SHIMADZU
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C184-E020E

Specification Sheet

GC-2010 *Plus*

with Advanced Flow Technology

The GC-2010 Plus provides reliable, high-precision trace analysis with high reproducibility, utilizing detectors such as BID, FID and FPD that feature best-in-class sensitivity.

The combination of Advanced Flow Technology and the new rapid oven cooling system shortens analysis times, and provides for significant improvements in productivity.

Multidimensional GC System MDGC/GCMS-2010

Using two columns of different selectivity, the MDGC system can separate and quantify target substances from highly complicated matrices. The MDGC/GCMS-2010 incorporates Multi-Deans switching, a new mechanism that significantly reduces the likelihood of fluctuations in the retention times of eluted components, even if switching is performed several times in one run.

Detector Splitting System

Compounds eluting from an analytical column are split to multiple detectors to obtain multiple chromatograms simultaneously. Offering abundant information in a single analysis, this system saves cost and reduces analysis times.

Backflush System

The Backflush System reverses the carrier gas flow after the target compounds are detected, discharging residual components in the column through the injection port split vent, shortening analysis times and increasing productivity. As the high boiling point components are discharged efficiently, retention time shifts, column contamination and column deterioration are reduced.

Easy-to-Use Advanced Flow Technology Software

Dedicated software simplifying the creation of the analytical conditions for both backflush and detector splitting.

GC-2010 Plus

■ Column Oven

Temperature range	: Room temperature + 4 °C to 450 °C (using liquid CO_2 gas*: –50 °C to 450 °C)
Dimensions	: 280 (W) × 280 (H) × 175 (D) mm
Oven volume	: 13.7 L
Temperature accuracy	: set value (K) ± 1% (calibration at 0.01 °C)
Temperature deviation	: <2 °C max. (on 200 mm dia. circumference 30 mm from rear)
Temperature variation coefficient	: <0.01 °C/ °C
Temperature program steps	: Up to 20 (cooling program possible)
Programmed rate setting range	: –250 to 250 °C/min.
Total time for all steps	: 9999.99 minutes max.

* Optional parts are required to use liquid CO_2 gas.

■ Injection Units

Maximum 3 independently temperature controlled injector units (The quantity that can be mounted simultaneously depends on the injector type) are provided.**

Injection port unit : Split/splitless injection unit provided as standard.

Split/Splitless Injection Unit (SPL-2010 Plus)

Temperature range : room temperature + 5 °C to 450 °C

Direct Injection Unit (WBI-2010 Plus)

Temperature range : room temperature + 5 °C to 450 °C

On-column/Programmable Temperature Vaporizer Injection Unit (OCI/PTV-2010)

Temperature range	: room temperature + 5 °C to 450 °C
Heating rate	: 50 °C to 450 °C within 3 minutes
Cooling rate	: 450 °C to 50 °C within 8 minutes (for 50 °C column temperature)
Heating program	: max. heating rate 250 °C/minute, heating in 7 steps

Switching possible between on-column and programmable temperature vaporizer injection units (requires split piping re-connection between OCI and PTV)

■ Detectors

Four detectors can be installed simultaneously and individually temperature controlled. (The quantity that can be mounted simultaneously depends on the detector type)**

Detector gas is electronically controlled by APC (Advanced Pressure Control)

Barrier Discharge Ionization Detector (BID)

Temperature range	: to 350 °C
Minimum detected quantity	: 1 pgC/s (dodecane)
Dynamic range	: 10^5

Flame Ionization Detector (FID)

Temperature range	: to 450 °C
Minimum detected quantity	: 1.5 pgC/s (dodecane)
Dynamic range	: 10^7

Thermal Conductivity Detector (TCD)

Temperature range	: to 400 °C
Sensitivity	: 20000 mV · mL/mg (decane)
Dynamic range	: 10^5

Electron Capture Detector (ECD)

Temperature range	: to 350 °C
Minimum detected quantity	: 4.4 fg/s (γ-BHC)
Dynamic range	: 10^4

Flame Photometric Detector (FPD)

Temperature range	: to 350 °C
Minimum detected quantity	: P: 0.055 pgP/s (55 fgP/s) (tributyl phosphate) S: 2.5 pgS/s (dodecane thiol)
Dynamic range	: Phosphorus mode: 10^4 Sulfur mode: 10^3

Flame Thermionic Detector (FTD, also called NPD or TSD)

Temperature range	: to 450 °C
Minimum detected quantity	: N: 0.1 pgN/s (azobenzene) P: 0.01 pgP/s (malathion)
Dynamic range	: Nitrogen mode: 10^3 Phosphorus mode: 10^3

** To keep instrument performance, max. 2 detectors shall be operated simultaneously.

■ Flow Control Unit

Advanced Flow Controller (AFC)

Split/splitless mode

Pressure setting range	: 0 to 970 kPa
Programmable steps	: 7 (pressure program possible)
Programmed rate setting range	: –400 to 400 kPa/min.
Split ratio setting range	: 0 to 9999.9
Total flowrate setting range	: 0 to 1200 mL/min.

Column average linear velocity can be kept constant while temperature is increasing.

Direct injection mode

- Pressure mode

Pressure setting range	: 0 to 970 kPa
Programmable steps	: 7
Programmed rate setting range	: –400 to 400 kPa/min.

- Flow mode

Flow setting range	: 0 to 1200 mL/min.
Programmable steps	: 7
Programmed rate setting range	: –400 to 400 mL/min.

Column average linear velocity can be kept constant while temperature is increasing.

■ Display

240 × 320-dot graphics display (30 columns × 16 lines)

■ Dimensions, Weight, Power Requirements (GC main unit)

Dimensions	: 515 (w) × 440 (H) × 530 (D) mm
Weight	: 30 kg (FID model)
Power requirements	: AC100V/115V/230V ±10%, 1800VA (Normal) 2600VA (High power oven), 50/60Hz, 15A or more

LabSolutions Ver. 5

■ Software Specification

Compatible with Windows® 7 Professional (32 and 64-bit) / XP Professional (SP2 or SP3)
32-bit application (capable of long filenames)
Graphical user interface (assistant bar, etc.)

■ Instrument Control

Controls GC-2010 Plus, GC-2010, GC-2014, GC-2025, GC-14B (A), AOC-20i/s.
Simultaneously controls a maximum of four GC or LC units (multi-license version permits registering up to 16 units).
Supports dual-injection system and a maximum of four detectors.

■ Data Acquisition

Offers minimum sampling time of 4 ms, snapshot function, single analysis and batch analysis capability, Batch Table Wizard, analysis add or insert function, extended analysis time function, automatic data file name creation, QA/QC (statistical) functions, batch auto-stop function, user program launcher function, pre-run program support, and OLE automation compatibility (for batch analysis, etc.).

■ Data Processing and Data Analysis

Automatic and manual peak integration, manipulation, identification (supports multiple relative retention times and grouping), quantitation (area normalization method, corrected area normalization method, internal standard method, external standard method, standard addition method, index calculation, manual coefficient input), calibration points and levels (16 levels × 10 points), manual calibration curve creation, column performance calibration, data comparison functions, relative retention time (RRT) display, retention time correction (AART)

■ Report Generation

Over ten types of report items (sample information, configuration settings, methods, chromatograms, peak tables, calibration curves, grouping results, diagrams, text, etc.), layout customization and preview functions, summary report

■ Files

Data Explorer for file management, All-In-One file structure, file conversion (CLASS-GC10 format, AIA ANDI format, and text format), GC/LCsolution file loading, file searching, template functions

■ Hardware Functions

Shutdown/startup functions, system check (GC self-diagnosis), status log, system suitability test (SST) functions

■ GLP/GMP-related

Audit trail, software validation, security, Part 11 compliance functions (optional)

■ Network Compatibility

GC-LAN connectivity (optional LAN adapter)

■ Other

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

Example of PC configuration

PC :

CPU: Intel Core i5 processor 3470 3.2 GHz, RAM: 4 GB, HDD: 500 GB
Super multi-drive, OADG keyboard, 1000BASE-T/100BASE-TX/10BASE-T LAN interface

Operating Software :

Windows® 7 Professional SP2
LabSolutions LC/GC Ver. 5.54
CLASS-Agent Manager Ver. 2.33
Adobe Reader (Read only. Cannot create PDF files)

- LabSolutions Single GC can control one GC unit. To control two or more GC units, use LabSolutions Multi GC.
- To control GC-14B(A) units, one CBM-102 interface is required for each GC unit.

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