Thermo Scientific TriPlus 100 LS Liquid Autosampler

The Thermo Scientific™ TriPlus™ 100 LS liquid autosampler is the evolution into the simplicity of the X-Y-Z robotic autosampler accommodating large sample volumes and enabling automated operations.

The TriPlus 100 LS liquid autosampler is perfected for liquid injection only and is compatible with the full range of performance-enhancing accessories of the Thermo Scientific™ TriPlus™ RSH platform with additional simplicity and dependability. Wide sample storage and large solvent capacities ensure the longest unattended operations in any GC and GC-MS lab running continuous operations.

The Perfect Choice to Automate Liquid Injection

The TriPlus 100 LS liquid autosampler performs liquid injections in a completely automated and reliable manner, regardless of the matrix or the selected technique. Able to accommodate almost any sample nature, the precise X-Y-Z control of all autosampler movements allows correct sampling and injection optimization even for highly viscous samples or very volatile solvents. Different pre-optimized liquid injection modes can be selected, as required, to fulfill the widest range of applications.

Robustness and Productivity

Based on the robustness and proven technology of the renowned TriPlus RSH robotic autosampler, the TriPlus 100 LS liquid autosampler is conceived to increase lab efficiency and productivity. Equipped with a sample capacity to accommodate 162 standard 2 mL vials, the autosampler can also utilize additional trays for a total of 648 2 mL vials. Four 10 mL vials for solvent flushing enable the thorough cleaning of syringes with different solvents before and after injections, eliminating any cross contamination. Larger and faster washing modules can be added at any time to offer further capacity for longer sequences or more difficult samples.

Simultaneous Operation on Multiple Gas Chromatographs

The TriPlus 100 LS liquid autosampler is equipped with the ability to access multiple injection ports and allows samples—placed in the same or different vials—to be injected into multiple inlets on a single GC or across two different GCs utilizing the Double Pro and Confirmation modes.. Moreover, the same autosampler can be controlled by a single method or two completely independent methods further reducing the cost per analysis, delivering faster results, and increasing sample throughput to levels previously unachievable.

Easy Automation of any GC System

The TriPlus 100 LS liquid autosampler is fully compatible with Thermo Scientific GC and GC-MS systems, and its robotic design enables easy installation onto virtually any GC present in the lab. Combined with the multi-vendor instrument controls of the native Thermo Scientific™ Dionex™ Chromeleon™ Chromatography Data System software, this offers a unique package in the market to achieve high-throughput liquid injections in an unattended fashion also utilizing older GC instrumentation already existing in the laboratory.

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Description

The TriPlus 100 LS liquid autosampler is an XYZ robotic sample handling apparatus for liquid sample injections. When the optional accessories are installed, the system is capable of automating sample preparation steps like standard dilution, standard and internal standard addition, and vortexing.

Features

High-Throughput Configuration
Dual GC set-up with *Double Pro* and *Confirmation* modes

- A single TriPlus 100 LS liquid autosampler using the same or two different software systems can serve two independent GC or GC/MS systems for liquid injections and for sample preparation
- Two different methods can be used.
- *Rapid Mode*, for increased sample throughput, starts the syringe washing cycle during the current GC cooling phase

Syringe Cleaning
Possibility to install multiple solvent stations to expand solvent and waste volumes:

- Standard Wash Station (provided as standard with the initial system): Contains five 10 mL vials for up to 4 different solvents for a total of 40 mL and 1 × 10 mL or drain to external waste bottle capability.
- Optional Large Volume Wash Station: Contains two 100 mL vials and one waste port for diverting waste to large reservoir.
- Optional Large Solvent Station: Contains three 100 mL vials.
- Optional Fast Wash Station: Comes equipped with two micro pumps that actively deliver the required flow of two different wash solvents. The syringe is washed by inserting the needle into a glass liner; the provided wash solution is aspirated and dispensed.

Liquid Injection Modes
Eight fully customizable method-specific preset menus are available through the data systems to easily allow the highest flexibility in liquid samples injections:

- Basic
- Enrichment
- Enrichment needle solvent wash
- Internal standard double
- Internal standard post
- Needle solvent wash
- Solvent flush double
- Solvent flush post

Additional Options

- Agitator Module used to heat and shake the samples with temperature and shaking parameters that can be individually controlled
  - Sample capacity of six heated vial positions for 2 mL, 10 mL, and 20 mL vials
  - Temperature control from 40 °C to 200 °C in 1 °C increments
  - Spacers for 2 mL are optionally available, while spacers for 10 mL vials are supplied with the module
- Vortexer Module used for intensive shaking (orbital interval shaking) at ambient temperature of only one vial at a time
  - Shaking speed is user selectable to a maximum speed of 2,000 rpm
- Barcode Reader Module used to decode and read barcodes applied in horizontal bars on vials. Consists of two scanners capable of decoding the following barcode types:
  - UPC-A
  - UPC-E
  - EAN-8
  - EAN-13
  - Code-128
  - EAN-128/GS10128
  - Code 39 (3 of 9)
  - 2 of 5 Interleaved
  - ISBT 128
- Liquid-Cooled Tray Holder Module for external re-circulating bath (optional). Holds one tray for 32 vials capacity of 10 mL and 20 mL vials
  - Temperature control is user-selectable from 4 °C to 70 °C; controlled through external liquid circulation bath.
- Temperature-Controlled Drawer keeps analytical samples below or above ambient temperature. It has one drawer, two slots, and is heated or cooled with a Peltier device.
  - Temperature control is user-selectable from 4 °C to 40 °C in 0.1 °C increments
  - Accommodates two different sample trays for well plates, 2 and 10 mL vials

Figure 1. The barcode reader module is available for efficient sample tracking.

Specifications

Communication	Two independent LAN
Local user interface	LED status indicators Optional hand-held control device with 4 keys, round knob, and graphical LCD display
Instrument control	Thermo Scientific chromatography data systems integrated with Virtual Terminal software to completely mimic the physical controller Drivers available for non-Thermo Scientific data systems
Teaching functions	Manual without using tools or external devices
Injector compatibility	Compatible with programmable temperature vaporizing, packed, purged packed, split-splitless injectors, and split-splitless with helium-saving capability injectors
GC mounting kits	For Installation on the following: Thermo Scientific™ TRACE™ 1300 GC, TRACE 1310 GC, TRACE GC Ultra, and FOCUS GC Agilent™ 5890, 6890 and 7890 GC Shimadzu™ 2014 and 2010 Plus GC PerkinElmer™ Clarus™ 4X0, 5X0 and 6X0 GC Bruker™ 451 and 456 GC
Vial volumes	300 µL fixed insert vials, 0.5, 0.7, 2, 2.5, 10, and 20 mL 96/384 microtiter or deep well plates with optional automatic foil cutter to pierce aluminium or plastic foils prior the needle penetration
Height from vial bottom	User selectable between 0.1 and 45 mm in 0.1 mm steps
Injection speed for liquid samples	Selectable from 0.1 µL/sec up to 900 µL/sec and fully programmable in three different steps, also dependent upon the volume of the installed syringe
Sample capacity	Depending on autosampler, GC, and MS configurations: Up to 4608 well plates Up to 840 0.5/0.7 mL vials Up to 648 2 mL sample vials Up to 180 10 mL or 20 mL vials, or up to 240 vials using the TriPlus RSH autosampler trayholder
Syringes	Capable of handling liquid volumes in the range 0.1 µL – 100 µL Possibility of using 0.5 µL, 1.0 µL, 5 µL, 10 µL (provided as standard), 25 µL, 50 µL, 100 µL syringes for sample injection and/or volume transfer Needle length, 57 mm
Injection volume	Ranges from 0.1 to 100.0 µL in 0.1 µL steps
Total vial height	47 mm (including cap)
Precision	≤0.3 RSD % obtained under Thermo Scientific standard conditions

Figure 2. Thermo Scientific TriPlus 100 Liquid Autosampler

Certifications

The TriPlus 100 LS liquid autosampler complies with the requirements of the following applicable European Directives and carries the CE marking accordingly:

- Low Voltage Directive 2006/95/EC
- EMC Directive 2004/108/EC
- Machinery Directive 2006/42/EC

The TriPlus 100 LS liquid autosampler conforms with the following product standards:

- EMC (Electromagnetic Compatibility):
  - IEC 61326-1 2nd Edition | EN 61326-1:2013
  - IEC 61000-6-2:2nd Edition | EN 61000-6-2:2005
  - IEC 61000-6-3:2nd Ed. am1 | EN 61000-6-3:2007+A1:2011
  - EN 55011:2009+A1:2010
  - CISPR 11:5th Edition am1
  - FCC part 15 (2012-3-15) Subpart B, §15.107(a); §15.109(a)

- Safety:
  - ANSI/UL 61010-1: 2004 2nd Edition
  - CAN/CSA C22.2 No. 61010-1:2004 2nd Edition
  - IEC 61010-2-010:2003
  - IEC 61010-2-051:2003
  - IEC 61010-2-81:2001 +A1:2003
  - IEC 61010-2-101:2002

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