

GAFT-1 FTIR GAS ANALYSER



Brix Engineering Pte Ltd

190, Middle Road, #16-01, Fortune Centre, M: +65 9446 2236 Singapore - 188979.

sales@brixengg.com | www.brixengg.com

System Introduction

Overview

The GAFT-1 FTIR Analyzer is a product targeted at online gas analysis of environmental protection and industrial control. Based on Fourier Transform Infrared Spectroscopy (FTIR), it can simultaneously monitor multiple gas components in exhaust gas, including SO₂, NO, (NO, NO₂), CH₄, HCl, HF, CO, CO₂, O₂, H₂O, etc. Other gas components also can be extended as required, such as NH₃, SO₂, N₂, VOCs, etc. Multi-component measurement of AIO realizes accurate qualitative/quantitative analysis of waste incineration/ultra-low flue gas emission and high integration, greatly reducing maintenance cost and system cost.



Technical Advantages

Advantage 1 : High integration, simultaneously measure multiple components, including SO₂, NO, (NO, NO₂), CH₄, HCl, HF, CO, CO₂, O₂, HCO, etc. Other gas components also can be extended as required, such as NH₃, SO₂, N₂O, VOCs, etc.

Advantage 2: High temperature tracing in the whole process, based on FTIR technology and Non-linear Least Square Method to effectively solve the problem that H₂O will interfere the measurement of SO₂, NO,(NO, NO₂); with fast response and high accuracy

Advantage 3: Adopt White cavity optical path; with high signal-to-noise ratio, low detection limit and large dynamic range; the surface of endoscope inside gas chamber is plated with gold; with high reflectivity and long maintenance period

Advantage 4: Pyramid-type interferometer is with reflector structure design without affecting by vibration; with modular design, the whole structure owns features of less maintenance, convenient replacement and low maintenance cost

Technology Comparison

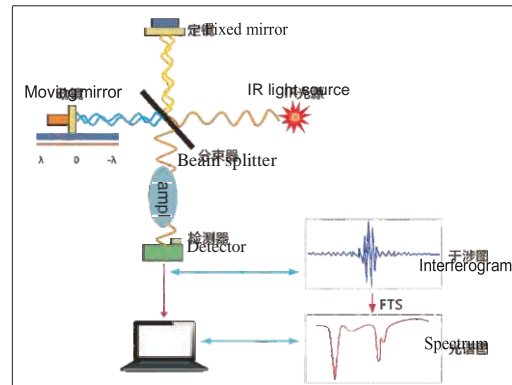
Brand A	Brand B	Our Product
High—temperature FTIR	High—temperature NDIR	High—temperature FTIR
A device can measure multiple components simultaneously	A device can measure multiple components simultaneously	A device can measure multiple components simultaneously
Low detection limit	Poor detection limit	Low detection limit, fast response
High cost	Low cost	Low cost, high cost performance
Less maintenance	Complicated structure, more maintenance	Modular design, less maintenance

Technical Principle

Detection Principle

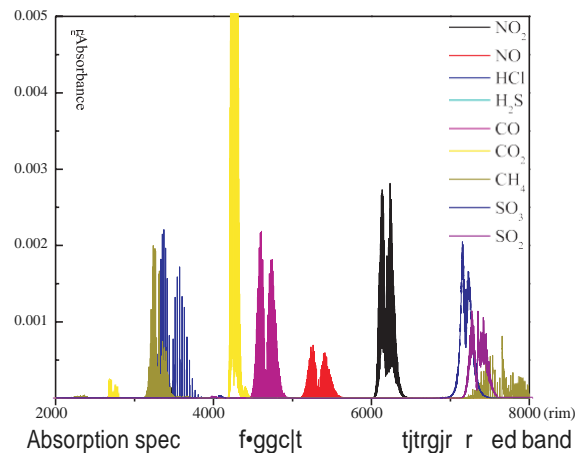
o Fourier Transform Infrared Spectroscopy (FTIR)

The FTIR technology owns wide coverage area. Each gas absorption has small interference and it can simultaneously measure multiple gas components. When the infrared radiation enters the interferometer, it will produce two beams of coherent light. The gas sample in the gas chamber absorbs energy of coherent light with specific wavelength. When interferogram that contains sample gas absorption information has been detected by the detector, computer will perform Fourier transform and obtain the infrared spectrum finally.



FTIR Schematic Diagram

When the infrared radiation passes gas sample, it can be observed that some infrared radiation of certain wavelength cannot get through the gas completely. That is to say, different gases will absorb the infrared radiation of specific wavelength. The infrared radiation interacts with gas molecules, and then the gas molecules gain energy from the infrared radiation to start vibration or rotation. All the vibration and rotation will cause absorption of specific wavelength in the infrared radiation. The energy transduction from infrared radiation to gas molecules leads to intensity reduction of some wavelengths in the infrared radiation.



The absorption spectrum presents absorption degree of sample in different infrared bands through graphical form. Spectrum displays a function that infrared radiation is regarded as wavelength when passing through gas. For each wavelength, to get transmittance T, divide the infrared radiation intensity when passing through the sample gas by the infrared radiation intensity when entering the sample gas. When there is no absorption, the value of transmittance T is 1 (or 100%), which indicates the infrared radiation in that wavelength is 100% passing through the sample gas. If the radiation intensity that enters the sample is I₀, and the radiation intensity through the sample is I, then the transmittance T can be expressed as:

$$T = I / I_0$$

In formula: T=Transmittance I₀=Intensity when entering the sample I=Intensity when passing through the sample

In addition, the logarithm of reciprocal value of transmittance T is the absorption of infrared radiation:

$$A = \log_{10}(1 / T)$$

In formula: T=Transmittance A=Absorbance

Every kind of gas will be absorbed at specific position, and concentration information for each kind of gas can be forecasted through the established relation model between sample gas absorbance and concentration.

Technical Parameter

Technical Index

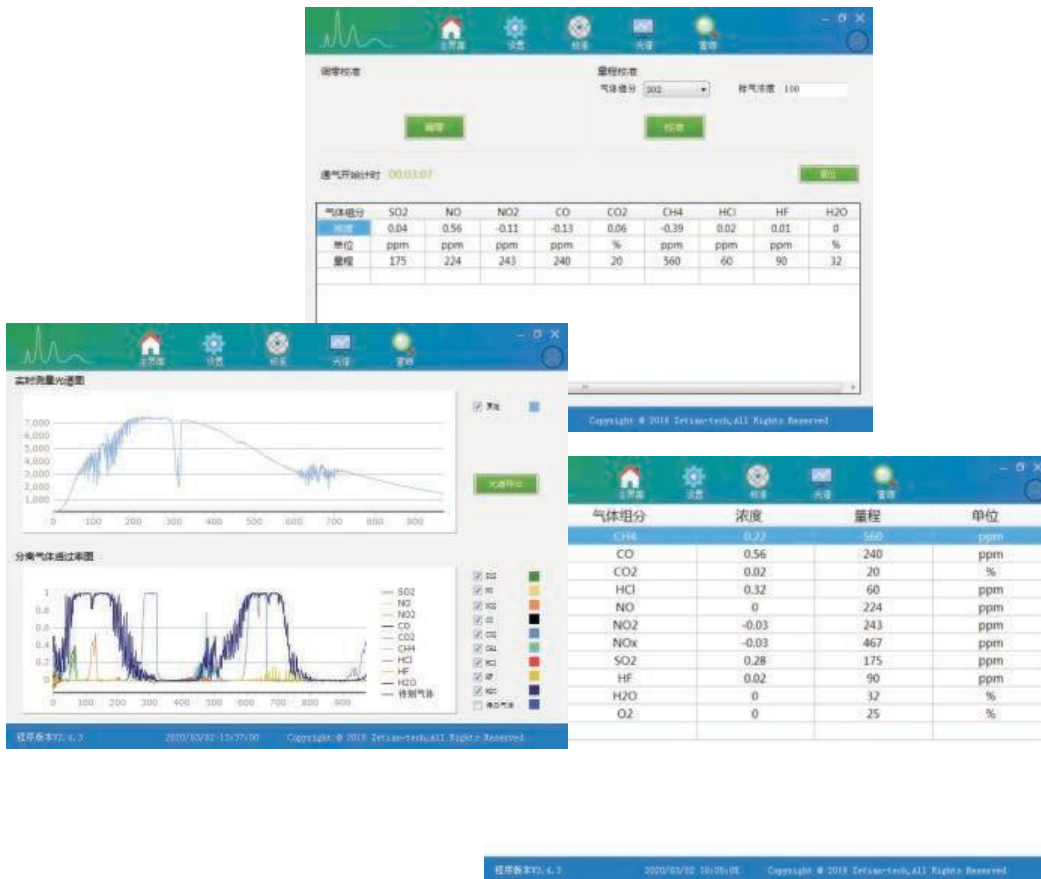
Parameter	Index	Parameter	Index
SO ₂ range	200mg/m ³	HCl range	200mg/m ³
NO range	300mg/m ³	HF range	200mg/m ³
NO ₂ range	300mg/m ³	CO range	20%
NO _x range	759mg/m ³	O ₂ range	25%
CO range	300mg/m ³	Zero drift	+ 2%F.5/7d
H ₂ O range	40%	Span drift	+ 2%F.5/7d
CH ₄ range	300mg/m ³	Linearity error	+ 2%F.S

Specification

Measuring principle	SO ₂ , NO, NO ₂ , CH ₄ , HF, HCl, CO, CO ₂ , H ₂ O: FTIR technology
	O ₂ : Zirconia principle
Communication interface	RS232, RS485, etc.
Communication protocol	Support Modbus protocol, customizable
Power supply	Rated voltage: (220 + 22)VAC; rated power: 1200W; AC frequency: 50/60 Hz
Working condition	Ambient temperature: -10-35°C; ambient humidity: < 90%RH, non-condensing
Dimension	19 inch*5U*610mm
Weight	35kg

Management Platform

Software Interface

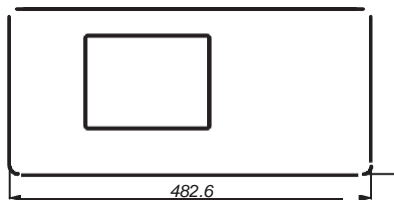


Software Function

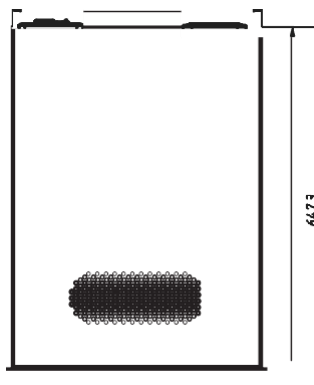
- FUNCTION 1:** Real—time data monitoring: measure concentration of pollutant components and gas components in real time (including SO₂, NO, NO₂, CO, CO₂, H₂O, HCl, HF, CH₄, and O₂)
- FUNCTION 2:** Auto calibration & light source self—inspection function: realize automatic zeroing and calibration
- FUNCTION 3:** Data query and processing: view current spectral energy value and energy curve; analyze spectral data automatically; calculate pollutant concentration
- FUNCTION 4:** Data storage and query: save data automatically; view historical data (including data in real time, data of minutes, hours, and days) according to time slot; can be exported in form of EXCEL
- FUNCTION 5:** Perfect information management: basic information entry of enterprises and monitoring points; employ user permission classification and record operation information to prevent from operating by unauthorized users and altering software parameters

Product Application

Chassis Dimension



Front View



Top View

Application Field

- Waste Incineration Power Plants
- Solid waste treatment plants
- Ultra-low emission monitoring
- Automobile surface coating
- Ship exhaust gas emission
- Petroleum refining & petro-chemistry

