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## Model and technical index of GC-7820 gas chromatograph

GC-7820 gas chromatograph is composed of sample injector, detector, chromatographic column box, gas flow control system, heating control system, signal detection system and network data transmission workstation.

### A. GC-7820 Gas Chromatograph

GC-7820 type gas chromatograph is improved on the basis of GC -6890 type, which has made a qualitative leap in its automation and overall performance. The instrument has a powerful network remote control function, making the instrument unattended, decentralized monitoring, and centralized control a reality . Figure 1.5 Appearance of GC-7820 Gas Chromatograph



Figure 1.5 Appearance of GC-7820 Gas Chromatograph

#### Main Specifications:

- Operation display : 8- inch **high-definition** color LCD touch screen, which can be used as a handheld controller ;
- Temperature control area : 8 channels ;
- Temperature control range : 4 °C to 450 °C above room temperature, increment: 1 °C, Accuracy:  $\pm 0.1$  °C ;
- Program heating order : 16 ( expandable ) ;
- Rising rate : 0.1 ~ 60 °C /min ;
- Air circuit control : precision mechanical valve flow control;
- External events : 8 channels; auxiliary control output 2 channels;



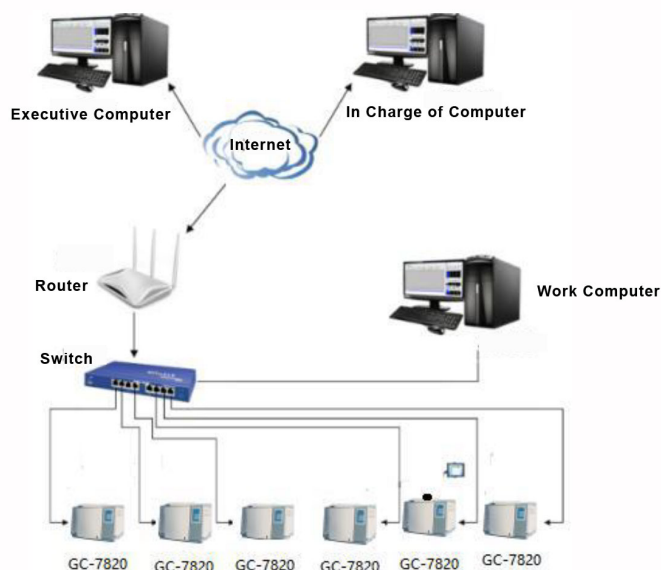
## Features of GC-7820 Gas Chromatograph

A traditional gas chromatograph works in the form of 1 chromatograph, 1 workstation, 1 computer, and 1 printer. This way of working makes it very inconvenient for users such as chemical plants, laboratories, and colleges with more chromatographic equipment to use and manage, and the repeated investment and waste of equipment is serious. Equipped with a large number of computers also brings a lot of inconvenience to users in equipment management and data management. At the same time, this traditional mode often requires the use of a gas chromatograph from one manufacturer and a workstation from another manufacturer, which makes it difficult to perform the overall functions of the system and improve the performance of the system. Not to mention (such as remote transmission of data, monitoring of multiple instruments, etc.).

Aiming at the disadvantages of using this traditional gas chromatograph, applying decades of development results, adopting brand-new industrial design, applying the current mainstream network communication technology to gas chromatograph, and developing a new gas chromatograph with international advanced technology. The instrument adopts the latest highly integrated industrial-grade chip, bus technology, Ethernet technology, micro-flow gas control technology and data processing software, which optimizes the temperature control accuracy and gas control accuracy, and fundamentally improves the reliability of the instrument.

GC-7820 gas chromatograph adopts network communication technology and has a built-in high-precision AD conversion circuit, so that multiple chromatographs can share a set of computers to complete data analysis, printing, and storage; and realize remote control and chromatography of the instrument. The long-distance transmission of data facilitates the real-time tracking and management of product quality by enterprise managers.

The following figure is a simplified diagram of the working mode of the GC-7820 chromatograph:



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Figure 1.2 Simplified diagram of the working mode of GC-7820 gas



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### GC-7820 gas chromatograph features:

- ★ The 8 -inch color LCD touch screen equipped with the instrument supports hot swapping and can be used as a handheld controller;
- ★ Better thermal insulation effect: when the temperature of the oven, steam room and detector reaches 300°C, the maximum outdoor temperature is 40°C
- ★ Chromatographic Data Processing Combined with Instrument Operation Control, Making Easy Operation.
- ★ The instrument can be connected to the manufacturer through the Internet to realize remote diagnosis, remote update, etc. (requires user settings);
- ★ Using multi-thread technology for signal acquisition, data processing, and management users can work concurrently at the same time
- ★ The instrument adopts a multi-processor parallel working mode, which makes the instrument more stable and reliable; it can be equipped with a variety of high-performance detectors, such as FID, TCD, ECD, FPD and NPD, and up to three detectors can be installed at the same time to meet complex Sample analysis requirements.
- ★ The instrument adopts a modular structure design, and the later maintenance is simple and convenient.
- ★ The brand-new microcomputer temperature control system has high temperature control accuracy, excellent reliability and anti-interference performance; it has eight completely independent temperature control outputs, which can realize 16- step temperature programming, and has an automatic back-opening system for the column box, which can control the near room temperature. Increase, faster heating/ cooling speed;
- ★ Double column compensation function, which can effectively suppress baseline drift and noise influence background.
- ★ Oven with large capacity (300\*280\*180mm) can hold 2 pcs capillary column 0.32mm in diameter (length: 80m).
- ★ The chromatographic machine has a built-in low-noise, high-resolution 24 -bit AD circuit, and has the functions of baseline storage and subtraction.
- ★ The standard workstation is suitable for Win XP, Win2000, Win7, Win8, Win10 and other operating systems.
- ★ The microcomputer system of the chromatograph with completely independent intellectual property rights has the standard protocol of MODBUS/TCP, which can be connected to the DCS system.
- ★ Three independent connection IP addresses are designed inside the instrument, which can be connected to the working computer (the laboratory site), the computer in charge (such as the quality inspection department, the production department, etc.), and the executive computer (such as the Environmental Protection Bureau, the Technical Supervision Bureau, etc.), Real-time monitoring of instrument operation and analysis of data results when needed;
- ★ The advanced 10M / 100M Ethernet communication interface is adopted, and the built-in IP protocol stack enables the instrument to realize long-distance data transmission through the enterprise internal LAN and the Internet; it is convenient for setting up the laboratory, simplifying the configuration of the laboratory, and convenient management of analytical data;
- ★ Self-test, power protection, keyboard lock, auto-ignition function and tampering double power interference
- ★ Equipped with an extended analysis result communication interface, support development secondary and expansion of user functions Can read sample data with A/A standard compliant CDF files (American Institute of), from which it can connect to the Agilent chromatography workstation, Waters;
- ★ Adopts unique Hi-Fi digital filter algorithm, has strong deep ability tackling noise
- ★ Data processing has: normalization, normalization method, single point calibration (point method standard internal single point, external standard single point method), multi-point correction (standard method multiple internal, multiple point external standard method)
- ★ The dedicated workstation equipped with the instrument can support the access of multiple chromatographs at the same time, realize data processing and instrument reverse control, and simplify document management ;



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- Types of injectors : packed column injection, capillary tube injection, six-way valve gas injection, automatic sampler ;
- Number of detectors : 3 (maximum); FID , TCD , ECD , FPD and NPD optional ;
- Start sample injection : manual and automatic are optional;
- Communication interface : Ethernet: IEEE802.3 ;

## B. Detector Specifications

### 1. Hydrogen flame ionization detector (FID)

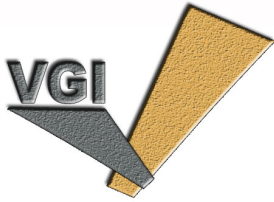
- Linear range :  $\geq 10^6$
- Detection limit :  $\leq 5 \times 10^{-12}$  g/s (hexadecane/isooctane)
- Baseline noise :  $\leq 0.05$  P A
- Baseline drift :  $\leq 1 \times 10^{-13}$  A /30min

### 2. Hydrogen Generator:

1. Mains supply voltage : 220v 50Hz
2. Maximum power : 150W; 180W
3. Ambient temperature : 0-40°C, relative humidity <85%.
4. Environmental conditions : without much dust and corrosive gas.
5. Gas purity : 99.999% (relative oxygen content)
6. Output flow : Type 300 0-300 ml/min; Type 500 0-500 ml/min
7. Output pressure : 0.4Mpa (if special pressure is required, notification should be given to factory before leaving the factory to determine other things)

### 3. Thermal Conductivity Detector (TCD)

- Baseline noise :  $\leq 20$   $\mu$ V
- Linear range :  $\geq 10^4$
- Baseline drift :  $\leq 3$   $\mu$  V /30min
- Sensitivity :  $S \geq 10000$  mV•ml/mg ( benzene/toluene ) ( With magnification of 1, 2, 3, 4 times optional )



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#### 4. Electron capture detector (ECD)

- Detection limit :  $\leq 1 \times 10^{-13}$  g/ml (BHH-isooctane solution)
- Baseline noise :  $\leq 0.03$  mV
- Baseline drift :  $\leq 0.2$  mV /30min
- Linear range :  $10^3$
- Radiation source :  $^{63}\text{Ni}$

#### 5. Flame Photometric Detector (FPD)

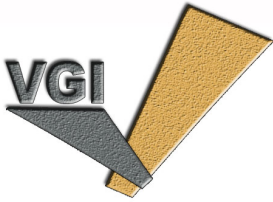
- Linear range : for Phosphorus  $\geq 10^3$
- Detection limit :  $\leq 5 \times 10^{-11}$  g/s (S thiophene)  
(P)  $\leq 1 \times 10^{-12}$  g/s; (methyl parathion-absolute ethanol solution)
- Baseline noise :  $\leq 3 \times 10^{-13}$  A
- Baseline drift :  $\leq 2 \times 10^{-12}$  A/30min
- Linear range : for Sulfur  $\geq 10^2$

#### 6. Nitrogen and phosphorus detector (NPD)

- Detection limit : (N)  $\leq 5 \times 10^{-13}$  g/s,  
(P)  $\leq 5 \times 10^{-13}$  g/s; (methyl parathion-absolute ethanol solution)
- Baseline noise :  $\leq 5 \times 10^{-13}$  A
- Baseline drift :  $\leq 2 \times 10^{-12}$  A/30min
- Linear range : nitrogen  $\geq 10^2$ , phosphorus  $\geq 10^2$

#### 7. Electronic gas pressure and flow measurement system:

- Flow measuring range : 0~500 sccm;
- Standard pressure level : 0.01 kPa;
- Pressure sensors : maximum 13;
- Pressure range : 0 ~ 0.3 MPa;
- Pressure and flow calculation algorithm : 13 bands; (temperature automatic compensation algorithm and atmospheric pressure) Flow measurement sensor: 3 lanes (maximum); gases: nitrogen, air, hydrogen, helium, argon;



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## 8. Air Generators:

The main technical parameters are as follows:

1. Working condition : power supply voltage 220V and frequency 50Hz.
2. Ambient temperature : between 15-40 degrees Celsius with a relative humidity of less than 70%, and free from a lot of dust and corrosive gas pollution.
3. Air purity : three-level filtration without oil.
4. Output flow rate : 0-2L/min
5. Output pressure : output A with range 0-0.4Mpa and output B with range 0-0.5Mpa.
6. Noise : less than 42 decibels.
7. Rated power : 150W; 180W

## 9. Trolley

Specifications:

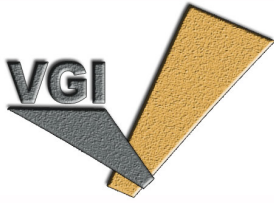
- Trolley 3 shelves
- Dimensions : 105 cm x 50 cm x 85 cm
- Material : Stainless steel plate, Stainless steel pipe

## 10. Power Supply:

AC110/220V $\pm$ 10%, 50/60Hz.

## EPC control system, EFC

EPC control system, EFC is a gas flow control system designed and manufactured with accurate proportional valve, pressure sensor and flow sensor. Compared to control traditional mechanical valve, it has much better gas pressure and flow control accuracy, improve the degree of automation of equipment, eliminating the drawbacks that mechanical valves traditional can not compensate for temperature, thus improving the overall performance of the instrument can carry one or three EPC, EFC control modules. The instrument can configure up to 24 gas pressure and flow control lines. The EPC control module, EFC operates on all workstations and is implemented via the keyboard instrument.



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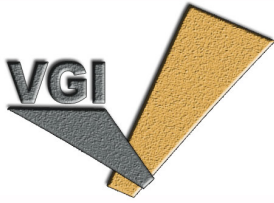
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