



Gas Chromatograph GC-4000 Plus



GL Sciences Inc.

Gas Chromatograph GC-4000 Plus

Be active in various fields with analysis . . .

- ✓ High Performance
- ✓ Excellent Reproducibility
- ✓ Easy Operation



High Performance



① Inlets

● Direct Inlet (For Packed Columns)



Inlet for packed columns such as packed glass columns (6.2 mm O.D.) and stainless columns (3.18 mm O.D.).
On-Column style is available for packed glass columns to introduce the sample directly into the column inlet port, and dedicated SUS column adaptor is available for stainless columns.

● Split / Splitless Inlet (For Capillary Columns)

Easy to change split proportions and column flow rate.

● Direct Inlet with Septum Purge (For Wide Bore Columns)

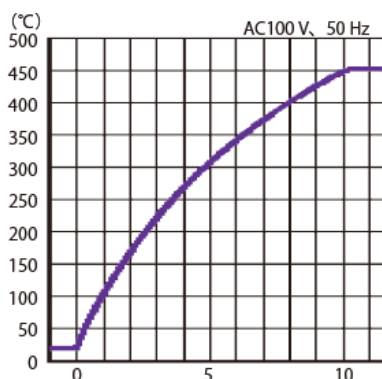
This inlet enables direct injection of samples to wide bore columns (0.53mmID.).
Bleeding from septum is decreased by Septum Purge.

② Column Oven

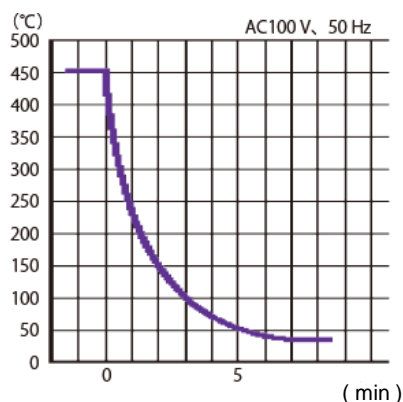
The column oven is designed the fantalicious temperature stability and achieve the high reproducibility on the capillary column analysis.
High speed rising and cooling make it possible to boost productivity.



(Temperature Rising)



(Temperature Cooling)



High Performance

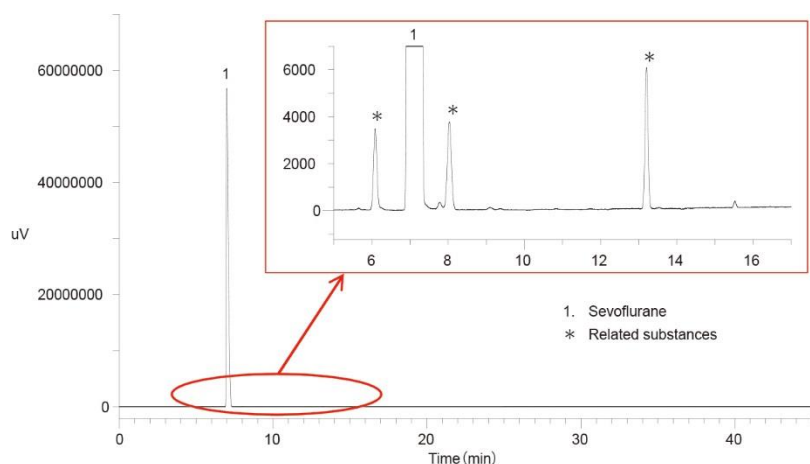


③ Detectors

● Flame Ionization Detector (FID)

Auto-range FID eliminate the need of range switching.
When flame-out, it will be reignited and turn on/off the supplied gases automatically due to EPFC.

Analysis of Sevoflurane (Under the Condition of Japanese Pharmacopoeia 16)



Column : InertCap 624
0.32 mm I.D. × 30 m df = 1.8 μm
Col.Temp : 40°C(10 min)-10°C/min-200°C
Sample : Sevoflurane
Sample Size : 2 μL

● Thermal Conductivity Detector (TCD)

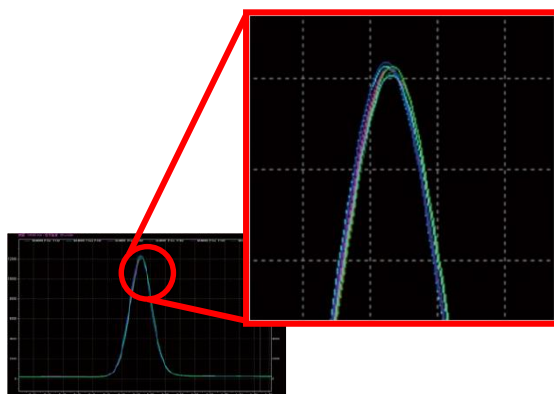
Auto-Zero function is added. Built-in high sensitivity tenfold amp.



④ Built-in Electronic Pressure Flow Controller (EPFC)

EPFC, a newly developed technology offers high accuracy control for the carrier gases and good reproducibility for the data. Furthermore, It can be used for high throughput analysis using the narrow-bore column.

Split/Splitless injector can select the gas save mode for reducing the supplied gases.



Column : InertCap 1
 0.25 mm I.D. × 30 m df = 0.25 μm
 Col.Temp : 50°C(2 min)-20°C/min-200°C
 Sample : Decane(100 mg/L)
 Sample Size : 1 μL

● Retention time

	1	2	3	4	5	6	7	8	9	10	AVE	STDEV	RSD(%)
Retention time (min)	6.342	6.343	6.343	6.343	6.343	6.343	6.343	6.343	6.343	6.343	6.3428	0.0004	0.0066

Improved Design for Easy-To-Use

● Simple Design

4 colors display inform the current condition of the system.

READY
 OVEN TEMP 40 40<
 PROG TIME 12.00
 INITIAL TEMP 40

Ready

ERR10
 INJ2 PRESS LOW
 PLEASE CHECK
 THE GAS <CLR>

Error

GAS SAVE INJ2
 COL.F. 1.00 1.00<
 COL.P. 75.9
 SPLIT F. 10.0 50.0

Gas save

RUN RATE1
 OVEN TEMP 84 84<
 PROG TIME 12.00
 INITIAL TEMP 40

Busy (Analysis)

● Convenient Auto functions

Auto Startup

After turning on “START UP”, “Carrier gas supplying”, “Heating on” and “Ignition of FID” will be performed automatically.

Auto Shutdown

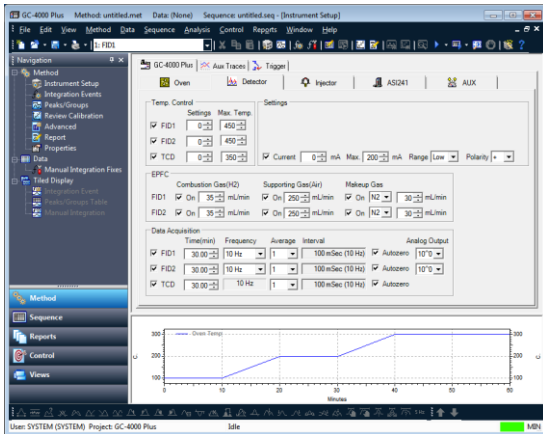
After analyzing, if “SHUT DOWN” is turned on, “Heating off”, “FID shutdown”, Carrier gas off” and “Oven fan off” will be performed automatically.



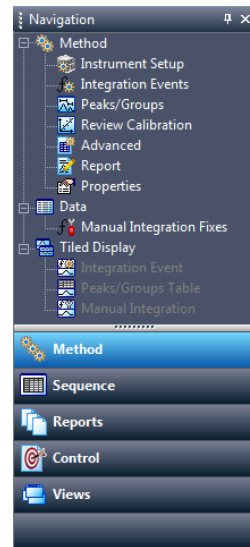
Open LAB CDS EZChrom Edition

Data processing software . . .

GC-4000 Plus can be controlled by Open LAB CDC EZChrom Edition.



Navigation window which is new function offers each parameter can be accessed easily.



“SHUT DOWN” function can be configured in Schedule of the data processing software, therefore the excessive gases can be reduced.

Auto Injector ASI 241i

ASI 241i can perform the various injection methods. It offers high reliability and boost productivity.

Auto sampler ASI 241s



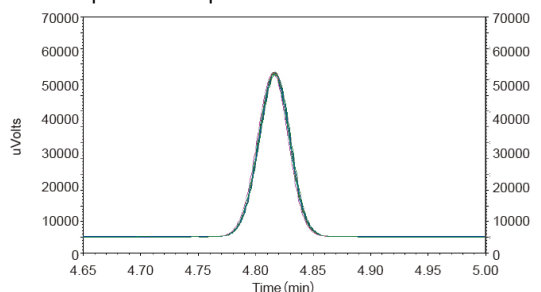
150pcs 1.5mL and 96pcs 4.0mL vials (Option) can be set on this table. It's very convenience for the analysis of a number of samples.



● Excellent reproducibility

	1	2	3	4	5	6
Area	103765	104610	104257	103707	104130	104857
7	8	9	10	AVE	STDEV	RSD(%)
103912	104168	103604	103620	104063	425.319	0.409

Column : InertCap 1
 0.25 mm I.D. × 30 m df =0.25 μm
 Col.Temp : 80 °C
 Sample : Cumene(0.1 %)
 Sample Size : 1 μL



Standard System

GC-4000 Plus SF	Split/Splitless Inlet × 1, Single FID × 1
GC-4000 Plus WF	Direct Inlet with Septum purge × 1, Single FID × 1
GC-4000 Plus DSF	Direct Inlet × 1, Split/Splitless Inlet × 1, Single FID × 1
GC-4000 Plus DDT	Direct Inlet × 2, TCD × 1
GC-4000 Plus DSTF	Direct Inlet × 1, Split/Splitless Inlet × 1, TCD × 1, Single FID × 1
GC-4000 Plus DDF(F)	Direct Inlet × 2, Differential FID × 1
GC-4000 Plus DDTF(F)	Direct Inlet × 2, TCD × 1, Differential FID × 1

Specifications

■ Column Oven

Type	Forced circulation isothermal air oven
Dimension	250(W) × 160(D) × 250(H)mm
Temperature Range	Room Temperature +5 °C (inlet & detector @ 300 °C) -450 °C
Cooling Time	450→50 °C within 6 mins (After setting for 1 minute at 450°C, power line voltage at 220VAC, room Temperature 20 °C) The heaters at inlet and detector are OFF
Temperature Coefficient	Below 0.1 °C to Ambient Temperature 10 °C (Ambient Temperature 10~30 °C)
Temperature Accuracy	Setting Temperature (Absolute Temperature) ± 1 %
Temperature Deviation	Within ± 1% (Coil Diameter 170 mm @ 150 °C)
Overheating Prevention	1)Observation at the highest temperature (Settable in range of 50~450 °C) 2)Observing circulation by the temperature sensor (Observing temperature fixed at approx 500 °C)

■ Temperature Program

Rising Levels	7 Levels
Temperature Setting	0 ~ 450 °C(1 °C)
Programming Time	999.99 min (All Steps Total)
Temperature Rise	0~99.9 °C/min (0.1 °C/min)
Program File Number	30

■ Body

Electric Source	AC 220 V ± 10 %
Dimension	Approx.562 (W) × 520 (D) × 450(H) mm
Weights	Approx.46 kg (DSF)

■ Inlets

Temperature Range	Room Temperature~450 °C
Overheating Prevention	Observation at the highest temperature (80~450 °C)
Type for packed columns	Direct Inlet → D
Type for capillary columns	Split/Splitless Inlet → S
Type for wide bore columns	Direct Inlet with Septum Purge → W

■ Carrier Gas Flow Control(EPFC)

Type	Electronic Pressure Flow Controller (EPFC)
Maximum Supplied Gas Pressure	900 kPa
Pressure Range	10~800 kPa
Split/Splitless Inlet → S	
Total Flow Range	10~800 mL/min(Helium) 10~500 mL/min(Nitrogen, Argon)
Control Mode	Flow, Pressure
Program	Pressure Program (7 Steps), High Pressure Injection
Gas Save Mode	Use
Septum purge	3~10 mL/min
Direct Inlet → D	
Column Flow Rate	5~100 mL/min
Control Mode	Flow, Pressure
Program	Pressure Program (7 Steps), Flow Program (7 Steps)
Direct Inlet with Septum Purge → W	
Column Flow Range	1~100 mL/min(for wide bore column) 5~100 mL/min(for packed column)
Control Mode	Flow, Pressure
Program	Pressure Program (7 Steps), Flow Program (7 Steps) *Only Packed Column

■ Flame Ionization Detector (FID)

Type	Voltage Applied to Nozzle
Sensitivity	0.1 Coulomb/g(cumene)
Highest Usable Temperature	450 °C
Overheating Prevention	Observation at the highest temperature (80~450 °C)
Range	Auto Range (Digital Communication) 10 ⁰ , 10 ¹ , 10 ² , 10 ³ , 10 ⁴ (Analog Communication)
Dynamic Range	10 ⁷

■ Thermal Conductivity Detector (TCD)

Cell Type	Distribution Type
Element	Rhenium Tungsten Filament (110Ω 4 element)
Temperature	Room Temperature~350 °C
Overheating Prevention	Observation at the highest temperature (80~350°C)
Control Type	Standard provision (× 10 amplifier)
Current Setting	0~200 mA (with overflow electricity prevention)

Global Solution

GL Sciences

<http://www.glsciences.com>

We reserve the right to change specification to make improvements without notice.

GL Sciences Inc.

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