

Gas Chromatograph

# Nexis GC-2030 Specifications



# Chromatography System

Nexis™ GC-2030 opens up an entirely new chapter in Shimadzu's long history with gas chromatographs. It showcases some of the best\* specifications on the market, while at the same time offers completely new and creative ways to use your gas chromatograph.

\* As of July 2021, according to a Shimadzu survey

## The GC you can rely on

The complete redesign of the column oven, injection port, introduction of the 3rd generation advanced flow controller and addition of many other convenient and safety features make Nexis GC-2030 the most reliable gas chromatograph from Shimadzu yet.

- Retention time repeatability: < 0.0008 min\*<sup>1</sup>
- Peak area repeatability: < 0.5 % RSD\*<sup>1</sup>
- High quality deactivated insert, ultra low bleed septa and ultra clean ferrules guarantee you get the best results.
- Integrated leak check function allows you to easily check for leaks.
- Fully integrated alerts and counters for hardware and consumables notify you when to perform maintenance, avoiding costly downtime and loss of precious samples.
- Highly precise oven control eliminates any temperature irregularity, making sure you get reproducible and accurate results.
- Oven door sensor automatically shuts off all heating elements when the door is opened or not properly closed.
- Error and warning message system notifies you of any irregularity in the system.
- An optional hydrogen sensor is available for applications with hydrogen carrier gas. The sensor detects potential leaks and stops the system immediately.
- Every Nexis GC-2030 is strictly evaluated and tested in accordance with Shimadzu's highest level of quality. In addition, further performance verification is carried out when the unit is delivered and installed.

## Truly capable and versatile

There is a whole lot you can do with Nexis GC-2030. It is designed to house a multitude of injection units and detectors. This allows you to configure your GC exactly the way you want it. It supports a wide variety of samplers, multiple valve systems and even support for third party accessories.

- Flow control modes: constant pressure, constant column flow, constant linear velocity.
- Max simultaneous flow line installations: 3\*<sup>2</sup>
- Max simultaneous injection unit installations: 3
- Max simultaneous detector unit installations: 4
- Max number of flow controllers: 6 (choose from a combination of 3 AFCs and/or 4 APCs)
- Valve systems: support for up to 8 valves
- Supported injection units:
  - Split/Splitless Injection Unit (SPL)
  - Split Injection unit for gas (SPI)
  - Direct Injection Unit (WBI)
  - On-column Injection Unit (OCI)
  - Programmable Temperature Vaporization Injection Unit (PTV)
  - Packed Column Injection Unit (SINJ)
- Supported detectors:
  - Flame Ionization Detector (FID)(standard, jetanizer, polyarc)
  - Flame Photometric Detector (FPD)
  - Sulfur Chemiluminescence Detector (SCD)
  - Barrier Discharge Ionization Detector (BID)
  - Electron Capture Detector (ECD)
  - Thermal Conductivity Detector (TCD, PTCO)
  - Flame Thermionic Detector (FTD/NPD)
  - Mass Spectrometer (MS) (Single Quadrupole, Triple Quadrupole) and other non-shimadzu detector
- Samplers and accessories:
  - Automatic liquid injector (AOC™-30i, AOC-20i Plus)
  - Automatic liquid sampler (AOC-20s U)
  - Dual tower injection system
  - Automatic Gas Injector (GI-30)
  - Multifunctional autosampler (AOC-6000 Plus) (liquid injection, headspace injection, SPME Fiber and Arrow)
  - Static headspace sampler (HS-10)
  - High-end static headspace sampler (HS-20 NX)
  - High-end trap type headspace sampler (HS-20 NX Trap)
  - Thermal Desorption Systems (TD-30 series)
  - Multi-functional Pyrolyzer (PY-3030D)

\*<sup>1</sup> Auto Injector AOC-30i; FID as the detector; tetradecane (2.5 ng to the column) split injection. Results may vary depending on the sample and the analytical conditions.

\*<sup>2</sup> Up to three flow lines can be installed on the GC. However, software can control for only up to two flow lines simultaneously.

## Simply Seamless

Nexis GC-2030 builds on the already familiar features of the GC-2010 Plus but at the same time makes these even more accessible. The entire analytical workflow was reimagined during development. The result is a GC that is highly efficient and truly intuitive. Many areas of the GC have been redesigned to make operation more seamless. Nexis GC-2030 takes care of most of the unnecessary impediments so that you can focus on what matters most, the chromatography.

### More ways to connect

- Nexis GC-2030 supports both Ethernet (LAN) and USB connections

### Navigate with touch

- **Color touch screen (transmissive type) 1.2.2**
- Screen size: 7 in
- Dot format: 480 × 800
- Luminance: 270 (Cd/m<sup>2</sup>)

### Convenient tools now even more accessible

- **With the introduction of the new touch screen, drastic improvements have been made to the user interface. 1.2.2**  
**Frequently used controls are made even more accessible.** New functions have also been added to aid you during periodic maintenance.
- The one touch injection maintenance button prepares your GC for injection unit maintenance. Press the button again to continue where you left off.
- Usage counters for liners, septa and syringe injections notify you to replace these consumables when a certain threshold is met.
- Sleep/Wake Function: put your GC to sleep when not in use to save valuable energy and wake the system to restore the previous analytical settings. Extensive customization of the sleep and wake settings can be done directly using the touch screen interface.
- **The diagnostics function easily notifies you with 2D codes linked to the solution if any irregularity occurs. Solutions are displayed by reading the 2D code on the smart device, which supports quick recovery. 1.2.3**
- Switching Carrier Gases Function: with the gas selector (optional), He consumption can be reduced by switching to an alternative gas automatically while waiting for analysis. In addition, by setting the type of gas at the time of analysis, the carrier gas can be selected according to the analysis.

### ClickTek™, it changes everything

The new ClickTek Nut and ClickTek Connector make their debut on Nexis GC-2030. ClickTek technology allows for leak free connections to be made completely tool-free. Over-tightening and under-tightening is a thing of the past. The innovative design allows for almost no variability in sealing torque because there are only two positions available; it is either open or closed.

#### ClickTek Nut

- Two-position locking mechanism guarantees leak-free sealing.
- Innovative locking mechanism prevents over-tightening.
- Supported injection units: Split/Splitless, WBI
- Max operating temperature: 450 °C
- Max operating pressure: 1035 kPa

#### ClickTek Connector

- Two-position locking mechanism guarantees quick and easy leak-free column-to-injection unit and/or column-to-detector connections.
- Innovative locking mechanism prevents over-tightening.
- Innovative ClickTek ferrule locking mechanism, allows the connector to be removed without compromising the ferrule, so you can store and readily use the same column and ferrule at a later time.
- Max operating temperature: 350 °C
- Compatible with conventional capillary columns
- ClickTek Connector and ferrule each sold separately.

#### A Brighter Oven

- Some types of columns are susceptible to damage when cooled very rapidly. Nexis GC-2030 makes it extremely easy to protect your columns. Choose from three preset oven cooling rates: fast, mid, slow or customize your own.
- The oven light illuminates the entire oven and can be safely used up to 450 °C.

# Advanced Flow Controller

## Truly Advanced

The all new AFC-2030 is smaller and better in every single way. It features a completely new design, which has better stability and cleaner output gas. The new tool-free split line filter makes it easy for users to monitor and to replace the filter.



### Advanced Flow Controller (AFC)

#### — Carrier 1.3.1

##### Automatically compensates for variations in atmospheric pressure and temperature

Pressure units	: psi, kPa, bar
Pressure range	: 0 to 1035 kPa (0 to 150 psi)
Pressure setpoint resolution	: 0.1 kPa (0.001 psi) 1.3.2
Pressure program ramps	: 7
Pressure program rate	: -400 to 400 kPa/min
Pressure sensor accuracy	: < ± 2.0 % (full scale)
Pressure sensor repeatability	: < ± 0.34 kPa
Temperature coefficient	: < ± 0.068 kPa per °C
Pressure drift	: < ± 0.68 kPa/6 months
Control amplitude	: ±0.001 psi

1.3.1

#### Supports control modes for constant pressure, constant linear velocity and constant column flow

1.3.5

Supported carrier gas types	: He, N <sub>2</sub> , H <sub>2</sub> , Ar
Carrier gas flow range	He : 0 to 1300 mL/min
	N <sub>2</sub> : 0 to 600 mL/min 1.3.3
	H <sub>2</sub> : 0 to 1300 mL/min
	Ar : 0 to 600 mL/min
Flow setpoint resolution	: 0.1 mL/min
Flow ramps	: 7
Flow sensor accuracy	: < ± 5 % (carrier gas dependent)
Flow sensor repeatability	: < ± 0.35 % of setpoint
Temperature coefficient	: < ± 0.2 % per °C

### Dual Advanced Flow Controller (DAFC)

#### — Carrier

Pressure units	: psi, kPa, bar
Flow rate range	: 0 to 100 mL/min
Flow rate setpoint resolution	: 0.1 mL/min
Flow rate ramps	: 7
Supported carrier gas types	: He, N <sub>2</sub> , H <sub>2</sub> , Ar

### Advanced Pressure Controller (APC)

#### — Detector Gas

Flow accuracy	: < ± 3 mL/min or 7% of setpoint
Flow repeatability	: < ± 0.35 % of setpoint
Temperature coefficient	: < ± 0.2 % per °C

### Auxiliary Pressure Controller (AUX-APC)

Pressure units	: psi, kPa, bar
Pressure range	: 0 to 1035 kPa
Pressure setpoint resolution	: 0.1 kPa (0.001 psi)
Pressure program ramps	: 7

### Gas Selector

#### Reduction of He consumption by switching alternative gases automatically

Supported gas types	: He, N <sub>2</sub> , H <sub>2</sub> , Ar
Supported switchable location	: carrier gas, make-up gas, AUX-APC gas
Analysis using alternative gas	: possible

# Advanced Flow Technology (AFT)

## Heart-Cut System

The Heart-Cut System allows you to perform complicated separation of analytes by using two different columns in the same oven.

## 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 unit split vent, shortening analysis times and reducing column contamination.

## Detector Splitting System

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

## Detector Switching System

The detector switching system allows you to introduce eluted components from a column into either of two detectors.

# Injection Ports

## 1.3 Split/Splitless Injection Unit (SPL)



### Click, Set, Go

The new SPL with ClickTek presents a new advancement in injection port technology. Never has an injection port been so reliable, yet so easy to use.

Sealing mechanism : ClickTek Nut  
 Injection mode : **Split; Splitless**; High pressure injection  
 Split ratio : Up to 12500:1  
 Pressure range : 0 to 1035 kPa  
 Maximum operating temperature: **450 °C** 1.3.4

### 1.3

**Supports capillary columns from 50 µm to 530 µm I.D.** / Electronic septum purge comes built-in / Gas saver mode reduces gas consumption / Inert treatment (option)

## Other Injection Units

	SPI Split Injection Unit for Gas	WBI Direct Injection Unit	OCI/OCI-NX On-Column Injection Unit	PTV Programmable Temperature Vaporizer Injection Unit
Supported capillary columns	50 µm to 530 µm I.D.	50 µm to 530 µm I.D.	50 µm to 530 µm I.D.*3	50 µm to 530 µm I.D.
Electronic septum purge	Built-in	Built-in	Built-in	Built-in
Gas saver mode	Available	N/A	N/A	Available
Sealing mechanism	N/A	ClickTek Nut	Standard Nut	Standard Nut
Injection mode	Split/Splitless	Direct	Direct	Split/Splitless
Split ratio	Up to 12500:1	N/A	N/A	Up to 9999.9:1
Pressure range	0 to 1035 kPa	0 to 1035 kPa	0 to 1035 kPa	0 to 1035 kPa
Maximum operating temperature	450 °C	450 °C	450 °C	450 °C
Programmable temperature ramps	N/A	N/A	7	7
Heating rate	N/A	N/A	OCI: 50 °C to 250 °C: 250 °C/min 250 °C to 350 °C: 200 °C/min 350 °C to 450 °C: 150 °C/min OCI-NX: 50 °C to 450 °C: 350 °C/min	50 °C to 250 °C: 250 °C/min 250 °C to 350 °C: 200 °C/min 350 °C to 450 °C: 150 °C/min

	SINJ Packed Column Injection Unit
Supported columns	Packed
Sealing mechanism	Standard Nut
Flow rate range	0 to 100 mL/min
Maximum operating temperature	450 °C

\*3 Capillary column smaller than 530 µm I.D. is connected using the optional Simple OCI insert for OCI. For OCI-NX, connect using the press-tight connector (Option).

## Column Oven

Dimensions : (W) 280 × (H) 280 × (D) 175 mm  
 Oven volume : 13.7 L  
 Fits up to two 105 m × 0.530 mm I.D. capillary columns  
 Ambient rejection : < 0.01 °C per 1 °C  
 Temperature range : **(ambient +2 °C) to 450 °C** 1.2  
 -50 °C to 450 °C (with CO<sub>2</sub>)  
 -99 °C to 450 °C (with LN<sub>2</sub>)

Temperature Setpoint Resolution : 0.1 °C  
 Temperature accuracy : set value (K) ± 1% (calibration at 0.01 °C)  
 Temperature deviation : < 2 °C (on 200 mm dia. circumference 30 mm from rear)  
 Temperature stability : set value ± 0.1 °C

Programmable temperature ramps : 32 ramps  
 Negative ramps : possible  
 Settable time for each step : 9999.99 min  
 Total time of steps : 9999.99 min  
 Programmed rate settings range : -250 to 250 °C/min  
 Oven cool down time : **450 °C to 50 °C in 3.4 min** 1.2.1  
 Column oven cooling speed : three stages (high/middle/low) and custom settings

### Standard Oven

Range °C	Rate °C/min	Rate*4 °C/min
50 to 70	40	80
70 to 115	40	60
115 to 200	40	50
200 to 250	25	30
250 to 300	15	30
300 to 380	15	20
380 to 450	7	20

### High Power Oven

Range °C	Rate °C/min	Rate*4 °C/min
50 to 70	120	120
70 to 115	95	120
115 to 175	65	110
175 to 250	55	80
250 to 300	45	80
300 to 350	45	65
350 to 450	35	50

\*4 Data when using oven insert (option). Single column only and INJ/DET location is limited.

# Detectors

## Flame Ionization Detector (FID)

### Our best FID yet

The FID shows good response for all organic compounds. It is characterized by high robustness and a wide linear dynamic range.

Minimum Detectable Quantity (MDQ) : < 1.2 pg C/s (dodecane) for capillary column	Flow rate settings:	Makeup	: 0 to 100 mL/min
< 2.5 pg C/s (dodecane) for packed column	H <sub>2</sub>		: 0 to 100 mL/min
	Air		: 0 to 1000 mL/min
Linear dynamic range	: 1 × 10 <sup>7</sup> (± 10%)		
Max acquisition rate	: 1 ms (1000 Hz)		
Max operating temperature	: 450 °C		
Automatic flame out detection and reignition			

## Flame Photometric Detector (FPD)

### Even more sensitive

The new FPD improves on the core capabilities of our previous FPD.

Sensitivities for both phosphorus (P) and sulfur (S) based compounds have been improved.

Minimum Detectable Quantity (MDQ) : < 45.0 fg P/s (tributyl phosphate)	Flow rate settings:	H <sub>2</sub>	: 0 to 250 mL/min
Minimum Detectable Quantity (MDQ) : < 2.0 pg S/s (dodecanethiol)	Air		: 0 to 1000 mL/min
Easy switching of photometric filters	: P, S, Sn		
Dynamic range:			
Tributyl phosphate (P)	: 1 × 10 <sup>4</sup>		
Dodecanethiol (S)	: 1 × 10 <sup>3</sup>		
Max acquisition rate	: 1 ms (1000 Hz)		
Max operating temperature	: 450 °C		

## Sulfur Chemiluminescence Detector (SCD)

### The next industry standard SCD

Shows high selectivity and sensitivity for sulfur containing compounds.

Exhibits linear response for sulfur over a wide range of concentrations.



Minimum Detectable Quantity (MDQ) : < 0.3 pg S/s (dodecanethiol)	Flow rate settings:	N <sub>2</sub>	: 5 to 100 mL/min
Dynamic range	: > 1 × 10 <sup>4</sup>	H <sub>2</sub>	: 0 to 100 mL/min
Stability	: < 3 % RSD (24 hrs)	O <sub>2</sub>	: 0 to 15 mL/min
Max acquisition rate	: 1 ms (1000 Hz)	O <sub>3</sub>	: 0 to 50 mL/min

# Barrier Discharge Ionization Detector (BID)

## Plasma technology is the future of GC

A universal and highly sensitive detector for trace level analysis. The BID is commonly used for the analysis of highly dilute organic compounds and permanent gases.

Minimum Detectable Quantity (MDQ) : < 0.8 pg C/s (dodecane)	Max operating temperature	: 350 °C
Dynamic range	: $1 \times 10^5$	Flow rate settings:
Max acquisition rate	: 1 ms (1000 Hz)	Discharge gas (He) : 0 to 100 mL/min

# Electron Capture Detector (ECD)

## Unparalleled performance

The detector of choice for trace level analysis of electrophilic compounds such as halogenated, organometallic and nitro compounds.

Minimum Detectable Quantity (MDQ) : < 4.0 fg/s (lindane)	Max operating temperature	: 400 °C
Dynamic range	: $1 \times 10^5$	Flow rate settings:
Max acquisition rate	: 1 ms (1000 Hz)	ECD gas (N <sub>2</sub> , Ar) : 0 to 200 mL/min

# Thermal Conductivity Detector (TCD)

## Universal detection

A detector that senses changes in the thermal conductivity of the eluting sample. It can detect all compounds aside from the carrier gas.

### For capillary column

Sensitivity	: > 20000 mV × mL/mg (decane)	Max operating temperature	: 400 °C
Dynamic range	: $1 \times 10^5$	Flow rate settings:	
Max acquisition rate	: 1 ms (1000 Hz)	Makeup (He, H <sub>2</sub> , N <sub>2</sub> , Ar)	: 0 to 20 mL/min

### For packed column\*<sup>5</sup>

Sensitivity (packed column)	: > 40000 mV × mL/mg (decane)	Max acquisition rate	: 2 ms (500 Hz)
Dynamic range	: $1 \times 10^5$	Max operating temperature	: 350 °C

\*<sup>5</sup> Capillary columns can be connected when using an optional adopter.

# Flame Thermionic Detector (FTD)

## Selective for P and N

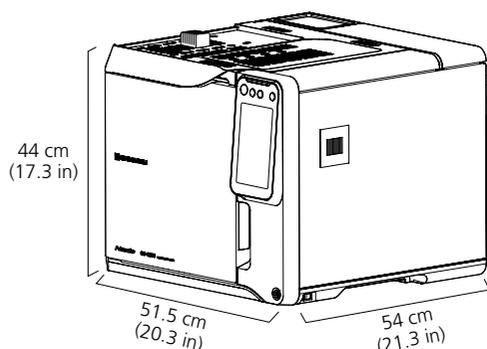
A detector that shows a selective response for compounds containing nitrogen or phosphorus.

Minimum Detectable Quantity (MDQ) : < 0.1 pg N/s (azobenzene)	Flow rate settings:	
Minimum Detectable Quantity (MDQ) : < 0.01 pg P/s (malathion)	Makeup (He, N <sub>2</sub> , Ar)	: 0 to 100 mL/min
Dynamic range (N)	H <sub>2</sub>	: 0 to 30 mL/min
Dynamic range (P)	Air	: 0 to 1000 mL/min
Max acquisition rate		: 1 ms (1000 Hz)
Max operating temperature		: 450 °C

# System

## Size and Weight

Height	: 44 cm (17.3 in)
	PTCD model 50 cm (19.7 in)
Width	: 51.5 cm (20.3 in)
Depth	: 54 cm (21.3 in)
Weight	: 43.5 kg (96 lbs)



## Electrical and Operating Requirements

Line voltage	: 100 V AC $\pm$ 10% (100 V Model) 115 V AC $\pm$ 10% (115 V Model) 230 V AC $\pm$ 10% (230 V Model)
Power consumption	: 1800 VA (100 V / 115 V Model) 2600 VA (230 V Model)
Frequency	: 50/60 Hz
Operating temperature	: 5 °C to 40 °C (Recommended temperature: 18-28 °C)
Operating humidity	: 5% to 90% (Recommended humidity: 40-70%)
Max operating altitude	: 2000 m

## Other Specifications

PRG-2030 option: (additional board for EVENT output)  
External DC 24 V  $\times$  16 ch (max 100 mA) or DC 24 V  $\times$  8 ch (max 100 mA) + contact closure  $\times$  2ch (max DC 30 V, 1 A)

PRG-Box option: (additional box for AC control)  
External AC (100/120 V or 220-240 V) output  $\times$  8 ch (total max 15 A/10 A)

## Data Communications

Ethernet (LAN):  
10BASE-T/100BASE-TX (IEEE 802.3)

USB 2.0 (full speed)

Analog output:  
2 ch (1 ch as standard, additional 1 ch option)  
Linear/Wide (for Chromatopac™), range switching function

Remote I/O:  
2 external input (programmable: START/STOP/WAIT/PREP RUN) as standard  
4 external output (programmable: READY/RUN/START/ERROR) as standard

## Certifications

- IEC61010-1, IEC61010-2-010
- CE marking
- UL/CSA Certification
- EMC (EN 61326-1)
- EU RoHS/Chinese RoHS
- KC marking

Note: Depends on the area and product model

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