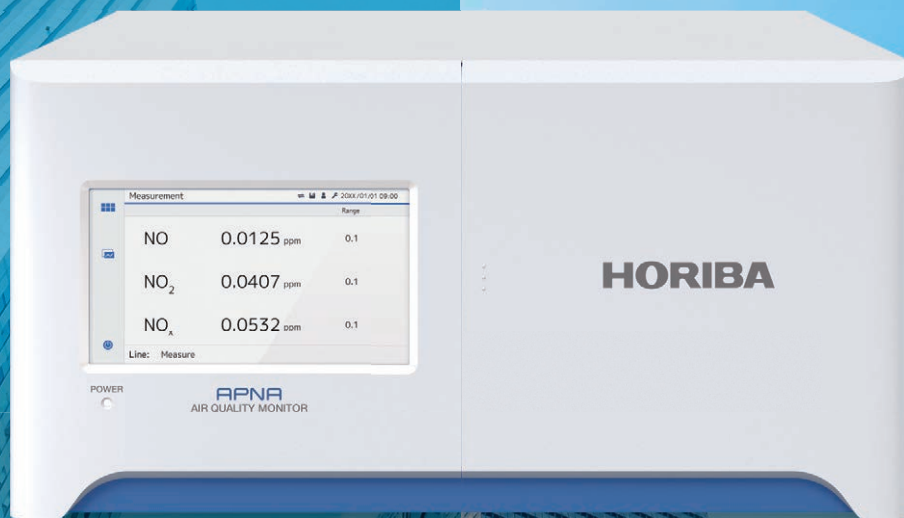


HORIBA

AIR QUALITY MONITOR

AP-380 SERIES



For Air Quality and Industrial Trace Gas Monitoring Applications



Air Quality Monitor AP-380 Series

The AP-380 Series offers a comprehensive lineup of five models, each providing low concentration gas measurements tailored for both indoor and outdoor air quality monitoring and industrial processes trace gas monitoring. Built on HORIBA's core gas measurement technologies, the AP-380 features flexible modular design, remote operations and eco-friendliness.

Index

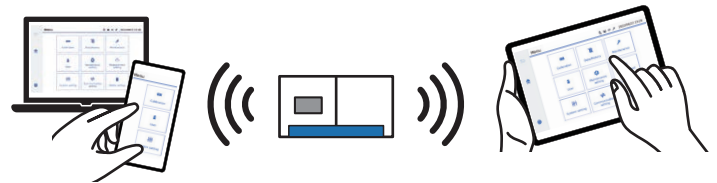
Features	p.2-3
Specifications	p.4-5
Applications	p.6-7
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System Integration Solution	p.11
Worldwide Locations	p.12

Ultimate Performance

- HORIBA's unique measurement technologies with cross-modulation enhance excellent sensitivity, stability and robustness
- Continuous online measurement with fast response
- The wide measurement range with automatic range switching provides flexibility
- Enhanced Lower Detection Limit

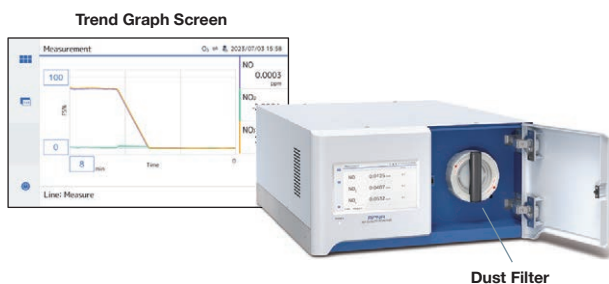
Connected & Intelligent

- Remote operation from various devices: PC, tablet or smartphone
 - Modbus[®] TCP and RTU communication
 - USB flash drive for data storage
- * Standard specification is wired LAN connection. For wireless connection, separate device is required.
* Modbus is a trademark of Schneider Electric USA Inc.



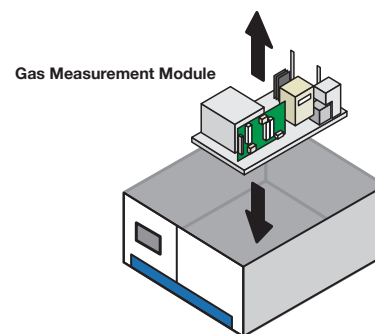
User-Friendly Interface & Functionality

- Durable 7-inch wide color touch screen LCD with intuitive interface and trend graph
- Selectable metrics (ppb, $\mu\text{g}/\text{m}^3$, ppm, mg/m^3), response time (moving average value), and calculation method
- User-configurable dilution ratio (e.g., dilution CEMS)
- Dust filter accessible from the front panel for easy daily maintenance



Modular Design for Various Needs & Customizations

- A gas measurement module can independently provide measurement results
 - Housing is customizable for stationary, wall mount, mobile or portable installations
 - Easy integration of multiple AP-380 measurement modules into air quality monitoring station or dilution continuous emission monitoring system (CEMS)
- * APHA-380 is not subject to modular design.



Reduced Operational Expense & Maximum Uptime





- Remote diagnostics allow fast and effective maintenance
- Internal parts timer with alarm facilitates timely parts replacement, optimizing parts stock
- Modular design enables easy and fast replacement in the field

* APHA-380 is not subject to modular design.

Environment-Friendly Design

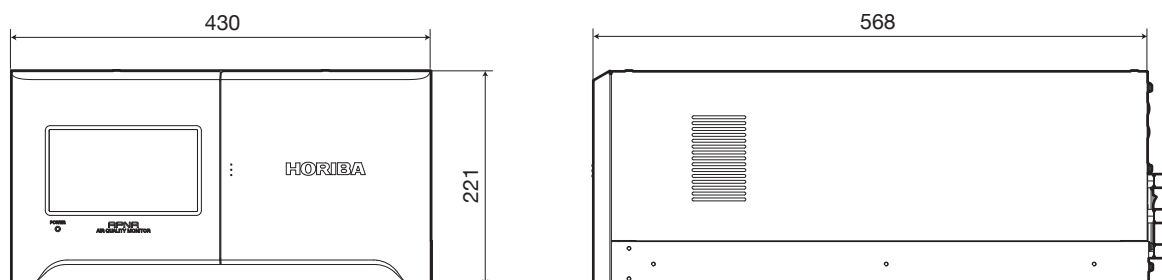
- Utilization of UV LED instead of mercury lamp for environmental preservation
- Catalyst-free ozone decomposer and long life parts for reducing environmental load
- Reduced power consumption*
- Remote operation reduces emission from transportation, contributing to the reduction of carbon footprint

* Power consumption reduction compared to the previous model.






Model	APNA-380	APSA-380
Components	Nitrogen oxides   	Sulfur dioxide 
Measuring principle	Chemiluminescence	Ultraviolet Fluorescence
Measurement range	0-0.1/0.2/0.5/1.0/2.0/5.0/10/20 ppm (up to 8 ranges selectable, auto-range)	0-0.05/0.1/0.2/0.5/1.0/5.0/10/20 ppm (up to 8 ranges selectable, auto-range)*1
Lower Detection Limit (2σ)	< 0.4 ppb*2*4	< 0.3 ppb*3*4
Repeatability	±1.0% of full scale	±1.0% of full scale
Linearity	±1.0% of full scale	±1.0% of full scale
Zero drift (24h)	< 0.4 ppb	< 0.5 ppb
Span drift (24h)	< 0.5% of full scale	< 0.5% of full scale
Response time (t95)	< 40 s from the inlet*4	< 120 s from the inlet*4
Sampling pump and filter	Internal	Internal
Power supply	AC 100-240 V, 50/60 Hz (for analyzer), DC 24 V (for module only)	AC 100-240 V, 50/60 Hz (for analyzer), DC 24 V (for module only)
Power consumption	140 W	50 W
Dimensions (mm)	430 (W) x 568 (D) x 221 (H)	430 (W) x 568 (D) x 221 (H)
Weight (kg)	Approx. 18	Approx. 18

*1 : 2nd point calibration is required in case of using higher than 1 ppm range *2 : For ranges less than 2 ppm *3 : For ranges less than 1 ppm *4 : Digital filter
 Above specifications are indicated for air base gas. If other than air base gas is to be measured, please feel free to consult with us.

Dimensional Outline (Unit: mm)

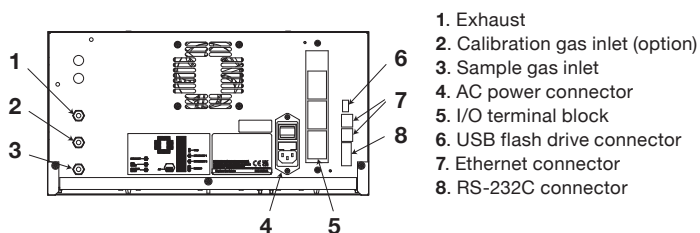


Under Certification: TÜV, US EPA, MCERT, CAEPI, KTL, JMOE

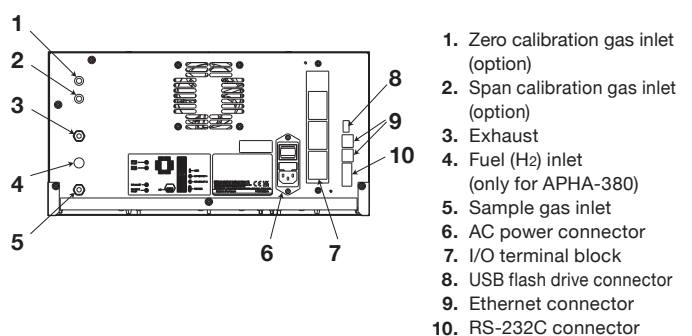
APOA-380	APMA-380	APHA-380
Ozone	Carbon monoxide	Hydrocarbon
		  
Cross-Modulation Non-Dispersive Ultraviolet Absorption (NDUV)	Cross-Modulation Non-Dispersive Infrared Absorption (NDIR)	Flame Ionization Detector Method (FID) with Selective Combustion
0-0.1/0.2/0.5/1.0/2.0/5.0/10 ppm (up to 7 ranges selectable, auto-range)	0-5/10/20/50/100/300 ppm (up to 6 ranges selectable, auto-range)	0-5/10/20/50/100 ppmC (up to 5 ranges selectable, auto-range)
< 0.3 ppb*3*4	< 0.02 ppm*4	< 0.02 ppmC*4
±1.0% of full scale	±1.0% of full scale	±1.0% of full scale
±1.0% of full scale	±1.0% of full scale	±1.0% of full scale
< 0.5 ppb	< 0.02 ppm	< 0.025 ppmC
< 0.5% of full scale	< 0.5% of full scale	< 0.5% of full scale
< 60 s from the inlet*4	< 30 s from the inlet*4	< 40 s from the inlet*4
Internal	Internal	Internal
AC 100-240 V, 50/60 Hz (for analyzer), DC 24 V (for module only)	AC 100-240 V, 50/60 Hz (for analyzer), DC 24 V (for module only)	AC 100-240 V, 50/60 Hz (for analyzer), DC 24 V (for module only)
80 W	90 W	230 W
430 (W) x 568 (D) x 221 (H)	430 (W) x 568 (D) x 221 (H)	430 (W) x 568 (D) x 221 (H)
Approx. 15	Approx. 16	Approx. 26

For detailed specifications, please refer to each models' datasheet

Rear Panel Configuration for APSA, APNA, APOA



Rear Panel Configuration for APMA, APHA



Measurement Principle

The measurement principles of each analyzer are introduced in details on our special website. Visit here for more information.

Applications of AP-380 Series

Ozone Leak Monitoring at Wastewater Treatment Plant



Background:

Ozonation is one of the technologies used for killing microorganisms and inorganic pollutants in wastewater treatment. It has many advantages, but off-gases after ozone treatment are corrosive, as well as extremely irritating and toxic. Occupational health and safety regulations call for standard exposure limits for ozone in the workplace to be no more than 0.1 ppm averaged over an eight-hour period. Hence, the off-gases from the ozone contact chamber must undergo treatment to eliminate ozone before being released into the ambient air. For the prevention of workers' exposure to ozone leakage, monitoring the ozone levels in the working environment of the wastewater treatment plant is of utmost importance.

Solution:

APOA-380 for Occupational Safety Monitoring

- Wall mount design* for easy installation on site
- Cross-modulation NDUV technology for excellent sensitivity, long-term stability and minimized zero drift in 24/7 operations
- Available for remote operation from central control room, unattended operation from remote location, etc.

*Available upon request. Please consult with us.



Image of wall mount design

Vehicle Interior Air Quality



Background:

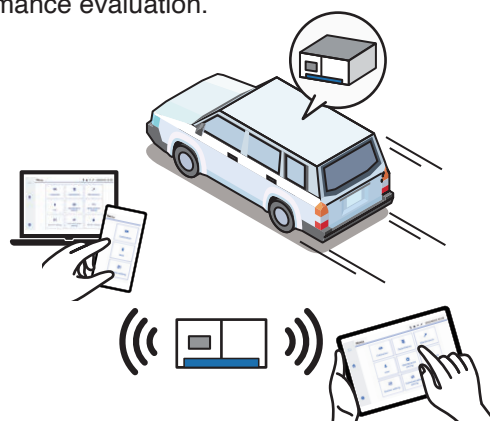
The air quality in the vehicle cabin becomes one of the important aspects to protect the health of passengers. The space inside the vehicle is very compact, yet numerous pieces of equipment are installed with sealants, plastics, and lubricants that tended to evaporate volatile organic compounds (VOCs), raising health concerns. Moreover, in-cabin air quality is strongly affected by the traffic related air pollutants such as fine particulate matters, nitrogen oxides, and other pollutants present in the out-cabin ambient air. High-efficiency filters for cabin air filtration and other measures are required to minimize passengers' exposure to pollutants and mitigate health risks.

The AP-380 can be used for the evaluation of Vehicle Interior Air Quality (VIAQ) in new and under-development cars, as well as for R&D of in-cabin filters and filtration systems for performance evaluation.

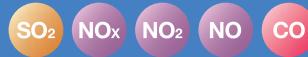
Solution:

APNA-380 for In-cabin NOx Monitoring

- Modular design allows for installation inside the vehicle, operation on DC 24 V power supply during R&D and on-road tests
- Remote operations facilitate control of readings externally, leaving analyzer in fully closed car
- High sensitivity and robustness ensures reliable and stable monitoring data even in harsh on-road conditions
- Compact, lightweight design with low power consumption



Dilution Continuous Emission Monitoring



Background:

The dilution extractive emission monitoring is well-suited for emission monitoring with harsh sample gas conditions, including high levels of dust, moisture, and pollutant gases. This method involves the dilution of the sample gas with dry, clean air to reduce its concentration and dew point. The compact size and modular design of the AP-380 monitor allow for flexible local modification and customization based on regional regulations and customer requests.

Solution:

APSA-380, APNA-380, APMA-380 for Dilution CEMS

- Compact size for easy on-site installation
- Modular design enables local customization and adjustment to specific needs
- Programmable dilution ratio
- High sensitivity with minimum range for SO₂ 0-0.05 ppm, NO_x 0-0.1 ppm, CO 0-5 ppm, and minimized zero drift due to cross-modulation technology
- Dilution is done at the probe, eliminating the need for additional components like heated lines and coolers



Carbon Monoxide Monitoring for Explosion Prevention



Background:

Milk powder deposits inside spray dryers used for powdered milk production can lead to serious problems, such as fires and exposure due to their tendency to self-ignite and smolder. The conditions inside the spray dryer are favorable for exposure due to high temperature, presence of oxygen, and carbon monoxide formed by thermal decomposition of milk. In order to prevent an explosion, the monitoring of carbon monoxide and detecting of ignition in the early stage are of primary importance.

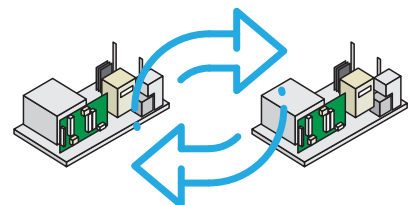


The APMA-380 is a solution to monitor CO concentration in exhaust from drying chamber on low ppm level and with quick response for fire/explosion prevention purpose.

Solution:

APMA-380 for Explosion Prevention

- Modular design enables installation of 2 modules inside the system for redundancy
- Cross-modulation NDIR technology constantly adjust zero point to minimize zero drift and achieve high accuracy in continuous 24/7 operations
- Cross-modulation enables differential concentration measurement of carbon monoxide before and after drying chamber by a single unit



*The application is not limited to powdered milk production. Please consult with us for information about other applications of interest.

Carbon Dioxide Monitor

CO₂

APCA-370

The APCA-370 is designed for continuous CO₂ monitoring in ambient air. It ensures high precision and accurate measurements with exceptionally low drift over long term due to utilization of HORIBA's state-of-the-art technology cross-modulation non-dispersive infrared absorption (NDIR) method. HORIBA's unique reference gas purifier* generates CO₂-free gas internally to use as zero gas for cross-modulation which enhance the performance of analyzer.

*Japan Patent No.06523797, US Patent No. US9962647



Specifications

Component	Carbon dioxide (CO ₂)
Measurement range	0-500/1000 ppm
Sample gas flow rate	Approx. 0.7 L/min
Lower Detection Limit (2σ)	0.5 ppm
Repeatability	±1.0% of full scale
Linearity	±2.0% of full scale

Zero drift*	±0.1 ppm/day or ±2.0 ppm/week
Span drift*	±2.0%/day of full scale ±3.0%/week of full scale
Response time (t₉₀)	Less than 60 s

*Ambient temperature change: within 5°C

Hydrogen Sulfide Monitor

H₂S

Hydrogen sulfide (H₂S) in ambient air is measured by combining an ultraviolet fluorescence-based analyzer with an oxidation catalyst unit which converts H₂S to SO₂.



H₂S Converter Unit CU-1

Specification Example

Component	Hydrogen sulfide (H ₂ S)
Measuring principle	Oxidation catalyst + Ultraviolet Fluorescence
Measurement range	0-0.1/0.2/0.5/1.0 ppm or 0-0.05/0.1/0.2/0.5 ppb
Sample gas flow rate	Approx. 0.7 L/min
Lower Detection Limit (2σ)	2 ppb
Repeatability	±3.0% of full scale
Linearity	±2.0% of full scale
Zero drift	±2.0% of full scale/day
Span drift	±5.0% of full scale/day

*For other measurement range requirements than shown above, please consult us.

Ammonia Monitor

NH₃

Ammonia (NH₃) in ambient air is measured by combining a chemiluminescence analyzer with an oxidation catalyst unit which converts NH₃ to NO.



NH₃ Converter Unit CU-2

Specification Example

Component	Ammonia (NH ₃), Nitrogen Oxide (NO _x)
Measuring principle	Oxidation catalyst + Chemiluminescence
Measurement range	0-0.1/0.2/0.5/1.0 ppm or 0-1/2/5/10 ppb
Sample gas flow rate	Approx. 0.3 L/min
Lower Detection Limit (2σ)	5 ppb
Repeatability	±2.0% of full scale
Linearity	±2.0% of full scale
Zero drift	±2.0% of full scale/day
Span drift	±2.0% of full scale/day

Standard Gas Generator

SGGU-610 / 640

Zero gas and span gas preparation for APSA-380 and APNA-380 analyzers



Specifications

Generating principle	Atmospheric air purification method for zero gas / Flow rate ratio mixing method and overflow control method for span gas
Purity of zero gas	NO and SO ₂ : 1 ppb max. for inlet concentration 100 ppb
Generated flow rate	Approx. 2.5 L/min (±0.5 L/min)
Generated pressure	Atmospheric pressure +50 Pa to +300 Pa
Span stabilization time	Within 10 min (98% response)
Component gas	NO, SO ₂ : Cylinder gas concentration below 1 vol% (Base gas: N ₂) Supplied pressure: 50 kPa (±20 kPa)
Dilution ratio	Approx. 1/1000 (displayed in a range of ±5%)
Dilution accuracy	±2% of the displayed dilution rate
Power supply	AC 100-240 V (with transformer), 50-60 Hz

Hydrogen Generator

OPGU Series

For generation of hydrogen to operate APHA-380 FID analyzer



Specifications

Generating principle	S.P.E. (Solid high polymer electrolytic film) water electrolysis
Concentration of gas	More than 99.999% H ₂
Max. generated flow rate	100 mL/min. (at 25°C 1013 hPa)
Generated pressure	20-400 kPa on gauge (variable)
Water tank capacity	2 L
Applicable pure water	Ion exchanged water conductivity: 0.1-0.2 µS/cm
Pure water consumption	Approx. 5.5 mL/h (at max. generation)

Ambient Dust Monitor

PM

APDA-371

The APDA-371 automatically measures and records ambient particulate matter (PM) concentration, using the industry-proven principle of beta-ray attenuation. The measurement principle operates according to EU and U.S. EPA regulations and is type approved by TÜV.

Specifications

Measured object	PM2.5, PM10 or TSP
Measurement content	Particulate mass concentration
Measuring principle	Beta-ray attenuation
Measurement range	0-1.000 mg/m ³ (0-1000 µg/m ³) (standard) 0-0.100, 0.200, 0.250, 0.500, 2.000, 5.000, 10.000 mg/m ³ (optional)
Sample gas flow rate	Approx. 16.7 L/min
Repeatability	±2.0% of full scale at 1000/5000/10000 µg/m ³
Linearity	±3.0% of full scale at 1000/5000/10000 µg/m ³
Zero drift	±20 µg/m ³ /day at 200/500/1000/5000/10000 µg/m ³
Span drift	±30 µg/m ³ /day at 200/500 µg/m ³ range ±3.0% of full scale at 1000/5000/10000 µg/m ³ range
Compliance	CE, TÜV (EU), U.S. EPA



Related Products

Ambient Dust Monitor

PM

APDA-372

The APDA-372 dust monitor is specifically designed for indoor and outdoor air quality monitoring and provides continuous and simultaneous measurement of particulate matters PM1, PM2.5, PM4, PM10 and TSP using the light-scattering method. The method and a white LED light source equipped in the APDA-372 enable a highly stable output and long lifetime. On-site gravimetric correlation or subsequent analysis of the composition of the aerosol are also available. The measurement principle operates according to EU regulations and is type approved by TÜV.



Specifications

Measured object	PM1, PM2.5, PM4, PM10 and TSP	Measurement range (mass)	0 - 1500 µg/m³
Measurement content	Particulate mass concentration	Time resolution	1 s - 24 h (or on demand)
Measurement range (size)	PMtot (0.18-18 µm)	Flow rate	4.8 L/min
Measurement range (number)	0 - 20000 particles/cm³	Compliance	CE, TÜV etc.

Continuous Particulate Monitor with X-ray Fluorescence

PM

PX-375

Measured object	PM10, PM2.5 or TSP
Measured content	Particulate mass concentration and element concentration
Standard parameters	Al/Si/S/K/Ca/Ti/V/Cr/Mn/Fe/Co/Ni/Cu/Zn/As/Se/Rb/Sr/Zr/ Pb/Ga/Ge/Y/Pd/In/Sn/Sb/Te/Cs/Ce/Bi/Ag
Option parameters	Other detectable elements and black particles (BP)



Features:

- Real time data acquisition with sampling and analysis on site
- Continuous analysis of particulate mass and elemental concentration (Shortest at 30 min interval)
- Sample on the PTFE filter with a breathable reinforcing layer of non-woven fabric (HORIBA patent filter*)

*Japan Patent No.4590367

Source Apportionment Solution Using PX-375 and Eco-WEB (Data management software)

Estimates the pollution source by air pollutants monitoring (including wind direction and speed) and data analysis. Review of processes at facility contributes to the reduction of ambient air pollution.

1. Measurement

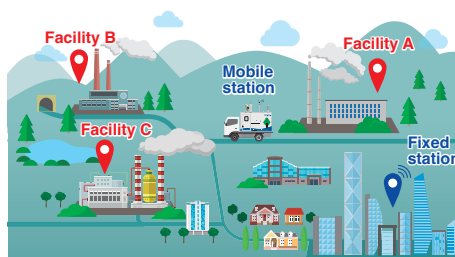
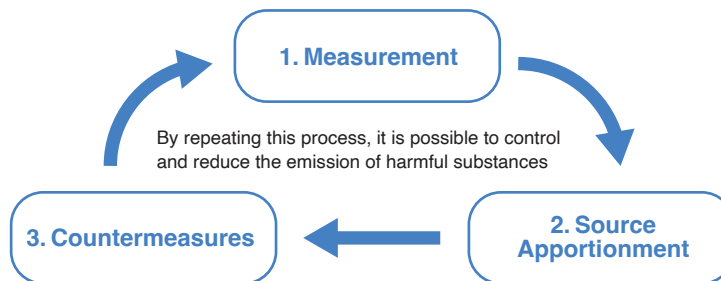
To trace the pollution source, measurements of ambient air are done by PX-375 at various locations within the facility. Unlike the IPC atomic emission spectroscopy, PX-375 measures elemental concentration in real-time (shortest every 30 min.), allowing for the monitoring of concentration changes over time.

2. Source Apportionment

Utilizing the Eco-WEB software to conduct data collection and analysis. It is possible to grasp changes every hour with trend graph data and elemental concentration variations based on wind direction. By considering the occurrence time and direction, it becomes feasible to estimate the emission source and understand which facility's process is generating harmful substances.

3. Countermeasures

Reviewing the processes within the facility to improve and reduce the emission of harmful substances.



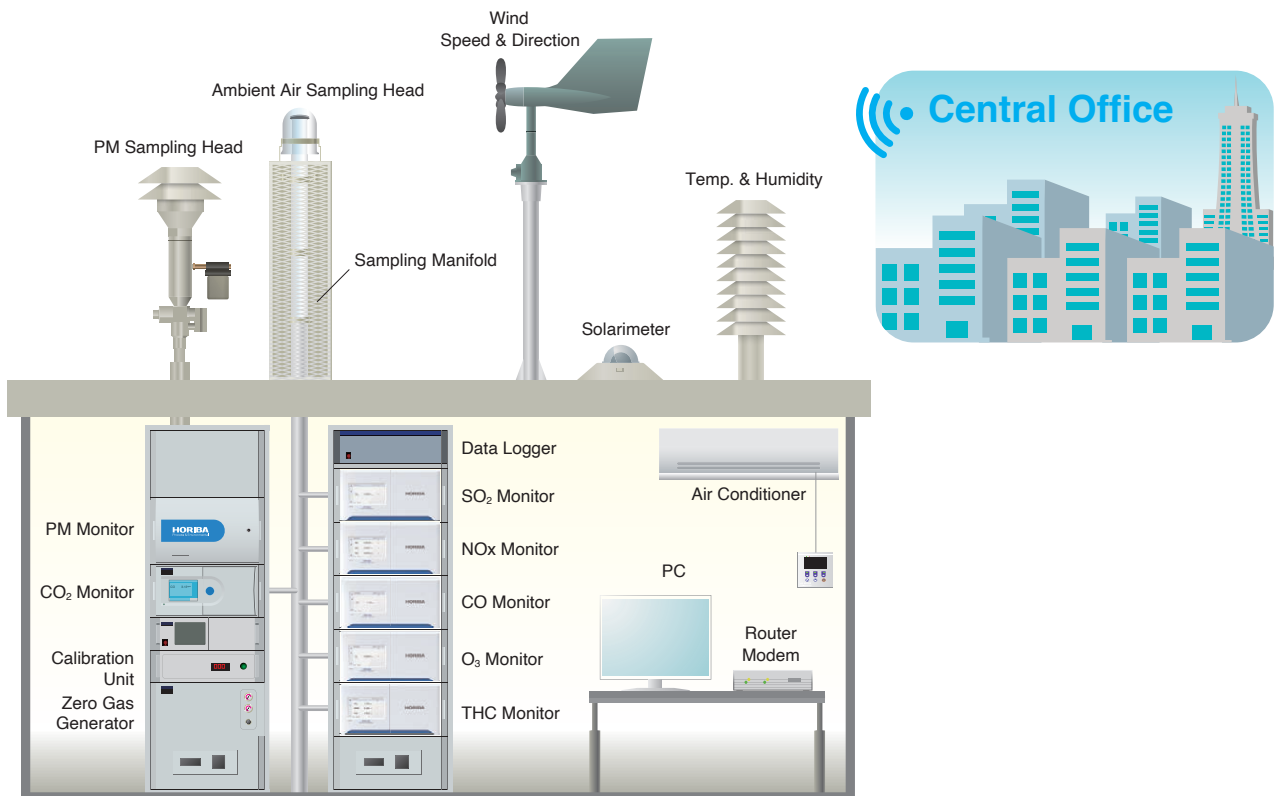
Facility candidates for potential pollution source | Area which in need of identifying pollution source

Example of Eco-WEB screen



Air Quality Monitoring System (AQMS)

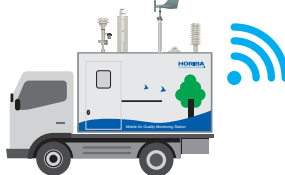
An Air Quality Monitoring System (AQMS) is a system that measures ambient pollutant parameters and metrological parameters such as wind speed, wind direction, rainfall, radiation, temperature and barometric pressure. The ambient pollutant parameters include nitrogen oxides (NO_x), sulfur dioxide (SO₂), carbon dioxide (CO₂), carbon monoxide (CO), ozone (O₃), methane (CH₄), non-methane hydrocarbons (NMHC), and particulate matters (PM₁₀, PM_{2.5}, PM₁, TSP). With more than 60 years of experience at air quality monitoring, HORIBA's air quality monitoring system is well-recognized around the world. The systems are completely tailored based on customers' requests and can be fully outfitted with all required equipment including cabinets, meteorological sensors, calibration tools to meet even most challenging requirements.



Fixed Station



Mobile Station



Mini Station



● Multi Gas Calibrator APMC-370

Generate calibration gases such as NO, SO₂, CO, CO₂, O₃, H₂S, NH₃ (Other parameters are also available)



● Zero Gas Generator ZNV-7

Zero gas generation from ambient air with compressor, moisture removal and chemical absorbers



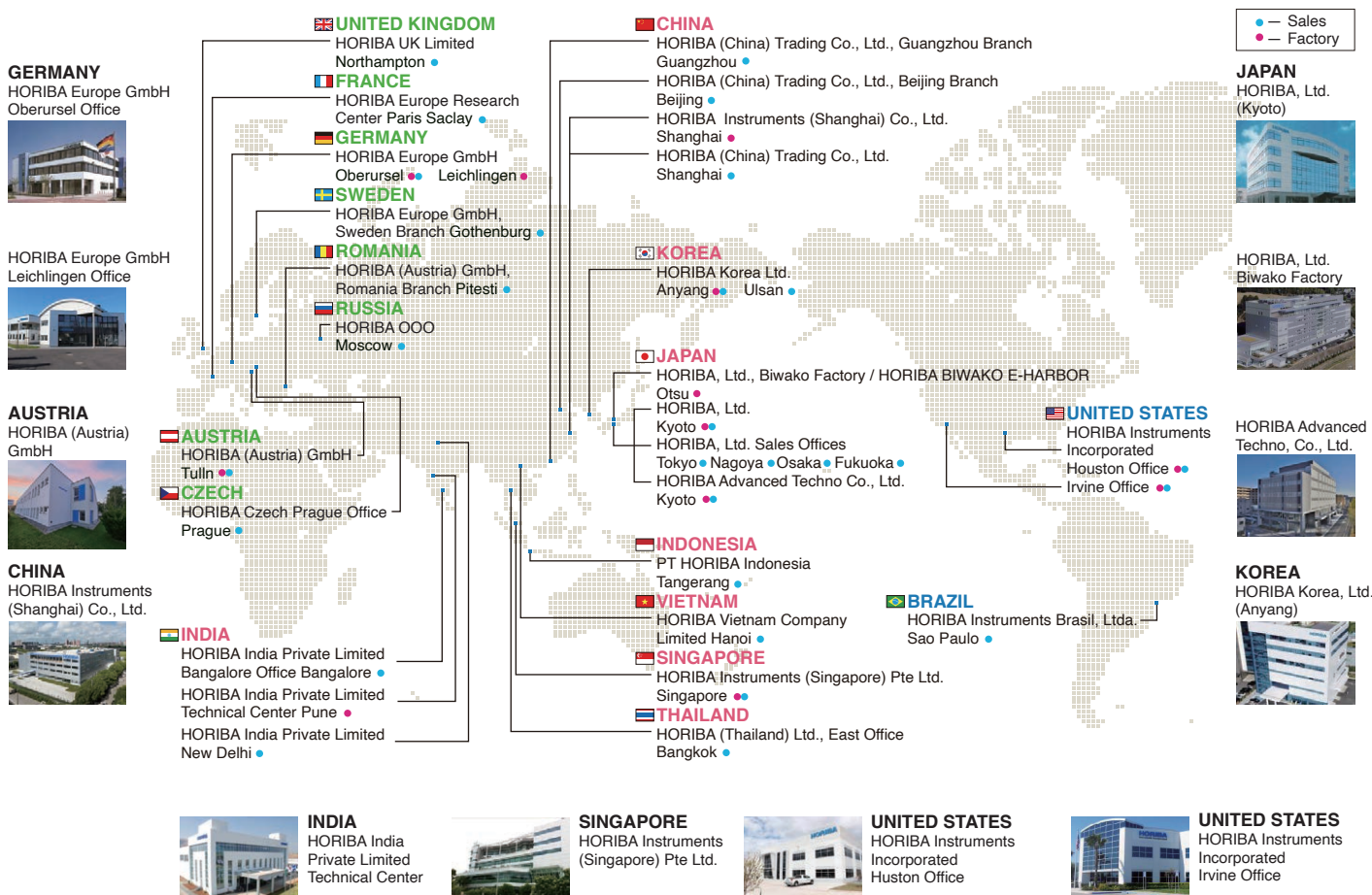
● Data Logger IOX-380: I/O Expander

Collection, average calculation, storage and transfer to a central location of environmental data



Global Sales and Service Network for AP-380 Series

As a global company, HORIBA has 50 offices and centers of activity around the world. These technology development and business centers in key business areas can be regarded as the “headquarters” of HORIBA's business operations. We have development and production sites in main areas such as Japan, Europe, the U.S. and China, where we can discern clues to global trends. Our excellent research and development engineers continue to work on new technological development rooted in the needs of each region. Proven quality and trustworthy performance, coupled with local support and service capabilities, have established widespread confidence in the HORIBA brand.



IMS The HORIBA Group adopts IMS (Integrated Management System) which integrates Quality Management System ISO9001, Environmental Management System ISO14001, and Occupational Health and Safety Management System ISO45001. We have now integrated Business Continuity Management System ISO22301 in order to provide our products and services in a stable manner, even in emergencies.

⚠ Please read the operation manual before using this product to assure safe and proper handling of the product.

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HORIBA
 HORIBA, Ltd.
 Group Head Office
 2 Miyano Higashi-cho, Kisshoin, Minami-ku, Kyoto, 601-8510, Japan
 Phone: 81 (75) 313-8121 Fax: 81 (75) 321-5725
<https://www.horiba.com/int/>



Worldwide locations of HORIBA