

Commodity Description

HSK No.	Item No.	Description	Unit	Quantity
9027-20-0000		YL6500 Gas Chromatograph	set	1

A. Features

1. For education, quality control and research work.
2. Analysis of wide fields of organic and inorganic compounds such as gases, liquids and solids.
3. Determination for qualitative and quantitative analysis of compounds.
4. Intuitive graphic user interface with large touchpad color LCD (5.7").
5. Strongly enhanced powerful APC for accurate and precise results
6. Automatic loading and saving up to 20 different analytical methods.
7. High speed data process by network (LAN) communication.
8. Various inlets and detectors installable up to three per each.
9. Time control : Automatic turn-on/off
10. Ten heated zone : 1 heated oven zone
 - 3 heated injector zone
 - 3 heated detector zone
 - 2 heated valve zone
 - 1 heated methanizer zone

B. Specifications

1. YL6500 Gas Chromatograph

1) Gas Chromatograph YL6500 GC Oven System Module

- (1) Usable volume : 14L
- (2) Automatic cooling under processor control
- (3) Temperature operating range : 4□ above ambient to 450□ or more
 - 80□ ~ 450□ (with LN₂ cryogenic cooling)
 - 55□ ~ 450□ (with CO₂ cryogenic cooling)
- (4) Temperature set-point : 0.1□
- (5) Programming: 25 ramps, 26 steps temperature program
- (6) Maximum heating rate: 100□/min (50 to 70□ at 25□ as room temperature)
- (7) Maximum heating set point rate: no limitation
- (7) Run time: Maximum 9,999 min
- (8) Cool down rate: 6.5 minutes from 450□ to 50□
- (9) Temperature program method: Maximum up to 20
- (10) Temperature stability: ±0.01□ (Isothermal), ±0.1□ (Gradient)

- (11) Improved column conditioning function: Automatic set of split flow up to 5 ml/min on column conditioning
- (12) Prevention of oven malfunction (Over heating)
- (13) Heated Device: 10 heated zones standard
 - a. 1 heated oven zone
 - b. 3 heated injector zone
 - c. 3 heated detector zone
 - d. 2 heated valve zone
 - e. 1 heated methanizer zone

2) Inlet

- Maximum no. of installation: three)

(1) Packed inlet

- a. Maximum Temperature : 450 °C
- b. Pressure setting range : 0.01 ~ 150 psi
- c. Total flow setting range : 0.1~100 ml/min
- d. Flow stability < ± 0.05 ml/min
- e. Pressure stability < ± 0.05 psi
- f. Temperature set point : 0.1°C
- g. Temperature stability < ± 0.1 °C

(2) Capillary inlet (Split/Splitless)

- a. Maximum Temperature : 400°C
- b. Pressure setting range : 0.01 ~ 150 psi
- c. Total flow setting range : 0.1 ~ 400 ml/min N₂ / 0 ~ 1000ml/min He
- d. Splitless time set point : 0.01min
- e. Total Flow stability < ± 0.05 ml/min
- f. Pressure stability < ± 0.05 psi
- g. Temperature set point : 0.1°C
- h. Temperature stability < ± 0.1 °C

(3) On-column inlet

- a. Maximum Temperature : 450 °C
- b. Pressure setting range : 0.01 ~ 100 psi
- c. Total flow setting range : 0.1 ~ 100 ml/min
- d. Flow stability < ± 0.05 ml/min
- e. Pressure stability < ± 0.05 psi
- f. Temperature set point : 0.1°C

- g. Temperature stability $\pm 0.1^{\circ}\text{C}$
- h. Temperature programming up to 5 steps

3) Advanced Pneumatic Control

- (1) Up to 6 APC blocks for inlets, detectors or auxillary gases
- (2) Increased precision and accuracy in pressure and flow rate
 - : Increased the number of times sampling for flow and pressure
 - : Increased the number of times controlling for valves
 - : Shockproof APCs
 - : Automatic compensation for temperature & pressure in installation condition
- (3) Up to 6 APCs can be installed and up to 18 channels of APC
- (4) Flow setpoint : 0.1ml/min
- (5) Pressure setpoint : 0.01psi
- (6) Pressure display value: 0.001 psi
- (7) All gas flows controlled by APC
- (8) Available gasses : N₂, He, H₂, Air, Ar/CH₄
- (9) Board for use of APC control : APC Main B/D
- (10) Constant Flow
- (11) Constant Pressure
- (12) Programmed Flow : 5step
- (13) Programmed Pressure : 5step
- (14) Leak detection
- (15) After an alarm for a shortage of gas, it automatically saves the method to method no. 0 and shuts down
- (16) Gas saver

4) Detector

- Maximum no. of detector installation: three
- Data Acquisition Rate : 200 Hz

- (1) Flame Ionization Detector
 - a. 450 °C maximum operating temperature
 - b. Automatic flame ignition
 - c. Temperature set-point : 0.1 °C
 - d. Ignition message: Alarm message as 'Flame out'
 - e. MDL : 2.0 pg carbon/sec
 - f. Linear dynamic range : 10⁷
 - g. Temperature stability : $\pm 0.1^{\circ}\text{C}$

- h. Air : 0~500 ml/min
- e. H₂ : 0~100 ml/min
- f. Make-up gas : 0~100 ml/min

(2) Thermal Conductivity Detector

- a. 400°C maximum operating temperature
- b. Flow through cell : 4 Rhenium-Tungsten filaments
- c. MDL : 2.5 ng/ml (Standard), 400 pg/ml (uTCD)
- e. Filament protection
- f. Temperature set-point : 0.1 °C
- g. Micro-cell (Option)
- h. Ref : 0~100 ml/min
- f. Make-up : 0~100 ml/min

(3) Nitrogen-Phosphorous Detector

- a. 400°C maximum operating temperature
- b. MDL : <0.4 pg N/sec (Azobenzene) / <0.2 pg P/sec (Malathion)
- c. Dynamic Range for N : > 10⁴
- d. Dynamic Range for P : > 10⁴

(4) Flame Photometric Detector

- a. 300°C maximum operating temperature
- b. Minimum detection limit for S : < 20 pg S/sec
- c. Minimum detection limit for P : < 0.5 pg P/sec
- d. Dynamic Range for S : Calibration curve is compulsory
- e. Dynamic Range for P : > 10⁵
- f. S/C Selectivity : 10⁵
- g. P/C Selectivity : 10⁶

(5) Pulsed Discharge Detector

- a. 400°C maximum operating temperature
- b. PDHID, PDECD mode is selectable
- c. APC supported to a column flow
- d. Helium ionization mode(PDHID) : Linearity – 10⁵
 - MDL (organic compound : low ppb)
 - (permanent gas : low ppm)
- Electron capture mode(PDECD) : Linearity – 10⁵
 - MDL – 10⁻¹⁵
 - Dopant gas : 3% Xe in Helium



(6) Electron Capture Detector

- a. Maximum Operating Temperature : 400 °C
- b. Minimum Detection Limit for S : 10 fg/sec
- c. Linear Dynamic Range : > 10⁴

5) Gas Sampling Valve

- (1) Up to 4 gas sampling valves
- (2) Maximum 20 methods for gas valve switching
- (3) Various gas sample loops available
- (4) Purge housing option for very low trace level analysis

2. Chromatography Data System

YL-Clarity Chromatography Data System

- (1) Full control of YL6500 GC
- (2) Measuring: Simultaneous data acquisition from up to four independent chromatographs, each chromatograph can acquire data from up to 12 detectors.
- (3) Integration: There is extensive possibility to modify chromatograms. The chromatogram can be changed by entering global parameters or interactively, through direct graphic modification of the baseline.
- (4) Overlay: Simultaneously displays a virtually unlimited number of chromatograms and their mathematical modification; for example, mutual deductions or derivations of any order.
- (5) Calibration: Internal and external standard calculation methods, calibration of groups of peaks and reference peaks method for better identification.
- (6) Automated measuring support: Sequence tables for any set of samples with or without an autosampler.
- (7) Postrun: Automatically displays, prints, exports and starts other programs after the completion of a measurement.
- (8) Summary result tables: Displays and prints selected results from all simultaneously displayed chromatograms.
- (9) User settings: User selects parameters for peak display and the specification for axes, including color from an extensive array of color settings. Text labels and lines, either as part of the area or anchored to a chromatogram, may also be inserted.
- (10) Export: Optional exportation of all results, with or without the chromatogram, in various formats, into a file or clipboard.
- (11) Import: Imports chromatograms or mathematical curves, which have been saved in text or AIA formats, from other programs.
- (12) Method and calibration history: Each chromatogram can easily be displayed under the same conditions as when it was printed, exported or saved.



- (13) Column performance: Calculations of peaks in terms of symmetry, efficiency, resolution; all by several methods (tangent, moments, etc.).
- (14) Batch: Automatically batch processes, displays, exports or prints any number of chromatograms.
- (15) 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.
- (16) User accounts: Sets up access rights and passwords (including their parameters e.g., minimum length, validity, etc.). Each user can define his or her own station appearance.
- (17) Audit trail: Records selected events and operations into a special file. Records selected operations directly into a chromatogram.
- (18) Electronic signature: Each chromatogram can be signed electronically. Signature selection is based on the username or the signature certificate.
- (19) Networked Solution: Clarity chromatography station files can be accessed from networked computers using Clarity software. This enables the offline evaluation of chromatograms, development of new methods and printing reports.
- (20) 21 CFR Part 11: Clarity Satisfies with the requirements of the 21 CFR Part 11 directive of the FDA.
- (21) Operating Windows: Microsoft Window 2000, XP, Vista and 7

3. Autosampler

1) YL3000A Autosampler

- (1) General features
 - a. Syringe volume: 0.5, 1, 5, 10, 25, 50 and 100ul
 - b. Tray capacity: 121 vials, 2ml; optional tray available
 - c. Maintenance: Preventive counters available
 - d. Electrical control: LAN and TTL; optional: RS232
 - e. Syringe area illumination: yes (programmable)
- (2) Filling
 - a. Sample volume: as low as step of 0.1ul
 - b. Air volume: as low as step of 0.1ul
 - c. Filling speed: 1-100ul/sec
 - d. Viscosity delay: 0-15s
 - e. Bubble elimination: Up to 15 pull up strokes
- (3) Injection
 - a. Injection speed: 1-100ul/sec
 - b. Injection depth: Programmable
 - c. Pre and post injection delay: 0-99s
- (4) Washing



- a. Type: pre-injection, sample, post-injection
- b. Solvent capacity: 6x10ml vials
- c. Mode: Single or double wash
- (5) Internal standard technique
 - a. IS volume: as low as step of 0.1ul
 - b. Air gap volume: as low as step of 0.1ul
 - c. Mode: 1 or 2 air gaps
- (6) Physical features
 - a. Dimensions (WxHxD): 280x570x320mm (tray in closed position)
 - b. Weight: 8kg
 - c. Power supply: 100-240±10%Vac; 50-60Hz; 60VA

2) YL3100A Autoinjector

- (1) General features
 - a. Syringe volume: 0.5, 1, 5, 10, 25, 50 and 100ul
 - b. Tray capacity: 15 vials, 2ml
 - c. Maintenance: Preventive counters available
 - d. Electrical control: LAN and TTL; optional: RS232
 - e. Syringe area illumination: No
- (2) Filling
 - a. Sample volume: as low as step of 0.1ul
 - b. Air volume: as low as step of 0.1ul
 - c. Filling speed: 1-100ul/sec
 - d. Viscosity delay: 0-15s
 - e. Bubble elimination: Up to 15 pull up strokes
- (3) Injection
 - a. Injection speed: 1-100ul/sec
 - b. Injection depth: Programmable
 - c. Pre and post injection delay: 0-99s
- (4) Washing
 - a. Type: pre-injection, sample, post-injection
 - b. Solvent capacity: 6x10ml vials
 - c. Mode: Single or double wash
- (5) Internal standard technique
 - a. IS volume: as low as step of 0.1ul
 - b. Air gap volume: as low as step of 0.1ul
 - c. Mode: 1 or 2 air gaps
- (6) Physical features
 - a. Dimensions (WxHxD): 280x570x320mm



- b. Weight: 6.4kg
- c. Power supply: 100-240±10%Vac; 50-60Hz; 60VA

3) YL3200A Autosampler as higher capacity

(1) General features

- a. Syringe volume: 0.5, 1, 5, 10, 25, 50 and 100ul
- b. Tray capacity: 2 removable racks; **209 vials**, 2ml
- c. Maintenance: Preventive counters available
- d. Electrical control: LAN and TTL; optional: RS232
- e. Syringe area illumination: yes (programmable)
- f. **Syringe ID: Included**
- g. **Integrated Bar Code Reader can be available (option)**

(2) Filling

- a. Sample volume: as low as step of 0.1ul
- b. Air volume: as low as step of 0.1ul
- c. Filling speed: 1-100ul/sec
- d. Viscosity delay: 0-15s
- e. Bubble elimination: Up to 15 pull up strokes

(3) Injection

- a. Injection speed: 1-100ul/sec
- b. Injection depth: Programmable
- c. Pre and post injection delay: 0-99s

(4) Washing

- a. Type: pre-injection, sample, post-injection
- b. Solvent capacity: 6x10ml vials
- c. Mode: Single or double wash

(5) Internal standard technique

- a. IS volume: as low as step of 0.1ul
- b. Air gap volume: as low as step of 0.1ul
- c. Mode: 1 or 2 air gaps

(6) Physical features

- a. Dimensions (WxHxD): 280x570x320mm (tray in closed position)
- b. Weight: 9.2 kg
- c. Power supply: 100-240±10%Vac; 50-60Hz; 60VA

4. HT200H Static Headspace Autosampler

- (1) Shaking Method: Orbital
- (2) Incubation Oven: 6 position

- (3) Syringe Sizes: 2.5, 5ml
- (4) Tray Capacity: 40 Vials, 10 or 20ml
- (5) Cleaning System: Nitrogen
- (6) Oven Temperature: 40 - 150°C
- (7) Time: 0 - 23h 59m
- (8) Progressive Increase: 0 - 23h 59m
- (9) Shaking Cycles On/Off: 0 - 99mins
- (10) Syringe Temperature: 40 - 170°C
- (11) Pre-fill Volume: Steps of 0.01ml
- (12) Pull Up Strokes: Up to 15 Strokes
- (13) Equilibrium Delay: Up to 60secs
- (14) Sampling Volume: Steps of 0.01ml
- (15) Filling Speed: 0.1 - 100ml/min
- (16) Sampling Repeats: Up to 15
- (17) Waiting Time between Samples: 1 - 99secs
- (18) Injection Speed: 0.1 - 100ml/min
- (19) Waiting Time (before and after injection): 1 - 99secs
- (20) Dimensions (W x H x D): 420 x 520 x 400mm
- (21) Mass: 11.5kg

5. HT280T Dual Autosampler for Liquid injection/Headspace injection (option: SPME)

1) For Static Headspace Automatic injection

- (1) Shaking Method: Orbital
- (2) Incubation Oven: 6 position
- (3) Syringe Sizes: 2.5, 5ml
- (4) Tray Capacity: 40 Vials, 10 or 20ml
- (5) Cleaning System: Nitrogen
- (6) Oven Temperature: 40 - 150°C
- (7) Time: 0 - 23h 59m
- (8) Progressive Increase: 0 - 23h 59m
- (9) Shaking Cycles On/Off: 0 - 99mins
- (10) Syringe Temperature: 40 - 170°C
- (11) Pre-fill Volume: Steps of 0.01ml
- (12) Pull Up Strokes: Up to 15 Strokes
- (13) Equilibrium Delay: Up to 60secs
- (14) Sampling Volume: Steps of 0.01ml
- (15) Filling Speed: 0.1 - 100ml/min
- (16) Sampling Repeats: Up to 15
- (17) Waiting Time between Samples: 1 - 99secs



(18) Injection Speed: 0.1 - 100ml/min

(19) Waiting Time (before and after injection): 1 - 99secs

2) For GC Liquid Automatic injection

(1) Tray Capacity: 110 vials of 2 or 2.5ml

(2) Pre & Post Injection Washes

- a. Volume: by steps of 0.1 μ l
- b. Mode: each injection, each sample or sample group
- c. Number of wash: up to 15

(3) Number of wash: up to 15

(4) Various sampling performance

- a. Sample Volume: by steps of 0.1 μ l
- b. Air Volume: by steps of 0.1 μ l
- c. Aspirating speed: from 0.1 to 100 μ l/s
- d. Sample wash: up to 15
- e. Bubble elimination: up to 15 strokes
- f. Viscosity time: from 0 to 15s

(5) Injection

- a. Injection speed: from 0.1 to 100 μ l/s
- b. Waiting time before and after injection: from 0 to 99 s
- c. Method stores: up to 10

(6) Internal Standard Techniques

- a. Int. STD Volume: by steps of 0.1 μ l
- b. Air gap Volume: by steps of 0.1 μ l
- c. Mode: one or two air gap

3) General Specifications

(1) Physical Characteristics

- a. Dimensions (W x H x D): 420 x 520 x 400mm
- b. Weight: 11.5kg

(2) POWER

- a. Voltage: 230 or 115 \pm 10% Vac
- b. Frequency: 50/60 Hz

(3) AMBIENT CONDITIONS

- a. Temperature: 15°C - 35°C
- b. Humidity: 5% - 85%

4) SPME Kit (option)

- (1) Extraction: Liquid and Headspace
- (2) Tray Capacity: 40 Vials, 10 or 20ml
- (3) Extraction Depth: Variable
- (4) Shaking Method: Orbital
- (5) Incubation Oven: 6 position
- (6) Oven Temperature: 40 -150°C
- (7) Shaker Speed: 320 – 720 rpm
- (8) Oven Door: Kept closed during extraction
- (9) Fibre Cleaning Station(optional): Variable duration

6. Accessories for GC

1) Start-up Kit for installation GC

Nuts and ferrules 1/8"	10 ea
Nuts, 1/4"	2 ea
Vespel ferrule, 1/4"	2 ea
Union Tee, 1/8"	1 ea
Septa, 11mm, 50/pk	1 pk
Tubing cutter	1 ea
Monkey spanner	1 ea
Wrench 1/2" & 9/16"	1 ea
Wrench 1/2" & 7/16"	1 ea
Wrench 3/8" & 7/16"	1 ea
Wrench 1/4" & 5/16"	1 ea
(+) screw driver 6x100	1 ea
(+) screw driver 5x100	1 ea
(-) screw driver 6x100	1 ea
10ul syringe	1 ea
Copper tubing, 1/8"	1 ea

2) Accessories for YL3000A/3100A/3200A Autosampler

Installation kit for YL3000 series Autosampler to YL6500 GC	1 kit
2ml Clear ABC S/T vial, 100/pk	1 ea
ABC Screw cap w/PTFE/silicone septa	1 ea

0.35ml Glass insert shell 100/pk	1 ea
Autosampler syringe, 10ul	1 ea

3) Accessories for HT200H Autosampler

6500 GC Installation kit, Standard Interface for Headspace	1 kit
Spacers for 40 position tray to allow use of 10ml vials	1 ea
20ml Headspace Vials Clear, Round Bottom. 100ea/pk	1 pk
10ml or 20ml Vials Crimp Cap with Sil/PTFE septa, Pack / 100	1 pk
Manual Crimper for 20mm Caps	1 ea
De-Crimper for 20mm Caps	1 ea
Plunger only for 2.5ml Syringe	1 ea
Glass Barrel + intergral needle for 2.5ml Syringe	1 ea

4) Accessories for HT280T Autosampler

6500 GC Installation kit, Standard Interface for Headspace	1 kit
Set of spacers for 40 position tray to allow use of 10ml vials	1 set
20ml Headspace Vials Clear, Round Bottom. 100ea/pk	1 pk
10ml or 20ml Vials Crimp Cap with Sil/PTFE septa, Pack / 100	1 pk
Manual Crimper for 20mm Caps	1 ea
De-Crimper for 20mm Caps	1 ea
Plunger only for 2.5ml Syringe	1 ea
Glass Barrel + intergral needle for 2.5ml Syringe	1 ea
Installation kit for YL3000 series Autosampler to YL6500 GC	1 kit
2ml Clear ABC S/T vial, 100/pk	1 ea
ABC Screw cap w/PTFE/silicone septa	1 ea
SPME Kit for factory installation (when ordered with system). Includes SPME holder and starter kit of fibres.. Note that SPME accessories can only be purchased from Supelco	1 kit

7. Warranty

- 1 year after installation date