

Gas Chromatography

TurboMatrix Headspace and Headspace Trap Samplers



For added flexibility to meet your laboratory's changing requirements, five different PerkinElmer® TurboMatrix™ Headspace (HS) sampler models are available:

TurboMatrix HS 16 – 16 vials with overlapped thermostating of one vial.

TurboMatrix HS 40 – 40 vials with intelligent, overlapped thermostating of up to 12 vials.

TurboMatrix HS 110 – 110 vials with intelligent, overlapped thermostating of up to 12 vials.

TurboMatrix HS 40 Trap – 40 vials with intelligent, overlapped thermostating of up to 12 vials plus built-in trap for lower detection limits.

TurboMatrix HS 110 Trap – 110 vials with intelligent, overlapped thermostating of up to 12 vials plus built-in trap for lower detection limits.

Pages 1-3 of this document include specifications for both TurboMatrix HS and HS Trap models. The specifications on Page 4 are exclusively for the TurboMatrix HS Trap models.

Hardware

Sample vials	<p>Use PerkinElmer 22-mL sample vials (Part Number B0104236) for a maximum liquid sample volume of 15 mL. With the low-volume vial adapters (Part Number N6120110), the TurboMatrix HS 16 and TurboMatrix HS 40 models can also use 6-mL sample vials (Part Number N9302134) for a maximum sample volume of 2 mL. The 6-mL sample vials cannot be used on the TurboMatrix HS 110 models.</p> <p>Note: Use of non-PerkinElmer sample vials and patented cap enclosures is NOT recommended and system performance problems resulting from the use of non-PerkinElmer vials and caps will NOT be covered under the system warranty.</p>
Sample thermostating	<p>Solid aluminum thermostating oven (available on TurboMatrix HS 40 and HS 110 models only). Thermostating period and temperature precisely controlled for each sample. Software algorithm automatically optimizes sample thermostating overlap.</p>
Sample temperature	<p>Temperature settable from 35 °C to 210 °C in 1 °C increments or can be run at ambient.</p>
Sampling needle	<p>Stainless steel, platinum/iridium (optional), Siltek™ (standard on trap models). Temperature settable from 35 °C to 210 °C in 1 °C increments or can be run at ambient.</p>
Transfer line length	<p>Choice of 1008 mm (standard) or 1650 mm.</p>
Transfer line temperature	<p>Temperature settable from 35 °C to 210 °C in 1 °C increments or can be run at ambient.</p>
Transfer line system	<p>Deactivated fused-silica capillary transfer line or capillary column (0.32-μm i.d. or 0.25-μm i.d.) shielded inside a heated transfer tube between the headspace sampler and GC injector.</p>
Column compatibility	<p>Compatible with all capillary-column diameters in split and splitless (direct coupled) mode. On-column sampling using 0.25, 0.32 or 0.53-mm i.d. capillary columns and 1/8-inch o.d. packed columns.</p>
Sampling method	<p>Pneumatic, pressure-balanced sampling (no syringe or gas sample loop). Sample vials are pressurized with carrier gas. During the injection period, carrier gas flowing to the GC system is replaced by pressurized sample gas. Rapid transfer of analytes is ensured without re-equilibration in a gas-sampling valve or syringe and subsequent loss of analytes. Injection amount is programmable by time or by volume without requiring any hardware change.</p> <p>For headspace-trap sampling, the gas is focused on a sorbent trap before injection into the GC. This can be done for up to four cycles.</p>
Analyte compatibility	<p>Polar and non-polar organic compounds can be analyzed without any change of internal tubing. Low risk of sample-composition change during analyte transfer. Analysis of chemically-active compounds such as free volatile organic acids, sulfur compounds, amines and other nitrogen-containing organic compounds can be performed using the optional platinum/iridium or Siltek™ needle.</p>
Pneumatic control	<p>Choice of:</p> <ul style="list-style-type: none">– Manual pneumatics using built-in pressure regulator (0-60 psig), non-trap models only.– Electronically-controlled Programmable Pneumatic Control (PPC) module (0-60 psig).

Modes of operation

Constant mode	Routine analysis mode with constant, equal thermostating time for each sample. Includes intelligent, overlapped thermostating to automatically optimize oven movement for maximized sample throughput.
MHE mode	Multiple headspace extractions from each vial. Up to nine extraction steps with intermediate vent performed automatically. For use in method development and validation or for routine analysis of special samples.
Progressive mode	Method-development tool used in determining required equilibration time and in performing kinetic studies. Thermostating time is automatically increased to determine optimal thermostating time.

Control

Standalone operation	<p>Each headspace sampler is a self-contained standalone unit. All instrument functions are easily controlled from the touch screen of the built-in graphical user interface (GUI). Set and actual values may be displayed at any time. Configurable user interface for simplest possible interaction.</p> <ul style="list-style-type: none">– Simple one-touch operation– Single-method operation– Sequence-based multimethod operation of up to eight methods– Password protection– Ten operating methods can be stored in the instrument– Parameters remain stored with last-used method directly available after power-up
Operating languages	English, French, German, Italian, Japanese, Chinese, Spanish and Russian (GUI).
Software control	<p>A Remote Control Software (RCS) package is available to control the headspace samplers from a Microsoft® Windows environment.</p> <p>Complete, integrated control from TotalChrom® software.</p>
Gas chromatograph/data system interfacing	Output signal lines for READY and RUN to start gas chromatograph (GC) and data-handling devices. Input lines for START, STOP and READY to control the headspace unit externally. Six built-in relays (4 with contact closures, 2 with 24-volt outputs).
Economy mode	Programmable power-saving and gas-saving feature with automatic wake-up function.
Priority vial	One or two-vial positions can be assigned to priority vials. Urgent vials can be placed in these positions and will be inserted into the analysis sequence for quickest possible analysis. Available for the TurboMatrix HS 40 and TurboMatrix HS 110, non-trap and trap models.
Maintenance alarms	Settable injection counter with a customizable display alerts users to perform routine maintenance.

System integrity checks

Automatic system leak checking	Static leak checks: Checks the whole system for leaks prior to analysis
Automatic vial leak checking	Dynamic leak check: Checks each vial for leaks as it is sampled (PPC systems only)

Optional accessories

Shaker	Patented, intelligent frequency shaker for quicker sample-specific equilibration during thermostating. All vials are agitated simultaneously to allow quicker equilibration. Automatic frequency-checking program optimizes the agitation process. Available for the TurboMatrix HS 40 and TurboMatrix HS 110, non-trap and trap models.
Cryofocusing/ water trap	On-column cryofocusing accessory for preconcentration of analytes and improved detection limits. Water trap included to allow large-volume sampling from aqueous samples without ice blockage. Available for the TurboMatrix HS 40 and TurboMatrix HS 110, non-trap models only.
BCD output	Output of sample number to external device. Standard on TurboMatrix HS 110, non-trap and trap models.
Injector adapter kits	Injector adapter kits are available for most contemporary GCs. Side-mount kit available for PerkinElmer Clarus®, AutoSystem™ and AutoSystem XL GCs.
Removable sample tray	Extra sample trays for vials to be loaded into while instrument is running. Available for the TurboMatrix HS 40 and TurboMatrix HS 110, non-trap and trap models.
Clarus injector interface	Special hourglass-injector insert to connect the fused silica transfer line from the headspace sampler to the capillary column provides the performance advantages of a direct connection, while still maintaining the convenience of connecting to a split injector.

Physical details

Ambient operating conditions Temperature range: 15 °C to 32 °C
Humidity: 75% maximum RH without condensation

Power requirements 100/120/240 V; 50/60 Hz; 900 VA

	TurboMatrix HS 16	TurboMatrix HS 40 (non-trap and trap)	TurboMatrix HS 110 (non-trap and trap)
Width	43 cm (17 in)	43 cm (17 in)	43 cm (17 in)
Depth	58 cm (23 in)	61 cm (24 in)	61 cm (24 in)
Height	61 cm (24 in)	61 cm (24 in)	61 cm (24 in)
Weight	32 kg (70 lb)	33 kg (73 lb)	35 kg (77 lb)

Hardware

Inline adsorbent trap	Material:	Quartz
	Length:	132 mm
	Outer diameter:	3.5 mm
	Inner diameter:	2.8 mm for adsorbent packing with 0.7 mm inlet/outlet channel
	Packed bed length:	25 mm maximum
	Trap-load temperature:	5 °C above ambient to 100 °C
	Desorption temperature:	5 °C above ambient to 400 °C
	Heating rate:	300 °C/min or 2400 °C/min linear program
	Heating hold time:	0 to 999 minutes
	Desorption pressure:	0 to 60 psig
	Desorption pressure time:	0 to 999 minutes
	Desorption split:	Off or fixed at 10 mL/min
	Cooling rate:	400 °C to 40 °C in less than 2 minutes
	Trap materials:	Standard: Air Toxics Custom: To order Empty: For packing by user
	Thermal runaway protection:	From firmware and by thermal fuse
Sample pathway	Diameter:	0.5 mm-Siltek™-coated sample pathway
	Valving:	Pressure balanced (no mechanical valve in sample flow path)

Operation

Pressure pulsed extraction	Vial pressure:	0 to 60 psig (independent of dry purge and column pressure)
	Vial pressurization per cycle:	0.1 to 99.9 minutes
	Trap-load time per cycle:	0.1 to 99.9 minutes
	Trap-load flow rate:	50 mL/min fixed
	Number of pulse cycles:	1 to 4
Water management	Technique:	Dry purge
	Time:	0.1 to 99 minutes
	Temperature:	5 °C above ambient to 99 °C
	Pressure:	0 to 60 psig (independent of vial and column pressure)
Purge flow rate:	50 mL/min fixed	
Column isolation flow feature	Standard on all HS Trap models. Allows the HS system to be serviced while the GC and detector are still active.	
	Flow rate:	1 to 25 mL/min by manual mass flow controller
Internal standard addition option	A gaseous standard mixture is used to charge a gas sampling loop, which is subsequently delivered to the sample vial prior to sampling. May be ordered as a factory option or as a field upgrade to trap models.	
	Loop size:	100 µL
	Loop-load flow rate:	Adjustable by needle valve
	Loop-load time:	0 to 2 minutes
	Loop-pressure equilibration time:	0 to 2 minutes
	Loop-inject time:	0 to 2 minutes

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