

The YL9100 HPLC



Think Smart Work Better

The History of HPLC development

1989



- Analog
- Integrator
- Manual

1997



- Analog
- Software
- Manual

2000



Acme 9000

- Digital
- Software-control
- Autosampler

2008



YL9100

- Network HPLC
- Reliable Design
- Powerful CDS
- Fully automated
- PDA available

YL9100 HPLC Overview

- ❖ Superior Performance
- ❖ Greater Reliability
- ❖ Excellent Usability
- ❖ Serviceability and Easy Maintenance
- ❖ Higher Cost-Effectiveness

YL9100 HPLC – Features 1

Superior Performance

- ❑ **Network (LAN) communication**
 - High speed data transfer and real time processing
- ❑ **Higher performance solvent delivery pump**
 - New designed carrier assembly and CAM
 - Improvement of precision of flow rate
- ❑ **Better UV/Vis detector with new optic design**
 - Seya-Namioka, New Blazed Holographic concave grating
- ❑ **New Detector – Photo Diode Array with excellent sensitivity**

YL9100 HPLC – Features 2

Greater Reliability

- ❑ Improvement of System components
 - New designed main parts of Pump, Detectors and Column compartment with very robust materials

- ❑ **Innovative manufacturing process**
 - Three step quality control and assurance system

YL9100 HPLC – Features 3

Excellent Usability

- ❑ **Intuitive, intelligent and powerful software**
 - Easy control window for instruments
 - Harmonization Microsoft's standards for accessing files, reviewing data and reports, and other tasks
 - System Suitability Test with USP, EP and JP
 - Compliance with 21 CFR Part 11
 - Diagnostics and Error detection

- ❑ **Automation Perfectly of Analysis work**
 - Startup, analysis operation, shut down, ... , and to report generation

YL9100 HPLC – Features 4

Serviceability and Easy Maintenance

- ❑ **Better long-life components**
 - New designed the carrier, CAM, needle bearing, seals and belt (with polyurethane) for long-life time
 - New designed the Deuterium and Tungsten lamp guaranteed 2,000 hours
 - Semi-permanent peltier in the Column Compartment

- ❑ **Easy Maintenance**
 - Easy replacement and pre-alignment of lamps
 - Easy replacement of sample cell assembly
 - Diagnostics procedure by software

YL9100 HPLC – Modules

What is the innovated from each module

- ❖ Vacuum Degasser
- ❖ Pump
- ❖ Column Compartment
- ❖ UV/Vis Detector
- ❖ PDA Detector

YL9100 HPLC – Modules -VD

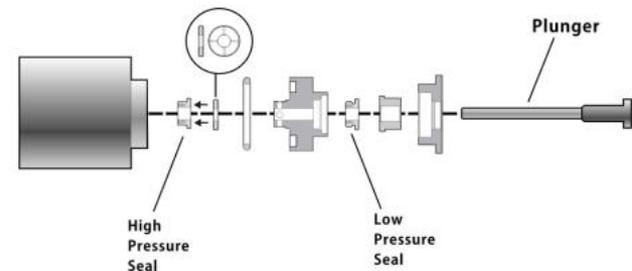
➤ YL9101 Vacuum Degasser - **No fluctuation, shorten warming up**

- ✓ Number of channel : 4 CHs
- ✓ Maximum degassing range: 10ml/min
- ✓ **High capacity of chamber: 925ul per channel**
- ✓ **Excellent compatibility with Toxic chemicals**
: degassing membrane with Teflon® AF
- ✓ **Robust ZHCR® vacuum pump – 220 million cycle**
- ✓ Safety & maintenance : Vacuum Error detection
- ✓ Wide range of Line Voltage : 100-240VAC, $\pm 10\%$, Wide range
- ✓ Line frequency : 50/60Hz, $\pm 5\%$
- ✓ Power consumption : 20W



YL9100 HPLC – Modules – QP/BP/IP

- YL9110 **Q**uaternary Pump
 - YL9111 **B**inary Pump
 - YL9112 **I**socratic Pump
- ✓ New design of mechanical parts of pumps
 - ✓ **Compressibility Compensation technology**
 - ✓ **Semi-automatic Prime/Purge**
 - ✓ **Built-in Leak sensor**
 - ✓ Wide flow range by each check valve with two balls
 - ✓ **Ultra robust carrier, bearing, belt, etc**
 - ✓ **A new Binary Pump in a module**



YL9100 HPLC – Modules – BP

➤ YL9111 **B**inary Pump

- ✓ **A New Pump for higher throughput and reproducibility**
- ✓ **The best pump for High Pressure Gradient System**
- ✓ Built-in Large capacity static mixer
- ✓ X2 Parallel dual-plunger
- ✓ Attractive price compared to QP



YL9100 HPLC – Modules – QP/IP

➤ YL9110 Quaternary Pump

- ✓ Attached 4-way mixing valve to QP



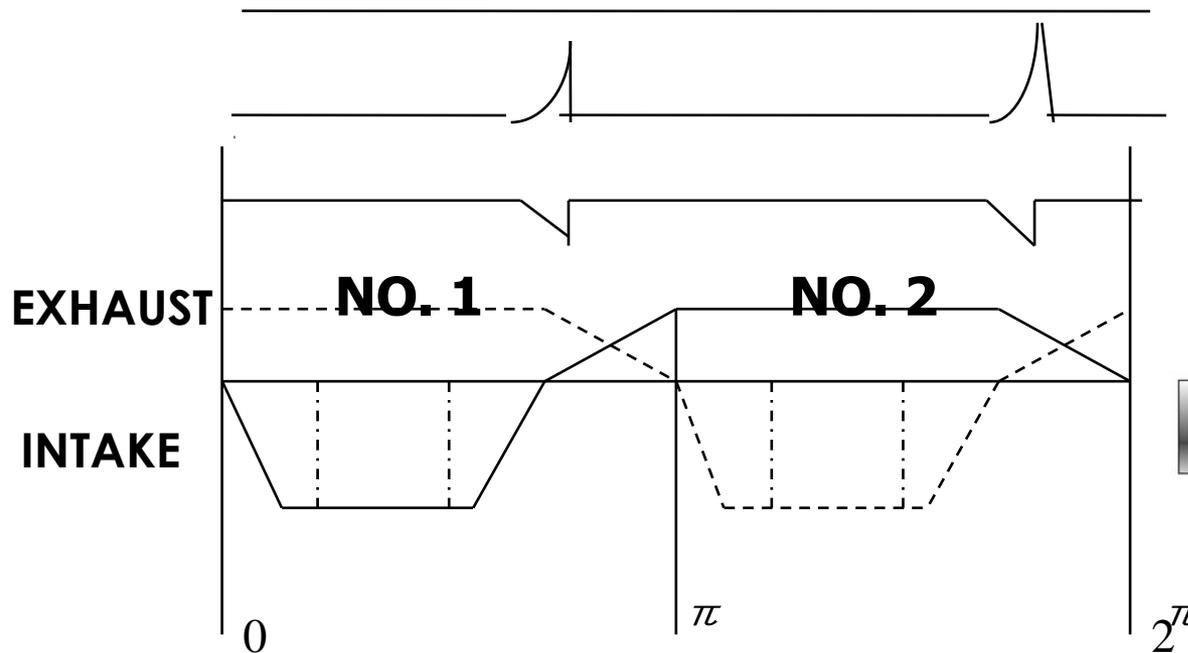
➤ YL9112 Isocratic Pump

- ✓ Improved Isocratic Pump with parallel dual-plunger
- ✓ Easy upgraded from IP to QP



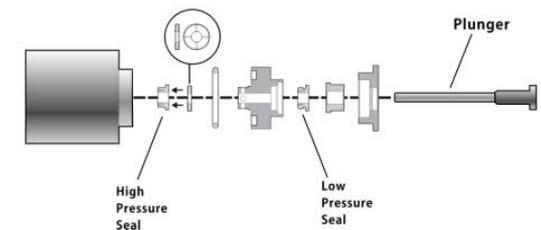
Compensation of Compressibility

When the flow rate is cut off at intersection,
 the speed(RPM) of motor increases to compensate the flow rate.
 - Compression of solvent by Piston vs Elasticity of Seal



After
 Compensation
 Motor Speed

Before
 Compensation



YL9100 HPLC – Modules -CC

➤ YL9130 Column Compartment - **Powerful temperature control**

- ✓ **The best temperature precision: $\pm 0.05^{\circ}\text{C}$**
- ✓ **Powerful Cooling is the standard: down to 4°C**
- ✓ Preheating available
- ✓ Semi-automatic injector/Switching valve: up to 2
- ✓ Column capacity: 300mm – 3ea
- ✓ Leak sensor
- ✓ 40 steps programming



YL9100 HPLC – Modules -UVD

➤ YL9120 UV/Vis Detector

- Excellent sensitivity

- ✓ New designed Optic structure: Seya-Namioka
- ✓ New Blazed Holographic Concave Grating
- ✓ Excellent Data acquisition rate: up to 50 Hz
- ✓ Long-life D2 lamp
- ✓ Advanced band width: 5 nm
- ✓ Excellent Sensitivity: $<\pm 0.35 \times 10^{-5}$ AU at 254nm
- ✓ Integrated cell and slit assembly
- ✓ Greater cooling of the lamp's thermal environment
- ✓ Tested flow cell guarantee up to 1,500 psi(103 bar)
- ✓ Optimal cell volume and path length for analytical method development and QC/QA
- ✓ Leak sensor

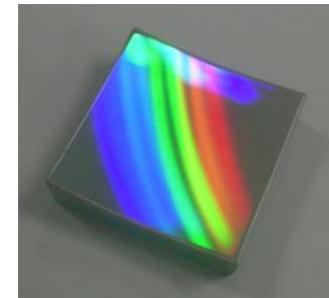
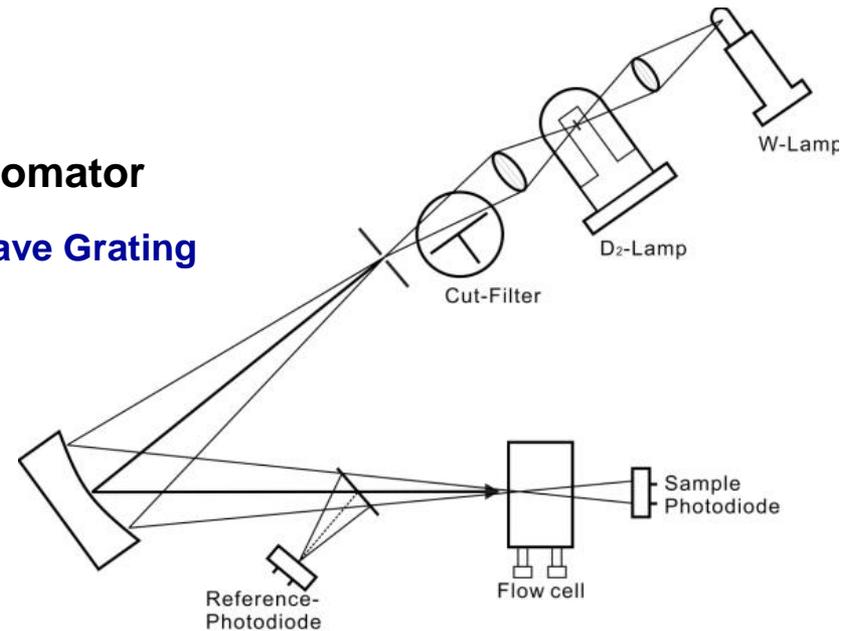


YL9100 HPLC – Modules -UVD

➤ YL9120 UV/Vis Detector

❖ What is the Seya-Namioka monochromator

- To attach **New Blazed Holographic Concave Grating**
- **Extremely low stray light**
- **Highest light intensity**
- **Reduced astigmatism**
- **Very compact design and size**
- **More serviceability**
- **High performance beam splitter**
- **New designed an integrated cell+slit assembly**



YL9100 HPLC – Modules -PDA

➤ YL9160 PDA Detector

- Highest Sensitivity

✓ Optimum wavelength resolution: 1,024 diodes

✓ Wide range from 190 to 950 nm

✓ Highest Sensitivity

$\pm 1.0 \times 10^{-5}$ AU at 254nm, 2 sec rise time

✓ Fast data acquisition: 50 Hz

✓ Greatest drift level

2.0×10^{-4} AU/h at 254nm, Baseline correction



YL9100 HPLC – Modules -RID

➤ YL9170 RID

- For universal detection, GPC and sugar analysis

- ✓ RI Range : 1.00 ~ 1.75 RIU
- ✓ Noise : $< \pm 1.3 \times 10^{-8}$ RIU
- ✓ Linear dynamic range : 80×10^{-5} RIU
- ✓ Drift range : 0.8×10^{-7} RIU/h
- ✓ Flow rate range : 0.2 ~ 3.0 ml/min(analytical)
- ✓ Narrow-bore & Semi-prep also available
- ✓ Cell pressure : 6 kg/cm²(84 psi)



YL9100 HPLC – Modules -ELSD

➤ YL9180 ELSD / YL9181 ELSD

- For universal detection, Better sensitive than RID

- ✓ Universal detector to analyze components which do not have UV absorption, cannot be separated with an isocratic solvent and must use a gradient elution, which cannot be used with a refractive index detector. Only mobile phases without any buffers should be used
- ✓ Display: 2 line x 20 character per line VFDL
- ✓ Operating Conditions:
 - Intended for indoors operation only. 60°F to 85°F and <90% R.H. non condensing
- ✓ Evaporative Zone Temperature: Ambient to 120°C
- ✓ Nebulization Chamber Temperature: Ambient to 60°C (10-70 °C for 9181)
- ✓ Gas Requirement: 65psi ± 5 psi Nitrogen or other inert gas
- ✓ Gas Consumption: Approximately 2.5 SLPM
- ✓ Liquid Flow Rate: 0.25 ml/min. to 3 ml/min (0.2mL/min to 5mL/min for 9181)
- ✓ Electrical Requirement: 120 V AC, 50/60 Hz or 240 V AC, 50/60 Hz 600 Watts
- ✓ Wetted Materials: Stainless Steel, glass, Anodized Aluminum, Teflon
- ✓ Light Source: 670 nM Laser Diode, <5 m W
- ✓ Detector: Hermetically Sealed Photo-Diode/Operational Amplifier
- ✓ Output Signal: 0-5 VDC, Communications: RS-232



YL9100 HPLC – Modules -AS

➤ YL9150 Autosampler

- Fully automated work

- ✓ **Sample capacity :96 standard vials**
- ✓ Option: 384 well-plates, 24 vials(10ml for prep)
- ✓ Sample loop: 100ul(standard)
- ✓ Injection cycle time: <60 sec
- ✓ Injection: full loop, partial loop and ul pickup
- ✓ RSD $\leq 0,3\%$ at full loop
- ✓ $\leq 0.5\%$ at partial loopfill inj.
- ✓ $\leq 1.0\%$ at uL pickup inj.
- ✓ **Carry-over < 0.05%**
- ✓ Option: Built-in Peltier cooling /Heating (4°C ~ 40C)



YL9100 HPLC – Modules -CDS

➤ YL-Clarity CDS

- Intelligent and Powerful Chromatography Data Station

1

**Measuring
Four Instruments
up to 12 detectors.**

2

**Post-run
Automatically
displays, prints,
exports and starts
other programs**



YL9100 HPLC – Modules -CDS

3

Column performance
 Method validation
 By USP, EP and JP

4

User accounts
 Sets up access rights
 and passwords

5

Audit trail
 Records selected
 events and operations
 into a special file.

6

Electronic signature
 Each chromatogram
 can be signed
 electronically.

7

Networked Solution
 Clarity files can be
 accessed from
 networked computers
 using Clarity Offline
 software.

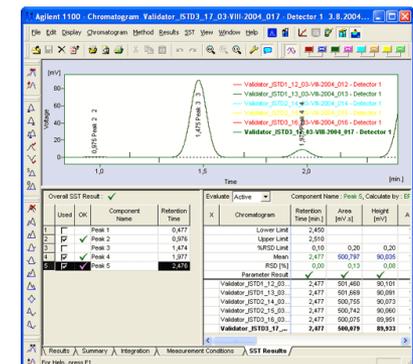
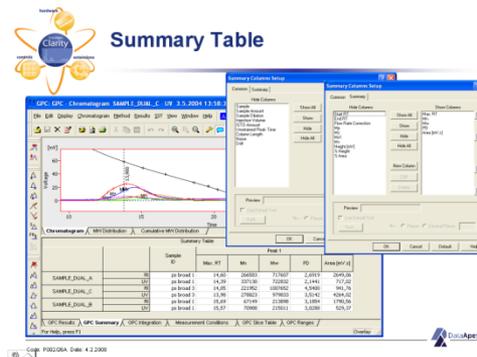
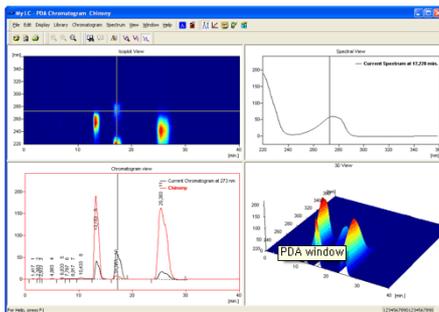
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Great Compatibility
 Window XP/2000.
 Window Me/98,
 'Window Vista and
 Window 7

YL9100 HPLC – Modules -CDS

➤ YL-Clarity CDS

- ✓ Perfectly compliance with 21CFR Part 11
- ✓ **GPC option available**
- ✓ System Suitability Test option available(Method validation)
- ✓ **PDA module option available: 3-D data analysis**
- ✓ Software Validation option available: Software OQ



YL9100 HPLC – Competition vs S

➤ Specifications of YL9100 VS “S” company Pro...

| | YL9100 | “S” Pro... |
|---------------------------|-----------------------------------------------|----------------------------|
| Degassing | 4-channel | 3-channel or 5-channel |
| Pumps | Isocratic/QLPG/BHPG | Isocratic/QLPG/BHPG |
| UV/Vis Detector | | |
| Wavelength range | 190- 900 nm | 190-700nm or –900nm |
| Baseline Noise | ± 0.35 x 10 ⁻⁵ AU at 254 nm | 0.5 x 10 ⁻⁵ AU |
| Baseline Drift | < 1 x 10 ⁻⁴ AU at 254 nm | 1 x 10 ⁻⁴ AU/hr |
| Data acquisition rate | Max 50 Hz | Max 20Hz ?? |
| PDA | 1,024 diodes | 512 diodes |
| Column Compartment | | |
| Temperature range | 4(cooling)-90°C | 4(cooling) - 85°C |
| Temperature Stability | ± 0.05 °C | 0.1 °C |