

GC Systems	YL6500 GC	6890N	7890B	Intuvo 9000	GC-2010 Plus	Clarus 680	Clarus 580	Trace GC Ultra	SCION 456
Manufacturer	YL Instruments	Agilent	Agilent	Agilent	Shimadzu	PerkinElmer	PerkinElmer	Thermo Scientific	SCION Instruments
Maximum Number of Heated Zones	10	7	7		7				Standard 5 4 optional, 9 total
Maximum Number of Inlet	3	2	2	1	3	2	2		3
Maximum Number of Detectors	3	2	3		4	2	2	3	4
Maximum GC Methods Storage	20	5	5			5	5		50
Clock Time Programming	Yes	Yes	Yes						
Data Communication	LAN	LAN	LAN	LAN	LAN	LAN	LAN	LAN	LAN
Column Oven									
Operating Temp Range	Amb. + 4 to 450°C	Amb. + 4 to 450°C	Amb. + 4 to 450°C	Amb. + 10 to 450°C	Amb. + 4 to 450°C	Amb. + 10 to 450°C	Amb. + 10 to 450°C	Amb. + few degrees to 450°C	Ambient +4 °C to 450 °C
with LN2 cryogenic cooling	- 80 to 450°C	-80 to 450°C	-80 to 450°C			-99 to 450°C	-99 to 450°C	- 99 to 450°C	-100 °C to 450 °C
with LCO2 cryogenic cooling	- 40 to 450°C	-40 to 450°C	-40 to 450°C		- 50 to 450°C			- 55 to 450°C	-60 °C to 450 °C
Temperature set-point resolution	0.1°C	1°C	0.1°C	0.1°C	0.1°C	1°C	1°C		0.1°C
Maximum Temp. Ramp Rate	120°C/min	120°C/min	120°C/min	250°C/min	??	70°C/min(Standard) 140°C/min(option)	45°C/min	120°C/min	150°C/min
Programmed rate setting range	no limitation				-250 ~ 250 °C/min				
Maximum Programming Ramp/Plateaus	25/26	6/7	20/21	20/21	20/21	9/10	3/4	7/8	24/25
Oven Cooldown Rate	6.5 min 450°C to 50°C (option: 5.5 min)	4.5 min 450°C to 50°C	4.0 min 450°C to 50°C	<3 min 450°C to 50°C	3.4 min 450°C to 50°C	2.0 min 450°C to 50°C in a specific condition	250 °C to 50 °C: 4.8 min 200 °C to 50 °C: 3.8 min 50 °C to 0 °C: 2.6 min 50 °C to -30 °C: 3.4 min	4.17 min 450°C to 50°C	400 °C to 50 °C in 4.5 minutes
Maximum run time	9,999 min	999.99min	999.99 min	999.99 min	9999.99min	999 min	999 min		
Oven Volume	14L	13.9L	13.9L		13.7 L	13 L	10.6 L		
Pneumatics									
	APC (Advanced Pneumatic Control)	EPC (Electronic pneumatic control)	EPC (Electronic pneumatic control)	EPC (Electronic pneumatic control)	AFC/APC (Advanced Flow/Pressure Controller)	PPC (Programmable pneumatic control)	PPC (Programmable pneumatic control)		Electronic Flow Control (EFC)
Atmospheric Pressure Compensation	Yes (real time)	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
Amb. Temp. Compensation	Yes (real time)	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
Maximum pressure	100psi(option:150psi)	100 psi	150 psi	150 psi	970kPa		100 psi		
Setting value	0.001psi	0.01 psi	0.001psi	0.001psi	0.1kPa				
Display value	0.001psi	0.01 psi	0.001psi	0.001psi	0.1kPa				
Retention time repeatability	0.0013min(Tetradecane)	0.0008min(Tetradecane)	0.0008min(Tetradecane)	<0.0008 min	??				<0.008% or < 0.0008 min
- Programmable Flow for Carrier Gas	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
- Programmable Pressure for Carrier Gas	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
- Gas Saving Control	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Leak Detection/Automatic Shut Down	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
Carrier and makeup gas settings selectable for He, H2, N2 and argon/methane.	Yes	Yes	Yes	Yes					
APC channels	18	12				12	12		9
Chromatographic Data System									
	YL-Clarity	Chemstation	Chemstation	OpenLAB	LabSolution	TotalChrom	TotalChrom/TurboMass/ Empower2/EZChrom Elite	ChromQuest	CompassCDS
Platform	All Windows OS	Windows	Windows	Windows	Windows	Windows		Windows	Windows
Simultaneous Use for Multiple Instrument Types	Yes	Yes	Yes	Yes	Yes	Yes		Yes	Yes
Maximum Number of Instrument Control	4	4	4	4	4				
21CFR Compliance	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Inlets									
Maximum number of inlets	3	2	2	1	3	2	2		3
Packed Inlet									
Maximum Operating Temp.	450°C	400°C	400°C	450°C	450°C	450°C	450°C	400°C	450°C
Pressure Setting Range	0.001- 100 psi (option: 150 psi)	0.0- 100 psi	0.001-150psi	0.0- 100 psi	0-970kPa (around 140 psi)	0 - 100 psi			0-150 psi
Total Flow Setting Range	0.1- 100 mL/min	0.0- 100 mL/min	0 - 200 mL/min	0-500 mL/min for N2 0-1250mL/min for He or H2		0 - 100 mL/min			50ml/min
Adaptable Column I.D.	0.53mm to 1/4"	0.53mm to 1/4"	0.53mm to 1/4"		0.53mm to 1/4"	0.53mm to 1/4"	1/2"-1/4"		
Split/Splitless Capillary Inlet									
Maximum Operating Temp.	400°C	400°C	400°C	400°C	450°C	450°C	450°C	400°C	450°C
Pressure Setting Range	0.001- 100 psi (option: 150 psi)	0-100psi (≥0.2 mm diameter column) 0-150psi (<0.2 mm diameter column)	0-100psi (≥0.2 mm diameter column) 0-150psi (<0.2 mm diameter column)	0-100psi (≥0.2 mm diameter column) 0-150psi (<0.2 mm diameter column)	0-970kPa (around 140 psi)	0 - 100 psi			0-150 psi
Total Flow Setting Range	0-200 mL/min for N2 0 - 1000 mL/min for H2 or He	0-200 mL/min for N2 0-1000mL/min for He or H2	0-200 mL/min for N2 0-1250mL/min for He or H2	0-500 mL/min for N2 0-1250mL/min for He or H2	0 - 1200 mL/min	0 - 100 mL/min			500 mL/min for N2/Ar 1500 mL/min for H2/He
Maximum Split Ratio	7,500	7,500	7,500	7,500	9,999.9				10,000
Adaptable Column I.D.	0.050 to 0.530mm	0.050 to 0.530mm	0.050 to 0.530mm				1/16" fitting		
Septum Purge	Fixed	Fixed	Fixed						
On-Column Inlet									
Maximum Operating Temp.	450°C	450°C	450°C		450°C	500°C	500°C	400°C	450°C
Pressure Setting Range	0.001- 100 psi (option: 150 psi)	0.00 - 100.00 psi	0.01 - 100 psi						0-150 psi
Temperature programming	up to 5 steps	3 steps	3 steps		7 steps	2 steps	3 steps	3 steps	
Detector									
Maximum number of Detectors	3	2	3 (third detector as TCD)		4	2	2		4
Detectors available									
FID	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
TCD	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
uTCD	Yes								
ECD	Yes	Yes (Micro ECD)	Yes (Micro ECD)	Yes	Yes	Yes	Yes	Yes	Yes
NPD	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
FPD	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
PDD	Yes				BID				Yes(PDHID)
MSD	Yes	Yes	Yes	Yes	Yes				Yes
FID (Flame Ionization Detector)									
Maximum Operating Temp.	450°C	450°C	450°C	450°C	450°C	450°C	450°C	400°C	450°C
Minimum detectable level	1.5 pg carbon/sec as dodecane using N2 carrier	1.8 pg C/s (for tridecane)	1.4 pg C/s (for tridecane)	1.4 pg C/s (for tridecane)	1.5 pg C/s	3pg C/s (for tridecane)	>0.015 coulombs /g C	2 pgC/s	2 pgC/s
Flame-out Detection	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Linear Dynamic Range	10 ⁷	10 ⁷	10 ⁷	10 ⁷	10 ⁷	10 ⁶	10 ⁶	10 ⁷	10 ⁷
Maximum Data Acquisition Rate	200Hz	200Hz	500Hz	1,000 Hz				300 Hz	
TCD (Thermal Conductivity Detector)									
Maximum Operating Temp.	400°C	400°C	400°C	400°C	400°C	350°C	350°C		450°C
Minimum detectable level	2.5 ng/ml as dodecane µTCD : 0.4 ng/ml	400 pg propane/mL with He carrier	400 pg tridecane/mL with He carrier	400 pg tridecane/mL with He carrier	20,000 mV*mg/mL decane	<1ppm nonane	9 µV/ppm nonane at 160 mA at the bridge with a detector temperature of 100 °C	600 pg Ethane/mL He	300 pg Butane/ml
Linear Dynamic Range	10 ⁵	10 ⁵	10 ⁵	10 ⁵ ± 5%	10 ⁵	10 ⁵	> 10 ⁵	10 ⁵	10 ⁵
Maximum Data Acquisition Rate	200Hz								
ECD (Electron Capture Detector)									
			Micro ECD	Micro ECD				Micro ECD	
Maximum Operating Temp.	400°C	300°C	300°C	400°C	350°C	450°C	450°C		450°C
Minimum detection limit	<10 fg/sec as Lindane	<6 fg/mL Lindane	<4.4 fg/mL Lindane (<4.5 fg/sec as Lindane)	<4.4 fg/mL Lindane	<4.4 fg/sec	< 0.05 pg perchloroethylene with argon/methane or nitrogen	< 0.05 pg perchloroethylene with argon/methane or nitrogen	10 fg/sec Lindane	7 fg/sec Lindane
Linear Dynamic Range	10 ² as MF mode	>5 x 10 ⁴ with lindane	>5 x 10 ⁴ with lindane	>5 x 10 ⁴ with lindane	> 10 ⁴	> 10 ⁴	> 10 ⁴	> 10 ⁴	10 ⁶
Maximum Data Acquisition Rate	200Hz	50 Hz	50 Hz	50 Hz					
NPD (Nitrogen Phosphorous Detector)									
Maximum Operating Temp.	400°C	400°C	400°C	400°C	450°C	450°C	450°C		450°C
Minimum detectable level	<0.2pg N/s, azobenzene <0.02pgP/s, parathion methyl	<0.4 pg N/s <0.2pg P/s with azobenzene/malathion octadecane mixture	<0.3 pg N/s <0.1 pg P/s with azobenzene/malathion octadecane mixture	<0.08 pg N/s <0.01 pg P/s with azobenzene/malathion octadecane mixture	0.1 pg N/sec 0.03 pg P/sec	0.5 pg N/sec 2,4-dimethylaniline, 0.05 pg P/sec tributylphosphate	5 • 10 ⁻¹⁴ g N/sec 2,4-dimethylaniline 5 • 10 ⁻¹⁴ g P/sec tributylphosphate	0.05 pg N/sec 0.02 pg P/sec	100 fg N/sec 100 fg P/sec
Linear Dynamic Range	>10 ⁴	>10 ⁵	>10 ⁵ with azobenzene/malathion mixture	>10 ⁵	>10 ⁴	>10 ⁴	> 10 ⁴	>10 ⁴	N :10 ⁵ P: 10 ⁴
Maximum Data Acquisition Rate	200Hz	200Hz	200Hz	1,000 Hz					
FPD (Flame Phosphorous Detector)									
Maximum Operating Temp.	250°C		250°C	400°C	350°C	450°C	450°C		
Minimum detection limit	<1.0 pg S/s, <0.2 pg P/s (parathion methyl)	<3.6 pg S/s, <60 fg P/s, with methylparathion	<2.5 pg S/s, < 45 fg P/s, with methylparathion	<2.5 pg S/s, < 45 fg P/s, with methylparathion	< 3 pg S/s, < 55 fg P/s, with methylparathion	10 pg S/sec thiophene, 1 pg P/sec tributylphosphate	1 • 10 ⁻¹¹ g S/sec thiophene 1 • 10 ⁻¹² g P/sec tributylphosphate	5 pg S/sec Malathion, 0.1 pg P/sec	
Dynamic Range for S	>10 ³	>10 ³	>10 ³	>10 ³	>10 ³	10 ²	10 ²	>10 ³	
Dynamic Range for P	>10 ⁴	>10 ⁴	>10 ⁴	>10 ⁴	>10 ⁴	10 ³	10 ³	>10 ⁴	
Maximum Data Acquisition Rate	200Hz	200Hz	200Hz						
PDD (Pulsed Discharge Detector)									
Maximum Operating Temp.	400°C				300°C				PDHID
Minimum detection limit	Helium ionization mode(PDHID) :(organic compound : low ppb) (permanent gas : low ppm)				2 pg	Low pg range		Low pg range	50 ppb (Methane)
Linear Dynamic Range	10 ⁵				> 10 ⁶	10 ⁵		10 ⁵	10 ⁴