EXPEC 1950
Open-path Infrared Gas Analyzer

// Infrared optical fencing, identifies toxic substances to ensure safety

EXPEC TECHNOLOGY 谱育科技

Instrument Introduction

EXPEC1950 open-path infrared gas analyzer can perform remote, non-contact, intelligent continuous monitoring of multiple non-point source toxic and harmful gases based on the open-path FTIR remote detection, outputting qualitative and quantitative analysis results in a real time manner.

The instrument is divided into emitting side and receiving side. The emitting side emits an expanded collimated infrared beam, which is received by the receiving side after passing through the detected area, to perform qualitative and quantitative analysis of gases based on the infrared fingerprint spectra of the gases using the deep neural network algorithm. The instrument is widely used for monitoring of leakage, and diffusion, etc. of toxic and harmful gases in such fields as chemical industry, environmental protection, transportation, and industrial manufacturing.

Technical Parameters

Parameters	Indicator
Measured component	Over 420 gases, including TIC, and VOC
Band range	600-5000cm^{-1} (expandable)
Lower limit of measurement	ppb- percent level
Interferometer	Independently developed Michelson interferometer
Detector	Stirling refrigeration, without liquid nitrogen
Measurement distance	50-1000m
Measuring methods	Opposite-type, continuous monitoring

Instrument Features

01

Exquisite structure

The instrument has an opposite-type split design, without reflector mirror array. It has a flip-back-type body frame, allowing simple and convenient maintenance. The detector is limited by multiple points, ensuring the measurement accuracy after repeated mounting and demounting.

02

Strong adaptability

The instrument body is protected in a hermetic manner, and adapts to different pollution environments. Multiple detectors, telescope, and other accessories are provided to adapt to different monitoring demands. The instrument can be used alone, and multiple ones can be networked in a segmented manner, to form an optical fencing.

03

Intelligent detection

The instrument can realize simultaneous alarm for multiple mixed gases through identification of fingerprint spectra. The system can intelligently determine the measurement scheme and automatically perform background correction.

04

Strong detection function

There are multiple environmental monitoring models and expert spectrogram database built in the system, so the system can monitor >420 routine gases, toxic industrial compounds (TIC), and volatile organic compounds (VOC), etc. The system supports online upgrading of monitoring models and spectrogram database.

05

High detection accuracy

The instrument uses MCT detectors based on Stirling deep refrigeration, achieving ppb-percent level monitoring based on the deep neural network analysis algorithm.

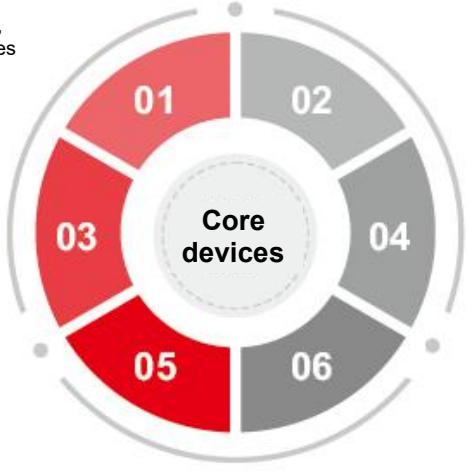
Core Devices

High-efficiency light concentration telescope system

- 306 mm large-aperture Cassegrain reflection telescope
- Aspheric reflector mirror set, reducing aberration, raising the energy convergence efficiency of light source, and ensuring long-distance energy transmission and signal-noise ratio
- Infrared enhanced gilded reflection surface, coupled with protective plating layer, ensures high reflectivity and weathering property

Infrared detector

- Integrated MCT (mercury cadmium tellurium) detector based on Stirling deep refrigeration
- No regular artificial addition of liquid nitrogen is needed, avoiding device damage and data loss due to carelessness in maintenance



Infrared light source

- High-emissivity silicon carbide mid infrared light source
- Intelligent feedback driving circuit, ensuring short-term stability and long-term consistency of infrared light energy
- Hermitic cavity packaging, reducing external influence and extending life

Interferometer

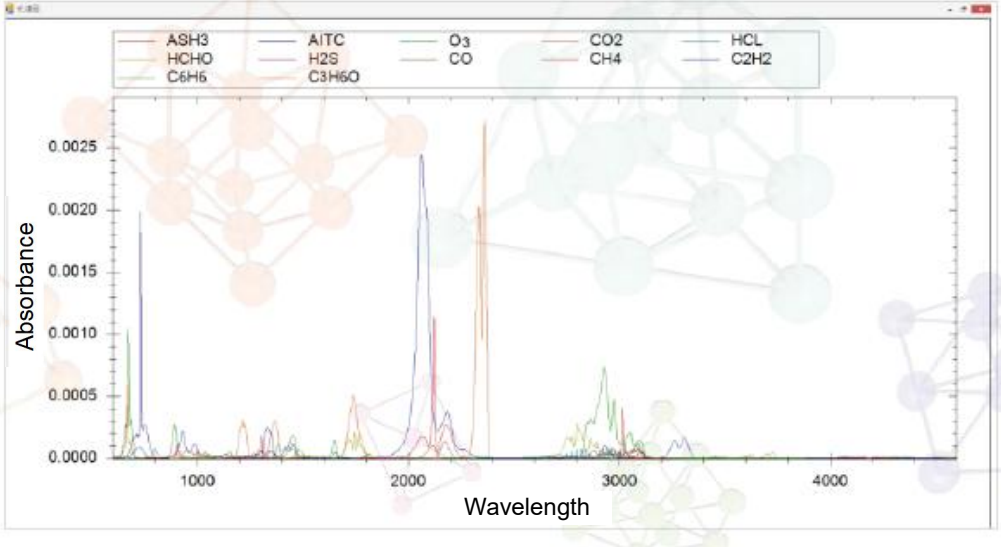
- Independently developed spatially-differentiated Michelson interferometer, with double-cone swing arm, to offset the influence of vibration in a common mode manner;
- TEC temperature-controlled and frequency-stabilized VCSEL semiconductor solid laser, with stable wavelength standard and a life up to 10 years
- Fully-enclosed thermostatic cavity, ensuring stable performance of the core optical system

Metrological calibration system

- The instrument contains a built-in dual-radiation-source calibration module, adapting to measurement calibration for different target temperatures
- Automatically calibrating the accuracy of wave number according to the narrow-line absorption spectra of gas
- Built-in gas cell module, with standard gas path interface, used for quantitative calibration of key target gases

Heavy-duty PTZ

- Precision heavy-duty electric PTZ, with automatic orientation switchover function, achieving networked detection with one instrument and multiple lines
- Manual adjustment of PTZ in three degrees of freedom, together with 10× sighting mirror, achieving accurate optical path alignment



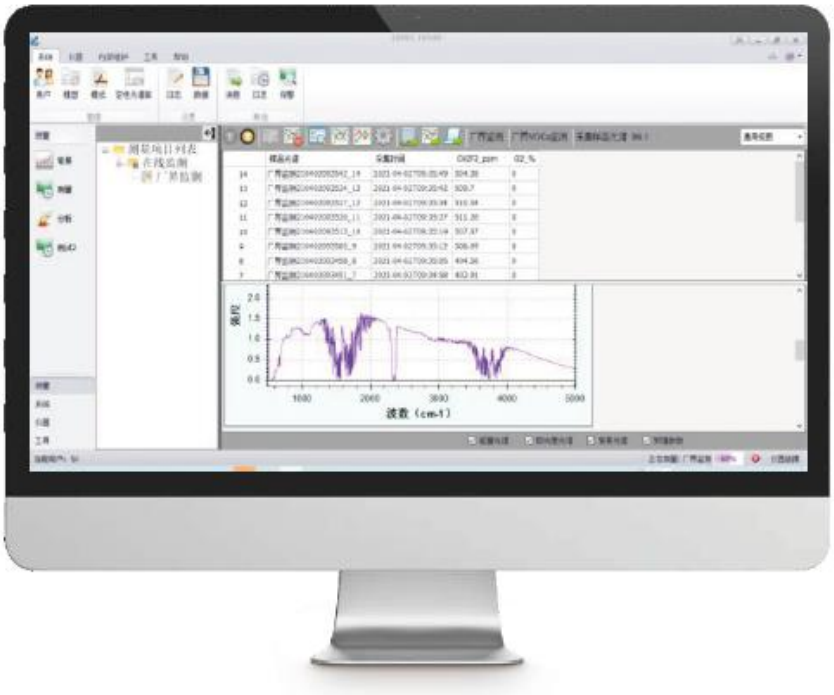
Software System

Expert database
A spectrogram database containing over 560 toxic and harmful gases, including VOC and TIC; multiple application analysis models, supporting customization of analysis model.

Intelligent monitoring
The system intelligently determines a measurement scheme, automatically selects a background calibration mode, to obtain gas components and contents and create spectrogram and report table by comparing with the expert spectrogram database using multiple patented algorithms. The analysis time is less than 1 s.

Intelligent warning
When detecting that the gas concentration reaches a dangerous value, the instrument triggers an alarm, giving light and sound warning and reporting to the control center. The alarm levels can be set to multiple levels through self definition.

Data storage
The monitoring data is displayed locally and in the control center in a real time manner, saved locally and uploaded to the server, which can be invoked and analyzed at any time. The measurement results automatically form daily, monthly and yearly monitoring reports.



Application Analysis

An EXPEC1950 open-path infrared gas analyzer is installed at the riverside of the factory boundary in a chemical industrial park, used for all-weather fully-automatic monitoring toxic and harmful gases diffused to the surrounding areas from the park. The equipment is installed in the safety station room, mainly monitoring such gases as hydrogen sulfide, ozone, nitrogen dioxide, sulfur dioxide, and carbon monoxide. The equipment automatically creates specific monitoring models according to the monitoring environment.

Safety station room

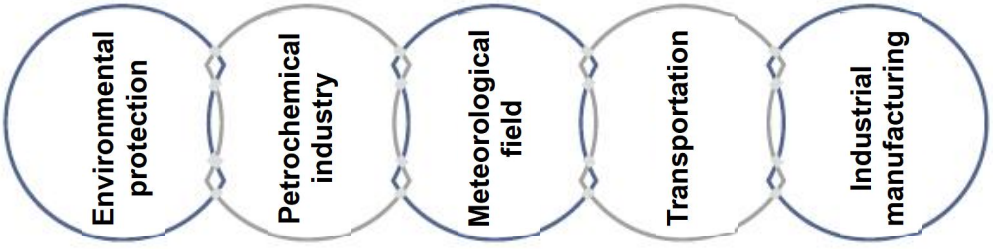
On-site installation picture

Central control screen

Introduction to safety station room

- The station room has concrete floor and occupies 4~10 square meters of land, and it is beautiful and elegant on the whole;
- A password-type burglar-proof door is provided, and the room is managed by dedicated persons, preventing outsiders from entering by mistake;
- There are power supply, air conditioning, lighting, firefighting and ventilating systems provided in the room, to keep the inside of the room dry and constant temperature;
- The overall waterproof, moisture-proof, lightning protection, grounding and firefighting properties meet relevant standard.

Application Scenarios



- Real-time warning monitoring of fugitive emissions in factory area

- Environmental air monitoring around urban transportation and expressways

- Warning for dangerous gases in industrial park and residential districts

- Warning monitoring of toxic and harmful gases in industrial production workshops

EXPEC TECHNOLOGY

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