supply.

The Ozone analyzing module is checked by an ozone generator. In this generator a constant flow of zero air is mixed with Ozone produced by an UV-lamp.

All function checks are stored in the internal database of the airpointer. At any time the user has access to this data.

**Calibration**

For a calibration with external span gas the maintenance door can be used. There is no need to open the airpointers main door. This ensures a constant internal temperature during calibration.

The calibration is performed via a graphical Interface in the user menu. The parameters to be calibrated are displayed in a concentration vs. time diagram. This allows the user to assess the stability of the measurement and shows if constant conditions are reached.

After the calibration the airpointer indicates if the calibration was successful. In this case it presents the new calibration function which is stored in the internal database. At any time the user has access to this data.

**Maintenance/Diagnostics**

For the routine maintenance the maintenance door can be utilized. There is no need to open the airpointer’s main door. This ensures a constant internal temperature during maintenance and diagnostic procedures. Behind the maintenance door connection facilities for a Notebook (RJ485) incl. power supply, for the external zero or span gas and the sample filter holder are arranged. The filter holder has a glass window to enable the user to check the proper seat and the need for filter replacement.

All analyzing modules are equipped with their own flow sensors to ease trouble shooting. A leak check of the complete system or single analyzing modules is easy to perform.

**Software**

All relevant operation parameters of the airpointer are monitored and stored every minute in the systems data base. This allows preventive maintenance as well as understanding the influence of potential errors to the data.

Extensive diagnostic features are an integrated part of the systems software. A separate program (watchdog) observes the operation and corrects potential dysfunctions automatically.

The change of measuring sites, the calibrations, malfunctions and their repair can be documented in electronic format in the airpointer’s station logbook.

All errors are automatically stored in user accessible protocol files. The data safety can be enhanced via an automatic independent backup at the recordum portal which is operated by recordum and located in a secure data center in Europe.
Network Management

The system is an active web server accessed by a standard web browser. No special software is needed for operation. Not only the measurement data but also operational data like temperatures of heated or cooled parts, pressure and fan speeds are stored in the database to enable further evaluation and preventive maintenance.

The real time data are shown via a separate service interface.

Different access levels with different permissions (e.g. to calibrate) are implemented. These rights are editable by the authorized user. The access to the user interface at the different user levels is protected by login name and password.

The system provides the capability of remote diagnostics and calibration. It is able to send out e-mails with text and graphical information on any available data and in case of a failure a message will be sent automatically.

An optional intrusion alert system sending out SMS in case of unauthorized access to the system is available.

The system provides a data interface for third party systems. The capability of an automated download (http or ftp for csv or XML files) is provided to be able to transfer data into a central data acquisition system.

The possibility of an automated, quasi continuous backup of all data obtained on a central server is available. The option of building a network of monitoring systems via a standardized portal server platform maintained by the manufacturer will be offered on request.

Owners and administrators of more airpointer units have an overview of their instruments including a quick status information.

Optional online services include backup for setup information, measurement data or all available data in a system to provide availability also in case of emergency or computer failure.
Data Management

The airpointer system contains a built-in Data Processing System. This is based on LINUX for high reliability. It features full Internet connectivity either via air through GPRS/UMTS/EDGE/WLAN (depending on configuration and availability) or fixed line connection using ADSL/SDSL/DSL or cable modem. Any other Inter- or Intranet using TCP/IP-protocol can be used, too.

The datalogger has an internal storage capacity of five years of continuous operation (three averages, one minute being the shortest).

It has built-in temperature sensors to protect the hard disc from booting at temperatures too low. A watchdog functionality ensures safe and reliable operation.

Connection capability of additional external gas, particulate and/or meteorological sensors is provided. Data from these sensors are integrated in the internal data base.

For this purpose the following software protocols are currently supported: AK, Bayern/Hessen (Gesytec), Thermo Instrument, T-API, Gill wind sonic, Mierij, Vaisala).

Download data for offline data evaluation.

Individual login for various users and groups.

Service technicians get a quick view on the system status.

Quick view on time series of measurement data and instrument information, both on online data and data stored in the portal data repository.

Easy integration of airpointer monitoring data into web sites such as geographical information systems (GIS) or owner’s home page.

Integration into existing air quality networks by automatic plain data download.

recordum also developed the data logging device “airhopper”. The airhopper enables traditional 19”-type instrumentation including legacy analyzers to be included into a network. Data management and data presentation features are similar to the air-pointer®.
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### Information and Specifications

Information and Specifications provided in this brochure are subject to change without notice.
Next Generation Air Quality Monitoring

The airpointer® is world’s first „out-of-the-box plug and play“ compact multi gas air quality monitoring system. Measure anywhere you want due to very compact dimensions and measure a wide variety of pollutants in a modular platform - with up to seven ambient air analyzers measuring CO*, NO/NO2/NOx*, O3*, SO2*, H2S, VOC and new: PM10 and PM2.5 as well as a variety of Indoor Air Quality Sensors. Tailor it to your specific needs with our unique SIP sensor interface platform. *Sensors using Reference Methodology!

Save time and money

The airpointer® provides the lowest operating cost in the industry resulting from a highly optimized energy management system and low maintenance needs. The airpointer® requires only 10% of the space of a traditional monitoring station, has only 10% weight, consumes less than 10% electricity and reduces the need of on-site service through the remote service feature. This is why the airpointer® is the best performing air quality monitoring system offering the lowest ecological footprint. Access the monitoring and raw data without special software - standard internet connection and web browser will do.

Typical applications

Single Point Air Quality Monitoring
Air Quality Monitoring Networks
Hot-Spot Monitoring
Air Quality Based Traffic Management

Indoor Air Quality Monitoring
Fence Line Monitoring
Special Configured Applications for Research
Public Air Quality Information

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The airpointer® is designed and manufactured according to ISO 9001:2000. recordum® was founded in 2004, based on 30 years of experience in air quality monitoring. © 2007 by recordum® Messtechnik GmbH, Jasomirgottgasse 5, 2340 Mödling, Austria, info@recordum.com

www.recordum.com

Patents Pending