EXPEC 1900
FTIR Gas Telemetering Instrument

// Identify toxic gases remotely, and ensure safety by reading images

EXPEC 谱育科技
TECHNOLOGY

➤ Instrument Introduction

EXPEC 1900 FTIR gas telemetering instrument plots the spatiotemporal distribution of toxic and harmful gases. It has visible visual imaging, night vision infrared imaging and chemical imaging functions, where the chemical imaging is realized with the advanced quick FTIR remote sensing technology. The instrument obtains the infrared spectra of the atmosphere in the target area through passive FTIR remote detection, and scans the infrared absorption spectra of the gases in the target area to qualitatively determine the gas components, quantitatively calculate the gas concentrations and plot chemical images based on the infrared fingerprint spectra of the gases using the deep neural network algorithm.

This instrument is especially suitable for circumstances where dangers cannot be determined. It helps users carry out risk assessment for the target object in a remote and non-contact manner, determine the chemical components of gas and corresponding concentrations, and master the distribution and diffusion situations of the gas on a large spatial scale. It is an effective technical guarantee in numerous fields such as environmental protection, safety monitoring, fire prevention, public security, petroleum chemical industry, and transportation, protecting the safety of people's lives and property and the ecological environment safety.
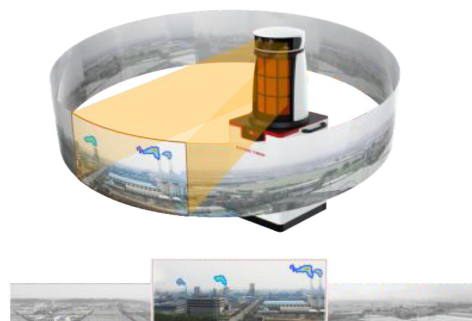
➤ Technical Parameters

| Parameters	Indicator
Measured component	Over 400 gases, including TIC, and VOC
Band range	600-5000cm^{-1} (expandable)
Lower limit of measurement	ppm- percent level
Interferometer	Independently designed Michelson interferometer
Detector	Stirling refrigeration, without liquid nitrogen
Measurement radius	5km
Measurement angle	360° horizontal, ±30° pitching
Display	Visible video recording, infrared video recording, chemical analysis video recording, three-in-one superposed display
Measuring methods	Continuous monitoring, remote video display on screen, automatic saving of results, automatic warning

Instrument Features

01 | **Visualization**

The chemical imaging with FTIR remote sensing as the core is combined with the visible/infrared video imaging, to disclose problem points and risk sources in the form of images. The instrument displays the cloud cluster size, concentration gradient, motion path and temperature gradient field of gas. It provides timely data basis for overall management of pollution sources and decision making for emergencies.

02 | **Intelligence**

The instrument can achieve all-weather fully-automatic visual angle patrol scanning. It provides watching and monitoring at fixed time and location for key areas, and can give automatic warning if finding abnormality. The instrument can automatically trace cloud clusters, to lock and display the position of a leakage source. It can clearly display the observed gas components and concentrations.

03 | **Wide coverage**

The instrument provides 360° full visual angle coverage, 60° vertical scanning, a routine measurement radius of 5 km and the maximum range of visibility of about 20 km. A full-area coverage can be achieved at the high point of visual field.

04 | **High detection accuracy**

The instrument uses a research-grade MCT infrared detector based on Stirling refrigeration (-200°C), coupled with a high-resolution FTIR optical remote sensing system and a patented data processing algorithm, enabling ppm level detection capability.

05 | **Strong detection function**

The instrument contains a standard spectrogram database of over 400 gases, including inorganic and organic gases from various chemical pollutants and combustion products, which can be expanded for customer requirements. In principle, it can detect tens of thousands of gases.

06 | **Mobile for emergency**

The instrument is in an on-board mode, so it can quickly arrive at an accident scene, to determine the components and concentrations of toxic and harmful gases in a remote manner, providing reliable data support for emergency response actions.

➤ Key Technology

360° scanning PTZ and 2D rotary galvanometer

- Automatic 360° full-coverage visual angle, 120° × 60° galvanometer, achieving quick 2D rotary scanning; allowing to set key areas for scanning;

- Diamond-like long-life shielding window, providing IP54 protection that meets the weathering requirement for outdoor operation, to protect the internal optical and electronic systems

Infrared/visible dual-pickup-camera imaging system

- Starlight-level visible pickup camera with high sensitivity and high dynamic range, with 24-hour monitoring

- Infrared imaging system, capturing polluting gas clusters and high temperature heat sources unidentifiable by human eyes
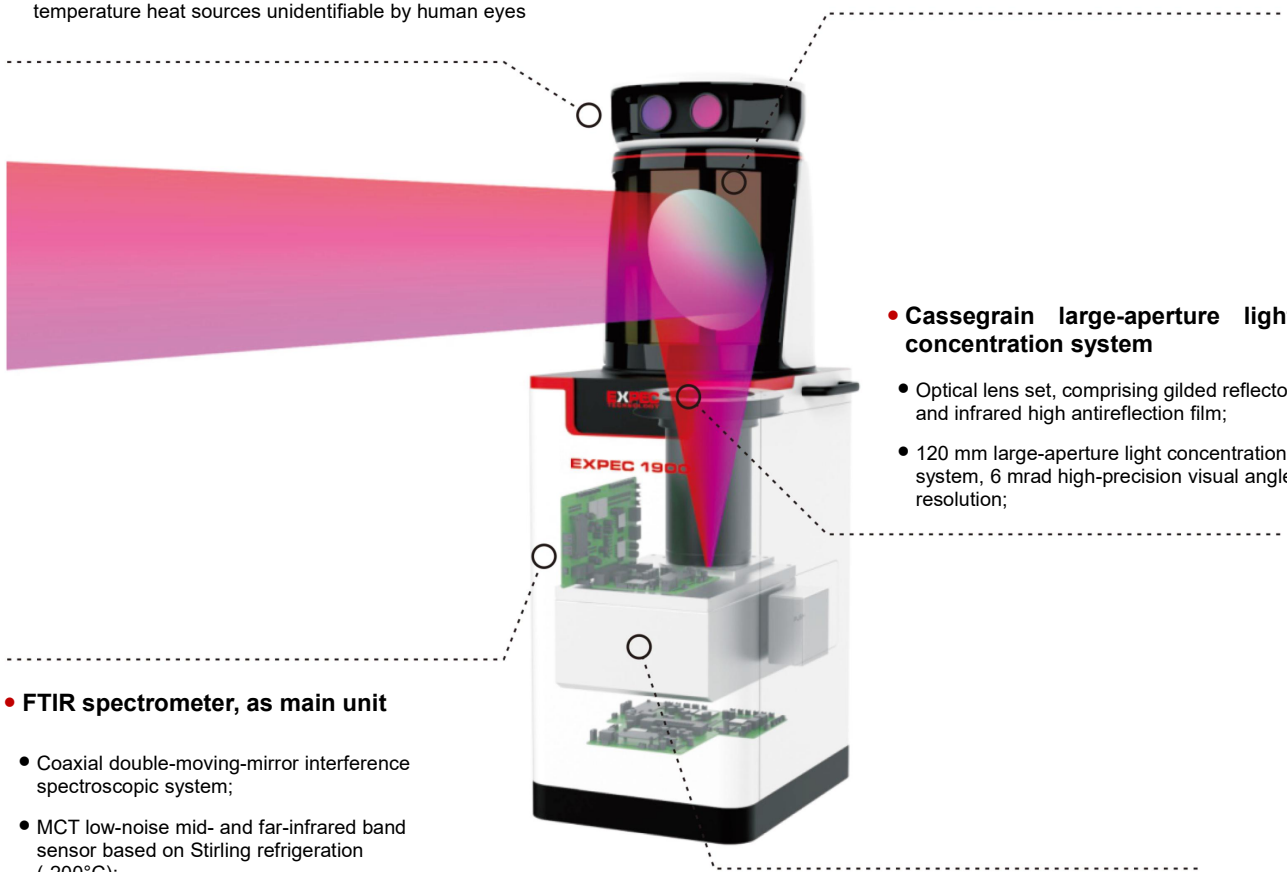
Cassegrain large-aperture light concentration system

- Optical lens set, comprising gilded reflector and infrared high antireflection film;

- 120 mm large-aperture light concentration system, 6 mrad high-precision visual angle resolution;

FTIR spectrometer, as main unit

- Coaxial double-moving-mirror interference spectroscopic system;

- MCT low-noise mid- and far-infrared band sensor based on Stirling refrigeration (-200°C);

- Dual-blackbody calibration system for metrological traceability;

- TEC temperature-controlled and frequency-stabilized VCSEL semiconductor solid laser, with a stable wavelength, and extended 5 times life;

1000M data acquisition and processing module

- 216k high-speed Fourier interference signal acquisition, 24-bit analog-to-digital conversion (ADC);

- FPGA+ARM dual-core architecture, 3.2G high-speed signal processing;

- Patented deep neural network analysis algorithm;

- Processing and fusion of three paths of video stream from infrared visual imaging, visible visual imaging and chemical imaging;

➤ Intelligent Software

Supporting self-built cloud and public cloud, with data automatically uploaded to the server, to facilitate joint operating of multiple computers, assisted analysis by external experts and interface with environmental protection and monitoring authorities;

The images from visible imaging, infrared imaging and chemical imaging are clearly displayed in a combined manner;

The measurement data is saved in detail, and is traceable (including spectra, pictures, compound types, position, and time);

User defined scanning mode, satisfying personalized detection demands;

Continuously expanded spectra database (mainly established for industrial toxic substances and pollutants), currently covering absolutely most main polluting gases.

➤ Application Area

Environmental protection

Safety guarantee in industrial park
Leakage monitoring of stored gas
Analysis of chimney gas emissions

Emergency safety

Response to transportation emergency
Response to emergency in storage of dangerous chemicals
Safety guarantee for large conference

Scientific research

Meteorological research
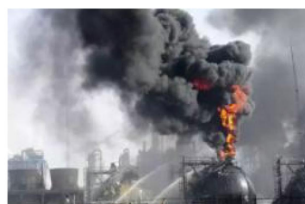Analysis of components of atmospheric pollutants

- Safety guarantee in industrial park

- Leakage monitoring of stored gas

- Monitoring of chimney gas emissions

- Leakage accident in storage of dangerous chemicals

- Leakage accident in transportation of dangerous chemicals

- Study on components of atmospheric pollutants

EXPEC
TECHNOLOGY

Hangzhou Expec Technology Co., Ltd.

Website:www.expec-tech.com

Address: No. 2466, Keji Avenue, Qingshanhu Subdistrict, Lin'an District, Hangzhou, Zhejiang

Tel: 400-700-2658