



GC sample injection
the way you want it to be

GC/GC-MS Sample Injection


Environmental
Forensics


Foods / Beverages
Consumer Products


Combinatorial
Chemistry


Online Monitoring
Process Control


Petrochemical
Polymers
Pharmaceutical

 Superior accuracy and reproducibility
combined with optimum injection flexibility

 Top mounted, saves valuable benchspace
Interfaces with any major GC / GC-MS system

 Add on features - Barcode, Flow-Through Cell,
Micro- and Deepwell plate compatible

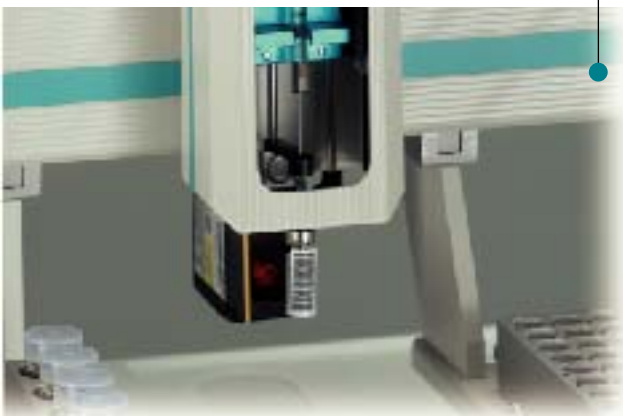
 Temperature controlled sample storage
Dual injection port mode

 Remote control software for customized
Prep And Load cycles





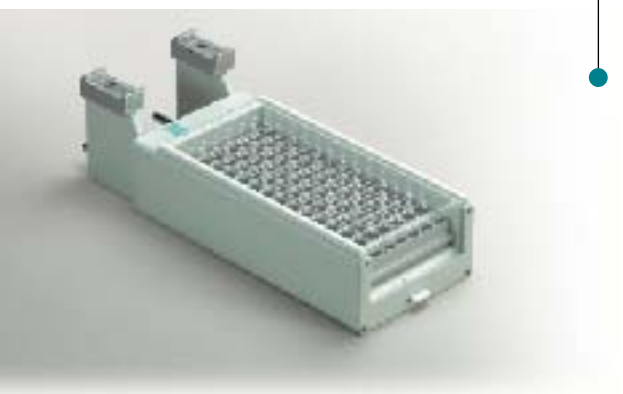
Flow-Through Cell for online analysis



Barcode reading for positive sample identification



Next generation microplate sample format



Cooled trayholder for thermo labile samples

Reliability is standard

CTC Analytics' aim is to supply instruments to customers which make the operation of sample processing simple and transparent. In line with today's lab requirements for flexibility, capacity and precision, we have enhanced again the already proven reliability and productivity of our sample injection systems. GC PAL, the next generation of CTC's GC autoinjectors offers all the features of our popular model A200S and more, to meet today's requirements. The GC PAL provides powerful working capabilities, an investment you can grow with.

Flexibel sample handling

Every single injection step of the GC PAL, e.g. fill/inject speed, pre- and post injection delay times, pre- and post syringe cleaning, variable needle penetration depths, or internal standard addition is individually controlled through the GC PAL's advanced software package. The LVI (Large Volume Injection) mode allows to inject samples up to 500µl in one stroke, without the usual degradation in chromatographic performance. Using the capability to inject larger volumes, you can eliminate the need to concentrate a sample through evaporation. This translates into substantial time and cost savings. For low volume samples the fast injection speed minimizes needle discrimination and reduces background interference which means better results with less rework. Fast injection cycle times of ~20 seconds together with the nanoliter injection capability fits perfectly into the field of fast GC applications.

Gradual expansion as needs change

Additional instrument capabilities can be added anytime by using one of the different GC PAL options.

- Beside micro- or standard sample vials, the GC PAL injects also directly from 96/384 well micro- or deepwell plates, the next generation of sample format.
- The barcode reader option transfers sample information to the PC control software, ensuring a positive sample identification in regulated environments.
- A unique Flow-Through Cell sampling station enables online analysis of drinking water or real time monitoring of chemical processes.
- Temperature controlled sample storage makes it easy to cool down samples to prevent degradation or heat samples for derivatisations or kinetic studies.

Productivity

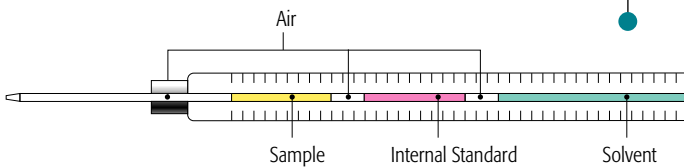
The GC PAL's dual injection port mode allows injections from samples, placed in the same or different vials, in a single GC run. This assures high productivity for high sample throughput or dual column and/or detector confirmation.

Maintenance

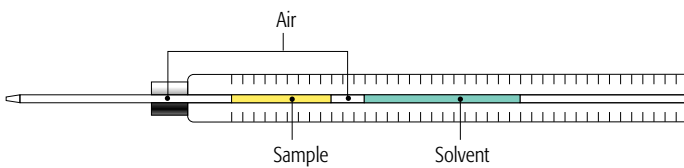
The modular GC PAL design provides worry-free operation and low maintenance costs. An open architecture for easy access to the syringe, sample trays and GC injection ports, guarantees a quick exchange of the GC injector septa, sample tray formats or different syringe sizes. All PAL liquid handling systems are equipped with Flash EPROM technology, for problem-free update of every installed instrument with the newest enhancements and capabilities.



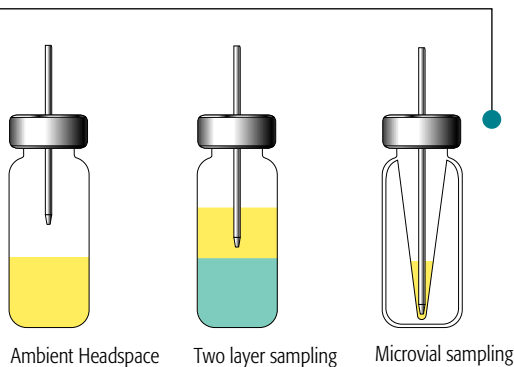
GC PAL remote control software



Internal standard injection mode



Sandwich Injection mode



Ambient Headspace Two layer sampling Microvial sampling



PAL Flow-Through Cell for online analysis

Flexibel system control

Choose between 3 options to control your GC PAL instrument. The local handheld controller provides easy-to-learn, easy-to-use operation. For individual application requirements the PC based Windows 98/NT4/2000/XP software Cycle Composer is available. For single keyboard operation of a whole GC/GC-MS system, various third party GC PAL drivers are available.

Intelligent Automation

The software Cycle Composer provides smart remote control for the GC PAL. The Cycle Composer software allows the operator to easily setup, edit and run GC PAL methods for even very complex Prep and Load applications.

Third party data acquisition drivers

For "single keyboard" operation, various third party data acquisition instrument drivers are available, for a smooth and complete integration of the GC PAL into one single GC processing system.

Perfect injection handling

For maximized performance, the GC PAL can handle up to 6 different syringe sizes, which cover an injection volume range of 0.1µl - 500µl. Different injection modes include the traditional, the hot empty needle, sandwich or the internal standard addition techniques. These choices provide solutions to various analytical problems and challenges. The sandwich mode prevents the effects of boiling point discrimination in low volume applications. The internal standard addition is used for quantitative calculations, retention index studies or matrix spiking.

Sampling flexibility

Beside liquid injections the GC PAL can sample up to 500µl of the headspace in a 2ml/10ml or 20ml vial. This straightforward and inexpensive procedure serves as a quick screening tool of unknown volatile samples. Variable syringe needle depths enables sample aspiration anywhere within a sample vial. Two layers or small volume samples are processed exactly with the GC PAL's built in vial height monitoring system.

GC PAL injection parameter control

- Pre injection syringe wash strokes for two different solvents
- Post injection syringe wash strokes for two different solvents
- Pre injection syringe wash strokes with sample
- Plunger speed used to aspirate / eject sample
- Air gap after sample aspiration
- Number of filling strokes to aspirate sample
- Delay time between sample pull-up and ejection
- Injector selection used for injection
- Plunger speed used during sample injection
- Delay time prior and after sample injection



GC PAL Specifications

System type

XYZ robot with syringe only concept

Local user interface

Control panel with 4 function keys, graphical LCD display, unique scroll knob for teach functions

Remote control

Cycle Composer control software Windows 98 / NT4 / 2000 / XP

Maintenance

Accessibility to all maintenance parts from front
Preventative maintenance kits available

Electrical control

2x RS232
3x TTL Input
1x Opto Coupler Input
2x Relay Output

Power Requirements

100-240V, 120W, 50/60Hz

Environment

4°C - 40°C constant temperature, < 80% humidity
(non condensing)

Weight

~ 10kg (without accessories)

Dimension

Length 828mm Depth 385mm Height 575mm

Syringe sizes

1.2µl, 5µl, 10µl (standard), 25µl, 100µl, 250µl, 500µl

Injection Speed

Selectable from 0.01µl /sec. up to 500µl/sec.

Sample capacity*

up to 600 1ml micro vials (78 1ml vials standard)
294 2ml standard vials (98 2ml vials standard)
96 10ml or 20ml vials
4 deepwell microplates (96/384 wells)
8 standard microplates (96/384 wells)

(* depends on GC model)

Syringe cleaning

Wash Station for 2 different solvents (standard)

GC mounting kits

Agilent Technologies 5890 / 6850 / 6890
ThermoFinnigan Trace 2000 / GC 8000 top
Varian GC 3400 / 3600 / 3800 / 3900
Shimadzu GC 14 / 17A / 2010
Perkin Elmer Autosystem XL / Clarus 500
GL Sciences GC 353 / 393

Options

Thermostatted Trayholders (4°C - 70°C)
Barcode Reader for common industry standard barcode symbols
Flow-Through Cell
Stack for 96/384 well micro- or deepwell plates
Solvent/Reagent reservoir
Large Volume Wash Station

Instrument drivers for third party data acquisition systems

- Agilent ChemStation
- Dionex Chromeleon
- Leco ChromaTOF
- Shimadzu GCMsSolution
- ThermoFinnigan Xcalibur
- Varian Star / Galaxie
- Waters Masslynx

Specifications are subject to change without notice

...other PAL GC sample injection systems

Static Headspace - Liquid Injection - SPME Extraction
combined in one single instrument



Distributed by:

CTC Analytics has dedicated the last 10 years to the continued development and high reliability of advanced sample injection technology. To learn more about the unique PAL Series of GC/GC-MS sample handling systems or any of our LC/LC-MS sample injection systems contact your CTC Analytics distributor.

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