



# YL6100 GC

Fully Optimized GC with Advanced Pneumatic Control



*YL6100 Gas  
Chromatograph*



Thinking at the customer's side leads to **better work in your laboratory**

# Intelligent **YL6100 GC**

## Features

### Powerful Control

- Perfect control of all parameters by YL-Clarity/Autochro-3000 CDS
- Stable and precise control with powerful dual CPUs
- Remote Time Control : Remote Time Delay and Remote Signal Output
- Auto-start up and shut down

### Easy Operation

- Intuitive user interface for a keyboard
- Column conditioning Function
- Stores up to 20 different analytical methods

### Higher Productivity

- Pressure Programming : Shortens RT(retention time)
- Fast test setup : Automatic loading and saving up to 10 different analytical and methods

### Economical Function

- Time scheduling function : Scheduling of system ON and OFF
- Run time based control : Automatically repeatable runs up to 9,999 analyses

### Safety Function

- Automatic flow & temperature control
  - : Detector "ON" after checking flow between reference and sample to protect TCD cell
- Automatic flame ignition after checking the FID temperature
  - : Air/H<sub>2</sub> flow will be blocked automatically if auto-ignition is set as "OFF"

### APC (Advanced Pneumatic Control)

- Pressure programming : Reduction in decomposition and loss of sample in splitless injection
- Flow control : Improved detector stability
- High sensitivity : At large amount of sample in split injection
- Gas saver : Carrier gas and Auxiliary gas can be saved
- Automatic flame ignition for FID



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Young Lin GC products have been developed for more than 17 years with an accumulated experience in chromatographs. The YL6100 GC meets all analytical demands providing practical solutions for every application and satisfying the features you've always desired.

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To offer the most reliable results and the best performance in your laboratory, Young Lin systems satisfy with international standards such as ISO 9001 and CE. We have also acquired Quality certificate for excellent machines, materials and mechanisms.



## Getting Better

- More stable APC Performance and easier maintenance :  
All APC boards have been placed on the right to ensure reliable and accurate data by avoiding temperature influence from the rear of the oven
- Simplified and distinct keypad
- Clear and well-designed 4 line LCD display
- 3 ducts (The previous model had 2 ducts) : more accurate cooling
- Thumb-suitable open button

5000 Series

OVEN  
Temp  
InitTime  
Rate1

System Control

Gain Servo  
Time Base  
Start Point

# Optimized Gas Chromatograph with APC

APC is a standard function in gas chromatography. You can enjoy all the advantages of multi-functional APC with our YL6100 GC. Our multi-functional APC increases productivity by accurate and precise control for flow and pressure and reduces operating costs by means of the Gas Saver. Also APC improves your competitiveness with fast and accurate analysis.

## Stability

Electronic control gives faster stability of gas flow than manual control.



## Fast and High Resolution Analysis

Oven temperature programming makes the retention time for high molecular weight samples longer by increasing the carrier's viscosity. With APC, you can shorten the retention time by decreasing analysis temperature with column head pressure programming. Therefore, Fast and accurate analysis into initial state improves your laboratory productivity.

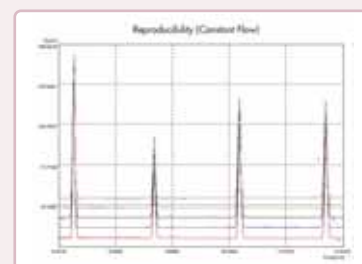
## Reproducibility (C8 - C18)

Data below shows very accurate reproducibility in retention time(0.04% RSD) and area(2% RSD) for hydrocarbon analysis in the Constant Flow and Constant Pressure Mode.

Also separation efficiency and reproducibility is improved by the optimized flow and pressure with APC.

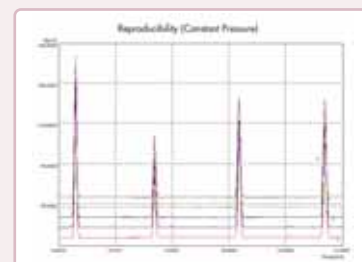
### Reproducibility of Retention Time (%RSD)

Company	C8	C10	C12	C14	C16	C18
Young Lin	0.0382	0.0423	0.0302	0.0204	0.0167	0.0125



### Reproducibility of Area (%RSD)

Company	C8	C10	C12	C14	C16	C18
Young Lin	1.2884	1.7273	1.6681	1.9453	1.9508	1.9123



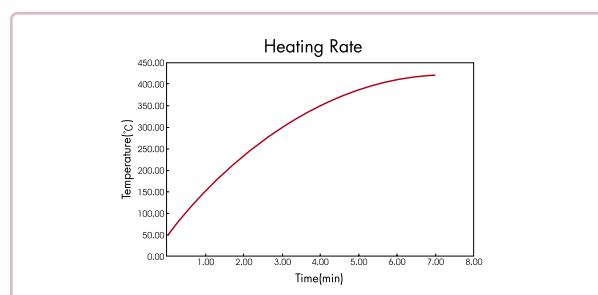
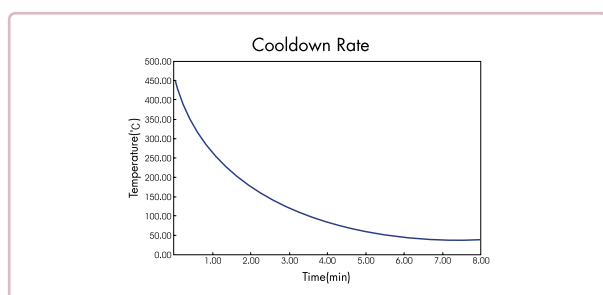
# Powerful and Excellent Column Oven

All analytical instruments must perform productive analysis and also ensure precise control to obtain very accurate and reproducible results. Our YL6100 GC provides the perfect solution for these requirements.

The column oven is the most important part of the GC for accurate analysis, so it must have an excellent and powerful performance. Column oven temperature should be precisely-controlled, fast-ramped and fast cooled to obtain accurate and reproducible results. The YL6100 GC uses a quiet and powerful fan and heater to perform fast oven ramping and cooling and also to provide very good stability. You can increase oven temperature up to 450 °C and analyze samples with a high boiling point.

## Superior Productivity

The column oven of YL6100 GC has low thermal capacity which enables rapid heating and cooling. Only 6.5 min is required for cooling down from 450 °C to 50 °C. Such excellent performance provides very stable and high reproducible retention time.



## In-Side-Oven temperature Uniformity



If in-side-oven temperature is not stable, retention time is not reproducible and peaks can be split.

The in-side-oven temperature uniformity of YL6100 GC is only less than  $\pm 0.2^\circ\text{C}$  at 200 °C of oven temperature when measured at five different points as shown above.

## Temperature stability

YL6100 GC delivers the most stable temperature to provide accurate reproducibility in retention time.

## Specifications

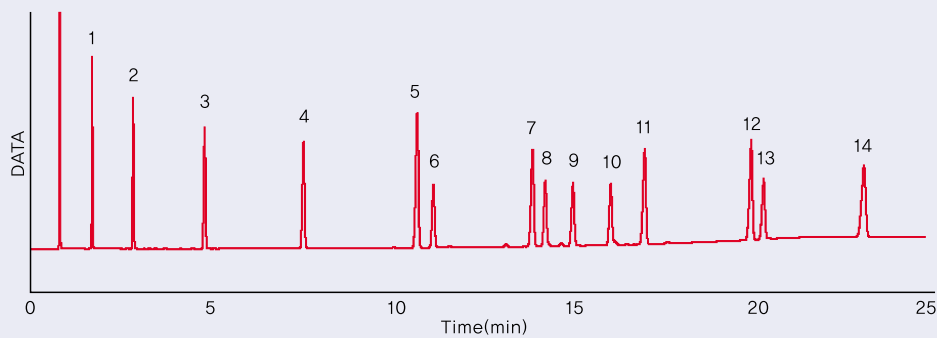
- Operating temperature : 4 °C above ambient to 450 °C
- With LN<sub>2</sub> cryo : -80 °C to 450 °C
- With CO<sub>2</sub> cryo : -55 °C to 450 °C
- Temperature set-point resolution : 1 °C
- Maximum set-point temperature rate : 100 °C/min
- Maximum run time : 9,999 min
- Programming ramp/plateaus : 15/16
- Column bleed compensation standard for two channels
- Temperature Stability :  $\pm 0.05^\circ\text{C}$
- Fast cooling down rates : 6.5 min(from 450 °C to 50 °C)

# High Performance Detectors

## Flame Ionization Detector (FID)

For detection of any organic compounds which can be ionized by hydrogen/air flame

- Maximum temperature : 450 °C
- Automatic flame ignition/flame out detection
- MDL : < 3.2 pg carbon/sec as dodecane using N<sub>2</sub> carrier and 0.4572 mm jet
- Linear Dynamic Range : < ± 10 %, 10<sup>7</sup> with N<sub>2</sub> carrier and 0.4572 mm jet
- Sensitivity : 19 m Coulomb/sec



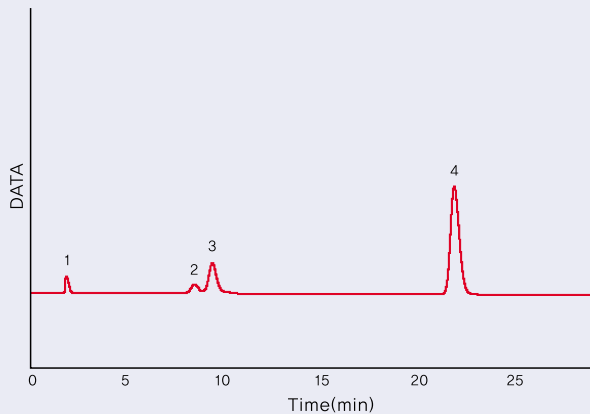
- |                      |                       |                       |
|----------------------|-----------------------|-----------------------|
| 1. C8:0(Caprylic)    | 2. C10:0(Capric)      | 3. C12:0(Lauric)      |
| 4. C14:0(Myristic)   | 5. C16:0(Palmitic)    | 6. C16:1(Palmitoleic) |
| 7. C18:0(Stearic)    | 8. C18:1(Oleic)       | 9. C18:2(Linoleic)    |
| 10. C18:3(Linolenic) | 11. C20:0(Arachidic)  | 12. C22:0(Behenic)    |
| 13. C22:1(Erucic)    | 14. C24:0(Lignoceric) |                       |

Oven : 140 °C(For 5 min) -5 °C/min -240 °C(For 20 min)  
 Column : HP-INNOWAX(30m\*0.53mm\*1.0um)  
 Carrier gas : He, 5.0 ml/min (Split ratio 20:1)  
 Injector : Capillary 250 °C  
 Detector : FID 250 °C  
 Sample : Fatty Acid Methyl Esters  
 Injection Volume: 1ul (Liquid)

## Thermal Conductivity Detector (TCD)

For universal detection of every compound including inorganic compounds except the carrier gas used

- Maximum temperature : 400 °C
- Flow through cell : 4 Rhenium - tungsten filaments
- MDL : < 5 ng dodecane/ml
- Linear Dynamic Range : 10<sup>5</sup> (± 5 %)



1. H<sub>2</sub>
2. O<sub>2</sub>
3. N<sub>2</sub>
4. CH<sub>4</sub>

Oven : 35 °C(For 7 min) - 5 °C/min -150 °C(For 1 min)  
 Column : Carbosieve 1/8  
 Carrier gas : Ar, 20 ml/min  
 Injector : Packed 150 °C  
 Detector : TCD 150 °C  
 Injection Volume : Gas 1ml

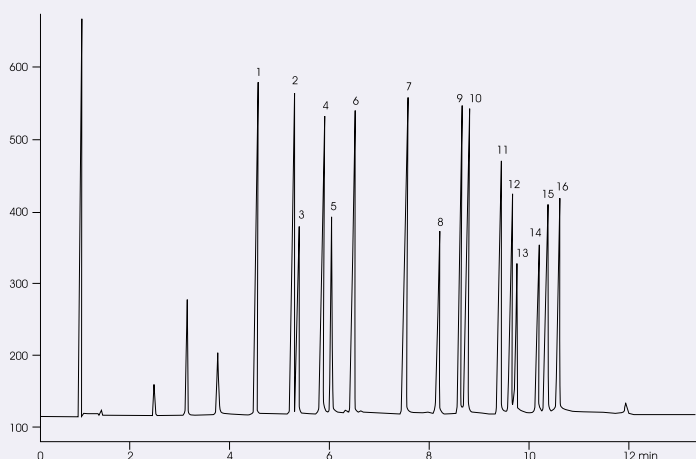
## Pulsed Discharge Detector (PDD)

High Sensitive Detectors for Analysis of Halogenated Compounds



PDD has two different modes, one is PDECD and the other is PDHID. The PDECD is a selective detector for monitoring high electron affinity compounds such as freons, chlorinated pesticides, and other halogen compounds. For this type of compound, the minimum detectable quantity (MDQ) is at the femtogram ( $10^{-15}$ ) or picogram ( $10^{-12}$ ) level. The PDD is similar in sensitivity and response characteristics to a conventional radioactive ECD, and can be operated at temperatures up to  $400^{\circ}\text{C}$ . For operation in this mode, He and  $\text{CH}_4$  are introduced just upstream from the column exit. The other mode, the PDHID is an universal, non-destructive, high sensitivity detector. The response to both inorganic and organic compounds is linear over a wide range. Response to fixed gases is positive (increase in standing current), with an MDQ in the low ppb range.

### Analysis of halogenated compounds by PDECD mode



- |                       |                        |
|-----------------------|------------------------|
| 1. $\alpha$ -BHC      | 2. $\gamma$ -BHC       |
| 3. $\beta$ -BHC       | 4. Heptachlor          |
| 5. $\delta$ -BHC      | 6. Aldrin              |
| 7. Heptachlor epoxide | 8. Endosulfan I        |
| 9. 4, 42 - DDE        | 10. Dieldrin           |
| 11. Endrin            | 12. 4, 42 - DDD        |
| 13. Endosulfan II     | 14. 4, 42 - DDT        |
| 15. Endrin aldehyde   | 16. Endosulfan sulfate |

#### \* Pesticides

- Column : HP- 608, 30 mm x 0.53 mm x 0.5  $\mu\text{m}$
- Oven temp :  $100^{\circ}\text{C}$  (2 min) to  $280^{\circ}\text{C}$  at  $12^{\circ}\text{C}/\text{min}$
- Detector : PDECD, D-2,  $300^{\circ}\text{C}$
- Carrier : Helium, 8 mL/min
- Injector : 1  $\mu\text{l}$ , split 15:1,  $280^{\circ}\text{C}$

## Nitrogen Phosphorous Detector (NPD)

For selective detection of organic nitrogen and phosphorous compounds

- Maximum temperature :  $400^{\circ}\text{C}$
- MDL :  $< 0.4\text{pg N}/\text{sec}$ (Azobenzene)  
 $< 0.2\text{pg P}/\text{sec}$ (Malathion)
- Dynamic Range :  $> 10^4$  (N and P)
- Selectivity : 35,000 to 1 : gN/gC  
75,000 to 1 : gP/gC

## Flame Photometric Detector (FPD)

For selective detection of sulfur and phosphorous compounds

- Sensitivity :  $5.0 \times 10^{-13}$  gP/sec (P mode),  $5.0 \times 10^{-11}$  gS/sec (S mode)
- Dynamic Range :  $10^5$  (P mode), Calibration curve is compulsory(S mode)
- MDL : Vapona -1/ $\mu\text{l}$  Sol 15ppb Vapona in Hexane produces a peak 2x the noise  
Tetrahydrothiophene -1/ $\mu\text{l}$  Sol 0.5ppm in Benzene gives a peak 2x the noise
- Optical Filters : 525 nm(P mode), 394 nm(S mode)

## Electron Capture Detector (ECD)

For selective detection of halogenated compounds.

- Maximum temperature :  $350^{\circ}\text{C}$
- MDL :  $< 0.1$  pg /sec as Lindane
- Linear Dynamic Range :  $10^4$



# Unattended and Automated Analysis

Automatic analysis improves laboratory productivity. Autosampler for 6000 series realizes unattended and automated analysis up to 110 samples and removes tedious and time-consuming manual injection. It is also possible to do dual injection into inlet A and B, so you can enjoy dual efficiency with one autosampler. It is rugged, easy to install and highly reliable.

## 6000 Series Autosampler

Low cost, high precision and easy operation are the main features of our Autosampler for 6000 series. It offers you improved productivity and enhanced analytical capacity. The Autosampler can perform fast injection for decrease of sample decomposition and slow injection similar speed with manual Injection for high viscous sample. It is also possible to do dual Injection into inlet A and B, you will get dual efficiency. It can store up to 10 methods and inject automatically up to 110 samples. It displays an error message if there are no vials in the tray. Controlled by a keyboard or YL-Clarity/Autochro-3000.

## Specifications

- Capacity 110 vials of 2 or 2.5 ml
- Pre and Post- Washing Solvent Position
- Viscosity time from 1 to 15 seconds
- Sequence maximum 15 steps
- Injection depth programmable
- Dual port injection
- Air bubble removal up to 15 strokes
- Internal standard technique
- Programmable sampling and injection speed

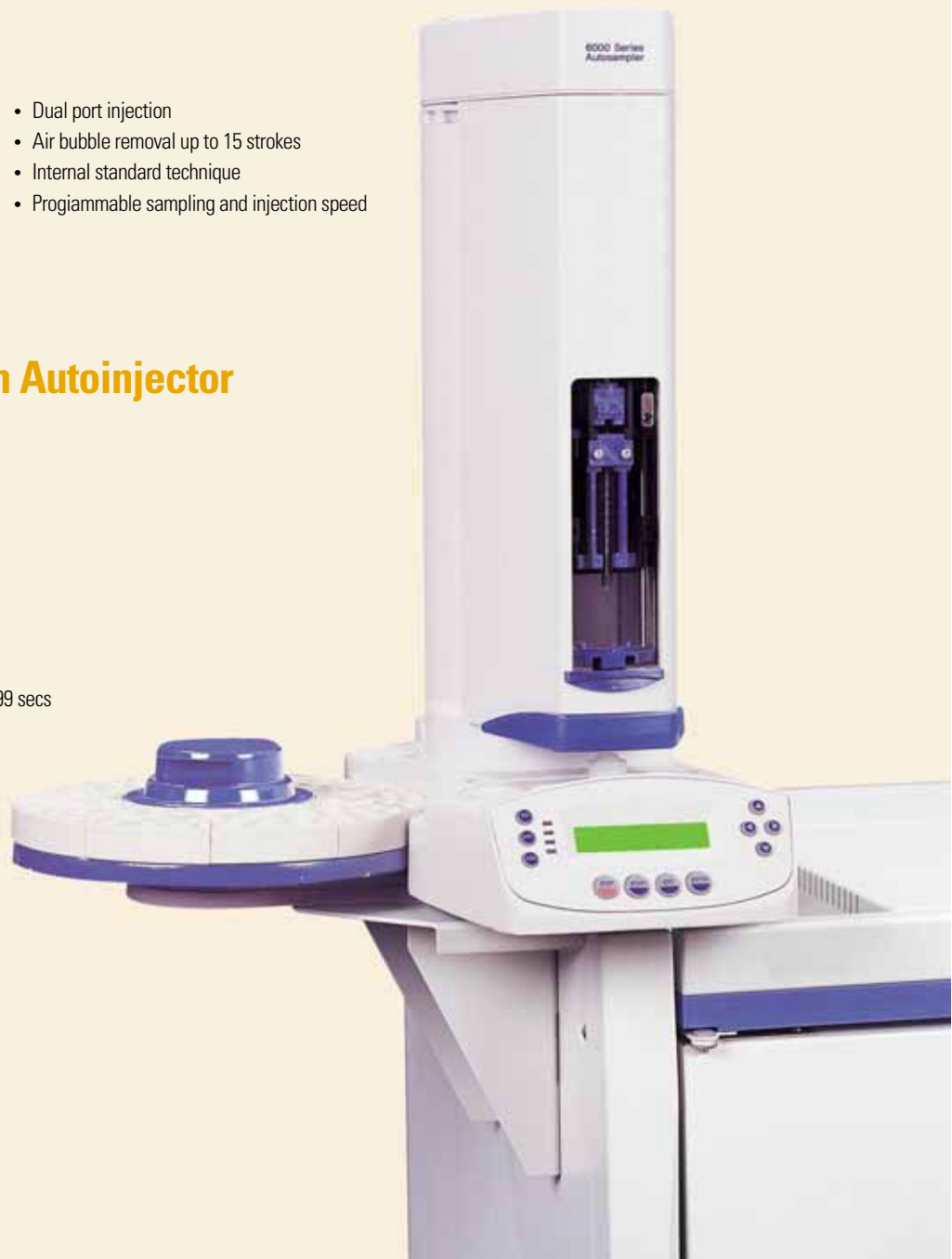
## Economical Solution Autoinjector

### Tray Capacity

- Sampling : 10 vials, 2 or 2.5 ml
- Sample Volume : Steps of 0.1 ul
- Needle Washing : Up to 15 strokes

### Injection

- Injection Speed : 0.1 - 100 ul/sec
- Waiting Time(before and after inject) : 0 - 99 secs



# Sample Preparation System

## Static Headspace Autosampler, HT200H

HT200H, available in GC or GC/MS, is useful to analyze drinking water, waste water, soil (EPA 5021), industrial waste, etc.

The HT200H eliminates tubing, dead volume and sample absorption.

The injection tower transports vials to the 6 position incubator for orbital agitation at the programmed temperature. The heated syringe then samples the headspace and injects directly into the GC.



## Headspace, Liquid and SPME Autosampler, HT280T

The HT280T is a single unit combining static Headspace analysis, Liquid sample injection and SPME (Solid Phase Microextraction)! It can save your time and money, increase analysis flexibility.



## Pyrolyzer, Pyroprobe 5000 series

Pyrolysis coupled with our YL6100 GC allows you to analyze the samples which were previously unsuitable for analysis without extractions or derivatizations.

By using pyrolysis, samples such as paint, adhesives, tapes, caulk, food packaging, rubber, plastic, papers, ink, coating and a full range of household products can be analyzed for qualitative and quantitative information.



## Gas Sampling Valve

In order to obtain accurate results in gas analysis, it is necessary to equip with a gas sampling valve in the front of column. The gas sampling valve enables manual or automatic gas sample injection and flow switching. Our gas sampling valve is operated by an air actuator which opens and closes it. The air actuator is useful in situations where any spark could be dangerous or where there is no electricity available.

They are small, relatively inexpensive, very rugged, dependable, and field-serviceable.



## Purge Housing

When you analyze samples of O<sub>2</sub>, N<sub>2</sub>, etc with low concentration of a few ppms, the purge housing is very useful for this analysis. Purge housings eliminate any possible diffusion from the atmosphere into the valve, or safely vent fugitive emissions from the valve.



## Valve Rotors

Rotor Type	Material	Max temp (°C)	Max pressure (psi)
Valcon E	Polyaryletherketone / PTFE composite	225	400
Valcon T	Polyimide / PTFE / carbon composite	330	300

# Dedicated Analyzers for Specific Demands

## Residual Solvent Analyzer

Organic residual solvents used in the manufacture of pharmaceuticals and found in the inks used for the printing of packaging materials for food and drug products are known to be hazardous to human health if ingested. The Young Lin Residual Solvent Analyzer can accurately and efficiently detect and quantify residual solvents.

## VOC Analyzer

The Young Lin VOC Analyzer accurately tests the presence of VOCs and measures their concentration. The system contains all necessary reagents and equipment for conducting the analyses including detailed procedures and protocols for conducting the tests. These protocols are in full compliance with approved U.S. EPA methods.

## Gas Analyzer

The Young Lin Gas Analyzer efficiently detects and quantifies various gaseous products in a sample. The system uses a porous layer open tubular (PLOT) column, which is a different setup from columns used to separate constituents of liquid samples. The system components include an injector, a detector and a column.

## Pyrolysis-GC System

The Young Lin Pyrolysis-GC system is a state of the art system for obtaining information on the ingredients found in various non-volatile and low-soluble polymers such as nylon, wax, paint, film, wood and plastic products. The targeted material or sample is heated to be fragmented into its individual constituents, which are then separated and identified by the GC System.

## Blood Alcohol Concentration Analyzer

The amount of alcohol in the bloodstream is referred to as the Blood Alcohol Level (BAL). It is recorded in milligrams of alcohol per 100 milliliters of blood, or milligrams percent. The Young Lin Blood Alcohol Level Analyzer using Headspace and GC system is a state of the art system for obtaining the concentration of alcohol in driver's blood or a suspect's blood related to a drinking crime. When someone dies unnaturally caused by alcohol such as methyl alcohol, an inspector identifies alcohols and quantifies the level of methyl alcohol or other side products extracted from blood or urine.



# Chromatography Data System

## YL-Clarity

The sophisticated YL-Clarity data system is easy to use and offers extensive data management plus full control of the entire YL6100 GC & YL9100 HPLC system. The software is designed for 21 CFR Part 11 Compliance and through full compatibility with MS Windows XP and Vista seamlessly handles data processing and instrument control

### 21 CFR Part 11 compliance

#### User accounts

YL-Clarity sets up access rights and passwords (including their parameters e.g., minimum length, validity, etc.). Each user can define the appearance of their own station.

#### Audit trail

It records selected events and operations into a special file and selected operations directly into a chromatogram.

#### Electronic signature

Each chromatogram can be signed electronically. Signature selection is based on the username or the signature certificate.

### Data Acquisition

#### Overlay

YL-Clarity simultaneously displays a virtually unlimited number of chromatograms and their mathematical modification; for example, mutual deductions or derivations of any order.

### Measuring

Simultaneous data acquisition from up to four independent chromatographs, each chromatograph can acquire data from up to 12 detectors.

### Data Management

#### Integration

There are extensive possibilities to optimize integration. The integration parameters can be changed by entering global parameters or interactively, through direct graphic modification of the baseline.

#### Calibration

Internal and external standard calculation methods, calibration of groups of peaks and reference peaks method for better identification.

#### Postrun

YL-Clarity automatically displays, prints, exports and starts other programs after the completion of a measurement.

### User calculations

Users can define custom calculations in the Result and Summary tables. Using the integrated editor you can create your own columns from original columns and individual mathematical functions.

### Optional

SST ( System Suitability Test) & Validation Kit



## Autochro-3000

- Easy view of statistics and overlay
- Strengthened user authentication for data reliability
- Control of multi-system at the same time
- Various analysis method applications
- No risks of data loss
- Intuitive user interface and easy usage

### System control

- Function that can setup control way of device error to protect system when error takes place.

### Data Acquisition

- Each analysis function of multi system in a one program simultaneously.
- Supporting raw data of multi channel.
- Multi tasking function during data collection.
- Function that can close main program during automatic analysis to use minimum system resource.
- Display of baseline, retention time, peak start and end, axis label and peak name on a chromatogram.

### Data Management and Report Generation

- Setup of confirmation standard, confirmation range, way of selection of each compound.
- Various calibrations: ESTD, ISTD and another analysis method by using user definition form.
- Analysis report, Calibration report, Statistics report and Audit trail report
- Compatible with other program since data transform to Industrial standard ASCII CDF automatically.





These Products are manufactured by Young Lin  
ISO 9001-certified facility that is periodically  
audited by the registering body to ensure compliance

# YL6100 GC



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