SCION 456-GC

Specification Sheet

Dimensions and Weights
Height: 57 cm (22.5 in.),
Width: 66 cm (26.0 in.),
Depth: 56 cm (22.0 in.)
Weight*: 43 kg (59lb)
* Typical values

Environmental Conditions
Operating temperatures: 10°C to 40°C.
Operating humidity (relative): 5% to 95%
Line voltage requirements: 120 V, 230 V (±10% nominal)

Column Oven
Dimensions: 23 cm (w) x 11 cm (d) x 28 cm (h)
Temperature range:
- Ambient: +4°C to 450°C
- Liquid N₂: -100°C to 450°C
- Liquid CO₂: -60°C to 450°C

Temperature program ramps/holds: 24/25
Maximum temperature ramp rate:
- 150°C/min for all voltages and 180°C/min with insert accessory

Cool down rate: 400 °C to 50 °C in 4.5 minutes
Temperature set-point resolution: 0.1 °C
Ambient temperature reject <0.01°C change in oven for 1°C change in ambient temp.
Retention Time Repeatability <0.008% or <0.0008 min, based on n-Pentadecane under temperature programming conditions.
Area repeatability <1% RSD

General Specifications
Up to 9 EFC modules total, injector, detector and auxiliary Optional backflush
GC Control:
External events (digital output):
8 standard
8 optional, total 16
Max number of timed events: 30 #
Heated zones:
Standard 9
Two power outlets 24V (1A max. each)

<table>
<thead>
<tr>
<th>Temperature Range (°C)</th>
<th>456-GC Rates (°C/min)</th>
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<tbody>
<tr>
<td>50 - 70</td>
<td>150</td>
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<tr>
<td>70 - 115</td>
<td>95</td>
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<td>115 - 175</td>
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<td>175 - 300</td>
<td>45</td>
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<tr>
<td>300 - 450</td>
<td>30</td>
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Methods:
• Maximum stored internal methods: 50 (max. 30 alphanumeric characters)

Logging:
• Run log file (stored with the chromatogram when using CompassCDS) Error log file

Local Display:
• TFT full color screen
• WVGA resolution (800 x 480) Size 23 cm (9”)

Local Control:
• Touch screen
• Hard Keys

Languages:
• English, German, French, Spanish, Italian, Portuguese, Cyrillic, Kanji, Chinese (standard and traditional), Thai, Korean and Dutch

Local automation:
• Method lines: 25
• Modes: Infinite looping Dual and duplicate injection

Communication
Ethernet: Protocol: TCP/IP
Data rate: 100 Mbps
Control:
• GC control and method parameters
• Analog output (optional):
  - Number of channels: 3
  - Time programmable steps: 30
  - Output software selectable (set individual):
    • 0-1 V (default)
    • 0-10 V

Synchronization signals with other devices and data systems:
Ready in and out
Start in and out

Data Handling and System Control:
CompassCDS Chromatography Data System

Certifications
CSA:
  C22.2 61010-1
  UL 61010-1
  IEC: 61010-1

EMC:
  47 CFR part 15
  ANSI C63.4
  EN 61326

ATEX Directive 94/9/EC
Injector Options

Maximum injectors: two, operating concurrently.
Pneumatics: Electronic Flow Control (EFC):
- S/SL Split/Splitless injector*
- PTV Programmable Temperature
- Vaporizing* COC Cold On-Column injector*
- Flash injector
- PWC Packed/Wide bore On-Column injector
  * including septum purge

S/SL Split/Splitless Injector
Pressure range: 0-150 psi
Total flow:
- 500 mL/min for N2/Ar
- 1500 mL/min for He/H2
Maximum temperature: 450°C
Split range: 1-10,000 (column dependent)

Suited for columns:
- Wide bore: (0.53 mm)
- Narrow bore: (0.05 to 0.32 mm)

COC Cold On-Column Injector
Pressure range: 0-150 psi
Total Flow: 50 mL/min (Type 23 EFC)

Temperature range:
- Ambient +10 °C to 450 °C using air cooling
- -60 °C to 450 °C using liquid CO2 cooling
- -160 °C to 450 °C using liquid N2 cooling

Maximum temperature: 450°C
Maximum temperature ramp rate: 200 °C/min
Temperature ramps/holds: 24/25

Suited for columns:
- Wide bore (0.53 mm)
- Narrow bore (0.32mm)

PTV Programmable Temperature
Vaporizing Injector
Pressure range: 0-150 psi
Total flow:
- 500 mL/min for N2/Ar
- 1500 mL/min for He/H2
Temperature range:
- Ambient + 10 °C to 450°C using air cooling
- -160 °C to 450 °C using liquid N\textsubscript{2} cooling
- -60 °C to 450 °C using liquid CO\textsubscript{2} cooling

Maximum temperature ramp rate: 200°C/min
Temperature ramps/holds: 24/25
Split range: 1-10,000 (column dependent)

Operational capabilities:
- Large volume injection
- Temperature ramped splitless
- Cold on-column
- Split and splitless

Suited for columns:
- Wide bore (0.53 mm)
- Narrow bore (0.05 to 0.32 mm)
  Maximum injection volume: 250 µL (LVI mode)

**Flash Injector**
Pressure range: 0-150 psi
- Total flow: 50 mL/min (Type 23 EFC)

Maximum temperature: 450°C Suited for columns:
- Wide bore (0.53 mm)
- Packed (1/8” to 1/4”)

**PWOC Packed/Wide-bore On-Column Injector**
Pressure range: 0-150 psi
- Total flow: 50 mL/min (Type 23 EFC)
Maximum temperature: 450°C

Suited for columns:
- Wide bore (0.53 mm)
- Packed (1/8” to 1/4”)

**Electronic Flow Control: Injectors (EFC)**
Module types: 4 injector-specific modules
Pressure: 0.1 % Full Scale
Resolution pressure set points is 0.001 psi
Flow sensor accuracy 2% of measured or 0.2% of full scale
Flow sensor repeatability 0.5%

**Sample Preconcentration Trap (SPT)**
Trace level analysis of volatiles in gases
Fully integrated
Temperature Range:
- 60°C to 450°C using liquid CO\textsubscript{2} cooling
- -185°C to 450°C using liquid N\textsubscript{2} cooling

Temperature rate:
- Ballistic for instant release of adsorbed volatiles
Available traps:
Two lengths
A wide range of standard packings and custom packings

Detector Options
Maximum detectors: two, operating concurrently (one of which is a Single or Triple Quad MS)
Pneumatics: Electronic Flow Control (DEFC)

Detector types:
- FID Flame Ionization Detector
- TCD Thermal Conductivity Detector
- ECD Electron Capture Detector NPD
- NPD Nitrogen-Phosphorus Detector
- PFPD Pulsed Flame Photometric Detector
- PDHID Pulsed Discharge Helium Ionization Detector
- MS Mass Spectrometry (see GC/MS brochure and datasheet)

Note: Data Acquisition Rate: 600Hz for all detectors, (exception PFPD)

FID Flame Ionization Detector
Maximum temperature: 450 °C
Detectivity: 1.4 pg C/sec
Linear dynamic range: 10^7

Flame tip type: ceramic (patented)
Operational quality:
- Flame-out detection
- Auto re-ignition

TCD Thermal Conductivity Detector
Maximum temperature: 450 °C
Detectivity: 300 pg/mL (Butane)
Linear dynamic range: 10^6

Operational quality:
- Filament protection
- Automatic bridge balancing

ECD Electron Capture Detector
Maximum temperature: 450°C
Detectivity: 7 fg/s Lindane
Linear dynamic range: 10^4
Radioactive source: 63Ni - 15 mCi (555 M bq)

NPD Nitrogen-Phosphorus Detector
Maximum temperature: 450°C
Detectivity:
N: 100 fg N/sec (Azobenzene)
P: 100 fg P/sec (Malathion)

Linear dynamic range:
- N: 10^5
- P: 10^4
Operational quality: self-aligning bead
**PFPD Pulsed Flame Photometric Detector**

Photomultiplier tube:
- S/P
- S/P/N

Maximum temperature: 450 °C

Detectivity:
- S: 1 pg S/sec (S/P tube)
- P: 100 fg P/sec (S/P tube)
- N: 20 pg N/sec (S/P/N tube)

Linear dynamic range:
- S: $10^3$
- P: $10^4$
- N: $10^2$
- Up to 23 elements can be detected

**PDHID Pulsed Discharge Helium Ionization Detector Detectivity:**

50 ppb (Methane)

Linear dynamic range: $10^4$ (Methane)

Operational quality:
- Gold plated connections
- Welded column connections

**Detectors (DEFC)**

Module types: 6 detector-specific modules

Accuracy: ± 7 % set point flow

Resolution: 0.1 or 1 mL/min

**Automation Options**

**8410 Autoinjector**

Sample capacity:
- 10 x 2 mL vials
- 6 x 5 mL vials
- 5 x 10 mL vials

Large solvent wash vial: 2 x 120 mL*

Dual and duplicate mode

Internal standard addition

Modes of operation:
- Liquid
- Ambient headspace *
- SPME (Solid Phase Micro Extraction)*
- Sample heating and cooling*

Pre-programmed modes of injection Syringes:
- 1 μL, 2 μL, 5 μL, 10 μL, 100 μL, 250 μL for liquid injection
- SPME
**8400 Autosampler**

Sample capacity: 100 x 2 mL vials  
Large solvent wash vial: 2 x 120 mL*  
Dual and duplicate mode  
Internal standard addition

Modes of operation:
- Liquid  
- Ambient headspace*  
- SPME*  
- Sample heating and cooling*  
- Pre-programmed modes of injection

Syringes:
- 1μL, 2 μL, 5 μL, 10 μL, 100 μL, 250 μL for liquid injection  
- SPME  
* Optional

Optionally a CTC-PAL autosampler, including specific options may be installed.