

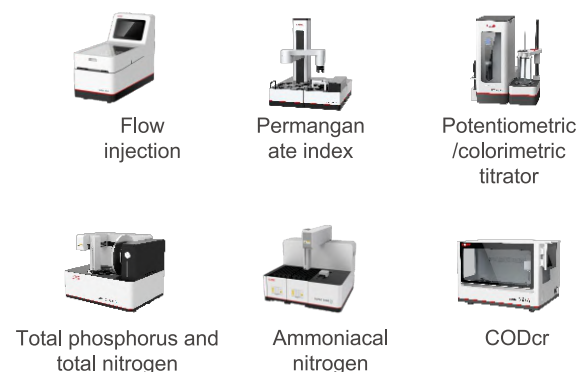
Chromatograph-mass spectrometer



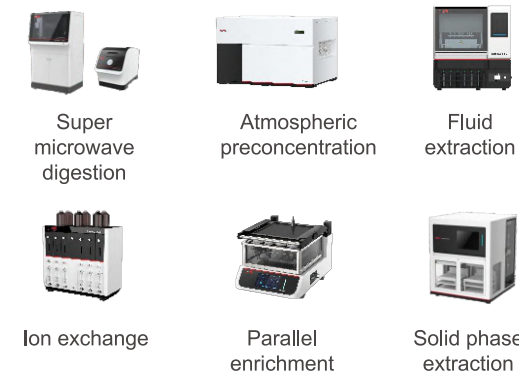
Spectrometer



Physical and chemical



Preprocessing



GC 2000 Gas Chromatograph
Extraordinary Design with Complementary Features



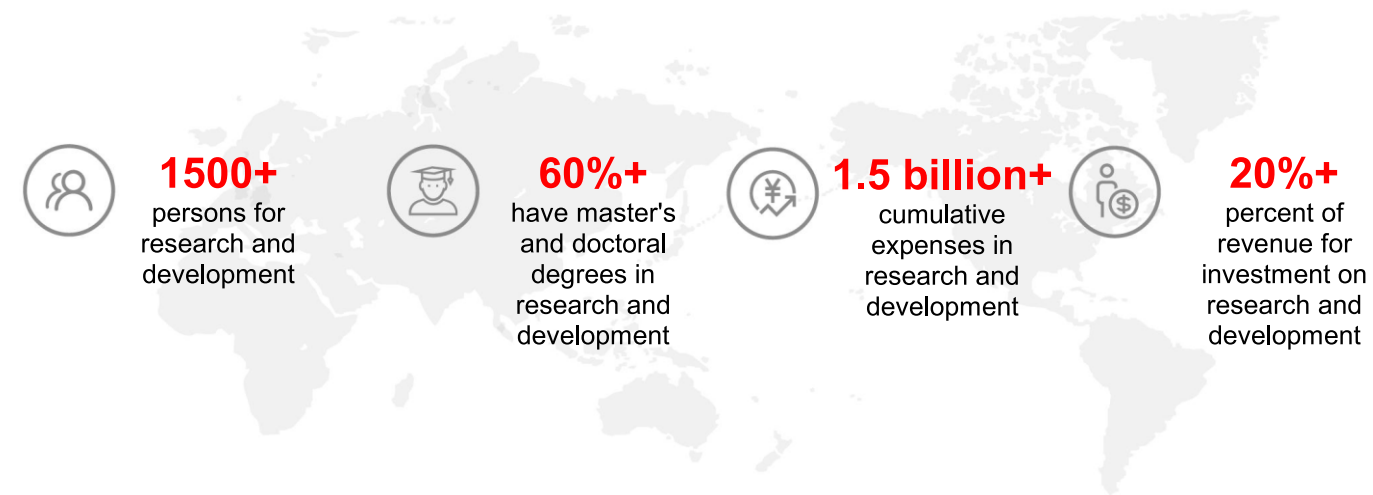
Ruko Arya Kemuning Blok A No.4
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About EXPEC

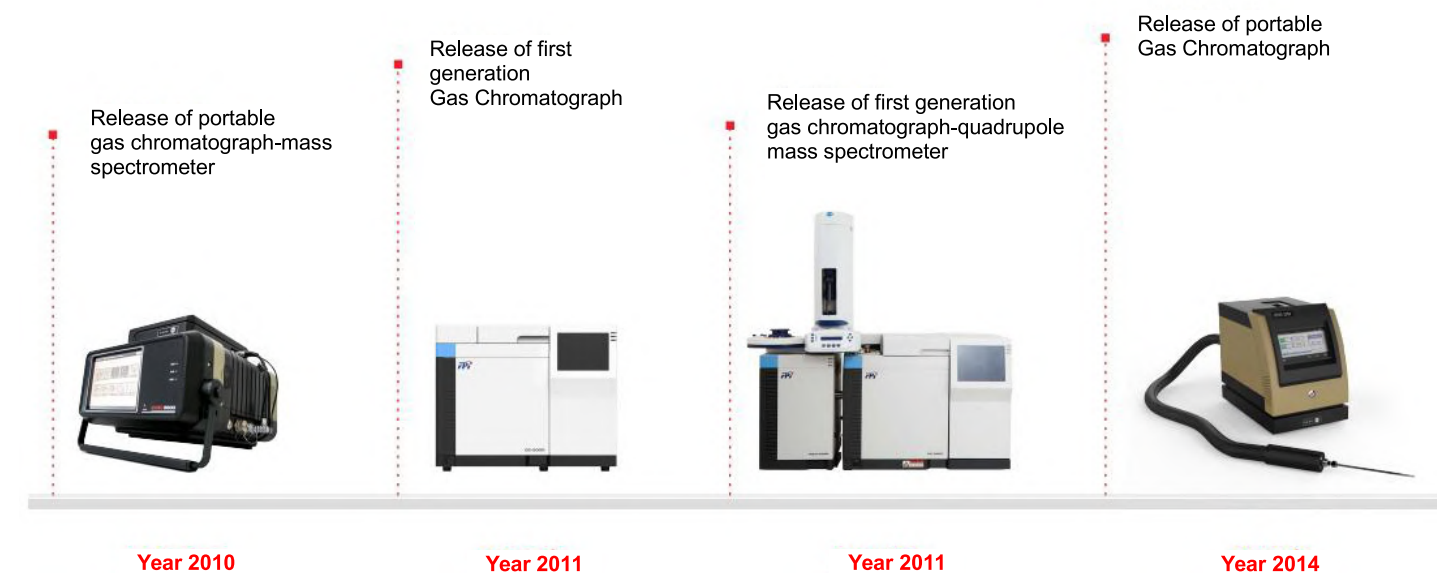
Founded in 2015, and headquartered in Hangzhou, Zhejiang Province, Hangzhou EXPEC Technology Co., Ltd. (EX Technology) is a national high-tech enterprise focusing on the R&D, industrialization, and innovative application of scientific instruments. Through innovation, we aim to achieve automated and intelligent analysis, detection monitoring in the field, grow into a world-leading scientific instrument manufacturer and support China's aspirati become a major player in the field of scientific instruments.

Our R&D team has adhered to "independent R&D, persistent innovation, and deep customization". After investing he in the R&D of major scientific instruments for more than 10 years, we have undertaken a large number of projects u the National Key R&D Program of the Ministry of Science and Technology and the formulation of national/ind standards, mastered the technologies for mass spectrum, chromatographic, spectrum, and physico-chemical ana and detection, as well as technologies of pre-injection gas, liquid and solid processing, developed a serie industry-leading product mixes for laboratory analysis, field analysis (portable, online, mobile) and automated ana and provided global customers with all-round specialized scientific analysis solutions in fields such as advanced ind environmental monitoring, medical diagnosis, life science, food, drugs and emergency safety.

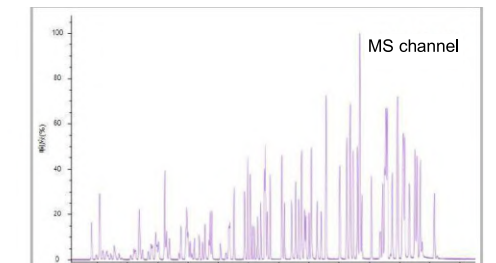
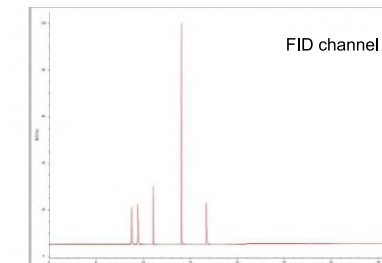


Development history of gas chromatograph/ gas chromatograph-mass spectrometer

Development history of gas chromatograph/gas chromatograph-mass spectrometer



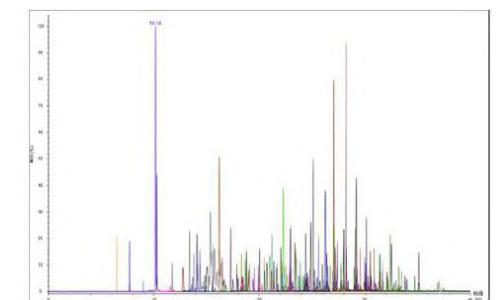
- The standards HJ 604 and HJ 38 of the Ministry of Environmental Protection of the People's Republic of China are widely used for the determination of methane and non-methane total hydrocarbon content. Since the non-methane total hydrocarbon analysis frequency is high, the sample size is large, and the analysis and calculation process is complex, the methane and non-methane total hydrocarbon analysis solution based on the GC 2000 gas chromatograph is equipped with an automatic bag sampler, which eliminates the need for manual attendance for repeated injection. At the same time, the dedicated methane and non-methane total hydrocarbon analysis software has a large number of built-in methodologies and automatic result calculation programs, with the sample results obtained by batch processing in only three steps, and the small valve box with independent temperature control ensures reproducible and reliable results.



- According to the *Monitoring Plan for Volatile Organic Compounds in Ambient Air in Key Areas* issued by the Ministry of Environmental Protection of the People's Republic of China, the GC 2000 gas chromatograph incorporates the EXPEC 3700 GC-MS analysis system and heart-cutting technology to cut the first 5 C₂-C₃ components (ethane, ethylene, acetylene, propane and propylene) to the polar column for separation, with the remaining 111 compounds detected on the non-polar column. Without column oven cooling, all 116 VOCs including aldehydes and ketones can be analyzed in one injection.



- GB23200.113-2018 *National food safety standard-Determination of 208 pesticides and metabolites residues in foods of plant origin-Gas chromatography-tandem mass spectrometry method* is the first national standard for multi-pesticide residue detection by GCMS/MS in China. Compared with traditional GC or GC-MS methods, the detection throughput, selectivity and sensitivity of the GC-MS/MS national standard method are greatly improved, which will become an important means for pesticide residue analysis in the industry. Equipped with the EXPEC 5232 GC-MS/MS mass spectrometry platform, GC 2000 has a methodology database containing thousands of compounds and adopts the intelligent MRM technology (MRM optimized for retention duration) to help food safety laboratories achieve high-throughput analysis of multiple pesticide residues.



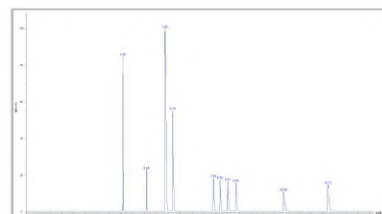
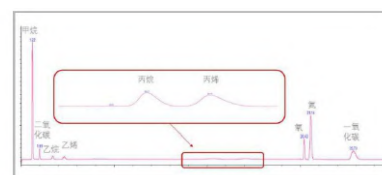
MRM Ion Pair Multi-channel Overlay

GC 2000 Gas Chromatograph



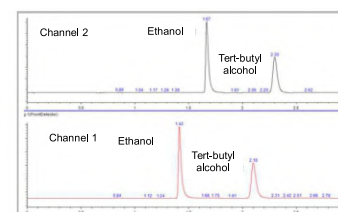
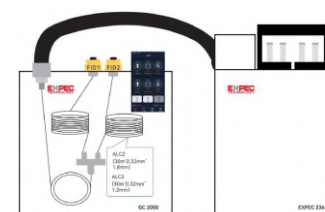
Application in energy and chemical industries

- The gas chromatograph needs to be closely integrated with the production process in the energy and chemical industries, so an engineered multi-valve multi-column scheme is required for the gas chromatograph. Different valves and columns of GC 2000 can be combined to meet the analysis requirements for non-condensable gas, natural gas, coal gas, refinery gas, etc.
- Atmospheric gas valves cannot meet the testing requirements for pressurized liquid samples (e.g., liquefied petroleum gas) in the energy and chemical industries. GC 2000 can be equipped with a high-pressure liquid valve to introduce pressurized liquid samples into the gas chromatography system for analysis.



Application in public security and judicial industries

- The alcohol content in blood is determined by headspace dual-channel gas chromatography according to GA/T 842-2019 *Examination Methods for Ethanol Concentration in Blood*. The blood alcohol analysis solution based on GC 2000 gas chromatograph and EXPEC 236 automatic headspace sampler combines the one-in-two-out dual-channel technology, which can divide the sample into two parts by one headspace injection, and make them enter two blood alcohol columns and two FIDs for detection respectively, so as to obtain the complete dual-column confirmation results with one injection.



Qingshan Lake Innovation Base of EXPEC Technology
Research-and-development and industrialization base for high-end scientific instruments (100 mu / 130,000 square meters)
Mass spectrometry instrument innovation center, Zhejiang Mass Spectrometry Technology Engineering Research Center, post-doctoral research center

Release of domestically produced explosion-proof-body gas chromatograph	Release of gas chromatograph-triple quadrupole mass spectrometer	Release of new generation GC 2000 Gas Chromatograph	Release of new generation gas chromatograph-quadrupole mass spectrometer
Year 2018	Year 2020	Year 2022	Year 2023

GC 2000 Gas Chromatograph

A trustworthy partner

The new-generation GC 2000 gas chromatograph is benchmarked against international leading brands, and the instrument adopts advanced electronic flow control, microfluidic plate control, high-precision independent temperature control and other technologies to meet the user's requirements for strong analytical capabilities and reliable stability.

A smart application expert near you

The new-generation GC 2000 has intelligent functions such as self-diagnosis, self-leak detection, self-saving of carrier gas, automatic reminders, etc., which help you easily grasp the instrument status and solve problems quickly. It can be matched with various pretreatment equipment such as solid phase microextraction, headspace, liquid sampler, etc. to meet your needs for more application expansion.

➤ Ultra-stable liquid injection port

- Fully electronic flow control is adopted with a self-diagnostic function and no need for manual soap leak detection, reducing the risk of system contamination
- Optional injection ports with permanent ultra-deactivated surface treatment are available, which makes it easy for users to deal with the detection of strong adsorption and corrosive samples



➤ Ultra-high-precision electronic pressure controller (EPC)

- The EPC core is made of ruby, and its excellent pressure control performance is consistent all day long
- The pressure control accuracy of the EPC can reach 0.001 psi



➤ World-class column oven

- Supporting up to 32-stage/33-platform temperature programs, and adapted to the most complex analysis methods
- Rapid equilibration of column temperature for minimal waiting time between analyses



Mass spectrometry detector capacity is enhanced to upgrade qualitative and quantitative levels

➤ Gas chromatograph-quadrupole mass spectrometer (GC-MS)

The EXPEC 3700 single quadrupole mass spectrometer (GC-MS) provides GC 2000 with dual advanced qualitative/quantitative capabilities. The combination of all-molybdenum metal pre-quadrupole and main quadrupole achieves more precise quality resolution; The inert ion source enables the mass spectrometry system to perform stably for variable samples and during long-term operation.

- High temperature inert ion source with dual filament design enables long-term instrument operation
- High-precision main quadrupole made of all molybdenum metal ensures long-term stable analysis without temperature control
- Molybdenum metal pre-quadrupole effectively avoids fringing field effect and supports polishing maintenance
- Multiple off-axis channel dynode detector effectively avoids neutral ion interference and improves instrument sensitivity
- High-speed vortex molecular pump ensures that the mass spectrometry system operates in a high vacuum state and effectively prolongs the service life of the instrument



➤ Gas chromatograph-triple quadrupole mass spectrometer (GC-MS/MS)

EXPEC 5231 triple quadrupole mass spectrometer (GC-MS/MS) has expanded the trace detection capability of GC 2000 to a new level and has become a triple quadrupole mass spectrometer with independent intellectual property rights. EXPEC 5231 adopts a cold-spot-free GC-MS interface and an EI ion source design to ensure efficient and stable sample transfer and ionization. The deactivated sample flow path realizes excellent stability, low matrix effect and strong target detection capability in the process of complex matrix analysis.

Excellent sensitivity

- Highly efficient EI ion source ionization efficiency and ion transmission efficiency
- Innovative pulse counting detection technology greatly reduces detected ion signal loss and effectively filters noise interference
- Innovative axial acceleration collision cell technology greatly improves collision efficiency

Excellent stability

- Innovative dual-channel RF power supply closed-loop adaptive adjustment technology improves the stability of quadrupole RF power supply
- Innovative anti-temperature and humidity alternation technology adapts to a wider range of temperature and humidity applications
- Deactivated flow path design of the whole machine achieves excellent reproducibility of target compounds in complex matrices



Both EXPEC 3700 GC-MS and EXPEC 5232 GC-MS/MS provide GC 2000 with outstanding scalability and can be better applied to scenarios such as food safety, environmental monitoring, life science, chemical energy, emerging materials, criminal investigation and forensic medicine.

GC 2000 Gas Chromatograph

Stability, efficiency and flexibility empower future gas chromatography laboratories



Liquid autosampler

- 16-bit, 110-bit and 150-bit sample positions can be selected according to sample throughput
- Dual-tower sample injection function is supported



Multifunctional sampler

- Multi-mode sample injection (liquid, headspace/solid phase microextraction) is supported
- Automatic aging of SPME fiber is supported



Automatic bag sampler

- 30-bit high-flux bag sample or syringe injection is supported
- Gas sample can be injected directly or after enrichment and concentration



Automatic headspace sampler

- 75-bit high-throughput sample waiting position and 12-bit simultaneous sample heating position are provided
- Priority injection function for urgent samples is supported



Atmospheric pre-concentration sampler

- Samples can be cooled to -160°C without liquid nitrogen
- Complete accessories for sampling, multi-position injection, tank cleaning, standard preparation, etc. are provided

Sophisticated valve system supports GC 2000 application effortlessly



Large valve box supports complex multi-valve independent temperature control
Up to 6 valves or narrow-bore columns are accommodated

Small valve box supports simple single-valve independent temperature control

Side extension installation of two detector positions is supported
Up to 4 detector positions are available for multi-valve applications

Gas valve

- Suitable for injection of atmospheric pressure gas samples and switching of different flow paths; Pipeline passivation supported

High pressure liquid valve

- Suitable for injection of high pressure liquid samples

Peek valve

- Suitable for injection of moderately corrosive gas samples and switching of flow paths

Applicable valve types



User-friendly workstation software

- Fully electronic flow control is adopted with a self-diagnostic function and no need for manual soap leak detection, reducing the risk of system contamination
- Optional injection ports with permanent ultra-deactivated surface treatment are available, which makes it easy for users to deal with the detection of strong adsorption and corrosive samples



Excellent human-computer interaction experience

- The human-computer interaction APP is based on Android intelligent operating system, the interface is in Chinese, the skeuomorphic graphic UI design is incorporated, and the monitoring content is clear at a glance
- The 8-inch color screen display is ultra-large, the resolution is 1280*720 (RGB), and the capacitive screen provides full touch operation

Supporting multiple detector options (up to four at the same time)

- Flame Ionization Detector (FID)
- Electron Capture Detector (ECD)
- Flame Photometric Detector (FPD)
- Pulsed Flame Photometric Detector (PFPD)
- Thermal Conductivity Detector (TCD)
- Mass Selective Detector (MS)
- Triple Quadrupole Mass Spectrometer (MS/MS)
- Helium Ionization Detector (PDHID)

GC 2000 Gas Chromatograph

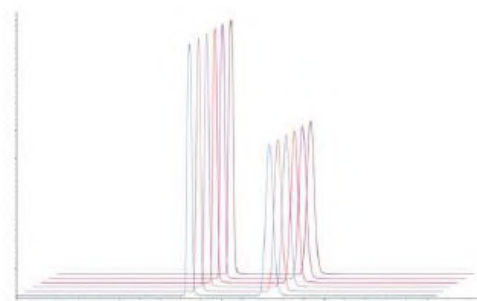
Stability, efficiency and flexibility empower future gas chromatography laboratories

In addition to achieving excellent analytical capabilities, future chemical analysis laboratories will pursue stable data quality, efficient human-machine collaboration, and flexible expansion space, whether for scientific research or daily testing.

The GC 2000 gas chromatography system is designed for this purpose. With solid hardware materials, intelligent software interaction and rich supporting combinations, GC 2000 can easily meet the detection needs in the fields of food safety, environmental monitoring, life and health, chemical energy, emerging materials, criminal investigation and forensic medicine, and provide comprehensive solutions for future gas chromatography laboratories.



High-precision electronic gas circuit control ensures accurate and consistent analysis results

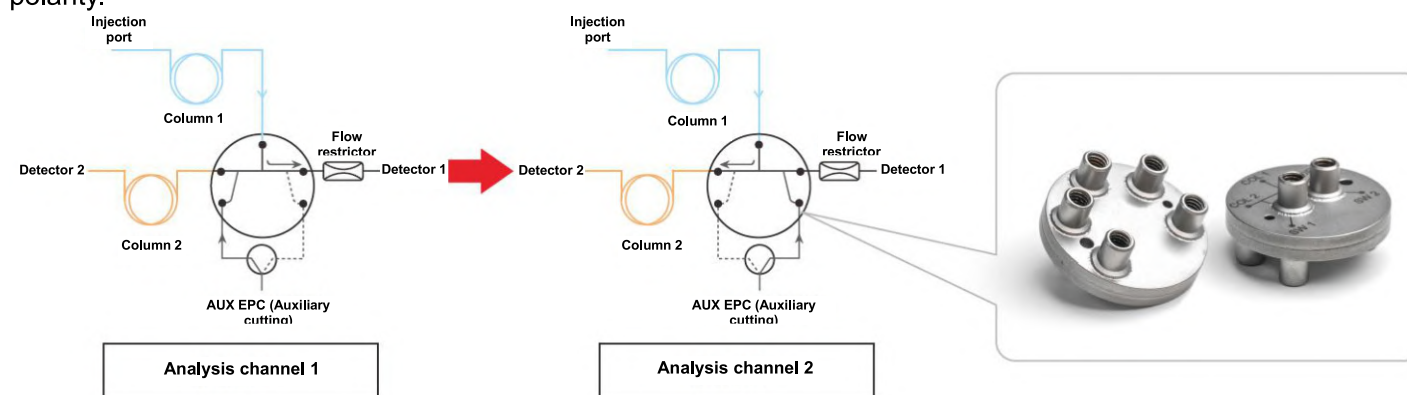


Repeatability Performance with RSD Less than 1% at
Ultra-high Control Accuracy of 0.001 psi

The EPC core component of GC 2000 is made of ruby. The hard texture of ruby makes the gas path less susceptible to environmental factors. Therefore, GC 2000 has ultra-high precision electronic gas path control capability of up to 0.001 psi, high stability and good repeatability, ensuring that laboratory testing obtains stable data day after day.

Heart-cutting technology provides more options for separation

GC 2000 high-precision EPC supports full-process constant flow control for heart-cutting applications. When most components of the complex sample are gradually separated in the first column according to the chromatogram, the chromatographic peaks from local co-distillation can be further separated in the second column with different polarity.



Ultra-deactivated surface treatment technology eliminates matrix effect and invalid peak shape

When analyzing complex matrix samples, especially compounds with strong activity in complex matrices, the varying degree of matrix effect has a great impact on the reliability of quantitative results.

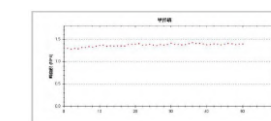
GC 2000 applies the cutting-edge ultra-deactivated surface treatment technology, which greatly shields the active sites on the flow path surface and avoids the residues in the matrix or target component flow path. This makes the response of the target component consistent in the matrix sample and pure solvent, eliminating the problems caused by the matrix effect.



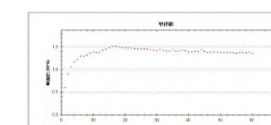
In chemical analysis laboratories, it is desirable to obtain perfectly separated, symmetrical and sharp peak shapes. However, the peak tailing or peak tailing interfere with the separation effect. Especially for components with heteroatoms in the structure, the active groups composed of nitrogen, oxygen, phosphorus, sulfur, etc. on the molecule will interact with the active sites in the flow path to create an adsorption effect and change the peak shape.

GC 2000 ultra-deactivated treatment technology effectively treats the active sites on the sample flow path surface, making it impossible for the active groups to interact with the flow path surface, and effectively improving the peak shape and separation. GC 2000 can achieve symmetrical and sharp chromatographic peaks and excellent chromatographic separation effects when used for the analysis of active sulfides.

Matrix Effect Comparison

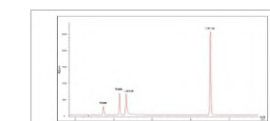


Deactivated Injection Port



Common Injection Port

Peak Shape Comparison



Deactivated Injection Port



Analysis of 4 Sulfides at Common Injection Port

Smart interactive experience is combined with classic style

Smart touch screen - infinite possibilities with a click

8-inch true color touch screen, with built-in Chinese and English bilingual interactive applications based on Android operating system. The smart screen can be operated as easily as a mobile phone, unlocking limitless possibilities for human-computer interaction.



Classic style without changing software usage habits

The software interface of the GC 2000 gas chromatograph workstation inherits the user's consistent usage habits for decades. Users do not need to re-learn the system software to obtain the desired results.



Data statistics - powerful data analysis software

The data analysis software of GC 2000 can not only process the analysis results of multiple samples in batches, but also perform the statistical operations among different samples and graphically display the operation results. There is no need for Excel secondary processing, and the differences and change trends between samples are instantly accessible and clearly visible with a single click.

