
AI POWERED

SEE IN ACTION
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# 2800T

## ALL-IN-ONE GC AUTOSAMPLER

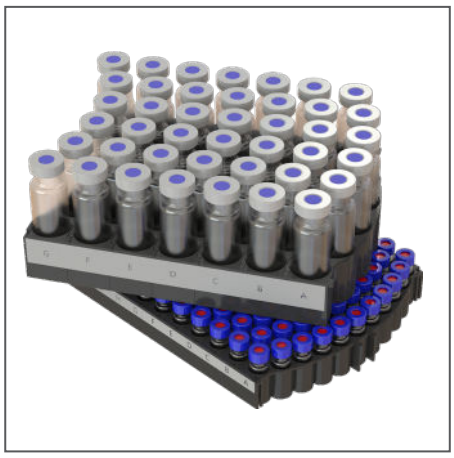
For headspace analysis, liquid sample injection and SPME.

## WE HAVE THE AUTOSAMPLER TAILORED TO FIT YOUR NEEDS

HTA's GC autosampler offering is the widest and the most complete on the market: 2800T is one of the seven models we currently offer. Our specialists will not oversell you: they will recommend the model that best fits your needs.

## KEY **FEATURES:**

- **Fits all GCs and GC/MSs**
- **Empowered by AI**
- **Smart technologies mark the difference**
- **Intuitive to operate**
- **Touch screen powered**





## ANY GC. ANY GC/MS

You don't need more than one autosampler to automate your GC: **the 2800T combines the functions of an autosampler for liquid, static headspace and SPME in a single device.**

It **can easily be installed on all the GC and GC/MS systems** available on the market, serving up to two injectors in most configurations, with no requirement to modify the GC inlet or GC oven. As a multifunctional autosampler, it offers **near-to-zero bench requirements, maximised productivity and a lower total cost of ownership** compared to multiple autosamplers feeding the same GC.

## SMART TECHNOLOGIES MAKE THE DIFFERENCE

**2800T** benefits from a **unique portfolio of patented, proprietary or licensed technologies** that have been put together by our R&D team **to ensure an amazing experience**.

Its unique rotating tower design will keep the **samples away from any heated source**: in fact, the sample rack is mounted away from the GC oven to prevent exposure to high temperatures which could cause degradation or condensation in the sample vial.

**Specific functionalities have been engineered to elevate MS potentialities**. Mass detectors are more sensitive than conventional GC detectors to some phenomena: that's why the 2800T exact and highly reproducible position of the syringe needle in the injector port makes the difference. Furthermore, sampling and injection methods reducing stress to septa have been implemented, thereby minimising contamination of the liner and analyser. Special functionalities to support prep-run reduce carrier gas consumption on the analyser

resulting in lower operation costs, increased analyser parts lifetime and **more environmentally conscious behaviour**.

**To provide additional robustness to your headspace analysis, 2800T** features the **vial leakage check**[1] that monitors the pressure inside vials by a heuristic procedure to check for anomalous values that are indicative of a vial leakage problem. In addition, our **headspace syringes** – compared to the market standard – **provide excellent performance over a large temperature range** for an increased lifetime, lower cost of operations, and increased reproducibility of your headspace analysis.

**To provide additional robustness to your liquid sample analysis, 2800T features SyringeID**, a patented technology based on RFID tags. **The SyringeID is optional** and provides the capability to identify syringes in a univocal way, thereby preventing errors when mounting a syringe and syringe volume mismatching and keeping track of the syringe consumption.

And if that still wasn't enough, we invite you to continue reading the artificial intelligence paragraph to discover other exciting technologies by HTA!

## INTUITIVE TO OPERATE

**2800T is an all-in-one autosampler made simple: neither too expensive nor too complex to operate**. Having no need for macro programming means immediate, simple and intuitive usage.

The **high-quality touchscreen** provides easier system accessibility and usability for both novices and experienced users. For routine analyses, the **2800T features one-touch operation**: after loading the sample, you just need to push the START button.

Besides the touch screen, the **2800T** can be also controlled by a PC with optional HTA Autosampler Manager software, available in standard or **CFR 21 Part 11** version (see the dedicated brochure for additional information). The HTA Autosampler Manager enables convenient **method development** for headspace and SPME analysis: progressive tests can be executed so that successive samples receive incremental changes in method parameter setpoints for time and temperature.

Both headspace and SPME techniques imply **2800T** transport vials into the oven for preconditioning where they are simultaneously heated and shaken to facilitate the state change and reach equilibrium. Therefore, **2800T** has been equipped with a **six-position oven** to **optimise preparation times**. Based on your method setting, **2800T** calculates when to load vials and how many vials to load in the oven to ensure each sample receives the same conditioning treatment and to allow for the next sample to be analysed immediately after the previous sample.

### 5-MINUTES TO RELOCATE THE AUTOSAMPLER

The **2800T** takes advantage of our **quick-fix mounting kit and our space-saver design**, thereby allowing for autosampler easy relocation across the lab with no service engineer or tool required. Therefore, you are enabled to address any workload peak you may experience in **less than a 5-minute move** of the HTA autosampler from one GC to another, **swap** HTA autosamplers or **share** HTA autosamplers among several GCs.

### 5-MINUTES TO SWITCH BETWEEN MODALITIES

The **2800T** automates GC sample introduction by enabling labs to switch between liquid injection, headspace, and SPME applications. **Switch tools with confidence: it only takes a few minutes**.

The quick switch means that there is **no transfer line to disassemble, no bulky turret to store or move across the laboratory, and no complex re-alignment procedures**. It takes less than 5 minutes to perform a few, quick, simple tasks: select a new injection modality on the touch screen, change the syringe tool and load a new sample rack, if the application requires it. You are then ready to continue the analysis without downtime.

# 2800T HAS YOU COVERED: ALL SAMPLE INTRODUCTION TECHNIQUES YOU MAY NEED IN A SINGLE INSTRUMENT!

**One of the reaons that GC (and GC/MS) boasts to be the most versatile analytical technique is the availability of multiple sample introduction techniques**, of which, LIQUID injection, static HEADSPACE and SPME are the most popular, satisfying 99.2% of the needs in terms of automated sample introduction in GC and GCMS.

**The careful selection of the correct injection technique is essential for today's lab managers to ensure quality data and maintain an efficient workflow** and is dependent on 3 main key factors.

**SAMPLE VOLATILITY:** Liquid injection is compatible with the widest range of volatility and, when combined with derivatization methods, may enable the vaporisation of otherwise non-volatile compounds. Headspace is well suited for volatile analytes while SPME is compatible with a wide range of volatiles and semi-volatiles.

**RECOVERY OF TARGET ANALYTES:** generally you can follow these guidelines: ppb level (Liquid injection), ppb ~ ppm level (Headspace) and ppt ~ ppb level (SPME).

**MATRIX CONSTRAINS:** Liquid injection is more suitable for pure compounds or simple samples without matrix interferences, while most complex samples will require headspace or SPME.


## Focus: LIQUID INJECTION

Liquid samples are introduced directly into GC inlet by a mcirosyringe during liquid injection.

Regardless of wheter you run split/splitless, PTV or on-column, the **2800T** will do the job. **2800T** offers optimised liquid injection modes to **support a wide range of sample types, inlets, and sampling methods** to provide the optimal conditions even for the most critical samples. This includes: the internal standard technique (also known as sandwich injection), multi-phase sampling, priority injection, hot & cold needle, nano-litre injection and much more.


## Focus: HEADSPACE

**Static Headspace (SHS)-gas chromatography with its simplicity and broad applicability is one of the most reliable and robust techniques for volatiles analysis.**

In SHS, liquid samples are pre-heated in the autosampler incubation oven at the correct temperature to allow the dissolved components to move freely in equilibrium between the gas headspace and the liquid phase. Afterwards the autosampler heated gas-tight syringe is moved over the oven and the headspace gas is withdrawn for subsequent injection into the GC and a final cleaning step by purging with inert gas before processing the next sample.

The **2800T** allows for sequential injections, even with samples characterised by highly dissimilar features. Even the most chemically active compounds can be analysed without needing to change any of the sample pathways. **Furthermore, it permits adjustable sample volumes without loop changes**.

We offer the **lowest cost of ownership** on the market. No carrier gas is needed because gas is used only for purging between samples. No o-rings or seals to replace, saving hours of unnecessary downtime. **No magnetic or special caps are required** because vial transport is positive and reliable.


## Focus: SPME

**SPME is ideal for volatile and semi-volatile organic compounds: it is similar to DHS or SHS with a trap but provides much greater flexibility**. In the SPME technique, the SPME sampling needle contains a fiber coated with a polymeric stationary phase. After sample conditioning in the oven, this fiber can be immersed directly into liquid samples (DI-SPME) or the sample headspace (HS-SPME) for adsorption of the target compounds. The fiber is then desorbed in the GC injector to release trapped analytes.

The **2800T is compatible with a variety of SPME fibers, including arrows**. Optimum performance is achieved through precise control of all steps, from fiber preconditioning to adsorption and desorption. It supports the **derivatisation pre- and post-extraction** as required by the different SPME applications, **post-extraction fiber washing** for DI-SPME applications, as well as **post-desorption fiber cleaning** by exposition in the injector or an external cleaning station (optional). Furthermore the possibility of setting a very low shaking speed minimises the mechanical stress on the fiber while **the oven cover is kept closed during the extraction phase to ensure temperature homogeneity**, especially if the extraction time is very long.

# ARTIFICIAL INTELLIGENCE

HTA Monitor – PC utility – is the engine at the foundation of our Artificial Intelligence (AI) capabilities[2].
Learn below how AI can boost your lab productivity!

## GC INLET SEPTUM TEST

Concerned about having an overtightened GC inlet septum nut after **septum replacement?** Don't worry, the **2800T** provides the ability to **check whether the septum is overtightened** or correctly compressed. The excess septum compression can result in septum corning (reduced septum lifetime, fragments of septum introduced into the injection port) or in extreme cases needle damage (bent needle or shorten needle life). An inlet septum test is available when using headspace and standard liquid syringes.

## AUTOMATED CONSUMABLES TRACKING

Automated consumables tracking with alert notifications **minimise unexpected downtime** and waste due to unnecessary replacement. Consumables consumption tracking goes far above preventive maintenance counters: **expiration dates and performance tests** are available. Furthermore on each start-up additional tests can be automatically performed to check whether syringe maintenance or replacement is needed: the **syringe plunger diagnostic test** for the liquid syringes and the **system integrity test**[4] for the headspace syringes.

## SUPPORT FLEXIBLE WORKING STYLES

**Screen mirroring** enables the control of the autosampler from your PC without the need to stand in front of the autosampler. A replica of the autosampler touch screen is made available so that you can perform every task from the same familiar user interface.

## EASY SERVICE CONNECTION

You can **contact tech support by scanning a QR code** and passing all relevant information about your instrument, configuration and issue. In most cases, before you even ask a question, we will have given you the answer!

## PREDICTIVE MAINTENANCE

**Self-diagnostic tests** are automatically performed when the autosampler is not running or when a request is made to diagnose instrument status. The **HTA AI engine** detects the need to **schedule maintenance in advance** to offer extended uptime and lower operating costs. While preventive maintenance achieves robustness by over-maintaining your instrument, **predictive maintenance** allows performing maintenance to your valuable equipment only when needed in the amount required. In short, predictive maintenance offers the same benefit as preventive maintenance at a fraction of the cost.

## CONTINUOUSLY IMPROVING AND PARAMETER OPTIMISATION

**The AI engine regularly receives software updates** via the internet. These updates add new functionalities and improve existing ones, enabling the automatic update function to always be up to date. AI engine updates do not affect the operations of the autosampler, so they are safe and well-accepted even in highly regulated contexts. AI supports users by suggesting programming or setting changes for **smooth, efficient analysis flow** during headspace and SPME analysis. It also includes **injection-to-injection optimisation** so that time between injections is automatically calculated for ideal sample throughput.

# TECHNICAL SPECIFICATIONS

### GENERAL FEATURES

| | |
|---|---|
| Maintenance: | preventive counters; system performance test for headspace[4] and liquid syringes; predictive maintenance functionalities by AI |
| Electrical control: | LAN and TTL |
| Target illumination: | yes |
| Barcode Reader: | optional |

**Tray capacity**

| | |
|---|---|
| Headspace/SPME: | 42 vials (20ml); optional: 6 and 10ml |
| Liquid: | 121 vials (2ml) |

**Oven**

| | |
|---|---|
| Oven positions: | 6 |
| Oven temperature: | ambient; 40-170°C |
| Shaking method: | orbital |
| Shaker speed: | from very low to very high |
| Shaking cycles: | on/off 0-9.9min |
| Incubation time: | 0-999min |

**Physical features**

| | |
|---|---|
| Dimensions (WxHxD)[3]: | 330x640x320mm |
| Weight: | 10kg |
| Power supply: | 100-240±10%Vac; 50-60Hz; 120W |

### PC REQUIREMENTS FOR HTA MONITOR

Software:
- Microsoft® Windows 7®, Windows 8®, Windows 10®, Windows 11® PC Edition only (excluding mobile devices and appliances)
- Additional required software: Microsoft.NET Framework 4.5.2
- PC is expected to run Windows OS with the latest update installed (unless differently specified)

Hardware:
- RAM: 1GB
- Disk space (for installation): 100MB
- LAN port
- 1024x768 Minimum SVGA

### LIQUID

| | |
|---|---|
| Syringe volume: | 0.5, 1, 5, 10, 25, 50 and 100µl |
| SyringeID[1]: | optional |

**Filling**

| | |
|---|---|
| Sample volume: | as low as a step of 0.1µl |
| Air volume: | as low as a step of 0.1µl |
| Filling speed: | 1-100µl/sec |
| Viscosity delay: | 0-15s |
| Bubble elimination: | up to 15 pull up strokes |

**Injection**

| | |
|---|---|
| Injection speed: | 1-100µl/sec |
| Injection depth: | programmable |
| Pre and post inj delay: | 0-99s |

**Washing**

| | |
|---|---|
| Type: | pre-injection, sample, post-injection |
| Solvent capacity: | 6x10ml vials |
| Mode: | single or double wash |

**Internal standard technique**

| | |
|---|---|
| IS volume: | as low as a step of 0.1µl |
| Air gap volume: | as low as a step of 0.1µl |
| Mode: | 1 or 2 air gaps |

### HEADSPACE

| | |
|---|---|
| Syringe volume: | 2.5ml (standard); optional: 1ml |
| Cleaning system: | inert gas flush (inlet: 1/8"; max pressure: 2bar) |
| Vial Leakage Check[1]: | yes |

**Sampling and injection**

| | |
|---|---|
| Syringe temperature: | ambient; 40–150°C |
| Sample volume: | steps of 0.01ml |
| Sample homogenization: | up to 15 |
| Sample speed: | 0.1–100ml/min |

### SPME[5]

| | |
|---|---|
| Extraction mode: | liquid phase/headspace vapors |
| Fiber type: | 10mm, 20mm |

**Fiber cleaning station**

| | |
|---|---|
| Temperature: | 210-300°C |
| Cleaning system: | inert gas flush (inlet: 1/8") |

[1] Patented technology
[2] Patent pending
[3] Tray and oven cover in closed position
[4] An optional accessory required
[5] Optional, supplied as a separate kit

Some functionalities require the usage of HTA software:
- progressive mode, vial leakage check and CFR 21 Part 11 require HTA Autosampler Manager
- some AI functionalities require HTA Monitor

It is not required to have HTA Monitor and CDS on the same PC.



When it comes to designing and manufacturing robotics solutions, there's no company more dedicated, experienced and knowledge about the scientific industry than HTA. We offer an extensive collection of analyser front-ends and sample preparation workstations designed to fit applications in analytical chemistry, life sciences and clinical laboratories. This even includes GC, LC and ICP autosamplers. HTA manufactures in Italy under a certified UNI EN ISO 9001:2015 and 13485:2016 quality management systems.

**HTA s.r.l.**

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