



Thermo Scientific
TRACE 1300 Series
Gas Chromatograph

powerful breakthroughs
for increased productivity
and performance

Thermo
SCIENTIFIC

the productivity you need

the performance you want

Reducing cost of ownership while increasing productivity is one of today's tough challenges faced by laboratories using automated analytical equipment. For QA/QC and routine chemical laboratories, improvements in this area are intimately connected with the simplification of analytical workflows, optimization of technical resources and waste reduction.

The Thermo Scientific TRACE 1300 Series Gas Chromatograph is the latest technology breakthrough conceived to substantially elevate performance in QA/QC and routine laboratories. Developed around key innovations driven by customer needs, including user-exchangeable instant connect injectors and detectors, enhanced robustness of components, scaling down of injector and detector solutions, customer-driven design of the user interface, and optimization of all electronic elements, the TRACE™ 1300 Series GC results in an extremely fast, easy to use, compact GC, delivering an incredibly high lab productivity at reduced cost of ownership.

Ultimate Productivity

A breakthrough in lab productivity is provided by:

- **Easy adoption of standard GC methods** – Eliminate the difficulties of method development during start-up with the aid of enhanced injectors, integrated electronic gas control (IEC) and an easy-touch, icon-driven instrument interface, no matter how complex the analytical method.
- **Increased robustness of injector technology** – Reduce sample clean-up prior to analysis and exploit time-saving benefits of the injector backflush.
- **Shorter sample cycle time** – Ensure fast cycle time with low thermal mass injectors and detectors, combined with fast GC oven proprietary technology.
- **Unmatched detector sensitivity in trace analysis** – A completely new range of micro volume GC detectors, ideal for trace analysis, to limit sample re-concentration requirements or reduce injected sample amount. For positive detection and identification, the most advanced range of mass spectrometers complement conventional GC detectors.
- **Seamless automation** – Automate analyses with liquid, headspace and solid-phase micro extraction (SPME) injections and sample preparation cycles with the most modern robotic sample handling in the industry.
- **Scalable, simply intelligent chromatography data system** – Efficiently analyze data with full Thermo Scientific Dionex Chromeleon Chromatography Data System compatibility.

Invest for the Future

A substantial reduction of ownership costs is ensured by:

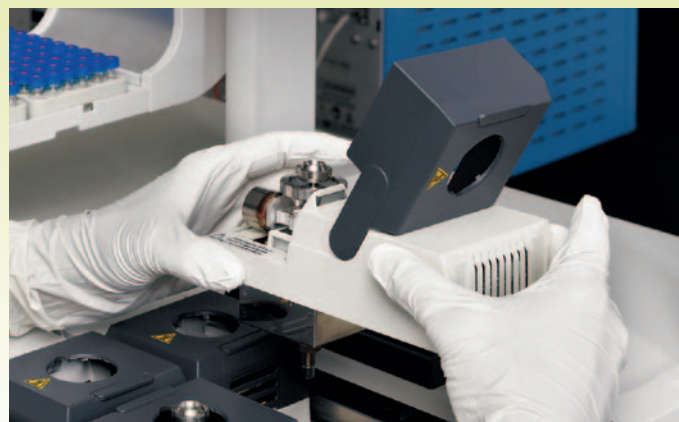
- **Tailorable GC configurations** – Proprietary user-exchangeable instant connect injectors and detector modules offer budget-conscious laboratories the flexibility to start with a single-channel instrument investment with the opportunity to expand to multi-injector/detector configurations. Accommodate new applications or increased throughput requirements simply by installing new modules within two minutes.
- **Reduced training requirements** – Install the system with minimal effort. Just easily plug in injector and detector modules and connect gases. The icon-driven touch screen or intuitive Thermo Scientific Dionex Chromeleon software guides the instrument and method set-up instantaneously.
- **Smart maintenance** – Access injectors and detectors with minimal effort using unprecedented tool-free options and eliminate any downtime during maintenance with back-up injectors and detector modules.
- **Consumable adaptability** – Systems are compatible with existing standard consumables to reduce inventory costs in the laboratory populated by multiple GC brands.
- **Energy-saving** – Limit power usage during operations with reduced instrument thermal mass allowing quick start-up.
- **Minimal sample and solvent consumption** – Optimize sample and solvent usage with the powerful combination of large volume and back-flush capabilities of injectors, extraordinary detector sensitivity and micro-volume sample handling with robotic automation.

“Instant Connect” Injectors and Detectors

With the TRACE 1300 Series GC, changing the configuration requires only two minutes, just the time needed to remove three screws and put the new injector or detector module in place.

With these proprietary Thermo Scientific “Instant Connect” (IC) modules, special training, dedicated tools or on-site service engineers are not required to tailor the GC configuration to your workload or to run a specific method. This unique modularity design offers the following advantages to the operator:

- **Exceptional throughput –**
Upgrade a GC from single to multiple channels to satisfy rapid incremental business needs and enhance laboratory productivity
- **Postpone preventive maintenance for continuous operations –**
Remove contaminated injector/detector bodies, replace them with clean ones and start running samples in a few minutes while programming basic maintenance when the laboratory schedule allows.



The TRACE 1310 local user interface can be easily translated into any language. Chinese, and Brazilian Portuguese versions are shown.

Complete Solution for your Needs

The TRACE 1300 Series GC is available in two models designed to meet the specific needs of all laboratories. The **TRACE 1300 GC** system is the ideal budget-conscious investment for the basic routine laboratory when lower operator expertise requires ease of use with minimal instrument interaction. Its simplified user interface is also ideal for 24/7 operations, as needed in petrochemical plants or remote laboratories that require single-button start/stop/maintenance local interactions while maintaining full programmability through the networked control software.

Larger routine QA/QC laboratories will benefit from the **TRACE 1310 GC** which features a complete icon-based touch screen interface which is ideal for direct instrument control when method development is required. While retaining all of the capabilities and performance of the TRACE 1300 GC model, it also provides local status update of the oven, injectors and detectors, maintenance commands, run log, multiple language capabilities and video tutorials to drive simple instrument interaction.



Thermo Scientific TRACE 1300 GC with a two-button user interface offers simplicity for laboratories where local instrument interaction is not necessary.



Thermo Scientific TRACE 1310 GC with an icon-based touch screen is ideal for direct instrument control and for method development.

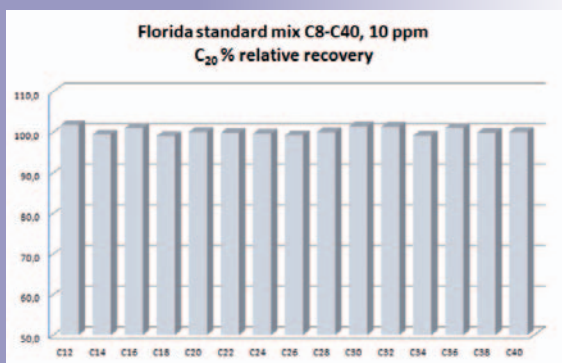
reliability, robustness and up time

the advantages of Instant Connect injectors

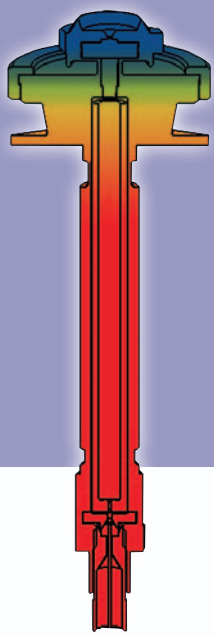
The Highest Versatility through the Instant Connect (IC) Injector Modules

A full range of liquid injection modes are available on the TRACE 1300 Series GC to cope with the most demanding sample analysis. Starting with the conventional Split/Splitless and extending through the Programmable Temperature Vaporizing (PTV) injector for wider boiling point sample ranges, up to on-column capability if a more gentle injection technique is needed, the flexibility of the instant connect injectors is maximum.

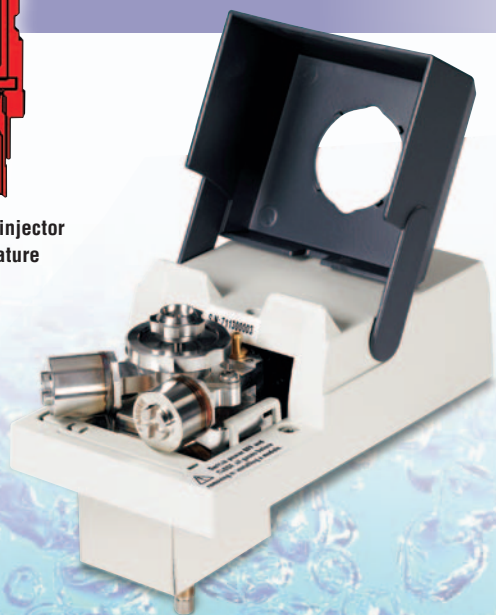
Further versatility is achieved by adding back-flush or large-volume capabilities for reduced sample clean-up steps or increased system sensitivity. All of these injection techniques are available as user-exchangeable plug-in modules, featuring compact, tubing-free injector manifold design for easier maintenance and fully integrated electronic carrier gas control. Maximum flexibility is guaranteed with the ability to switch the injector module quickly when a different injection technique is required.



Instant Connect-SSL free from discrimination: Hydrocarbon Florida mix % recovery versus C₂₀, average of 20 injections.



iC-SSL injector temperature profile



Instant Connect-SSL Module

The Instant Connect-SSL injector features a further optimized thermal profile developed to avoid sample discrimination in split and splitless mode, thus allowing the broadest range of analytes to be accurately injected. The unique injector head guarantees minimum thermal stress to the septum, therefore reducing its bleeding and extending septa lifetime. Injector design also guarantees complete oxygen diffusion-free operation, a prerequisite for accurate injections into high performance mass spectrometers.

The flexible injector configuration enables a quick and easy implementation of existing and validated methods to become immediately productive. Its large compatibility with standard consumables allows the use of generic liners, septa and ferrules often available in the lab and used on different GC models and brands, therefore cutting operational costs.

This new proprietary injector design also ensures easy and immediate access to the septum and liner for simple and quick maintenance. Moreover, when difficult sticky samples require extra care, users can extract the injector body without specific tools, thoroughly cleaning it and immediately restoring routine operations – a quick, trouble-free two-minute operation!

Exceptional Retention Time Stability

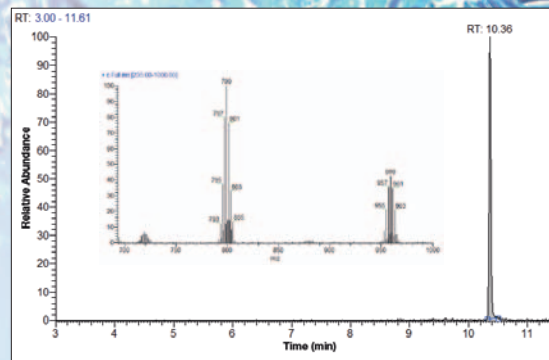
Hydrocarbon	Mean RT Min.	Std. Dev. Min.	Hydrocarbon	Mean RT Min.	Std. Dev. Min.
C12	4.6200	0.0011	C28	12.4725	0.0005
C14	6.0192	0.0005	C30	13.1348	0.0008
C16	7.2268	0.0005	C32	13.7557	0.0007
C18	8.3051	0.0006	C34	14.3395	0.0007
C20	9.2825	0.0006	C36	14.8908	0.0007
C22	10.1767	0.0006	C38	15.4118	0.0008
C24	10.9997	0.0005	C40	15.9063	0.0006
C26	11.7629	0.0005			

Retention time stability on 20 consecutive runs of hydrocarbon mix.
Retention time standard deviation $\leq 1/1000$ minute.

IC-PTV Module

The Instant Connect-PTV injector combines the “discrimination-free” performances of a cold injector with the robustness of the vaporizing injectors. Merging together fast heating and cooling performance with the inertness of the injector chamber and large sample capacity, this injector is the ideal choice for trace analysis in dirty matrices and for thermally labile compounds. Its unique design and multi-mode operations enable the preservation of sample integrity in all situations.

Unlike other PTV injectors using liquid coolant, fast cooling is achieved by a compact and limited thermal-mass design, combined with an efficient forced air circulation system. When initial sub-ambient temperatures are required by the application, a convenient cryogenic option is available. Easy liner removal from the top and complete access to the injector chamber makes maintenance quick and trouble-free.

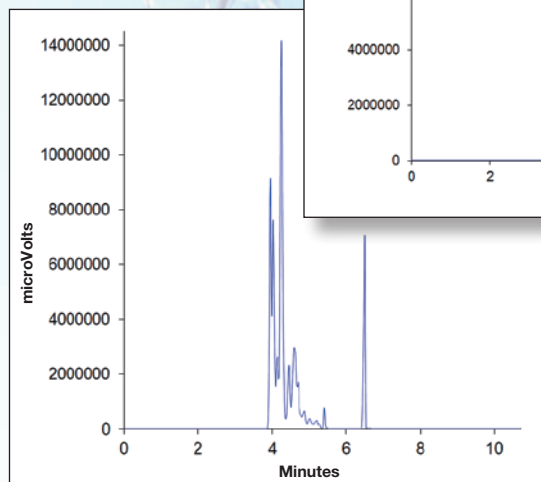


iC-PTV: On-column chromatogram of Decabromodiphenylether (MW= 959 m/z). Its full elution shows the lack of discrimination even for very high molecular-weight components.

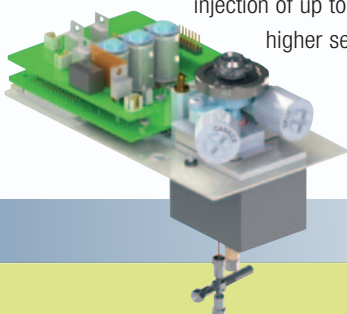
Backflush and Large Volume Capabilities

The capabilities of Instant Connect-SSL and Instant Connect-PTV modules are further enhanced by the available backflush options. These solutions enable the user to reverse the flow inside the injector, eliminating heavy or “undesired” compounds, protecting the column and detector while cutting down non-productive times, thus increasing throughput.

Additional enhancement on system performance is reached by the large volume capabilities available on both Instant Connect-SSL and Instant Connect-PTV modules. Splitless injections of up to 50 μL are possible on a standard Instant Connect-SSL injector equipped with a liner packed with glass wool and a pre-column, using the proprietary Concurrent Solvent Recondensation technique. Suitable for volatile samples, this technique guarantees strong robustness when analyzing contaminated matrices. A PTV Large Volume solvent split injection of up to 250 μL is the alternative for higher sensitivity improvements.



Real gasoline sample chromatogram with (left) and without (right) backflush. Without changing the analytical method, the heavier matrix components are eliminated. Considerable time is saved while maintaining the analytical column and detector cleaner.



iC-SSL backflush. The T-piece for column connections and its carrier gas control are integrated within the module.

Outstanding retention time stability is achieved even in the most complex GC and GC/MS applications through the use of innovative and unique IEC (integrated electronic control) modules. This guarantees 0.001 psi response through the entire working range.

These miniaturized gas controls, integrated within every injector or detector module for

compact, self-sufficient fully-featured devices, deliver strictly controlled pressure or flow to columns and detectors.

Setting constant or ramped pressures and flows is easy through the software or the local user interface while the electronic control maintains the stability during every run for exceptional retention time accuracy and precision.

To further enhance analytical performances, the IEC module also supports the automated Leak Check of the injector and column installed and Column Evaluation procedures.

Additional IEC channels can be implemented at any time, providing further functionality for multidimensional applications.

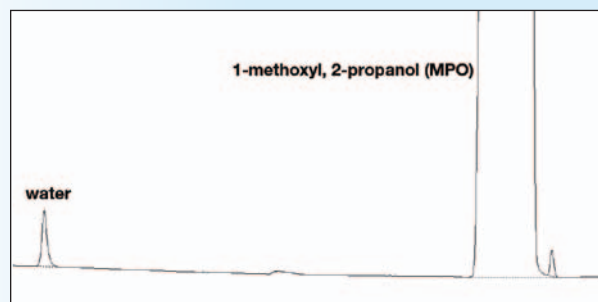
exceptionally sensitive

and stable response in trace analysis

Instant Connect Detectors Designed for Enhanced Productivity

A complete set of newly designed, miniaturized Instant Connect detectors available with the TRACE 1300 Series GC guarantees fast peak detection and maximum sensitivity. Small cell volumes and rapid acquisition response, standard at 300 Hertz, make them ideal for standard and fast chromatography applications, ready to boost laboratory productivity at any time. The highest sensitivity levels are easily achieved even in the most demanding trace analyses in dirty matrices, such as the determination of halogenated or nitrogen/phosphorous-containing pesticides in food or environmental samples.

Ultra-modern digital electrometers enable wider dynamic ranges to be captured automatically by the software into a single run without cumbersome manual method settings. In this way, the quantification of trace contaminants and highly-concentrated analytes in a single run is possible without the need for extensive method development, multiple standards injections or sample dilutions.



TCD determination of water in industrial solvent

As for the other modules of the TRACE 1300 Series GC, swapping detectors or upgrading from single to multi-detector takes only a few minutes to execute, and laboratory personnel can perform the replacement without any special training needed. The GC can be quickly configured to address evolving laboratory needs and increased sample requirements by installing the necessary modules for a specific method; a time and expense-saving benefit for routine and contract laboratories.

Instant Connect Detectors

Instant Connect-FID

The **Instant Connect-FID (Flame Ionization Detector)** offers high sensitivity and a wide dynamic range with rapid acquisition speed, making it ideal for extremely fast GC applications.

Instant Connect-TCD

The newly-designed micro-volume **Instant Connect-TCD (Thermal Conductivity Detector)** is used in a wide variety of capillary and packed column applications. Due to its exceptional thermal stability and fast response, this non-destructive detector provides exceptional sensitivity over the widest range of applications.

Instant Connect-ECD

The new **Instant Connect-ECD (Electron Capture Detector)** is excellently developed for trace analysis in challenging samples. Its miniaturized cell equipped with a purged, removable anode, has been designed to maximize robustness towards the matrix effect while guaranteeing the utmost sensitivity.

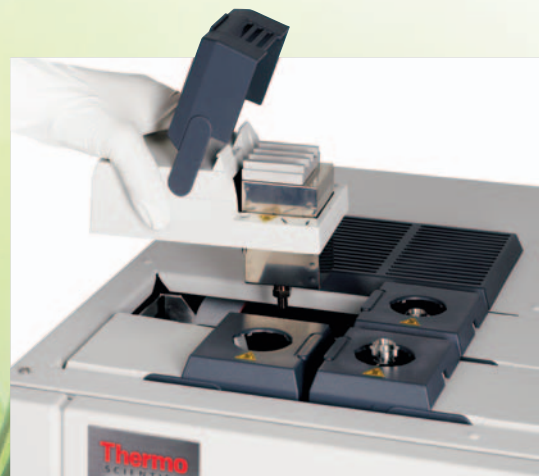
Instant Connect-NPD

Built upon the proven sensitivity of the **Thermo Scientific Nitrogen Phosphorous Detectors (NPD)**, the new Instant Connect-NPD brings exceptional flexibility to the determination of specific components with the adoption of multiple dedicated sources.

Mass Spectrometer Solutions

The TRACE 1300 GC and TRACE 1310 GC are fully compatible with any Thermo Scientific mass spectrometer representing the ideal front end for every GC/MS need. Transfer lines can be connected on either side of the GC oven, thus providing the maximum flexibility when coupling the TRACE 1300 Series GC with one of these mass spectrometers.

Ranging from ion traps to single and triple quadrupoles to high-resolution instrumentation, Thermo Scientific mass spectrometers deliver increasingly higher mass resolving capabilities, selectivity and sensitivity offering unsurpassed analytical performance even for the most difficult matrix challenges.



green by design

Minimizing Environmental Impact

Thermo Scientific products responsibly contribute to the conscientious management of our environment and its resources. To minimize the environmental impact of using GC instrumentation, the TRACE 1300 Series GC has been designed to guarantee lower power consumption and the quickest start-up in gas chromatography instrumentation. Due to the reduced thermal mass design, heated zones reach their set-point from power-off conditions in only a few minutes, thus further reducing electricity consumption and limiting non-productive wait times.

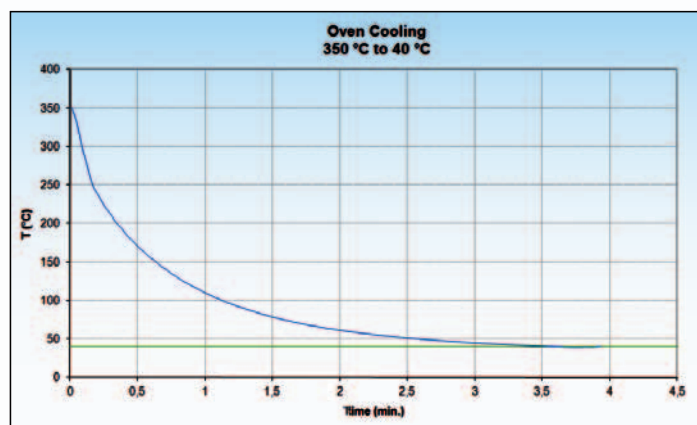
Shorter sample cycle time and exceptional throughput are achieved through the fast heating and cooling capabilities of the new proprietary oven. Enabling an astonishing thermal stability, this fast new oven is ideal for standard, as well as multi-columns applications. Even with a full-sized oven, the TRACE 1300 Series GC features one of the smallest footprints in the industry, thus reducing laboratory bench space requirements.

Fewer parts are required to manufacture the TRACE 1300 GC, and the reduced size and lower weight enable lighter transport. Combined with ongoing recycling initiatives, all of these factors contribute to a reduced carbon footprint that creates a positive impact on our environment.

For laboratories adopting alternative carrier gases in order to maintain lower operational costs and to preserve the limited Helium natural sources, the TRACE 1300 Series GC is also fully compatible with the use of Hydrogen and Nitrogen, and is compliant in all its components with the latest Restriction of Hazardous Substances (RoHS) requirements for electrical and electronic equipment.

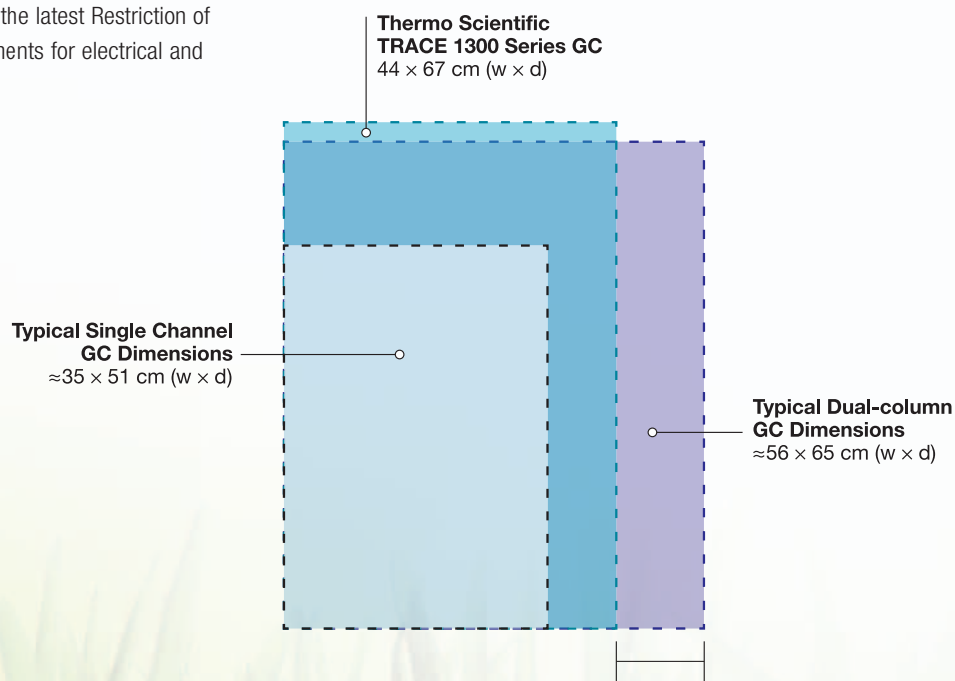
Warm-up Times. From OFF Conditions to Readiness (minutes)

Oven at 50 °C Injector and Detectors at 250 °C	TRACE 1300 Series GC	Standard GC
	3.5	10.2



The TRACE 1300 Series GC quickly reaches near-ambient temperatures.

Overhead View Instrument Comparison



The significant width difference between the TRACE 1300 Series GC and the other dual-column GCs saves precious bench-top space.

expand throughput

with liquid, solid and gas sampling devices

Autosampling and Autoinjection Solutions

For maximum ease of use when executing liquid injections, the new Thermo Scientific AI 1310 Autoinjector and the new Thermo Scientific AS 1310 Autosampler guarantee the desired flexibility, throughput and robustness.

The AI 1310 Autoinjector is an eight-position sampling module. It combines the high precision of an automatic injection system with the ease of use of the Plug and Play concept and represents the ideal answer to those labs requiring highly reliable results for small batches of samples.

A tool-free upgrade is available for the AI 1310 Autoinjector to extend sample capacity to the 105 positions found on the AS 1310 Autosampler. Both of these samplers feature removable trays and can serve any type of GC injectors guaranteeing the utmost robustness while allowing true unattended operations.

When dual column confirmation or double productivity is required, two AS 1310 Autosamplers are easily installed on the TRACE 1300 Series GC system enabled by the AS 1310 Gemini Kit, allowing simultaneous injections on two ports, for higher analysis capacity of up to 210 samples.

The AI/AS 1310 Autosampler uses a revolving turret that allows the syringe to swing from the sample tray to the injection port. This approach keeps the injection syringe away from the inlet's temperature influence, thus preserving low boiling compound sampling efficiency and leaving the inlet unobstructed. This option is valuable for manual sampling, for using an external device's transfer line, or basic maintenance.

Syringe installation is an easy task, and the system automatically aligns without any need for manual intervention. Just load the samples, and the GC runs the analyses with no additional down time.

Both of the AI/AS 1310 systems can be installed either on the front or on the rear GC injector just by swapping the sample container or sample tray's side. The automatic recognition of the position does the rest. This completely independent, compact sampling system can be placed on any Thermo Scientific GC or GC/MS system in the lab.



**Thermo Scientific
AI 1310 Autoinjector**



Robotic Sample Handling Solutions

For additional productivity requirements, including liquid, headspace or Solid Phase Micro Extraction (SPME) injections or when unattended automated sample and standard preparation is needed, the Thermo Scientific TriPlus Robotic Sample Handling (RSH) autosampler offers the most innovative solution.

This modern sampling system is able to automatically switch between injection modes during a single sequence to analyze, for example, liquid samples, followed by headspace analyses, then SPME. The autosampler enables the simultaneous automation of two adjacent Thermo Scientific GC systems increasing laboratory productivity and executing standard or sample dilutions, internal standard addition and derivatization.

These operations are possible using proprietary “custom cycles” and can be run just before the injection, directly on the GC without wasting precious lab bench space. Your results benefit from improved precision and reproducibility, while your laboratory gains unique advantages from the TriPlus™ RSH autosampler unattended operations and sample handling flexibility.

For volatile organic analysis, headspace, purge and trap, and thermal desorbers can be connected through the injection port or into the oven, thus allowing solid, liquid and gaseous sample quantitations with conventional or mass spectrometry detectors.

**Thermo Scientific
TriPlus RSH Autosampler**



TriPlus RSH Autosampler installed onto a TRACE 1310 GC including the Automatic Tool Changing station

Chromeleon software

from samples to results quickly and easily,
boosting your productivity



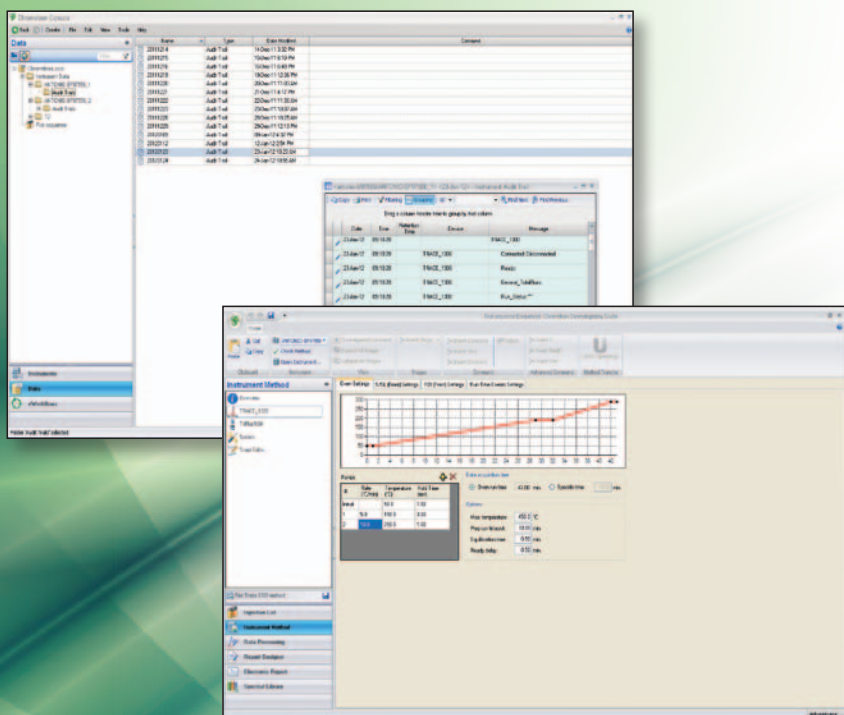
The TRACE 1300 Series GC is fully controlled by the Chromeleon™ 7.1 Chromatography Data System, the Simply Intelligent™ chromatography package that streamlines your path from samples to results.

Whether your needs are simple or complex – whether your scope is a single instrument, a global enterprise, or anything in between – Chromeleon 7.1 Operational Simplicity™ makes your job easy and enjoyable.

The software's intuitive, easy-to-navigate user interface guides you effectively towards your goals with just a few clicks and allows for the quick training of new users. All detector signals are acquired digitally without any analog/digital converter. Gas pressures, injectors, oven temperatures, and additional instrument status information are stored in the acquired data files.

The Chromeleon 7.1 software package uses eWorkflows™ to accelerate chromatography analysis minimizing operator tasks. An eWorkflow is a set of rules that captures all of the unique aspects of a chromatography procedure and guides the operator through a minimal number of choices needed to execute the analysis. Using an eWorkflow, the operator simply selects an instrument, specifies the number of samples and the starting vial position in the autosampler, and begins the analysis. The software then runs the chromatography, processes the data, and produces final results and reports.

Chromeleon 7.1 software is the next-generation Chromatography Data System that adapts to your needs with its simplified user interface, innovative eWorkflows, powerful data mining and analysis tools, and unrivaled reporting capabilities.



Additional software platforms

The TRACE 1300 Series GC is also controlled by other software platforms, including Thermo Scientific Chrom-Card data system, Xcalibur data system, and Chrom-Card and ChromQuest software. Chrom-Card™ software is a cost-effective software solution for rapid instrument control and localized data acquisition and handling. ChromQuest™ software is a multi-technique chromatography software platform easily scalable from a single system to an enterprise-wide network where any instrument configured as part of the enterprise can be monitored and controlled by any authenticated client.

The Xcalibur™ data system is the common platform for all Thermo Scientific mass spectrometry systems. It provides confident control of the TRACE 1300 Series GC from method development to reporting and is used to provide tools for generating and maintaining your own spectral libraries.

Thermo Scientific columns and consumables

The TRACE 1300 Series GC has been designed without the need for customized consumables so it will be largely compatible with most of the existing consumables that injectors and detectors of other brands require. This allows further operational cost savings without the need to buy additional sets of dedicated consumables.

For today's chromatographer, Thermo Scientific TraceGOLD, TRACE and TracePLOT columns provide excellent quality and performance, with guaranteed reproducibility. Syringes, injection port liners, ferrules, gas filters, o-rings, and septa are designed to complement our innovative GC and GC/MS systems. This wide range of consumables and accessories is designed to offer application-focused solutions to customers in the petrochemical, food and beverage and environmental industries.

- Wide range of low-bleed, high temperature columns
- Consumables tested and certified on Thermo Scientific instruments
- Gas filters to improve column lifetimes and system stability
- Vials guaranteed for the Thermo Scientific autosampler systems



Thermo Scientific solutions

for your gas chromatography needs

Thermo Scientific ISQ Single Quadrupole GC-MS

The ISQ™ GC-MS system offers rugged and reliable performance and nonstop productivity. The ISQ GC-MS features a new source design ideal for continuous high-throughput operation. The vacuum interlock enables source removal without venting the system, for unstoppage productivity.



Thermo Scientific ITQ Series GC-Ion Trap MS

The ITQ™ Series GC-Ion Trap MS offers outstanding full-scan electron ionization sensitivity and upgradeability. From a small-footprint entry-level QA/QC instrument to a fully-featured, research-grade system with advanced MSⁿ functionality, the ITQ Series GC-MS system offers a broad range of standard features along with an impressive list of options.



Thermo Scientific TSQ Quantum XLS Series Triple Quadrupole GC-MS/MS

The TSQ™ Quantum XLS Ultra is the new "Gold Standard" in GC-MS/MS. Thermo Scientific HyperQuad technology delivers highly increased mass resolving quadrupoles for ultra-selective SRM, with best-in-class sensitivity, and allows unsurpassed analytical performance for the most difficult matrix challenges.



Thermo Scientific DFS High Resolution GC-MS

The DFS™ high resolution GC-MS system is the most advanced magnetic sector, high-resolution mass spectrometer ever built for target compound analysis and for solving general organic analytical questions. Its revolutionary ion optics and intuitive user interface make operation of the DFS GC-MS easy and straightforward.

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