

# SIL-HT

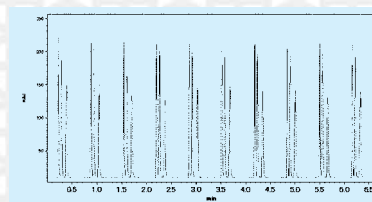
Shimadzu  
 Autosampler for HPLC System



High throughput is the key word for the modern HPLC analysis. The SIL-HT is the best performing autosampler in terms of sample injection speed, sample capacity, and minimizing sample carryover of highly adsorbent sample components. These features are in increasingly high demand and essential for high throughput analysis. The SIL-HT has been developed to meet such users' requirements and will provide optimum results in your lab. The SIL-HT is available in two versions; SIL-HT<sub>A</sub>, ambient model; and SIL-HT<sub>c</sub> with sample temperature control from 4 to 40°C.

## High throughput

The SIL-HT maximizes analysis throughput with fast sample injection and high sample capacity. Injection speed is 15seconds for injecting samples of 10mL. The SIL-HT is the fastest autosampler currently on the market.



High speed analysis : 10 replicate injections  
 Column : Shim-pack FC-ODS (30mm x 4.6mm i.d.)  
 Mobile Phase : Water / Acetonitrile (55 / 45)  
 Flow Rate : 3.0 mL / min  
 Temperature : 50 °C  
 Detection : absorbance at 254 nm  
 Sample : Methyl Paraben, Ethyl Paraben, Propyl Paraben  
 methanolic solution (each 25 mg / L)  
 Injection Volume : 10 µL

## Near-zero sample carryover

Recently, an increasing number of extremely basic and hydrophobic components are being used in new drug formulations. Since these chemical compounds strongly adsorb to the sampling needles or rotor seals (mainly Vespel) of autosamplers, cross contamination may not be reduced by simple rinsing. To minimize adsorption of such chemicals, the outer surface of the sampling needle of the SIL-HT's autosampler is coated using a special, innovative surface processing technology (patent pending). Furthermore, by employing newly developed rotor seals and needle seals made of PEEK, the SIL-HT dramatically reduces contamination, even with the most highly adsorbent sample compounds. As a result, the SIL-HT demonstrates nearly zero sample carryover.

## Excellent repeatability

The SIL-HT uses a needle-in-the-flow-path injection design (also called as direct injection method or total volume injection method) and high-performance measuring pump (6nL step resolution) for enhanced accuracy. This results in superior repeatability over conventional autosamplers. In addition, precious samples are not wasted since the total volume aspirated is injected.

Set No.	1µL	5µL	10µL	50µL	100µL
1	0.43%	0.12%	0.05%	0.02%	0.02%
2	0.12%	0.10%	0.09%	0.02%	0.02%
3	0.33%	0.14%	0.06%	0.02%	0.02%
4	0.23%	0.10%	0.06%	0.02%	0.02%
5	0.43%	0.11%	0.06%	0.13%	0.01%
6	0.21%	0.04%	0.04%	0.13%	0.04%
7	0.18%	0.13%	0.05%	0.06%	0.13%
8	0.23%	0.17%	0.08%	0.05%	0.03%
9	0.39%	0.10%	0.06%	0.01%	0.10%
10	0.36%	0.14%	0.08%	0.02%	0.04%
<b>Average</b>	<b>0.29%</b>	<b>0.12%</b>	<b>0.06%</b>	<b>0.05%</b>	<b>0.04%</b>

Injection volume repeatability for various injection volumes : 10 injections per set  
 Column : Shim-pack VP-ODS (150mm x 4.6mm i.d.)  
 Mobile Phase : Water / Methanol (15 / 85)  
 Flow Rate : 1.0 mL / min  
 Temperature : 40 °C  
 Detection : absorbance at 254 nm  
 Sample : Naphthalene methanolic solution (260 mg / L)

## Specifications of SIL-HT SIL-HTA (without sample cooler 228-45061-xx) SIL-HTc (with sample cooler 228-45062-xx)

Sample injection unit	Sample injection system		Total sample injection, variable sample injection system (zero sample loss during injection)
	Settable range of injection volumes		0.1 to 100 $\mu$ L (standard), or 1 to 2000 $\mu$ L (option) (0.1 $\mu$ L steps from 0.1 to 0.9 $\mu$ L, and 1 $\mu$ L steps from 1 to 2000 $\mu$ L)
	Sample processing capability		With 1-mL vials: 350 With 1.5-mL vials: 210 (SIL-HTA), 140 (SIL-HTc) With 4-mL vials: 100 With micro plates: 4 (96 wells: 384, 384 wells: 1536) With deep-well plates: 4 (96 wells: 384, 384 wells: 1536)
	Injection volume repeatability		RSD: 0.3% max. (at 10 $\mu$ L injection)
	Cross contamination		0.01% max. (for analysis of naphthalene)
	Injection volume accuracy		Less than +/-1% (50 $\mu$ L)
	Injection volume accuracy correction		Possible
	No. of injections		1-99 times per sample
	Setting of analysis time		0.01-9999.9 (0.01 minute increments to 999.99min., 0.1 minutes increments over 1000min.)
	Number of steps for injection conditions		Max 102 steps
	Sample suction speed		0.1-15 $\mu$ L/sec (0.1 $\mu$ L/s step for 0.1-0.9 $\mu$ L/sec., 1 $\mu$ L/s step for over 1 $\mu$ L/sec.)
	Rinsing liquid suction speed		1-35 $\mu$ L/sec. (1 $\mu$ L/s step)
	Maximum pressure		Max. 20.0Mpa (Standard pipings of sample flowpath is PEEK)
	Sample cooler (SIL-HTc only)	Method	Direct cooling method (at a setting of 4 deg. C, room temperature must be less than 30 deg. C and humidity less than 70%)
		Temperature setting range	4 to 40 deg. (Cooling down to 4 deg. C for room temperatures up to 30 deg. C and humidity up to 70%)
Operating ambient temperature range		4 to 35 deg. C	
System controller	Display		LCD with back light (320 x 240 pixels)
	Memory media		3.5-inch floppy disk drive, disk (2HD)
	Input/Output terminals		External start input: 1, Error input: 3, External output (EVENT 1, 2, 3, 4): 4, Output for external control (AC Remote): 1, Optical link: 1 (for Chromatopac), 8 (for LC unit control), RS-232C: 1 (for PC connection)
	(configuration of condition setting files)		
	No. of analysis files		20 files (parameter, time program)
	No. of fraction collector files		10 files (parameter, time program)
	Analysis sequence files		102 steps
	Pump control		Solvent delivery modes: isocratic, high-pressure gradient, low-pressure gradient, constant pressure solvent delivery Programs: flow volume, pressure, concentration, upper pressure limit, lower pressure limit, linear, step, index function (all are multiple steps)
	Autosampler control		Sample injection volume, number of repeated analyses, analysis time, analysis file number, etc
	Column oven control		Oven temperature, upper temperature limit
	Detector control		Detection wavelength, range, time constant, lamp ON/OFF, scanning conditions, etc
Self-diagnostic and safety measures		Monitoring abnormalities through checks of memory, upper and lower pressure limits oven temperature upper limit, lamp current and motor speeds	
Operating pH range			pH: 1 to 14 standard
Wetted surface material			SUS316, PEEK, Ceramics
Operating temperature range			4 to 35 deg. C
Operating humidity range			up to 70%
Power supply			AC100V, 150VA (SIL-HTA), 300VA (SIL-HTc), 50/60Hz
Size			W540 x D500 x H415mm
Weight			40kg (SIL-HTA), 45kg (SIL-HTc)



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JQA-0376