C184-E026A

SHIMADZU
Excellence in Science

Energy Saving Capillary Gas Chromatograph

GC-2025

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GC for Ecology

Environmentally Friendly

Shimadzu's new-generation GC-2025 capillary gas chromatograph minimizes environmental impact by reducing power and carrier gas consumption while retaining the performance capabilities required for capillary analysis.

The GC-2025 incorporates a digital flow controller that controls both the carrier and detector gases and a newly designed energy-saving column oven that features small volume and less heating loss, realizing a dramatic improvement in operability.
The compact GC-2025 is the gas chromatograph for environmentally friendly, high value performance.

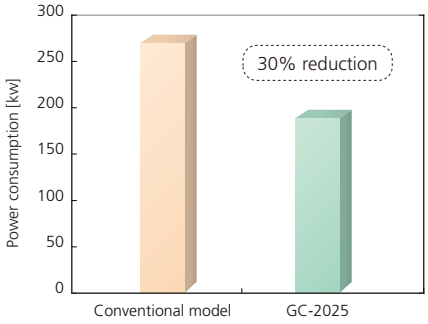
This product conforms to Shimadzu's Eco-labeled designation.

* Energy savings: 30% reduction as compared to the previous model

Eco-friendly

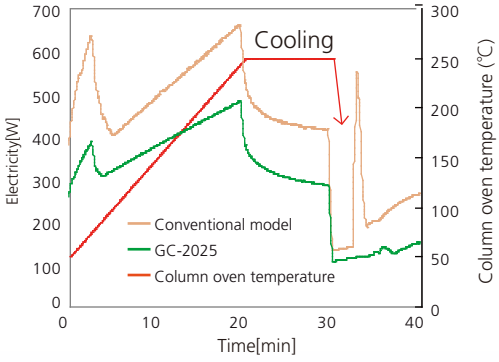
Unique, Eco-friendly Technology for High Energy Savings

A compact design and efficient insulating materials inside the oven minimize the heat capacity and heat loss, thereby reducing electricity costs and realizing more environmentally friendly operation. Furthermore, the GC-2025 is equipped with an energy-saving heater, which results in a 30% (*) reduction in electricity consumption during temperature-programming analysis as compared to the GC-2010 Plus.



Comparative example of the power consumption used during 1 analytical cycle.

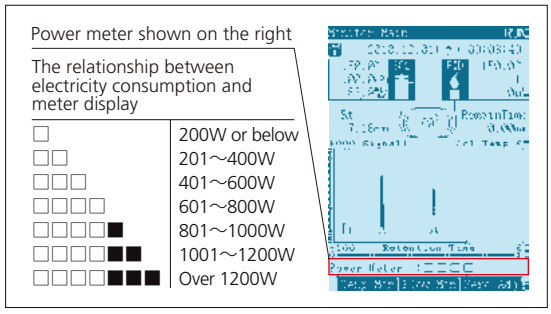
(*) Power consumption varies according to site conditions, ambient temperature, etc.



Change in electricity consumption during temperature-programming analysis with conventional model and GC-2025

Power Consumption Display Function

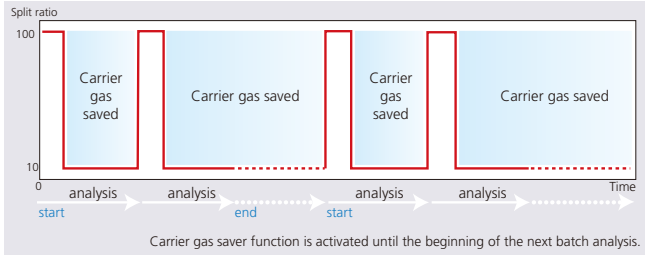
In addition to instrument status, the power consumption is displayed on the main screen. With this meter, power consumption can be checked at a glance, helping to increase awareness of energy savings and ecology in the laboratory.



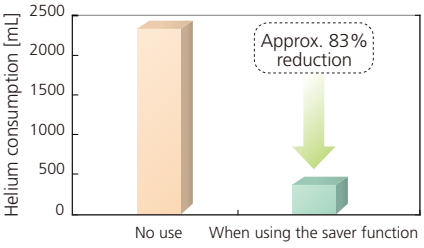
Carrier Gas Saver Function

Because helium is an expensive resource, its use as carrier gas should be minimized. The carrier gas saver function allows you to reduce the carrier gas emitted from the system by reducing the split ratio in the analysis. In a split / splitless sample injection method, this function can save valuable carrier gas and thus reduce operating costs.

Example of carrier gas saver function



In this case, set the split ratio to 100 in the sample injection; in other analyses, the split ratio can be reduced to 10. As a result, carrier gas consumption will be minimized.
In addition, the carrier gas saver is on after the batch analysis.



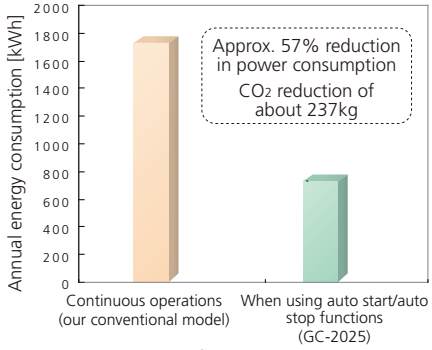
Analysis time: 30min Split ratio: 100
Carrier gas saver function: Split ratio 10 after 1 min
Column temperature 170℃
Column: Inner diameter 0.25mm, length 30m, thickness 0.25µm

Reduction of He carrier gas consumption during one analysis using the carrier gas saver function.

Reduced Operating Costs

During annual operation, when the auto start/auto stop functions of the GC-2025 are used, a reduction in power consumption of nearly 57% will be realized as compared to the existing model. In addition, CO_2 emissions will be reduced by approximately 378kg.

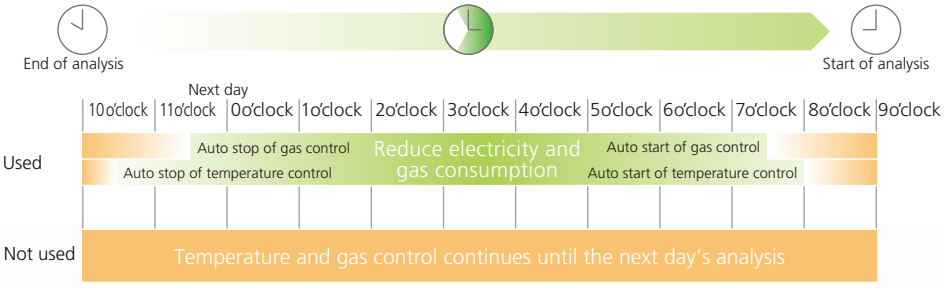
*Annual operation is defined as 260 days. A power conversion factor of 0.378kg-CO_2/kwh used.
* Power consumption may differ depending on the installation conditions, room temperature, etc.



Comparative example of the annual power consumption during continuous operation using our conventional model and the GC-2025 when automatic functions are used.

Auto-stop Function / Auto-start Function

The auto-stop and auto-start functions help to reduce operating costs. The automatic shutdown function automatically stops the temperature control after GC analysis to save power. Furthermore, it stops the control of the detector and carrier gases after a set time. If the automatic startup function is used, gas control will be started after a set time; the temperature control will start subsequently.



Comparison of consumption using the auto stop /auto start functions and not using them.

Compact All-in-One Design

There is increasing interest from researchers for smaller instruments that more effectively utilize laboratory space. With a compact design, the GC-2025 minimizes space requirements while maintaining the necessary features for normal capillary analysis. The column oven has been conveniently designed to accommodate commercially available columns. (A capillary column with 9cm or less coil height can be installed.)

SPL

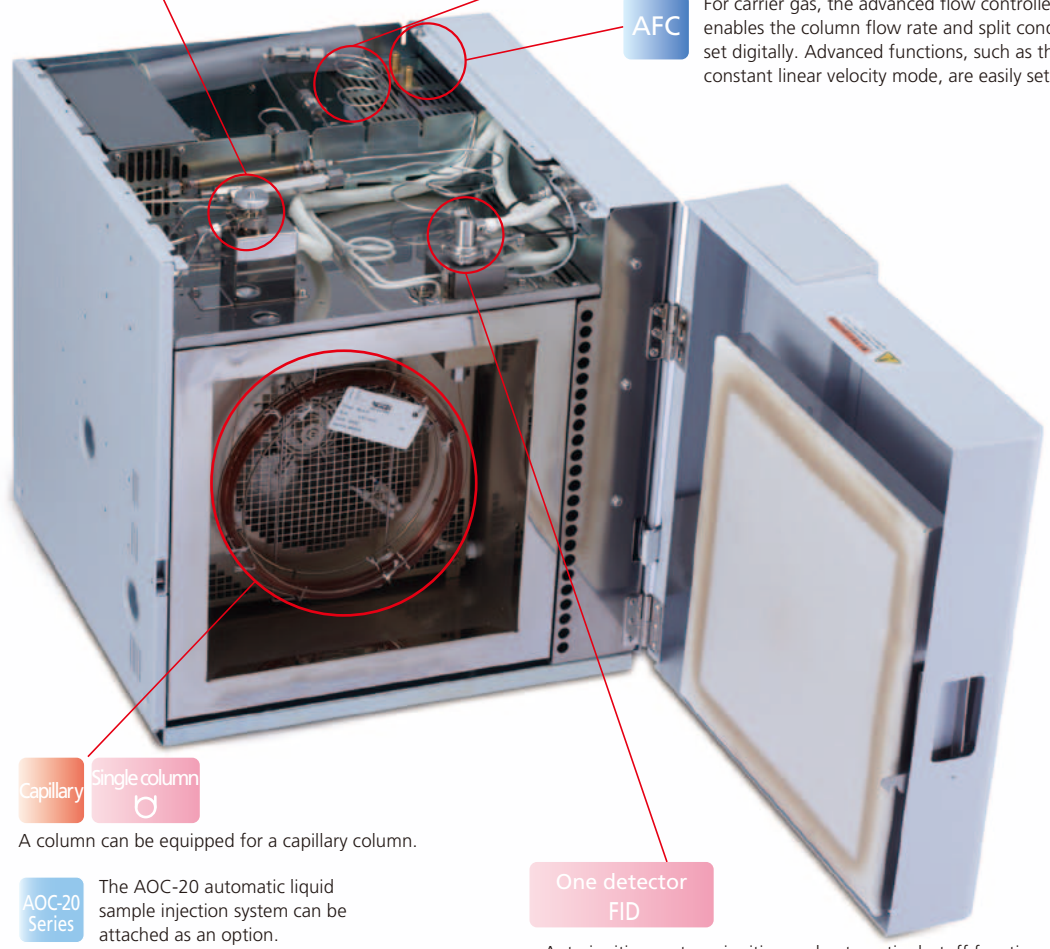
- Split/splitless injection unit.
- Equipped with an advanced flow controller (AFC) that can control up to 970kPa and makes high-speed analysis using a narrow bore column possible.
- Can decrease the amount of splitless gas using the carrier gas saving function.
- Allows high-pressure split and splitless injection.

APC

Advanced pressure controller (APC) enables the detector gas flow rate to be set digitally.

AFC

For carrier gas, the advanced flow controller (AFC) enables the column flow rate and split conditions to be set digitally. Advanced functions, such as the carrier gas constant linear velocity mode, are easily set.



Capillary **Single column**

A column can be equipped for a capillary column.

AOC-20 Series

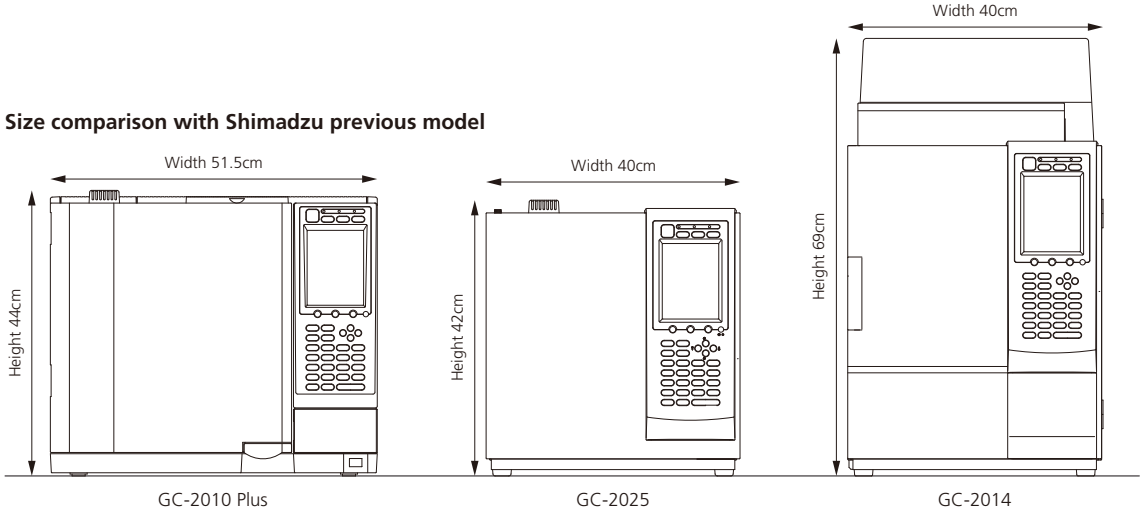
The AOC-20 automatic liquid sample injection system can be attached as an option.

One detector FID

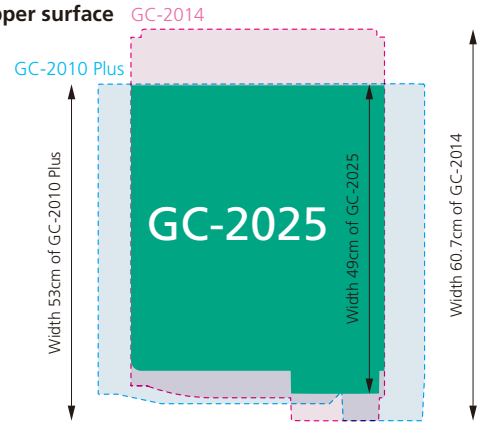
- Auto ignition, auto re-ignition and automatic shutoff functions are equipped as standard.
- Equipped with a feedback function is included to shut off the hydrogen gas supply in the event of detector flameout.
- Wrong piping connection for hydrogen is prevented by using a left-handed thread in the joint of the hydrogen gas supply.

Space-saving Design Enables Easy Installation Anywhere

Size comparison with Shimadzu previous model



GC upper surface

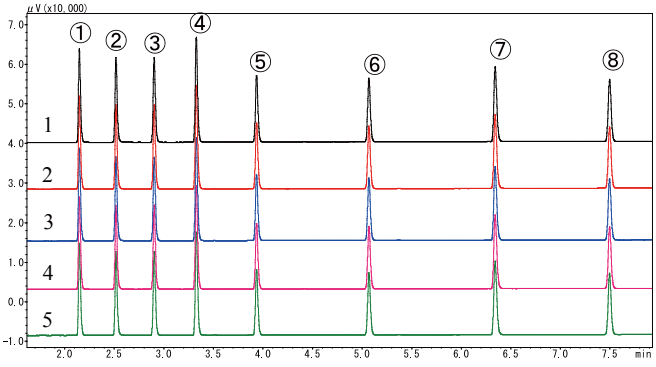


High Performance

In addition to its eco-friendly features, the GC-2025 inherits the functionality of Shimadzu's high-end capillary gas chromatograph, GC-2010 Plus, delivering superb performance for capillary analysis. GC-2025 provides high-quality analytical results and improved productivity.

High Precision

The same high-accuracy AFC as used in the GC-2010 Plus and an advanced design split/splitless injection unit realize high repeatability of retention time and peak area.



Analysis of Grob Text Mixture (Solvent: Acetone analytes 100ppm each)

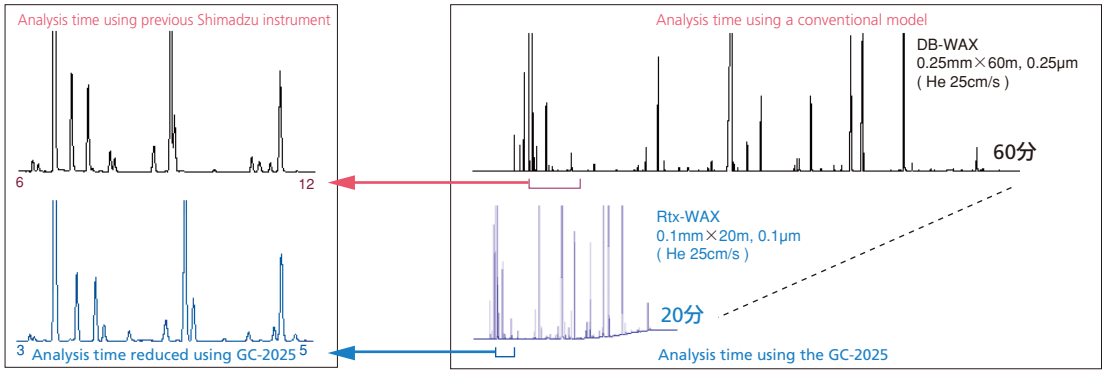
Reproducibility of peak area

	1	2	3	4	5	Average	Standard deviation	C.V.%
① n-Decane	34193	33747	33629	33576	33541	33737.1	266.5418	0.790055
② n-Octyl Alcohol	33079	32882	32727	32712	32769	32833.9	152.3486	0.463999
③ n-Undecane	34664	34400	34284	34252	34257	34371.4	174.3561	0.507271
④ 2,6-Dimethylaniline	43906	43574	43332	43408	43434	43530.9	227.3048	0.522169
⑤ Methyl n-Nonanoate	29858	29622	29513	29468	29510	29594.4	157.9951	0.533869
⑥ Methyl n-Caprate	30919	30689	30605	30531	30579	30664.5	153.0667	0.499166
⑦ Dicyclohexylamine	39795	39495	39243	39279	39209	39404.2	245.2999	0.622521
⑧ Methyl Laurate	33023	32659	32636	32596	32689	32720.7	172.2095	0.526302

High-Speed Scanning

Narrow-bore capillary columns reduce analysis time and improve production capacity. With its advanced flow controller (maximum pressure: 970kPa, maximum flow rate: 1200mL/min), the GC-2025 is suitable for high-speed analyses using narrow-bore capillary columns.

High-speed analysis of coffee flavor compounds



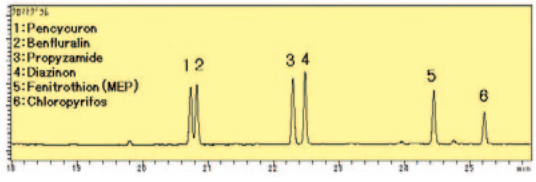
Constant Linear Velocity Mode Reduces Method Development Time

For carrier gas control, configuration with the carrier gas linear velocity mode is recommended.
With this mode, you can reduce the time needed to determine analytical conditions for acquiring the best chromatographic separations.

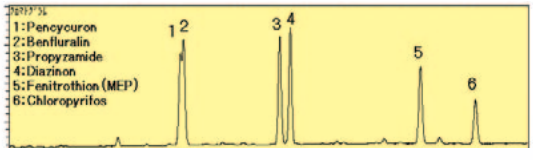
[Analysis Conditions] Column: DB1 30m×0.32mm i.d.df=0.25μm
Column temperature: 60℃ (1min)-7℃ /min-230℃
Injector temperature: 240℃
Detector temperature: 270℃
Carrier gas: Helium
Carrier gas linear velocity: 40cm/sec, Column head pressure: 44.0kPa
Sample injection volume: 1μL (splitless analysis)

Chromatogram comparison of constant carrier gas linear velocity mode with constant column flow mode (Pesticide analysis from a golf course)

Constant carrier gas linear velocity mode

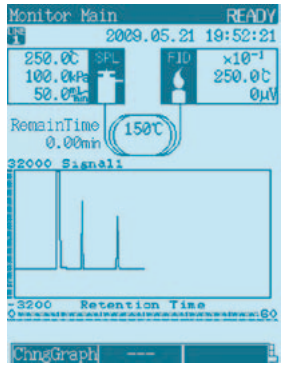


Constant column flow mode



Simple Operation

A large window display contains pertinent information and a graphical user interface makes it possible to define analytical conditions quickly. The built-in help function makes operation easy, even for new users. In addition, analysis conditions can be reset, enabling digital setup of all instrument parameters.



Shimadzu Gas Chromatography Workstation
GCsolution Ver.2 (Windows7)

GCsolution workstation software improves productivity, reliability, and operability with the "Assistant Bar" and "Data Explorer" functions. Moreover, the high-level operating environment supports GLP/GMP compliance for pharmaceutical and environment applications.

Easy Operation for Improved Productivity

- Common operation system in LabSolutions series has been adopted, for more intuitive operation and a shorter learning curve.
- The software features an enhanced manipulation function for improved operability and functionality.

Enhanced Basic Functions

- Control and data processing function enable use of up to 4 GC systems.
  Corresponding models: GC-2025, GC-2010 Plus, GC-2010, GC-2014, GC-17A, GC-1700, and GC-14A/B
- The data processing functions in Chromatopac and CLASS-GC10 have been implemented.
- The identification, quantitation and data comparison functions have been enhanced.
- The data station offers flexible report options and the summary report can be output.

Supports GLP/GMP

- For improved data reliability, GCsolution supports GLP/GMP with its user-management, self-diagnosis, and audit trail functions
- An optional function for supporting Part11 is available.

Network Support

- A network environment for remote access and data analysis can be effectively implemented.
- Sharing various files and the uniform management of data are possible using "CLASS-Agent".

Customizing

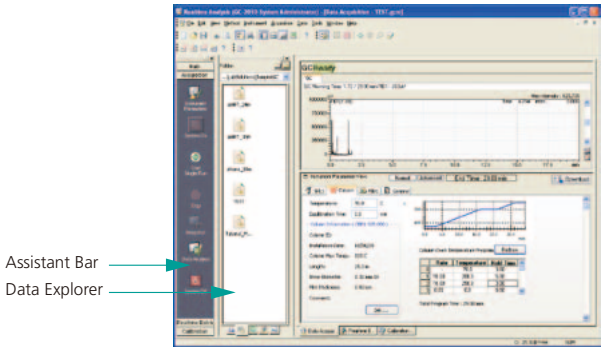
- An easier custom-designed operating environment using the OLE automation function can be constructed.

OS

- An Windows 7 Professional / Windows XP Professional / Windows Vista Business

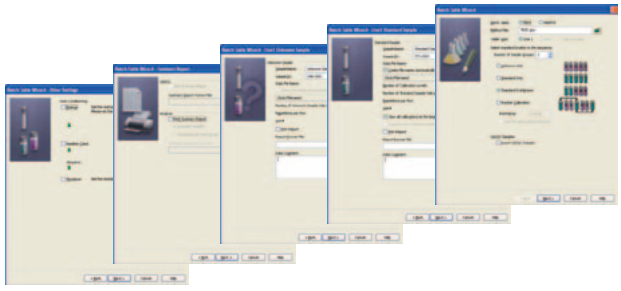
Easy Operation "Assistant Bar" and "Data Explorer"

- The "Assistant Bar" allows navigation operation from analysis start to post-run analysis using simple icons.
- « Data Explorer » classifies and displays files.



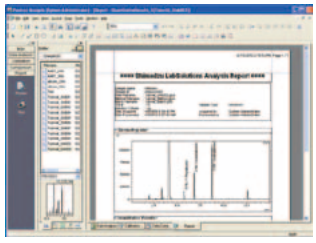
"Batch Table Wizard" Makes Continuous Analysis Easier

- Analysis of many samples continuously with the Batch Table Wizard.
- Using the Wizard instructions, simply enter the necessary items for easy batch table creation.



Editing Reports « Report creation function »

- Easily construct reports.
- Paste and edit items such as chromatograms and peak tables without any limitation.
- Completed report formats can be saved as templates.
- "LabSolutions" is equipped with a PDF output function as standard. Save analysis reports as PDF files to promote paperless operation.



Specifications of GCsolution Ver.2

■Software
Corresponds with Windows 7 Professional / Windows XP Professional / Windows Vista Business
32Bit application (correspondent with long file name)
Graphical U/I (Assistant Bar etc.)

■Controllable equipment
GC-2025, GC-2010 Plus, GC-2010, GC-2014, GC-17A, GC-1700, GC-14A/B, AOC-20i/s, TurboMatrix*, AOC-5000*.
Max 4 GCs (9 detectors) can be controlled simultaneously .
Max 4 detectors (GC-2010) or 2 detectors (GC except for GC-2010) can control dual injection.
* Optional s/w is necessary to control Turbo matrix, AOC-5000.

■Data acquisition
Minimum sampling time 4ms, Snapshot function, Single/Batch analysis control, Batch table wizard, Additional/cutting-in analysis, Analysis time extension, Auto data file creation function, QA/QC (statistical calculation) function, Auto batch stopping function, User program starting function, Correspondent with pre-run program, Correspondent with OLE automation (batch analysis etc.)

■Data processing
Undulation processing function, manipulation function, identification function (with multi relative retention time and grouping), quantitative function (least squares method, modified least squares method, internal standard method, external standard method, standard additional method, retention index calculation, manual response factor entering), weighted and linear calibration (16 levels x 10 points), Manual calibration curve creation, column performance calculation, data comparison function

■Reporting
Over 10 items such as Sample information, Method, Chromatogram, Peak table, Calibration curve, Grouping result, Figures, Texts, etc. Corresponds with OLE object, Customized layouts, Preview function, Summary report.

■Files
Data explorer for file controlling, All-in-one file system, File transforming function (CLASS-GC10 form, AIA ANDI form, Text form), File explorer function, Template function

■H/W
GC auto stop/start functions, System check (GC self-check) function, Status log function

■GLP/GMP
Audit trail function, Software validation, Security function, Part 11 function (Optional)

■Available network
Post-run application s/w (Second use license s/w, optional, GC-LAN connectable (Optional)

■Other
Maintenance guide (GC-2025, GC-2010 Plus, GC-2010, GC-2014, GC-17A/1700, GC-14A/B, AOC-20i)

Options

Automatic liquid sample injection system, AOC-20 Series

The compact, lightweight design enables simple installation and operation. A variety of injection modes, such as solvent flush, auto injection of internal standards, and large-volume injection, are possible. In conjunction with an AOC-20s autosampler, a maximum of 150 samples (1.5ml sample vials) can be processed.

Exhaust duct

A distance of over 30 cm from the back surface of a GC-2025 to a wall is required in order to secure sufficient cooling performance. If the distance is less than 30cm, an exhaust duct is recommended. When adding the exhaust duct, a distance of 25 cm from the back surface of the GC to the wall is sufficient.

Low temperature control solenoid valve, CRG-2025

When controlling sub-ambient column oven temperature, a CRG-2025 makes it possible to cool the column oven with liquid carbon dioxide. The CRG-2025 consists of a solenoid valve to control refrigerant flow, a refrigerant nozzle inside the column oven, and a connection pipe to introduce refrigerant from the container.

(*) When using a CRG unit, use of the pipe included with the CRG unit is recommended.
Please contact your local representative in advance if centralized piping with other tubing is planned.

Specifications

■ Column oven

Temp. range	: Room temperature + 10 to 400℃ (*When using liquid carbon dioxide: -50 to 400℃)
Size	: W250 mm x H250 mm x D90 mm
Capacity	: 5.6 liters
Temp. accuracy	: +/-1% of setting value (Calibration is possible at 0.01℃)
Temp. deviation	: Within 3℃ (On 180mm dia. circumference 60 mm from rear)
Room temp. dependency	: 0.01℃/℃
Programming steps	: 20 steps (Cooling program is possible)
Program rate setting range	: -250 to 250℃/min
Total step time	: ~9999.99min

* An optional part is required when using liquid carbon dioxide.

■ Split/Splitless Injection Unit (SPL)

Carrier gas is digitally controlled by the AFC (Advanced Flow Controller)

Temp. range	: ~ 400℃

■ FID (Hydrogen flame ionization detector)

Detector gas is digitally controlled by the APC (Advanced Pressure Controller)

Temp. range	: ~ 400℃
Minimum detection limit	: 2pgC/s (Dodecane)
Dynamic range	: 10^7

■ Carrier gas flow controller(Advanced Flow Controller)

Pressure setting range	: 0 to 970kPa
Program plate	: 7 (Pressure decreasing program is possible)
Program rate setting range	: -400 to 400kPa/min
Split ratio setting range	: 0 to 9999.9
Total flow rate setting range	: 0 to 1200mL/min

Column averaged linear velocity can be maintained during temperature programming.

■ Display

240 x 320 dot graphics display (30 digits x 16 lines)

■ Size, Weight, Power supply (GC main unit)

Size	: W400 mm x H420 mm x D490 mm (excluding protrusions)
Weight	: 30 kg
Power supply	: 115 to 230 VAC, 1700 VA (115 V type) 2600 VA (230V Type), 50/60 Hz

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