



thermo scientific

Thermo Scientific

# TriPlus 500

## Preinstallation Requirements Guide

Headspace Sampler

31716105    Revision A    •    January 2019

**ThermoFisher**  
SCIENTIFIC

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Release history:

Revision A, released January 2019 "*Original Instructions.*"

**For Research Use Only. Not for use in diagnostic procedures.**

## TriPlus 500 Headspace Sampler Installation Request Form

Before completing this installation request form, read all of the *TriPlus 500 Headspace Sampler Preinstallation Requirements Guide*. For laboratories outside the U.S., go to [www.thermofisher.com](http://www.thermofisher.com), click **Contact Us**, select the **Instrument Service** option, type the product name, and request to be contacted by email to schedule your instrument installation. You can then send this completed and signed form to the office handling the installation. For laboratories in the U.S., send this completed and signed form to [ULSConciergeNA@thermofisher.com](mailto:ULSConciergeNA@thermofisher.com).

### Laboratory setup

- |  |   |
|--|---|
| <p><input type="checkbox"/> All laboratory remodeling is complete and complies with all relevant safety regulations.</p> <p><input type="checkbox"/> The TriPlus 500 Headspace Sampler is on site.</p> <p><input type="checkbox"/> A principal operator will be on site during the installation/certification period.</p> <p><input type="checkbox"/> Doorways, hallways, and so on are a minimum width of 80 cm (32 in.).</p> <p><input type="checkbox"/> Laboratory lighting is adequate.</p> <p><input type="checkbox"/> Air conditioning is adequate for temperature, humidity, and particulate matter control. The laboratory must remain at a constant temperature between 15–35 °C (59–95 °F).</p> <p><input type="checkbox"/> Relative humidity is 40–80%, noncondensing.</p> <p><input type="checkbox"/> The work area is free from magnetic disruption and electrostatic discharge.</p> <p><input type="checkbox"/> Floor space is sufficient and flooring will support the load.</p> <p><input type="checkbox"/> Main power is installed and complies with local electrical codes.</p> <p><input type="checkbox"/> Power is free from fluctuations due to slow changes in the average voltage or changes due to surges, sags, or transients.</p> <p><input type="checkbox"/> Power outlets are of the correct configuration for the power cords.<br/>Note NEMA type: _____</p> <p><input type="checkbox"/> Voltage of power outlet has been measured.<br/>Note measured voltage:<br/>AC line-to-ground: _____ V<br/>AC neutral-to-ground: _____ V<br/>AC line-to-neutral: _____ V</p> <p><input type="checkbox"/> Power outlets are available for testing and cleaning equipment.</p> | <p><input type="checkbox"/> One or more RJ-45 wall outlets. To connect your system to your site's LAN network, you must have an additional shielded twisted pair network cable.</p> <p><input type="checkbox"/> All required gases are on site, gas lines are installed and terminate within 2 m (6 ft.) of the workbench. All gas line terminate to 1/8 in. compression-type fittings and appropriate gas regulators are available.<br/>Note gas types and actual purity levels:<br/>Gas: _____ purity: _____<br/>Gas: _____ purity: _____</p> <p><input type="checkbox"/> All gas lines are clean and have no leaks.</p> <p><input type="checkbox"/> For systems that will be used for gas phase sample analysis, a gas phase analytical standard is on site and available for use.</p> <p><input type="checkbox"/> All relevant safety regulations have been followed.</p> <p><input type="checkbox"/> Sufficient bench or table space is available for all of the equipment. Note the dimensions:<br/>Width: _____<br/>Depth: _____<br/>Height: _____<br/>Does the bench (table) have wheels? Yes__ No__</p> <p><input type="checkbox"/> Sufficient clearance is provided behind the bench (or table).</p> <p><input type="checkbox"/> The bench (or table) can support <i>twice</i> the load of the instrument and is free from vibration.</p> |
|--|---|

**IMPORTANT** Thermo Fisher Scientific reserves the right to invoice for the field service engineer's time if the installation requirements are not met by the installation date.

**For customized installations**

Does your contract contain any special acceptance specifications?  Yes  No  
If YES, attach full details of the specifications.

Does the system require additional equipment?  Yes  No  
If YES, attach full details of the additional equipment.

**I certify that the preinstallation requirements for the TriPlus 500 Headspace Sampler are complete and accurate.**

Signature \_\_\_\_\_ Date \_\_\_\_\_

Print name \_\_\_\_\_ Telephone \_\_\_\_\_

Email address \_\_\_\_\_

Principal instrument operator:

Print name \_\_\_\_\_ Telephone \_\_\_\_\_

Email address \_\_\_\_\_

Company \_\_\_\_\_ Telephone \_\_\_\_\_

Address \_\_\_\_\_

Address \_\_\_\_\_

City \_\_\_\_\_ State \_\_\_\_\_ Country \_\_\_\_\_

Sales order number \_\_\_\_\_

**Note** This form is intended to cover the essential components of your TriPlus 500 Headspace Sampler installation. However, you must use the information in this guide and any additional information that your Thermo Fisher Scientific field service engineer provides to ensure the proper setup of your system. After receiving this form, the installation can be scheduled.

## Declaration

Manufacturer: **Thermo Fisher Scientific**

Thermo Fisher Scientific is the manufacturer of the instrument described in this manual and, as such, is responsible for the instrument safety, reliability and performance only if:

- installation
- re-calibration
- changes and repairs

have been carried out by authorized personnel and if:

- the local installation complies with local law regulations
- the instrument is used according to the instructions provided and if its operation is only entrusted to qualified trained personnel

Thermo Fisher Scientific is not liable for any damages derived from the non-compliance with the aforementioned recommendations.

**Thermo Fisher Scientific S.p.A.**

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## Regulatory Compliance

Thermo Fisher Scientific performs complete testing and evaluation of its products to ensure full compliance with applicable domestic and international regulations.

Thermo Fisher Scientific declares, under sole responsibility, that the product as originally delivered complies with the requirements of the following applicable European Directives and carries the CE marking accordingly:

- Machinery Directive: 2006/42/EC
- EMC Directive: 2014/30/EU
- RoHS Directive: 2011/65/EU

... and conforms with the following product standards:

Compliant with applicable directives:

- Machinery Directive: 2006/42/EC
- EMC Directive: 2014/30/EU
- RoHS Directive: 2011/65/EU

Compliant with product standards:

### EMC

- EN 61326-1:2013, IEC 61326-1:2012
- FCC rules: CFR no. 47 Part 15 Subpart B Section 15.107 and 15.109

### Safety

- EN 61010-1:2010, IEC 61010-1:2010
- EN 61010-2-010: 2014, IEC 61010-2-010: 2014 (TriPlus 500 HS only)
- EN 61010-2-081: 2015, IEC 61010-2-081: 2015
- UL 61010-1:2012/R:2016-04

- UL 61010-2-010:2015 (TriPlus 500 HS only)
- UL 61010-2-081:2015
- CAN/CSA C22.2 No. 61010-1:2012/U2:2016-04
- CAN/CSA C22.2 No. 61010-2-010:2015 (TriPlus 500 HS only)
- CAN/CSA C22.2 No. 61010-2-081:2015

**Note** This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

## FCC Compliance Statement

THIS DEVICE COMPLIES WITH PART 15 OF THE FCC RULES. OPERATION IS SUBJECT TO THE FOLLOWING TWO CONDITIONS: (1) THIS DEVICE MAY NOT CAUSE HARMFUL INTERFERENCE, AND (2) THIS DEVICE MUST ACCEPT ANY INTERFERENCE RECEIVED, INCLUDING INTERFERENCE THAT MAY CAUSE UNDESIRE OPERATION.



**CAUTION** Read and understand the various precautionary notes, signs, and symbols contained inside this manual pertaining to the safe use and operation of this product before using the device.

## Notice on Lifting and Handling of Thermo Scientific Instruments

For your safety, and in compliance with international regulations, the physical handling of this Thermo Fisher Scientific instrument *requires a team effort* to lift and/or move the instrument. This instrument is too heavy and/or bulky for one person alone to handle safely.

## Notice on the Proper Use of Thermo Scientific Instruments

In compliance with international regulations: Use of this instrument in a manner not specified by Thermo Fisher Scientific could impair any protection provided by the instrument.

## **Notice on the Susceptibility to Electromagnetic Transmissions**

Do not use radio frequency transmitters, such as mobile phones, in close proximity to the instrument.





## WEEE Directive

2012/19/EU



Thermo Fisher Scientific has contracted with one or more recycling or disposal companies in each European Union (EU) Member State, and these companies should dispose of or recycle this product. See [www.thermofisher.com/rohswcee](http://www.thermofisher.com/rohswcee). for further information on Thermo Fisher Scientific's compliance with these Directives and the recyclers in your country.

## Directive DEEE

2012/19/EU



Thermo Fisher Scientific s'est associé avec une ou plusieurs compagnies de recyclage dans chaque état membre de l'union européenne et ce produit devrait être collecté ou recyclé par celles-ci. Davantage d'informations sur la conformité de Thermo Fisher Scientific à ces directives, les recycleurs dans votre pays et les informations sur les produits Thermo Fisher Scientific qui peuvent aider la détection des substances sujettes à la directive RoHS sont disponibles sur [www.thermofisher.com/rohswcee](http://www.thermofisher.com/rohswcee).

## WEEE Direktive

2012/19/EU



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# Preface

This guide contains detailed information for preparing your site for installing a Thermo Scientific™ TriPlus™ 500 Headspace Sampler (TriPlus 500 HS).

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## About Your System

**WARNING** Thermo Fisher Scientific systems operate safely and reliably under carefully controlled environmental conditions.



If the equipment is used in a manner not specified by the manufacturer, the protections provided by the equipment might be impaired. If you maintain a system outside the specifications listed in this guide, failures of many types, including personal injury or death, might occur. The repair of instrument failures caused by operation in a manner not specified by the manufacturer is specifically excluded from the Standard Warranty and service contract coverage.

## Power Rating

TriPlus 500 HS alone:

- 100-240 Vac; 600 W; 50/60 Hz

Vial Loader

- 24 Vdc through a portable external power supply, level VI efficiency  
Input 100-240 Vac; 50/60 Hz; 1.3 A— Output 24 Vdc; Power 90 W; 3.75 A



**WARNING** You must only use the portable external power supply furnished with the instrument by Thermo Fisher Scientific.

Detailed instrument specifications are in the Product Specifications Sheet.

## Contacting Us

There are several ways to contact Thermo Fisher Scientific for the information you need.

❖ **To find out more about our products**

Go to <http://www.thermofisher.com> for information about our products.

❖ **To get local contact information for sales or service**

Go to <http://www.unitylabservice.com/en/home.html>

## Related Documentation

In addition to this guide, Thermo Scientific™ provides the following documents for TriPlus 500 HS.

- *TriPlus 500 Headspace Sampler User Guide*, PN 31716106
- *TriPlus 500 Headspace Sampler Hardware Manual*, PN 31716107
- *TriPlus 500 Headspace Sampler Spare Parts Catalog*, PN 31716108

## Safety Alerts and Important Information

Make sure you follow the precautionary notices presented in this manual. The safety and other special notices appear in boxes.

### Special Notices

Notices includes the following:







**IMPORTANT** Highlights information necessary to prevent damage to software, loss of data, or invalid test results; or might contain information that is critical for optimal performance of the system.














**Note** Emphasizes important information about a task.

**Tip** Helpful information that can make a task easier.

### Safety Symbols and Signal Words

All safety symbols are followed by **WARNING** or **CAUTION**, which indicates the degree of risk for personal injury, instrument damage, or both. Cautions and warnings are following by a descriptor, such as **BURN HAZARD**. A **WARNING** is intended to prevent improper actions that could cause personal injury. Whereas, a **CAUTION** is intended to prevent improper actions that might cause personal injury, instrument damage, or both. You can find the following safety symbols on your instrument, or in this manual:

Symbol	Descriptor
	<b>BIOHAZARD:</b> Indicates that a biohazard <i>will, could, or might</i> occur.
	<b>BURN HAZARD:</b> Alerts you to the presence of a hot surface that <i>could or might</i> cause burn injuries.
	<b>ELECTRICAL SHOCK HAZARD:</b> Indicates that an electrical shock <i>could or might</i> occur.
	<b>FIRE HAZARD:</b> Indicates a risk of fire or flammability <i>could or might</i> occur.
	<b>EXPLOSION HAZARD.</b> Indicates an explosion hazard. This symbol indicates this risk <i>could or might</i> cause physical injury.
	<b>FLAMMABLE GAS HAZARD.</b> Alerts you to gases that are compressed, liquefied or dissolved under pressure and can ignite on contact with an ignition source. This symbol indicates this risk <i>could or might</i> cause physical injury.

















	<b>GLOVES REQUIRED:</b> Indicates that you must wear gloves when performing a task or physical injury <i>could</i> or <i>might</i> occur.
	<b>CLOTHING REQUIRED.</b> Indicates that you should wear a work clothing when performing a task or else physical injury <i>could</i> or <i>might</i> occur.
	<b>BOOTS REQUIRED.</b> Indicates that you must wear boots when performing a task or else physical injury <i>could</i> or <i>might</i> occur.
	<b>MATERIAL AND EYE HAZARD.</b> Indicates you must wear eye protection when performing a task.
	<b>HAND AND CHEMICAL HAZARD:</b> Indicates that chemical damage or physical injury <i>could</i> or <i>might</i> occur.
	<b>HARMFUL.</b> Indicates that the presence of harmful material <i>will, could, or might</i> occur.
	<b>INSTRUMENT DAMAGE:</b> Indicates that damage to the instrument or component <i>might</i> occur. This damage might not be covered under the standard warranty.
	<b>LIFTING HAZARD.</b> Indicates that a physical injury <i>could</i> or <i>might</i> occur if two or more people do not lift an object.
	<b>MATERIAL AND EYE HAZARD:</b> Indicates that eye damage <i>could</i> or <i>might</i> occur.
	<b>READ MANUAL:</b> Alerts you to carefully read your instrument's documentation to ensure your safety and the instrument's operational ability. Failing to carefully read the documentation <i>could</i> or <i>might</i> put you at risk for a physical injury.
	<b>TOXIC SUBSTANCES HAZARD:</b> Indicates that exposure to a toxic substance could occur and that exposure <i>could</i> or <i>might</i> cause personal injury or death.
	<b>RADIOACTIVE HAZARD.</b> Indicates that the presence of radioactive material <i>could</i> or <i>might</i> occur.
	For the prevention of personal injury, this general warning symbol precedes the <b>WARNING</b> safety alert word and meets the ISO 3864-2 standard. In the vocabulary of ANSI Z535 signs, this symbol indicates a possible personal injury hazard exists if the instrument is improperly used or if unsafe actions occur. This symbol and another appropriate safety symbol alerts you to an imminent or potential hazard that <i>could cause personal injury</i> .



## Instrument Markings and Symbols

Table 1 explains the symbols used on Thermo Fisher Scientific instruments. Only a few of them are used on TriPlus 500 HS, which are annotated with an asterisk below.

**Table 1.** Instrument Marking and Symbols

Symbol	Description
	Direct Current
* 	Alternating Current
	Both direct and alternating current
3 	Three-phase alternating current
	Earth (ground) terminal
	Protective conductor terminal
	Frame or chassis terminal
	Equipotentiality
*	On (Supply)
* 	Off (Supply)
	Equipment protected throughout by DOUBLE INSULATION or REINFORCED INSULATION (Equivalent to Class II of IEC 536)
	Fuse
* 	Instruction manual symbol affixed to product. Indicates that the you must refer to the manual for specific <b>WARNING</b> or <b>CAUTION</b> information to avoid personal injury or damage to the product.
	Caution, risk of electric shock
* 	Caution, hot surface
* 	Caution, biohazard
* 	Symbol in compliance to the Directive 2012/19/EU on Waste Electrical and Electronic Equipment (WEEE) placed on the European market after August, 13, 2005.

## Safety Information and Warnings

This safety guide raises awareness of potential safety issues and general points for consideration for Thermo Fisher Scientific representatives during installation, and repair of the TriPlus 500 HS, or parts of it (following the life cycle principle), as well as for the end user of the TriPlus 500 HS in the lab during the learning phase, and in routine work.



**IMPORTANT** Read this section first before operating with TriPlus 500 HS.

### General Considerations

- Before a unit is put to use, consult the TriPlus 500 HS manuals and related documents under all circumstances.
- Changes or modifications to this unit not expressly approved by the party responsible for compliance, could void your authority to operate the equipment.
- Be aware that if the equipment is used in a manner not specified by the manufacturer, the protective and safety features of the equipment might be impaired.
- The repair of instrument failures caused by operation in a manner not specified by the manufacturer is expressly excluded from the standard warranty and service contract coverage.
- When for technical reasons it is necessary to work on instrument parts which might involve a potential hazard (heated/moving parts, components under voltage, and so on) contact the Thermo Fisher Scientific authorized representative.



Routine maintenance operations can be performed by a Thermo Fisher Scientific representative. Alternatively they can be performed by a trained operator. Routine maintenance can be performed according to the instructions reported in the *TriPlus 500 Headspace Sampler Hardware Manual*.

### Electrical Hazards



Every analytical instrument has specific hazards. Be sure to read and comply with the following precautions. They ensure the safety and long-term use of your TriPlus 500 HS.

The installation over-voltage category is Level II. The Level II category pertains to equipment receiving its electrical power from the local level, such as an electrical wall outlet.

The power line and the connections between TriPlus 500 HS and other instruments, used in the configuration setup of the total analytical system, must maintain good electrical grounding. Poor grounding represents a danger for the operator, and might seriously affect the performance of the instrument.

Do not connect TriPlus 500 HS to power lines that supply devices of a heavy duty nature, such as motors, refrigerators and other devices that can generate electrical disturbances.



Use only fuses of the type and current rating specified. Do not use repaired fuses, and do not short-circuit the fuse holder. The supplied power cord must be inserted into a power outlet with a protective earth (ground) contact. When using an extension cord, make sure that the cord also has an earth contact.

If the supplied power cord does not fit the local electrical socket and a replacement or adapter has to be purchased locally, make sure that only a certified power cord is used. Any power cord used must be certified by the appropriate local authorities.

Do not to leave any cable connecting TriPlus 500 HS and the chromatographic system, or the power cord close to heated zone, such as the injector or detector heating blocks, or the GC hot air vents.

Always replace any cable showing signs of damage with another one provided by the manufacturer. Safety regulations must be respected.



Do not change the external or internal grounding connections. Tampering with or disconnecting these connections could endanger you and damage the TriPlus 500 HS.

The instrument is properly grounded in accordance with these regulations when shipped. To ensure safe operation, do not make any changes to the electrical connections or the instrument's chassis.



Do not turn the instrument on if you suspect that it has incurred any type of electrical damage. Instead, disconnect the power cord and contact a Thermo Fisher Scientific representative for a product evaluation. Do not attempt to use the instrument until it has been evaluated. Electrical damage might have occurred if TriPlus 500 HS shows visible signs of damage, exposure to any liquids or has been transported under severe stress.



Damage can also result if the instrument is stored for prolonged periods under unfavorable conditions: for example, subjected to heat, moisture, and so on. Ensure that the power supply/controller unit is always placed in a clean and dry position. Avoid any liquid spills in the vicinity.



Before attempting any type of maintenance work, always disconnect the power cords from the power supply if optional devices are installed. Capacitors inside the instrument might still be charged also if the instrument is turned off.

To avoid damaging electrical parts, do not disconnect an electrical assembly while power is applied to TriPlus 500 HS. After the power is turned off, wait approximately 30 seconds before you disconnect an assembly.



The instrument includes a number of integrated circuits. These circuits might be damaged if exposed to excessive line voltage fluctuations, power surges or electrostatic charges, or both.

## Preface

### Safety Information and Warnings



The power supply for TriPlus 500 HS has the symbols **I/O** on the label for the power switch to indicate On/Off. It is important that the power On/Off switch is accessible to unplug the AC power cord from the power supply/wall outlet in case of emergency.

## Other Hazards



Danger of crushing to fingers and hands. To avoid injury keep your hands away from moving parts during operation. Turn off the power to TriPlus 500 HS if you must reach inside a mechanically powered system with moving parts.



To avoid injury, observe safe laboratory practice when handling solvents, changing tubing, or operating the TriPlus 500 HS. Know the physical and chemical properties of the solvents you use. See the Safety Data Sheets (SDS) from the manufacturer of the solvents being used.

When using TriPlus 500 HS, follow the generally accepted procedures for quality control and method development.

Do not operate on the instrument components that form part of the work area of TriPlus 500 HS when it is in motion.



Do not use vials without a sealing cap. Vapor phase from organic solvents can be hazardous and flammable. Acidic vapor phase can cause corrosion to critical mechanical parts.



Use high quality vials and closures as depending on the application conditions, high pressure can build up in the vial. Do not reuse headspace vials. Repeated heating of reused vials may increase the chance of vial breaking.

## Working with Toxic or other Harmful Compounds



**WARNING** Before using hazardous substances (toxic, harmful, and so on), please read the hazard indications and information reported in the applicable Safety Data Sheet (SDS). Use personal protective equipment according to the safety requirements.

- **Protective gloves:** Loose fitting thermal insulated or leather gloves.
- **Eye protection:** Full face shield and safety glasses are recommended.
- **Other protective equipment:** Safety shoes when handling containers. Long sleeved shirts and trousers without cuffs. Work clothing that sufficiently prevents skin contact should be worn.

Before using dangerous substances (toxic, harmful, and so on), read the hazard indications and information reported in the Safety Data Sheet (SDS) supplied by the manufacturer, referring to the relevant CAS (Chemical Abstract Service) number.

TriPlus 500 HS requires the use of several chemical products with different hazard characteristics, which are present in vials.

Before using these substances, please read the hazard indications and information reported in the SDS supplied by the manufacturer referring to the relevant CAS number.

When preparing the samples, please refer to local regulations for the ventilation conditions of the work room.

All waste materials must be collected and eliminated in compliance with the local regulations and directives in the country where the instrument is used.



**ATTENTION** If using dangerous or flammable solvents, it is suggested to work with a fume hood placed over the TriPlus 500 HS.

## Biological Hazards



In laboratories where samples with potential biological hazards are handled, you must label any equipment or parts thereof which might become contaminated with biohazardous material.

When working with biohazardous materials, it is your responsibility to fulfill the following mandatory requirements:

- Instructions on how to safely handle biohazardous material must be provided.
- Operators must be trained and made aware of the potential dangers.
- Personal protective equipment must be provided.
- Instructions must be provided on what to do in case operators are exposed to aerosols or vapors during normal operation (within the intended use of the equipment) or in case of single fault situations such as a broken vial.  
The protective measures must consider potential contact with the skin, mouth, nose (respiratory organs), and eyes.
- Instructions for decontamination and safe disposal of the relevant parts must be provided.

It is your responsibility to handle hazardous chemicals or biological compounds (including, but not limited to, bacterial or viral samples and the associated waste), safely and in accordance with international and local regulations.

## Maintenance

Any external cleaning or maintenance must be performed with TriPlus 500 HS turned off and the power cord disconnected.

Avoid using solvents and spraying on electrical parts. For the removal of potentially dangerous substances (toxic, harmful, and so on) read the hazard indications and information reported in the Safety Data Sheet (SDS) supplied by the manufacturer referring to the relevant CAS (Chemical Abstract Service) number. Use proper protective gloves.

When working with hazardous materials such as radioactive, biologically hazardous material, and so on, it is important to train all operators how to respond in case of spills or contamination.

Depending on the class of hazardous material, the appropriate measures have to be taken immediately. Therefore, the chemicals or solvents needed for decontamination have to be on hand.

Any parts of the equipment which can potentially be contaminated, such as the sample vial tray, and so on, must be cleaned regularly. The waste solvent from cleaning and any hardware which requires to be disposed of has to be properly eliminated with all the necessary precautions, abiding by national and international regulations.

When preparing for decontamination, ensure that the solvent or chemical to be used will not damage or react with the surface, dye (color) of the instrument, table or other nearby objects. If in doubt, please contact your Thermo Fisher Scientific representative to verify the compatibility of the type or composition of solvents with TriPlus 500 HS.

## Disposal



Do not dispose of this equipment or parts thereof unsorted in municipal waste. Follow local municipal waste regulations for proper disposal provisions to reduce the environmental impact of waste electrical and electronic equipment (WEEE). European Union customers: Call your local customer service representative responsible for TriPlus 500 HS for complimentary equipment pick-up and recycling.

**WARNING** The customer has to ensure that TriPlus 500 HS has not been contaminated by any hazardous chemical or biological compounds including (but not limited to) bacteria or viruses.



Any part which had direct contact with the analytical sample must be identified and must undergo an appropriate decontamination procedure prior to shipping for disposal.

Potentially dangerous components are vials and trays. Any critical parts sent for disposal must be handled according to national laws for hazardous compounds.

The customer and the service engineer are fully responsible for enforcing these requirements. Thermo Fisher Scientific will hold the representative, customer responsible, or both, if these regulations are not observed.

# TriPlus 500 Headspace Sampler Site Preparation

This chapter provides the information you need to prepare your site before the Thermo Fisher Scientific representative arrives to install the Thermo Scientific™ TriPlus™ 500 Headspace Sampler (TriPlus 500 HS) coupled with a Thermo Scientific™ TRACE™ 1300 Series GC.

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**CAUTION** This guide does not include the information to prepare your lab for the installation of your gas chromatography system. You can find all the instruction in the **Preinstallation Requirements Guide** of your GC system.

The TriPlus 500 HS operates reliably under controlled environment conditions. Operating or maintaining the system outside the specifications outlined in this guide might cause many different types of system failures. The repair of such failures is specifically excluded from the standard warranty and service contract coverage.

**Note** In addition to the information in this guide, you must also obey the building and safety rules and regulations for construction that apply in your area.

## Entrance Requirements

Use the following guidelines to make sure the entrance to your site will allow delivery of the TriPlus 500 HS.

1. Ensure the width of your delivery door opening is at least 81 cm (32 in.).
2. Make sure you have enough room to move boxes around corners, into elevators, or through doorways. The TriPlus 500 HS is shipped in a container with the following dimensions:

Instrument	Depth	Width	High	Weight
TriPlus 500 HS base unit	75 cm (30 in.)	65 cm (25 in.)	75 cm (30 in.)	60 kg (132 lbs)
Vial Loader	40 cm (16 in.)	60 cm (24 in.)	40 cm (16 in.)	12 kg (26.5 lbs)

Other modules, such as the computer, monitor, and other options, are shipped in their own containers.

## Space and Load Requirements

The TriPlus 500 HS must be installed to the right of the GC. Use [Table 1](#) to verify and determine the space and weight requirements for your instrument set.

**Table 1.** Space and Load Requirements (Sheet 1 of 2)

Instrument	Depth		Width		Height		Weight	
	cm	in.	cm	in.	cm	in.	kg	lbs
TriPlus 500 HS base unit	60	24	31	12	45	18	24.5	54
Vial Loader	59	23	18	7	51	20	7	16
TriPlus 500 HS + Vial Loader	64 <sup>5</sup>	25	31	12	96	38	32	70
TRACE 1300 Series GC	60-67 <sup>1</sup>	26	41	16	45	18	35 <sup>2</sup>	77 <sup>2</sup>
TSQ 9000 MS	89	35	40	16	45	18	61	135
ISQ 7000 MS	43	17	33	13	45	18	45	99
Computer <sup>3,4</sup>	48	19	20	8	43	17	12	27
Monitor <sup>4</sup>	16	7	46	18	32	13	4	8



**Table 1.** Space and Load Requirements (Sheet 2 of 2)

Instrument	Depth		Width		Height		Weight	
	cm	in.	cm	in.	cm	in.	kg	lbs
Keyboard <sup>4</sup>	23	9	46	18	50	2	1	2

1. The touch screen extends 7 cm from the front of the TRACE 1310 GC.
2. The weight of the GC is intended without injector/detector modules. The weight of each injector/detector module is 0.8 kg (1.77 lbs).
3. This item is placed on the floor under the system, thereby reducing the weight requirements for your workbench.
4. Dimensions vary per manufacturer, therefore approximations are provided.
5. The Vial Loader extends 4 cm from the back of the TriPlus 500 HS.
6. The weight of the TriPlus 500 HS + Vial Loader includes the tray holder plates and three sample trays but does not include any sample vials. The total weight of the maximum configuration including two tray holder plates, six sample trays and 240 x 20 mL sample vials is about 44 kg (97 lbs)

Use the following guidelines to make sure you have enough space for the GC system with the TriPlus 500 HS.

1. The GC system should be placed on a workbench that has minimum dimensions of 1 x 2 m (3 x 6 ft.). Allow at least 30 cm (12 in.) of extra space around the workbench for connections.
2. Make sure you have at least 92 cm (3 ft.) of clearance above the system. This space allows room for optional modules, (such as the Vial Loader) and proper heat dissipation.
3. Make sure your workbench can support a GC system and a TriPlus 500 HS. Keep in mind, additional instruments add to the total weight.
4. Ensure that your work area is stable and free of vibration from nearby equipment. The system is a sensitive instrument.

## TRACE 1300 Series GC + TriPlus 500 HS Configuration Space and Weight Requirements

The TriPlus 500 HS must be installed to the right of the GC. Use the following tables to determine the space and weight requirements according to your GC + TriPlus 500 HS configuration. See [Table 2](#).



**IMPORTANT** The dimensions reported in the tables are rounded up for excess.

The dimensions are calculated considering the distances that must be leaved between the units of the GC system:

- **1 cm** between a TRACE 1300 Series GC and a TSQ 9000 MS
- **1 cm** between a TRACE 1300 Series GC and a ISQ 7000 MS

## 1 TriPlus 500 Headspace Sampler Site Preparation

### Space and Load Requirements

**Table 2.** Overall Dimensions of the GC System + TriPlus 500 HS

Configuration	Depth		Width		Height		Weight	
	cm	in.	cm	in.	cm	in.	kg	lbs
TRACE 1300 Series GC+ TriPlus 500 HS	67 <sup>1</sup>	26 <sup>1</sup>	75	30	45 <sup>2</sup>	18 <sup>2</sup>	61 <sup>3</sup>	131 <sup>3</sup>
TSQ 9000 MS + TRACE 1300 Series GC + TriPlus 500 HS	89	35	116	46	45 <sup>2</sup>	18 <sup>2</sup>	121 <sup>3</sup>	266 <sup>3</sup>
ISQ 7000 MS + TRACE 1300 Series GC + TriPlus 500 HS	43	17	108	43	45 <sup>2</sup>	18 <sup>2</sup>	106 <sup>3</sup>	230 <sup>3</sup>

1. The touch screen extends 7 cm from the front of the TRACE 1310 GC.

2. With the optional Vial Loader the total height is 95 cm (37 in.)

3. The weight of the GC excludes any injector/detector modules. The weight of each injector/detector module is 0.8 kg (1.77 lbs).

**ATTENTION:** When the Vial Loader is used, add 7 kg (15.5 lbs). The total weight of the maximum configuration including two tray holder plates, six sample trays and 240 x 20 mL sample vials is about 44 kg (97 lbs)

## Lighting Requirements

Use the following guidelines to check the lighting of your site:

1. Ensure that your work area is properly lit. You may need an overhead lamp to light your work area.
2. You may need a small, high-intensity lamp when you clean the instrument or work inside it.

## Power Requirements

This sections gives details on the power requirements.

### Power Line

**CAUTION** The power line and the connections between the instruments must maintain good electrical grounding. Poor grounding represents a danger for the operator and might seriously affect the instrument performance.

Do not connect TriPlus 500 HS to lines feeding devices of a heavy-duty nature, such as motors, UV lamps, refrigerators, air compressors and other devices that can generate disturbances.



Pay attention not to leave any cable connecting the sampling unit and the chromatographic system or the power cord close to the GC hot air vents.

Occasionally, unacceptable quality in line power sources might adversely affect the operation of a GC system.

It is the user's responsibility to correct line voltage problems. Specifying power conditioning equipment is a complex task that is best handled by a company or consultant specializing in that field. Contact your Thermo Fisher Scientific Field Service Engineer (FSE) for assistance in locating a power consultant.

## Electrical Specifications

The electrical specifications and the various protection classes are provided in [Table 3](#).

**Table 3.** Electrical Specifications (Sheet 1 of 2)

Parameter	Requirements
<b>TriPlus 500 HS</b>	
Voltage	100-240 Vac $\pm$ 10%; 50/60 Hz
Current	8.5 A Max.

**Table 3.** Electrical Specifications (Sheet 1 of 2)

Parameter	Requirements
Consumption	600 W Max.
<b>Vial Loader</b>	
Voltage	Input 100-240 Vac
Current	1.3 A
Consumption	90 W

Use the following guidelines to ensure your site is equipped with enough power to support the system. See [Table 4](#).

**Table 4.** System Power Requirements

Equipment	Maximum Power (W)
TriPlus 500 HS	600
Vial Loader	90
TRACE 1300 Series GC + TriPlus 500 HS	2600
TRACE 1300 Series GC + TriPlus 500 HS + Vial Loader	2690
TSQ 9000 MS, including foreline pump	1080
ISQ 7000 MS, including foreline pump	1200
Computer*	400
Monitor <sup>1</sup>	25

\* Power requirements vary by manufacturer.

## Environment Requirements

The operating environment in your laboratory is affected by such factors as temperature, humidity, particulate matter, and electrostatic discharge. It is your responsibility to provide an acceptable operating environment for your TriPlus 500 HS and Vial Loader. Attention to the operating environment will ensure continued high performance of your TriPlus 500 HS and Vial Loader.

### Environmental Conditions

- Indoor use only.
- Up to 3500 meters altitude over sea level
- Temperature 15 °C to 35 °C (59-95 °F)

- Maximum relative humidity 80% for temperatures up to 31 °C decreasing linearly to 50% relative humidity at 40 °C
- Voltage variations must not exceed the nominal voltage by  $\pm 10\%$
- Transient overloads in compliance with installation categories II
- Pollution degree according to IEC 664 (3.7.3) 2
- Protection degree IP00
- Sound Pressure Level Limit < 70 dBA (where dBA = A weighted sound pressure level)

Use the following guidelines to ensure your site has the proper environmental conditions for the system:

1. Ensure that your room temperature is 5–40 °C (41–104 °F). The analytical performance is only confirmed for temperatures between 15–35 °C (59–95 °F).

For best performance, the operating temperature should be constant.

Use [Table 5](#) to calculate the amount of heat your system will generate and ensure your air-conditioning system can handle that amount of heat.



**CAUTION** Do not directly expose the GC system to any cooling duct outlets.

**Table 5.** Maximum Heat Generated by Each Instrument

Equipment	Heat Output (BTU per Hr.)	Heat Output (in W)
TriPlus 500 HS	2047	600
Vial Loader	307	90
TRACE 1300 Series GC + TriPlus 500 HS	8872	2600
TRACE 1300 Series GC + TriPlus 500 HS + Vial Loader	9179	2690
TSQ 9000 MS, including foreline pump	3685	1080
ISQ 7000 MS, including foreline pump	4095	1200
Computer*	1365	400
Monitor <sup>1</sup>	85	25

\* Power requirements vary by manufacturer

2. Ensure that the relative humidity in your laboratory is below 80% (for temperatures higher than 31 °C this limit decreases linearly to 50% at 40 °C), with no condensation. A temperature and humidity monitor in your laboratory helps ensure that the climate is within these specifications.

3. Ensure that the air in your site is free of excess **particulate matter**. For reference, the air should contain fewer than 100,000 particles (larger than 5  $\mu\text{m}$ ) per cubic meter.

If the concentration is larger than this amount, dust can accumulate on electronic components. This accumulation reduces their ability to cool off properly and could cause them to overheat. If your environment is particularly dusty, we recommend that you purchase the optional dust filter for your system.

4. Ensure that your site is free of electrostatic discharge (ESD), which might damage the electronic components of your system. Ensure your static has been discharged before touching internal components of the instrument. ESD can damage sensitive components, resulting in premature failures.

Take the following precautions to prevent electrostatic discharge:

- Use a static-dissipating floor covering (such as tile or conductive linoleum) in the room housing your instrument.
- Use laboratory chairs covered with natural fibers or other static-dissipating material.
- Wear laboratory coats and clothing made from natural fibers or other static-dissipating material.
- Do not place polystyrene (foam) cups or packing materials on the instrument.

## Gas Equipment Requirements

Use the following guidelines to make sure you have the gas supplies for your system ready far in advance of installation. You will need a supply of ultra-high purity GC gases. The TriPlus 500 HS requires auxiliary gases for all the operating processes.

- The **auxiliary gases** used with the instrument are helium, nitrogen, argon.
- The **carrier gas** used with the GC are helium, nitrogen, hydrogen, air, argon, argon/methane. Other gases are rarely used.



**WARNING** Before using gases, carefully read the hazard indications and information reported in the Safety Data Sheet (SDS) supplied by the manufacturer referring to the CAS (Chemical Abstract Service) number. It is the user's responsibility to see that all local safety regulations for the use of gases are obeyed.

**CAUTION** Secure gas cylinders to an immovable structure or wall. Handle all gases according to local safety regulations.



**WARNING - EXPLOSION HAZARD** The use of hydrogen as a carrier gas is dangerous. Hydrogen is potentially explosive and must be used with extreme care. Any use of hydrogen gas must be reviewed by appropriate health and safety staff, and all installations of hydrogen systems must be performed to applicable codes and standards. Thermo Fisher Scientific assumes no liability for the improper use of hydrogen as a carrier gas.

All Thermo Fisher Scientific gas chromatographs normally uses an inert gas as carrier gas. If you wish to use hydrogen as a carrier gas, a hydrogen sensor must be installed into the oven of your GC. Contact a Thermo Fisher Scientific sales representative if you plan to use hydrogen as the carrier gas in your GC. If you don't have the hydrogen sensor, you **must** use an inert carrier gas.

1. You must provide the gas supplies for your GC-GC/MS system. Be sure to order your gases and regulators far enough ahead of time to have them ready for the installation process.
2. You will need a supply of ultra-high purity GC gas. Typical cylinders are about 23 cm (9 in.) wide by 140 cm (55 in.) tall and output >15,000 kPa (>2200 psig).

A single full-size tank contains 8000 L of helium or 6000 L of hydrogen and each will last about three months with a typical usage rate of 50 mL/min.

**Table 6.** Auxiliary Gas Specifications

Gas Type	Purity <sup>1</sup>	Outlet Pressure	Regulator	Connector <sup>2</sup>
Helium	99.999%	300–550 kPa (44–80 psig)	Dual stage brass regulator with stainless steel diaphragm.	CGA-580
Nitrogen	99.999%	300–550 kPa (44–80 psig)	The regulator output pressure should be adjustable from 200 to 1000 kPa (29–145 psig)	CGA-580

<sup>1</sup> Ultra-high purity with less than 1.0 ppm each of water, oxygen, and total hydrocarbons and contained in one tank. Impurities below 1.0 ppm generally do not require purification. Gases with higher impurity levels may require the use of appropriate water, oxygen and hydrocarbon traps.

<sup>2</sup> Connectors will vary with cylinder size. Confirm that your regulator will work with your gas tank.

Oxygen and moisture cannot be prevented from entering the system during cylinder changes. To minimize the impact of these contaminants on the GC-GC/MS system, high purity gas handling equipment should be used.

To further protect the system from oxygen and moisture, point-of-use purifiers should be installed in the carrier gas lines just before they reach the GC to remove any residual contaminants. See [Table 7](#).

**Table 7.** Trap Specifications

Traps	Use
Moisture trap	Water in the gas lines may damage the analytical column and contaminate the system. Water content should be less than 1 ppm in all cases. If you are using multiple traps, install the moisture trap closest to the gas supply, before the hydrocarbon and the oxygen trap.
Hydrocarbon trap	Hydrocarbon traps remove organic materials from gases. If you are using multiple traps, install the hydrocarbon trap after the moisture trap, but before the oxygen trap.
Oxygen trap	Oxygen content in the gas lines should be less than 1 ppm. To achieve a level of oxygen of less than 1 ppm, install an oxygen-removing trap in the gas lines between the gas tank and the TriPlus 500 HS instrument. If you are using multiple traps, the oxygen trap should be the last trap in the series.

- Gas lines should be:
  - As short as possible, run to the back or side of the GC-GC/MS system.
  - Made of pre-cleaned copper or stainless steel when using helium and hydrogen.
  - Free of oil and moisture.
- Obtain the proper gas line filters, which help prevent impurities and contaminants from entering your system. Water, oxygen, and total hydrocarbons should be less than 1 ppm to avoid high background noise and prevent contamination. The GC-GC/MS system is equipped with intake filters that trap moisture, oxygen, and hydrocarbons.
- Store gas tanks and bottles properly so they will not damage cables or gas lines. Ensure they are secured in accordance with standard safety practices.

## LAN Network Requirements

The connection between the TriPlus 500 HS and a Thermo Scientific™ Chromatography Data System (Chromeleon, Xcalibur) must be carried out via Local Area Network (LAN). Your lab must be provided with one or more RJ-45 wall outlets. To connect your system to your site's LAN network, you must have an additional shielded twisted pair network cable.

**Note** We are not responsible for connecting to or establishing communication with your site LAN network. The FSE will test the system's ability to communicate on a mini-hub or LAN switch only (preferable).



## Receiving Instruments

When you receive the TriPlus 500 HS:

1. Inspect the boxes for damage when the instrument arrives. Our instruments are shipped by electronic equipment carriers who specialize in the handling of delicate equipment. Occasionally, however, equipment is inadvertently damaged in transit. If you notice evidence of external damage, do not refuse shipment. Instead, call Customer Service.
2. Once you have finished inspecting your shipment, move the cartons to a protected location, preferably the installation site. Leave the boxes as complete as possible and do not unpack or open the boxes without our Field Service Engineer (FSE) present. Doing otherwise might void your warranty or order.
3. Complete the Installation Request Form located at the front of this guide and forwards it to Customer Support.

## What Happens Next?

After the Installation Request Form is received, Customer Support will contact you to schedule the installation of your system. It is important to confirm that all the requirements on the form are met BEFORE the Field Service Engineer arrives.

The Field Service Engineer will install the system and confirm that all performance tests pass.

1. If equipment is damaged, keep all boxes and equipment in their existing condition and immediately notify the carrier.
1. Submit a damage claim directly to the carrier and send a copy (including any shortage claims) to your authorized Thermo Fisher Scientific sales representative.
1. Do not return any equipment to the dealer or the factory without prior factory authorization.

