Thermo Scientific

TriPlus

Automatic Sampling System

Operating Manual

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Home

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Read the manual before operating with the instrument.

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

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Contents

About This Manual

Overview

This Operating Manual contains descriptions of the features and components of the TriPlus Systems. Inside, you will find all the information necessary for routine operation of your sampler. This includes operating procedures, sample injection techniques, and diagrams and descriptions of the major components.

This manual is organized as follows:

Chapter 1, *Introduction*, provides a basic overview of the features and options of the TriPlus System. It also describes the available instrument configurations.

Chapter 2, *System Description*, provides a description of the components of the sampling unit of the TriPlus System.

Chapter 3, *Installation on Thermo GCs*, contains the instructions for the installation of the TriPlus on the TRACE GC Ultra and FOCUS GC gas chromatographs, the syringe and the electrical connections with the different units of the gas chromatographic system. The instructions for the installation of the TriPlus on the GC 8000 Top, GC 8000 and Mega 2 old GC models are also included.

Chapter 4, *Installation on Third-Party GCs*, contains the instructions for the installation of the TriPlus on third-party gas chromatographs and the electrical connections with the different units of the gas chromatographic system.

Chapter 5, *TriPlus Control from the PC*, provides the information to control the TriPlus from the computer.

Chapter 6, *Operations*, provides instruction to operating with the TriPlus sampler.

Chapter 7, *Maintenance and Troubleshooting*, provides maintenance and troubleshooting guidelines for the TriPlus sampler.

Chapter 8, *LAN Set-up*, contains a few notes on how to set-up and start using the TriPlus sampler with the LAN option.

Chapter 9, *TriPlus Control from the Pocket PC*, provides the information to control the TriPlus from the Pocket PC.

Appendix A, *TriPlus Sampler for Multiple GC Configuration*, contains the instruction to operate with the TriPlus sampler for multiple GC configuration.

Appendix B, *Customer Communication*, contains contact information for Thermo Fisher Scientific offices worldwide. Use the *Reader Survey* in this section to give us feedback on this manual and help us improve the quality of our documentation.

The *Glossary* contains definitions of terms used in this manual. This also includes abbreviations, acronyms, metric prefixes, and symbols.

The *Index* contains an alphabetical list of key terms and topics in this guide, including cross references and the corresponding page numbers.

Conventions Used in This Manual

The following table lists symbols and typographical conventions. Only a few of them are used in this manual.

Bold	Bold text indicates names of windows, menus, dialog boxes, buttons, and fields.
Italic	Italic indicates cross references, first references to important terms defined in the glossary, and special emphasis.
`Monospace`	Monospace, or Courier, indicates filenames and filepaths, or to indicate text the user should enter with the keyboard.
`Monospace Bold`	Monospace Bold indicates messages or prompts displayed on the computer screen or on a digital display.
»	This symbol illustrates menu paths to select, such as **File»Open…**.
KEY NAME	Bold, uppercase sans serif font indicates the name of a key on a keyboard or keypad, such as **ENTER**.

CAUTION

This symbol alerts you to an action or procedure that, if performed improperly, could damage the instrument.

NOTE

This symbol alerts you to important information related to the text in the previous paragraph.

WARNING!

This symbol alerts you to an action or procedure that, if performed improperly, could result in damage to the instrument or possible physical harm to the user. This symbol may be followed by icons indicating special precautions that should be taken to avoid injury.

This symbol indicates electric shock hazard.

This symbol indicates danger from hazardous chemicals.

This symbol indicates danger from high temperature surfaces or substances.

This symbol indicates a fire hazard.

This symbol indicates an explosion hazard.

This symbol indicates a toxic hazard.

This symbol indicates the presence of flammable materials.

This symbol indicates the presence of radioactive material.

This symbol indicates an operation or procedure that must NOT be performed by the user. A Thermo Fisher Scientific authorized Customer Support Engineer must perform this procedure.

This symbol indicates all metal objects, such as watches, jewels, etc., must be taken off.

This symbol indicates an eye hazard. Eye protection must be worn.

This symbol indicates the user must wear a protective screen when performing the procedure.

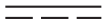
This symbol indicates the user must wear protective shoes when performing the procedure.

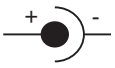
This symbol indicates the user must wear protective clothing when performing the procedure.

This symbol indicates the user must wear gloves when performing the procedure.

Instrument Markings and Symbols

The following table explains the symbols used on Thermo Fisher Scientific instruments. Only a few of them are used on the TriPlus sampler.See the asterisk.

	Symbol	Description
		Direct Current
*		Alternating Current
		Both direct and alternating current
		Three-phase alternating current
		Earth (ground) terminal
*		Protective conductor terminal
		Frame or chassis terminal
		Equipotentiality
*		On (Supply)
*		Off (Supply)

	Symbol	Description
		Equipment protected throughout by DOUBLE INSULATION or REINFORCED INSULATION (Equivalent to Class II of IEC 536)
*		Instruction manual symbol affixed to product. Indicates that the user must refer to the manual for specific Warning or Caution information to avoid personal injury or damage to the product.
		Caution, risk of electric shock
*		Caution, hot surface
*		Caution, biohazard
		In-position of a bistable push control
		Out-position of a bistable push control
*		Jack socket
*		Symbol in compliance to the Directive 2002/96/EC on Waste Electrical and Electronic Equipment (WEEE) placed on the european market after August, 13, 2005.

1

Introduction

This chapter provides a basic overview of the features and options of the TriPlus System. It also describes the available instrument configurations.

Chapter at a Glance…

Classification of the Instrument

Environmental Conditions

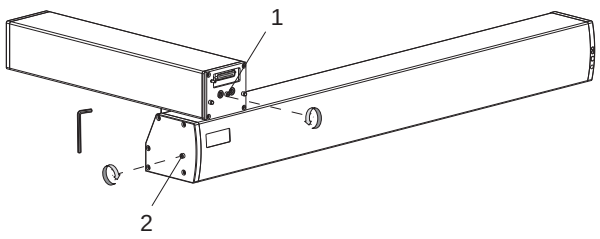
- Internal use
- Up to 2000 meters altitude
- Temperature 18 to 30 °C
- Maximum relative humidity between 30% and 85%
- Voltage variations must not exceed the nominal voltage by ± 10%
- Transient overloads in compliance with installation categories **II**
- Pollution degree according to IEC 664 (3.7.3) **2**
- Protection degree IP00

Safety Information

WARNING! **When, for technical reasons, it is necessary to work on instrument parts which may involve a hazard (moving parts, components under voltage, etc.) the authorized Technical Service must be contacted. This type of situations can be identified because access to these parts is possible only by using a tool. The removable protective covers bear a warning symbol suggesting to refer to the documentation accompanying the instrument.**
Should an operator perform a maintenance operation, he/she must have received proper training to carry out that specific action. Before using dangerous substances (toxic, harmful, etc.), please read the hazard indications and information reported in the Safety Sheet supplied by the manufacturer referring to the relevant CAS (Chemical Abstract Service) number.
The TriPlus requires the use of several chemical products, which are present in vials and syringes, having different hazard characteristics. Before using these substances or replacing the syringe, please read the hazard indications and information reported in the Safety Sheet supplied by the manufacturer referring to the relevant CAS (Chemical Abstract Service) number.

Crossrails Locking Screws

Before the TriPlus sampler is shipped, the X and Y crossrails are mechanically fixed to avoid damaging during the transport.



1. Y Crossrail Locking Screw
2. X Crossrail Locking Screw

The locking Allen screws (M4x25 mm) are recognizable by a label attached to the screws. These locking screws must be removed during the sampler installation.

The TriPlus Sampler

The TriPlus sampler, shown in Figure 1-1, is a sampling system based on three axes X,Y and Z, constituted by a basic body on which a series of components are installed. The components are chosen by the operator according to their own analytical demands.

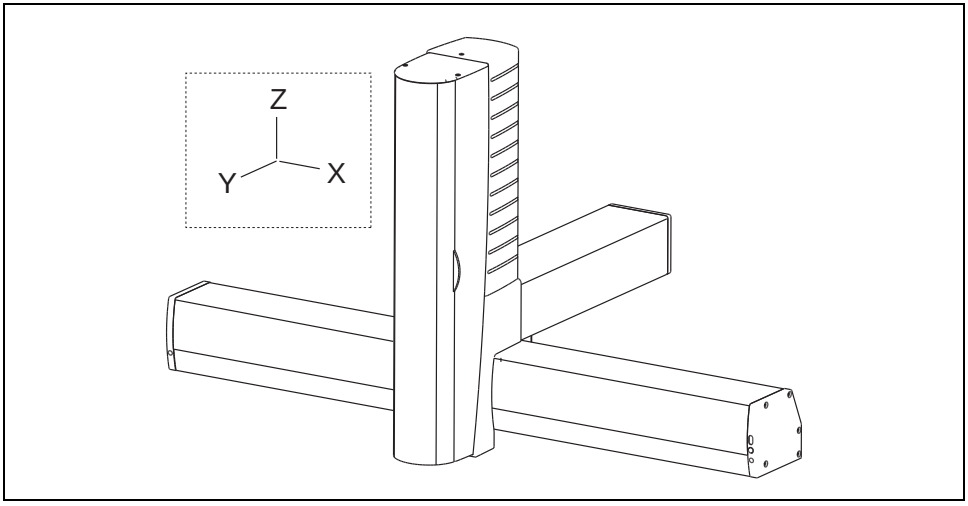


Figure 1-1. TriPlus Sampler Schematic View.

Choosing the appropriate components, TriPlus sampler may be configured for Liquids AS, or for Head Space HS.

Sampling Unit

The sampling unit consists of the following major components:

Sampler Support

It constitutes the supporting base allowing to install the sampler on the gas chromatograph.

Crossrails (X and Y axes)

The sampler is provided with two sliding crossrails that constitute the basic body:

- **Longitudinal Crossrail (X axis)**
  Represents the X axis of the system and is the structure bearing the sampling unit components.

NOTE The longitudinal crossrail (X axis) is available in the standard or extended version.

- **Orthogonal Crossrail (Y axis)**
  Represents the Y axis of the system. It slides on the longitudinal crossrail driving the movements of the tower fixed thereto.

Turret

The turret accommodates the injection assembly and accomplishes the necessary movements to carry out the three main operating steps. The turret is provided with a safety door allowing access to the syringe.

NOTE Each sampler configuration uses the dedicated turret and injection assembly.

Injection Assembly (Z axis)

Housed inside the turret, it consists of a moving support (sliding plate) on which the syringe is installed.

Components

Washing Station

It allows to accommodates the vials of solvents to clean the syringe with appropriate washing solvents and a specific position to accommodate a waste vial or a drain tube to collect the solvents in a waste container.

Two types of washing stations are available:

- Two solvents (2 x 100 mL reservoir)
- Four solvents (4 x 10 mL reservoir)

Fast Washing Station

It allows to accommodates 2 x 500 mL bottles of solvents to clean the syringe with appropriate washing methods solvents and a specific position to collect the waste solvents.

Tray Holder

Two types of tray holders are available:

- Standard (room temperature) tray holder
- Thermostatted tray holder

Each type of tray holder accommodates the relevant type of sample tray.

NOTE The thermostatted tray holder is electrically supplied by the dedicated portable external power supply.

Sample Tray

It is placed on the dedicated tray holder hanging to the crossrail X.
The following options are available according to the type of tray holder in use:

Standard Sample Tray

- 54 positions
- 150 positions
- 2 x 96-well plates
- 2 x 384-well plates

Thermostatted Sample Tray

- 96 positions
- 33 positions
- 2 x 96-well plates
- 2 x 384-well plates

NOTE Up to two sample trays may be installed on the TriPlus sampler after installation of the relative tray holder.

Second Sample Tray

Used to increase the number of samples to be analyzed.

Incubation Oven (Agitator)

It is the main component of the TriPlus HS and SPME versions.
Accurate thermostatting up to six sample vials is of primary importance in order to obtain reproducible results in head space analysis. This condition is ensured by accurate temperature control of the vials located in the incubation oven.

The incubation oven incorporates:

- A motor to shake the sample during the incubation period
- A pressure regulator to control the flushing gas to flush the syringe and the vials when Multiple Headspace Extraction is performed.

Optional Components

- **MHE Device**
  It is required when the Multiple Headspace Extraction (MHE) technique is used. See paragraph *MHE Device* on page 77.

Fiber Conditioning Station

This device allows the conditioning of the SPME fiber. See paragraph *Fiber Conditioning Station* in Chapter 2.

Bar Code Reader

This device reads the bar codes located on the vials and sends the content during the report printout. See paragraph *Bar Code Reader* in Chapter 2.

Fan Station

This device allows to achieve ultra high performances in terms of repeatability whenever very volatile solvents are sampled through a fan. See paragraph *Fan Station* in Chapter 2.

Power Module

The sampler is electrically supplied by the dedicated external power module.

WARNING! TriPlus sampler cannot work without this power module.

User Interface

The functions of the TriPlus can be controlled through:

- a data processing system for PC with dedicated software.
- a pocket computer with dedicated software.

On-Column Injector Actuator

ATTENTION This device is not provided with the TriPlus sampler.

It is an external device required for the automatic injections through the TriPlus sampler into the On-Column injector. The device allows the opening of the On-Column injector rotary valve when the syringe needle is inserted. When the needle is removed, the actuator closes the valve.

References

For more information, please refer to:

- *Sampler Configuration* on page 35
- *System Description* on page 41
- *Bar Code Reader* on page 80
- *Power Module* on page 88
- *TriPlus Control from the PC* on page 209
- *TriPlus Control from the Pocket PC* on page 377

Sampler Configuration

The TriPlus can be installed on the gas chromatographs for sample introduction into up to:

— three injectors by using the standard module longitudinal crossrail

— four injectors by using the extended longitudinal crossrail

The sampler may be configured in the following versions:

- *TriPlus AS for Liquids*
- *TriPlus HS for Head Space*
- *TriPlus SPME for Solid Phase Micro Extraction*

TriPlus AS for Liquids

This version features the following characteristics:

- **Injectors into which the sample may be introduced:**
  S/SL, PTV, PKD, PPKD and OCI.
- **Washing Station**
  Two solvents, four solvents and fast
- **Sample tray**
  — 54-position tray (Standard)
  — 150-position tray (Standard)
  — 33-position tray (Thermostatted)
  — 96-position tray (Thermostatted)
  — Tray for two well plates
- **Sample vial**
  — 1–2 –2.5 mL with the 96 and 150-position tray
  — 10 mL with the 33-position tray
  — 10 and 20 mL with the 54-position tray

- **Well plates**
  - 96-well plate
  - 384-well plate
- **Syringe types**
  5, 10, 100, 250 µL or 0.5, 10, 100, 500 µL with 80 mm needle or 50 mm needle

TriPlus HS for Head Space

- **Injectors into which the sample may be introduced:**
  S/SL, PTV, PKD and PPKD
- **Washing Station**
  Two vials and four vials
- **Sampler tray**
  - 54-position tray (Standard)
- **Sample vial**
  - 10 and 20 mL with the 54-position tray
- **Incubation oven (Agitator) capacity**
  - 6 vials (5 vials when the MHE device is present)
- **Incubation oven (Agitator) temperature control**
  - OFF (room temperature); from 40 to 150 °C
- **Syringe capacity**
  - 1, 2.5, 5 mL
- **Syringe temperature control**
  - OFF (room temperature), from 40 to 150 °C
- **Operating modes**
  - Constant (with or without enrichment)
  - Progressive (with or without enrichment)
  - Multiple Headspace Extraction (MHE)
  - Constant DoublePro

TriPlus SPME for Solid Phase Micro Extraction

- **Injectors into which the sample may be introduced:**
  S/SL and PTV
- **Washing Station**
  Two vials and four vials
- **Sampler tray**
  - 54-position tray (Standard)
- **Sample vial**
  - 10 and 20 mL with the 54-position tray
- **Incubation oven (Agitator) capacity**
  - 6 vials
- **Incubation oven (Agitator) temperature control**
  - OFF (room temperature); from 40 to 150 °C
- **Fiber Conditioning Station temperature control**
  - OFF (room temperature), from 40 to 350 °C.
- **Operating modes**
  - Constant (with or without enrichment)
  - Progressive (with or without enrichment)

Technical Specifications

The following table lists the main technical specifications of the TriPlus sampler.

Table 1-1. Technical Specifications

Programmability	Remote
External interface	RS232 Serial Line, LAN (Local Area Network), Infrared Transceiver
Sampler Power supply	Through external power module 115/230 V ac ± 10%; 220 VA; 50/60 Hz. Selectable through a voltage selector after replacing the appropriate fuse.
Fuses	• 4A time-lag IEC127/III (5 x 20 mm) for 115 Vac power supply • 2A time-lag IEC127/III (5 x 20 mm) 230 Vac power supply
Cooled/heated tray holder power supply	24 Vdc through a portable external power supply Electrical characteristics of the supply - input 100-240 Vac; 47/63 Hz; 1.5A - output 24 Vdc; 100 W
Maximum Current requirements	2 A for 120 V power supply 1 A for 230 V power supply
Heat Output	752 BTU h^{-1}
Sampler dimensions	Length (X axis) = 870 mm (34.3 in.) Standard version 1220 mm (48 in.) Extended version Width (Y axis) = 540 mm (21.3 in.) Turret height (Z axis) = 500 mm (19.7 in.)
Overall dimension on the GC	Length = 870 mm (34.3 in.) or 1220 mm (48 in.) Width = 773 mm (30.4 in.) [200 mm (7.9 in.) of which are protruding the rear] Height = 677 mm (26.7 in.)
Mass	Axes X+Y only = about 15 kg (33 lb.) Axis Z only = about 3.5 kg (7.8 lb.) Axes X+Y+Z and all the components = about 25 kg (56 lb.) Power Supply = about 4 kg (8.9 lb.)

2

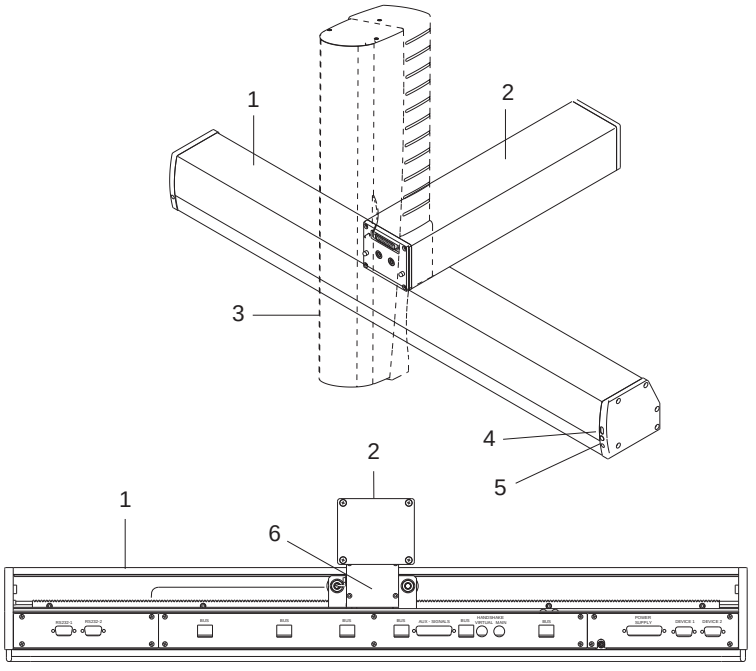
System Description

This chapter provides a description of the components of the sampling unit of the TriPlus system.

Chapter at a Glance...

Crossrails

They are constituting the primary structure on which the sampling unit components are installed according to the configuration of the sampler.
The two sliding crossrail, shown in Figure 2-1, constitute the X and Y axes of the sampler. They are connected to one another through a mechanism that manages the movements of the system thanks to a motorized truck and a rack located in every crossrail.



1. Crossrail X	2. Crossrail Y
3. Turret	4. Infrared Transceiver (IrDA)
5. Status LED	6. Truck

Figure 2-1. Crossrails X and Y

Crossrail X

It represents the X axis of the system and is the structure bearing the sampling units components. It consists of the following sections.

- **Front-upper section**
  It is the part of the crossrail on which the crossrail Y slides. A plate fixed on the right side contains an IrDA infrared transceiver and a LED (*Light Emission Diode*) indicating the instrument status. For details, please refer to paragraphs *Infrared Transceiver* and *Status LED* respectively.
- **Lower section**
  It includes the slots to attach the sampler support and the components.
- **Rear section**
  It includes the connectors for the connection of the sampling unit to the power module, the GC, and the components installed. Please refer to paragraph *Rear of the Sampling Unit*.
- **Internal section**
  It contains the main low voltage electronics boards. It also includes a rack on which the mechanism of the motorized truck managing the movement along the crossrail X is hooked.

Crossrail Y

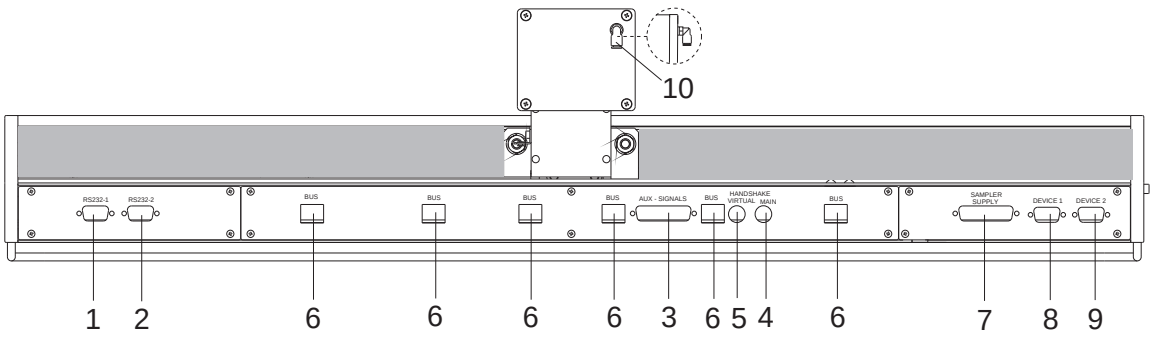
It represents the Y axis of the system. It is connected to the crossrail X through the motorized truck. Crossrail Y drives the movements of the injection assembly (Z axis) contained in the turret. It consists of the following sections.

- **Front section**
  It includes the guides and the electric connections for the turret installation.
- **Lower section**
  It is the section part sliding on the crossrail X through the motorized truck.
- **Rear section**
  It includes the inlet port for the connection of the syringe flushing gas. Please refer to paragraph *Rear of the Sampling Unit*.
- **Internal section**
  Contains the driving mechanism composed by the truck, two motors (one for axis) and the driver board for the management of the motors. It also includes a

rack on which the motorized truck section managing the movement along the axis Y is hooked.

Rear of the Sampling Unit

The rear part of the crossrail X includes the following components as shown in Figure 2-2.



1. RS232-1 Connector	2. RS323-2 Connector
3. AUX SIGNAL Connector	4. HANDSHAKE VIRTUAL Connector
5. HANDSHAKE MAIN Connector	6. BUS Connector
7. SAMPLER SUPPLY Connector	8. DEVICE 1 Connector
9. DEVICE 2 Connector	10. Syringe Flush Gas Inlet

Figure 2-2. Rear of the Sampling Unit

- 9-pin female connector marked **RS232-1** for the communication between the sampler and a COM port of the PC.
- 9-pin female connector marked **RS232-2** for the communication between the sampler and a COM port of the PC.
- 25-pin female connector marked **AUX- SIGNALS** for the connection to external devices (e.g. start/stop signal).

- 6-pin connector marked **HANDSHAKE MAIN** for proper interpretation between the sampler and the GC.
- 6-pin connector marked **HANDSHAKE VIRTUAL** for proper interpretation between the sampler and a second GC.
- 8-pin RJ45 type connector marked **BUS** for the connection to the CPU board and the components installed on the sampler.
- 25-pin connector marked **SAMPLER SUPPLY** for the connection between the sampler and the power module.
- 15-pin connector marked **DEVICE 1** for the connection between the CPU board and the following components:
  - Incubation oven (agitator)
  - Actuator for On-Column injector.
  - Fast Washing Station
  - Fiber Conditioning Station
- 15-pin connector marked **DEVICE 2** for the connection between the CPU board and the following components:
  - Actuator for On-Column injector.
  - Fast Washing Station
  - Fiber Conditioning Station
- Inlet port marked **FROM AGITATOR** for the connection of the syringe flushing gas coming from the pressure regulator located on the rear of the incubation oven (agitator).

Turret

It consists of a vertical structure fixed on the crossrail Y which guides the movements along the X and Y axes.

The front side is provided with a *safety door* allowing access to the *Injection Assembly (Z axis)*. The door opening immediately cuts off power supply to the sampler.

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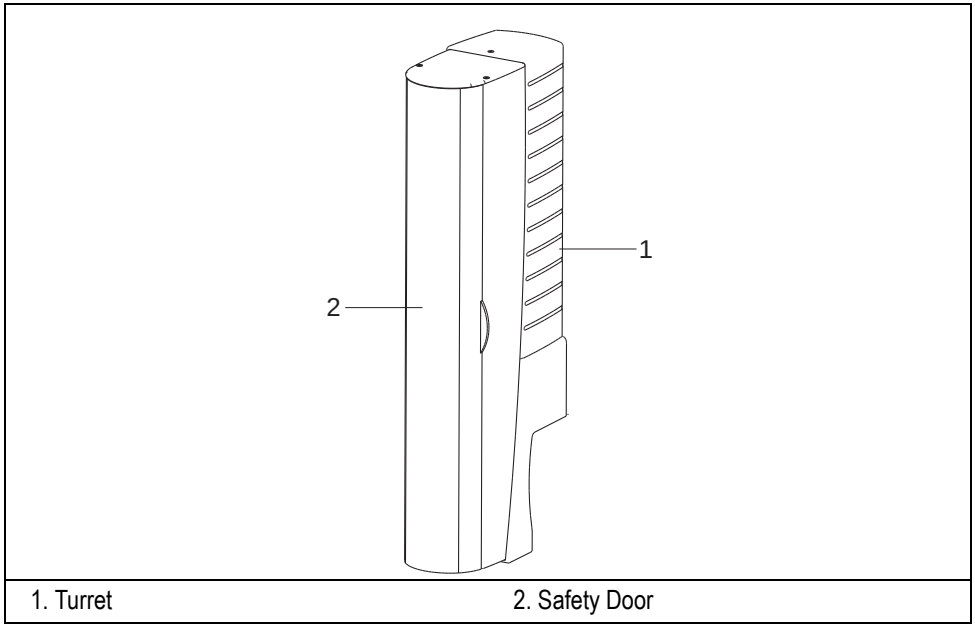


1. Turret 2. Safety Door

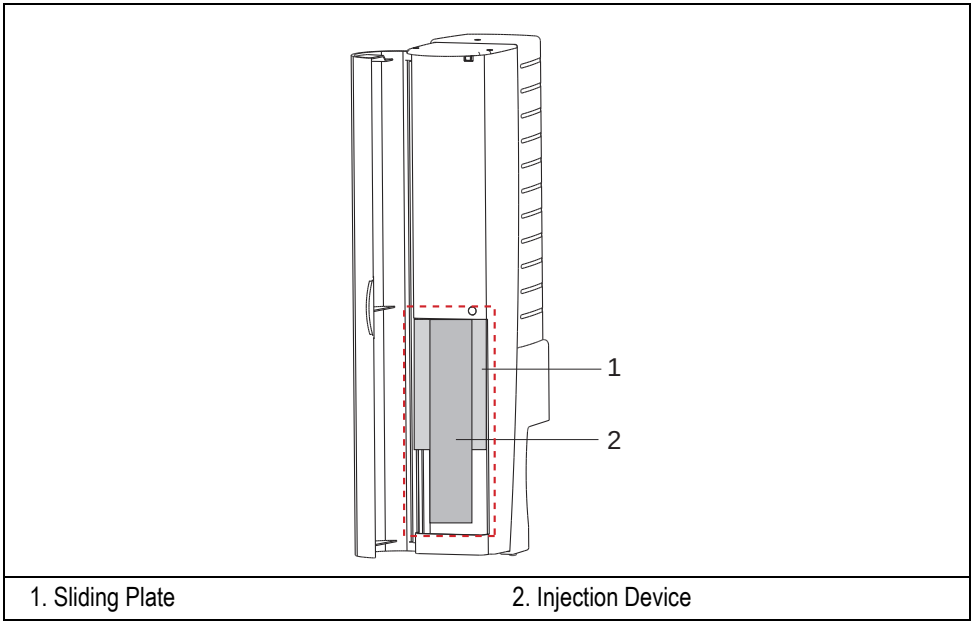
Figure 2-3. The turret

WARNING! **The turret must never be manually moved when the sampler is powered on.**

NOTE It is possible to change the home position of the turret when the sampler is in Stand-by condition.

Injection Assembly (Z axis)

It is located inside the turret and constitutes the Z axis of the system. It consists of a *sliding plate* which supports and guides the vertical movements of the *Injection Device*.



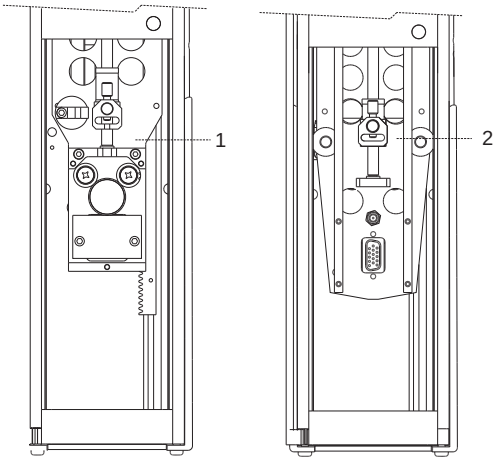
1. Sliding Plate
2. Injection Device

Figure 2-4. Injection Assembly

The vertical movements of the injection device are controlled by motors housed in the turret. The travel ends of the movable parts is defined by a series of sensors.

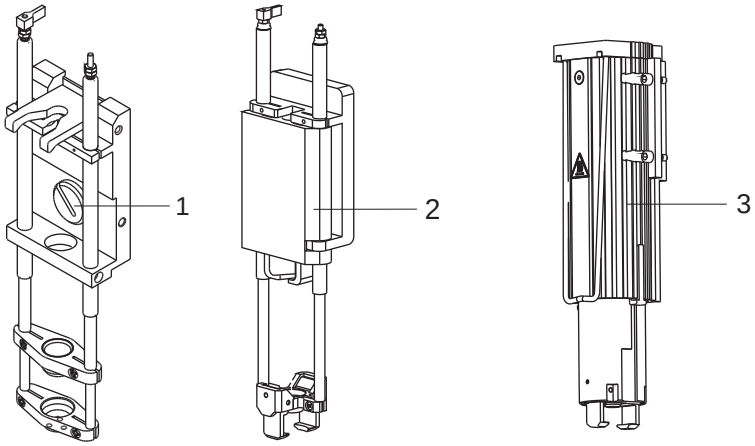
Inside the turret two electronic boards are also present, one for the motors control and one for the instrument functions control, respectively.

CAUTION **Every version of the sampler has the dedicated injection device.**



1. Sliding Plate for TriPlus AS and SPME
2. Sliding Plate for TriPlus HS

Figure 2-5. Injection Device Sliding Plate View



1.A Syringe Holder for TriPlus AS
2. Syringe Holder for TriPlus SPME
3. Syringe holder for TriPlus HS

Figure 2-6. Injection Device

Injection Device

According to the AS, HS or SPME version of the TriPlus sampler, the turret accommodates different types of injection device:

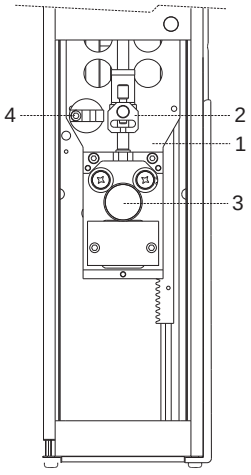
- *Injection Device for TriPlus AS*
- *Injection Device for TriPlus HS*
- *Injection Device for TriPlus SPME*

Injection Device for TriPlus AS

It includes the syringe plunger housing (located on the sliding plate), the syringe holder with the retractile mechanism provided with a touch sensor, and the syringe.

Sliding Plate

The sliding plate, shown in Figure 2-7, includes the elements to properly accommodate the syringe holder and to identify the syringe in use.



1. Sliding Plate	2. Syringe Plunger Housing
3. Supporting Magnet	4. Optical Sensor

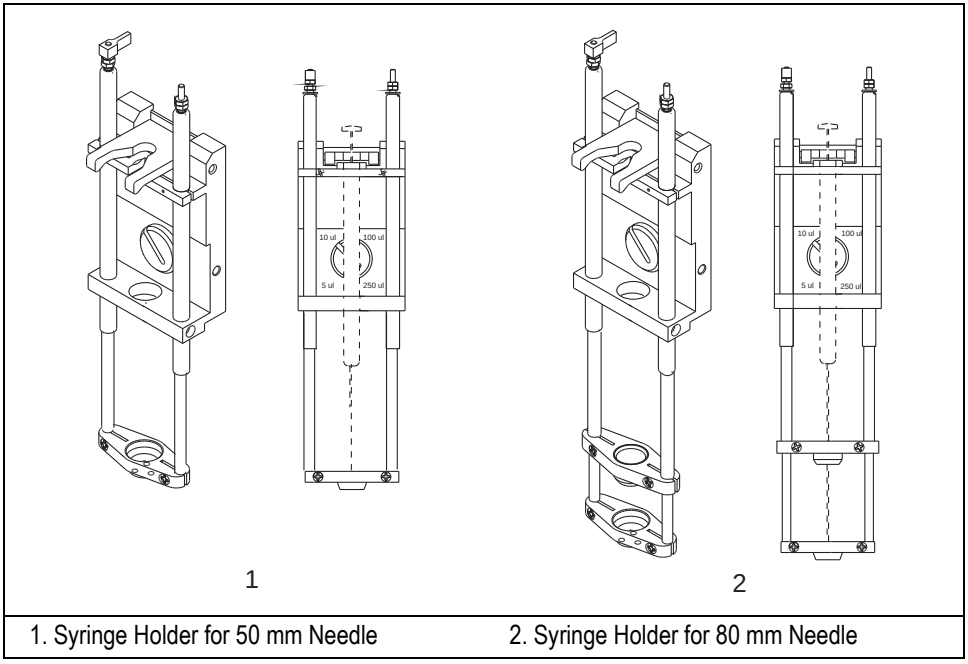
Figure 2-7. AS Sliding Plate Elements

Syringe Holders

The syringe holder accommodate the syringe. Figure 2-8 shows the syringe holders available:

- for syringes with 50 mm needle
- for syringe with 80 mm needle

The syringe holder is already factory assembled.



1. Syringe Holder for 50 mm Needle
2. Syringe Holder for 80 mm Needle

Figure 2-8. AS Syringe Holders

WARNING! The needle guiding mechanism is not adjustable. Use the appropriate holder to accommodate the syringe in use.

Syringe

It is possible to install the following syringes:

- 5, 10, 100 and 250 µL with 50 mm or 80 mm needle can be installed on the “standard” syringe holder.

- 0.5, 10, 100 and 500 µL with 50 mm or 80 mm needle can be installed on the “optional” syringe holder.

WARNING! Use only the syringes recommended by Thermo.

Syringe Volume Selector

According to the syringe in use, the system recognizes the capacity of the syringe by reading the position of the syringe volume selector, shown in Figure 2-9.

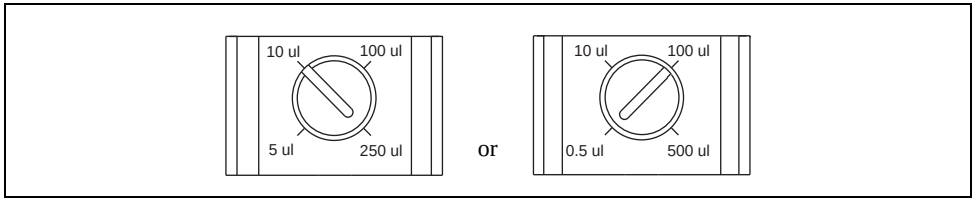


Figure 2-9. AS Syringe Volume Selectors

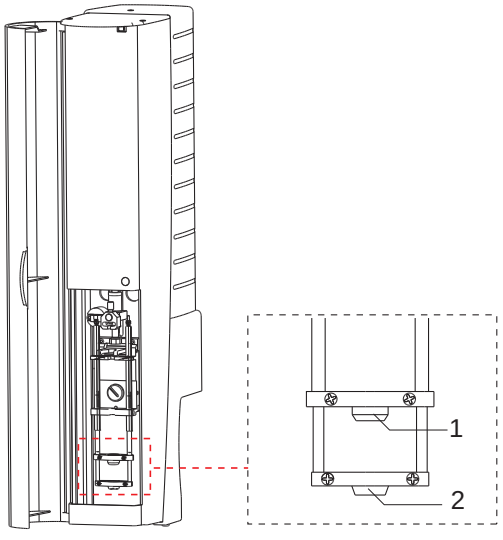
The position of the syringe volume selector must be manually selected at the moment of the syringe installation according to the capacity of the syringe in use.

WARNING! The capacity of the syringe must correspond to the volume set on the selector.

To install or replace the syringe, please refer to the chapters *Installation on Thermo GCs* or *Installation on Third-Party GCs* and *Maintenance and Troubleshooting*.

Retractile Mechanism and Touch Sensor

The lower end of the injection device, shown in Figure 2-10, consists of a retractable mechanism which safely guides the syringe needle and transports the vial through a series of magnets.



1. Needle Guide
2. Touch Sensor

Figure 2-10. AS Retractile Mechanism

The retractile mechanism is provided with a touch sensor, which prevents the vial from being lifted at the end of the sample drawing cycle when withdrawing the syringe needle from the sample vial.

The touch sensor has the following functions:

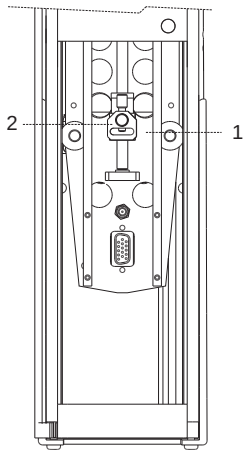
- to acknowledge the components installed
- to acknowledge the vial presence
- to acknowledge the injector presence
- to guide the syringe needle
- to transfer the labeled vial from the sample tray to the bar code reader when present.

Injection Device for TriPlus HS

It includes the syringe plunger housing (located on the sliding plate), the heated syringe holder, the vial capture device, and the syringe.

Sliding Plate

The sliding plate, shown in Figure 2-11, includes the elements to properly accommodate the syringe holder and to identify the syringe in use.

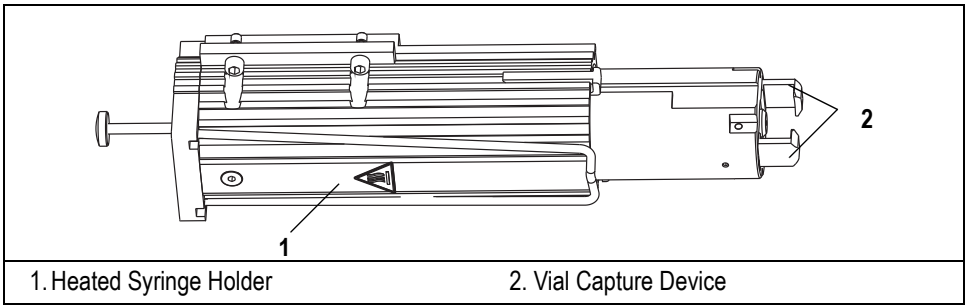


1. Sliding Plate
2. Syringe Plunger Housing

Figure 2-11. HS Sliding Plate Elements

Heated Syringe Holder

It contains the syringe and ensures stable heating. Figure 2-12 shows the heated syringe holder for HS. The syringe holder includes a retractile mechanism and a vial capture device.



1. Heated Syringe Holder 2. Vial Capture Device

Figure 2-12. Heated Syringe Holder for HS

Vial Capture Device

It consists of two grips located at the lower end of the of the retractile mechanism.

This device performs the following functions:

- to acknowledge the components installed
- to acknowledge the vial presence
- to acknowledge the injector presence
- to guide the syringe needle
- to grip and withdraw the vial from its position in the sample tray or incubation oven.
- to transfer the vial from the sample tray to the incubation oven and vice-versa.
- to transfer the labeled vial from the sample tray to the bar code reader when present.

Figure 2-13 shows the components of the injection device.

1. Capture Device	2. Syringe Holder
3. Locking Pins	4. Syringe Needle
5. Washer	6. Needle Guide
7. Needle Seal	8. Nut
9. Syringe Volume Selector	

Figure 2-13. HS Injection Device Components

Syringe

Syringes of 1, 2.5 or 5 mL volume can be mounted inside the injection device. The standard syringe is volume 2.5 mL. The 1 and 5 mL syringes may be installed instead of the standard, depending on the analytical requirements.

WARNING! **Use only the syringes recommended by Thermo.**

Syringe Volume Selector

According to the syringe in use, the system recognizes the capacity of the syringe by reading the position of the syringe volume selector, shown in Figure 2-14.

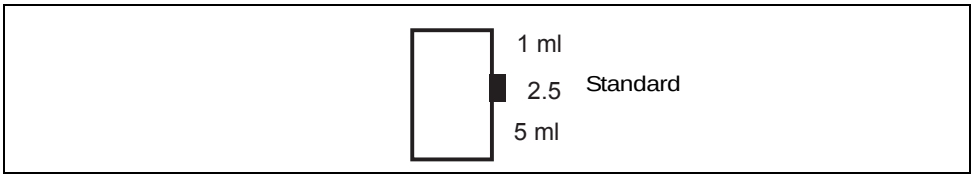


Figure 2-14. HS Syringe Volume Selector

The position of the syringe volume selector must be manually selected at the moment of the syringe installation according to the capacity of the syringe in use. The standard position is 2.5 mL.

WARNING! The capacity of the syringe must correspond to the volume set on the selector.

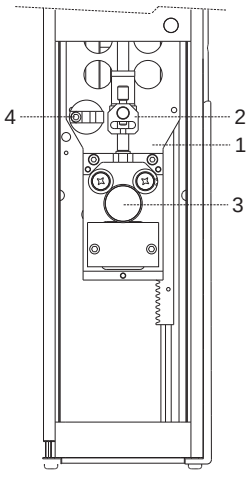
To install or replace the syringe, please refer to the chapters *Installation on Thermo GCs* or *Installation on Third-Party GCs* and *Maintenance and Troubleshooting*.

Injection Device for TriPlus SPME

It includes the syringe plunger housing (located on the sliding plate), the syringe holder with the vial capture device and the fiber holder.

Sliding Plate

The sliding plate, shown in Figure 2-15, includes the elements to properly accommodate the syringe holder for SPME.

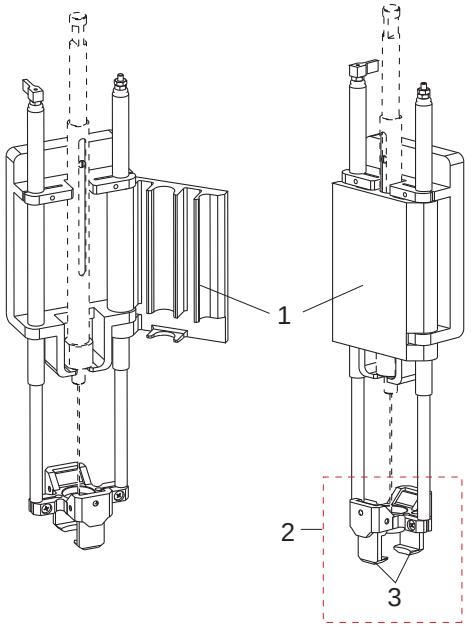


1. Sliding Plate	2. Syringe Plunger Housing
3. Supporting Magnet	4. Optical Sensor

Figure 2-15. SPME Sliding Plate Elements

Syringe Holder

The syringe holder accommodate the Supelco fiber holder. The lower part of the syringe holder is provided with a vial capture device as shown in Figure 2-16.



1. Syringe Holder Door
2. Vial Capture Device
3. Grips

Figure 2-16. Syringe Holder for SPME

Vial Capture Device

It consists of two grips located at the lower end of the syringe holder.

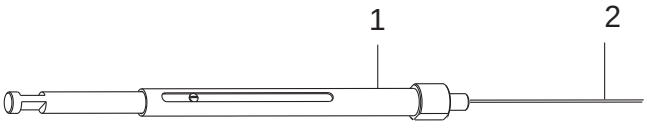
This device performs the following functions:

- to acknowledge the components installed
- to acknowledge the vial presence
- to acknowledge the injector presence
- to guide the syringe needle
- to grip and withdraw the vial from its position in the sample tray or incubation oven.

- to transfer the vial from the sample tray to the incubation oven and vice-versa.
- to transfer the labeled vial from the sample tray to the bar code reader when present.

Supelco Fiber Holder

The fiber holder, shown in Figure 2-17, accommodates the suitable fiber according on the analytical requirements.



1. Fiber Holder Body
2. Protective Needle

Figure 2-17. Fiber Holder for SPME

To install or replace the fiber, the fiber holder and the syringe holder, please refer to the chapters *Installation on Thermo GCs* or *Installation on Third-Party GCs* and *Maintenance and Troubleshooting*.

Washing Station

The washing station, shown in Figure 2-18, consists of an arc-shaped holder that supports a tray to accommodate the vials containing the solvent (solvents) necessary for the syringe washing, which can take place both before and after the injection. The washing solvent is then collected in the waste container.

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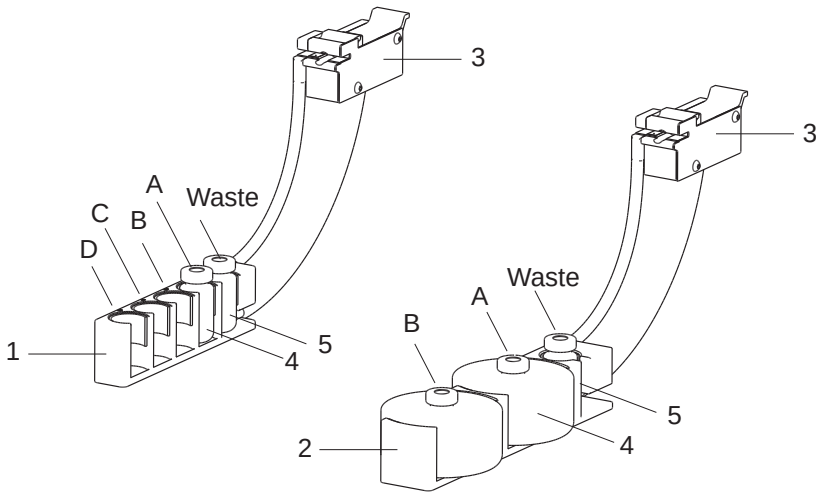

1. Four Position Holder + Waste	2. Two Position Holder + Waste
3. Mounting Clamp	4. Washing Solvent Vials
5. Waste Vial	A. B. C. D. Seats for the Solvents Vials

Figure 2-18. Washing Station

Two types of washing stations are available.

- **Two solvents**
  It may accommodate up to 2 x 100 mL solvent reservoir and one waste vial
- **Four solvents**
  It may accommodate up to 4 x 10 mL solvent vials and one waste vial.

For details, please refer to *Technical Specifications* in Chapter 1.

The vials containing solvents for the syringe washing are introduced into the appropriate seats **A**, **B** or **A**, **B C**, **D** according to the type of the washing station used.

CAUTION **In case of HS and SPME configurations, the washing station vials require metal caps and septa used for AS version.**

The waste container is introduced into the dedicated seat marked **WASTE**.
To avoid continuous emptying of the waste vial, this is available with a beak to which a tubing can be connected to have the solvent discharged into a greater container placed on the floor. See Figure 2-19.
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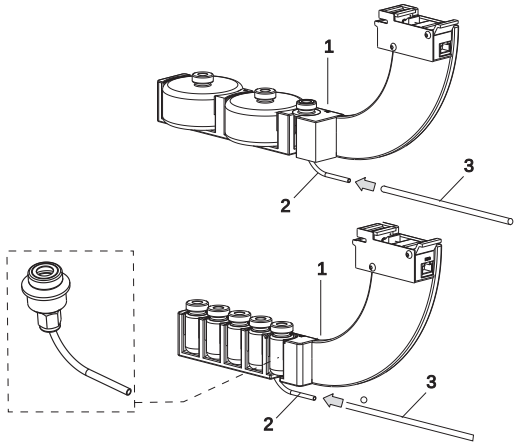
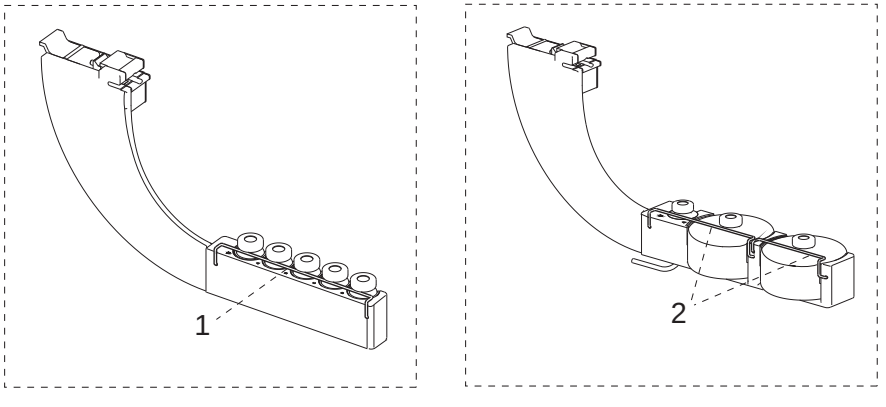


1. Washing Station
2. Beak
3. Waste Tube

Figure 2-19. Washing Station Waste

CAUTION **The washing station module when used in combination with HS/SPME version, it requires the optional Vial bracket holder herewith included (see Figure 2-20).**

The washing station equipped with Vial bracket holder is required to be mounted on the left side of the longitudinal crossrail of the sampler.
The Vial bracket holder is not required when operating with AS version, and the washing station can be mounted along the longitudinal crossrail also on right side.



1. Vial Bracket Holder for the Four Solvents Washing Station
2. Vial Bracket Holder for the Two Solvents Washing Station

Figure 2-20. Vial Bracket Holders

Fast Washing Station

This optional washing station, shown in Figure 2-21, permits a fast needle wash inside and outside through a dual solvent system.

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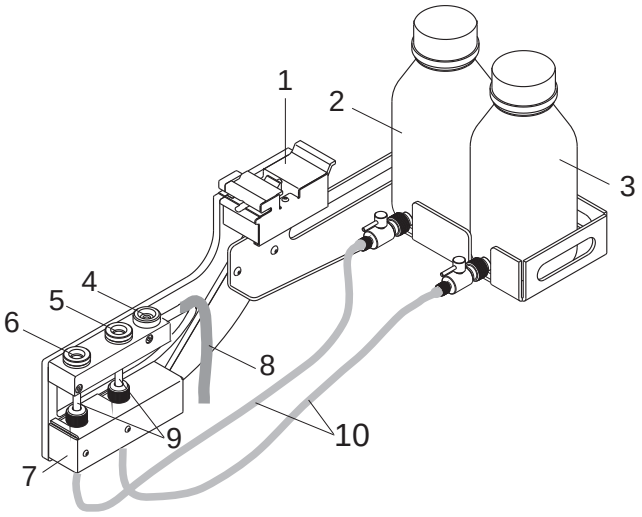


1. Mounting Clamp	2. Glass Bottle B; 500 mL
3. Glass Bottle A; 500 mL	4. Waste
5. Solvent Port A	6. Solvent Port B
7. Valves Compartment	8. Waste Tube
9. Glass Liners	10. Solvent Tubes

Figure 2-21. Fast Washing Station

When the needle is inserted in A/B port, the valves open filling the liners.The aspiration followed by ejection is performed by the syringe such to clean itself and the needle inside and outside.

NOTE The fast washing station is automatically recognized at the sampler power on.

Tray Holders and Sample Trays

TriPlus sampler can accommodate up to two tray holders.
Two types of tray holders are available:

- *Standard Tray Holder*
- *Thermostatted Tray Holder*

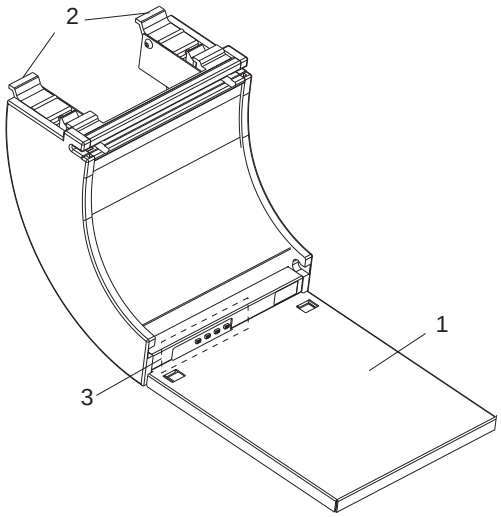
Each tray holder accommodates only one of the related sample tray. The type of sample tray installed is automatically acknowledged by the sampler through a series of sensors and magnets located on the tray holder and on the sample tray respectively. When two tray holders are used, it is necessary to configure them one as ***primary*** and the other as ***secondary*** through the positioning of the switch located on the rear of each tray holder.
The TriPlus admits the simultaneous use of two sample trays, however it is not permitted the use of two sample trays with overlap of one or more sample numbers.

WARNING! **Never install two tray holders having the same configuration (e.g. Primary, Secondary). Every type of sample tray has its magnet for automatic recognition. Don't install two sample trays having identical position numbering; the instrument will signal the relevant condition of alarm.**

ATTENTION **When swapping from the AS version to the HS/SPME version and vice-versa, please check the compatibility of the trays installed with the version in use as described in paragraph *Sampler Configuration* on page 35.**
E.g. the 150-position standard tray and the thermostatted trays are compatible with the AS version BUT NOT with the HS/SPME version.
The not compatible trays MUST BE DISABLED in the TriPlus Sampler Setup Page through data system or stand-alone software (refer to *Sampler Set-up Page* on page 222).

Standard Tray Holder

This holder, shown in Figure 2-22, consists of an arc-shaped structure provided with a support plate to accommodate the sample tray for analyses at room temperature. For more information, please refer to paragraph *Sample Trays for Standard Tray Holder*.



1. Support Plate
2. Mounting Clamp
3. Tray Identification Sensors

Figure 2-22. Standard Sample Tray Holder

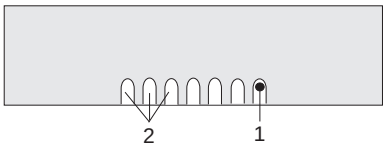
The standard tray holder can accommodate a sample tray with 54 or 150 positions or a sample tray for Well Plates.

Sample Trays for Standard Tray Holder

The sample tray is easily transportable, also when completely loaded, thanks to the proper handle on the front as shown in the following illustration.

Sample Tray Handle

On the rear of the sampler tray one or more magnets, each in a proper cavity as shown in the example of Figure 2-23, are located for the acknowledged of the tray.

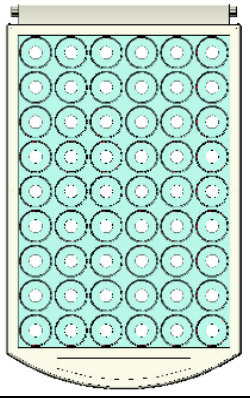


1. Magnet	2. Cavities Not Used

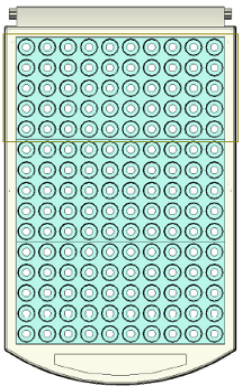
Figure 2-23. Tray Identification Magnets

54 and 150-position Sample Trays

They are shown in Figure 2-24.



54-position Sample Tray



150-position Sample Tray

Figure 2-24. Sample Trays for Vials for Standard Tray Holder

NOTE The first sample position is located on the upper left corner while the last sample position is located on the right lower corner.

Every sample tray has numbered positions for facilitating the identification of the sample vials.

- 150-position sample tray is composed of 15 rows of 10 positions each and it can accommodate vials of 1, 2 or 2.5 mL.
- 54-position sample tray is composed of 9 rows of 6 positions each and it can accommodate vials of 10 or 20 mL.

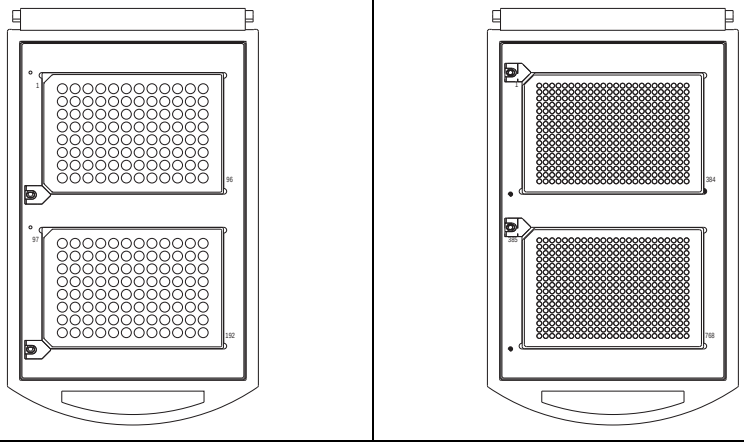
According to the type of sample tray used, the sample positions must be numbered as reported in Table 2-1:

Table 2-1. Standard Sample Trays for Vials

	Numbering	
Sample Tray	**First Sampler Tray**	**Second Sample Tray**
54-position	**1** to **54**	**55** to **108**
150-position	**1** to **150**	**151** to **300**

Sample Tray for Well Plates

This sample tray can accommodates two 96-well (8 rows x 12 columns) or two 384-well (16 rows x 24 columns) plates as shown in Figure 2-25.



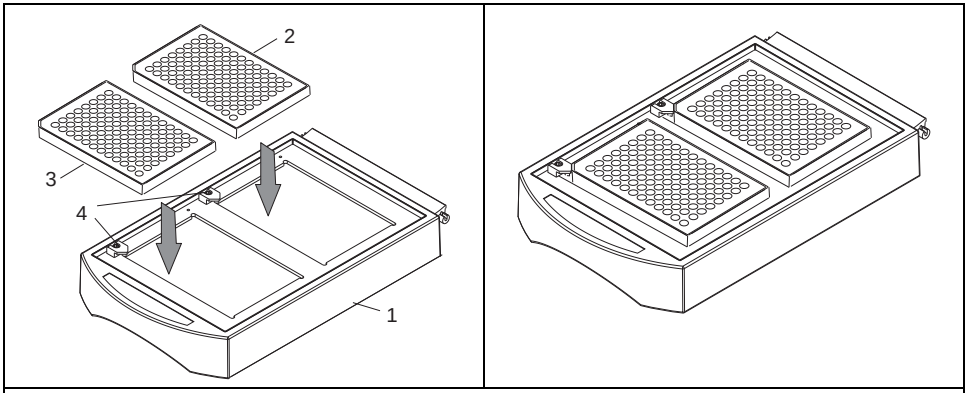
Sample Tray for Well Plates

Figure 2-25. Sample Tray for Well Plates for Standard Tray Holder

NOTE Two position keys are furnished with the sample tray for Well Plates. Each key could be placed in correspondence of the cut corner of the plate for orientation convenience.

Sample Tray for Well Plates Assembling

An example of assembling of the sample tray for Well Plates is shown in Figure 2-26.



1. Sample Tray for Well Plates
2. First Well Plate
3. Second Well Plate
4. Position Keys

Figure 2-26. Example of Sample Tray for Well Plates Assembling

According to the type of sample tray used, the sample positions must be numbered as reported in Table 2-2

Table 2-2. Standard Sample Trays for Well Plate

	Numbering	
Sample Tray	**First Sampler Tray**	**Second Sample Tray**
First **96**-well plate	**1** to **96**	**193** to **288**
Second **96**-well plate	**97** to **192**	**289** to **384**
First **384**-well plate	**1** to **384**	**769** to **1152**
Second **384**-well plate	**385** to **768**	**1153** to **1536**

Use of the Sample Trays

When the TriPlus is equipped with two tray holders and two sample trays the numbering overlapping of the samples must be avoid.
Two situations are possibile:

1. **The two sample trays are of the same type**.
   The progressive sample numbering is required.

For example:

- First sample tray from 1 to 150
- Second sample tray from 151 to 300

2. **The two sample are of different type.**
   The sample numbering must start from the sample tray having the less capacity. Continue the sample numbering on the second sample tray with possible sample numbering lack.

   For example:

   - First sample tray from 1 to 54
   - Second sample tray from 151 to 30

Thermostatted Tray Holder

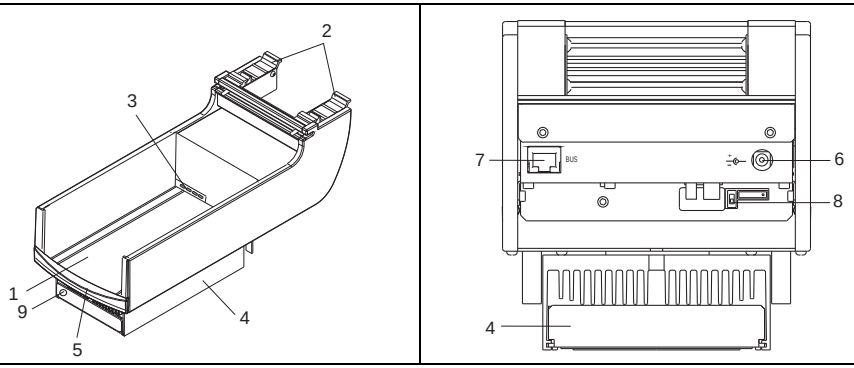
This holder, shown in Figure 2-27, consists of a structure provided with:

- An housing for the accommodation of the sample tray. For more information, please refer to paragraph *Sample Trays for Thermostatted Tray Holder*.
- A Peltier device the for both cooling and heating of the sample tray. The temperature range is from +4°C to +70°C (+/- 1°C).

NOTE

The thermostatted tray holder is electrically supplied by the dedicated portable external power supply. For the electrical characteristics of the power supply see the paragraph *Technical Specifications* in Chapter 1.Place the power supply in a way it is easy disconnect it from the mains. The thermostatted tray must be connected to its power supply **before** turning on the sampler in order to be automatically recognized at the sampler power on. The on/off indicator, located on the front, will be lit.

The thermostatted tray holder requires periodical maintenance as described in Chapter 7.



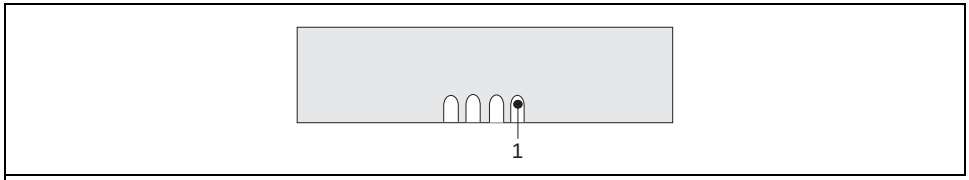
1. Sample Tray Housing	2. Mounting Clamp
3. Tray Identification Sensors	4. Peltier System
5. Clip	6. Jack
7. BUS connector	8. Primary/Secondary Tray Selector
9. On/Off Indicator	

Figure 2-27. Thermostatted Sample Tray Holder

The Thermostatted tray holder can accommodate a sample tray with 33 or 96 positions or a sample tray for Well Plates.

Sample Trays for Thermostatted Tray Holder

On the rear of the sampler tray one or more magnets, each in a proper cavity as shown in the example of Figure 2-28, are located for the acknowledged of the tray.

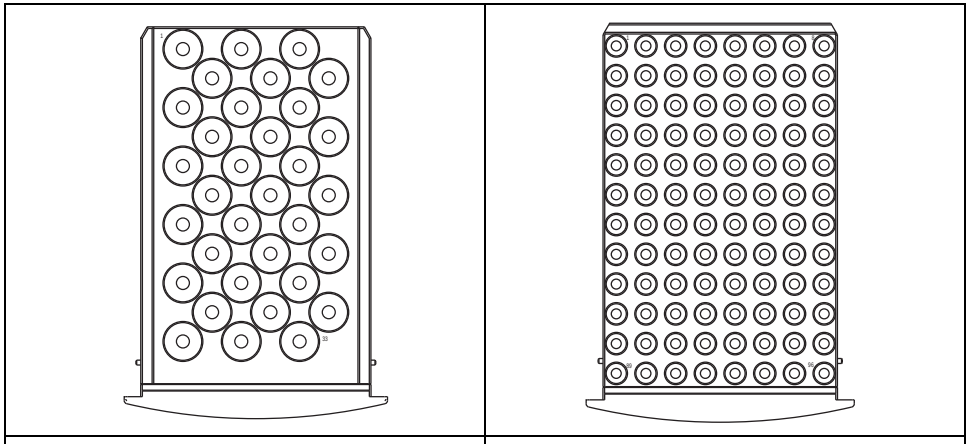


1. Magnet

Figure 2-28. Tray Identification Magnets

33 and 66-position Sample Trays

They are shown in Figure 2-29.



33-position Sample Tray | 96-position Sample Tray

Figure 2-29. Sample Tray for Vials for Thermostatted Tray Holder

NOTE The first sample position is located on the upper left corner while the last sample position is located on the right lower corner.

Every sample tray has numbered positions for facilitating the identification of the sample vials.

- 96-position sample tray is composed of 12 rows of 8 positions each and it can accommodate vials of 1, 2 or 2.5 mL.
- 33-position sample tray is composed of 11 rows of 3 positions each and it can accommodate vials of 10 or 20 mL.

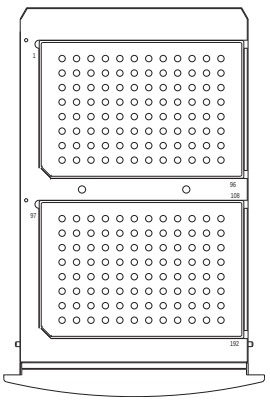
According to the type of sample tray used, the sample positions must be numbered as reported in Table 2-3:

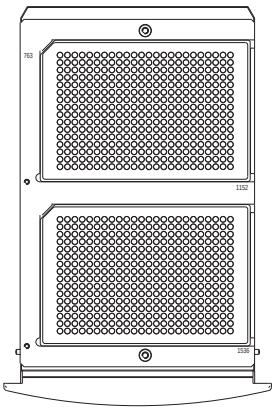
Table 2-3. Thermostatted Sample Trays for Vials

	Numbering	
Sample Tray	**First Sampler Tray**	**Second Sample Tray**
33-position	**1** to **33**	**34** to **66**
96-position	**1** to **96**	**97** to **192**

Sample Tray for Well Plates

This sample tray can accommodates two 96-well (8 rows x 12 columns) or two 384-well (16 rows x 24 columns) Well Plates as shown in Figure 2-30.



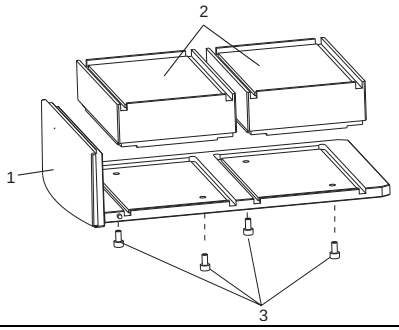


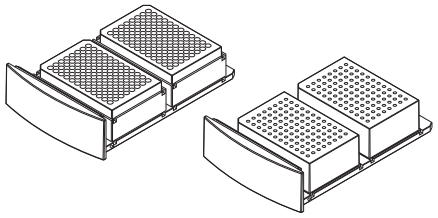
Sample Tray for Well Plates

Figure 2-30. Thermostatted Sample Tray for Well Plates

Removable Spacer

The sample tray is equipped with two removable spacers, as shown in Figure 2-34, to permit the accommodation of well plates having different height and volume sizes.



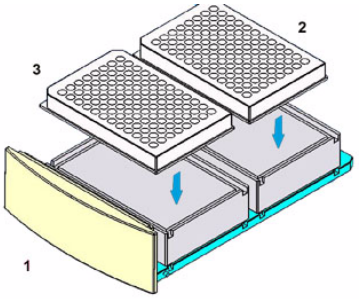


1. Sample Tray
2. Sample Tray Spacers
3. Fixing Screws

Figure 2-31. Sample Tray Spacer

Sample Tray for Well Plates Assembling

An example of assembling of the sample tray for Well Plates is shown in Figure 2-32.



1. Sample Tray for Well Plates
2. First Well Plate
3. Second Well Plate

Figure 2-32. Example Sample Tray for Well Plates Assembling

According to the type of sample tray used, the sample positions must be numbered as reported in Table 2-4:

Table 2-4. Thermostatted Sample Trays for Well Plate

	Numbering	
Sample Tray	**First Sampler Tray**	**Second Sample Tray**
First **96**-well plate	**1** to **96**	**193** to **288**
Second **96**-well plate	**97** to **192**	**289** to **384**
First **384**-well plate	**1** to **384**	**769** to **1152**
Second **384**-well plate	**385** to **768**	**1153** to **1536**

Use of the Sample Trays

When the TriPlus is equipped with two trays the numbering overlapping of the samples must be avoid.

Two situations are possible:

1. **The two sample trays are of the same type**.
   In this case the progressive sample numbering is required:

   For example:

   - First sample tray from 1 to 96
   - Second sample tray from 97 to 192

2. **The two sample trays are of different type**.
   The sample numbering must start from the sample tray having the less capacity. Continue the sample numbering on the second sample tray with possible sample numbering lack.

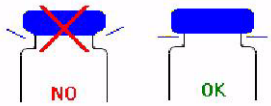
   For example:

   - First sample tray from 1 to 33
   - Second sample tray from 97 to 192

Vials

Vials of 1, 2, 2.5, 10 o 20 mL of capacity are used according to the AS or HS version of the TriPlus sampler as reported in Chapter 1. If vials of 1 mL are required, each position must be fitted with an adapter before placing the vials into the sample tray.

CAUTION **The vials must be correctly crimped with the appropriate septa and crimp-top caps.**



It is vital the TriPlus operates with the suggested Thermo Fisher Scientific vials, septa and crimp-top caps listed in the Spare Parts Catalog. Vials and septa with different characteristics may compromize the reliability of the sampling procedure.

When preparing the vials, please refer to local law regulations for the ventilation conditions of the work room.
When the bar code reader is present, make sure that the vials have been closed with the appropriate magnetic caps.

Well Plates

ATTENTION **The Well Plates are compliant to the Society for Biomolecular Screening (SBS) Standards.**

All plates offers an alphanumeric grid to help in sample identification. To facilitate orientation the corner at the H1 or A1 well location is cut off at an angle. The sampler will automatically recognize the well plate height at the first injection.

To allow the alignment adjustment of the injection device on the first well of the well plate in use, the centering pin is required.

.

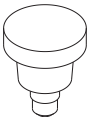


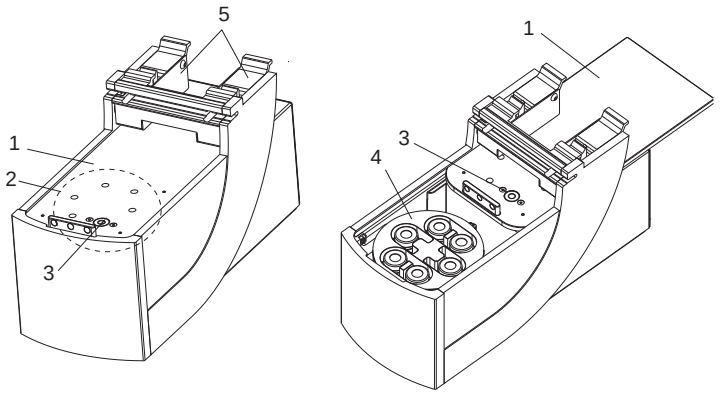
Figure 2-33. Centering Pin

Perform the adjustment by using the *Vial Center Adjustment (First) and Last* function in the *Component Information Page*.

Incubation Oven (Agitator)

The incubation oven is a component of the TriPlus HS sampler.
The incubation oven, shown in Figure 2-34, consists of a compartment fitted with 6 vial.

.



1. Sliding Cover
2. Cavity
3. MHE Device Position
4. Sample Vials Housings
5. Mounting Clamp

Figure 2-34. Incubation Oven (Agitator)

The incubation oven is temperature-controlled to allow sample vial conditioning before injection and is equipped with a sliding cover to allow vial insertion and removal.

Six holes are located on the top of the cover above each vial housing. Each hole allows the penetration of the syringe needle into the vial during the headspace sampling phase.

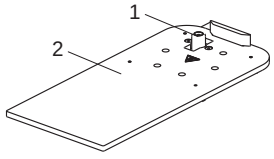
The incubation oven could be configured with the multiple headspace extractions (MHE) device. Refer to *MHE Device*.

On the rear panel of the incubation oven are located:

- a connector marked **DEVICE 1** for the connection between the incubation oven and the CPU board of the sampler.
- a pressure regulator of the flushing gas; refer to *Pressure Regulator*

MHE Device

The Multiple Headspace Extraction (MHE) operating mode can be performed by using an optional device installed on a predefined position of the dedicated incubation oven sliding cover as shown in Figure 2-35.



1. MHE Device 2. Sliding Cover

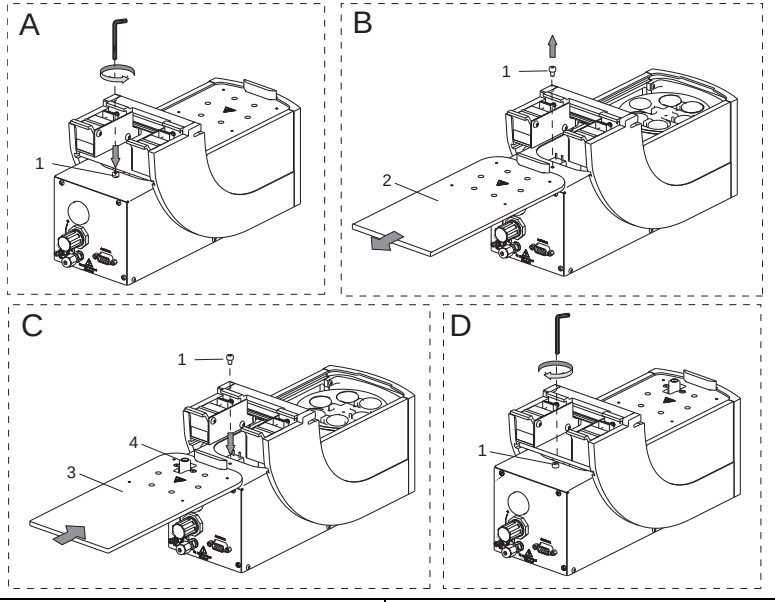
Figure 2-35. MHE Device

CAUTION **To perform the MHE technique, the original sliding cover must be replaced with the sliding cover provided with the MHE device.**

Sliding Cover Replacement

Proceed as follows:

1. Turn the TriPlus sampler off.
2. Unscrew and remove the blocking screw located on the top of the oven behind the sliding cover. See **A**.
3. Slip off the sliding cover. See **B** of Figure 2-36.
4. Replace the sliding cover with the one's provided with the MHE device. See **C** of Figure 2-36
5. Reinsert and screw the blocking screw. See **D** of Figure 2-36.
6. Turn the TriPlus sampler on. The MHE device will be automatically recognized during the initial test.

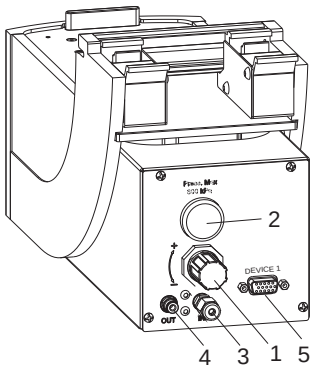


1. Blocking Screw	2. Original Sliding Cover
3. Sliding Cover with MHE Device	4. MHE Device

Figure 2-36. Incubation Oven Sliding Cover Replacement

Pressure Regulator

This device is located on the rear of the incubation oven as shown in Figure 2-37.



1. Pressure Regulator	2. Gauge
3. Flushing Gas Inlet	4. Flushing Gas Outlet
5. DEVICE 1 Connector	

Figure 2-37. Flushing Gas Pressure Regulator

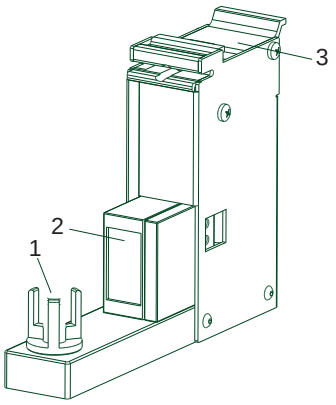
This device allows the regulation of the flushing gas (nitrogen is suggested) to flush the HS syringe or to supply the station for the fiber conditioning.

The device includes a pressure gauge (0–300 kPa; 0–43 psi) and a pressure regulator.

Bar Code Reader

This optional optic accessory, shown in Figure 2-38, allows to read bar codes reported on labels. Adhesive labels with the bar code containing the codified data of the samples are glued on the wall of the relevant sample vials.

WARNING! **This device is provided with a laser of class 2, therefore avoid to stare at the light beam.**



1. Revolving Holder
2. Reader
3. Mounting Clamp

Figure 2-38. Bar Codes Reader

CAUTION **This device accepts vials of 2, 10 and 20 mL. The 2 mL vials must have proper magnetic caps.**

The label must be compatible with the size of the vial used and must be carefully placed on the wall of the vial paying attention to avoid overlapping or deformation.
To allow the proper read of the bar code, the adhesive label with the bar code must be glued as follows:

- When 2 mL vials are used, we suggest the following criteria:
Pay attention that placing the vial into the revolving holder bottom cavity, the white lower portion of the label must remain visible. Considering that the holder cavity depth is about 2 mm, place the label at about 2 - 2.5 mm from the bottom of the vial as shown in

Figure 2-39.
- When the 10 and 20 mL vials are used, placed the label at maximum 15 mm from the bottom of the vial. We recommend to place the label at about 10-12 mm as shown in Figure 2-39.

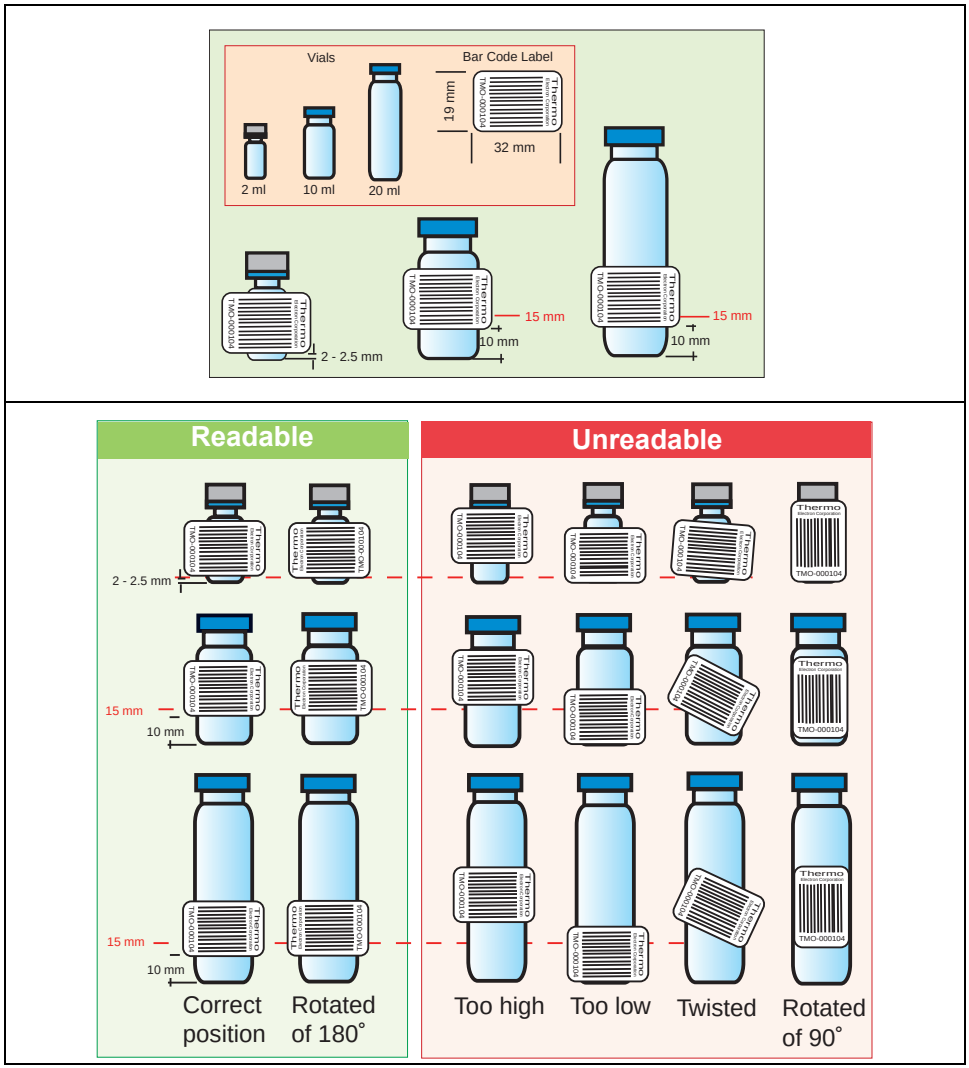


Figure 2-39. Bar Code Labels

When running a sample, the sequence of movements of a vial is as follows:

- The injection device takes the sample vial from the sample tray.
- The vial is carried and deposited into the revolving holder of the bar codes reader.
- The rotation of the holder allows the reader to read the bar code and memorize the contained data.
- The sequence of movements is repeated for every sample.

NOTE

The bar code must be in the “Ladder Style” as shown in Figure 2-39.
Among the many code types compatible with the Bar Code Reader, the more commonly used are:

- Code 39
- Code 39 Full ASCII
- Code 128
- EAN 128
- Code 93
- HSI Plessey

To have the same information contained in the label shown in Figure 2-39, a 600 dpi printer is needed.

Fan Station

The Z-axis fan station option, shown in Figure 2-40, allows to achieve ultra high performances in terms of repeatability whenever very volatile solvents are sampled, through a fan.

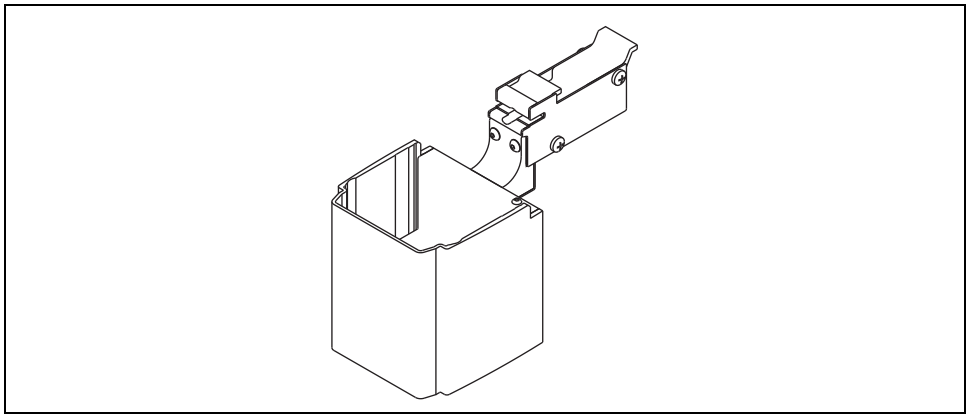
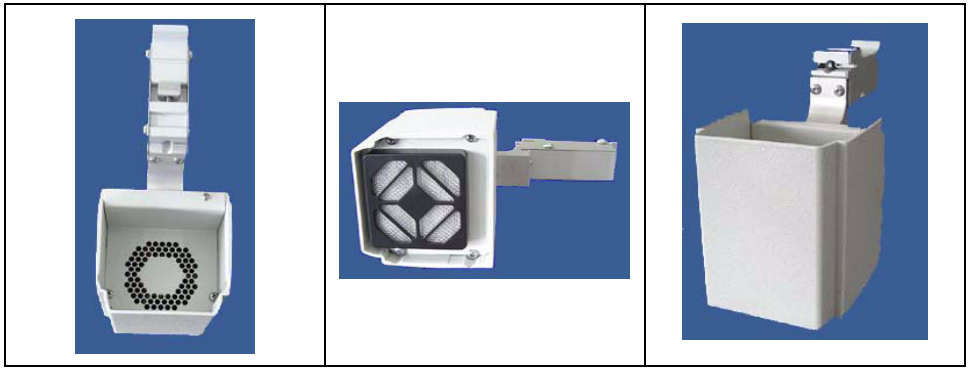


Figure 2-40. Fan Station

When installed and aligned, the fan station is the **Home** position of the turret. After the injection, the turret moves over the fan station which, through the fan located on the bottom, introduces air into the turret to maintain the syringe closer to the room temperature.

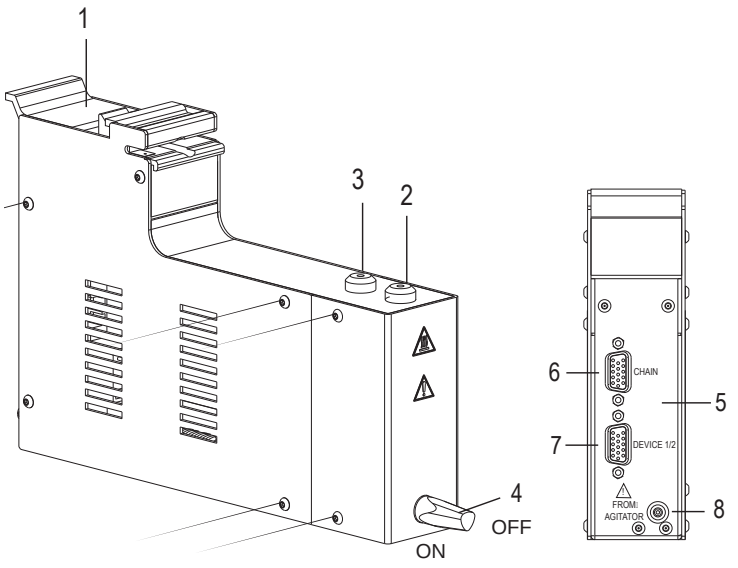


CAUTION **Install the fan station away from the heated surfaces.**

Fiber Conditioning Station

This optional station, shown in Figure 2-41, allows the manual conditioning of a new SPME fiber and its automatic bakeout after the injection.

NOTA For detailed information on the conditioning of your specific SPME fiber, refer to the manufacturer's instructions.



1. Mounting Clamp	2. Manual Conditioning Channel
3. Automatic Channel	4. Gas Flushing Flow Knob
5. Station Rear Panel	6. CHAIN Connector
7. DEVICE 1/2 Connector	8. Flushing Gas Inlet.

Figure 2-41. Fiber Conditioning Station

The manual conditioning channel (**2** of Figure 2-41), is used to manually condition a new SPME fiber. Before inserting the fiber, open the gas flushing flow (**4** of Figure 2-41) by completely rotating the knob counter-clockwise (ON

position). At the end of the manual conditioning, close the gas flushing flow by completely rotating the knob clockwise (OFF position).
The automatic channel (**3** of Figure 2-41) is the position used by the TriPlus sampler to perform the fiber bakeout after the injection.

WARNING! Do not insert manually the fiber into the automatic channel.

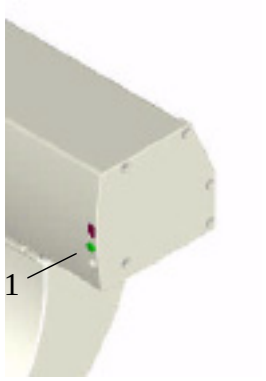
The 15-port connector marked **DEVICE 1/2** (**6** of Figure 2-41), is used to connect the station to the connector marked **DEVICE 1** or **DEVICE 2** on the TriPlus Sampling Unit.

The connector **CHAIN** (**7** of Figure 2-41), is used as third **DEVICE** connector when the configuration of the sampler includes also the Fast Washing Station. In this case, the **Incubation Oven** and the **Fiber Conditioning Station** must be connected respectively to the connectors marked **DEVICE 1** and **DEVICE 2** on the sampling unit while the **Fast Washing Station** must be connected to the connector marked **CHAIN** on the rear of the Fiber Conditioning Station.

The gas inlet marked **FROM AGITATOR** (**8** of Figure 2-41), is used to connect the flushing gas coming from the Incubation Oven.

Status LED

The status LED (*Light Emission diode*), located on the right side of the crossrail X, as shown in Figure 2-42, provides the operator with indications on the instrument operating conditions showing a continuous or intermittent light.



1. Status LED

Figure 2-42. Status LED

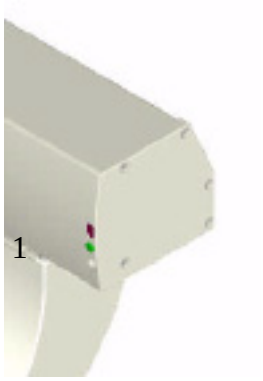
Condition	LED
St-by, initialization	Lit with continuous green light
Run (waiting GC Ready) and active sequence.	Intermittent green light; 3 light hits ON, 1 light hit OFF
Error	Intermittent green-red lights with **n** hits of green light and **n** hits of red light according to the number and the type of error. Refer to *Alarm Messages*.

Buzzer

Multi tone beep that signals the different status of the sampler (e.g. error condition, run, safety door opened, etc.) through a series of sounds of different frequency.

Infrared Transceiver

This device is located on the right side of the crossrail X, as shown in Figure 2-43. It allows the remote communication with the sampler through a pocket computer (Windows CB) and the relevant software.



1. Infrared Transceiver

Figure 2-43. Infrared Transceiver

To communicate via infrared transceiver the pocket PC must operate at a maximum distance of 1 m and with an angulation of 30° respect to the infrared transceiver.

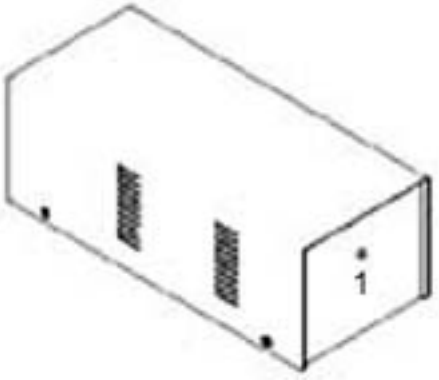
Power Module

This module provides the power supply to the sampler.

WARNING! The Power Module should be placed on a sturdy, level bench with adequate access to the main power switch.

Front Panel

The front panel consists of an indicator, as shown in Figure 2-44, which lights up when the power module is switched On.



1. Light Indicator

Figure 2-44. Power Module Front Panel

Rear Panel

The rear panel includes the parts shown in Figure 2-45.

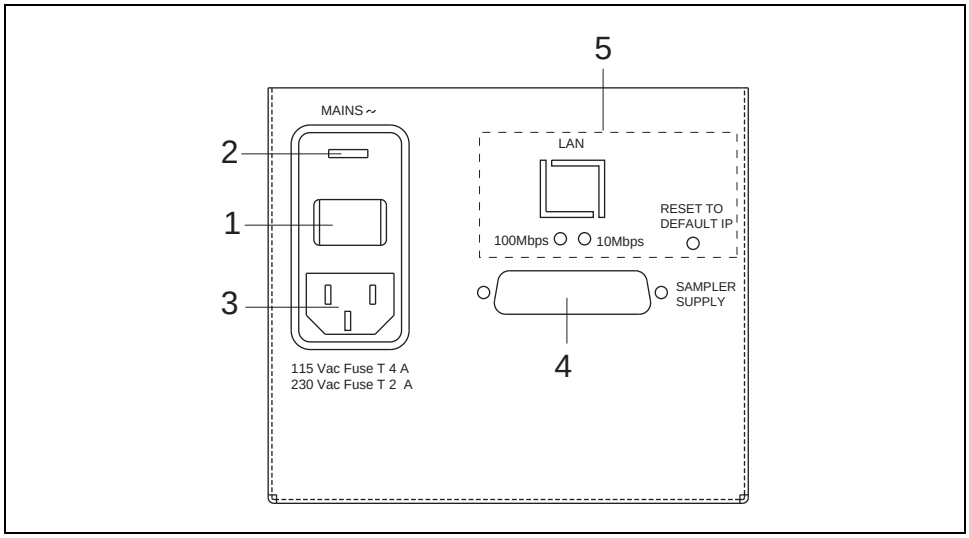


Figure 2-45. Power Module Rear Panel

Where:

1. = On/Off Switch
2. = Voltage Selector
3. = Power Supply Lead
4. = 25-pin connector marked **SAMPLER SUPPLY** to electrically supply the sampler.
5. = Option marked **LAN (Local Area Network)** for the network connection of the TriPlus LAN sampler.

LAN Option

To set the IP address and the LAN communication port, follow the instructions reported in Chapter 8 *LAN Set-up*.

Electrical Specifications

Power Supply	115/230 Vac +/-10%; 50/60 Hz; 220 VA. Selectable through a *Voltage Selector* after replacing the appropriate fuses.
Fuses	• 4A time-lag IEC127/III (5 x 20 mm) for 115 Vac power supply • 2A time-lag IEC127/III (5 x 20 mm) for 230 Vac power supply

Voltage Selector

The configuration of the instrument power supply is determined by the position of the voltage selector **2** of Figure 2-2. The selector is protected by a removable cover provided with a small window through which the selected power can be read.

Voltage Selector Position	Description
115	115 V ac +/- 10% power supply
230	230 V ac +/- 10% power supply

The voltage selector is factory configured to 230 V.

Before connecting the Power Module to the power supply, make sure that the selector configuration is compatible with the mains power. In case it is not, change the voltage configuration.

Changing Voltage Configuration

WARNING! Disconnect the power supply cable before changing the configuration of the Voltage Selector.

1. Remove the cover.

2. Take the voltage selector out of its seat. The selector appears as schematically shown in Figure 2-46.

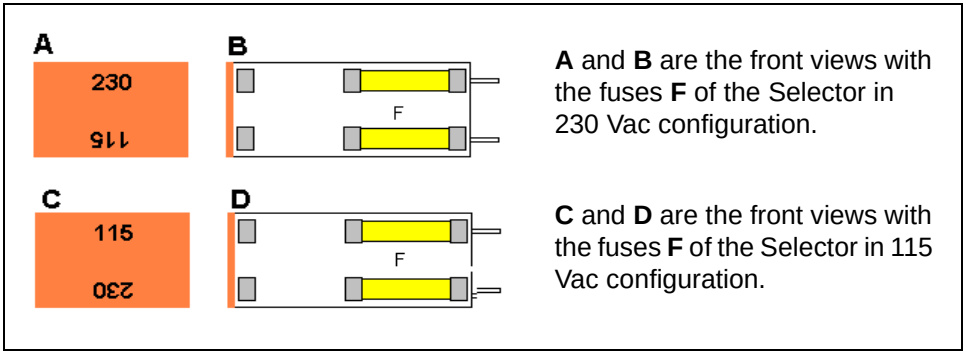


Figure 2-46. Voltage Selector Configuration

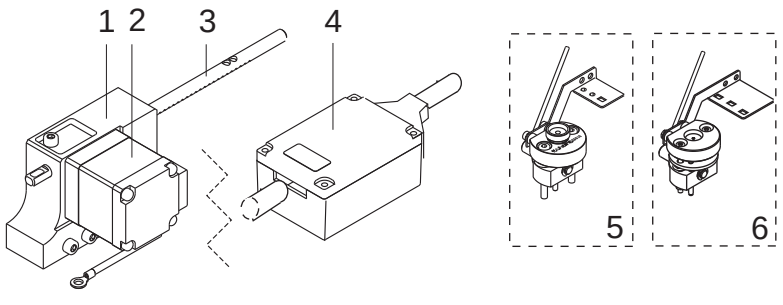
3. Remove the existing fuses
4. Install those suitable for the new configuration in the correct position according to the information reported in *Technical Specifications* in Chapter 1.
5. Introduce the power selector into its seat
6. Put the cover on again.

On-Column Injector Actuator

This device, shown in Figure 2-47, is required to carry out automatic injections with the TriPlus sampler.

ATTENTION The On-Column injector actuator is not provided with the TriPlus sampler.

The actuator must be installed on the On-Column injector equipped with the appropriate upper block (injection head) to properly open and close the rotary valve of the On-column injector.



1. Automatic Actuator
2. Stepping Motor
3. Actuator Shaft
4. Command Interface
5. Head for Standard On-Column Injections into a 0.53-mm ID Capillary Column
6. Head for Direct On-Column Injections into a 0.25/0.32-mm ID Capillary Column

Figure 2-47. On-Column Injector Actuator

The actuator is controlled through its own control interface connected to the port marked **DEVICE 1/2** located on the rear portion of the crossrail X.

NOTE Manual injections are possible without removing the automatic actuator. For the purpose, disconnect the control interface cable from the port OC. Manually move the valve lever to open and close the rotary valve of the OC injector.

The sequence of the actuator movements is as follows:

1. The sampler injection device moves over the injector then leans against the injector head.

2. The syringe needle penetrates into the injector as far as close to the rotary valve.
3. The movement of the needle is stopped, then the actuator opens the rotary valve.
4. The needle now penetrates into the injector as far as set in the analytical method.
5. The sample is injected.
6. The syringe needle goes up as far as above the rotary valve.
7. The movement of the needle is stopped, then the actuator closes the rotary valve.
8. The syringe needle now moves upwards again and goes out of the injector.

3

Installation on Thermo GCs

This chapter contains the instructions for the installation of the TriPlus on the TRACE GC Ultra, FOCUS GC and the electrical connections with the different units of the gas chromatographic system.
The instructions for the installation on the obsolete Mega 2, GC 8000 and GC 8000 Top gas chromatographs are also contained.

Chapter at a Glance...

Operating Sequences

Preliminary Information

This chapter contains the preliminary information for the installation and connection of the sampler to the GC, the electrical requirements and the sampler supports.

Who Performs the Installation

NOTE The TriPlus sampler is installed by authorized Thermo Fisher Scientific technical engineers, who will check its correct operation. For more details, please contact Thermo Fisher Scientific local representatives. Should the instrument not be installed by Thermo Fisher Scientific personnel, please strictly adhere to the following instructions.

Space Requirements

Provide enough space around the instrument on which the TriPlus sampler must be installed making reference to the overall dimensions of the sampler described in paragraph *Technical Specifications* in Chapter 1.

WARNING! Pay attention not to operate on the instrumental parts included in the work area of the sampler when this is in movement.

Electrical Requirements

The instrument must be electrically supplied as indicated in paragraph *Technical Specifications* in Chapter 1.

WARNING! The power line and the connections between the instruments must maintain good electrical grounding. Poor grounding represents a danger for the operator and may seriously affect the instrument performance.
Do not connect the TriPlus sampler to lines feeding devices of a heavy duty nature, such as motors, UV lamps, refrigerators 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.
Connect the TriPlus sampler only to instruments complying with the IEC 61010 safety regulations.

How to Lift and Carry the Crossrails X and Y

This operation must be performed by TWO persons who must stand each on one side of the crossrail X and put their hands underneath it.

Sampler Supports

The TriPlus sampler is installed on the GC by using the two appropriate supports provided. Every support has a support bar provided with holes for the fixing on the GC and a vertical support leg provided with mounting clamps for the correct hookup of the sampler.

ATTENTION **A hole of the support is identified as “protective conductor terminal” (see the symbol on page 25). Perform the fixing to the GC by using the proper screw interposing the tab washer.**

Material Required for the Installation

To install the sampler and its components the following material is required:

- Allen wrench for M4 screws
- Screwdriver for M5 screws

Installation References

To install TriPlus sampler on the GC refer to the following paragraphs:

- *Installation of the Sampler on the GC*
- *Electrical Connections*
- *Instrument Start-up*
- *Sampler Alignments*

Installation of the Sampler on the GC

This paragraph contains instructions to install the TriPlus sampler and its components on the GC. The sampler may be installed on the GC according to the following instrumental combinations:

Single TRACE GC Ultra	Single FOCUS GC
TRACE GC Ultra + TRACE GC Ultra	FOCUS GC + FOCUS GC
TRACE GC Ultra + FOCUS GC	TRACE GC Ultra + TRACE GC Ultra/MS
FOCUS GC + TRACE GC Ultra/MS	GC 8000 Top / GC 8000 / Mega 2

According to the combination of interest, refer to the following operating sequences:

1. **Supports installation on the GC**
   - *Support Assembling*
   - *Single TRACE GC Ultra Configuration*
   - *Single FOCUS GC Configuration*
   - *Double TRACE GC Ultra Configuration*
   - *Double FOCUS GC Configuration*
   - *TRACE GC Ultra / FOCUS GC Configuration*
   - *Double TRACE GC Ultra / MS Configuration*
   - *FOCUS GC / TRACE GC Ultra / MS Configuration*
   - *GC 8000 Top or GC 8000 or Mega 2 Configuration*

2. **Sampler and its Components Installation**
   - *How to Secure the Crossrail X on its Supports*
   - *How to Install the Turret (Z axis)*
   - *How to Install the Sampler Components*

3. **Syringe Installation**
   - *How to Install the Syringe Holder Assembly onto the AS Sampler*
   - *How to Install the Syringe Holder Assembly onto the HS Sampler*
   - *How to Install the Syringe Holder Assembly onto the SPME Sampler*

4. **Pneumatic Connection**
   - *How to Connect the Gas for the Flushing of the HS Syringe*
   - *How to Connect the Flushing Gas to the Fiber Conditioning Station*

5. **Cables Connection**
   - *How to Connect the Cables*

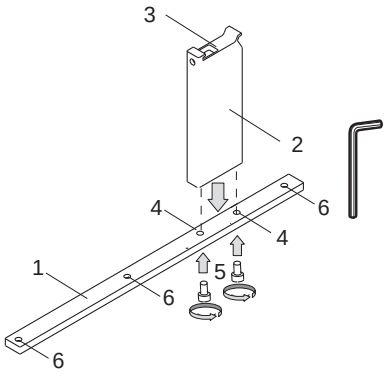
Supports Installation on the GC

To install the supports on the GC refer to the following operating sequences:

OPERATING SEQUENCE

Sampler Supports Assembling

With reference to Figure 3-1, proceed as follows:



1. Support Bar	2. Support Leg
3. Mounting Clamps	4. Support Leg Holes
5. Leg Fixing Screws	6. Support Bar Fixing Holes for the GC

Figure 3-1. Support Assembling

1. Insert the provided fixing screw into each hole present on the support bar.
2. Place the support leg on the support bar paying attention that the fixing screw of the leg is frontally turned.
3. Tighten the fixing screws.

OPERATING SEQUENCE

Single TRACE GC Ultra Configuration

To properly install the sampler supports on a TRACE GC Ultra, proceed as follows:

1. From the GC upper cover remove the plastic caps covering the corresponding fixing holes.

2. Insert into each holes present on the support bar the provided fixing screw.

3. Mount each sampler support on the GC paying attention to have the support leg turned toward the back of the GC as shown in Figure 3-2.

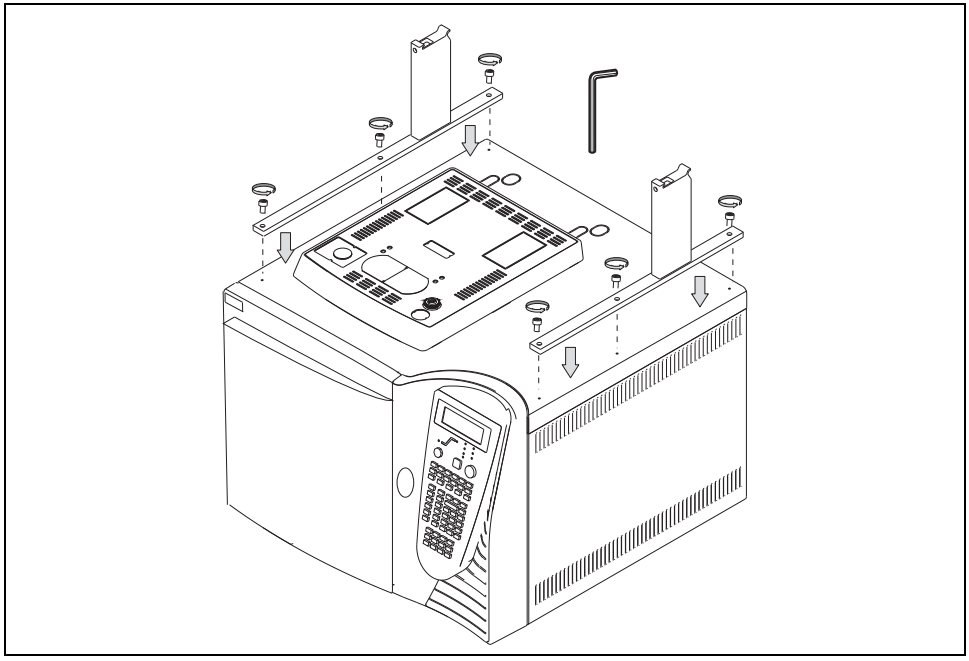


Figure 3-2. Sampler Supports Installation on a TRACE GC Ultra (1)

4. Guide the fixing screws into the corresponding fixing holes.

5. Tighten the fixing screws.

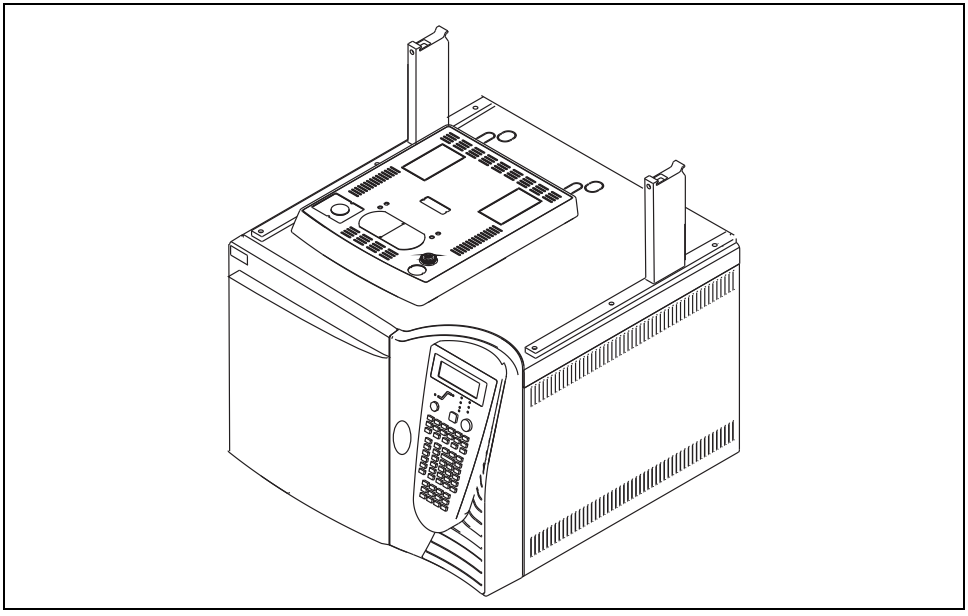


Figure 3-3. Sampler Supports Installation on a TRACE GC Ultra (2)

OPERATING SEQUENCE

Single FOCUS GC Configuration

To properly install the sampler supports on a FOCUS GC, proceed as follows:

1. From the GC upper cover remove the plastic caps covering the corresponding fixing holes.

2. Insert the provided fixing screw into each hole present on the support bar.

3. Mount each sampler support on the GC paying attention to have the support leg turned toward the back of the GC as shown in Figure 3-4.

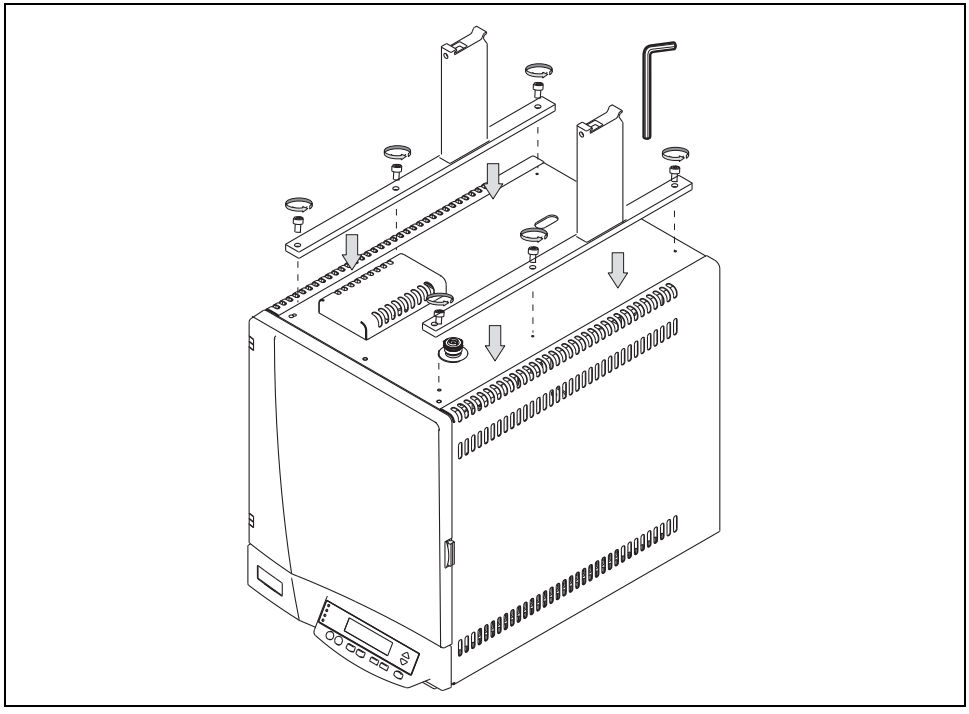


Figure 3-4. Sampler Supports Installation on a FOCUS GC (1)

4. Guide the fixing screws into the corresponding fixing holes.

5. Tighten the fixing screws.

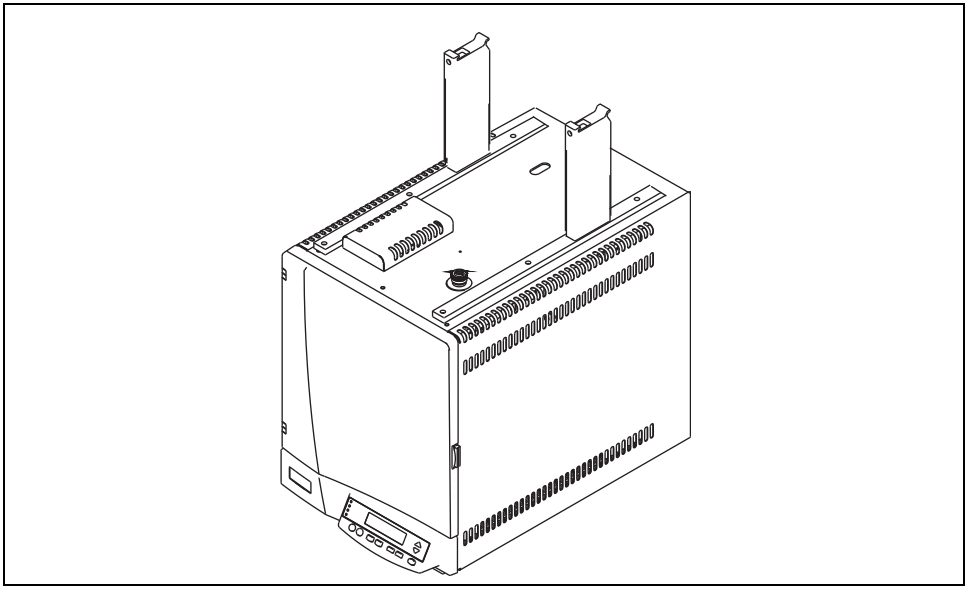


Figure 3-5. Sampler Supports Installation on a FOCUS GC (2)

OPERATING SEQUENCE

Double TRACE GC Ultra Configuration

To properly install the sampler supports on two TRACE GCs Ultra placed side by side, proceed as follows:

CAUTION **Before proceeding, verify that the working area is large enough to accommodate two TRACE GCs Ultra and eventual external devices.**

1. From **both** sides of the first TRACE GC Ultra upper cover remove the plastic caps covering the corresponding fixing holes.
2. Insert the provided fixing screw into each hole present on the support bar.
3. Mount each sampler support on the GC paying attention to have the support leg turned toward the back of the GC as shown in Figure 3-6.

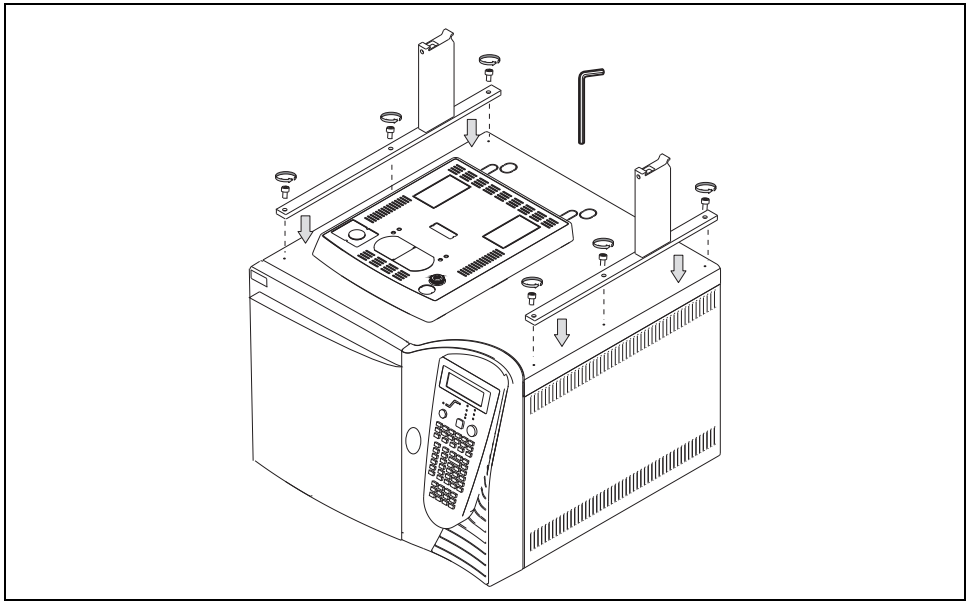


Figure 3-6. Sampler Supports Installation on the First TRACE GC Ultra

4. Guide the fixing screws into the corresponding fixing holes, then tighten the fixing screws as shown in Figure 3-6.

5. Move the second TRACE GC Ultra beside the first one leaving a distance of about 90 mm between the two GC units as shown in Figure 3-7.

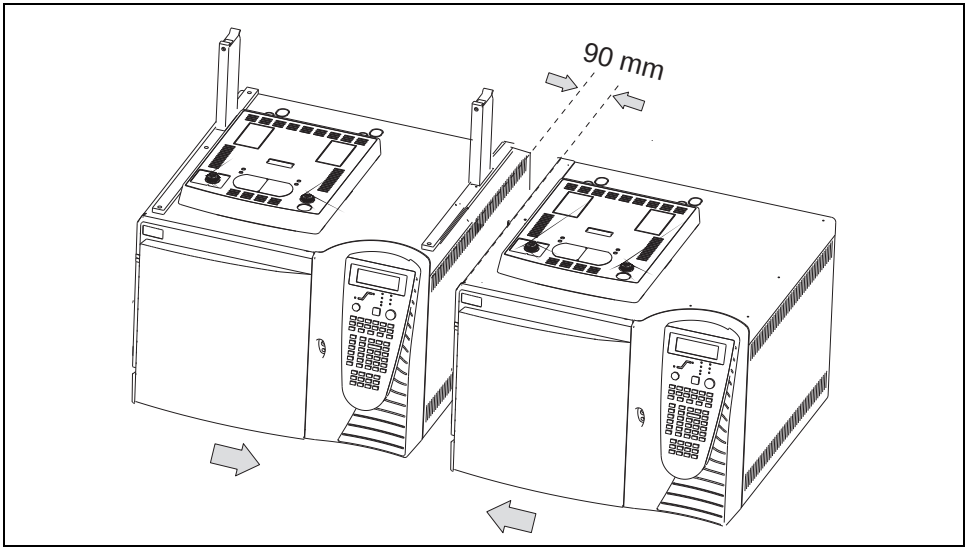


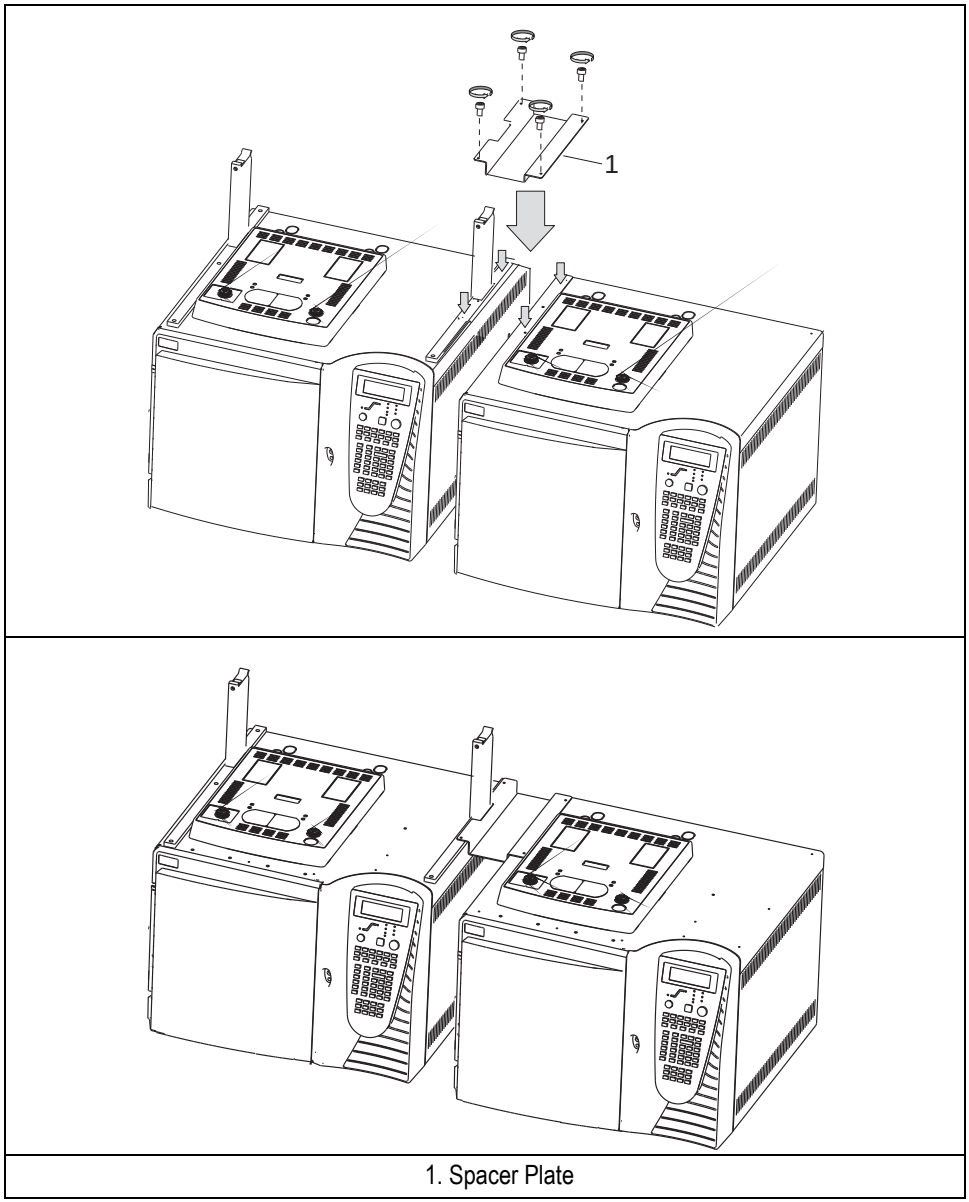
Figure 3-7. TRACE GC's Ultra Placing

1. From the left side of the second TRACE GC Ultra upper cover remove the plastic caps covering the corresponding fixing holes.

2. Insert the appropriate fixing screws into each hole present on the spacer plate provided.

3. Mount the spacer plate on the two GC units as shown in Figure 3-8.

4. Guide the fixing screws into the corresponding fixing holes, then tighten the fixing screws.



1. Spacer Plate

Figure 3-8. Mounting of the Spacer Plate

OPERATING SEQUENCE

Double FOCUS GC Configuration

To properly install the sampler supports on two FOCUS GCs placed side by side, proceed as follows:

CAUTION **Before proceeding, verify that the working area is large enough to accommodate two FOCUS GCs and eventual external devices.**

1. Place the two FOCUS GCs side by side leaving a distance of about 130 mm between the two GC units as shown in Figure 3-9.

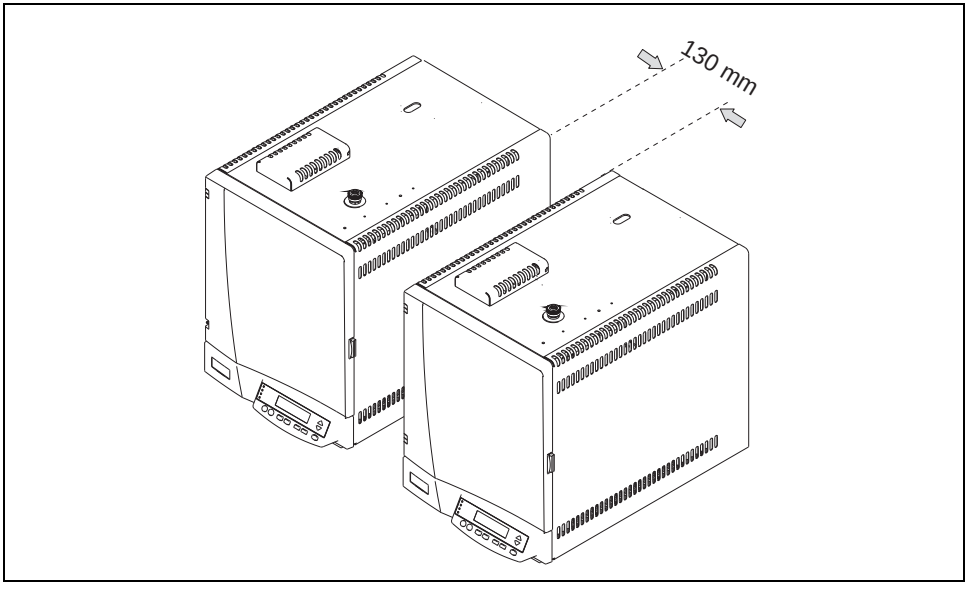


Figure 3-9. FOCUS GCs Placing

2. From the **right** side of each FOCUS GC upper cover remove the plastic caps covering the corresponding fixing holes.

3. Insert the provided fixing screw into each hole present on the support bar.

4. Mount each sampler support on the GCs paying attention to have the support leg turned toward the back of the GC.

5. Guide the fixing screws into the corresponding fixing holes, then tighten the fixing screws as shown in Figure 3-10.

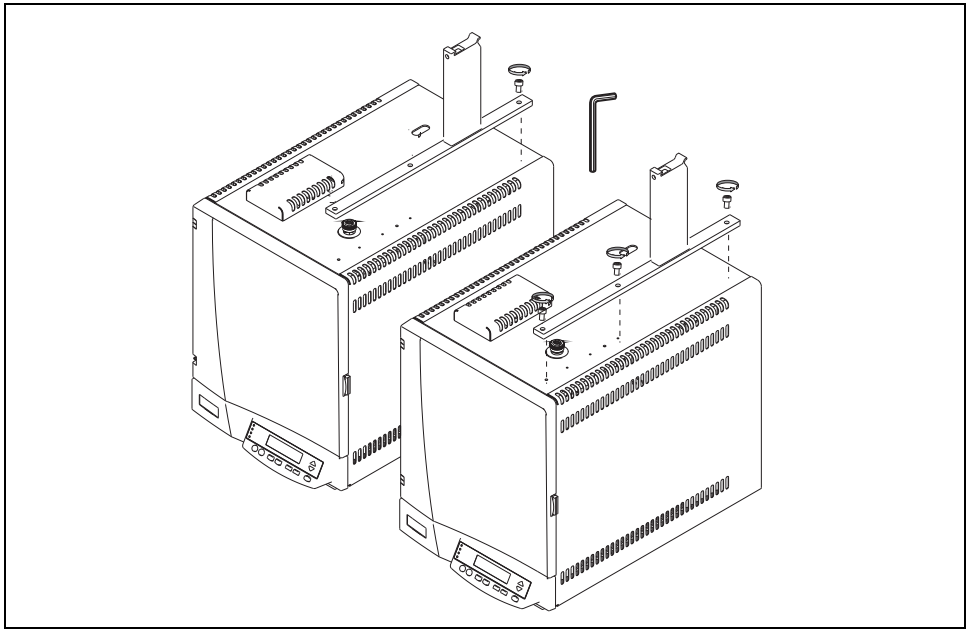


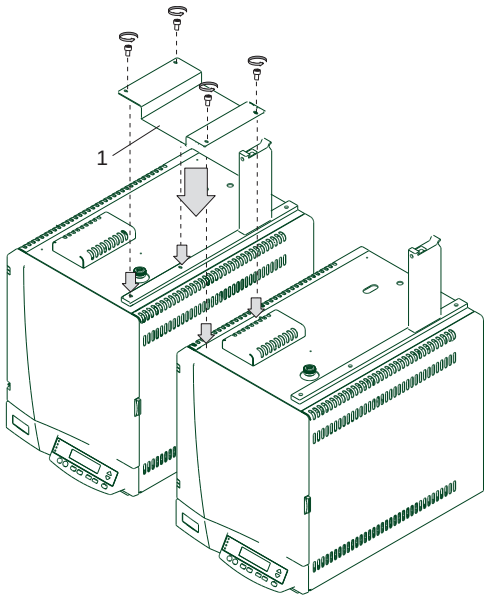
Figure 3-10. Sampler Supports Installation on Two FOCUS GCs

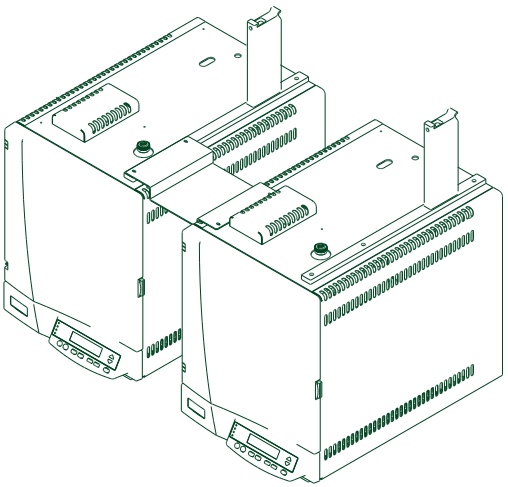
1. From the **left** side of the second FOCUS GC upper cover remove the plastic caps covering the corresponding fixing holes.

2. Insert the appropriate fixing screws into each hole present on the spacer plate provided.

3. Mount the spacer plate on the two GC units as shown in Figure 3-11.

4. Guide the fixing screws into the corresponding fixing holes, then tighten the fixing screws.





1. Spacer Plate

Figure 3-11. Mounting of the Spacer Plate

OPERATING SEQUENCE

TRACE GC Ultra / FOCUS GC Configuration

To properly install the sampler supports on a TRACE GC Ultra alongside a FOCUS GC, proceed as follows:

CAUTION **Before proceeding, verify that the working area is large enough to accommodate two GC units and eventual external devices.**

1. Place the FOCUS GC on the **left** and the TRACE GC Ultra on the **right** leaving a distance of about 57 mm between the two GC units as shown in Figure 3-12.

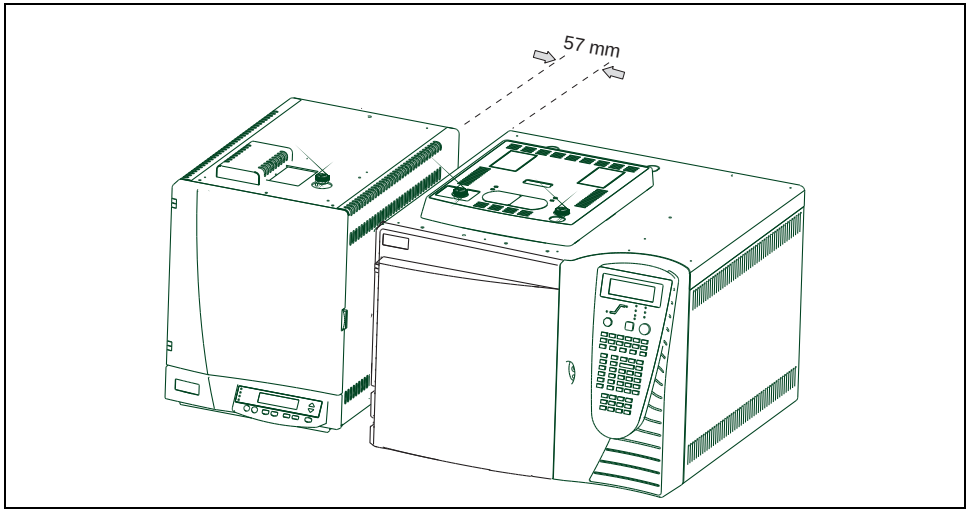


Figure 3-12. TRACE GC Ultra and FOCUS GC Placing

2. From the **both** the sides of the TRACE GC Ultra upper cover remove the plastic caps covering the corresponding fixing holes.

WARNING! **One of the two supports must not be assembled. If the supports have already been assembled, one of them must be disassembled.**

3. Disassemble one sampler support removing the support leg from the support bar unscrewing the two fixing screws. See **A** of Figure 3-13.

4. Mount the support leg on the spacer plate provided and fix them by using the same fixing screws previously removed. See **B** of Figure 3-13.

.

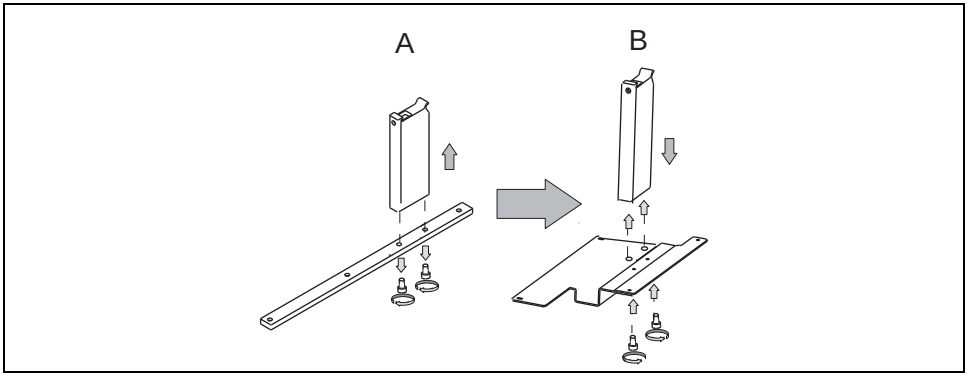


Figure 3-13. Sampler Support Disassembling and Spacer Plate Assembling

5. Insert the provided fixing screw into each hole present on the support bar.

6. Mount the alone support bar on the **left** side and the complete sampler support on the **right** side of the TRACE GC Ultra paying attention to have the support leg turned toward the back of the GC.

7. Guide the fixing screws into the corresponding fixing holes, then tighten the fixing screws as shown in Figure 3-14.

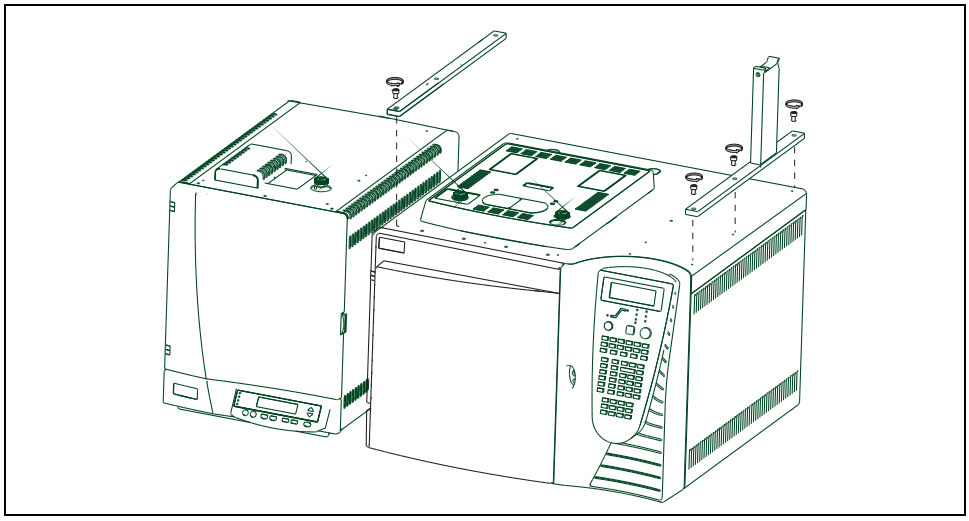


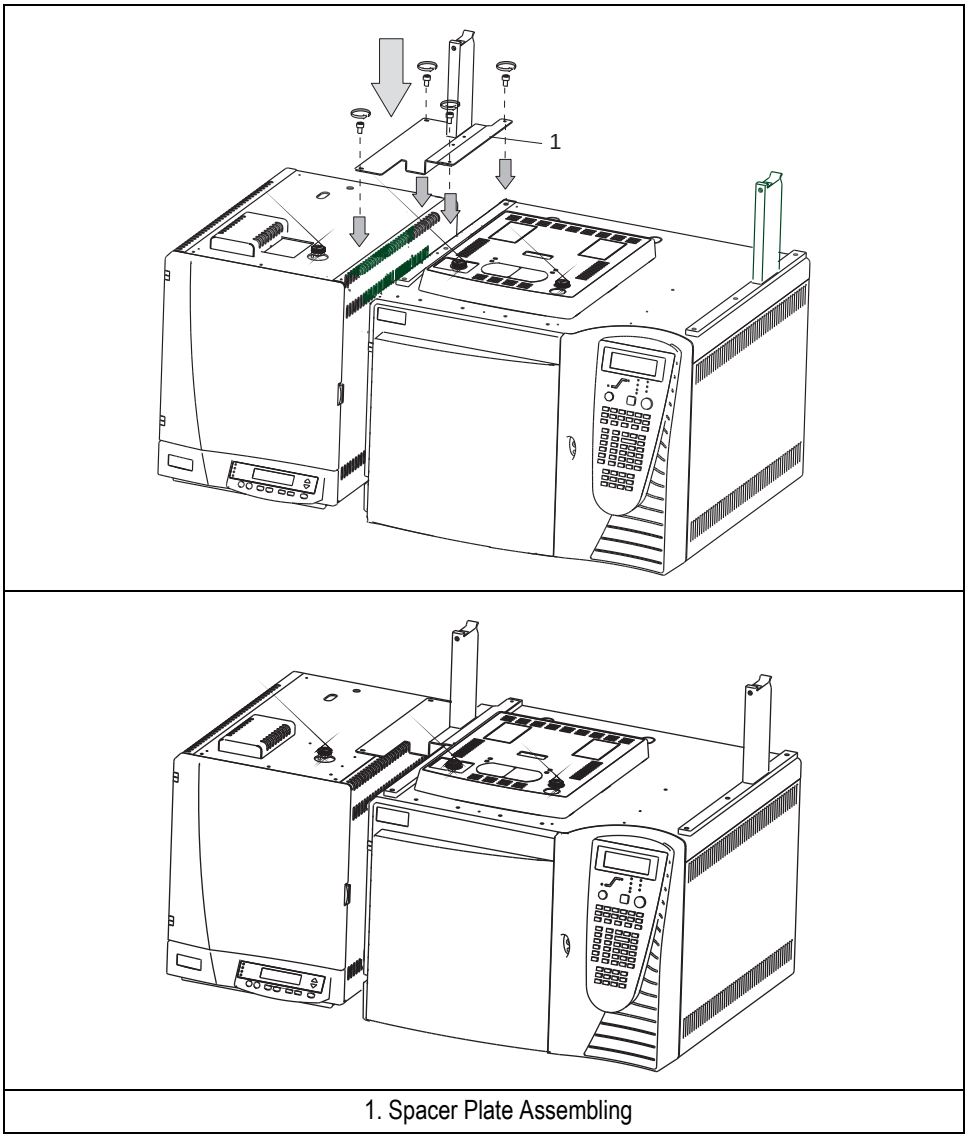
Figure 3-14. Sampler Supports Installation on a TRACE GC Ultra and a FOCUS GC

8. From the **right** side of the FOCUS GC upper cover remove the plastic caps covering the corresponding fixing holes.

9. Insert the appropriate fixing screws into each hole present on the spacer plate assembled with the support leg.

10. Mount the spacer plate assembling on the two GC units as shown in Figure 3-15.

11. Guide the fixing screws into the corresponding fixing holes, then tighten the fixing screws.



1. Spacer Plate Assembling

Figure 3-15. Mounting of the Spacer Plate Assembling

OPERATING SEQUENCE

Double TRACE GC Ultra / MS Configuration

To properly install the sampler supports on two TRACE GCs Ultra for MS, proceed as follows:

CAUTION **Before proceeding, verify that the working area is large enough to accommodate the GCs, the MS detector and eventual external devices.**
For this configuration the use of the TriPlus extended crossrail X is required.

1. From the **right** side of the TRACE GC Ultra and from the **left** side of the TRACE GC Ultra for MS upper cover remove the plastic caps covering the corresponding fixing holes.

2. Insert the provided fixing screw into each hole present on the support bar.

3. Mount each sampler support on the GCs paying attention to have the support leg turned toward the back of the GC as shown in Figure 3-16.

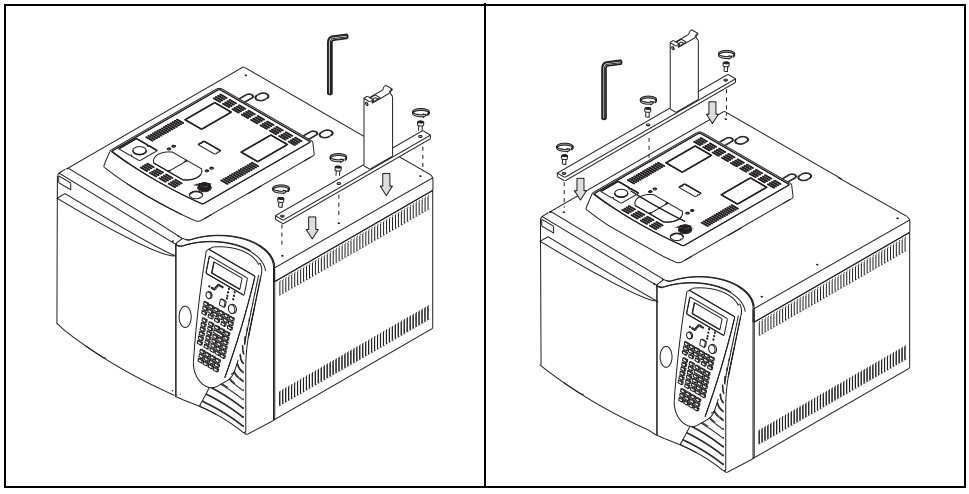


Figure 3-16. Sampler Supports Installation on two TRACE GC Ultra for MS

4. Guide the fixing screws into the corresponding fixing holes, then tighten the fixing screws.

5. Place the two GC units beside the MS detector as shown in Figure 3-17.

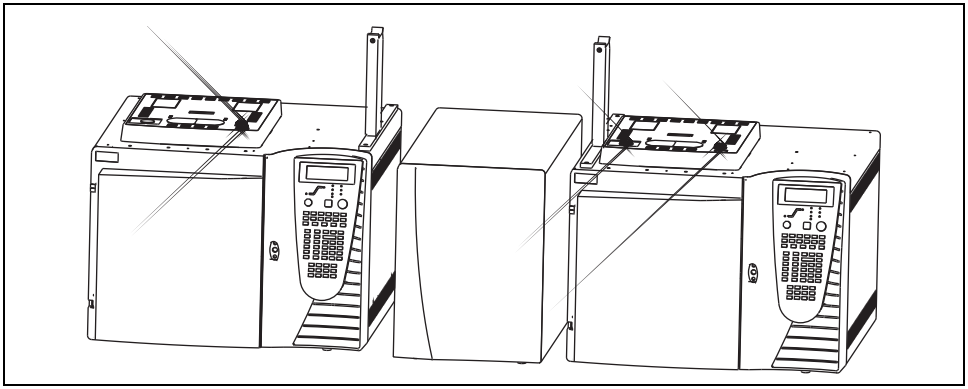


Figure 3-17. Two TRACE GCs Ultra and MS Placing

OPERATING SEQUENCE

FOCUS GC / TRACE GC Ultra / MS Configuration

To properly install the sampler supports on a TRACE GC Ultra for MS and a FOCUS GC placed on the sides of a MS detector, proceed as follows:

CAUTION **Before proceeding, verify that the working area is large enough to accommodate the GCs, the MS detector and eventual external devices.**
For this configuration the use of the TriPlus extended crossrail X is required.

1. From the TRACE GC Ultra upper cover remove the plastic caps covering the corresponding fixing holes.

2. Insert into each holes present on the support bar the provided fixing screw.

3. Mount each sampler support on the TRACE GC Ultra paying attention to have the support leg turned toward the back of the GC as shown in Figure 3-18.

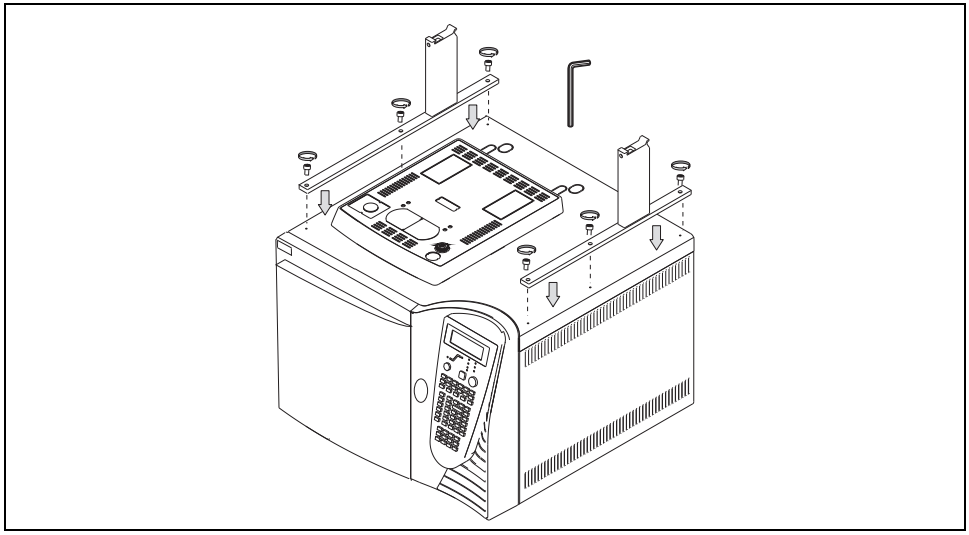


Figure 3-18. Sampler Supports Installation on the TRACE GC Ultra

4. Guide the fixing screws into the corresponding fixing holes.

5. Tighten the fixing screws.

6. Place the two GC units beside the MS detector as shown in Figure 3-19.

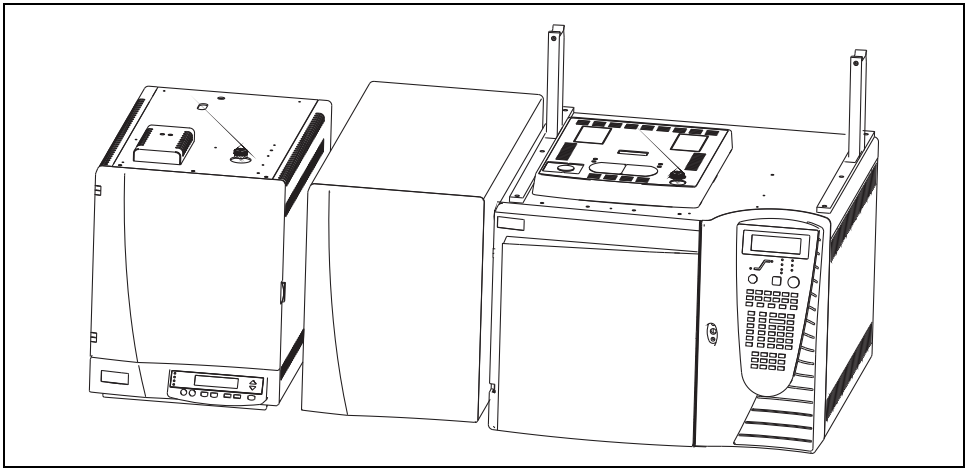


Figure 3-19. TRACE GCs Ultra, FOCUS GC and MS Placing

OPERATING SEQUENCE

GC 8000 Top or GC 8000 or Mega 2 Configuration

To properly install the sampler supports on a GC 8000 Top, GC 8000 or Mega2 old GCs, proceed as follows:

1. From the GC upper cover remove the plastic caps covering the corresponding fixing holes.

2. Insert into each holes present on the support bar the provided fixing screw.

3. Mount each sampler support on the GC paying attention to have the support leg turned toward the back of the GC as shown in Figure 3-20.

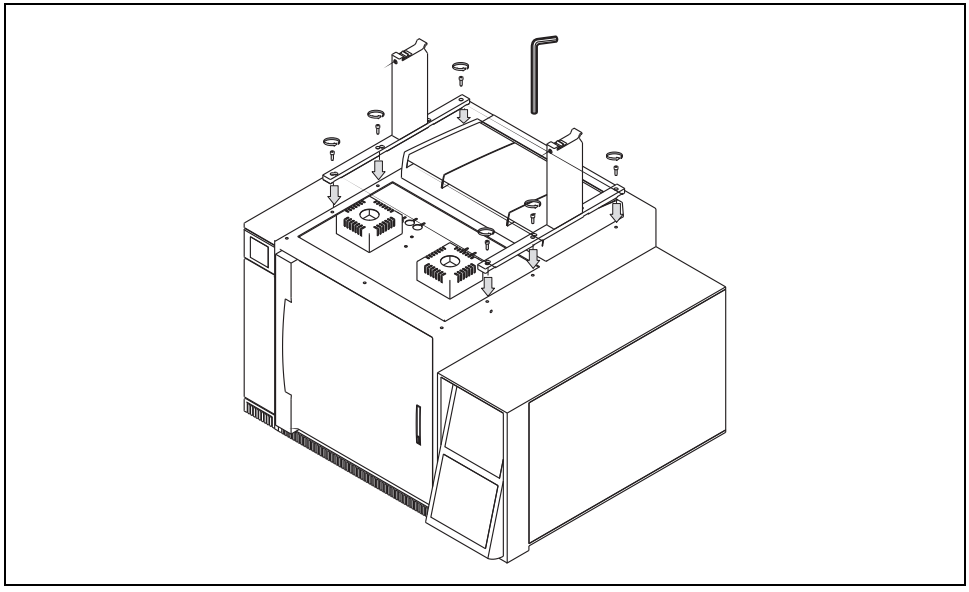


Figure 3-20. Sampler Supports Installation on a Mega 2 - GC 8000 - GC 8000 Top (1)

4. Guide the fixing screws into the corresponding fixing holes according to the obsolete GC in use as shown in Figure 3-21.

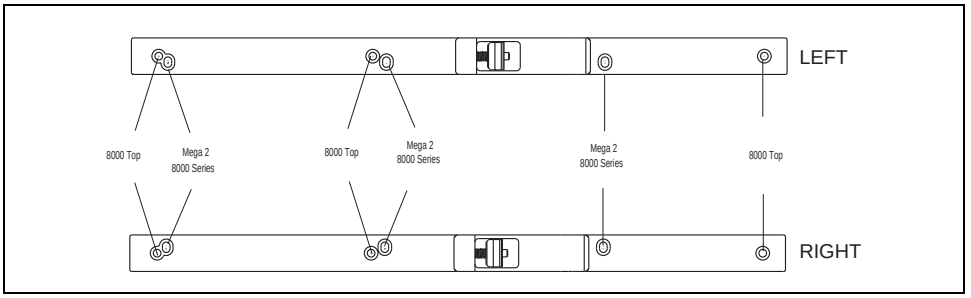


Figure 3-21. Sampler Supports Fixing Holes

5. Tighten the fixing screws.

6.

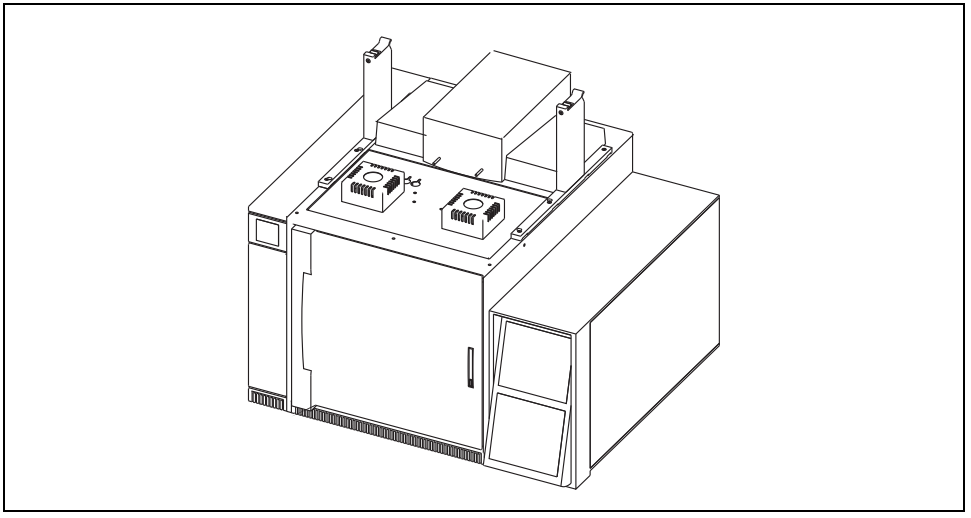


Figure 3-22. Sampler Supports Installation on a Mega 2 - GC 8000 - GC 8000 Top (2))

Sampler and Sampler Components Installation

To properly install the sampler and its components, proceed as described in the following operating sequences:

OPERATING SEQUENCE

How to Secure the Crossrail X on its Supports

To install the sampler crossrail X on its supports, see the following instructions:

WARNING! **Before performing this operation, ensure that there are no objects which might interfere with the installation and/or with the sampler movements.**

1. Loosen the fixing screw located on the leg of each support.

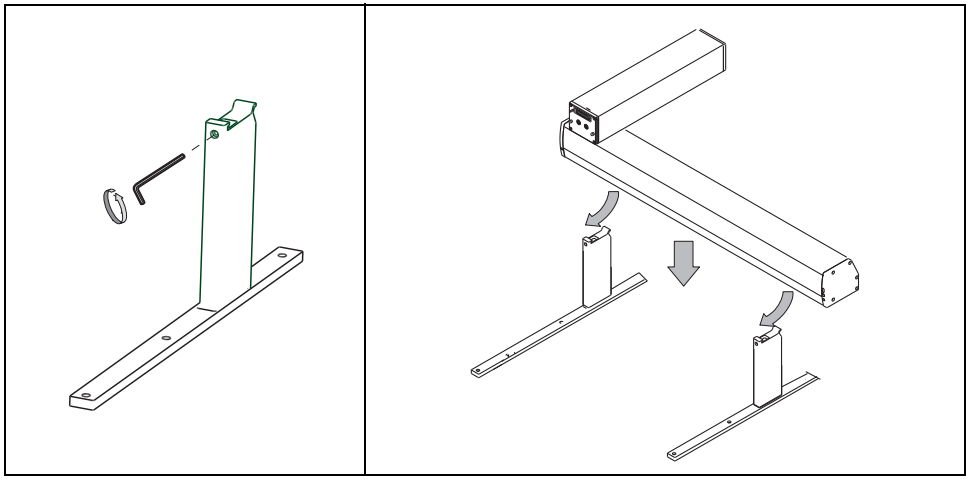
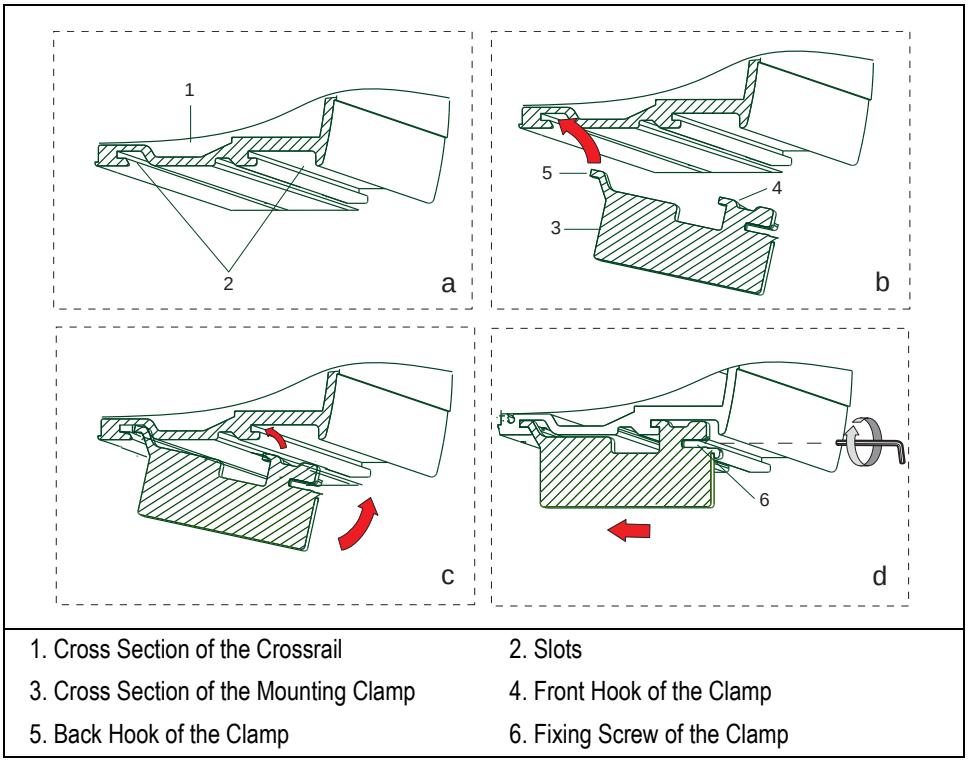


Figure 3-23. Crossrail X Installation

2. With the help of another person, gently take the crossrail X at its ends.

   Referring to Figure 3-24 proceed as follows:



1. Cross Section of the Crossrail
2. Slots
3. Cross Section of the Mounting Clamp
4. Front Hook of the Clamp
5. Back Hook of the Clamp
6. Fixing Screw of the Clamp

Figure 3-24. Hooking Sequence of the Clamp (1)

3. Uplift the crossrail X and place it on the top of the two supports tilting it slightly downwards in a way that the back hook of the clamp, located on the top of the support leg, slips into the proper slot. See **b** of Figure 3-24.

4. Straighten the crossrail X so that also the front hook of the clamp enters the proper slot parallel to the other.

5. Slightly push the crossrail backwards so that the hooks of the clamps perfectly anchor thereto. See **c** and **d** of Figure 3-24.

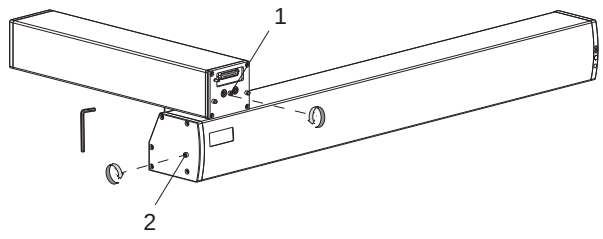
6. Tighten the fixing screws located on each leg of the support without too much strength.

7. **Only for single TRACE GC Ultra and FOCUS GC Configurations**: Loosen the fixing screws present on each leg. Standing in front of the crossrail X let it slide gently until the marker present towards the crossrail left end is perfectly aligned with the reference marker placed on the leg of the left support.

NOTE The alignment of the two markers is recommended to allow the operator to take advantage of the predefined centering of the sampler injection device on the injectors. The operator shall only perform the fine adjustment.

Removing the X and Y Crossrails Locking Screws

8. Remove the X and Y crossrails locking Allen screws, as shown in Figure 3-25, in order to release the relevant movement mechanism. These screws are recognizable by a label attached to the screws.

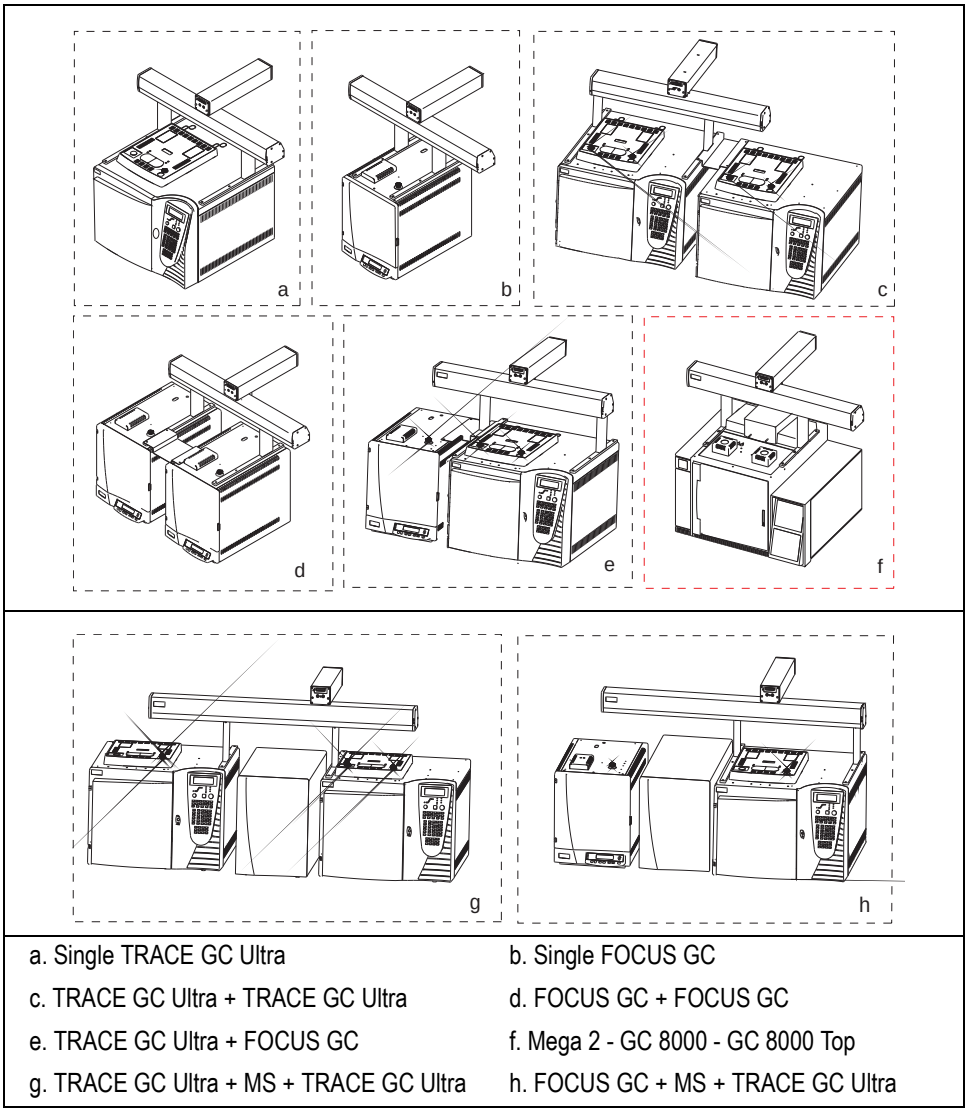


1. Y Crossrail Locking Screw 2. X Crossrail Locking Screw

Figure 3-25. X and Y Crossrails Locking Nuts

CAUTION **Keep these locking screws in a safety place because they must be re-used all the times the sampler has to be transported.**

Figure 3-26 shows the result of the assembling of the crossrail X on its supports in the GC different configurations.



a. Single TRACE GC Ultra
b. Single FOCUS GC
c. TRACE GC Ultra + TRACE GC Ultra
d. FOCUS GC + FOCUS GC
e. TRACE GC Ultra + FOCUS GC
f. Mega 2 - GC 8000 - GC 8000 Top
g. TRACE GC Ultra + MS + TRACE GC Ultra
h. FOCUS GC + MS + TRACE GC Ultra

Figure 3-26. Assembling of the TriPlus Sampler on the GCs

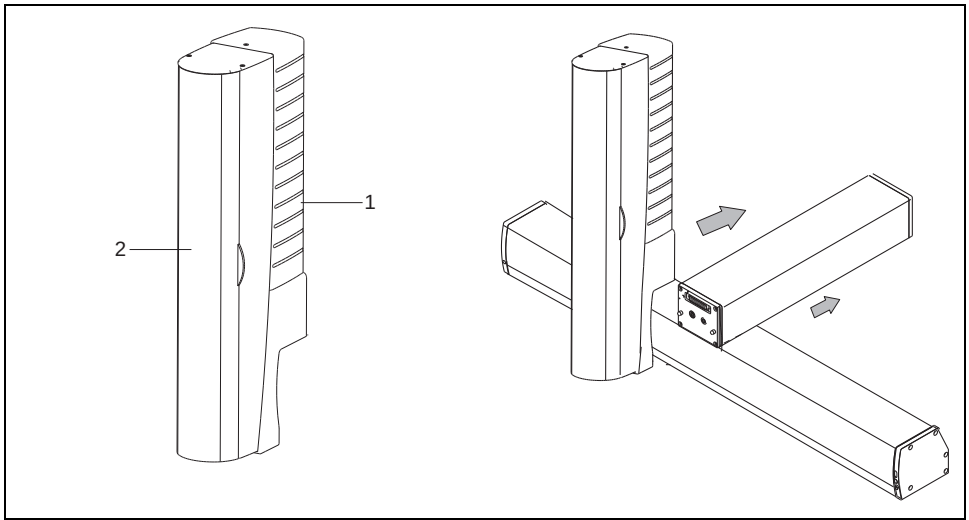
OPERATING SEQUENCE

How to Install the Turret (Z axis)

To install the turret, operate as follows:

WARNING! Before installing the turret turn OFF the sampler to avoid possible faults.

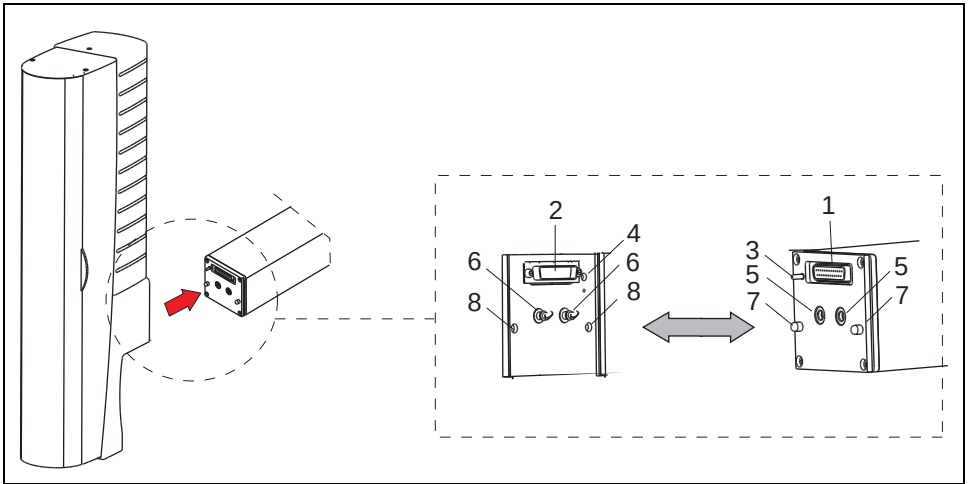
1. Push the crossrail Y towards the back of the GC until it stops.
2. Take the turret and rest its helmet onto the crossrail Y.



1. Helmet
2. Safety Door

Figure 3-27. Turret

3. Firmly holding the crossrail Y, push the turret against its front portion in a way that:
   - the guide pins present on the crossrail Y match the relevant guide slots
   - the relevant 25-pin connectors for electrical connection between the two units fit to one another.



1. 25-pin Female Connector	2. 25-pin Male Connector
3. 6. 7. Guide Pins	4. 5. 8. Guide Slots

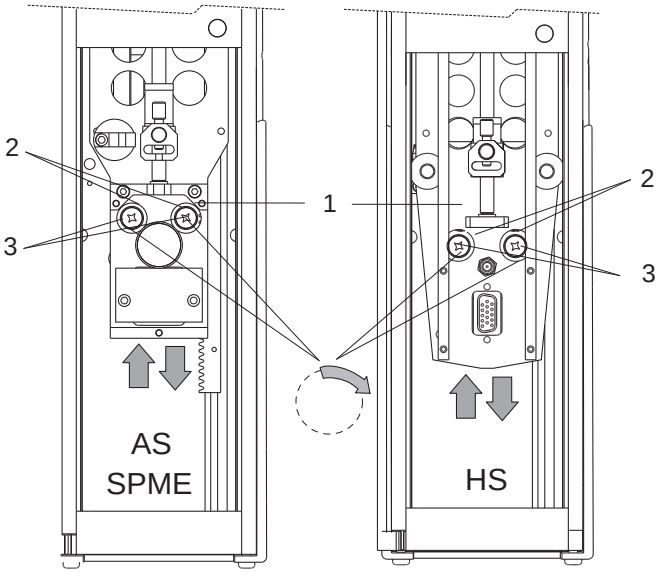
Figure 3-28. Turret Installation (1)

4. Open the turret safety door and move the injection slide up and down until the two reference holes present on the slide match the two quick-fit fixing screws. Do not release the slide.

5. Using the screwdriver provided in the standard outfit, turn the two quick-fit fixing screws clockwise by 1/4 of turn and release the slide.

CAUTION **The TriPlus sampler is featuring the AS version, as well as the SPME or HS turret version. When swapping from a turret version to another will be necessary to realign the system. Refer to *Instrument Start-up* and *Sampler Alignments*.**

WARNING! **Before installing the turret turn OFF the sampler to avoid possible faults.**



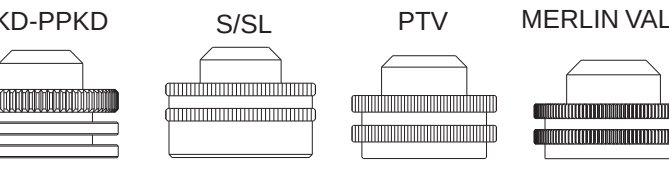
1. Slide
2. Reference Holes
3. Quick-fit Fixing Screws

Figure 3-29. Turret Installation (2)

NOTE If the fixing screws turn too easily, it means that the turret is not correctly installed. Repeat steps 3, 4 and 5.

Injector Septum Cap

ATTENTION The TriPlus HS/SPME version requires the use of the suitable injector septum cap provided in the standard outfit according to the type of injector.



OPERATING SEQUENCE

How to Install the Sampler Components

To install the sampler components, operate as follows:

Method Suggested to Install the Components

The following method is suggested to install the major sampler components:

Install the components on the crossrail X in the position you deem more suitable, paying attention not to invade the injection zone. The installed components shall not prevent the turret movements.

CAUTION **In case of detectors in stacked configuration and in line with the other components, do not place the incubation oven (agitator) behind the stacked detector. During the manual set-up operations, pay attention not to move the turret over the stacked detector.**

How to Anchor the Components to the Crossrail X

WARNING! **Before starting the operation, pay attention that each component has its own acceptable left and right installation limits, indicated in the following Figure 3-30. If these limits are not respected, the TriPlus sampler will go in Alarm condition.**

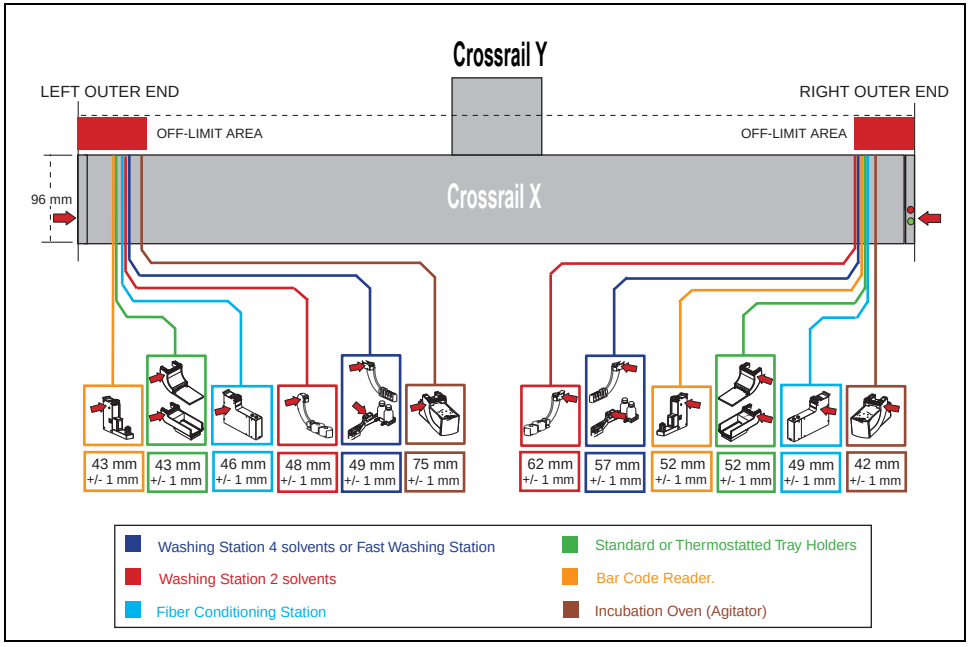


Figure 3-30. Component Left/Right Installation Limit

NOTE Each limit is measured from the left/right outer end of the crossrail X and the left/right outer end of the component of interest.

The components to be anchored may have one or two clamps. In the second case, they must be alternately and progressively hooked.

The hooking sequence is as follows:

1. Slightly tilt the component downwards in a way that the back hook of the clamp, present on the top, enter the proper slot. See **b** of Figure 3-31.

2. Straighten the component so that also the front hook of the clamp enters the proper slot parallel to the previous one. See **c** of Figure 3-31.

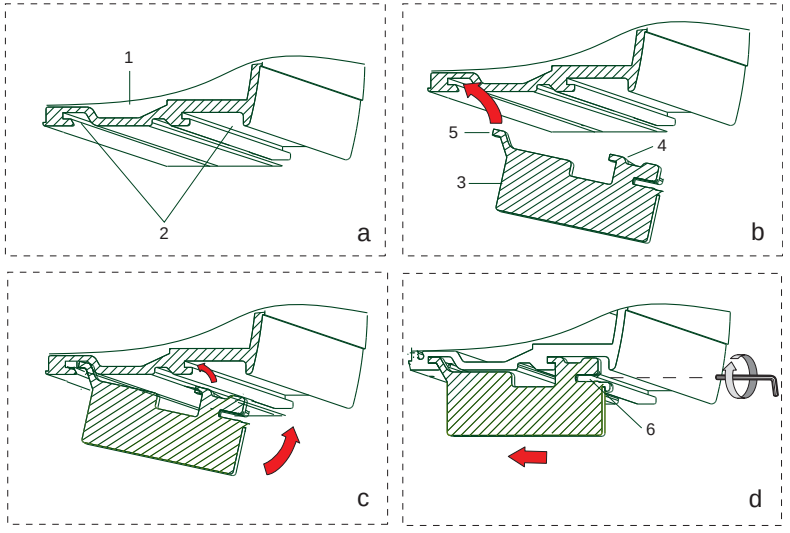
3. Slightly push the component backwards in a way that the clamp hooks result perfectly anchored. See **c** and **d** of Figure 3-31.

4. Tighten the fixing screw located behind the clamp. See **d** of Figure 3-31.

NOTE For components with two clamps, both the fixing screws have to be fully alternately and progressively tightened, in order to perform a symmetrical positioning.

WARNING! **If the thermostatted tray holder is installed, pay attention for not to obstruct the ventilation system located under the same tray holder.**

Pay attention to keep a minimal distance of 1 cm between the thermostatted and the standard tray holder or the washing station.



1. Cross section of the Crossrail	2. Slots
3. Cross section of the Mounting Clamp	4. Front Hook of the Clamp
5. Back Hook of the Clamp	6. Fixing Screw of the Clamp

Figure 3-31. Hooking Sequence of the Clamp (2)

WARNING! The tray holders cannot be installed above the injectors/detectors compartment of the GC.

How to Install the Sample Tray on the Standard Tray Holder

To install the sample tray on its support, operate as follows. See Figure 3-32.

1. Take the tray by its handle.
2. Rest the tray on the support plate.
3. Slightly lift it from the handle side and push it onwards to get the hooks on the tray back portion to fit into the relevant slots located on the support.

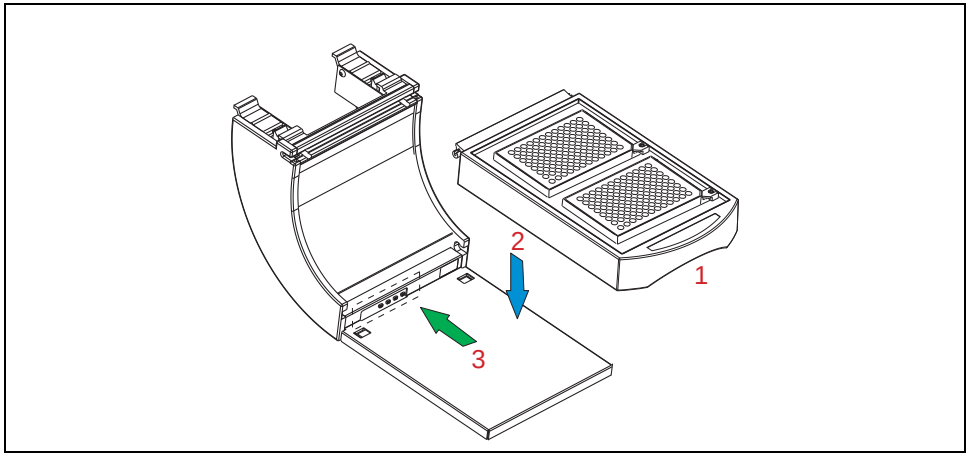


Figure 3-32. Sample Tray Installation on the Standard Tray Holder

How to Install the Sample Tray on the Thermostatted Tray Holder

To install the sample tray on its support, operate as follows. See Figure 3-33.

1. Take the tray by its handle.
2. Push down the tray holder clip.
3. Keeping the clip pushed down, insert the sample tray into the tray housing.

4. Place the tray cover when required.

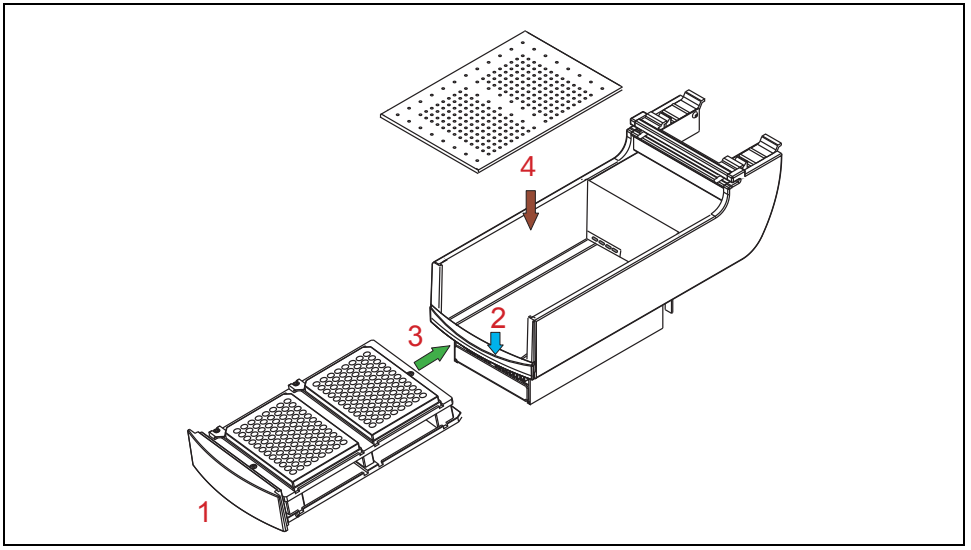


Figure 3-33. Sample Tray Installation on the Thermostatted Tray Holder

How to Install the Vial Bracket Holder on the Washing Station

The washing station when used in combination with the HS version, it requires the optional Vial bracket holder.

To install the Vial bracket holder proceed as follows:

1. Place the solvent vials into the washing station vial holder.
2. Insert the Vial bracket holder into the holes provided on the washing station body.

NOTE As shown in Figure 3-34, one vial bracket holder is required for the standard washing station while two of them are required for the LV applications washing station.

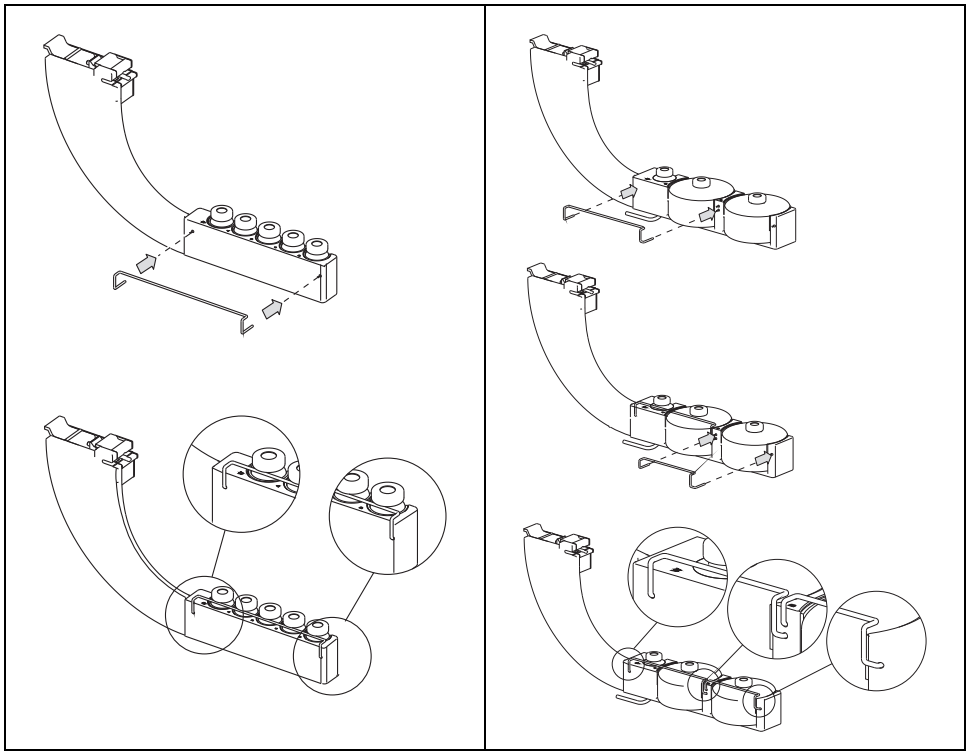


Figure 3-34. Vial Bracket Washing Station

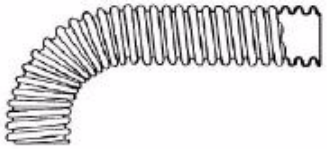
How to Install the Fast Washing Station

To install the proceed as follows. See Figure 3-35.

1. Place the two 500 mL solvent bottles into the washing station bottles holder.
2. Connect the solvent tubes provided between each bottle and the relevant solenoid valve.
3. Connect the waste tube between the waste beak and a drain vessel placed on the floor.

CAUTION **Take care to bend the waste tube at right angle immediately after the outlet. The tube should also have a vertical slope all the way until the waste reservoir. Avoid as much**

as possible to place the tube horizontally or else the liquid may form plugs preventing from a correct draining. The tube provided in the outfit, shown in the figure below, has a standard 2 m length that ensures to reach comfortably the waste reservoir.



You are advised to cut unnecessary lengths of the tube in order to avoid loops or horizontal sections.

4. Flow the solvent in the tubes manually opening the toggle valve on the lower part of each bottle.

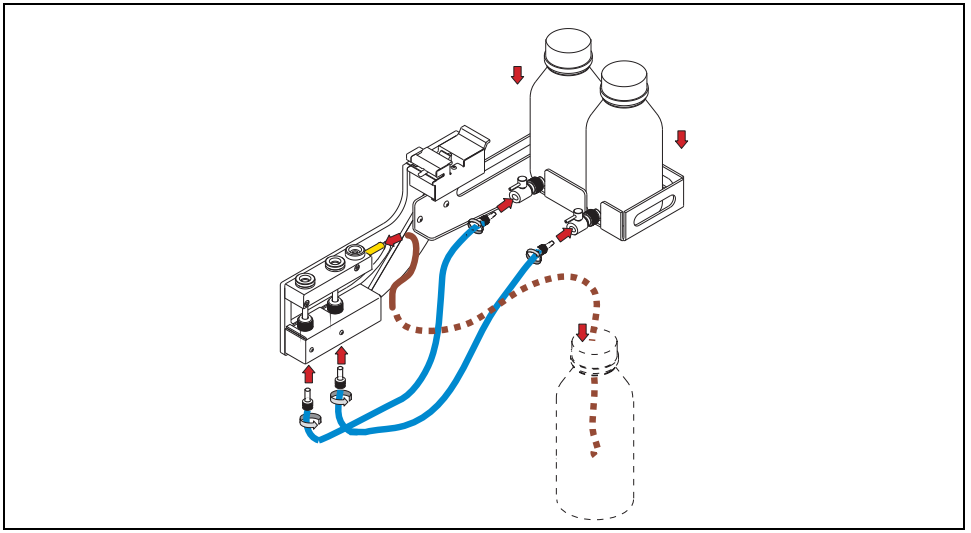


Figure 3-35. Fast Washing Station Installation

IMPORTANT **Before use, purge air in the fast washing station tubing by performing 10 off-line syringe washing.**

WARNING! **All the waste materials will have to be collected and eliminated in compliance to the regulations and the directives in force in the countries where the instrument is used.**

How to Install the Fan Station

1. Install the Fan Station away from the heated surface as shown in the example of Figure 3-36.

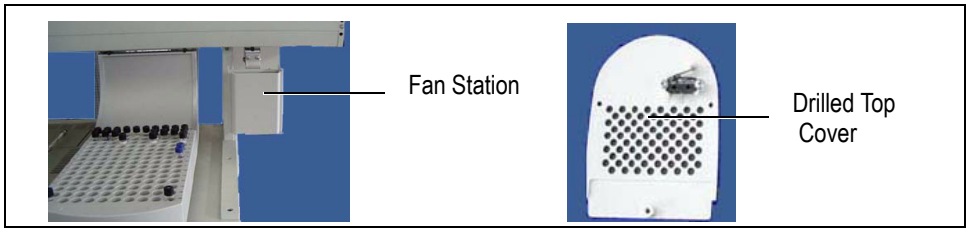


Figure 3-36. Example of Fan Station Installation

2. Verify that the turret of your TriPlus AS is provided with the drilled top cover.
3. If not, please replace the top cover with the drilled one's operating as follows:
   a. By using the screwdriver remove the three fixing screw of the turret top cover.
   b. Disconnect the two wires from the microswitch located on the cover.
   c. Connect the two wires to the microswitch located on the drilled cover.
   d. Mount and fix the new top cover on the turret by using the fixing screws.

How to Install the Fiber Conditioning Station

ATTENTION **Install the fiber conditioning station on the sampler paying attention for not to obstruct the fan located under the same station. Besides, pay attention to keep a minimal distance of 1 cm between the station and the nearest component to allow the ventilation through the side slots.**

Syringe Holder Installation

According to the AS, HS or SPME configuration of the TriPlus sampler, refer to the proper operating sequence:

- *How to Install the Syringe Holder Assembly onto the AS Sampler*
- *How to Install the Syringe Holder Assembly onto the HS Sampler*
- *How to Install the Syringe Holder Assembly onto the SPME Sampler*

OPERATING SEQUENCE

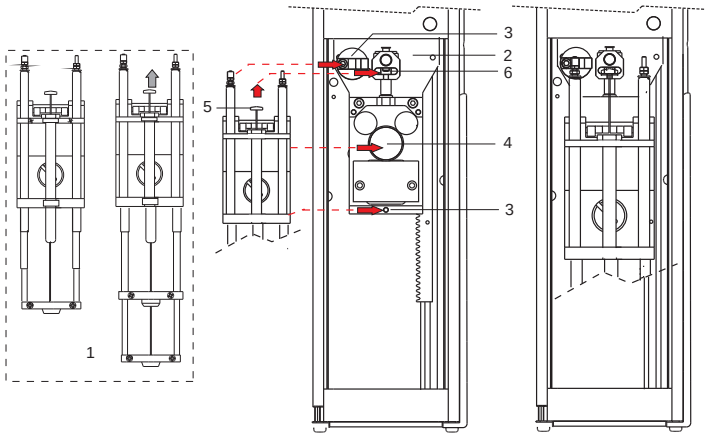
How to Install the Syringe Holder Assembly onto the AS Sampler

The syringe installation is a simple operation, but it requires caution to prevent damages to the syringe needle and ensure optimal performance of the injection device.
Syringes of 5, 10, 100, 250 µL or of 0.5, 10, 100, 500 µL can be installed with needle length of 50 or 80 mm by. The syringes used must be compatible with the system.

CAUTION **As a function of the syringe volume and of the length of the syringe needle, the appropriate syringe holder must be used.**

Install the syringe assembly onto the sliding plate making reference to Figure 3-38 and proceeding as follows:

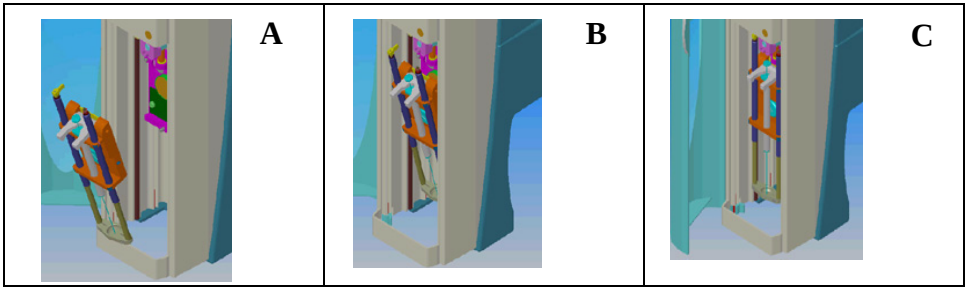
1. Open the turret safety door.
2. Take the syringe holder assembly.
3. Select the syringe volume on the selector present on the sliding plate to record the type of syringe installed.
4. Install the syringe on the holder as described in the operating sequence *Triplus AS Syringe Installation and Replacement* in Chapter 7.



1. Syringe Holder Assembly	2. Sliding Plate
3. Hooking Pins	4. Supporting Magnet
5. Plunger Head	6. Plunger Control Sliding-Shoe

Figure 3-37. Syringe Holder Installation (AS)

5. Apply the syringe holder assembly on the supporting magnet located on the sliding plate paying attention to simultaneously introduce the hooking pins and the plunger head into their relevant guides.



6. Close the turret safety door.

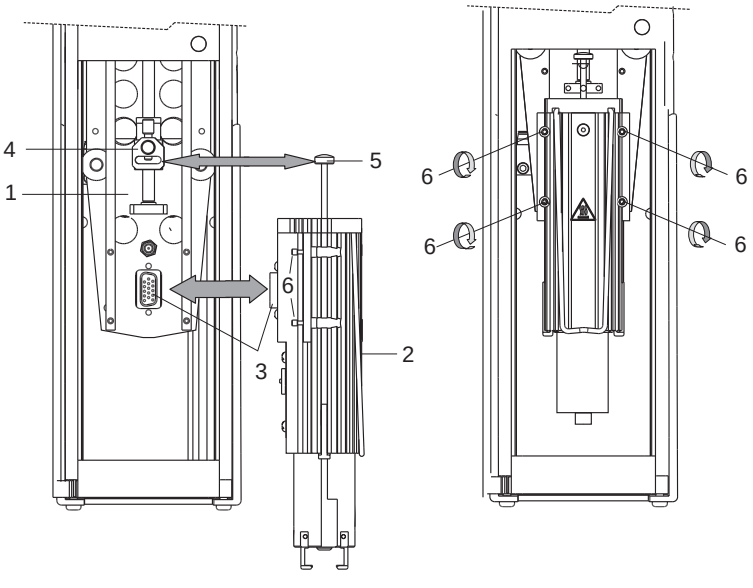
NOTE Before starting operation, remember to open the **Configuration Mismatch** page from the user interface in use, in order to automatically update the system with the new installed syringe.

OPERATING SEQUENCE

How to Install the Syringe Holder Assembly onto the HS Sampler

The installation of the syringe holder, or its replacement, is a procedure requiring caution to prevent damages and ensure a correct operation of the injection device.

NOTE The syringe is now considered as already installed inside the syringe holder assembly. For the syringe installation, refer to the operating sequence *TriPlus HS Syringe Installation and Replacement* in Chapter 7.



1. Sliding Plate	2. Syringe Assembly
3. 9-pin Connector	4. Plunger Control Sliding-Shoe
5. Plunger Head	6. Fixing Screws of the Syringe Assembly

Figure 3-38. Syringe Holder Installation (HS)

Install the syringe assembly onto the sliding plate making reference to Figure 3-38 and proceeding as follows:

The syringe assembly can accommodate syringes of 1, 2.5 or 5 mL.

1. Open the turret safety door.
2. Select the syringe volume on the selector present, on the rear panel of the syringe holder, to record the type of syringe installed.
3. Gently introduce the injection assembly into the turret fitting the 9-pin connector and the washing gas nozzle to their relevant seats provided in the heated syringe-holder assembly.
4. Move the syringe plunger upwards to insert the head into its seat provided in the plunger control shoe.
5. Gently tighten the four screws to fix the injection assembly to the turret sliding plate.
6. Close the turret safety door.

NOTE Before starting operation, remember to open the **Configuration Mismatch** page from the user interface in use, in order to automatically update the system with the new installed syringe.

OPERATING SEQUENCE

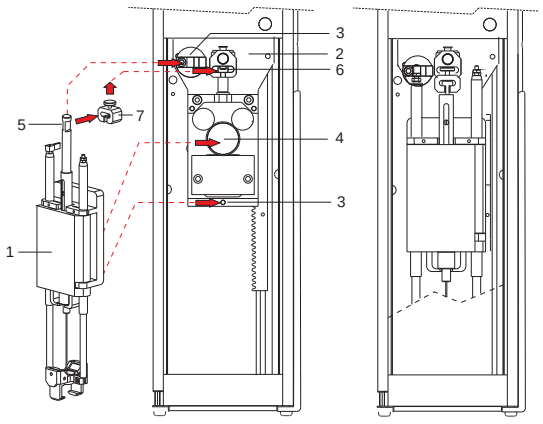
How to Install the Syringe Holder Assembly onto the SPME Sampler

The syringe holder installation is a simple operation, but it requires caution to prevent damages to the syringe needle and ensure optimal performance of the injection device. Install the syringe assembly onto the sliding plate making reference to Figure 3-39 and proceeding as follows:

1. Open the turret safety door.

2. Take the syringe holder assembly.

3. Install the fiber holder on the syringe holder as described in the operating sequence *Triplus SPME Fiber Holder Installation and Replacement in Chapter 7*.



1. Syringe Holder Assembly
2. Sliding Plate
3. Hooking Pins
4. Supporting Magnet
5. Plunger Head
6. Plunger Control Sliding-Shoe
7. Plunger Adapter

Figure 3-39. Syringe Holder Installation (SPME)

4. Insert the plunger adapter into the plunger control sliding-shoe.
5. Apply the syringe holder assembly on the supporting magnet located on the sliding plate paying attention to simultaneously introduce the hooking pins and the plunger head into their relevant guides.
6. Close the turret safety door.

NOTE Before starting operation, remember to open the **Configuration Mismatch** page from the user interface in use, in order to automatically update the system.

Pneumatic Connections

This paragraph describes how to connect the gas for the flushing of the HS syringe or to supply the fiber conditioning station.

OPERATING SEQUENCE

How to Connect the Gas for the Flushing of the HS Syringe

Proceed as follows:

Flushing Gas Connection

1. On the Pressure Regulator located on the rear panel of the incubation oven, connect the inlet marked **`IN`** to the gas supply.

2. Connect the outlet marked **`OUT`** to the gas inlet marked **FROM AGITATOR** situated on the rear section of the crossrail X.

Syringe Flush Gas Test

3. By using the **Syringe Flush** direct command from the user interface in use, enable the solenoid valve to turn **on** the syringe flush gas source.

4. On the Pressure Regulator set the pressure to 200 kPa (30 psi).

5. Allow the system to pressurize for 10 seconds.

6. Connect the flow meter (Thermo Scientific GFM Pro Flowmeter, or equivalent) to the end of the syringe needle.

7. Measure the flow out of the syringe needle.

8. The flow should be greater than 50 mL/min

9. Use the **Syringe Flush** direct command to disable the solenoid valve to turn **off** the syringe flush gas source.

OPERATING SEQUENCE

How to Connect the Flushing Gas to the Fiber Conditioning Station

Proceed as follows:

1. On the Pressure Regulator located on the rear panel of the incubation oven, connect the inlet marked **IN** to the gas supply.
2. Connect the outlet marked **OUT** to the gas inlet marked **FROM AGITATOR** situated on the rear section of the fiber conditioning station.
3. On the Pressure Regulator set the pressure to 250 kPa (36 psi) in a way to have a gas flow greater than 100 mL/min.

NOTE At the moment of the power on, after the acknowledgement of the station, the sampler will enable the flow of the flushing gas to supply the station.

Electrical Connections

This paragraph describes how to make electrical connections between the sampler and its components, and how to power the sampler through the power module.

NOTE Power supply to the instrument must be as specified in the paragraph *Technical Specifications* in Chapter 1. Before performing electrical connections, also ensure that the requirements reported in the paragraph *Electrical Requirements* of this chapter have been met.

Power Module

Place the power module beside the GC and in the most comfortable position for the operator to have free access to the on/off power switch.

WARNING! While installing the power module, pay attention to always have free access to the on/off switch to be able to act easily thereon in case of emergency.

Cables Connection

For the correct connection of the cables follow the instructions reported in the following operating sequence:

OPERATING SEQUENCE

How to Connect the Cables

Proceed as follows:

Connection of the Cables Between the Sampler and the Components

1. Using the cable provided, connect the 8-pin connector type RJ45 located on the component back to the closest 8-pin connector type RJ45 marked **BUS** located on the rear portion of the crossrail X.
   Repeat this operation for each component present.

Connection of the Cables Between the Sampler to the On-Column Actuator, Incubation Oven, Fast Washing Station, Fiber Conditioning Station

1. Using the proper cable, connect the 15-pin connector located on the rear panel of the component of interest to the 15-pin connector marked **DEVICE 1** or **DEVICE 2** located on the rear portion of the crossrail X.

CAUTION **Only two components can be directly connected to the DEVICE 1/2 connectors.**

   a. If the sampler configuration, e.g. SPME, includes the incubation oven, the fast washing station and the fiber conditioning station, connect the components as follows:

      - Connect the incubation oven to the connector marked **DEVICE 1** located on the rear portion of the crossrail X.
      - Connect the fiber conditioning station to the connector marked **DEVICE 2** located on the rear portion of the crossrail X.
      - Connect the fast washing station the connector marked **CHAIN** on the rear panel of the fiber conditioning station.

Connection of the Cables Between the Sampler and the GC

1. Using the cable provided, for each GC on which the TriPlus is installed, connect the 8-pin connector marked **HANDSHAKE MAIN** or **VIRTUAL** located on the rear portion of the crossrail X to:

   - the connector marked **AUTOSAMPLER** located on the rear panel of each GC in case of **TRACE GC** and **FOCUS GC**.
   - the 37-pin connector marked **J1** located on the rear panel of each GC Control Unit in case of **GC 8000** and **8000 Top GC**.
   - the 25-pin connector marked **AUX** located on the rear panel of the GC Control Unit in case of **Mega 2 GC**.

NOTE To Configure the TriPlus sampler for multiple GC, please refer to Appendix A *TriPlus Sampler for Multiple GC Configuration*.

Connection of the Cables Between the Sampler and the User Interface

User Interface means the PC with dedicated control software or a pocket PC.

1. Using the cable provided connect the connector marked **RS 232** located on the rear portion of the crossrail X to the COM serial port of the PC or to the pocket PC.

NOTE Each TriPlus unit is provided with two RS 232 ports located on the rear panel of the crossrail X, so to allow communication through two independent users.
The operator can decide whether to use the pocket PC connected to the sampler via RS232 cable or the IR transceiver or also via LAN if available.
To connect the pocket PC to the TriPlus sampler, refer to *Pocket PC Connection* in Chapter 9 *TriPlus Control from the Pocket PC*.

Connection of the Cables Between the Thermostatted Tray Holder and the External Portable Power Supply

1. Plug in the Vdc power cable of the external portable power supply into the jack marked **+/-** located on the back side of the thermostatted tray holder.
2. Connect the power cord of the external power supply to the mains outlet.

Connection of the Cables Between the Sampler and the Power Module

1. Using the cable provided, connect the 25-pin connector marked **SAMPLER SUPPLY,** located on the rear portion of the crossrail X, to the 25-pin connector marked **SAMPLER SUPPLY** located on the rear panel of the power module.

Connection to the LAN Network

Using the cable provided, connect the RJ45 connector marked LAN, located on the rear panel of the power module, to the LAN network.

To enter the desired IP address and the LAN communication port of the TriPlus sampler, follow the instructions reported in Chapter 8 *LAN Set-up*.

Instrument Start-up

Before switching on the instrument, check that the power module meets the requirements reported in the paragraph *Power Module*.

1. Connect the power module to the power line by using the cable provided.

CAUTION **If the thermostatted tray is present, it must be switched on before the sampler in order to be automatically recognized at the sampler power on.**

2. Move the power switch to position **I**.

   As soon as switched on, the sampler automatically performs an initial test to check the presence of the components and to define their position.

3. Open the TriPlus interface to be used for the sampler control:
   - Data system or
   - Stand-alone program or
   - TriPlus software on Pocket PC

4. Configure the sampler and verify the set-up of its components.
   Perform the operation following the instructions according to the user interface in use:
   - *If the **Data System** is used*
     Refer to *Configure TriPlus Autosampler* and *Sampler Setup Dialog Window* in the relevant operating manual.
   - *If the **Stand-alone Program** is used*
     Refer to *Configuration Page* and *Sampler Set-up Page* in Chapter 5 of this manual.
   - *If the **TriPlus Software on Pocket PC** is used*
     Refer to *Configuration Page* and *Sampler Setup Page* in Chapter 9 of this manual.

5. Perform the sampler alignments. Refer to paragraph *Sampler Alignments*.

Sampler Alignments

Before starting accommodate the sample vial complete with septa and cap into the first and the last position of the sample tray.

By using the relevant commands check and perform the alignment of the syringe carriage assembly (sampler injection device) on the following parts:

- GC injector(s)
- Sample vial

Perform the alignment operations following the instructions according to the user interface in use:

- *If the **Data System** is used*
  Refer to *Component Information Dialog Window* and *Injector Setup Page* in the relevant operating manual.
- *If the **Stand-alone Program** is used*
  Refer to *Component Information Page* and *Injector Setup Page* in Chapter 5 of this manual.
- *If the **TriPlus Software on Pocket PC** is used*
  Refer to *Component Information Page* and *Component Information Page* in Chapter 9 of this manual.

4

Installation on Third-Party GCs

This chapter contains the instructions for the installation of the TriPlus on third-party gas chromatographs and the electrical connections with the different units of the gas chromatographic system.

Chapter at a Glance...

Operating Sequences

Preliminary Information

This chapter contains the preliminary information for the installation and connection of the sampler to third-party GCs, the electrical requirements and the sampler supports.

Who Performs the Installation

NOTE The TriPlus sampler is installed by authorized Thermo Fisher Scientific technical engineers, who will check its correct operation. For more details, please contact Thermo Fisher Scientific local representatives. Should the instrument not be installed by Thermo Fisher Scientific personnel, please strictly adhere to the following instructions.

Space Requirements

Provide enough space around the instrument on which the TriPlus sampler must be installed making reference to the overall dimensions of the sampler described in paragraph *Technical Specifications* in Chapter 1.

WARNING! Pay attention not to operate on the instrumental parts included in the work area of the sampler when this is in movement.

Electrical Requirements

The instrument must be electrically supplied as indicated in paragraph *Technical Specifications* in Chapter 1.

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

Do not connect the TriPlus sampler to lines feeding devices of a heavy duty nature, such as motors, UV lamps, refrigerators 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.

Connect the TriPlus sampler only to instruments complying with the IEC 61010 safety regulations.

How to Lift and Carry the Crossrails X and Y

This operation must be performed by TWO persons who must stand each on one side of the crossrail X and put their hands underneath it.

Sampler Supports

The TriPlus sampler is installed on GC by using the two appropriate supports provided that must be assembled prior the installation.
Each support consists of a proper left/right bracket and a vertical support leg provided with mounting clamps for the correct hookup of the sampler.

ATTENTION **A hole of the support is identified as “protective conductor terminal” (see the symbol on pagina 25). Perform the fixing to the GC by using the proper screw interposing the tab washer.**

Material Required for the Installation

To install the sampler and its components the following material is required:

- 3-mm Allen wrench for M4 screws
- Phillips screwdriver for M5 screws

Installation References

To install TriPlus sampler on the GC refer to the following paragraphs:

- *Installation of the Sampler on the GC*
- *Electrical Connections*
- *Instrument Start-up*
- *Sampler Alignments*

Installation of the Sampler on the GC

This paragraph contains instructions to install the TriPlus sampler and its components on the GC according to the following instrumental combinations:

Single Agilent 5890 GC	Single Agilent 6850 GC	Single Agilent 6890 GC
Agilent 5890 + 5890 GCs	Agilent 6850 + 6850 GCs	Agilent 6890 + 6890 GCs

Refer to the following operating sequences:

1. **Supports installation on the GC**
   - *Sampler Supports Assembling for Agilent 5890 GC*
   - *Single Agilent 5890 GC Configuration*
   - *Double Agilent 5890 GC Configuration*
   - *Sampler Supports Assembling for Agilent 6850 GC*
   - *Single Agilent 6850 GC Configuration*
   - *Double Agilent 6850 GC Configuration*
   - *Sampler Supports Assembling for Agilent 6890 GC*
   - *Single Agilent 6890 GC Configuration*
   - *Double Agilent 6890 GC Configuration*
2. **Sampler and its Components Installation**
   - *How to Secure the Crossrail X on its Supports*
   - *How to Install the Turret (Z axis)*
   - *How to Install the Sampler Components*
3. **Syringe Installation**
   - *How to Install the Syringe Holder Assembly onto the AS Sampler*
   - *How to Install the Syringe Holder Assembly onto the HS Sampler*
   - *How to Install the Syringe Holder Assembly onto the SPME Sampler*
4. **Pneumatic Connection**
   - *How to Connect the Gas for the Flushing of the HS Syringe*
   - *How to Connect the Flushing Gas to the Fiber Conditioning Station*
5. **Cables Connection**

- *How to Connect the Cables*

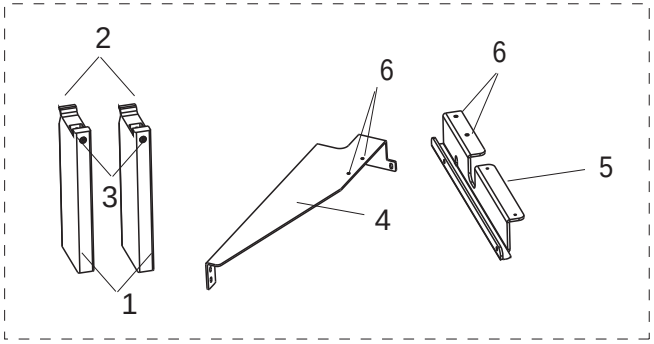
Supports Installation on the Agilent 5890 GC

To install the supports on the GC refer to the following operating sequences:

OPERATING SEQUENCE

Sampler Supports Assembling for Agilent 5890 GC

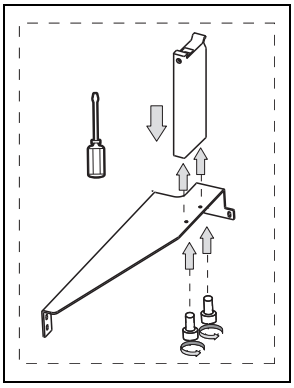
With reference to Figure 4-1, proceed as follows:



1. Support Leg	2. Mounting Clamps
3. Leg Fixing Screws	4. Left Bracket
5. Right Bracket	6. Support Leg Holes

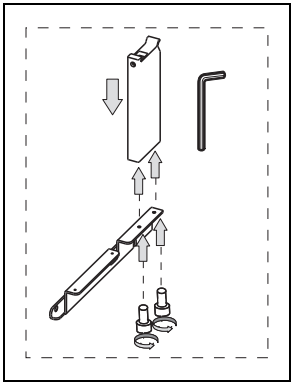
Figure 4-1. Sampler Support Assembling for Agilent 5890 GC

Left Sampler Support Assembly



1. Insert the provided fixing screw into each hole present on the left bracket.
2. Place the support leg on the left bracket paying attention that the fixing screw of the leg is frontally turned.
3. Tighten the fixing screws by using the Phillips screwdriver.

Right Sampler Support Assembly



4. Insert the provided fixing screw into each hole present on the right bracket.
5. Place the support leg on the right bracket paying attention that the fixing screw of the leg is frontally turned.
6. Tighten the fixing screws by using the 3-mm Allen wrench.

OPERATING SEQUENCE

Single Agilent 5890 GC Configuration

To properly install the sampler supports on an Agilent 5890 GC, proceed as follows:

1. Insert into the holes present on the left sampler support the provided fixing screws.

2. Mount the left sampler support on the GC left side as shown in Figure 4-2.

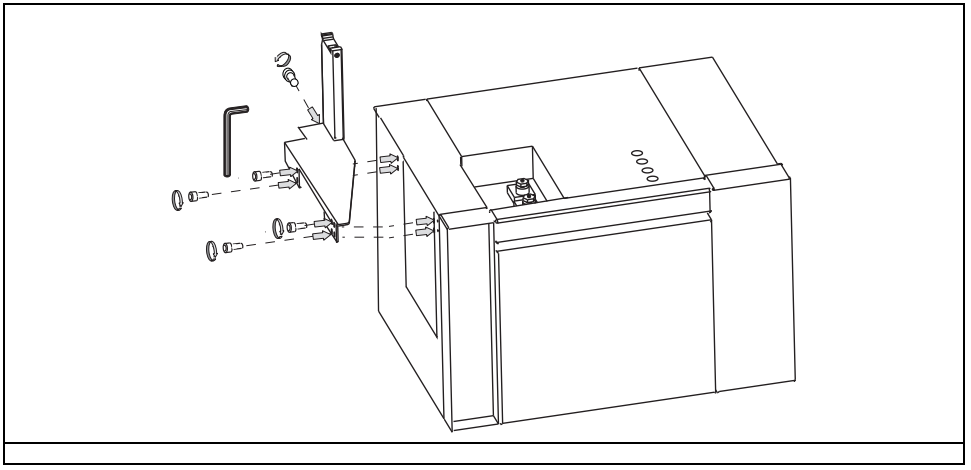


Figure 4-2. Left Sampler Support Installation on an Agilent 5890 GC (1)

3. Guide the fixing screws into the corresponding fixing holes.

4. Tighten the fixing screws by using the 3-mm Allen wrench.

5. Insert into the holes present on the right sampler support the provided fixing screw.

6. Mount the right sampler support on the GC left side as shown in Figure 4-3.

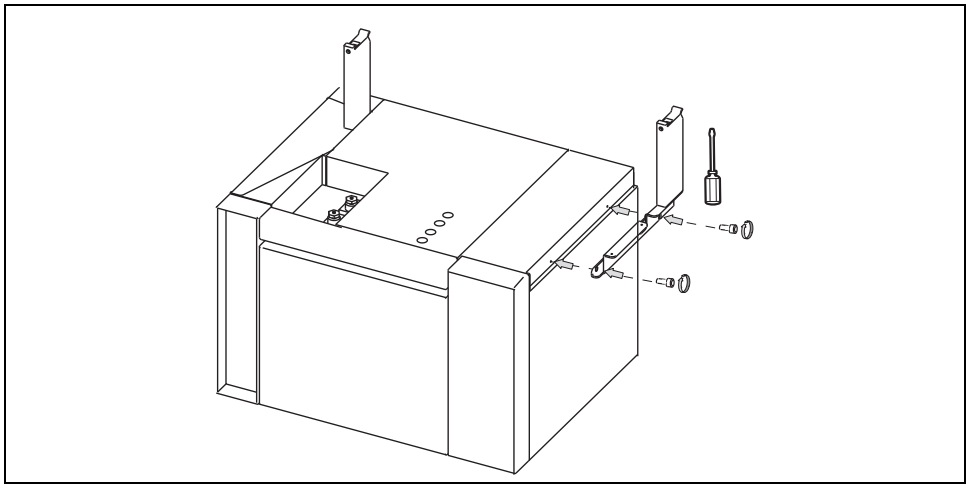


Figure 4-3. Right Sampler Supports Installation on an Agilent 5890 GC

7. Guide the fixing screws into the corresponding fixing holes.

8. Tighten the fixing screws by using the Phillips screwdriver.

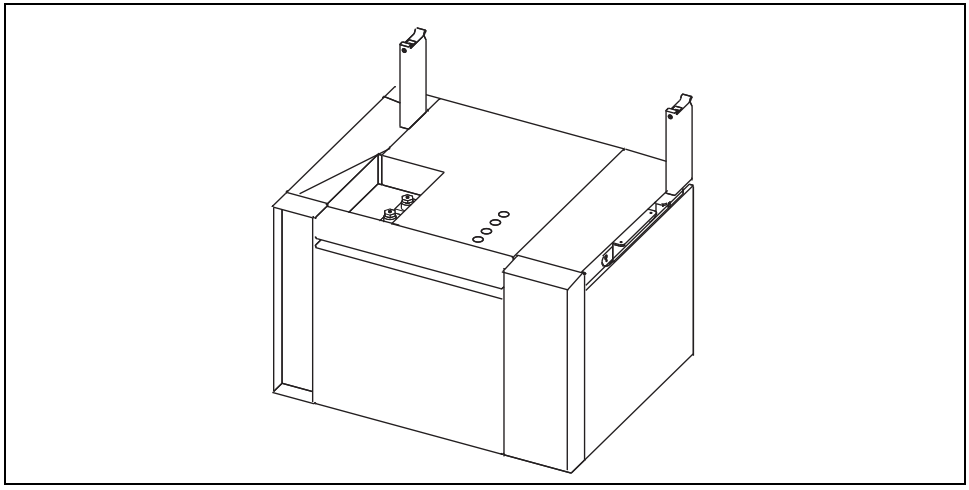


Figure 4-4. Sampler Supports Installation on an Agilent 5890 GC

OPERATING SEQUENCE

Double Agilent 5890 GC Configuration

To properly install the sampler supports on two Agilent 5890 GC placed side by side, proceed as follows:

CAUTION **Before proceeding, verify that the working area is large enough to accommodate two 5890 GCs and eventual external devices.**

1. Insert into the holes present on the left and right sampler supports the provided fixing screw.

2. Mount the sampler supports on the GC left and right sides of the first GC unit as shown in Figure 4-5.

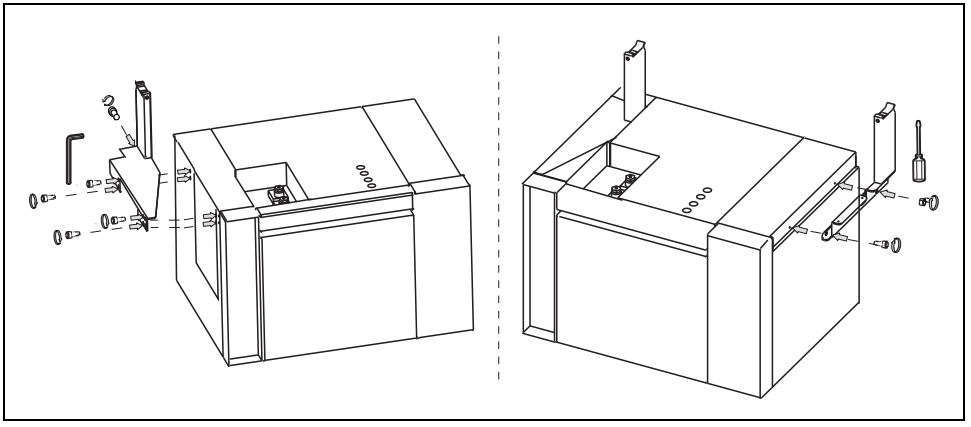


Figure 4-5. Sampler Supports Installation on the First Agilent 5890 GC (1)

3. Guide the fixing screws into the corresponding fixing holes.

4. Tighten the fixing screws.

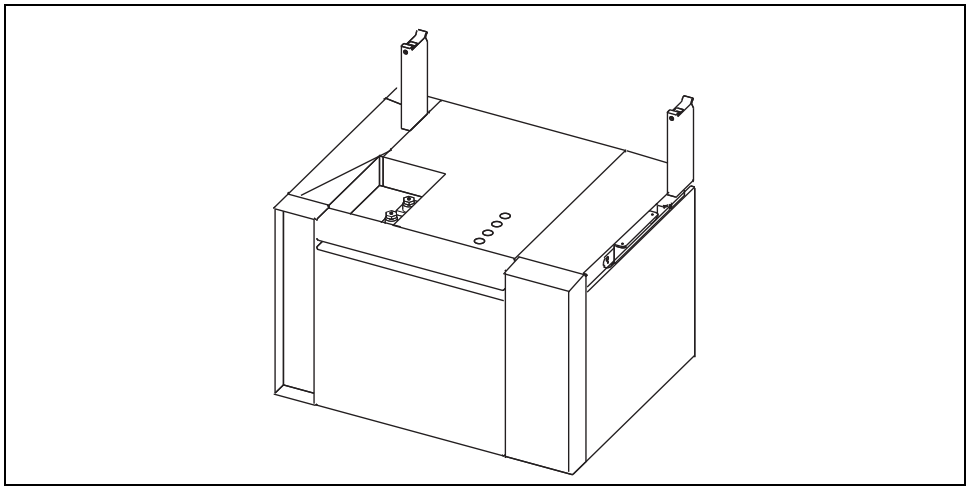


Figure 4-6. Sampler Supports Installation on the First Agilent 5890 GC (2)

5. Insert the appropriate fixing screws into the two fixing holes present on the spacer plate provided.

6. Mount the spacer plate on the left side of the second GC unit as shown in Figure 4-7.

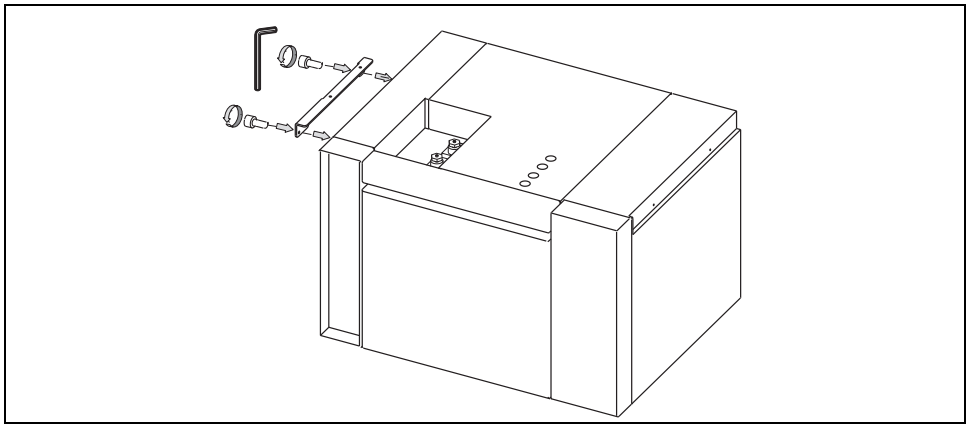


Figure 4-7. Spacer Plate Installation on the Second Agilent 5890 GC

7. Move the second GC beside the first one. Align the right sampler support of the first GC and the spacer plate of the second GC as shown in Figure 4-8, having care to fit the corresponding fixing holes.

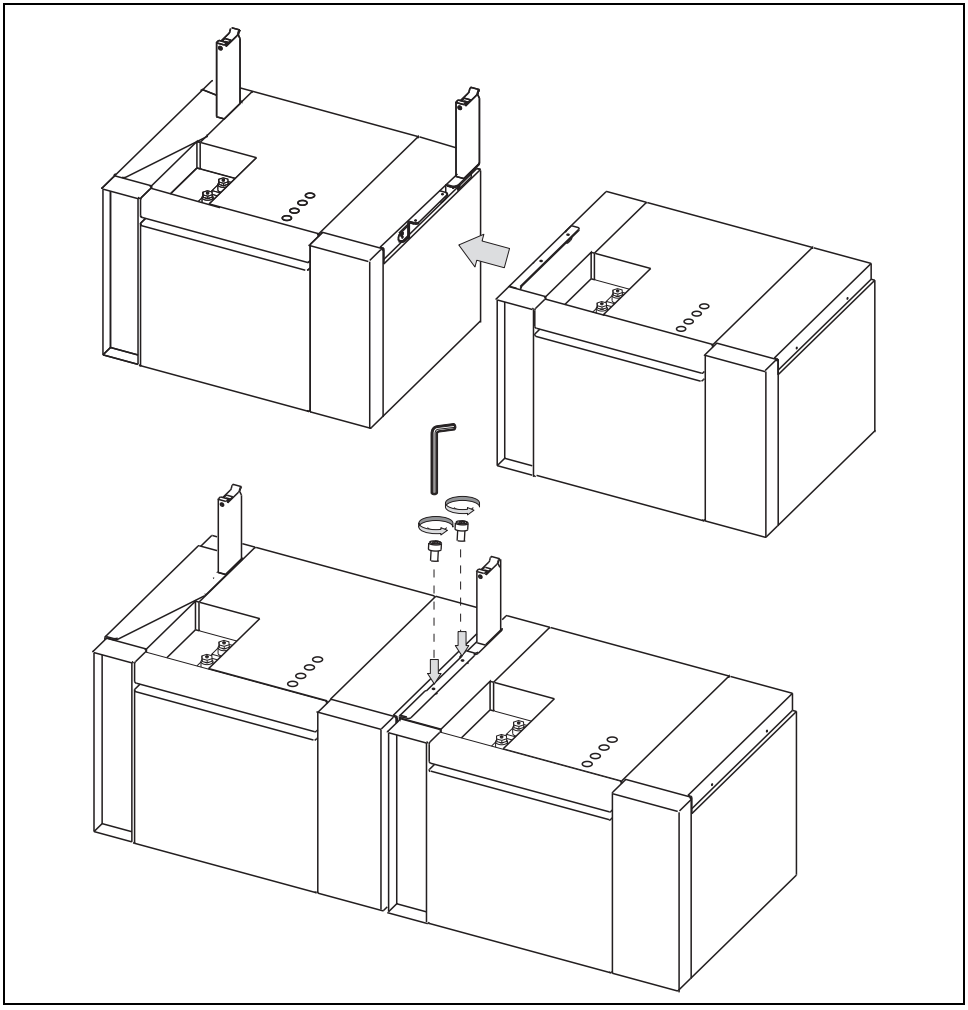


Figure 4-8. Agilent 5890 GCs Placing

8. Guide the fixing screws into the fixing holes.

9. Tighten the fixing screws by using the 3-mm Allen wrench.

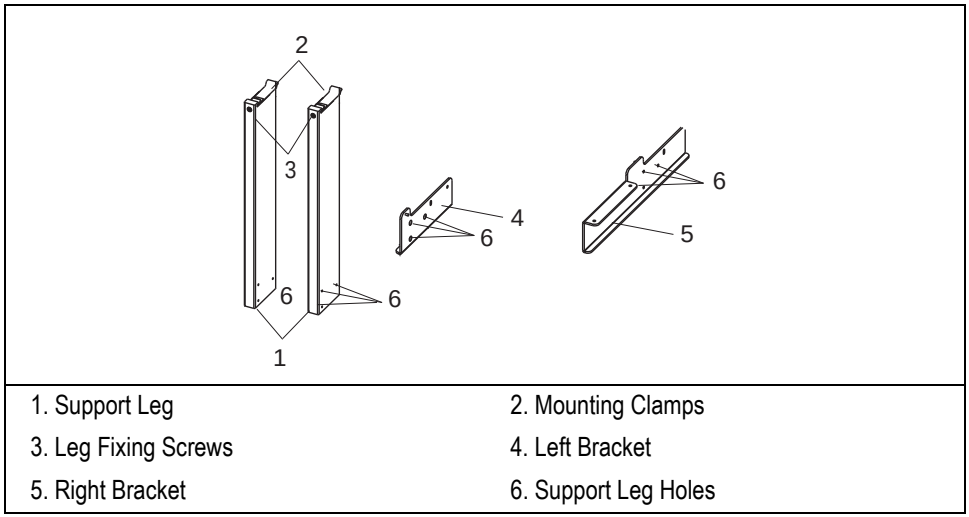
Supports Installation on the Agilent 6850 GC

To install the supports on the GC refer to the following operating sequences:

OPERATING SEQUENCE

Sampler Supports Assembling for Agilent 6850 GC

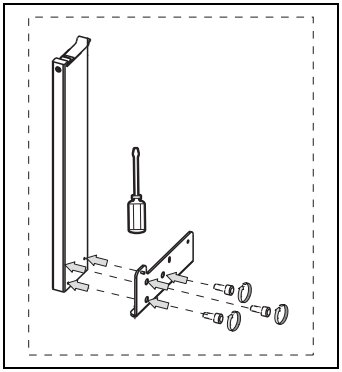
With reference to Figure 4-9, proceed as follows:



1. Support Leg	2. Mounting Clamps
3. Leg Fixing Screws	4. Left Bracket
5. Right Bracket	6. Support Leg Holes

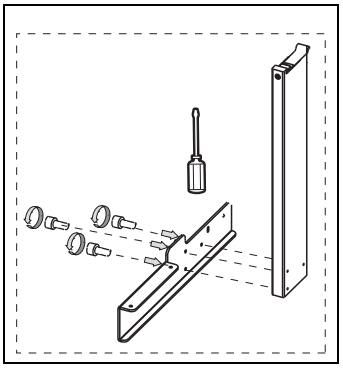
Figure 4-9. Sampler Support Assembling for Agilent 6850 GC

Left Sampler Support Assembly



1. Insert the provided fixing screw into each hole present on the left bracket.
2. Mount the left bracket on the lower section of the support leg paying attention that its fixing screw is frontally turned.
3. Tighten the left bracket fixing screws by using the Phillips screwdriver.

Right Sampler Support Assembly



4. Insert the provided fixing screw into each hole present on the right bracket.
5. Mount the right bracket on the lower section of the support leg paying attention that its fixing screw is frontally turned.
6. Tighten the right bracket fixing screws by using the Phillips screwdriver.

OPERATING SEQUENCE

Single Agilent 6850 GC Configuration

To properly install the sampler supports on an Agilent 6850 GC, proceed as follows:

1. Insert into the holes present on the left and right sampler supports the provided fixing screws.

2. Mount the left and right sampler supports respectively on left and right sides of the GC as shown in Figure 4-10.

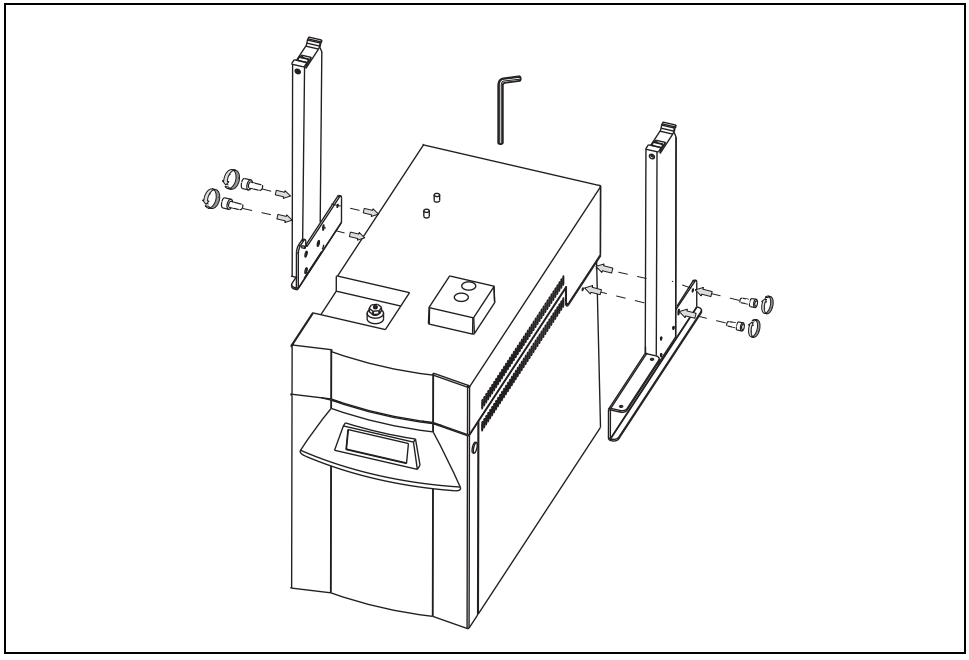


Figure 4-10. Sampler Supports Installation on an Agilent 6850 GC (1)

3. Guide the fixing screws into the corresponding fixing holes.

4. Tighten the fixing screws by using the 3-mm Allen wrench.

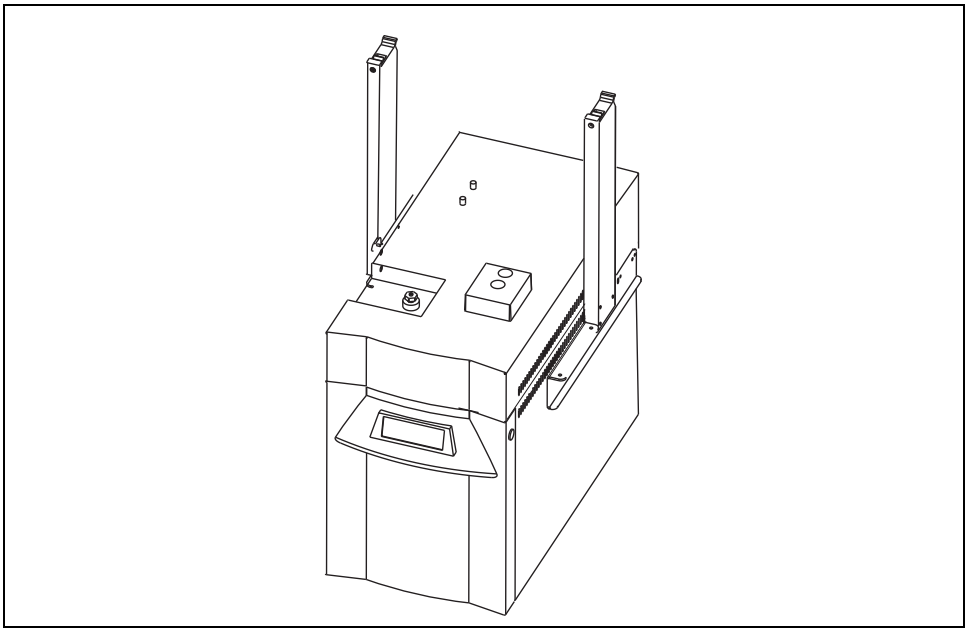


Figure 4-11. Sampler Supports Installation on an Agilent 6850 GC (2)

OPERATING SEQUENCE

Double Agilent 6850 GC Configuration

To properly install the sampler supports on two Agilent 6850 GC placed side by side, proceed as follows:

CAUTION **Before proceeding, verify that the working area is large enough to accommodate two 6850 GCs and eventual external devices.**

1. Insert into the holes present on the left and right sampler supports the provided fixing screws.

2. Mount the left and right sampler supports respectively on left and right sides of the first GC as shown in Figure 4-12.

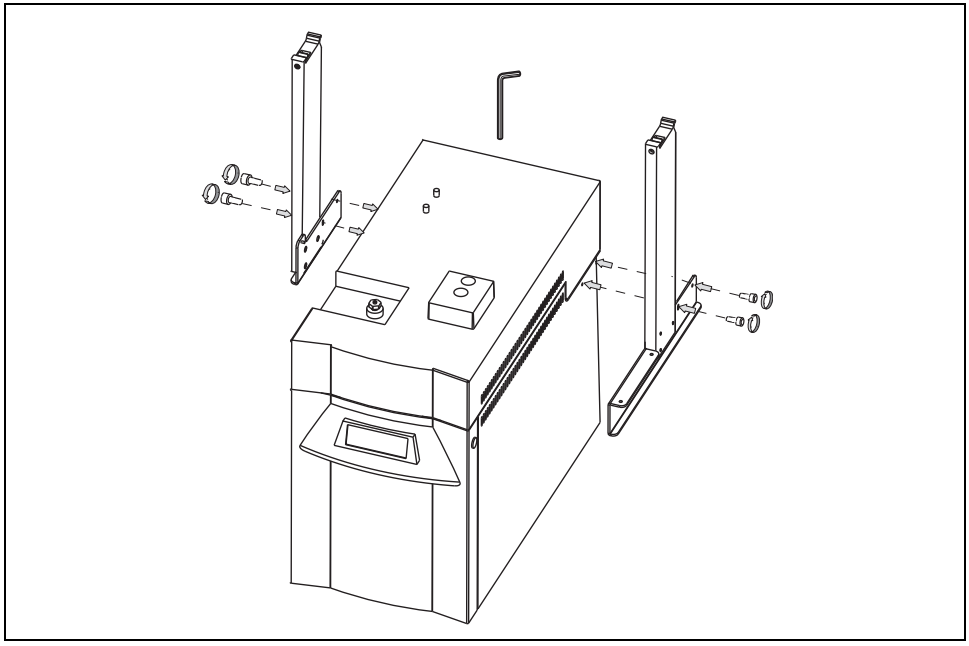


Figure 4-12. Sampler Supports Installation on the First Agilent 6850 GC (1)

3. Guide the fixing screws into the corresponding fixing holes.

4. Tighten the fixing screws by using the 3-mm Allen wrench.

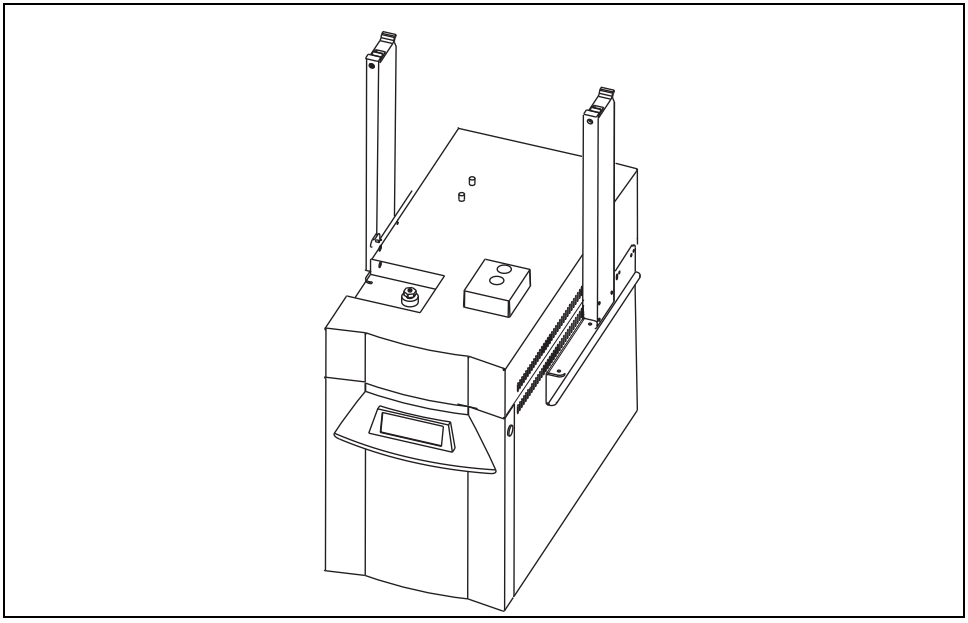


Figure 4-13. Sampler Supports Installation on the First Agilent 6850 GC (2)

5. Insert the appropriate fixing screws into the two fixing holes present on the spacer plate provided.

6. Mount the spacer plate on the left side of the second GC unit as shown in Figure 4-14.

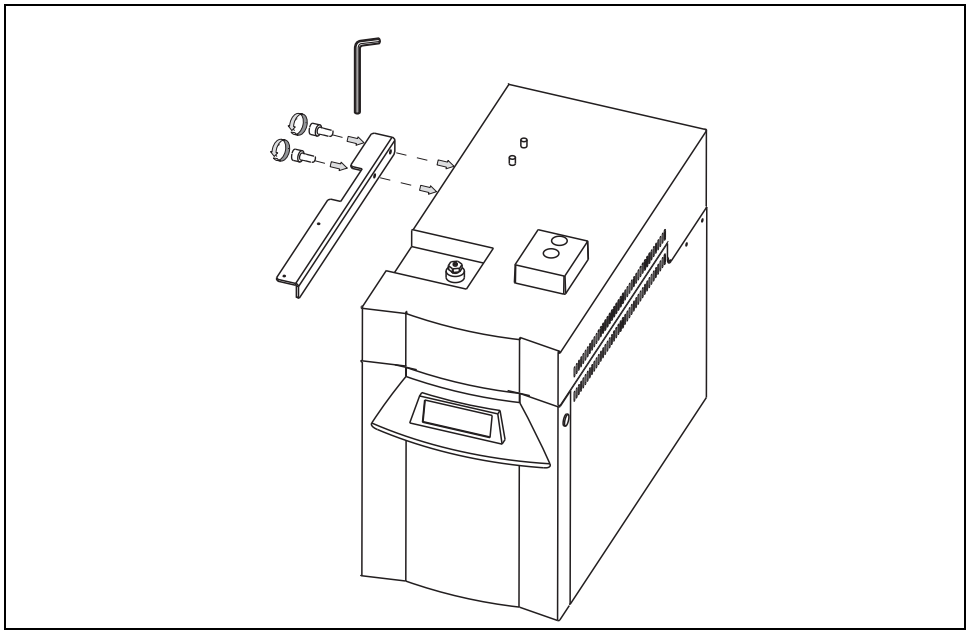


Figure 4-14. Spacer Plate Installation on the Second Agilent 6850 GC

7. Move the second GC beside the first one. Align the right sampler support of the first GC and the spacer plate of the second GC as shown in Figure 4-15, having care to fit the corresponding fixing holes.

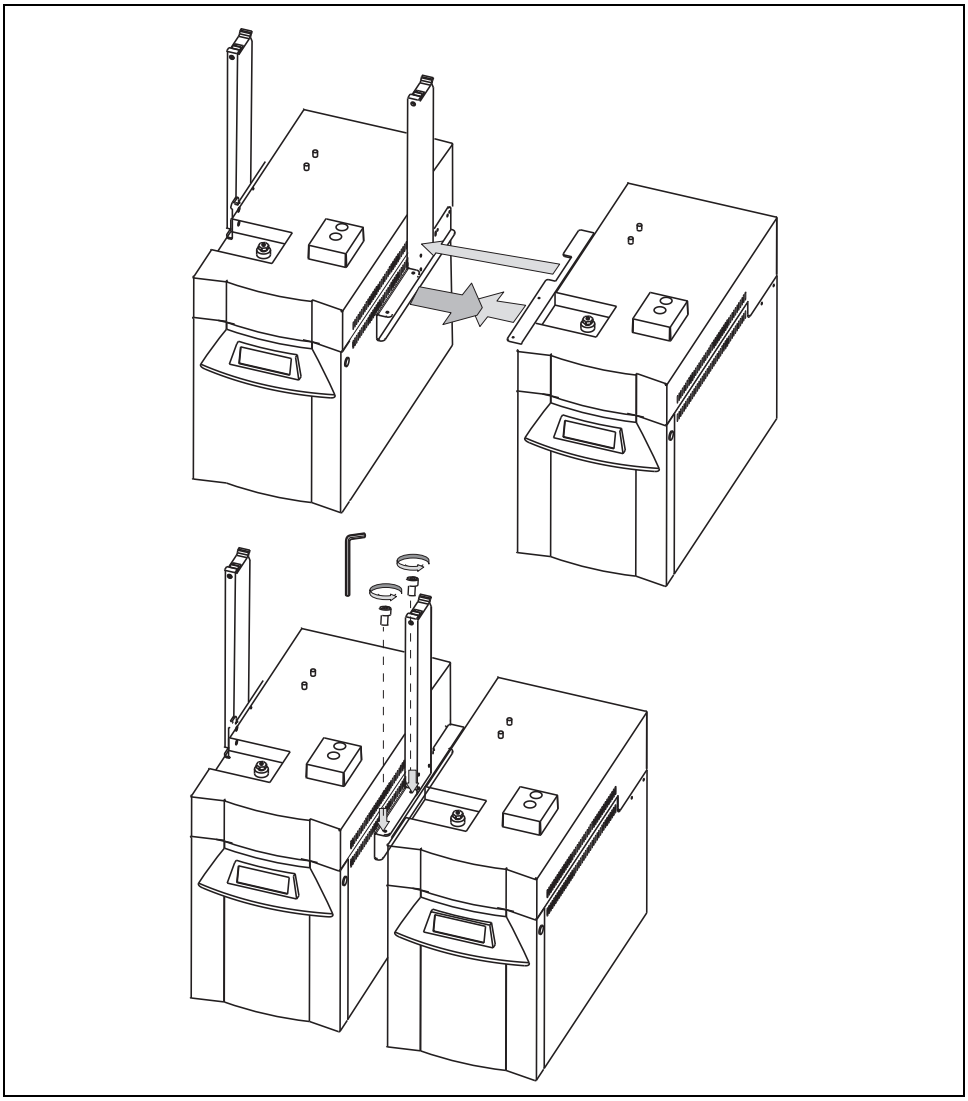


Figure 4-15. Agilent 6850 GCs Placing

8. Guide the fixing screws into the fixing holes.

9. Tighten the fixing screws by using the 3-mm Allen wrench.

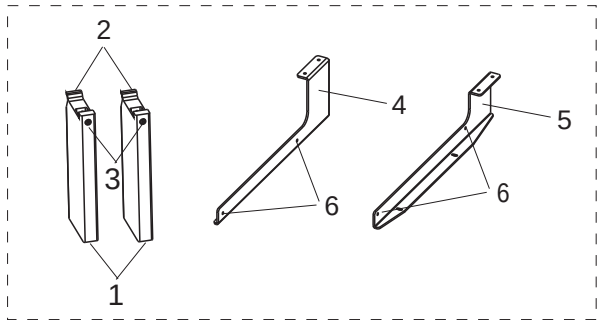
Supports Installation on the Agilent 6890 GC

To install the supports on the GC refer to the following operating sequences:

OPERATING SEQUENCE

Sampler Supports Assembling for Agilent 6890 GC

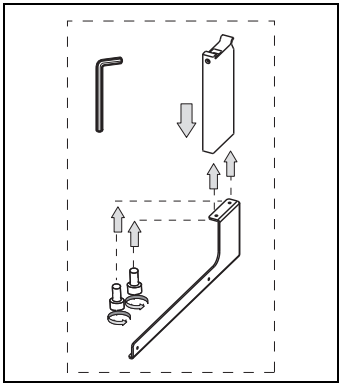
With reference to Figure 4-16, proceed as follows:



1. Support Leg	2. Mounting Clamps
3. Leg Fixing Screws	4. Left Bracket
5. Right Bracket	6. Support Leg Holes

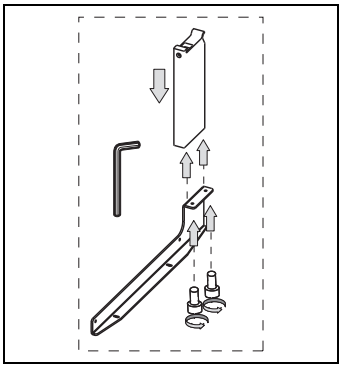
Figure 4-16. Sampler Support Assembling for Agilent 6850 GC

Left Sampler Support Assembly



1. Insert the provided fixing screw into each hole present on the left bracket.
2. Place the support leg on the left bracket paying attention that the fixing screw of the leg is frontally turned.
3. Tighten the left bracket fixing screws by using the Phillips screwdriver.

Right Sampler Support Assembly



4. Insert the provided fixing screw into each hole present on the right bracket.
5. Place the support leg on the right bracket paying attention that the fixing screw of the leg is frontally turned.
6. Tighten the right bracket fixing screws by using the 3-mm Allen wrench.

OPERATING SEQUENCE

Single Agilent 6890 GC Configuration

To properly install the sampler supports on an Agilent 6890 GC, proceed as follows:

1. Insert into the holes present on the left and right sampler supports the provided fixing screw.

2. Mount the left and right sampler supports respectively on left and right sides of the GC as shown in Figure 4-17.

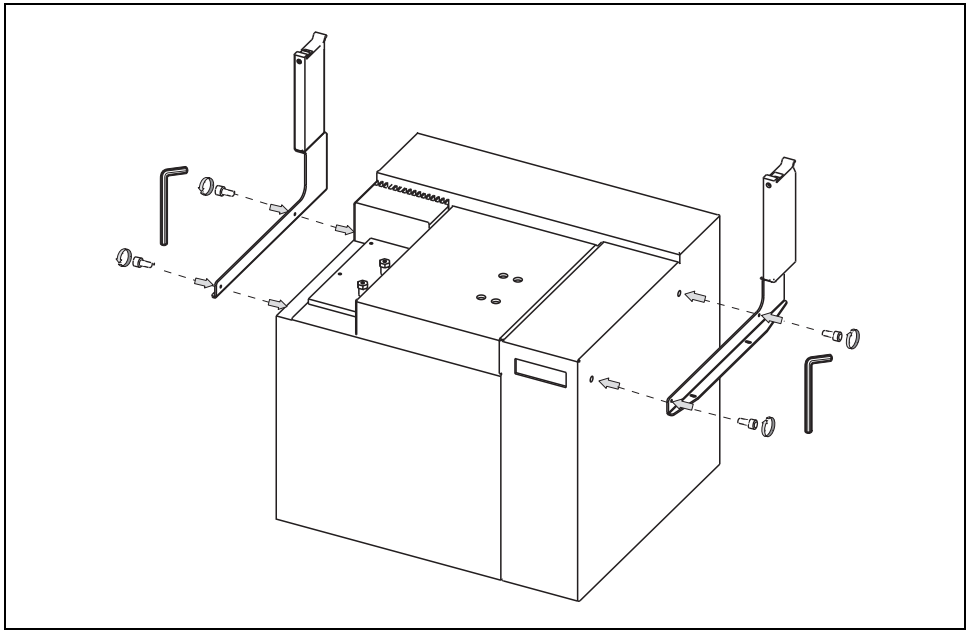


Figure 4-17. Sampler Supports Installation on an Agilent 6890 GC (1)

3. Guide the fixing screws into the corresponding fixing holes.

4. Tighten the fixing screws by using the 3-mm Allen wrench.

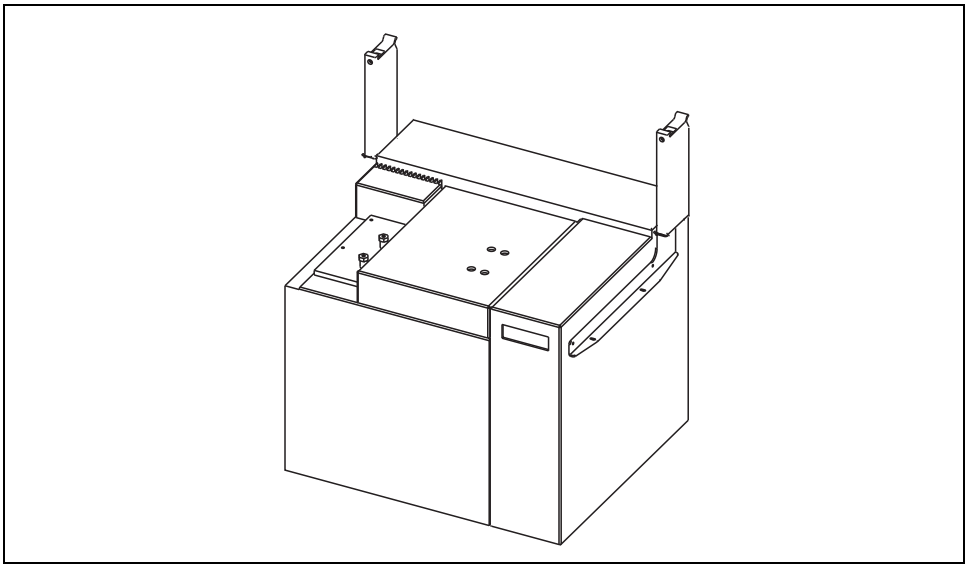


Figure 4-18. Sampler Supports Installation on an Agilent 6890 GC (2)

OPERATING SEQUENCE

Double Agilent 6890 GC Configuration

To properly install the sampler supports on two Agilent 6890 GC placed side by side, proceed as follows:

CAUTION **Before proceeding, verify that the working area is large enough to accommodate two 6890 GCs and eventual external devices.**

1. Insert into the holes present on the left and right sampler supports the provided fixing screw.

2. Mount the left and right sampler supports respectively on the left and right sides of the first GC unit as shown in Figure 4-19.

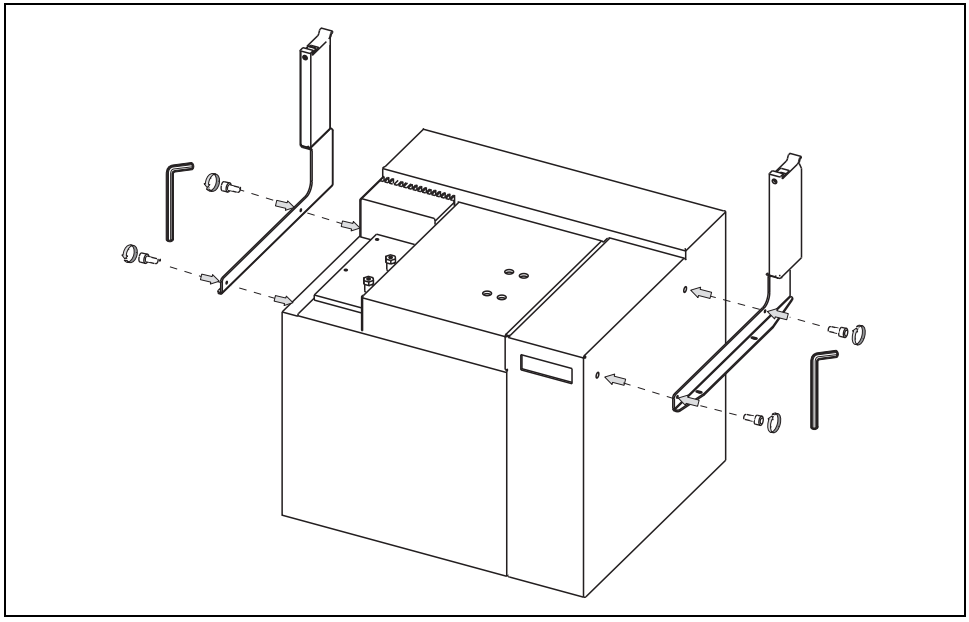


Figure 4-19. Sampler Supports Installation on the First Agilent 6890 GC (1)

3. Guide the fixing screws into the corresponding fixing holes.

4. Tighten the fixing screws by using the 3-mm Allen wrench.

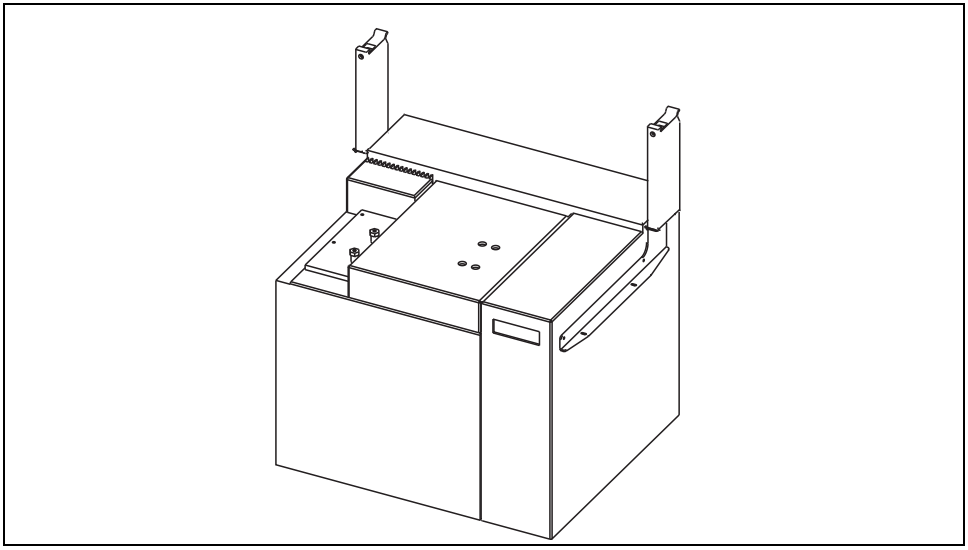


Figure 4-20. Sampler Supports Installation on the First Agilent 6890 GC (2)

5. Insert the appropriate fixing screws into the two fixing holes present on the spacer plate provided.

6. Mount the spacer plate on the left side of the second GC unit as shown in Figure 4-21.

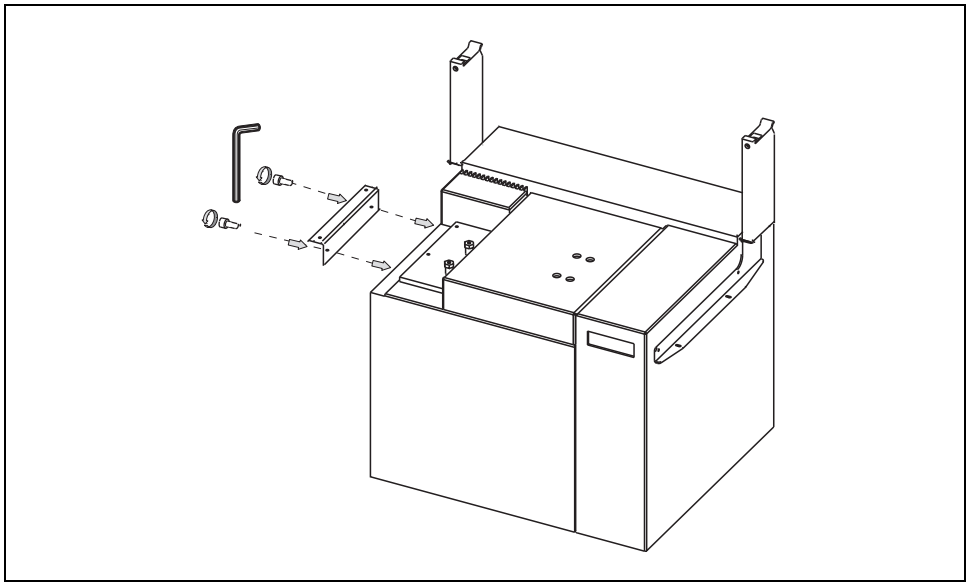


Figure 4-21. Spacer Plate Installation on the Second Agilent 6890 GC

7. Move the second GC besides the first one. Align the right sampler support of the first GC and the spacer plate of the second GC as shown in Figure 4-22, having care to fit the corresponding fixing holes.

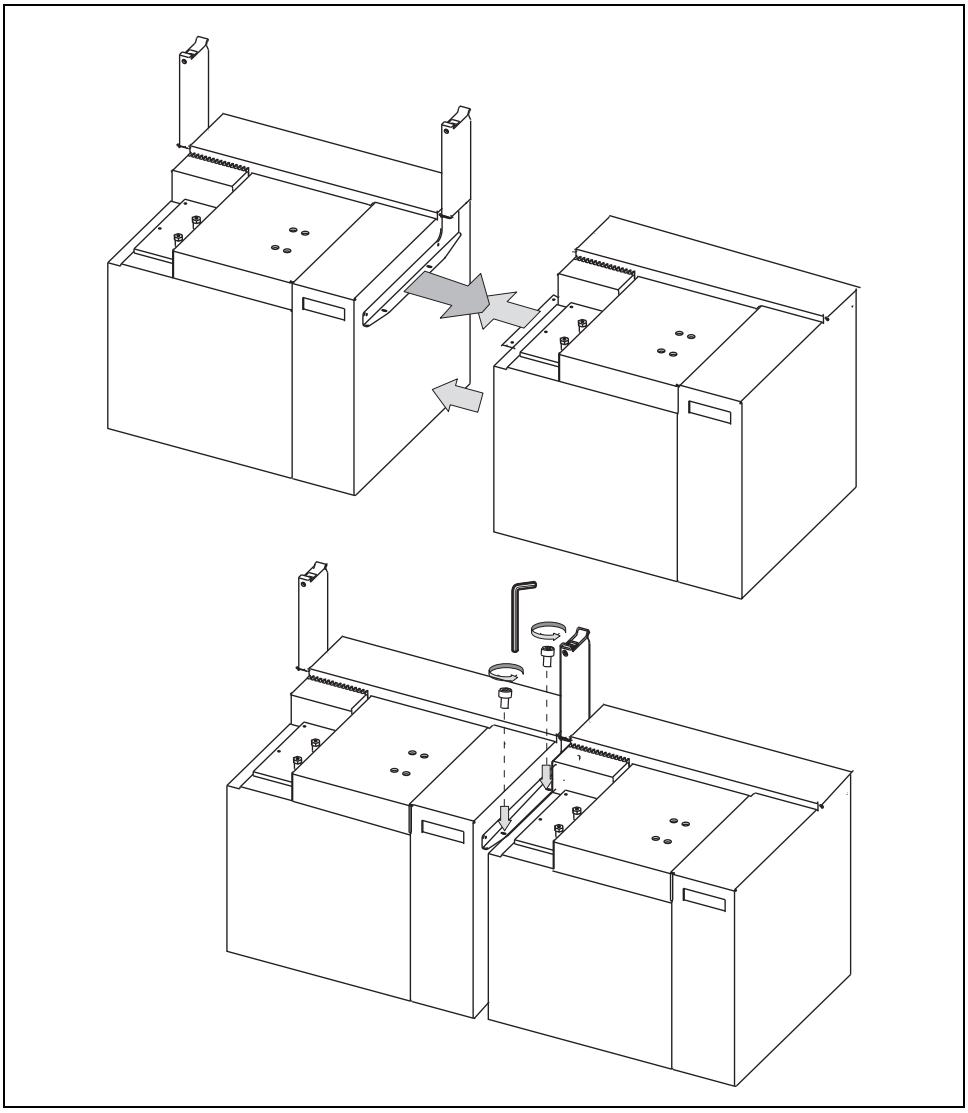


Figure 4-22. Agilent 6850 GCs Placing

8. Guide the fixing screws into the corresponding fixing holes
9. Tighten the fixing screws by using the 3-mm Allen wrench.

Sampler and Sampler Components Installation

To properly install the sampler and its components, proceed as described in the following operating sequences:

OPERATING SEQUENCE

How to Secure the Crossrail X on its Supports

To install the sampler crossrail X on its supports, see the following instructions:

WARNING! **Before performing this operation, ensure that there are no objects which might interfere with the installation and/or with the sampler movements.**

1. Loosen the fixing screw located on the leg of each support.

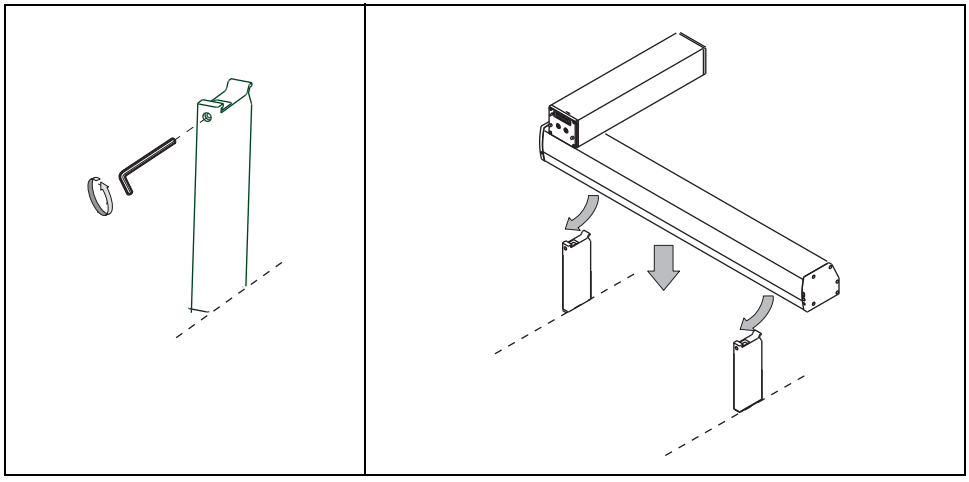


Figure 4-23. Crossrail X Installation

2. With the help of another person, gently take the crossrail X at its ends.

   Referring to Figure 4-24 proceed as follows:

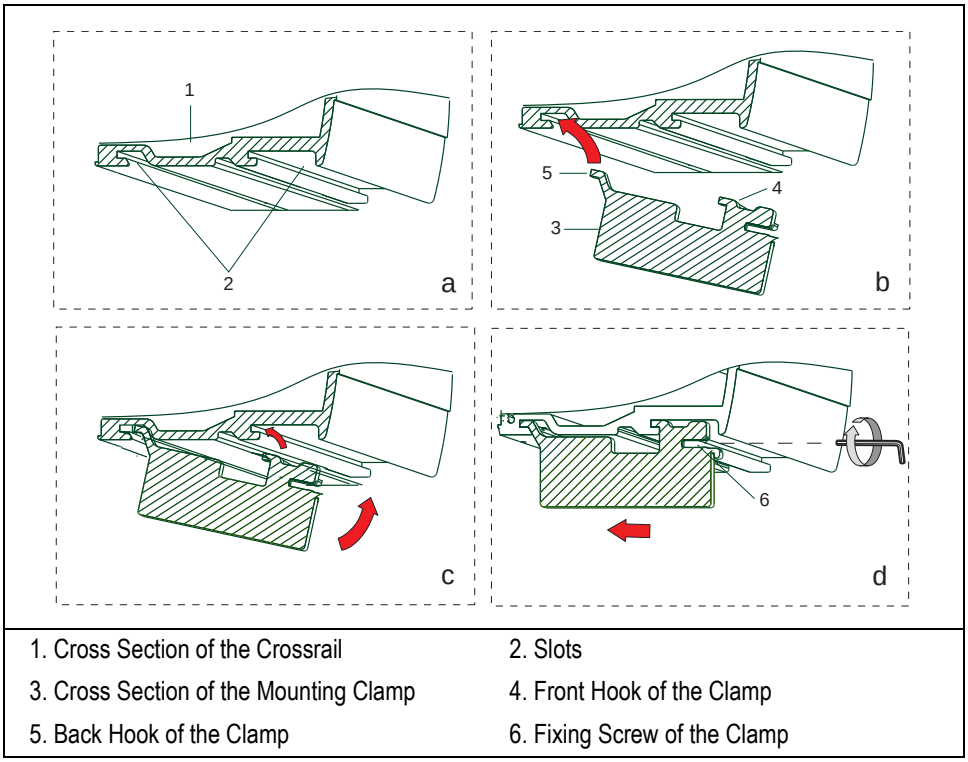


Figure 4-24. Hooking Sequence of the Clamp (1)

3. Uplift the crossrail X and place it on the top of the two supports tilting it slightly downwards in a way that the back hook of the clamp, located on the top of the support leg, slips into the proper slot. See **b** of Figure 4-24.

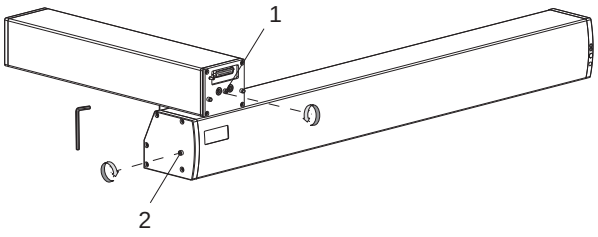
4. Straighten the crossrail X so that also the front hook of the clamp enters the proper slot parallel to the other.

5. Slightly push the crossrail backwards so that the hooks of the clamps perfectly anchor thereto. See **c** and **d** of Figure 4-24.

6. Tighten the fixing screws located on each leg of the support without too much strength.

Removing the X and Y Crossrails Locking Screws

7. Remove the X and Y crossrail locking Allen screws, as shown in Figure 4-25, in order to release the relevant movement mechanism. These screws are recognizable by a label attached to the screws.

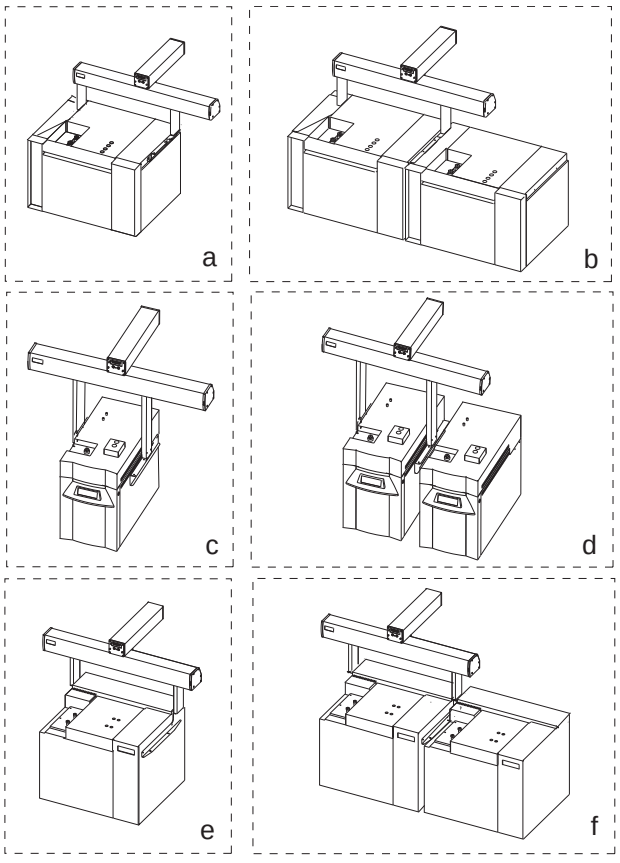


1. Y Crossrail Locking Screw	2. X Crossrail Locking Screw

Figure 4-25. X and Y Crossrails Locking Nuts

CAUTION **Keep these locking screws in a safety place because they must be re-used all the times the sampler has to be transported.**

Figure 4-26 shows the result of the assembling of the crossrail X on its supports in the GC different configurations.



a. Single Agilent 5890 GC	b. Agilent 5890 + 5890 GCs
c. Single Agilent 6850 GC	d. Agilent 6850 + 6850 GCs
e. Single Agilent 6890 GC	f. Agilent 6890 + 6890 GCs

Figure 4-26. Assembling of the TriPlus Sampler on the GCs

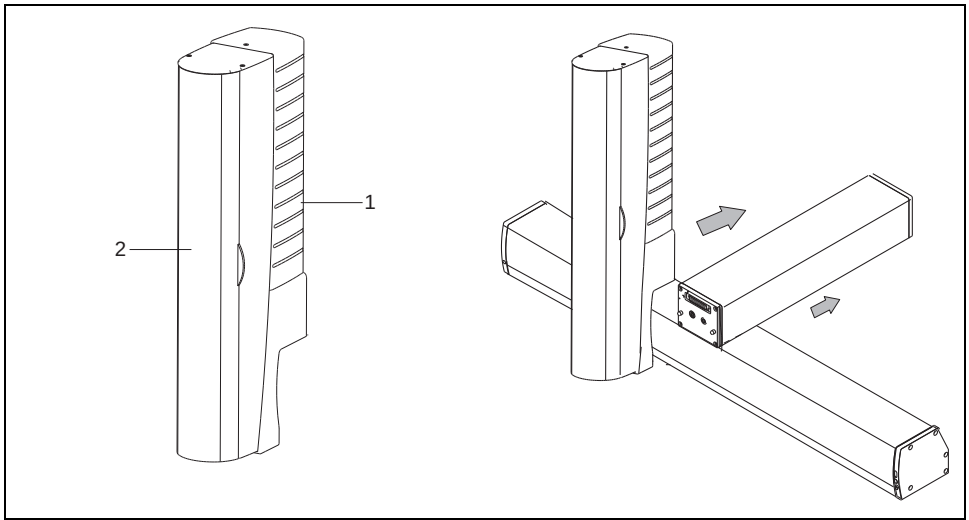
OPERATING SEQUENCE

How to Install the Turret (Z axis)

To install the turret, operate as follows:

WARNING! Before installing the turret turn OFF the sampler to avoid possible faults.

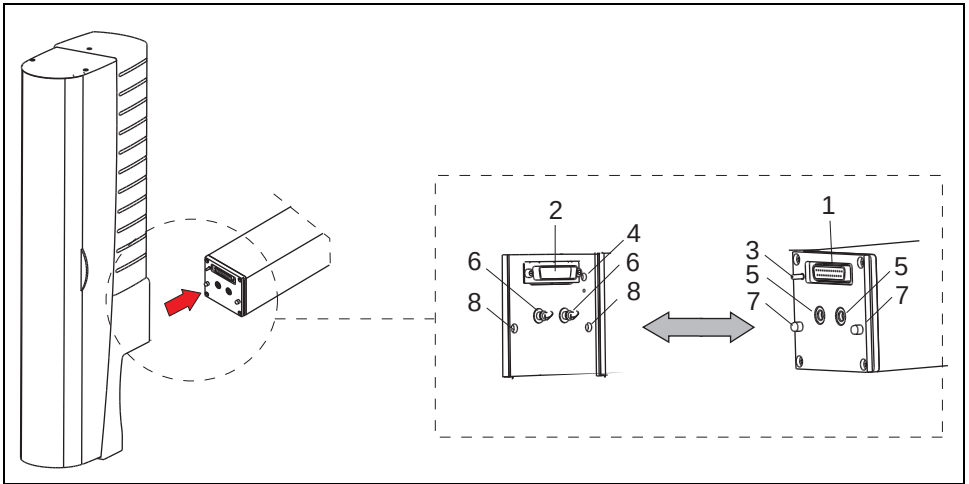
1. Push the crossrail Y towards the back of the GC until it stops.
2. Take the turret and rest its helmet onto the crossrail Y.



1. Helmet
2. Safety Door

Figure 4-27. Turret

3. Firmly holding the crossrail Y, push the turret against its front portion in a way that:
   - the guide pins present on the crossrail Y match the relevant guide slots
   - the relevant 25-pin connectors for electrical connection between the two units fit to one another.



1. 25-pin Female Connector
2. 25-pin Male Connector
3. 6. 7. Guide Pins
4. 5. 8. Guide Slots

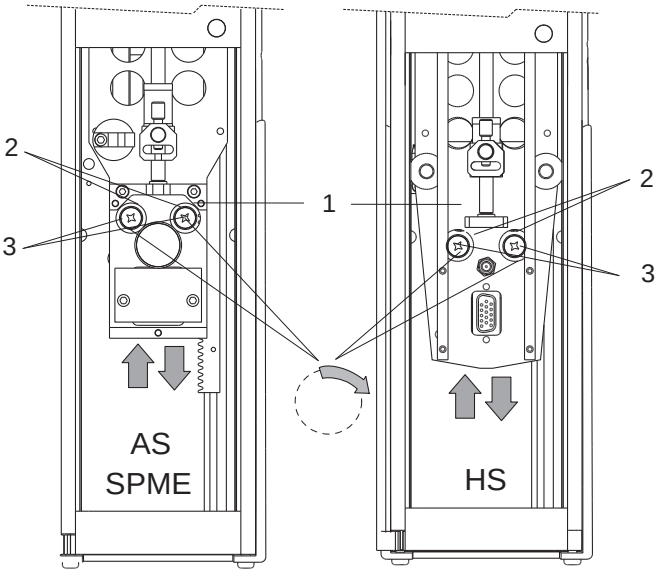
Figure 4-28. Turret Installation (1)

4. Open the turret safety door and move the injection slide up and down until the two reference holes present on the slide match the two quick-fit fixing screws. Do not release the slide.

5. Using the screwdriver provided in the standard outfit, turn the two quick-fit fixing screws clockwise by 1/4 of turn and release the slide.

CAUTION **The TriPlus sampler is featuring the AS version, as well as the SPME or HS turret version. When swapping from a turret version to another will be necessary to realign the system. Refer to *Instrument Start-up* and *Sampler Alignments*.**

WARNING! **Before installing the turret turn OFF the sampler to avoid possible faults.**



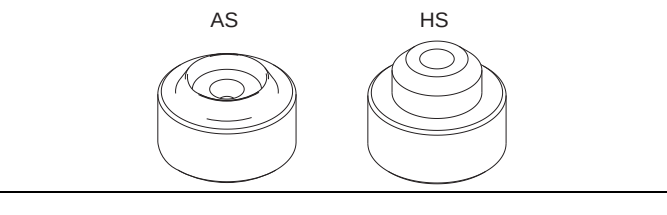
1. Slide
2. Reference Holes
3. Quick-fit Fixing Screws

Figure 4-29. Turret Installation (2)

NOTE If the fixing screws turn too easily, it means that the turret is not correctly installed. Repeat steps 3, 4 and 5.

Injector Adapter

ATTENTION The TriPlus AS and HS versions require to apply the relevant adapter, provided in the standard outfit, on the injector.



OPERATING SEQUENCE

How to Install the Sampler Components

To install the sampler components, operate as follows:

Method Suggested to Install the Components

The following method is suggested to install the major sampler components:

Install the components on the crossrail X in the position you deem more suitable, paying attention not to invade the injection zone. The installed components shall not prevent the turret movements.

CAUTION **In case of detectors in stacked configuration and in line with the other components, do not place the incubation oven (agitator) behind the stacked detector. During the manual set-up operations, pay attention not to move the turret over the stacked detector.**

How to Anchor the Components to the Crossrail X

WARNING! **Before starting the operation, pay attention that each component has its own acceptable left and right installation limits, indicated in the following Figure 4-30. If these limits are not respected, the TriPlus sampler will go in Alarm condition.**

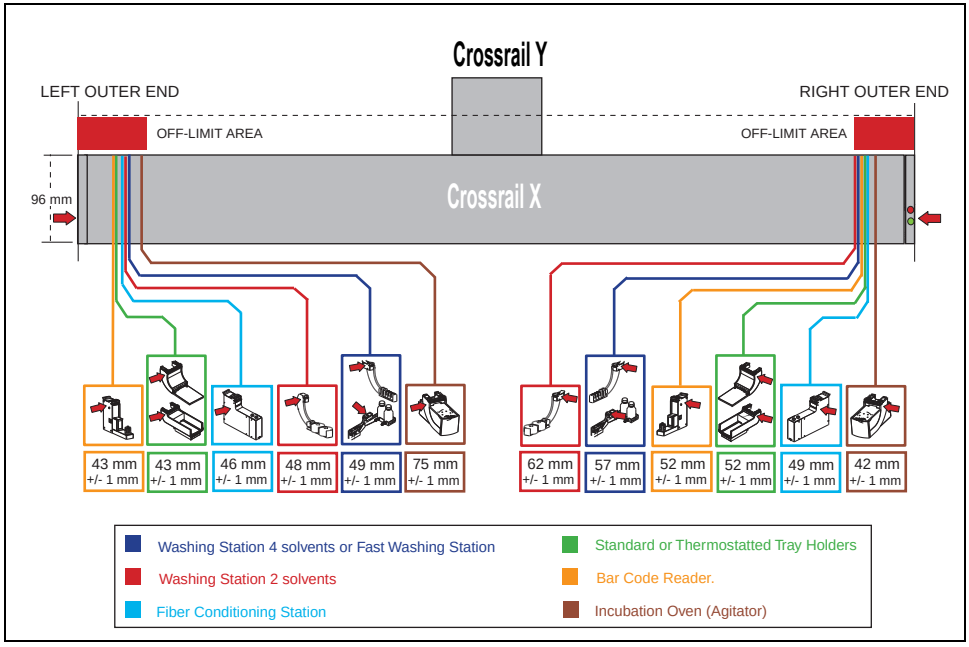


Figure 4-30. Component Left/Right Installation Limit

NOTE Each limit is measured from the left/right outer end of the crossrail X and the left/right outer end of the component of interest.

The components to be anchored may have one or two clamps. In the second case, they must be alternately and progressively hooked.

The hooking sequence is as follows:

1. Slightly tilt the component downwards in a way that the back hook of the clamp, present on the top, enter the proper slot. See **b** of Figure 4-31.

2. Straighten the component so that also the front hook of the clamp enters the proper slot parallel to the previous one. See **c** of Figure 4-31.

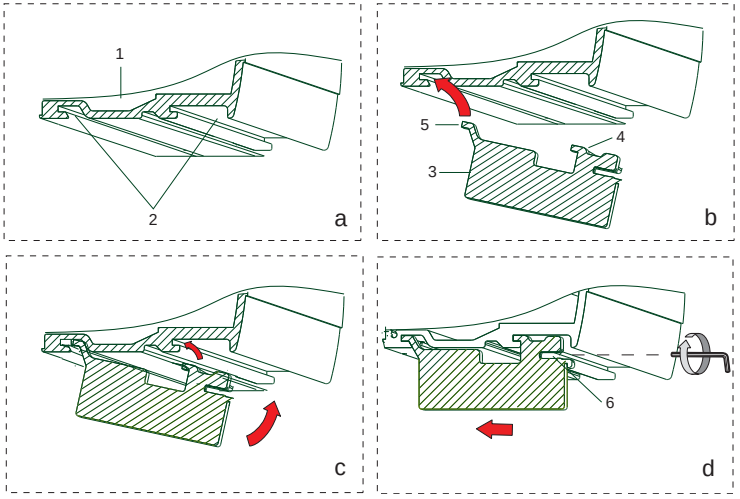
3. Slightly push the component backwards in a way that the clamp hooks result perfectly anchored. See **c** and **d** of Figure 4-31.

4. Tighten the fixing screw located behind the clamp. See **d** of Figure 4-31.

NOTE For components with two clamps, both the fixing screws have to be fully alternately and progressively tightened, in order to perform a symmetrical positioning.

WARNING! **If the thermostatted tray holder is installed, pay attention for not to obstruct the ventilation system located under the same tray holder.**

Pay attention to keep a minimal distance of 1 cm between the thermostatted and the standard tray holder or the washing station.



1. Cross section of the Crossrail	2. Slots
3. Cross section of the Mounting Clamp	4. Front Hook of the Clamp
5. Back Hook of the Clamp	6. Fixing Screw of the Clamp

Figure 4-31. Hooking Sequence of the Clamp (2)

WARNING! The tray holders cannot be installed above the injectors/detectors compartment of the GC.

How to Install the Sample Tray on the Standard Tray Holder

To install the sample tray on its support, operate as follows. See Figure 4-32.

1. Take the tray by its handle.
2. Rest the tray on the support plate.
3. Slightly lift it from the handle side and push it onwards to get the hooks on the tray back portion to fit into the relevant slots located on the support.

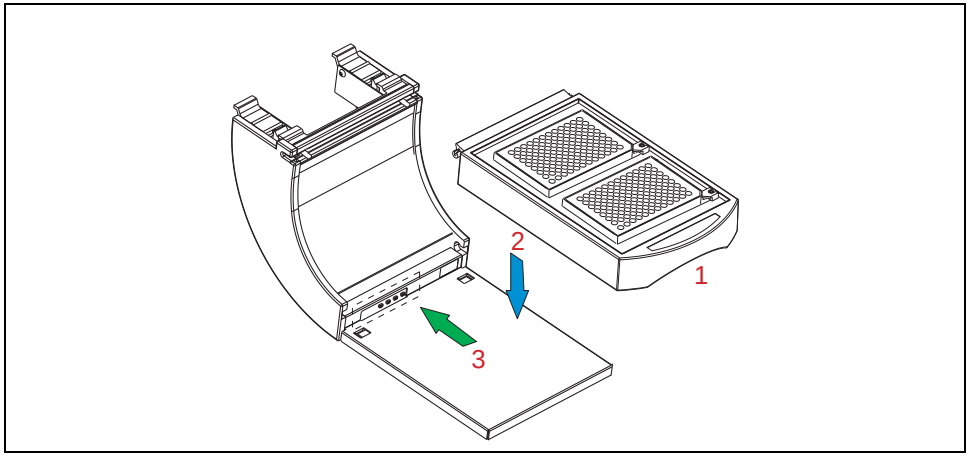


Figure 4-32. Sample Tray Installation on the Standard Tray Holder

How to Install the Sample Tray on the Thermostatted Tray Holder

To install the sample tray on its support, operate as follows. See Figure 4-33.

1. Take the tray by its handle.
2. Push down the tray holder clip.
3. Keeping the clip pushed down, insert the sample tray into the tray housing.

4. Place the tray cover when required.

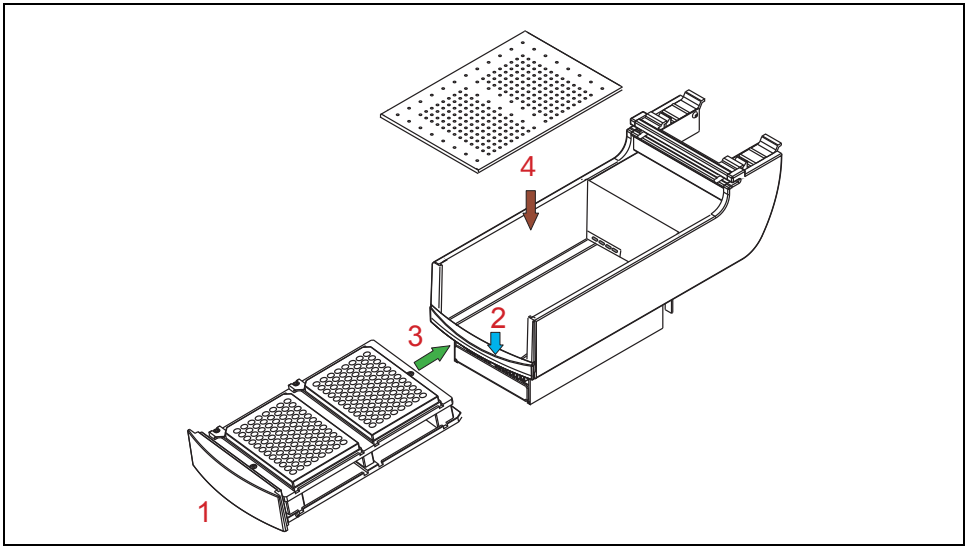


Figure 4-33. Sample Tray Installation on the Thermostatted Tray Holder

How to Install the Vial Bracket Holder on the Washing Station

The washing station when used in combination with the HS version, it requires the optional Vial bracket holder.

To install the Vial bracket holder proceed as follows:

1. Place the solvent vials into the washing station vial holder.
2. Insert the Vial bracket holder into the holes provided on the washing station body.

NOTE As shown in Figure 4-34, one vial bracket holder is required for the standard washing station while two of them are required for the LV applications washing station.

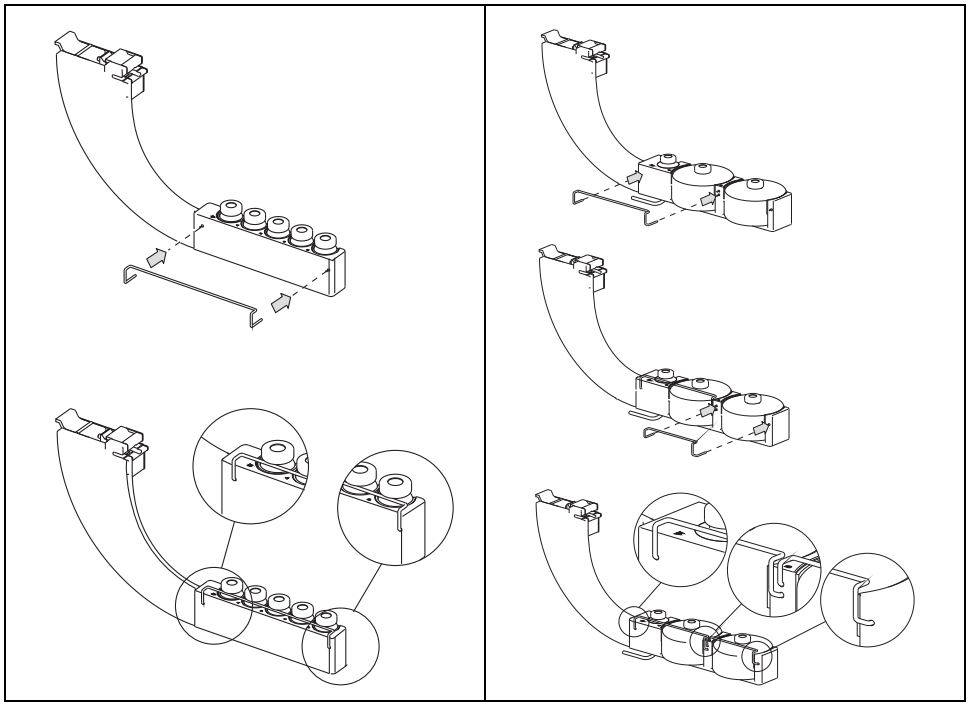


Figure 4-34. Vial Bracket Washing Station

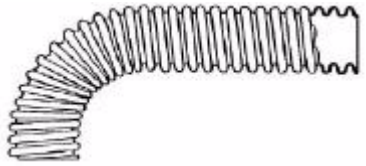
How to Install the Fast Washing Station

To install the proceed as follows. See Figure 4-35.

1. Place the two 500 mL solvent bottles into the washing station bottles holder.
2. Connect the solvent tubes provided between each bottle and the relevant solenoid valve.
3. Connect the waste tube between the waste beak and a drain vessel placed on the floor.

CAUTION **Take care to bend the waste tube at right angle immediately after the outlet. The tube should also have a vertical slope all the way until the waste reservoir. Avoid as much as possible to place the tube horizontally or else the liquid may form plugs**

preventing from a correct draining. The tube provided in the outfit, shown in the figure below, has a standard 2 m length that ensures to reach comfortably the waste reservoir.



You are advised to cut unnecessary lengths of the tube in order to avoid loops or horizontal sections.

4. Flow the solvent in the tubes manually opening the toggle valve on the lower part of each bottle.

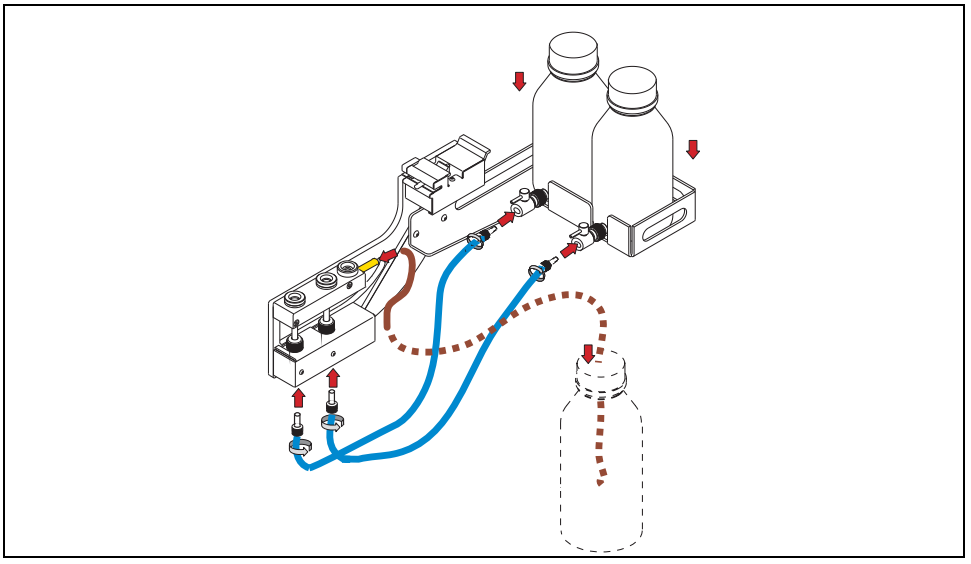


Figure 4-35. Fast Washing Station Installation

IMPORTANT **Before use, purge air in the fast washing station tubing by performing 10 off-line syringe washing.**

WARNING! **All the waste materials will have to be collected and eliminated in compliance to the regulations and the directives in force in the countries where the instrument is used.**

How to Install the Fan Station

1. Install the Fan Station away from the heated surface as shown in the example of Figure 4-36.

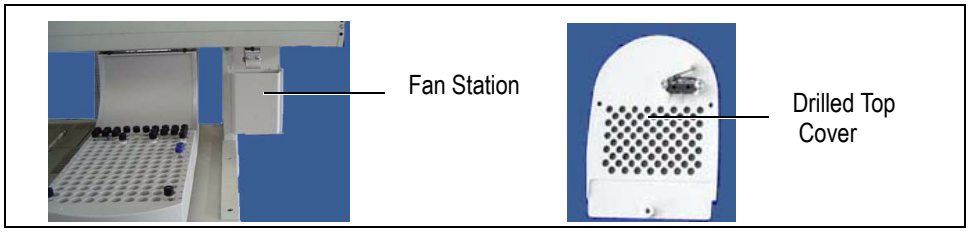


Figure 4-36. Example of Fan Station Installation

2. Verify that the turret of your TriPlus AS is provided with the drilled top cover.
3. If not, please replace the top cover with the drilled one's operating as follows:
   a. By using the screwdriver remove the three fixing screw of the turret top cover.
   b. Disconnect the two wires from the microswitch located on the cover.
   c. Connect the two wires to the microswitch located on the drilled cover.
   d. Mount and fix the new top cover on the turret by using the fixing screws.

How to Install the Fiber Conditioning Station

ATTENTION **Install the fiber conditioning station on the sampler paying attention for not to obstruct the fan located under the same station. Besides, pay attention to keep a minimal distance of 1 cm between the station and the nearest component to allow the ventilation through the side slotes.**

Syringe Holder Installation

According to the AS or HS configuration of the TriPlus sampler, refer to the proper operating sequence:

- *How to Install the Syringe Holder Assembly onto the AS Sampler*
- *How to Install the Syringe Holder Assembly onto the HS Sampler*
- *How to Install the Syringe Holder Assembly onto the SPME Sampler*

OPERATING SEQUENCE

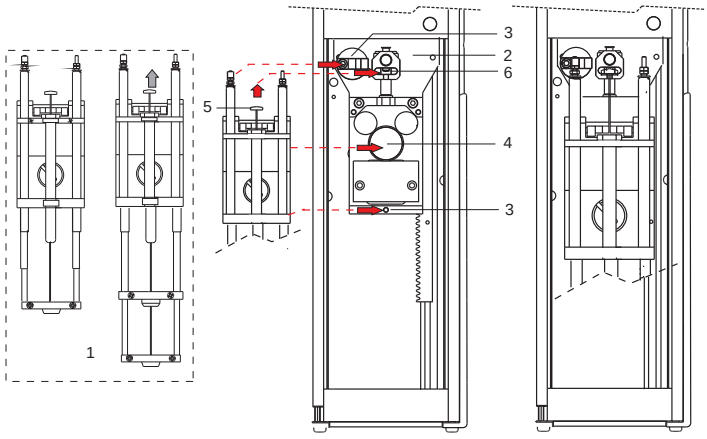
How to Install the Syringe Holder Assembly onto the AS Sampler

The syringe installation is a simple operation, but it requires caution to prevent damages to the syringe needle and ensure optimal performance of the injection device.
Syringes of 5, 10, 100, 250 µL can be installed with needle length of 50 or 80 mm. The syringes used must be compatible with the system.

CAUTION **As a function of the length of the syringe needle, the appropriate syringe holder must be used.**

Install the syringe assembly onto the sliding plate making reference to Figure 4-38 and proceeding as follows:

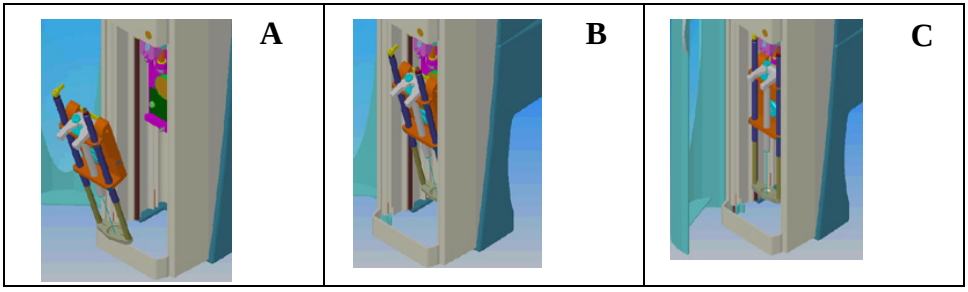
1. Open the turret safety door.
2. Take the syringe holder assembly.
3. Select the syringe volume on the selector present on the sliding plate to record the type of syringe installed.
4. Install the syringe on the holder as described in the operating sequence *Triplus AS Syringe Installation and Replacement* in Chapter 7.



1. Syringe Holder Assembly	2. Sliding Plate
3. Hooking Pins	4. Supporting Magnet
5. Plunger Head	6. Plunger Control Shoe

Figure 4-37. Syringe Holder Installation (AS)

5. Apply the syringe holder assembly on the supporting magnet located on the sliding plate paying attention to simultaneously introduce the hooking pins and the plunger head into their relevant guides.



6. Close the turret safety door.

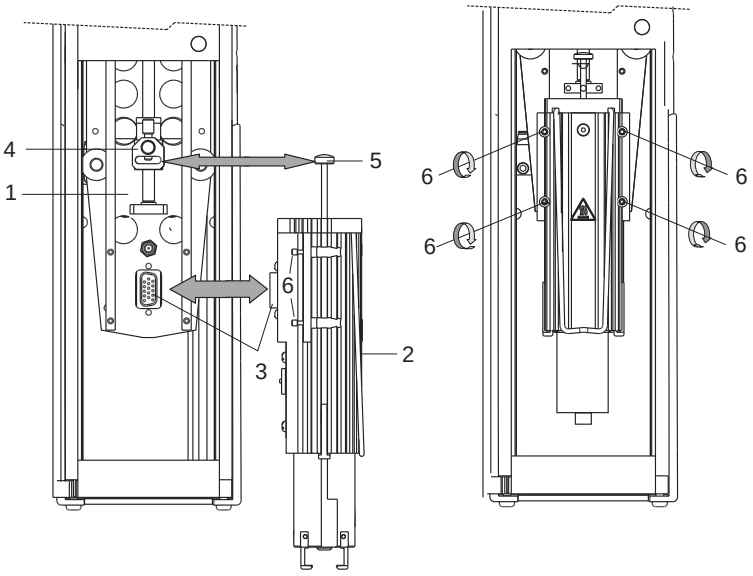
NOTE Before starting operation, remember to open the **Configuration Mismatch** page from the user interface in use, in order to automatically update the system with the new installed syringe.

OPERATING SEQUENCE

How to Install the Syringe Holder Assembly onto the HS Sampler

The installation of the syringe, or its replacement, is a procedure requiring caution to prevent damages and ensure a correct operation of the injection device.

NOTE The syringe is now considered as already installed inside the syringe holder assembly. For the syringe installation, refer to the operating sequence *TriPlus HS Syringe Installation and Replacement* in Chapter 7.



1. Sliding Plate	2. Syringe Assembly
3. 9-pin Connector	4. Plunger Control Shoe
5. Plunger Head	6. Fixing Screws of the Syringe Assembly

Figure 4-38. Syringe Holder Installation (HS)

Install the syringe assembly onto the sliding plate making reference to Figure 4-38 and proceeding as follows:

The syringe assembly can accommodate syringes of 1, 2.5 or 5 mL.

1. Open the turret safety door.
2. Select the syringe volume on the selector present, on the rear panel of the syringe holder, to record the type of syringe installed.
3. Gently introduce the injection assembly into the turret fitting the 9-pin connector and the washing gas nozzle to their relevant seats provided in the heated syringe-holder assembly.
4. Move the syringe plunger upwards to insert the head into its seat provided in the plunger control shoe.
5. Gently tighten the four screws to fix the injection assembly to the turret sliding plate.
6. Close the turret safety door.

NOTE Before starting operation, remember to open the **Configuration Mismatch** page from the user interface in use, in order to automatically update the system with the new installed syringe.

OPERATING SEQUENCE

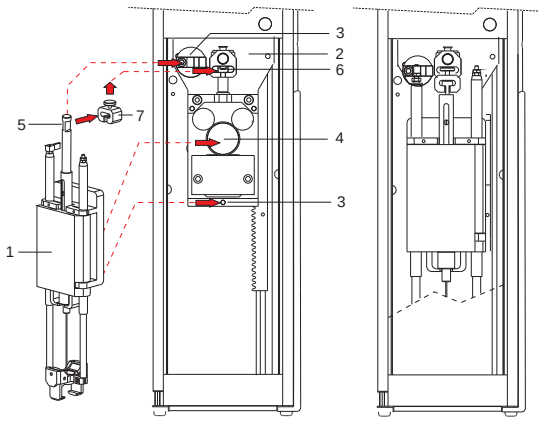
How to Install the Syringe Holder Assembly onto the SPME Sampler

The syringe installation ia a simple operation, but it requires caution to prevent damages to the syringe needle and ensure optimal performance of the injection device. Install the syringe assembly onto the sliding plate making reference to Figure 4-39 and proceeding as follows:

1. Open the turret safety door.

2. Take the syringe holder assembly.

3. Install the fiber holder on the syringe holder as described in the operating sequence *Triplus SPME Fiber Holder Installation and Replacement* in Chapter 7.



1. Syringe Holder Assembly
2. Sliding Plate
3. Hooking Pins
4. Supporting Magnet
5. Plunger Head
6. Plunger Control Sliding-Shoe
7. Plunger Adapter

Figure 4-39. Syringe Holder Installation (SPME)

4. Insert the plunger adapter into the plunger control sliding-shoe.
5. Apply the syringe holder assembly on the supporting magnet located on the sliding plate paying attention to simultaneously introduce the hooking pins and the plunger head into their relevant guides.
6. Close the turret safety door.

NOTE Before starting operation, remember to open the **Configuration Mismatch** page from the user interface in use, in order to automatically update the system.

Pneumatic Connections

This paragraph describes how to connect the gas for the flushing of the HS syringe or to supply the fiber conditioning station.

OPERATING SEQUENCE

How to Connect the Gas for the Flushing of the HS Syringe

Proceed as follows:

Purge Gas Connection

1. On the Pressure Regulator located on the rear panel of the incubation oven, connect the inlet marked **IN** to the gas supply.
2. Connect the outlet marked **OUT** to the gas inlet marked **FROM AGITATOR** situated on the rear section of the crossrail X.

Syringe Flush Gas Test

3. By using the **Syringe Flush** direct command from the user interface in use, enable the solenoid valve to turn **on** the syringe flush gas source.
4. On the Pressure Regulator set the pressure to 200 kPa (30 psi).
5. Allow the system to pressurize for 10 seconds.
6. Connect the flow meter (Thermo Scientific GFM Pro Flowmeter, or equivalent) to the end of the syringe needle.
7. Measure the flow out of the syringe needle.
8. The flow should be greater than 50 mL/min
9. Use the **Syringe Flush** direct command to disable the solenoid valve to turn **off** the syringe flush gas source.

OPERATING SEQUENCE

How to Connect the Flushing Gas to the Fiber Conditioning Station

Proceed as follows:

1. On the Pressure Regulator located on the rear panel of the incubation oven, connect the inlet marked **IN** to the gas supply.
2. Connect the outlet marked **OUT** to the gas inlet marked **FROM AGITATOR** situated on the rear section of the fiber conditioning station.
3. On the Pressure Regulator set the pressure to 250 kPa (36 psi) in a way to have a gas flow greater than 100 mL/min.

NOTE At the moment of the power on, after the acknowledgement of the station, the sampler will enable the flow of the flushing gas to supply the station.

Electrical Connections

This paragraph describes how to make electrical connections between the sampler and its components, and how to power the sampler through the power module.

NOTE Power supply to the instrument must be as specified in the paragraph *Technical Specifications* in Chapter 1. Before performing electrical connections, also ensure that the requirements reported in the paragraph *Electrical Requirements* of this chapter have been met.

Power Module

Place the power module beside the GC and in the most comfortable position for the operator to have free access to the on/off power switch.

WARNING! While installing the power module, pay attention to always have free access to the on/off switch to be able to act easily thereon in case of emergency.

Cables Connection

For the correct connection of the cables follow the instructions reported in the following operating sequence:

OPERATING SEQUENCE

How to Connect the Cables

Proceed as follows:

Connection of the Cables Between the Sampler and the Components

1. Using the cable provided, connect the 8-pin connector type RJ45 located on the component back to the closest 8-pin connector type RJ45 marked **BUS** located on the rear portion of the crossrail X.
   Repeat this operation for each component present.

Connection of the Cables Between the Sampler and the On-Column Actuator, Incubation Oven, Fast Washing Station, Fiber Conditioning Station

1. Using the proper cable, connect the 15-pin connector located on the rear panel of the component of interest to the 15-pin connector marked **DEVICE 1** or **DEVICE 2** located on the rear portion of the crossrail X.

CAUTION **Only two components can be connected to the DEVICE 1/2 connectors**

Connect the Cables Between the Sampler and the On-Column Actuator

a. In the TriPlus HS configuration, using the proper cable, connect the 15-pin connector located on the rear panel of the incubation oven (Agitator) to the 15-pin connector marked **DEVICE 1** located on the rear portion of the crossrail X.

b. Should the On-Column injector be present, connect the cable coming from the automatic actuator provided in the GC to the connector marked **DEVICE 2** located on the rear portion of the crossrail X.

Connect the Cables Between the Sampler and the Incubation Oven, Fast Washing Station, Fiber conditioning Station

a. If the sampler configuration, e.g. SPME, includes the incubation oven, the fast washing station and the fiber conditioning station, connect these components as follows:

- Connect the incubation oven to the connector marked **DEVICE 1** located on the rear portion of the crossrail X.
- Connect the fiber conditioning station to the connector marked **DEVICE 2** located on the rear portion of the crossrail X.
- Connect the fast washing station the connector marked **CHAIN** on the rear panel of the fiber conditioning station.

Connection of the Cables Between the Sampler and the GC

1. Using the cable provided, for each GC on which the TriPlus is installed, connect the 8-pin connector marked **HANDSHAKE MAIN** or **VIRTUAL** located on the rear portion of the crossrail X to the connector marked **REMOTE** located on the GC.

NOTE To Configure the TriPlus sampler for multiple GC, please refer to Appendix A *TriPlus Sampler for Multiple GC Configuration*.

Connection of the Cables Between the Thermostatted Tray Holder and the External Portable Power Supply

1. Plug in the Vdc power cable of the external portable power supply into the jack marked **+/-** located on the back side of the thermostatted tray holder.
2. Connect the power cord of the external power supply to the mains outlet.

Connection of the Cables Between the Sampler and the User Interface

User Interface means the PC with dedicated control software or a pocket PC.

1. Using the cable provided connect the connector marked **RS 232** located on the rear portion of the crossrail X to the COM serial port of the PC or to the pocket PC.

NOTE

Each TriPlus unit is provided with two RS 232 ports located on the rear panel of the crossrail X, so to allow communication through two independent users.
The operator can decide whether to use the pocket PC connected to the sampler via RS232 cable or the IR transceiver or also via LAN if available.
To connect the pocket PC to the TriPlus sampler, refer to *Pocket PC Connection* in Chapter 9 *TriPlus Control from the Pocket PC*.

Connection of the Cables Between the Sampler and the Power Module

1. Using the cable provided, connect the 25-pin connector marked **SAMPLER SUPPLY,** located on the rear portion of the crossrail X, to the 25-pin connector marked **SAMPLER SUPPLY** located on the rear panel of the power module.

Connection to the LAN Network

Using the cable provided, connect the RJ45 connector marked LAN, located on the rear panel of the power module, to the LAN network.
To enter the desired IP address and the LAN communication port of the TriPlus sampler, follow the instructions reported in Chapter 8, *LAN Set-up*.

Instrument Start-up

Before switching on the instrument, check that the power module meets the requirements reported in the paragraph *Power Module*.

1. Connect the power module to the power line by using the cable provided.

CAUTION **If the thermostatted tray is present, it must be switched on before the sampler in order to be automatically recognized at the sampler power on.**

2. Move the power switch to position **I**.

   As soon as switched on, the sampler automatically performs an initial test to check the presence of the components and to define their position.

3. Open the TriPlus interface to be used for the sampler control:

   - Data system or
   - Stand-alone program or
   - TriPlus software on Pocket PC

4. Configure the sampler and verify the set-up of its components.
   Perform the operation following the instructions according to the user interface in use:

   - *If the **Data System** is used*
     Refer to *Configure TriPlus Autosampler* and *Sampler Setup Dialog Window* in the relevant operating manual.
   - *If the **Stand-alone Program** is used*
     Refer to *Configuration Page* and *Sampler Set-up Page* in Chapter 5 of this manual.
   - *If the **TriPlus Software on Pocket PC** is used*
     Refer to *Configuration Page* and *Sampler Setup Page* in Chapter 9 of this manual.

5. Perform the sampler alignments. Refer to paragraph *Sampler Alignments*.

Sampler Alignments

Before starting accommodate the sample vial complete with septa and cap into the first and the last position of the sample tray.

By using the relevant commands check and perform the alignment of the syringe carriage assembly (sampler injection device) on the following parts:

- GC injector(s)
- Sample vial

Perform the alignment operations following the instructions according to the user interface in use:

- *If the **Data System** is used*
  Refer to *Component Information Dialog Window* and *Injector Setup Page* in the relevant operating manual.
- *If the **Stand-alone Program** is used*
  Refer to *Component Information Page* and *Injector Setup Page* in Chapter 5 of this manual.
- *If the **TriPlus Software on Pocket PC** is used*
  Refer to *Component Information Page* and *Component Information Page* in Chapter 9 of this manual.

5

TriPlus Control from the PC

This chapter provides the information to control the TriPlus from the computer with dedicated software.

Chapter at a Glance…

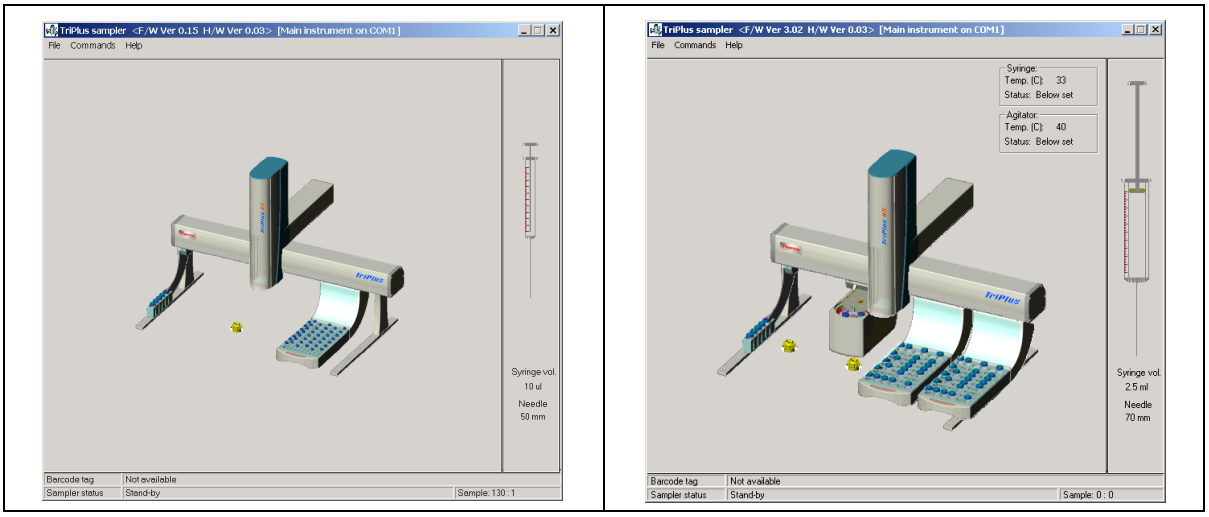
Introduction

The TriPlus sampler functions are controlled and programmed through a dedicated software, integrated in a Thermo Data System or available as a stand-alone version, installed in a computer and interfaced with the instrument via serial line RS 232.

This paragraph describes the user interface to program the instrument operating parameters through the dedicated software.

Stand-alone Software Initial Page

In the Initial Page the virtual image of the sampler is displayed with all the components currently installed and the syringe data. The following figure shows an example of this page.



File Menu

File Menu allows to access the following functions

Configuration

Select this function to open *Configuration Page* where the sampler communication parameters can be set.

Sampler set-up

Select this function to open *Sampler Set-up Page* where the working components, such as injectors, sample trays, washing station, etc., can be set and configured.

Method editor

Select this function to access the Method Setup Page where the parameters of the method should be set according to the sampler configuration and to the relevant

injection mode chosen. See *TriPlus AS Method Setup Page* or *TriPlus HS Method Setup Page* or *TriPlus SPME Method Setup Page*.

Animation

Select this function to animate the sampler image shown in the initial page. To enable animation, select **On**, otherwise select **Off**

Exit

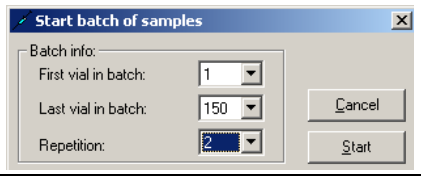
Select this function to exit the program.

Commands Menu

This menu permits to access the following functions:

Start batch of samples

This function allows to start the sequence of the batch of samples. The following dialog window is displayed.



Batch info Frame

- **First vial in Batch**
  Indicates the number of the first sample vial of the sequence.
- **Last Vial in Batch**
  Indicates the number of the last sample vial of the sequence.
- **Repetition**
  Number of injections that may be performed from the same vial in the sequence.
- **Start**
  Click this button to begin the sequence of the samples. The method used is the last loaded.
- **Cancel**
  Click on this button to quit the page without modifying the parameters in memory.

Stop batch of samples

This function stops the sample sequence currently running.

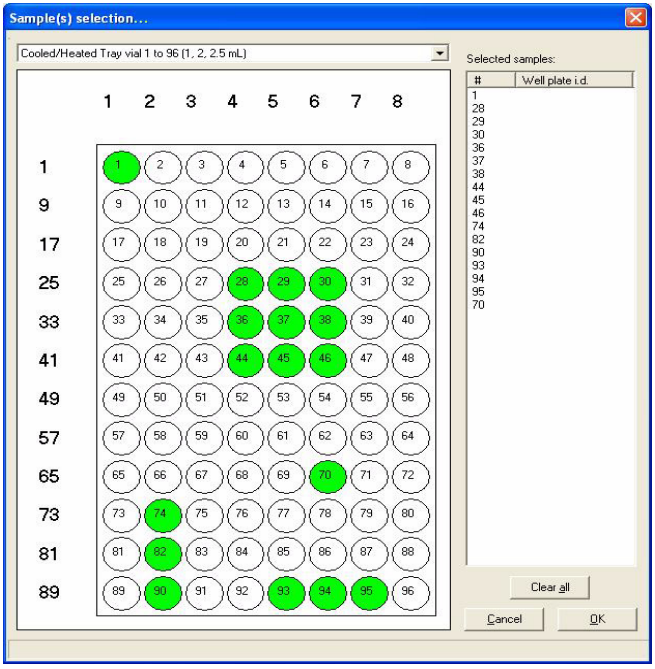
Multiple batches

This function allows to start the sequence of multiple batch of samples. The following option are available:

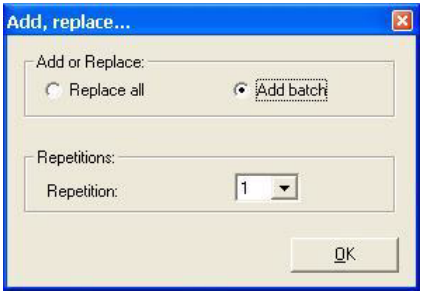
Start multiple batch of sample

This function allows to select the samples as shown in the example below and to starts the sequence of the selected batches of samples.

ATTENTION For Headspace and SPME sequences, a batch includes a series of consecutive vials with increasing progressive numbering.



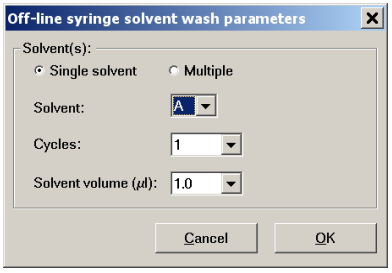
Click on OK, the following dialog window is displayed where it is possible to add, replace batches and select the number of injections that may be performed from the same vial in the sequence.



Stop all batches
This function stops all the sample sequence currently running.

View queued sample batches
This allows to view the queued sample batches.

Start syringe solvent wash
This function permits to start a syringe cleaning cycle.
The following page is displayed:



Solvent (s)
It is possible to select one of the four solvents selecting Single, or to select up to four different solvents selecting Multiple.

- **Single**
  Select this option when a single cleaning solvent should be used.

- **Multiple**
  Select this option when more than one cleaning solvents should be used.

Solvent
This parameter specifies the solvent(s) to be used according to the Single or Multiple option selected. The sampler may use up to 4 different solvents and you can select which to use as rinse solvent(s). Select A, B, C or/and D.

Cycles
This parameter allows to set how many syringe washing cycles with solvent have to be run. Set a number between 0 and 15.

Solvent volume (µl)
Specify the volume of the rinse solvent. It depends on the syringe volume.

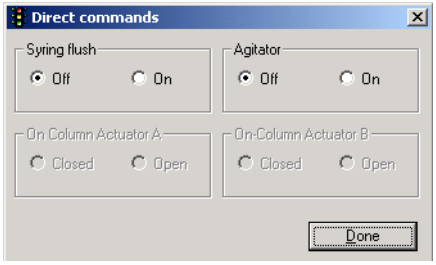
Ok
Press this button to start the cleaning cycle.

Cancel
Click on this button to quit the page without modifying the parameters in memory.

Start injector port wash
Start off line fiber conditioning

Direct command Menu

This menu opens the dialog page where it is possible the set the commands for the manual activation of the components indicated in the following page.



Parameter	Range	Description
`Syringe flush`	On – Off	It enables On or disables Off the activation of the syringe flush
`Agitator status`	On –Off	It enables On or disables Off the activation of the agitator status
`On-Column actuator A`	Open – Close	It enable the automatic actuator to open or close the rotary valve of the On-column injector when present
`On-Column actuator B`	Open – Close	It enable the automatic actuator to open or close the rotary valve of a second On-column injector when present

Help Menu

This function permits to access the help system.
The Help is divided into many modules and each has been designed to cover specific issues of the module currently in use.

About

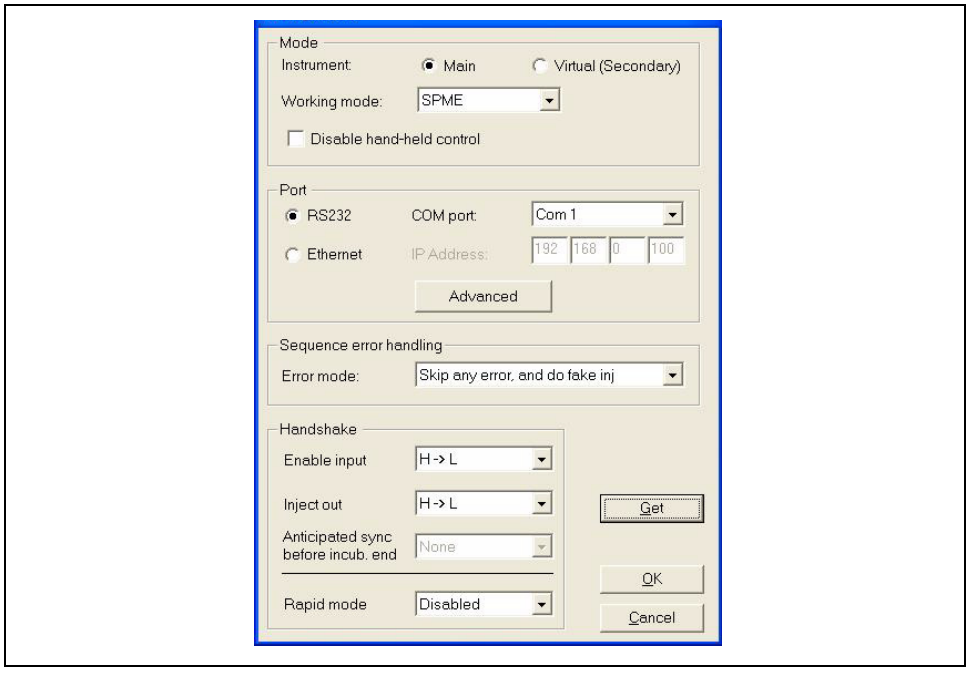
This function permits to display the version and the copyright of the program.

Related Topics

- *Configuration Page*
- *Sampler Set-up Page*
- *Method Selection Page*

Configuration Page

Use this page to set the mode, communication port and signal selection (Handshake) to allow correct interpretation between the sampler and the GC.



NOTE To Configure the TriPlus sampler for multiple GC, please refer to Appendix A *TriPlus Sampler for Multiple GC Configuration*

This page includes the following frames and buttons:

Mode

This section allows to configure the sampler to work with two different Data Systems each of them using its own method and sequence of samples.

Instrument Main

Check this option button to configure the sampler as main instrument. The start signal is generated at the output of the GC1 connector on the crossrail X.

Instrument Virtual (Secondary)

Check this option button to configure the sampler as virtual secondary instrument to operate with a second GC, controlled by a second independent data system. The start signal is generated at the output of the GC2 connector on the crossrail X.

WARNING! **Main and Virtual functions are usable only with the TriPlus AS version.**

NOTE In case of TriPlus HS and SPME versions, the Instrument Virtual function is not usable. To inject in two GCs, it is necessary to use the *Constant DoublePro* incubation mode connecting the two start/stop cables to the two GCs separately.

Working mode

Select the working mode according to the version of the sampler:

- GC-Liquids (TriPlus AS)
- GC-Head Space (TriPlus HS)
- SPME (TriPlus for Solid Phase Micro Extraction)
- LC (TriPlus for Liquid Chromatography)

NOTE TriPlus LC is not part of this manual; please refer to the dedicated operating manual.

Disable hand-held control

Check this box if you want to disable the control from a pocket computer when available.

Port

This frame allows to select the type of communication between the sampler and the data system.

RS232

Check this option button when the communication take place via RS232 serial line. Click on **ADVANCED** to open the window where the timeout may be set.

COM Port

Select which COM port (see the back of your CPU) your sampler is connected to. A COM port is a 9-pin cable connection located on the back of your computer.

WARNING! **Configuring the TriPlus through GC may slow down the communication performance, since a large amount of data is sent to Trace GC, and then Trace GC sends to TriPlus. The 'Through GC' communication configuration is reliable but significantly slower than connecting TriPlus directly on a COM port or through LAN.**

Ethernet

Check this option button when the communication takes place through LAN (Local Area Network). Click on **ADVANCED** to open the window where the communication LAN port and the timeout may be set.

IP Address

Enter the IP address to allow the LAN control of the GC through the Thermo data systems.

Advanced Button

Click on this button to open the window where the timeout RS232 or the LAN communication port used by the protocol of TCP-IP and the time-outs may be set. Generally the two values are 500 and 4001 respectively.

Sequence Error Handling

This frame allows to configure how treating the vial missing errors according to what the operator desires.

Error Mode

For default a recoverable error as vial missing, solvent missing, or injector missing is treated with a fake injection. Nevertheless there are cases in which it is not wanted to continue, but it is desired to attend the operator. In this case it is need to inform the sampler with this selection in the configuration:

The three possibile selections are:

- Skip any error, and do fake inj

- Skip missing vial, and do fake inj
- Stop sequence for all errors

Handshake Boxes

This frame allows to specify how the signal will change for the proper interpretation between TriPlus sampler and GC. Each pulse signal may be configured High to Low, Low to High, or None.

Enable input

This parameter signals to the sampler to start the injection.

Inject out

This parameter signals to the GC that the sampling has ended.

Anticipated synch before incub. End

Synchronism signal with the Cold Trap. For TriPlus HS version only.
This parameter allows the sampler to generate a pre-trigger signal, before the end of the sample conditioning time, starting the trap cooling. This synchronism allows to minimize the time the trap remains at the conditioning phase, thus saving on cooling agent.

Rapid Mode

This parameter allows to enable or to disable the sampler function to remain waiting for the GC READY signal after having performed the preliminary operations to prepare for sampling ignoring the GC phases.
See also *X-Axis Driver* in the paragraph *Sampler Set-up Page* to access the Rapid mode advanced parameters.

Buttons

Get

Click on this button to transfer the configuration data to the Data System

Ok

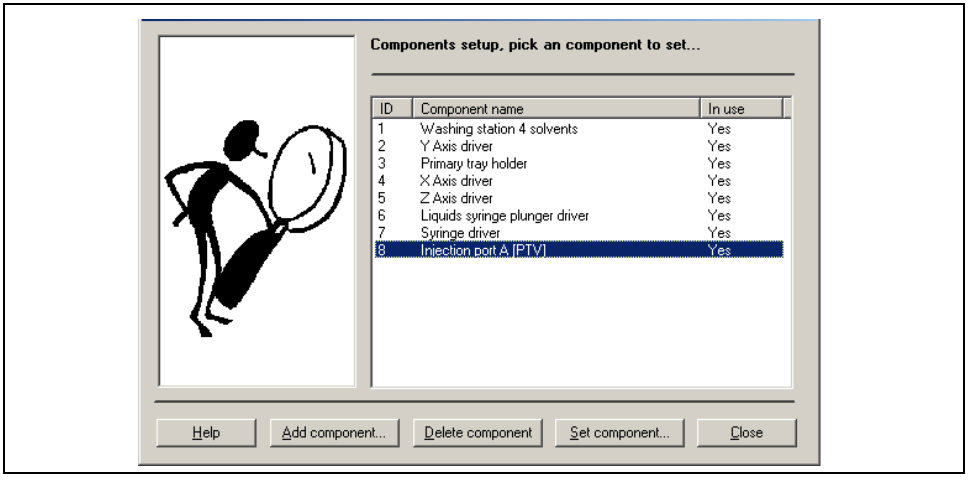
Click on this button to confirm the modification you entered in the Configuration Page. All entered parameters become active only after the selection of this function.

Cancel

Click on this button to quit Configuration Page without modifying the parameters in memory.

Sampler Set-up Page

This page allows to visualize the drivers, the recognized components and those in memory (injection ports).



Window Grid

The grid shows the components automatically recognized by the sampler. These components can be enabled or disabled but cannot be deleted. The component that can be added and/or deleted is the injection port indicated as **Injection port A.D**. The name between brackets indicates the type of injector specified in the *Injector Setup Page*.

ID

It indicates the number of each component listed in the grid.

Component name

It indicates the name of the component installed and recognized by the sampler (tray holder, wash station, etc.).

In use

It indicates the component status **Yes** or **Disabled**.

Help

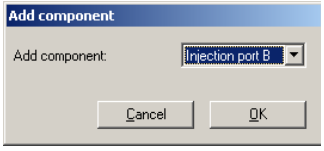
Click this button for help instructions on this topics.

Buttons

The following buttons allow to add, to cancel and to plan the injection port.

Add component

This button allows to add components. The following page appears where the desired component is selected.



Delete component

This button is only visualized when in the grid an injection port is selected. Clicking on this button, the injection port selected in the grid will be deleted from the list.

Set component

Clicking on this button, after having selected the component desired present in the grid, the relevant setup page is entered.

- If an automatically recognized component was selected, the *Component Information Page* will be visualized.
- If an injection port was selected, the *Injector Setup Page* will be visualized.
- If the SPME Fiber Holder was selected, the *Fiber Zero Adjustment* page will be visualized.

Close

Click on this button to exit the Sampler Set-up Page.

Fiber Zero Adjustment

This commands starts an automatic procedure that permits to adjust the fiber zero position, by retracting it just few millimeters inside the needle as point zero.

Start adjustment procedure

This procedure permits to adjust the stand-by position of the fiber.
In this step, the end of the fiber is set so that it is just barely withdrawn into the protective needle. The following procedure should be repeated whenever a fiber is installed.

1. Press **START ADJUSTMENT PROCEDURE** button to start the adjustment procedure.

2. Select the desired Course or the Fine option button.
3. Press the **DOWN ARROW** key until you can see the fiber.
4. Press the **UP ARROW** until the end of the fiber is flush with the end of the hollow tube.
5. Press again the **UP ARROW** key to withdraw the fiber for an additional 0.1 mm.

Set Fiber Exposure

Press this button to set the fiber exposition in millimeters.

Exit

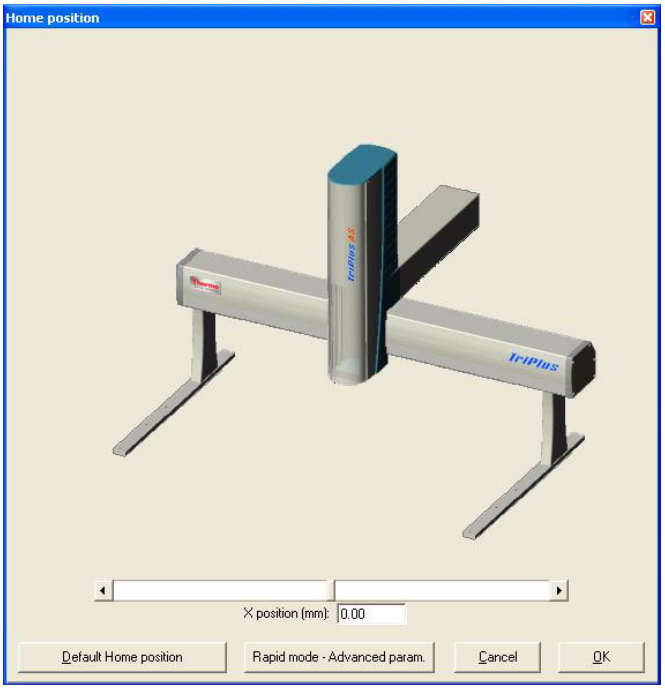
Press this button to exit.

X-Axis Driver

By clicking twice the X Axis Driver, the **Home Position** and the **Rapid Advanced Parameters** options can be selected.

Refer to:

- *Home Position*
- *Rapid Mode Advanced Parameters*



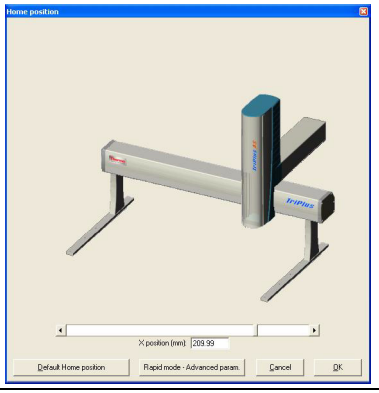
Home Position

This command allows to move the turret on its default home position.

To set home position of the turret click on the arrow buttons on either end of the slider bar will to increase or decrease the associated home position value. This value is visualized in the `X Position (mm)` box. Press the **DEFAULT HOME POSITION** button to move the turret on the its home position.

The Home position command is particularly useful to align the turret over the **Fan Station** option when installed.

Turret - Fan Station Alignment



1. Measure the distance (**D**) in millimetres between the left outer end of the crossrail X and the left outer end of the device.

2. Calculate the X Home Position value applying the following relation:

   D - 388 = X home position

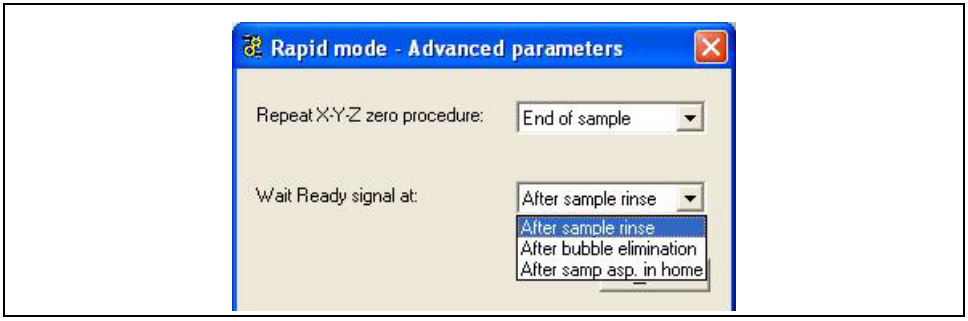
   where D is the distance measured

3. By using the arrow keys, move the cursor until the calculated position value is displayed in the `X position (mm)` box.

4. Close the page, the turret move on the new home position over the fan station.

Rapid Mode Advanced Parameters

Press the `Rapid mode - advanced Purim.` button to open the advanced parameters options available.

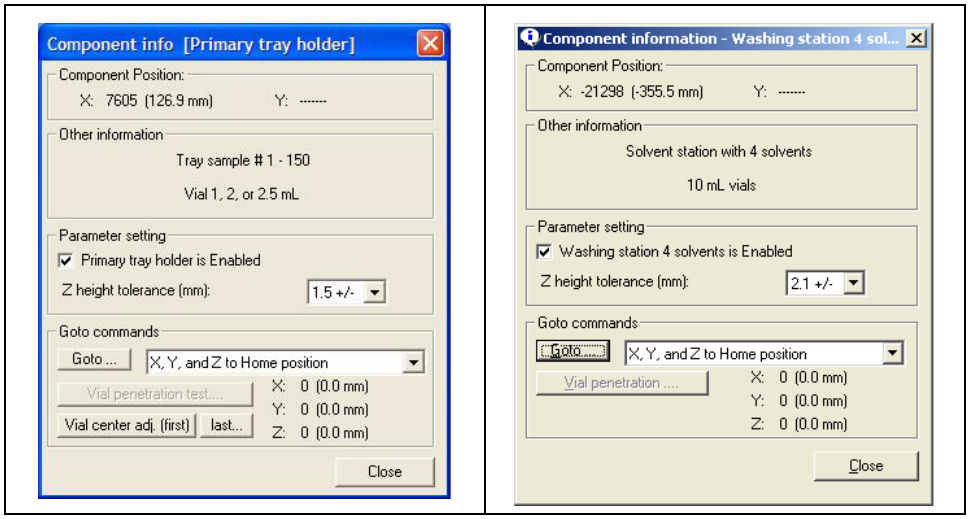


Related Topics

- *Component Information Page*
- *Injector Setup Page*

Component Information Page

This page provides information on the component selected in the Sampler Set-up Page as shown in the following examples:



This window includes the following frames and buttons

Component Position

This not editable parameter shows the coordinates of the sampler axes in comparison with the selected component.

Other information

Other information are provided on the component of interest.

Parameter Setting Group Box

Check Box of the selected component

Check this box to enable the operation of the selected component. The Sampler Set-up Page will display:

- **yes** if the component is in use, or
- **disabled** if the component is not active.

Z height tolerance (mm)

It indicates the window within which the touch sensor of the syringe carriage assembly has to recognize the type of vials accommodated in the sampler components.

Goto Commands

These commands allow to move the injection device on the vial position indicated by the function and to verify the alignment.
To move the injection device, select in the combo box the desired option, then click on **GOTO** button.
According to the selected component containing vials, such as Washing Station and Tray Holder, the relevant functions are available in the Component Information Page of the component.

Refer to:

- *When Washing Station is selected*
- *When Tray holder is selected*

When the vial of interest has been selected, the **VIAL PENETRATION** button is enabled. Refer to *Vial Penetration Button*.

NOTE When Tray Holder is selected, the **VIAL CENTER ADJUSTMENT (FIRST)** and the **LAST...** buttons are enabled. Refer to *Vial Center Adjustment (First) and Last*.

When Washing Station is selected

The following functions are available:

Function	Description
`X, Y, Z Home Position`	Select this function to return in stand-by condition.

Function	Description
Waste vial	Select this function to move the injection device on the Waste vial of the washing station
Last vial	Select this function to move the injection device on the last vial of the washing station

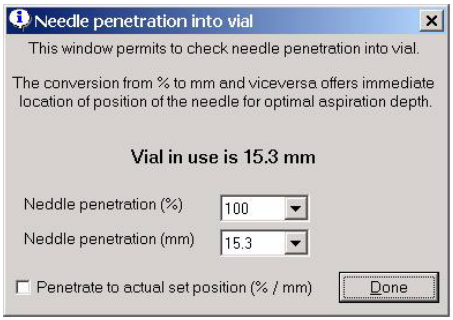
When Tray holder is selected

The following functions are available:

Function	Description
X, Y, Z Home Position	Select this function to return to stand-by condition.
First vial of 1st row	Select this function to move the injection device on the first vial of first row of the sample tray
Last vial of 1st row	Select this function to move the injection device on the last vial of the first row of the sample tray
First vial of last row	Select this function to move the injection device on the first vial of the last row of the sample tray
Last vial of last row	Select this function to move the injection device on the last vial of the last row of the sample tray

Vial Penetration Button

Click on this button to verify the correspondence between the penetration percentage of the needle into the selected vial and the same value expressed in millimeters and vice-versa.
Answer **OK** at the message visualized, then the following window is displayed.



Select in the relevant combo box, the percentage or the millimeters of the needle penetration.

NOTE The percentage value must be reported in the method if the same penetration, defined in the setup, is desired.

CAUTION **In the case of irregular vial (vial with conical insert or vial with conical bottom) the measure of the needle penetration must carefully be defined considering the real depth of the vial.**

Check the **Penetrate to actual set position** box if you want to define the needle penetration into the selected vial according to its height. Click **DONE** button to perform the operation.
DONE button has the double functions. It allows to perform the operation when enabled, and to exit this window.

Vial Center Adjustment (First) and Last

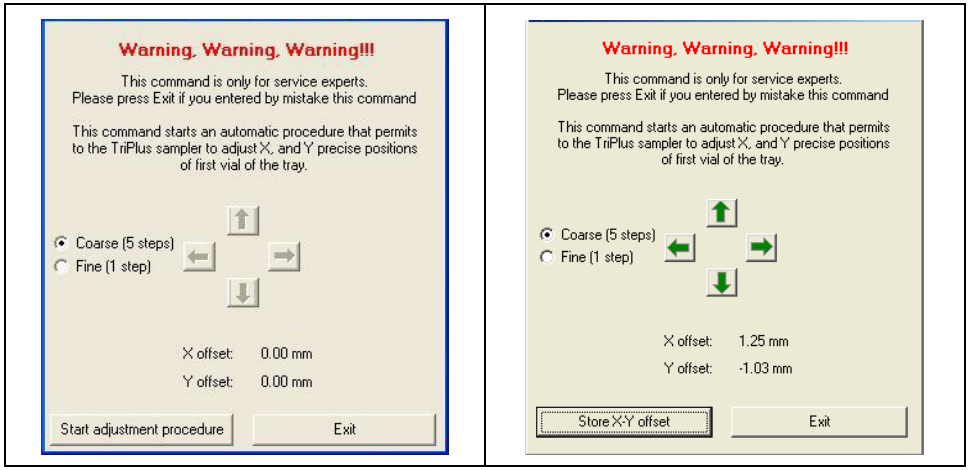
CAUTION **These commands are ONLY for service expert.**

These commands start an automatic procedure that permits to the TriPlus sampler to research the X, Y precise positions of first and last vials of the tray.

To perform the alignment proceed as follows:

1. If the well plates are used, insert the centering pin in the first well.

2. In the Component Information dialog window, click **VIAL CENTER ADJ. (FIRST)** to enter the setup page.



3. Click **START ADJUSTMENT PROCEDURE** to start the alignment procedure for the **first vial** of the tray. The sampler places the sensor over the vial (well) #1.

4. Select the **Fine** or **Course** option, then perform the alignment by using the arrows keys. At the end of the operation, click **STORE X-Y OFFSET**.

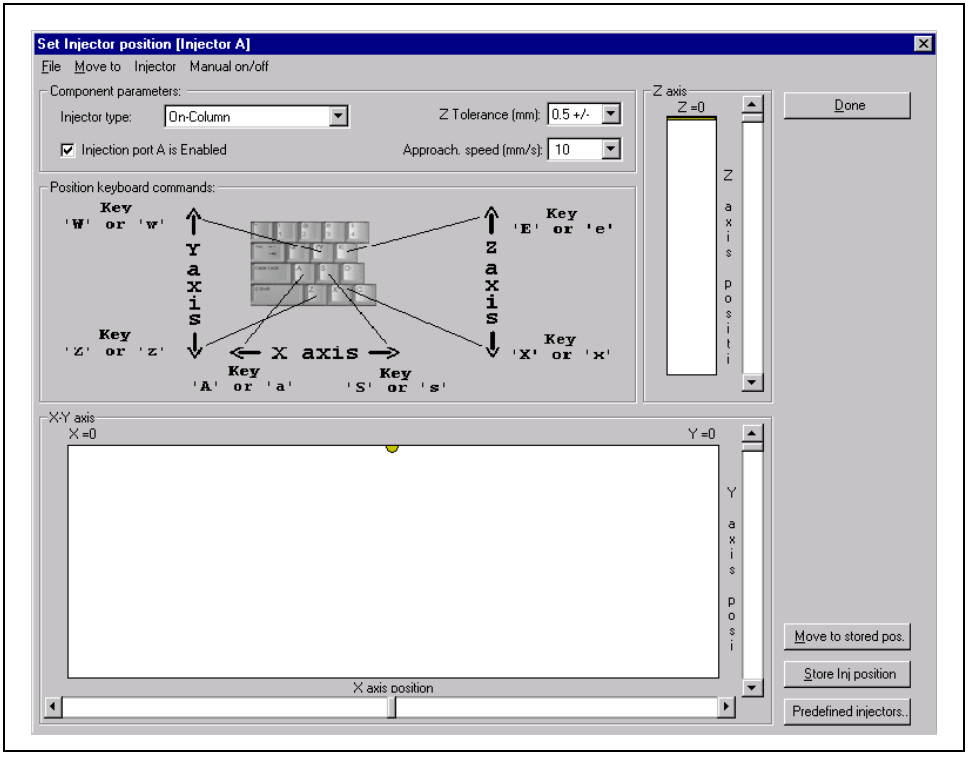
5. Click **EXIT**.

6. In the Component Information dialog window click LAST... to repeat the procedure for the **last vial** of the tray using the fine setup page for this vial. At the end of the operation, click **STORE X-Y OFFSET**.

7. Click **EXIT**, then click **CLOSE** to exit the set-up.

Injector Setup Page

This page allows to correctly align the syringe needle with the injector inlet of the GC.



Menu Bar

It allows to access the following pull-down menus:

- File
- Move To
- Injector
- Manual On/Off

File Menu

File Menu allows to access the following functions

Done

Select this function to exit this page. It has the same effect as the **DONE** button.

Move To Menu

This menu allows to access the following function and submenus

All axes home position

Select this function to move the sampler to stand-by condition.

Single axis Home

This submenu allows to access the following functions:

Function	Description
`Search zero on X axis`	Select this function to perform the autozero of the axis X only.
`Search zero on Y axis`	Select this function to perform the autozero of the axis Y only.
`Search zero on Z axis`	Select this function to perform the autozero of the axis Z only.
`Search zero on Plunger`	Select this function to perform the autozero of the syringe plunger.

Reset Command

This submenu allows to access the following function:

Function	Description
`Search zero on X, Y, Z and P`	Select this function to perform the autozero of all the three axes and of the syringe plunger.

Injector Menu

Injector Menu allows to access the following functions which permit to move the injection device on the injector and to verify the alignment.

Move to stored injector position

This function allows to move the injection device on the stored injection position. It has the same effect as the **MOVE TO STORED POS** button.

Auto-search injector height

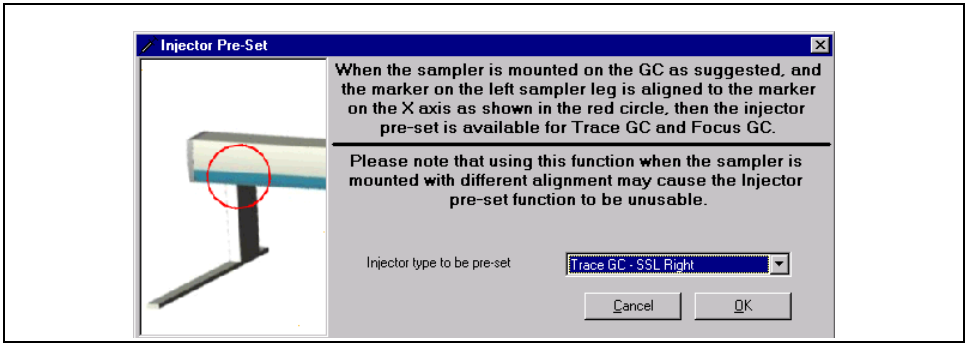
This function allows to move the injection device on the injector to search its height.

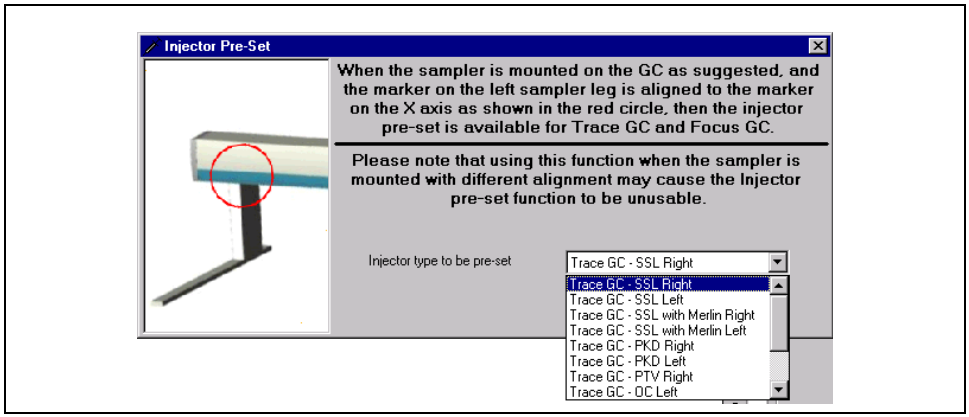
Store Injector Position

Select this function to store the injector position. It has the same effect as the **STORE INJ. POSITION** button.

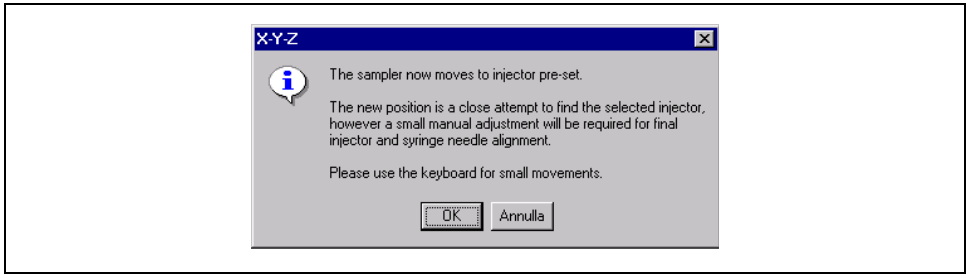
Pick a predefined Injector

This function allows to use the injector pre-set alignment. It has the same effect as the **PREDEFINED INJECTORS** button. The following page is visualized.





Select the injector type to be aligned and press the **OK** button. The following message is visualized.



Manual On/Off Menu

This menu allows to access the following functions which permit to set the manual commands.

Manual On/Off Commands

This function opens the dialog page where it is possible the set the commands for the manual activation of the components indicated.

Component parameters Group Box

This frame includes the following functions:

Injector type

It indicates the type of injector in use.

Injection port is enabled check box

Check this box to enable the operation of the selected injection port corresponding to the injector selected. The *Sampler Set-up Page* will display:

- **yes**, if the injection port is in use, or
- **disabled**, if it is not active.

Z tolerance (mm)

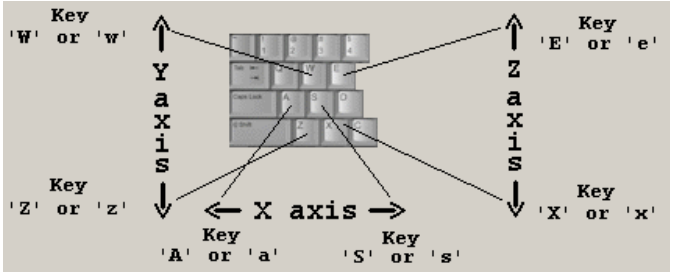
It indicates the window within which the touch sensor of the syringe carriage assembly has to recognize the type of vials accommodated in the sampler tray.

Approach speed (mm/s)

It indicates the penetration speed of the syringe needle into the injector. The box indicates the default value according to the injector type used.

Position keyboard commands

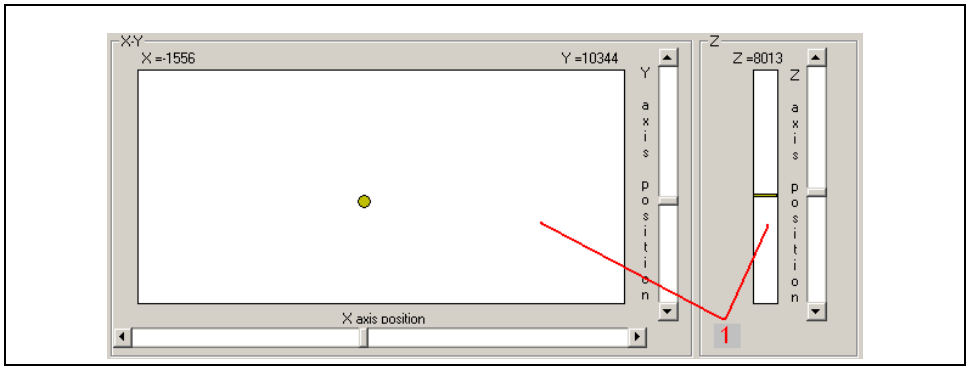
These manual commands may be carried out by using the keyboard of the PC. They allow to perform the fine alignment of the syringe carriage assembly on the injector port of interest. This operation follows that of the coarse alignment performed with the commands described in the *X, Y, Z Axis Frames*.



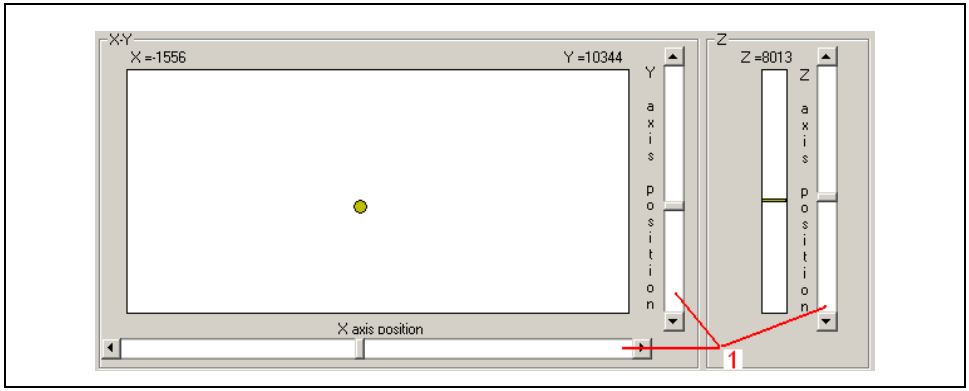
X, Y, Z Axis Frames

This section of Injector setup page shows the commands for the coarse alignment of the axes X Y and Z of the sampler in respect to the injector.

In the box XY the work area of the sampler is represented. The yellow little ball represents the touch sensor of the syringe carriage assembly.
In the box Z the work area of the syringe carriage assembly is represented.



Modifying the position of the axes by moving the relevant slider bars will change the position of the sampler alignment with the injector.



A slider bar is sometimes referred to as a scroll bar; the slider bars can be operated in several ways:

- Any of the slider bars can be operated by 'grabbing' (click and hold) the slider and dragging it along the length of the bar.
- Clicking on the arrow buttons on either end of the slider bars will increase or decrease the associated value. The amount of increase or decrease depends on the number of decimal places in the parameter, and it varies for different slider bars.
- Clicking on the area between the slider and the arrow buttons will increase or decrease the associated value at 10 times the rate of clicking on the arrows.

Buttons

Done

Click on this button to exit this page. It has the same effect as the Done function in File Menu.

Move to stored pos.

Click on this button to move the injection device on the stored injection position. It has the same effect as the **Move to stored position** function in Injector Menu.

Store Inj. Position

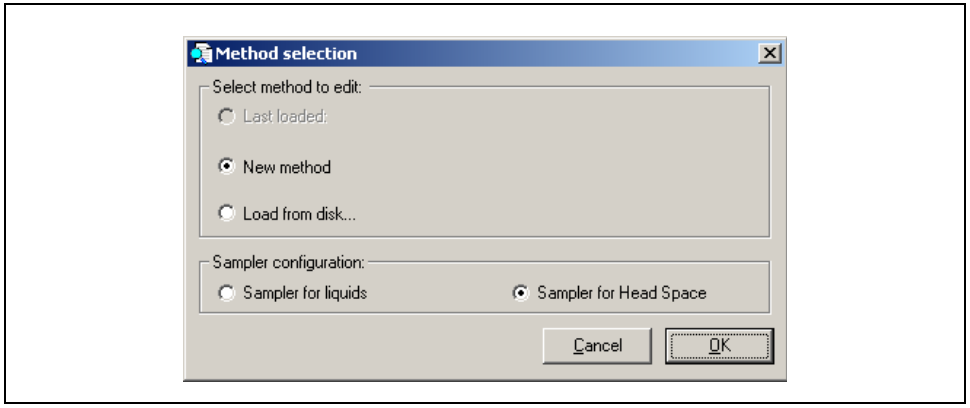
Click on this button to store the injection position. It has the same effect as the **Store Injector Position** function in Injector Menu.

Predefined injector

Click on this button to use the injector pre-set alignment. It has the same effect as the Pick a predefined injector function in Injector Menu.

Method Selection Page

This page allows to select the method to use.



This page includes the following frames and buttons

Select method to edit Group Boxes

Last loaded

Click this option box and press **OK**. The page Method related to the last loaded method will be visualized.

New method

Click this option box to create a new method of the sampler and press **OK**. According to the sampler version in use, the system will open the relative window of selection. Clicking twice on the icon of interest, the relative **Method Setup Page** will be visualized showing the default parameters and those recommended for that type of injection.
According to the version of the TriPlus sampler, refer to:

- *TriPlus AS Method Setup Page*
- *TriPlus HS Method Setup Page*
- *TriPlus SPME Method Setup Page*

Load from disk

Click this option box to load any method saved on disk and press **OK**. The system opens the dialog box where the name of the file to open must be specified. The relative Method Setup Page will be visualized containing all the analytical parameters used when the method was developed and saved.

Sampler Configuration Group Box

This section of the page is not editable and indicates the sampler version previously configured.

Buttons

Ok

Click on this button to open the page of the selected option. All entered parameters become active only after selecting this function.

Cancel

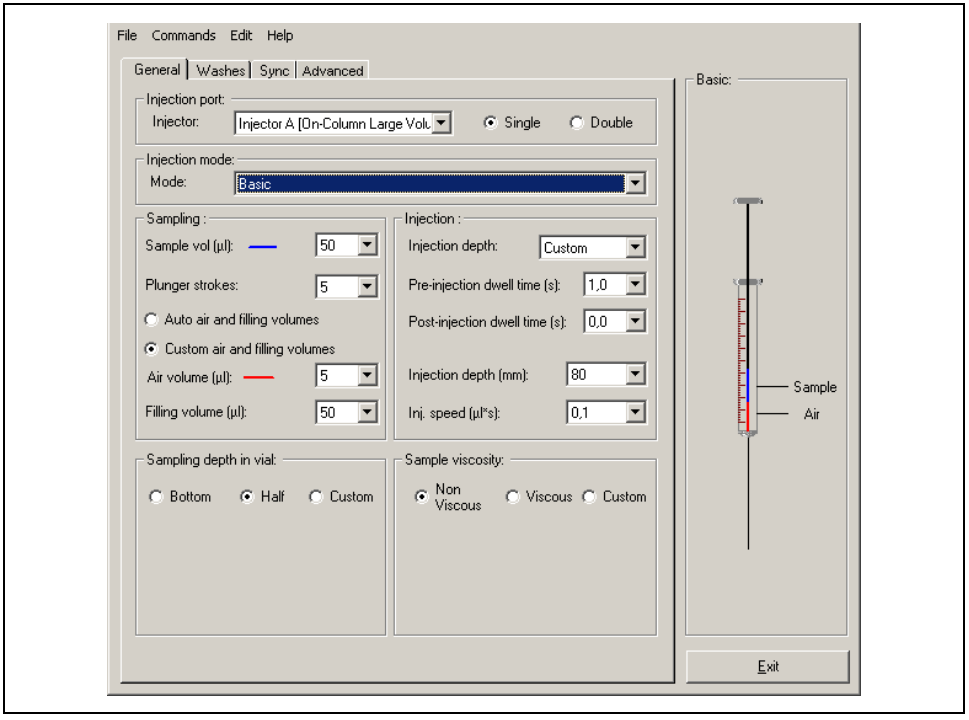
Click on this button to quit Configuration Page without modifying the parameters in memory.

Related Topics

- *Configuration Page*

TriPlus AS Method Setup Page

This page contains the parameters of the method required to perform injections with the sampler for liquids TriPlus AS.
Method Setup page is composed of several subsidiary pages (tags), some of which will only be visualized following the selected options. According to the type of injector, the syringe installed and the desired injection mode, the page will show suggested values that can be changed by the operator.



On the right section of the **Method Setup Page** the syringe filling is schematically visualized according to the injection mode selected. A specific parameter corresponds to every colored segment.

Menu Bar

The menu bar allows to access the following pull-down menus:

- File
- Commands
- Edit
- Help

File

File Menu allows to access the following functions

New

This function creates a new sampler method starting from the data currently in memory or from the default parameters previously stored with `Save As` function.
Click this option box to create a new method of the sampler and click on **OK**. According to the sampler version in use, the system will open the relative window of selection.

Load Method

This function permits to load the Sampler analytical method from disk into the computer memory. You can retrieve the same analytical method as it was in memory when you saved the method with the function **Save Method as.**

Save Method

This function permits to save the method currently in use. The system will ask the filename and the directory; all the analytical conditions are immediately saved in the desired file with the **.mfas** extension.

Save Method as..

This function permits to save the sampler analytical method onto disk. When using Save Method as…, it is possible to save the method under a new filename.

Save Template method

This function permits to save a sampler analytical method as template method. It is useful when several methods having the same typology must be created. You may find the template method by using `New` option.

Using `Save as...`function it is possible to save the method under a new filename.

Print Method

This function permits to print the sampler method.

Exit

This function allows to exit from the Method page.

Commands

This menu permits to access the following functions

Send Method

It allows to transfer method data from the PC memory to the sampler.

Get Method

It allows to transfer method data from the sampler to the PC.

Edit

This menu permits to access the following functions:

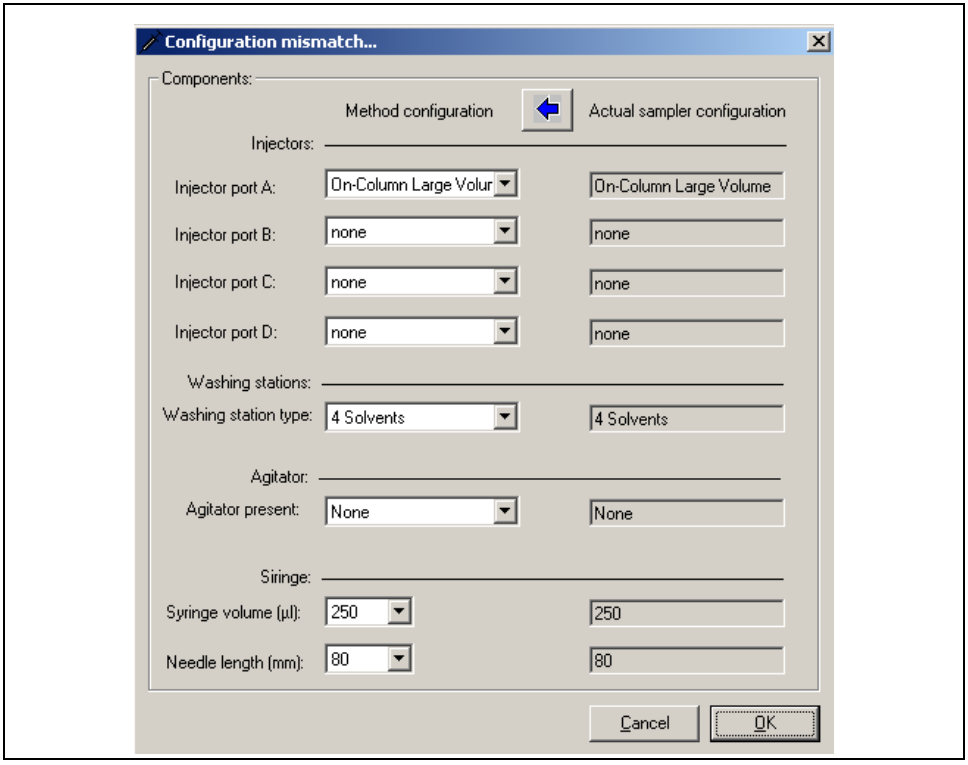
Check method / sampler conf.

This function allows to verify the compatibility between the analytical method and the configuration of the sampler. If the method and the configuration of the sampler are not compatible, following the relative error message, the page Configuration mismatch will be visualized.

Edit method / sampler conf. Match

This function allows to open the Configuration mismatch page in which it is possible to set the configuration of the method or to restore the actual configuration.

The following figure is an example of this page.



The page is divided into two parts:

1. on the right side, not editable, the actual configuration saved in memory is shown.

2. on the left side the same editable scheme is proposed where the operator can vary the configuration.

At the end of the changes press the **OK** button. If the configuration to be results compatible with the sampler the **Method Setup Page** will be visualized, otherwise an error message will appear and the resolution of the conflict will be to be handled.

Menu Help

This function permits to access the help system. The Help is divided in to many modules and each has been designed to cover specific issues of the module currently in use.

Exit Button

Click on this button to exit from Method Setup Page.

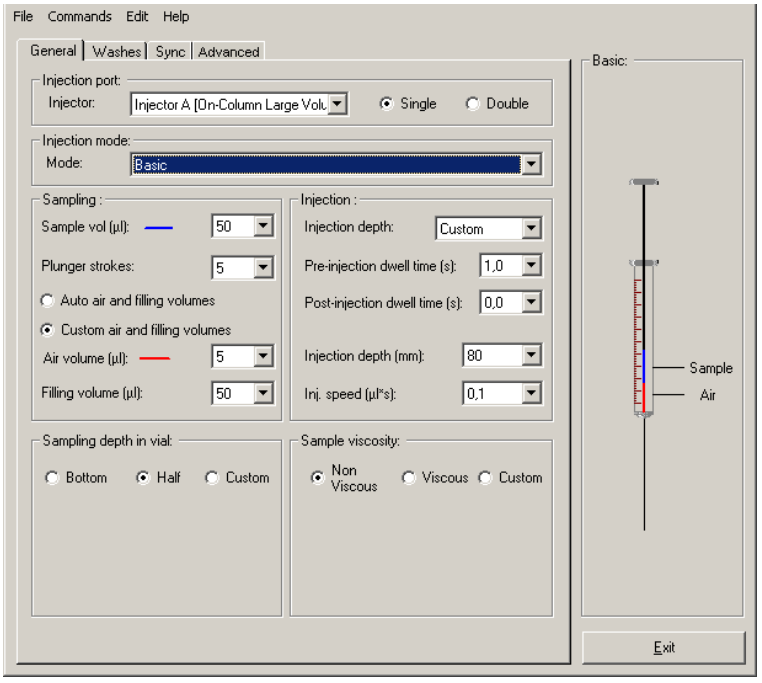
Related Topics

The Method Setup Page for TriPlus AS includes the following tags:

- *TriPlus AS Method Setup: General Tag*
- *TriPlus AS Method Setup: 2nd Inj.Port Tag*
- *TriPlus AS Method Setup: Washes Tag*
- *TriPlus AS Method Setup: Synch Tag*
- *TriPlus AS Method Setup: Synch / Int. Std Tag*
- *TriPlus AS Method Setup: Synch / Solvent flush Tag*
- *TriPlus AS Method Setup: Enrichment Tag*
- *TriPlus AS Method Setup: Advanced Tag*
- *TriPlus AS Method Setup: Cooled/Heated Tray Tag*

TriPlus AS Method Setup: General Tag

This tag allows to plan the parameters of sampling and injection.



This tag includes the following frames:

Injection Port

This frame includes the following options:

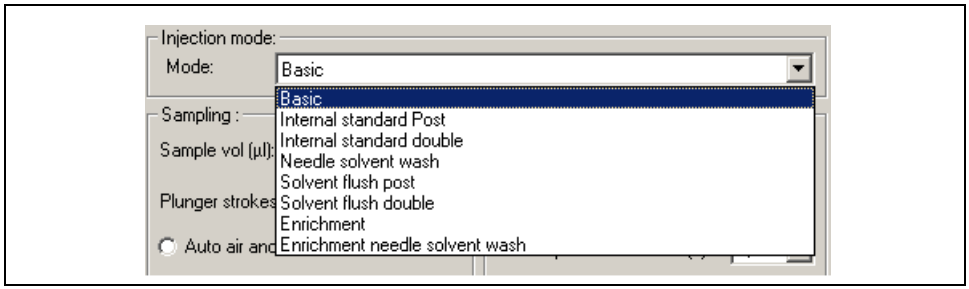
Injector

It indicates the injector selected during the setup. Choose between the following options:

Single
Select the option when the sampling will be performed in a single injector.

Double
Select this option when the sampling will be performed in two injectors. In this case the 2nd Inj. Port tag will be displayed where the required parameters for the second injector should be set.

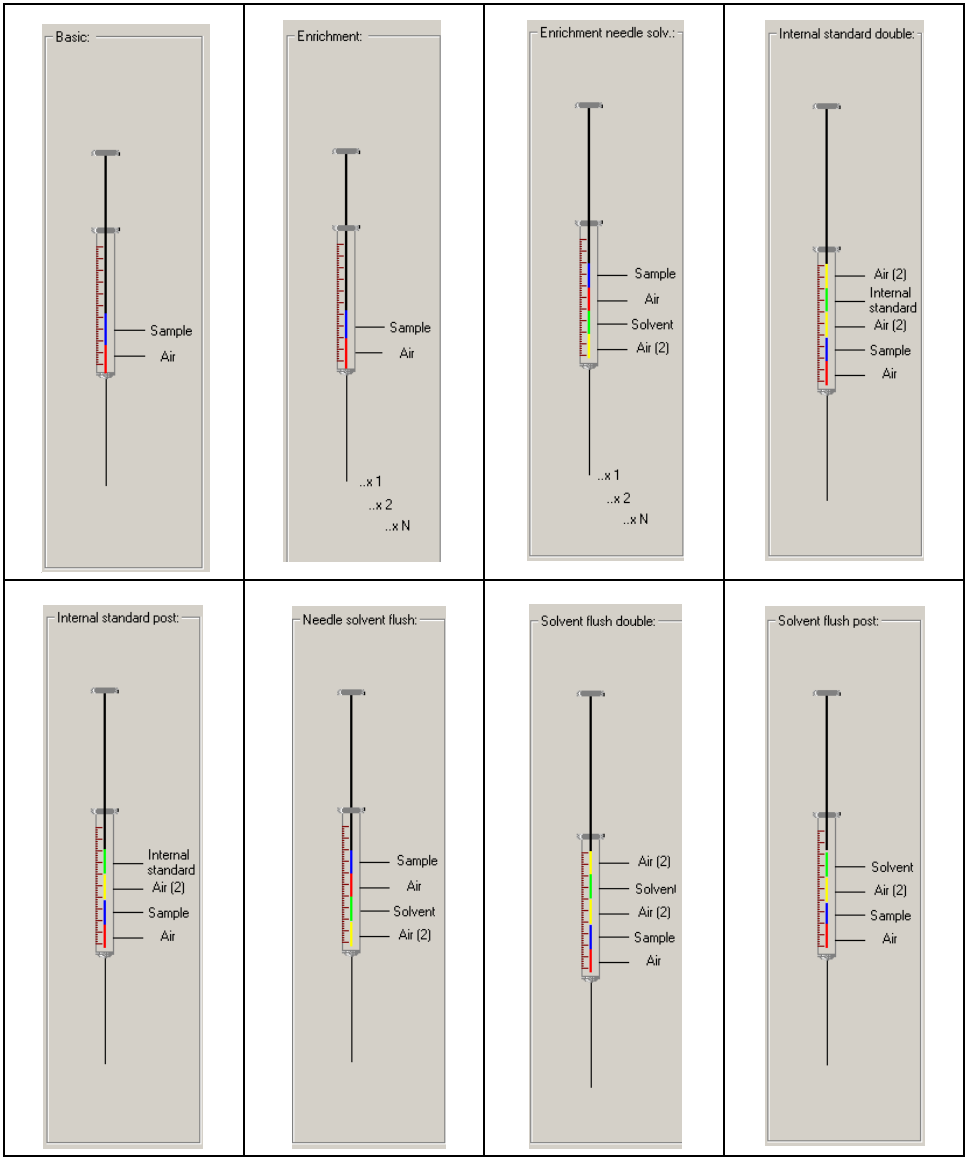
Injection Mode



Mode
Select the injection mode of interest choosing between the listed options.

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

According to the injection mode selected, the relevant parameters and default values, as well as the scheme of the syringe filling, on the right- hand side section of the Method Setup Page, are displayed.



Each colored segment represents a component of the syringe filling (air, solvent, sample, etc.) and it characterizes the relevant parameter.

Sampling

Sample vol

This parameter specifies the sample volume (µL) to be pulled up into the syringe and subsequently injected into the GC. This volume is a function of the syringe installed.

Plunger strokes

It allows to specify the number of plunger strokes to eliminate air bubbles forming during sample drawing.

Auto air and filling volumes

This option button is enabled when **Basic** or **Enrichment** injection mode has been selected. Check this option button when the automatic control of the volumes of air and sample to be pulled up into the syringe is desired.

Custom air and filling volumes

This option button is enabled when **Basic** or **Enrichment** injection mode has been selected. Check this option button when the manual control of the volumes of air and sample to be pulled up into the syringe is desired.

Air vol

This parameter is enabled if the **Custom air and filling volumes** option button has been checked. Set the desired volume of air (µL) to be pulled up after the needle is moved out of the vial.

Filling vol

This parameter is enabled if the **Custom air and filling volumes** option button has been checked. Set the desired volume of sample (µL) to be used for the syringe cleaning.

Injection

Injection depth

This parameter defines the penetration depth of the syringe needle into the injector. Set the parameter choosing one of the following options:

Standard (default value)

The syringe needle goes into the injector to the maximum possible depth according to the injector used and to the length of the needle.

Minimum

The syringe needle enters the injector and stops immediately beyond the septum. Use Minimum only if injecting with cold needle *(Cold Needle technique*)

NOTE When **Minimum** is selected, Pre and Post-inj dwell time (s) boxes are not enabled.

Custom

It allows to select the penetration depth and the injection speed. The **Injection depth (mm) and Inj. Speed (µl*s)** parameters boxes are enabled.

Pre-injection dwell time (s)

This parameter is active when the option **Standard** has been selected in **Injection depth:**. This parameter specifies how long the syringe needle must remain inside the injector before injection. This allows the needle to be heated before the sample injection. (*Hot Needle Injection*).

Post Injection dwell time (s)

This parameter is active when the option **Standard** has been selected in **Injection depth:**. This parameter, generally used after an OC or PTV injection, specifies how long the syringe needle must remain inside the injector after injection.

Injection depth (mm)

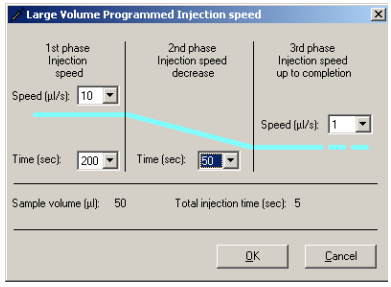
This parameter is enabled when **Custom** option has been selected. Select the desired penetration depth of the syringe needle into the injector.

Inj speed

This parameter is enabled when **Custom** option has been selected. Set the injection speed (µL/s).

NOTE When a large volume syringe (50 µL o more) is selected, the option **Program** is enabled.

Selecting Program and pressing the button that appears on the left, a dialog window is visualized where it is possible to create a speed gradient specially used during LVOC or LVPTV injection.



Sampling depth in vial

This parameter specifies the penetration depth of the syringe needle into the vial. Set the parameter choosing one of the following options:

Bottom

The needle goes down to the bottom of the vial.

Half

The needle goes down to half vial. Select **Half** if the sample vial may contain solid residues on the bottom.

Custom

Check this option button to select the desired penetration depth. The Sampling Vial depth% parameter is enabled.

Sampling Vial depth%

This parameter is enabled when **Custom** option has been selected.
Select the desired penetration depth of the syringe needle into the vial expressed as percentage of the vial height.

Sample Viscosity

These parameters define the sample drawing speed as a function of the sample viscosity. Choose one of the following options:

Non Viscous

When the sample has low viscosity.

Viscous

When the sample has high viscosity.

Custom

Check this option button to select the desired drawing parameters. The boxes of the following parameters will be enabled.

Sample Pull-up speed

This parameter is enabled when Custom option has been selected. It specifies the speed (µL/s) the liquid is pulled-up during the bubble elimination.

Delay after plug strokes (s)

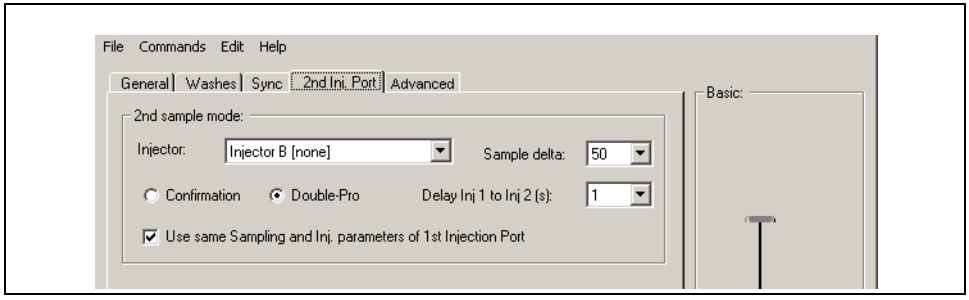
This parameter is enabled when **Custom** option has been selected.
It specifies how long the plunger will remain in the low position after the last stroke to eliminate bubbles before the sample drawing.

Viscosity delay

This parameter is enabled when **Custom** option has been selected. It specifies how long the plunger will remain at the top of the stroke after the sample drawing (to account for viscous samples). This allows the sample to fill in the syringe barrel.

TriPlus AS Method Setup: 2nd Inj.Port Tag

This tag is visualized when **Double option** has been selected in the General tag to perform the sampling in two injectors. Set here the required parameters for the second injector.



2nd Sample mode

Injector

Select the second injector. Choose one of the following modalities of injection

Confirmation

When this box is checked, the sampler injects the same sample into two injectors.

Double-pro

When this box is checked, the sampler injects a different sample into each injector. The **Sample delta** box is enabled.

Sample delta

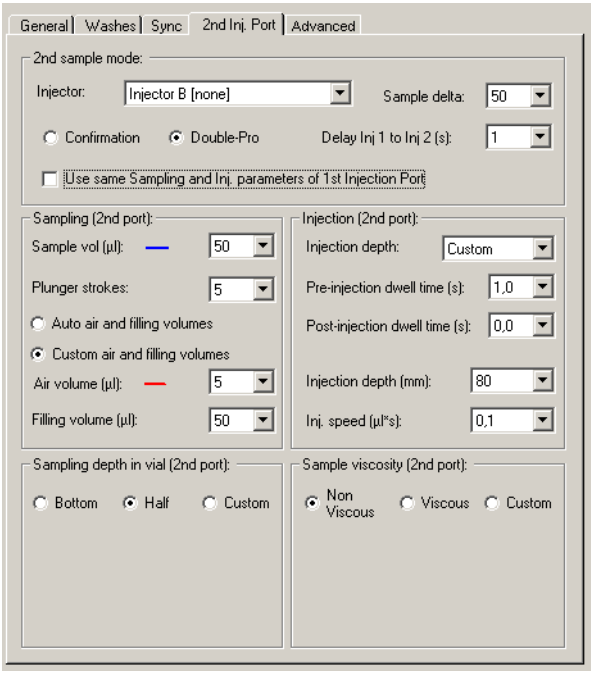
This box is enabled only when Double-pro option button is checked. Specify the interval between two batches of vials containing different samples.

Delay Inj. 1 to Inj. 2 (s)

It indicates the waiting time before the sample is injected into the second injector.

Use same Sampling and Inj. Parameters of 1st Injection Port

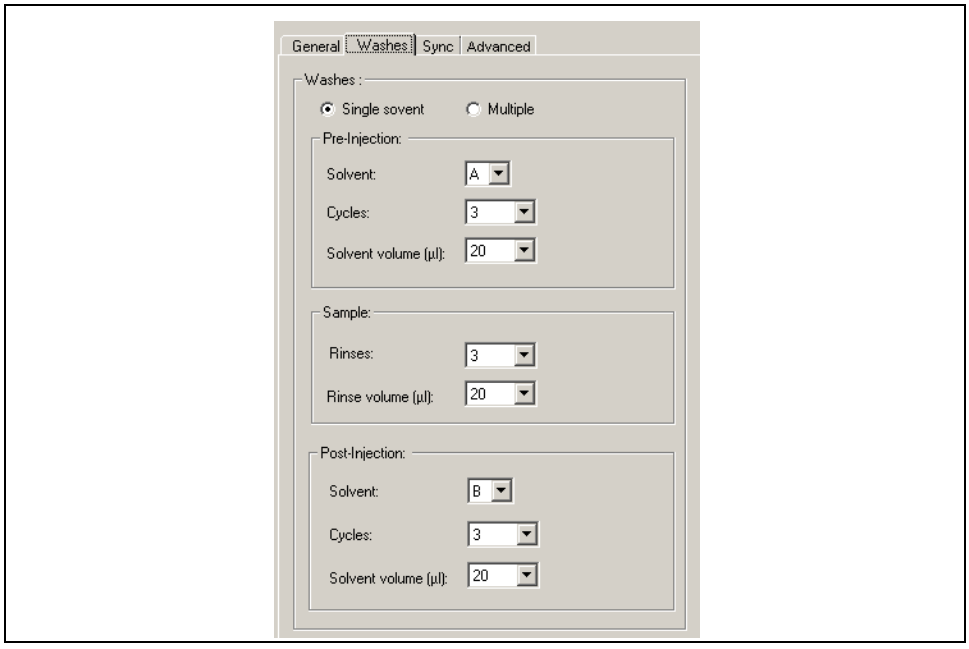
Check this box if the second injector will use the same sampling and injection parameters as the first one. Otherwise the programming section for the second injector parameters will be visualized.



Set the sampling and injection parameters for the second injector proceeding as described in *TriPlus AS Method Setup: General Tag*.

TriPlus AS Method Setup: Washes Tag

This tag allows to set the parameters of pre- and post-washing with solvent, and washing with sample.



This tag includes the following frames:

Washes

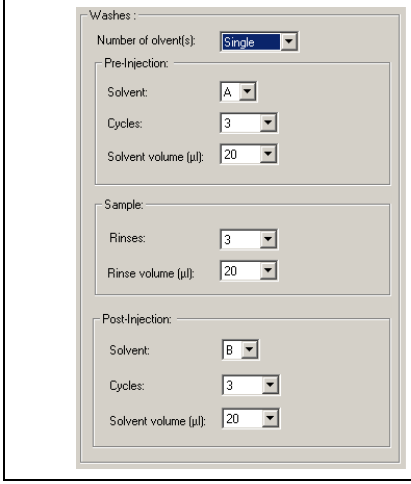
The sampler can use up to four different solvents for the cleaning before and after the injection.

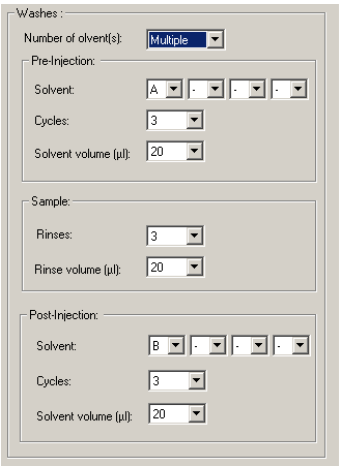
Single

Check this option button when a single cleaning solvent should be used. Refer to Solvent parameters.

Multiple

Check this option button when more than one cleaning solvent should be used. Refer to Solvents parameter.





Pre-injection

In this frame the parameters of pre-washing with solvent are specified.

Solvent

This parameter specifies the solvent(s) to be used according to the Single or Multiple option selected. The sampler may use up to 4 different solvents and you can select which to use as pre-rinse solvent(s). Select A, B, C or/and D.

NOTE When a solvent vial is used as Internal Standard or as Solvent Flush it cannot be selected as solvent wash.

Cycles

This parameter allows to set how many syringe pre-washing cycles with solvent have to be run before injection.

Solvent volume

Specify the volume (µL) of the pre-rinse solvent. It depends on the syringe volume.

Sample

In this box the parameters of the syringe washing with sample are set.

Rinses

It allows to set the number of syringe pre-washing cycles with sample to be run.

Rinse volume

Specify the volume (µL) of pre-rinse sample. It depends on the syringe volume.

Post-Injection

In this frame the parameters of post-washing with solvent are specified.

Solvent

This parameter specifies the solvent(s) to be used according to the Single or Multiple option selected. The sampler may use up to 4 different solvents and you can select which to use as post-rinse solvent(s). Select A, B, C or/and D.

NOTE When a solvent vial is used as Internal Standard or as Solvent Flush it cannot be selected as solvent wash.

Cycles

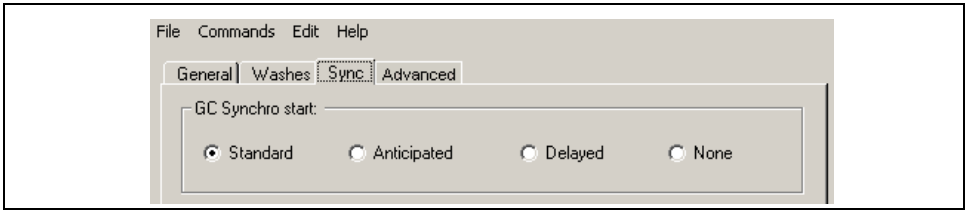
This parameter allows to set how many syringe post-washing cycles with solvent have to be run after injection. Set a number between 0 and 15.

Solvent volume

Specify the volume (µL) of the post-rinse solvent. The solvent volume depends on the syringe volume.

TriPlus AS Method Setup: Synch Tag

This tag allows to set in which step of the sampling phase the sampler sends the Start Signal to the GC.



GC Synchro start

To select in which step of the sampling phase the sampler will sends the Start Signal to the GC.You may choose among four different synchronism options listed below.

Standard

Selecting this option, the Start signal is sent at the beginning of the sample injection.

Anticipated

The Start signal is generated when the sliding plate touches the injector before injection. Select this when the GC run must start before that the injection takes place.

Delay

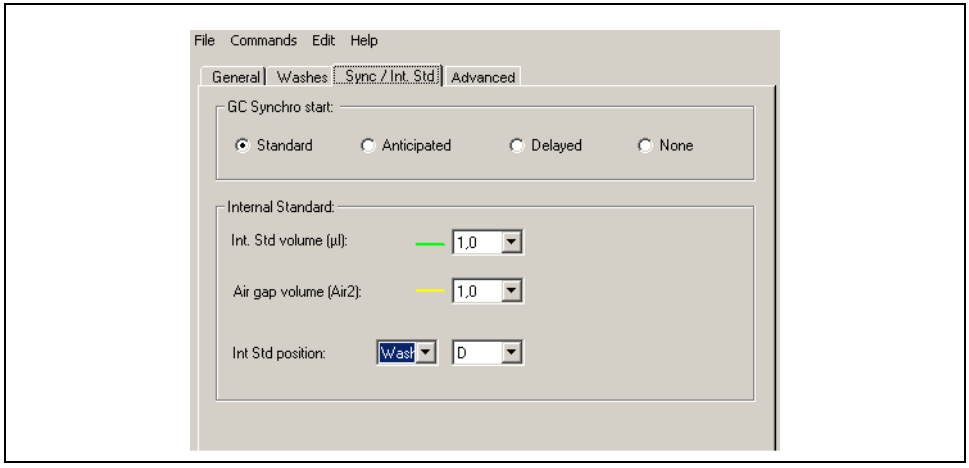
The Start signal is generated when the sample injection is completed. It is particularly useful in the *Large Volume Injection Technique* to avoid adjustment of the time of the parameters related to the quantity of injected solvent or to the speed of injection.

None

No signal is sent to the GC.

TriPlus AS Method Setup: Synch / Int. Std Tag

This tag is visualized when the injection mode **Internal standard Post** or **Standard Internal double** has been selected in the *TriPlus AS Method Setup: General Tag*.



The sampler supports the *Internal Standard* injection technique. The quantitative or qualitative analysis is more accurate with the automatic addition of an internal standard. The sampler will automatically compensate for any factors that may affect the sample sequence. This ensures the highest precision and accuracy of the analytical results. The *Internal Standard* technique consists of programmable volumes of an internal standard and a sample. Both are sequentially drawn from the syringe and injected together. Air gaps can be used to separate the sample from the internal standard.

- When **Internal standard post** mode is used, a single volume of air is drawn between the internal standard or the solvent, and the sample.
- When **Internal standard double** mode is used, a volume of air is drawn twice. The syringe body will contain a sequence consisting of: air, internal standard, air, and sample.

GC Synchro start

To select in which step of the sampling phase the sampler will sends the Start Signal to the GC.You may choose among four different synchronism options listed below.

Standard

Selecting this option, the Start signal is sent at the beginning of the sample injection.

Anticipated

The Start signal is generated when the sliding plate touches the injector before injection. Select this when the GC run must start before that the injection takes place.

Delay

The Start signal is generated when the sample injection is completed. It is particularly useful in the *Large Volume Injection Technique* to avoid adjustment of the time of the parameters related to the quantity of injected solvent or to the speed of injection.

None

No signal is sent to the GC.

Internal Standard

In this frame the Internal standard parameters should be set.

Int. Std volume

It indicates the volume (µL) of the internal standard.

Air gap volume

It indicates the air gap volume (µL) between internal standard and the sample

Internal standard position

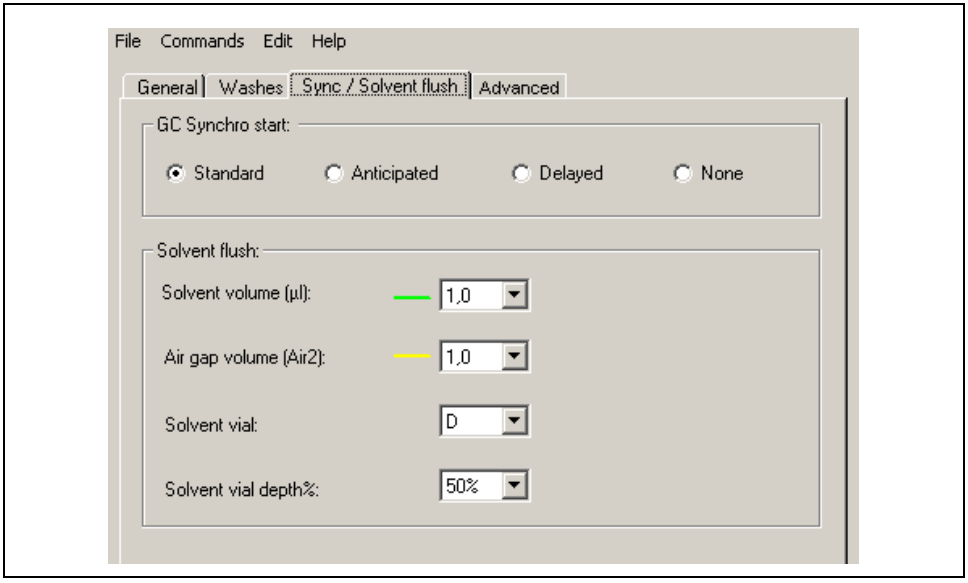
It indicates the position of the vial containing the internal standard.

Tray
Check this option if the vial containing the internal standard is located in the sample tray. It indicates the position number.

Wash
Check this option if the vial containing the internal standard is located in the wash station. It indicates the position A, B, C or D.

TriPlus AS Method Setup: Synch / Solvent flush Tag

This tag is visualized when the injection mode **Needle solvent wash**, **Solvent flush post**, **Solvent flush double** or **Enrichment needle solvent wash** has been selected in *TriPlus AS Method Setup: General Tag*.



The sampler supports the *Solvent flush* injection technique which uses a *plug* of solvent, which is drawn before the sample. During the injection, the solvent flushes out the sample from the syringe needle. This technique can reduce the analyte discrimination during injection. Air gaps can be used to separate the sample from the solvent.

- When **Solvent flush post** mode is used, a single volume of air is drawn between the solvent and the sample.
- When **Solvent double** mode is used, a volume of air is drawn twice. The syringe body will contain a sequence consisting of: air, solvent, air, and sample.

This tag includes the following frames:

GC Synchro start

To select in which step of the sampling phase the sampler will sends the Start Signal to the GC.You may choose among four different synchronism options listed below.

Standard

Selecting this option, the Start signal is sent at the beginning of the sample injection.

Anticipated

The Start signal is generated when the sliding plate touches the injector before injection. Select this when the GC run must start before that the injection takes place.

Delay

The Start signal is generated when the sample injection is completed. It is particularly useful in the *Large Volume Injection Technique* to avoid adjustment of the time of the parameters related to the quantity of injected solvent or to the speed of injection.

None

No signal is sent to the GC.

Solvent flush

In this box the solvent flush parameters should be set.

Solvent volume

It indicates the volume (µL) of the solvent.

Air gap volume

It indicates the gap volume (µL) between solvent and sample

Solvent vial

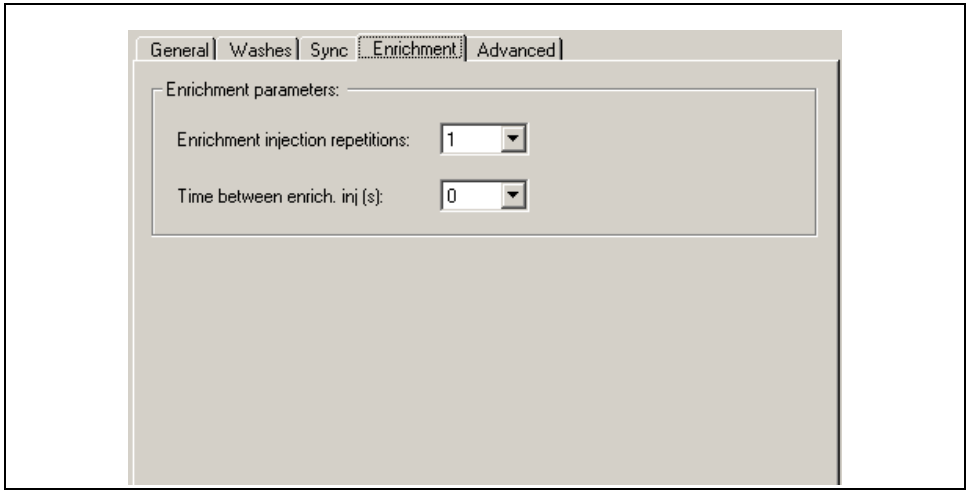
It indicates the position A, B, C or D of the vial containing the solvent.

Solvent vial deph%

This parameter is visualized when the injection mode **Needle solvent wash**, or **Enrichment needle solvent wash** has been selected.

TriPlus AS Method Setup: Enrichment Tag

This tag is visualized when the injection mode Enrichment has been selected in *TriPlus AS Method Setup: General Tag*. It is useful when the PTV injector is used with appropriate packing of the liner for the injection of gases or liquids. It is used sometimes instead of the normal programmed injection speed for large volume of liquids.



Enrichment parameters

In this box the sample enrichment parameters should be set.

Enrichment injection repetitions

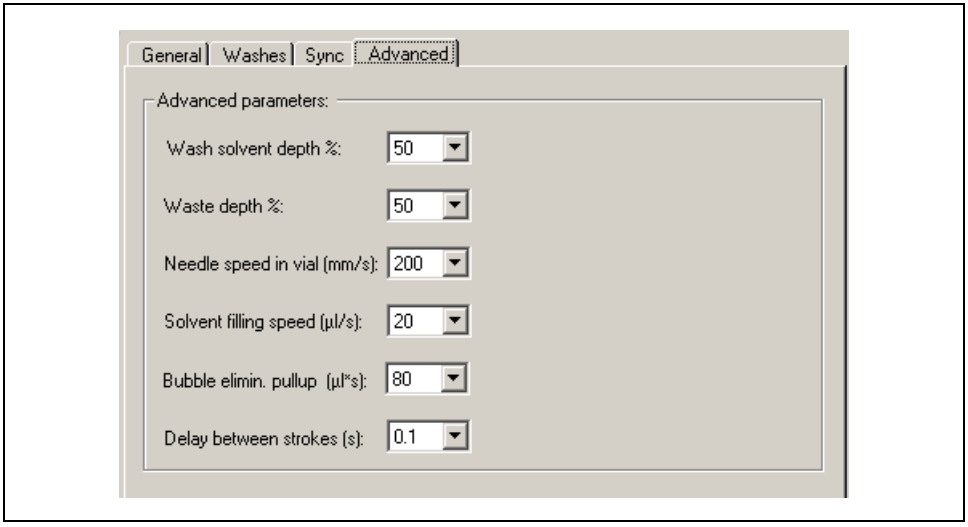
This parameter allows to inject the same sample vial several times before the start signal is sent to the GC.

Time between enrich. Inj. (s)

This parameter indicates the waiting time between an enrichment and the next.

TriPlus AS Method Setup: Advanced Tag

This tag contains some parameters that may be eventually used for a refinement of the method.



Advanced Parameters

This frame allows to set the following parameters

Wash solvent depth%

Specify at which percentage of the solvent vial the syringe needle must penetrate. 0% and 100% correspond respectively to the top and the bottom of the vial respectively. In the example, setting 50% means that the needle must penetrate up to half vial.

Waste depth%

Specify at which percentage of the waste vial the syringe needle must penetrate. 0% and 100% correspond to the top and the bottom of the vial respectively. In the example, setting 50% means that the needle must penetrate up to half vial.

Needle speed in vial (mm/s)

Specify the penetration speed of the syringe needle into the sample vial. It is modified according to the septa and needle characteristics.

Solvent filling speed

Specify at which speed (µL/s) the syringe plunger is pulled up to draw the wash solvent into the syringe. It is related to the viscosity of the solvent and the syringe type used.

Bubble elim. Pull-up

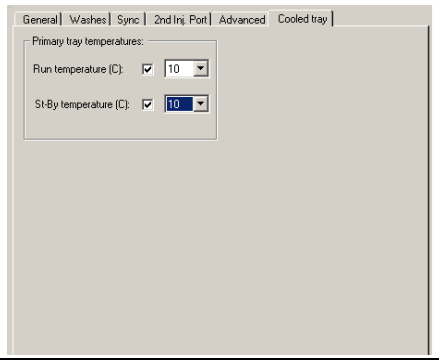
Specify at which speed (µL/s) the syringe plunger is pulled up and pushed down as the needle is held in the sample vial. This eliminates air from the syringe, thereby clearing it of bubbles.

Delay between strokes (s)

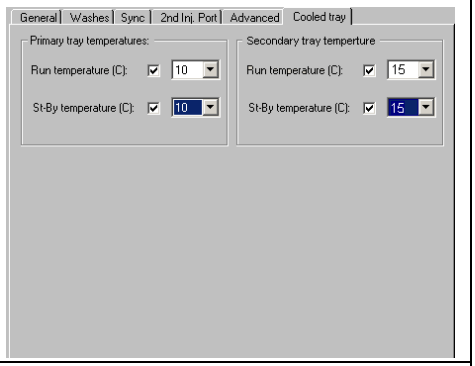
Specify the delay between each plunger stroke.

TriPlus AS Method Setup: Cooled/Heated Tray Tag

This tag is visualized when a thermostatted tray holder has been recognized by the sampler and enabled in the **Sampler Set-up Page**. See *Cooled/Heated Primary/ Secondary Tray Holder.* One or two frames can be visualized as shown in the following figure.



One thermostatted tray holder



Two thermostatted tray holders

Primary/Secondary Tray Temperature

Run Temperature (°C)

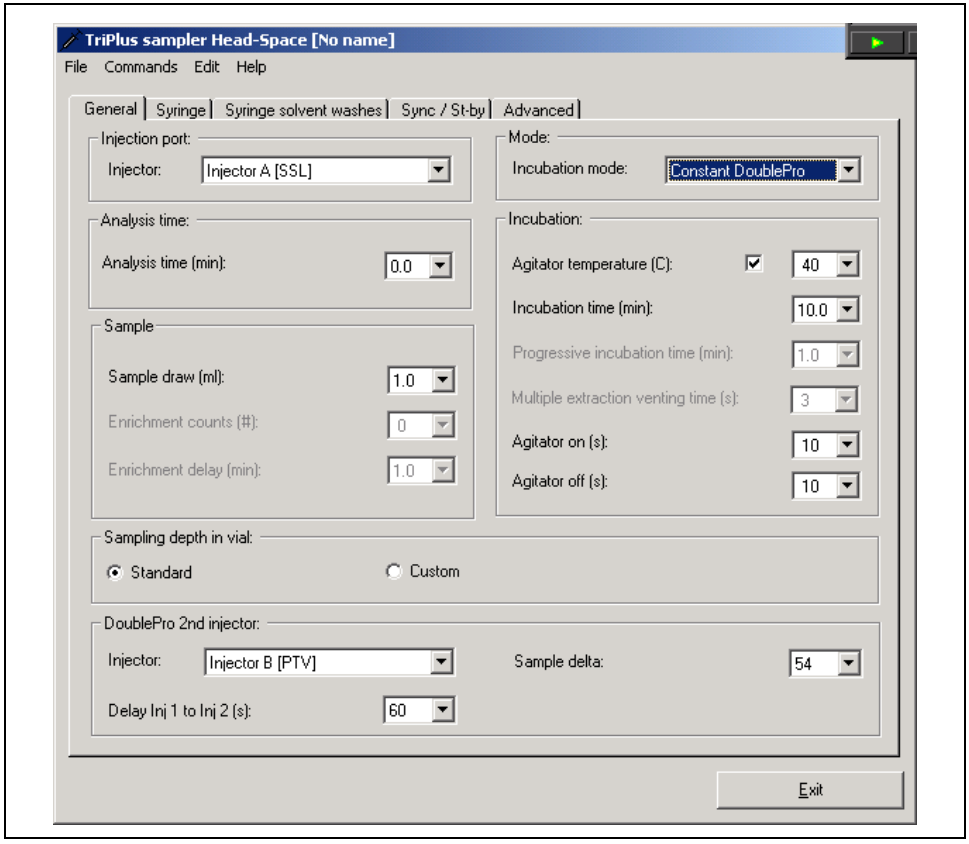
Check this box to enable the tray holder temperature control. The temperature is thermoregulated from 4 to 70 °C. If this box is unchecked, the temperature is not thermoregulated.

Stand-By Temperature (°C)

This parameter allows to set a temperature for the tray holder to stay while the sampler is not running (stand-by condition). Check this box to enable the stand-by temperature control. The temperature is thermoregulated from 4 to 70 °C.
If this box is unchecked, the temperature is not thermoregulated.

TriPlus HS Method Setup Page

This page contains the parameters of the method required to perform injections with the sampler for head space TriPlus HS. Method Setup page is composed of several subsidiary pages (tags) some of which will only be visualized following the selected options. According to the type of injector, the syringe installed and the desired injection mode, the page will show the suggested values that can be changed by the operator.



Menu Bar

The menu bar allows to access the following pull-down menus:

- File
- Commands
- Edit
- Help

File Menu

File Menu allows to access the following functions:

New

This function creates a new sampler method starting from the data currently in memory or from the default parameters previously stored with `Save As` function.
Click this option box to create a new method of the sampler and click on **OK**. According to the sampler version in use, the system will open the relative window of selection.

Load Method

This function permits to load the Sampler analytical method from disk into the computer memory. You can retrieve the same analytical method as it was in memory when you saved the method with the function **Save Method as**.

Save Method

This function permits to save the method currently in use. The system will ask the filename and the directory; all the analytical conditions are immediately saved in the desired file with the **.TRIPLUS** extension.

Save Method as..

This function permits to save the sampler analytical method onto disk. When using Save Method as…, it is possible to save the method under a new filename.

Save Template method

This function permits to save a sampler analytical method as template method. It is useful when several methods having the same typology must be created. You may find the template method by using `New` option. Using `Save as...`function it is possible to save the method under a new filename.

Print Method

This function permits to print the sampler method.

Exit

This function allows to exit from the Method page.

Menu Commands

This menu permits to access the following functions:

Send Method

It allows to transfer method data from the PC memory to the sampler.

Get Method

It allows to transfer method data from the sampler to the PC.

Menu Edit

This menu permits to access the following functions:

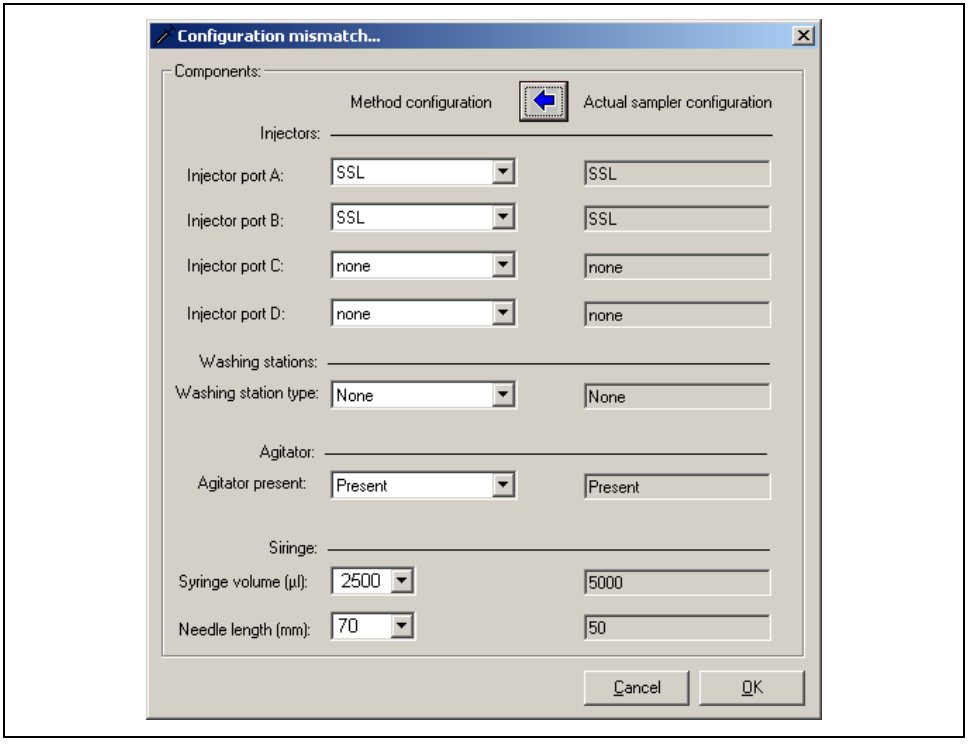
Check method / sampler conf.

This function allows to verify the compatibility between the analytical method and the configuration of the sampler. If the method and the configuration of the sampler are not compatible, following the relative error message, the page Configuration mismatch will be visualized.

Edit method / sampler conf. Match

This function allows to open the Configuration mismatch page in which it is possible to set the configuration of the method or to restore the actual configuration.

The following figure is an example of this page.



The page is divided into two parts:

1. on the right side, not editable, the actual configuration saved in memory is shown.

2. on the left side the same editable scheme is proposed where the operator can vary the configuration.

At the end of the changes press the **OK** button. If the configuration results to be compatible with the sampler, the **Method Setup Page** will be visualized, otherwise an error message will appear and the resolution of the conflict will have to be handled.

Menu Help

This function permits to access the help system. The Help is divided in to many modules and each has been designed to cover specific issues of the module currently in use.

Exit Button

Click on this button to exit from Method Setup page.

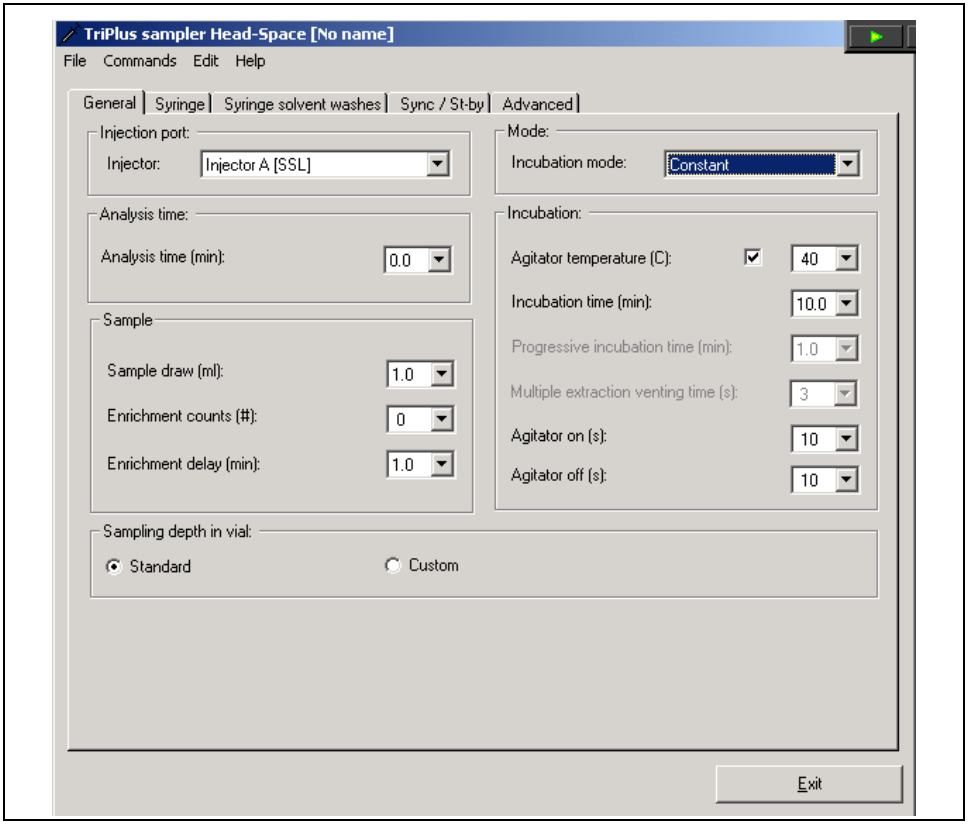
Related Topics

The Method Setup Page for TriPlus HS includes the following tags:

- *TriPlus HS Method Setup: General Tag*
- *TriPlus HS Method Setup: Syringe Tag*
- *TriPlus HS Method Setup: Syringe Solvent Washes Tag*
- *TriPlus HS Method Setup: Synch / St-by Tag*
- *TriPlus HS Method Setup: Advanced Tag*

TriPlus HS Method Setup: General Tag

This tag allows to set the parameters of sampling and incubation.



This tag includes the following frames:

Injection Port

This frame contains the syringe parameters.

Injector

It indicates the injector selected during the setup.

Mode

It specifies how the sample must be conditioned.

Incubation Mode

It is possible to choose between four incubation modes:

Constant
Choose this option to allow the sample to be sequentially conditioned at a programmed temperature with a constant conditioning time.

Progressive
Choose this option to allow the sample to be conditioned at a programmed temperature with a conditioning time that increases for each sample according to a programmed additional time.

Multiple Extraction
Choose this option to allow automatic multiple extraction steps of headspace from the same sample vial repeatedly.

Constant DoublePro
Choose this option to allow a couple of samples to be sequentially conditioned at a programmed temperature with a constant conditioning time and injected into two separated injectors.

Analysis time

This frame contains the following function:

Analysis time (min)

This box contains the full runtime of a single sample and it is used for calculation of the multiple sample incubation when incubation time is longer than the analysis runtime. The Sampler updates automatically this box sample by sample with the last runtime.

Incubation

Specify the conditioning and shaker parameters. The vial shaking is used to decrease the time necessary for the sample equilibrium.

Agitator temperature (°C)

Check this box to enable the agitator temperature control. The temperature is thermoregulated from 40 to 150 °C.
If this box is unchecked, the temperature below 40 °C is not thermoregulated but the agitator is ready only if its temperature is really below 40 °C.

Incubation Time (min)

This box specifies the incubation time for all samples to be analyzed with the method in use. The time here specified is in minutes.

Progressive incubation time (min)

This parameter is visualized when Progressive has been selected as incubation mode.
Specify in the box the time progressively added to the incubation time for all samples to be analyzed with the method in use. The time here specified is in minutes.

Multiple extraction venting time (s)

This parameter is visualized when Multiple Extraction has been selected as incubation mode. Specify in this box the venting flushing time of the headspace gas, contained in the vial, performed after each injection. The time here specified is in minutes.

Agitator on (s)

This box specifies the time in minutes for shaker on.
The vial shaking is used to decrease the time necessary for the sample equilibrium.

Agitator off (s)

This box specifies the time in minutes for shaker off.

Sample

This frame of controls is used to set parameters for the sample drawing.

Sample Draw (ml)

It specifies the volume of vapor to be drawn and injected. The maximum injectable value is 10% less than the syringe capacity.

Enrichment counts (#)

This label specifies the number of samplings to be carried out from the same sample vial. When >1, the headspace vapors are injected into the GC the number of times selected. The start signal to the GC is sent after the last injection.

Enrichment delay (min)

This label specifies the delay time between one enrichment and the next.

Sampling depth in vial

Set the penetration depth of the syringe needle into the vial.

Standard

The syringe needle penetrates into the vial at a predefined depth. Check this option button to select this function.

Custom

Check this option button to select the desired penetration depth. The **Sampling vial depth (mm)** parameter is enabled.

Sampling vial depth (mm)

This parameter is visualized when the option **Custom** has been selected. In the box set the desired penetration depth of the needle into the vial.

Double Pro 2nd injector

This frame is enabled only when **Constant DoublePro** incubation mode has been selected. In this modality, the sampler injects a different sample into each injector respecting the relevant incubation times.

Injector

It indicates the second injector defined in the Sampler Setup Page.

Sample delta

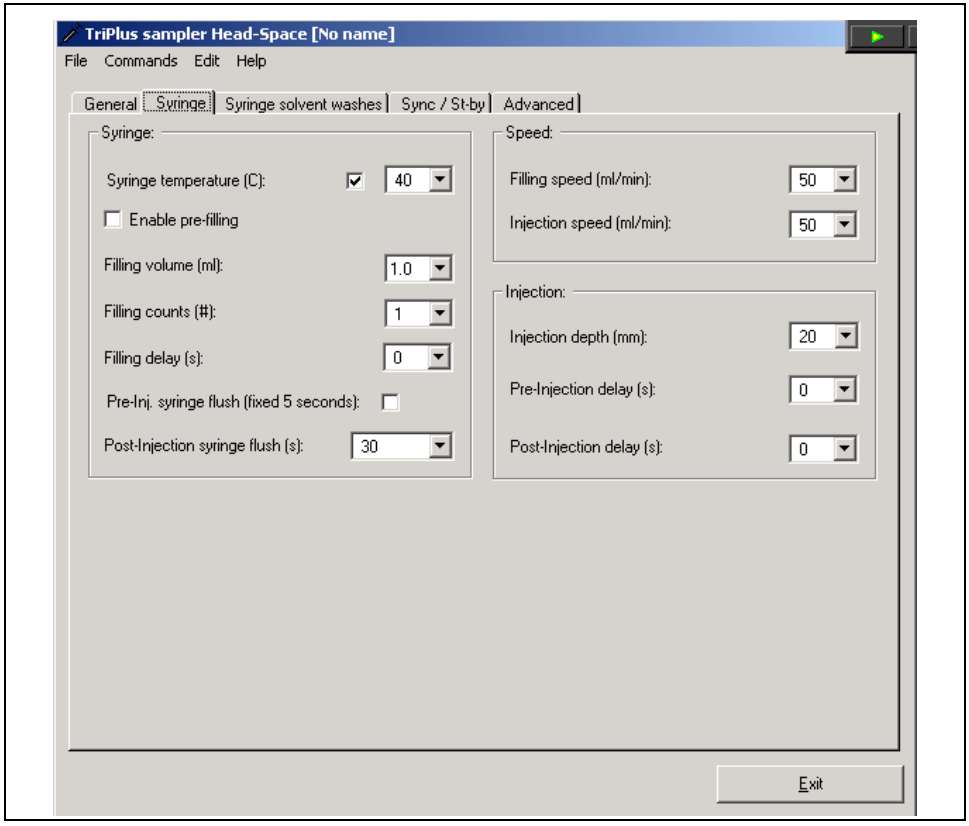
Specify the interval between two batches of vials containing the different samples.

Delay Inj. 1 to Inj. 2 (s)

It indicates the interval time before injecting the sample into the second injector. To have the correct retention time repeatability, set this time at a value little bit greater than the time necessary at the sampler to prepare the sample to inject.

TriPlus HS Method Setup: Syringe Tag

This tag allows to set the syringe parameters.



This tag includes the following frames:

Syringe

This frame contains the syringe parameters.

Syringe temperature (°C)

Check this box to enable the syringe temperature control. The temperature is thermoregulated from 40 to 150 °C.

If this box is unchecked, the temperature below 40 °C is not thermoregulated but the syringe is ready only if its temperature is really below 40 °C.

Enable Pre-filling

When enabled, this function allows the vial to be pressurized before sampling the headspace vapors. The volume used to pressurize the vial is the **sample draw** volume. Check this box to enable the function.

Filling volume (ml)

This parameter specifies the sample volume to be initially drawn into the syringe to purge it and the needle.

Filling count (#)

This parameter specifies the number of the syringe plunger strokes from the same vial to have a homogeneous phase between the headspace gas in the vial and the sample in the syringe.

Filling delay (s)

This parameter specifies the delay time between the plunger pull-up and the sample ejection while the syringe is filled with the sample.

Pre-Inj. Syringe flush (fixed 5 seconds)

Check this box when a syringe flush cycle is desired before the injection.

Post injection syringe flush (sec)

Set the time to be used for the syringe flush after the injection or **Continuous** option to flush the syringe throughout the analytical run.

Speed

This frame contains the parameters to control the speed of the sample drawing into the syringe and the speed of injection into the inlet.

Filling speed (ml/min)

Specify the speed at which the sample is withdrawn from the headspace into the syringe.

Injection (ml/min)

Specify the transfer speed of the sample from the syringe to the inlet.

Injection

This frame contains the parameters for the penetration depth and the amount of time the syringe needle resides in the injector before or after the sample is injected.

Injection Depth (mm)

This parameter defines the penetration depth of the syringe needle into the injector.

Pre-Injection delay (s)

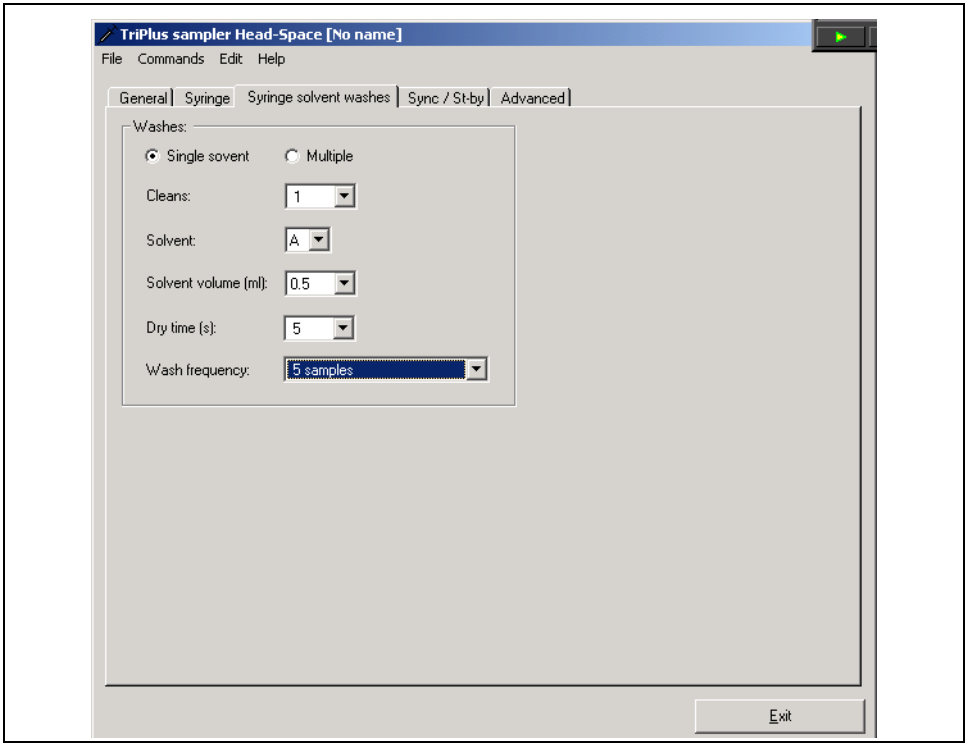
This parameter specifies the syringe needle waiting time in the injector **before** the sample is injected.

Post-Injection Delay

This parameter specifies the syringe needle waiting time in the injector **after** the sample is injected.

TriPlus HS Method Setup: Syringe Solvent Washes Tag

This tag contains the parameters for the periodic washing of the syringe.



This tag includes the following frame:

Washes

The sampler can use up to four different solvents for the syringe cleaning. It is possible to select one of the four solvents checking the Single option button, or to select up to four different solvents checking the Multiple option button.

Single

Check this option button when a single cleaning solvent should be used.

Multiple

Check this option button when more than one cleaning solvent should be used.

Clean

This parameter allows to set how many syringe cleaning cycles with solvent have to be run.

Solvent

This parameter specifies the solvent(s) A, B, C or/and D to be used according to the Single or Multiple option selected.

Dry time (min)

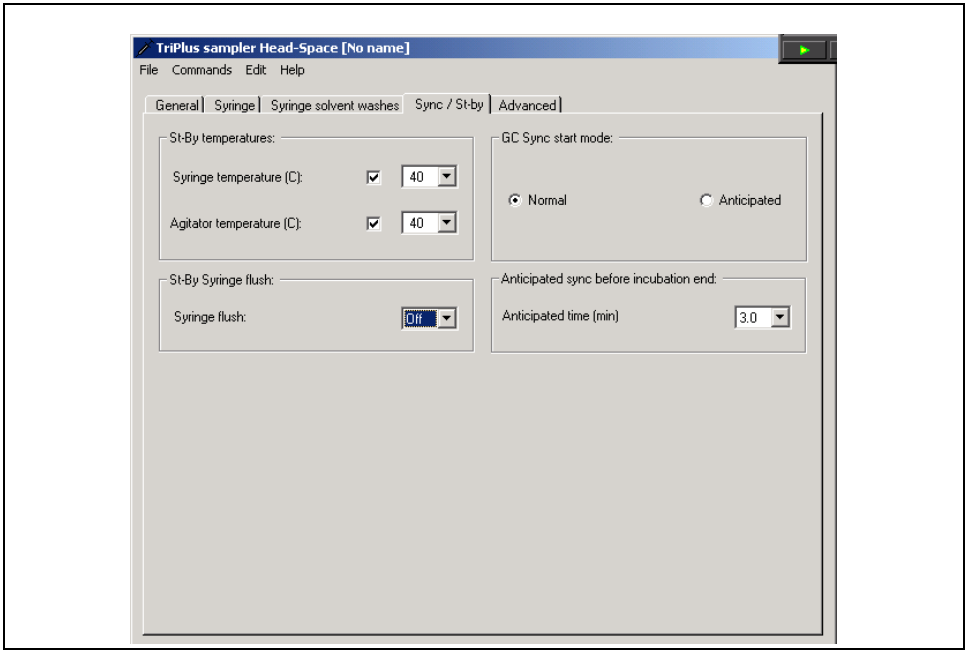
This parameter specifies the time required to dry the syringe after having performed the cleaning with the solvent.

Wash frequency

This parameter allows to select how many samples after which the syringe cleaning must be performed.

TriPlus HS Method Setup: Synch / St-by Tag

This tag allows to select in which step of the sampling phase the sampler sends the Start Signal to the GC. It also allows to set the sampler stand-by condition parameters.



This tags includes the following frames:

St-by temperature

Set in this frame the stand-by temperatures.

Syringe temperature (°C)

This parameter allows to set a temperature for the syringe to stay while the sampler is not running (stand-by condition). Check this box to enable the stand-by temperature control. The temperature is thermoregulated from 40 to 150 °C.
If this box is unchecked, the temperature below 40 °C is not thermoregulated but the syringe is ready only if its stand-by temperature is really below 40 °C.

Agitator temperature (°C)

This parameter allows to set a temperature for the agitator (incubation oven) to stay while the sampler is not running (stand-by condition). Check this box to enable the stand-by temperature control. The temperature is thermoregulated from 40 to 150 °C. If this box is unchecked, the temperature below 40 °C is not thermoregulated but the agitator is ready only if its stand-by temperature is really below 40 °C.

St-by Syringe flush

Enable the syringe flush during the stand-by condition if desired.

Syringe flush

This parameter allows to enable the syringe wash with inert gas when the sampler is not running. To enable the function select On.

GC Synch start mode

This parameter specifies the synchronism mode between the sampler and the GC.

Normal

Sends the Start signal to the GC at the end of the sample injection.

Anticipated

Sends the Start signal to the GC before the sample injection.

Anticipated sync before incubation end

Synchronism signal with the Cold Trap. This parameter allows the sampler to generate a pre-trigger signal, before the end of the sample conditioning time, starting the trap cooling. This synchronism allows to minimize the time the trap remains at the trapping temperature, thus saving on cooling agent.

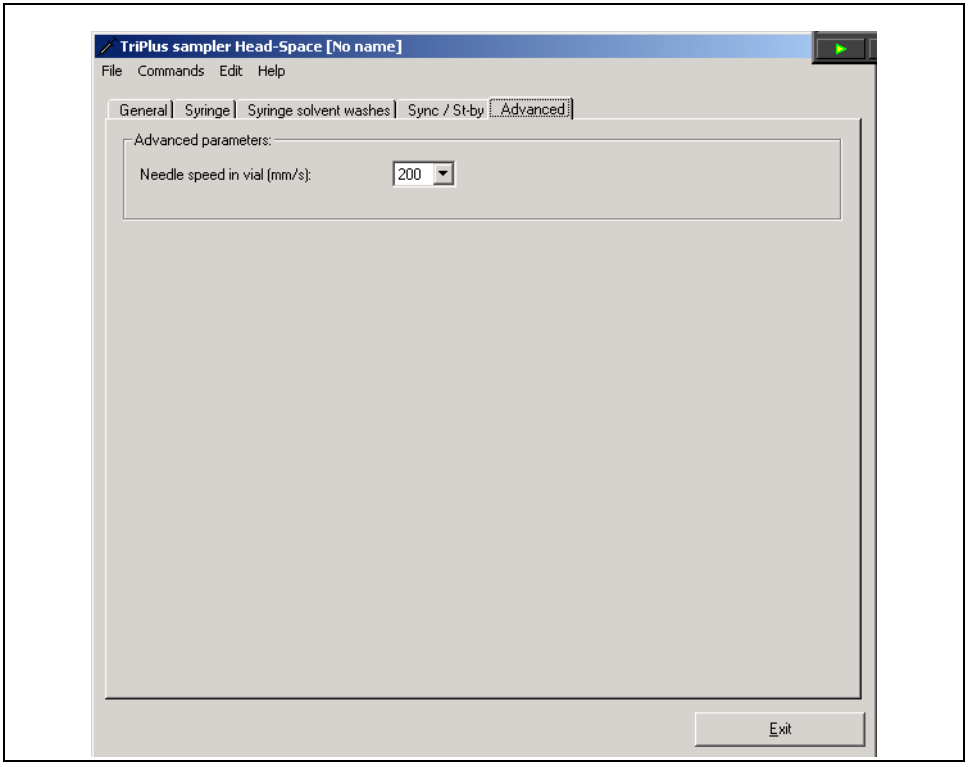
Anticipated time (min)

Set the required time to reach the cold trap temperature.

NOTE The samples sequence will be carried out with one sample at a time (no overlapping).

TriPlus HS Method Setup: Advanced Tag

This tag contains parameters that may eventually used for a refinement of the method.



Advanced Parameters

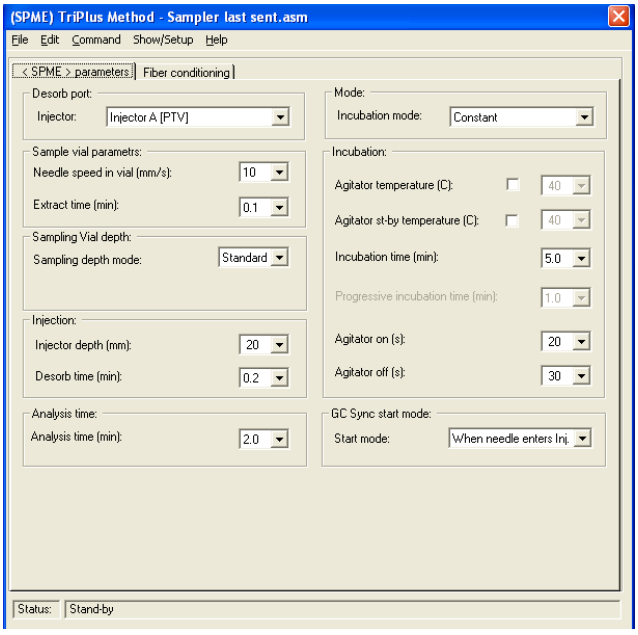
This frame allows to set the following parameters.

Needle speed in vial (mm/s)

Specify the penetration speed of the syringe needle into the sample vial.

TriPlus SPME Method Setup Page

This page contains the parameters of the method required to perform injections with the sampler TriPlus SPME version for solid phase micro extraction. Method page is composed of two subsidiary pages (tabs).



Menu Bar

The menu bar allows to access the following pull-down menus:

- File
- Commands
- Edit
- Help

File Menu

File Menu allows to access the following functions:

New

This function creates a new sampler method starting from the data currently in memory or from the default parameters previously stored with `Save As` function.
Click this option box to create a new method of the sampler and click on **OK**. According to the sampler version in use, the system will open the relative window of selection.

Load Method

This function permits to load the Sampler analytical method from disk into the computer memory. You can retrieve the same analytical method as it was in memory when you saved the method with the function **Save Method as**.

Save Method

This function permits to save the method currently in use. The system will ask the filename and the directory; all the analytical conditions are immediately saved in the desired file with the **.TRIPLUS** extension.

Save Method as..

This function permits to save the sampler analytical method onto disk. When using Save Method as…, it is possible to save the method under a new filename.

Save Template method

This function permits to save a sampler analytical method as template method. It is useful when several methods having the same typology must be created. You may find the template method by using `New` option. Using `Save as. . .`function it is possible to save the method under a new filename.

Print Method

This function permits to print the sampler method.

Exit

This function allows to exit from the Method page.

Menu Commands

This menu permits to access the following functions:

Send Method

It allows to transfer method data from the PC memory to the sampler.

Get Method

It allows to transfer method data from the sampler to the PC.

Menu Edit

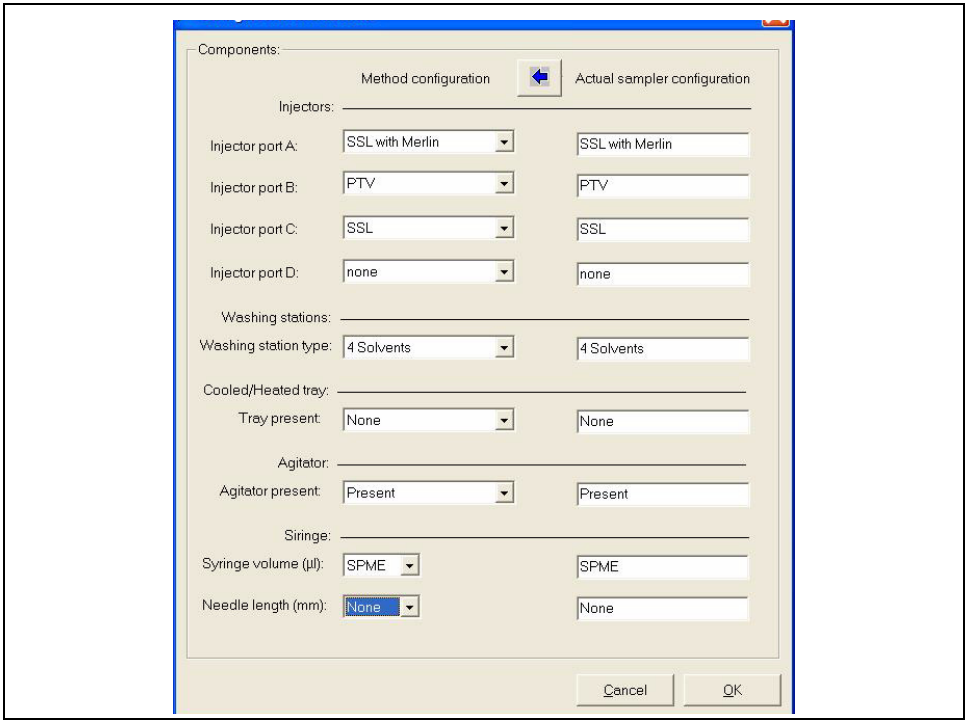
This menu permits to access the following functions:

Check method / sampler conf.

This function allows to verify the compatibility between the analytical method and the configuration of the sampler. If the method and the configuration of the sampler are not compatible, following the relative error message, the page Configuration mismatch will be visualized.

Edit method / sampler conf. Match

This function allows to open the Configuration mismatch page in which it is possible to set the configuration of the method or to restore the actual configuration.
The following figure is an example of this page.



The page is divided into two parts:

1. on the right side, not editable, the actual configuration saved in memory is shown.

2. on the left side the same editable scheme is proposed where the operator can vary the configuration.

At the end of the changes press the **OK** button. If the configuration results to be compatible with the sampler, the **Method Setup Page** will be visualized, otherwise an error message will appear and the resolution of the conflict will have to be handled.

Menu Help

This function permits to access the help system. The Help is divided in to many modules and each has been designed to cover specific issues of the module currently in use.

Exit Button

Click on this button to exit from Method Setup page.

Related Topics

The Method Setup Page for TriPlus SPME includes the following tags:

- *TriPlus SPME Method Setup: Parameters Page*
- *TriPlus SPME Method Setup:Fiber Conditioning Page*

TriPlus SPME Method Setup: Parameters Page

This tag allows to plan the parameters incubation, sampling and injection for the SPME method.

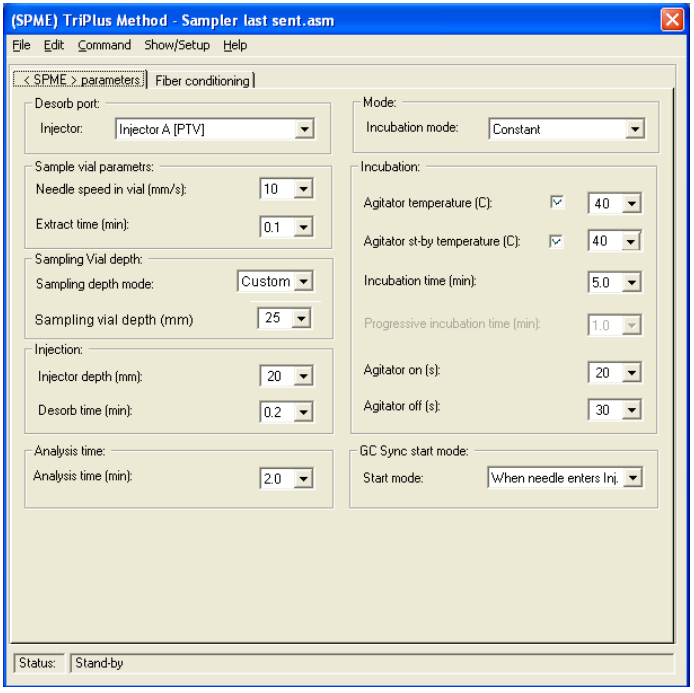


Figure 5-1. TriPlus SPME Parameters Page

Desorb Port

This frame includes the following option

Injector

Select the injector to be used.

Mode

It specifies how the sample must be conditioned.

Incubation Mode

It is possible to choose between two incubation modes:

- **Constant:** Choose this option to allow the sample to be sequentially conditioned at a programmed temperature with a constant conditioning time
- **Progressive:** Choose this option to allow the sample to be conditioned at a programmed temperature with a conditioning time that increases for each sample according to a programmed additional time.

Sample Vial Parameters

This frame includes the following options:

Needle speed in vial

Specify the penetration speed, expressed in mm/s, of the protective needle into the sample vial.

Extract time

This box indicates the extraction time, expressed in min, of the fiber into the vial located in the incubation oven (Agitator).

Incubation

Specify the conditioning and shaking parameters. The vial shaking is used to decrease the time necessary for the sample equilibrium.

Agitator temperature (°C)

Check the box to enable the temperature control. The temperature is thermo-regulated from 40 to 150 °C. If this box is unchecked, the temperature below 40 °C is not thermo-regulated but the agitator is ready only if its temperature is really below 40 °C.

Agitator st-by temperature (°C)

This parameter allows to set a temperature for the agitator (incubation oven) to stay while the sampler is not running (stand-by condition).
The temperature is thermo-regulated from 40 to 150 °C. If this box is unchecked, the temperature below 40 °C is not thermo-regulated but the agitator is ready only if its stand-by temperature is really below 40 °C.

Incubation Time

Specify in this box the incubation time for all samples to be analyzed with the method in use. The time here specified is in minutes.

Progressive incubation time (min)

This parameter is visualized when Progressive has been selected as incubation mode.
Specify in this box the time progressively added to the incubation time for all sample to be analyzed with the method in use. The time here specified is in minutes.

Agitator on

This box specifies the time for shaker on. The vial shaking is used to decrease the time in seconds necessary for the sample equilibrium.

Agitator off

This box specifies the time for shaker off.

Sampling Vial Depth

Set the penetration depth of the protective needle into the vial.

Sampling Depth Mode

Set the parameter choosing one of the following options:

- **Standard:** The protective needle penetrates into the vial at a predefined depth. Check this option to select this function.
- **Custom:** Check this option to select the desired penetration depth. The Sampling vial depth (mm) parameter is enabled.

Sampling vial depth

This parameter is visualized when the option Custom has been selected in Sampling Vial Depth combo box. In the box set the desired penetration depth of the protective needle into the vial.

Injection

This frame includes the following options:

Injector Depth (mm)

Select the desired penetration depth of the protective needle into the injector.

Desorb time (min)

This box indicates the desorbtion time of the fiber into the injector.

Analysis Time

This frame includes the following option:

Analysis time (min)

This box contains the full runtime of a single sample and it is used for calculation of the multiple sample incubation when incubation time is longer than the analysis runtime. The Sampler updates automatically this box sample by sample with the last runtime.

GC Synch Start Mode

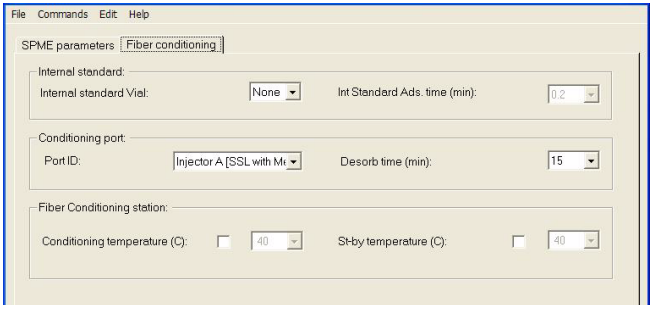
This frame includes the following modes to synchronize the Start signal:

Start mode

You may choose between the different synchronism options listed below.
When needle enters inj.: Selecting this option, the Start signal is sent to the GC at the beginning of the protective needle penetration into the injector.
Delayed: Selecting this option, the Start signal is generated when the fiber has been exposed.

TriPlus SPME Method Setup:Fiber Conditioning Page

This tag allows to plan the fiber conditioning parameters.



Internal Standard

This frame includes the following parameters:

Internal Standard vial

This box indicates the position of the internal standard vial in the washing station.

Int. Standard Ads. time (min)

This box indicates the exposure time of the fiber in the internal standard.

Conditioning Port

This frame includes the following parameters:

Port ID

Select the injector or the fiber conditioning port to use for the fiber bake-out.

Desorb time

This box indicates the desorption time of the fiber into the conditioning port selected.

Fiber Conditioning Station

This frame includes the following parameters:

Conditioning temperature (°C)

Check the box to enable the fiber conditioning temperature control according to the type of fiber in use. The temperature is thermo-regulated from 40 to 350 °C.

St-by temperature (°C)

This parameter allows to set a temperature for the fiber to stay while the sampler is not running (stand-by condition).
Check the box to enable the conditioning stand-by temperature control. The temperature is thermo-regulated from 40 to 350 °C.

6

Operations

This chapter provides instruction for operating with the TriPlus sampler.

Chapter at a Glance...

Overview

Before starting to work with the TriPlus sampler the following operations must have been performed:

Instrument Power On

When switched on, the instrument automatically performs an initial test to check the presence of the components and to define their position.
At the end of the test, the sampler goes in the stand-by condition and the status LED is lit with continuous green light.

Open the TriPlus User Interface (data system, stand-alone program or Pocket PC) to used.

Instrument Configuration

Make sure that the TriPlus sampler has been properly configured.

Refer to:

- *Configuration Page* in Chapter 5, or
- *Configuration Page* in Chapter 9

Sampler Set-up

Make sure that the TriPlus components are properly installed and enabled.

Refer to:

- *Sampler Set-up Page* and *Component Information Page* in Chapter 5, or
- *Sampler Setup Page* and *Component Information Page* in Chapter 9

Injector Set-up

Make sure that the syringe carriage assembly has been correctly aligned on the GC injector and on the sample vial.

Refer to:

- *Injector Setup Page* in Chapter 5, or
- *Injector Setup Page* in Chapter 9

Method Editing

Load an analytical method from disk according to the application to carry out. To help the develop of an analytical method, a list of methods factory saved as “template” are available on disk.

Refer to:

- *Method Selection Page* in Chapter 5, or
- *Method Selection Page* in Chapter 9

Template Method

A template method contains the analytical parameters suggested for the relevant application. See *Template Method Summary*.

A template method may be used as:

- a job method without changes
- a start point to develop a proper job method

Each template method can be modified but cannot be overwritten. Once you perform the changes in comparison to the selected template, the method must be saved with a different name.

The operator also can create personalized methods by using an empty template method. Once the own method is created, it can be saved as a template or as a job method.

How to Create / Load a Method

The user may to create a new method or to load a previously method saved on disk. In the first case the relative window of selection is displayed as shown below.
In the second case the system opens the dialog box where the name of the file to open must be specified.

In both the cases, the relative **Method Setup Page** will be visualized showing the default parameters and those recommended for that type of injection.

Template Method Summary

Table 6-1 reports an example of two *AS Template Methods*. The On-Column Injection and the SSL HOT Split injection are considered.

Table 6-2 reports an example of a *HS Template Method*. The Constant incubation mode is considered.

To help the operator to familiarize with the user interface, the parameters have been reported as shown in the tags of the Method Setup page.

AS Template Methods

Table 6-1. AS Template Method Summary

Tag	Parameter	On-Column	SSL HOT Split
General	**Injector Port**		
	Analysis Type (Single - Multiple)	Single	Single
	Injector:	Injector A [OC]	Injector A [SSL]
	Injector Mode		
	Mode	Basic	Basic
	Sampling Parameters		
	Sample volume (µl)	1.0	1.0
	Plunger strokes	10	10
	Auto air and filling volumes	Unchecked	Unchecked
	Custom air and filling volumes	Checked	Checked
	Air volume (µl)	3.0	3.0
	Filling volume (µl)	3.5	3.5
	Injection Parameters		
	Injection depth (Standard - Minimum - Custom)	Custom	Custom
	Pre-injection dwell time (s)	1.0	4.0
	Post injection dwell time (s)	2.0	0.0
	Injection depth (mm)	73	50
	Injection speed (µl/s)	100	100
	Vial Sampling Depth in vial		
	Sampling Depth (Button - Half - Custom)	Button	Button
	Sample vial depth%	---	---
	Sample Viscosity Parameters		
	Sample viscosity (Non viscous - Viscous - Custom)	Custom	Custom
	Sample Pull-up speed (µl/s)	0.8	0.8
	Delay after plug strokes (s)	4.0	4.0
	Viscosity delay	1.0	1.0

Tag	Parameter	OC	SSL HOT Split
Washes	**Washes Parameters**		
	Washes: Single solvent - Multiple	Single	Single
	Pre-Injection Parameters		
	Solvent	A	A
	Cycles	1	1
	Solvent Volume (µl)	1.0	1.0
	Sample Washes Parameters		
	Rinses	1	1
	Rinse Volume (µl)	1.5	1.5
	Post-Injection Parameters		
	Solvent	B	B
	Cycles	1	1
	Solvent Volume (µl)	1.0	1.0

Tag	Parameter	OC	SSL HOT Split
Synch	**GC Synchronization**		
	GC Synchro Start: Standard - Anticipated - Delayed - None	Standard	Standard

Tag	Parameter	OC	SSL HOT Split
Advanced	**Advanced Parameters**		
	Wash solvent depth%	100	100
	Waste depth%	15	15
	Needle speed in vial (mm/s)	20	20
	Solvent filling speed (µl/s)	20.0	20.0
	Bubble elimination pull-up (µl/s)	10.0	10.0
	Delay between strokes (s)	0.1	0.1

NOTE To print out the report of a TriPlus method, use the **Print** function.

HS Template Method

Table 6-2. HS Template Method Summary

Tag	Parameter	Constant Incubation Mode
General (HS)	**Injector Port**	
	Injector:	Injector A [SSL}
	Mode	
	Incubation Mode (Constant - Progressive - Multiple Extraction - Constant DoublePro)	Constant
	Analysis Time	
	Analysis Time (min)	0
	Incubation	
	Agitator Temperature (°C)	40
	Incubation Time	10
	Progressive Incubation Time (min)	---
	Multiple Extraction venting time (s)	---
	Agitator on (s)	10
	Agitator off (s)	10
	Sample	
	Sample draw (ml)	1
	Enrichment counts (#)	---
	Enrichment delay (min)	---
	Sample Depth in Vial	
	Sample depth in vial (Standard - Custom)	Standard
	Sampling vial depth (mm)	---
	Double Pro 2nd injector	
	Injector	---
	Sample data	---
	Delay Injector 1 to Injector 2 (s)	---

Tag	Parameter	Constant Incubation Mode
Syringe	**Syringe**	
	Syringe Temperature (°C)	40
	Enable Pre-filling	No
	Filling Volume (ml)	0
	Filling count (#)	1
	Filling delay (s)	0
	Pre-Injection syringe flush (fixed 5 seconds)	No
	Post-Injection syringe flush (Sec)	30
	Speed	
	Filling speed (ml/min)	50
	Injection speed (ml/min)	50
	Injection	
	Injection Depth (mm)	20
	Pre-injection delay	0
	Post-injection delay	0

Tag	Parameter	Constant Incubation Mode
Washes	**Washes Parameters**	
	Washes: Single solvent - Multiple	---
	Clean	---
	Solvent	---
	Dry time (min)	---
	Wash frequency	---

Tag	Parameter	Constant Incubation Mode
Synch / Stand-by	**Stand-by temperatures**	
	Syringe temperature (°C)	40
	Agitator temperature (°C)	40
	Stand-by Syringe flush	
	Syringe Flush	Off
	GC Synchronization	
	GC Synchro Start: Normal - Anticipated	Normal
	Anticipated Synch before incubation end	
	Anticipated time (min)	3

Tag	Parameter	Constant Incubation Mode
Advanced	**Advanced Parameters**	
	Needle speed in vial (mm/s)	200

NOTE To print out the report of a TriPlus method, use the **Print** function.

Start Analysis

1. According to the user interface in use set a sequence of samples as follows:

   - ***Data System***
     Open the **Sample Table** and enter all the parameters about the sequence of samples to be acquired and processed.

   - ***Stand-alone Program or TriPlus Software on Pocket PC***
     Set the sequence of samples by using the *Start batch of samples* function in **Commands** menu.

2. Prepare and accommodates the solvent vials into the washing station and the sample vials into the sample tray.

CAUTION **Vials must be accurately closed using appropriate septa and ring nuts.Septa must be those recommended by Thermo Fisher Scientific. The use of septa with different characteristics might damage or bend the syringe needle. During the vials preparation, it is recommended to comply with applicable safety regulations, specially as far as the conditions of the workplace ventilation are concerned.**

NOTE If the **Bar Code Reader** is used, the sample vials used with TriPlus AS must have a proper magnetic cap above.

The label must be compatible with the size of the vial used and must be carefully glued on the wall of the vial paying attention to avoid overlapping or deformation.
To allow the proper read of the bar code, the adhesive label with the bar code must be glued as described in paragraph *Bar Code Reader*.

3. Start the samples sequence.

Sampler Movements

This paragraph describes the movements of the sampler and the related parameters regarding the most common injection modes:

- *Basic Single Injector*
- *Internal Standard Post Single Injector*
- *Needle Solvent Wash Single Injector*
- *Basic Confirmation*
- *Basic Double Pro*

Basic Single Injector

Table 6-3. Basic Single Injector

Action	Movement	Parameter
Wait for start signal	• Home position	• Handshake
Barcode reader if enabled	• Move to vial on tray • Move vial to barcode reader • Rotate vial on barcode reader • Move vial to initial tray position	
Clean with solvent/s pre-injection	• Move to washing station • Aspirate solvent/s from wash station • Move to waste station • Eject to waste	• Number of solvents • Solvent selection • Cycles • Solvent volume • Wash solvent depth • Waste depth • Solvent filling speed
Rinse with sample	• Move to vial on tray • Aspirate sample from vial • Move to waste station • Eject to waste	• Rinses number • Rinse volume • Needle speed in vial

Table 6-3. Basic Single Injector (Continued)

Action	Movement	Parameter
Bubble elimination	• Move to vial on tray • Plunger strokes on sample vial	• Filling volume • Plunger strokes • Bubble elimination pull-up speed • Delay between strokes • Sampling vial depth
Aspirate sample	• Aspirate sample from vial	• Sample volume • Air volume • Sample pull-up speed • Viscosity delay • Delay after plunger strokes
Open OC if enabled	• Move to injector • actuator opens	
Inject sample	• Inject	• Injection depth • Injection speed • Pre-inj dwell time • Post -nj dwell time
Start signal out		• Handshake setup • Synchronization
Close OC if enabled	• Actuator closes	
Clean with solvent/s post injection	• Move to washing station • Aspirate solvent/s from wash station • Move to waste station • Eject to waste	• Number of solvents • Solvent selection • Cycles • Solvent volume • Wash solvent depth • Waste depth • Solvent filling speed
Autozero on X,Y,Z axis and plunger	• Home position	

Internal Standard Post Single Injector

Table 6-4. Internal Standard Single Injector

Action	Movement	Parameter
Wait for start signal	• Home position	• Handshake setup
Read barcode if enabled	• Move to vial on tray • Move vial to barcode reader • Rotate vial on barcode reader • Move vial to initial tray position	
Clean with solvent/s pre injection	• Move to washing station • Aspirate solvent/s from wash station • Move to waste station • Eject to waste	• Number of solvents • Solvent selection • Cycles • Solvent volume • Wash solvent depth • Waste depth • Solvent filling speed
Rinse with IS	• Move to IS vial • Aspirate IS from vial • Move to waste station • Eject to waste	• Rinses number • Rinse volume • Needle speed in vial • IS position
Bubble elimination	• Move to IS on tray • Plunger strokes on IS vial	• Filling volume • Plunger strokes • Bubble elimination pull-up speed • Delay between strokes • Sampling vial depth
Aspirate IS	• Aspirate IS from vial	• IS volume • Air gap volume • Sample pull-up speed • Delay after plunger strokes
Aspirate sample	• Move to sample vial on tray • Aspirate sample from vial	• Sample volume • Air volume • Viscosity delay

Table 6-4. Internal Standard Single Injector (Continued)

Action	Movement	Parameter
Open OC if enabled	• Move to injector • Actuator opens	
Inject sample	• Inject	• Injection depth • Injection speed • Pre-inj dwell time • Post-inj dwell time
Start signal out		• Handshake setup • Synchronization
Close OC if enabled	• Actuator closes	
Clean with solvent/s post injection	• Move to washing station • Aspirate solvent/s from wash station • Move to waste station • Eject to waste	• Number of solvents • Solvent selection • Cycles • Solvent volume • Wash solvent depth • Waste depth • Solvent filling speed
Autozero on X,Y,Z axis and plunger	• Home position	

Needle Solvent Wash Single Injector

Table 6-5. Needle Solvent Wash Single Injector

Action	Movement	Parameter
Wait for start signal	• Home position	• Handshake setup
Read barcode if enabled	• Move to vial on tray • Move vial to barcode reader • Rotate vial on barcode reader • Move vial to initial tray position	
Clean with solvent/s pre injection	• Move to washing station • Aspirate solvent/s from wash station • Move to waste station • Eject to waste	• Number of solvents • Solvent selection • Cycles • Solvent volume • Wash solvent depth • Waste depth • Solvent filling speed
Rinse with sample	• Move to vial on tray • Aspirate sample from vial • Move to waste station • Eject to waste	• Rinses number • Rinse volume • Needle speed in vial
Bubble elimination	• Move to vial on tray • Plunger strokes on sample vial	• Filling volume • Plunger strokes • Bubble elimination pull-up speed • Delay between strokes • Sampling vial depth
Aspirate sample	• Aspirate sample from vial	• Sample volume • Air volume • Sample pull-up speed • Viscosity delay • Delay after plunger strokes

Table 6-5. Needle Solvent Wash Single Injector (Continued)

Action	Movement	Parameter
Aspirate solvent	• Move to solvent position • Aspirate solvent	• Solvent volume • Air gap volume • Solvent vial • Solvent vial depth
Open OC if enabled	• Move to injector • Actuator opens	
Inject sample	• Inject	• Injection depth • Injection speed • Pre-inj dwell time • Post-inj dwell time
Start signal out		• Handshake setup • Synchronization
Close OC if enabled	• Actuator closes	
Clean with solvent/s post injection	• Move to washing station • Aspirate solvent/s from wash station • Move to waste station • Eject to waste	• Number of solvents • Solvent selection • Cycles • Solvent volume • Wash solvent depth • Waste depth • Solvent filling speed
Autozero on X,Y,Z axis and plunger	• Home position	

Basic Confirmation

Table 6-6. Basic Confirmation

Action	Movement	Parameter
Wait for start signal	• Home position	• Handshake setup
Read barcode if enabled	• Move to vial on tray • Move vial to barcode reader • Rotate vial on barcode reader • Move vial to initial tray position	
Clean with solvent/s pre injection	• Move to washing station • Aspirate solvent/s from wash station • Move to waste station • Eject to waste	• Number of solvents • Solvent selection • Cycles • Solvent volume • Wash solvent depth • Waste depth • Solvent filling speed
Rinse with sample	• Move to vial on tray • Aspirate sample from vial • Move to waste station • Eject to waste	• Rinses number • Rinse volume • Needle speed in vial
Bubble elimination	• Move to vial on tray • Plunger strokes on sample vial	• Filling volume • Plunger strokes • Bubble elimination pull-up speed • Delay between strokes • Sampling vial depth
Aspirate sample	• Aspirate sample from vial	• Sample volume • Air volume • Sample pull-up speed • Viscosity delay • Delay after plunger strokes
Open OC if enabled	• Move to injector • Actuator opens	

Table 6-6. Basic Confirmation (Continued)

Action	Movement	Parameter
Inject sample on 1° injector	• Inject	• Injection depth • Injection speed • Pre-inj dwell time • Post-inj dwell time
Start signal out		• Handshake setup • Synchronization
Close OC if enabled	• Actuator closes	
Wait delay between injector 1 and 2		
Read barcode if enabled	• Move to vial on tray • Move vial to barcode reader • Rotate vial on barcode reader • Move vial to initial tray position	
Rinse with sample	• Move to vial on tray • Aspirate sample from vial • Move to waste station • Eject to waste	• Rinses number • Rinse volume • Needle speed in vial
Bubble elimination	• Move to vial on tray • Plunger strokes on sample vial	• Filling volume • Plunger strokes • Bubble elimination pull-up speed • Delay between strokes • Sampling vial depth
Aspirate sample	• Aspirate sample from vial	• Sample volume • Air volume • Sample pull-up speed • Viscosity delay • Delay after plunger strokes
Open OC if enabled	• Move to injector • Actuator opens	

Table 6-6. Basic Confirmation (Continued)

Action	Movement	Parameter
Inject sample on 2° injector	• Inject	• Injection depth • Injection speed • Pre-inj dwell time • Post-inj dwell time
Close OC if enabled	• Actuator closes	
Clean with solvent/s post injection	• Move to washing station • Aspirate solvent/s from wash station • Move to waste station • Eject to waste	• Number of solvents • Solvent selection • Cycles • Solvent volume • Wash solvent depth • Waste depth • Solvent filling speed
Autozero on X,Y,Z axis and plunger	• Home position	

Basic Double Pro

Table 6-7. Basic Double Pro

Action	Movement	Parameter
Wait for start signal	• Home position	• Handshake setup
Read barcode if enabled	• Move to vial on tray • Move vial to barcode reader • Rotate vial on barcode reader • Move vial to initial tray position	
Clean with solvent/s pre injection	• Move to washing station • Aspirate solvent/s from wash station • Move to waste station • Eject to waste	• Number of solvents • Solvent selection • Cycles • Solvent volume • Wash solvent depth • Waste depth • Solvent filling speed
Rinse with sample	• Move to vial on tray • Aspirate sample from vial • Move to waste station • Eject to waste	• Rinses number • Rinse volume • Needle speed in vial
Bubble elimination	• Move to vial on tray • Plunger strokes on sample vial	• Filling volume • Plunger strokes • Bubble elimination pull-up speed • Delay between strokes • Sampling vial depth
Aspirate sample	• Aspirate sample from vial	• Sample volume • Air volume • Sample pull-up speed • Viscosity delay • Delay after plunger strokes
Open OC if enabled	• Move to injector • Actuator opens	

Table 6-7. Basic Double Pro (Continued)

Action	Movement	Parameter
Inject sample on 1° injector	• Inject	• Injection depth • Injection speed • Pre-inj dwell time • Post-inj dwell time
Start signal out		• Handshake setup • Synchronization
Close OC if enabled	• Actuator closes	
Clean with solvent/s post injection	• Move to washing station • Aspirate solvent/s from wash station • Move to waste station • Eject to waste	• Number of solvents • Solvent selection • Cycles • Solvent volume • Wash solvent depth • Waste depth • Solvent filling speed
Wait delay between injector 1 and 2		
Read barcode if enabled	• Move to vial on tray • Move vial to barcode reader • Rotate vial on barcode reader • Move vial to initial tray position	
Clean with solvent/s pre injection	• Move to washing station • Aspirate solvent/s from wash station • Move to waste station • Eject to waste	• Number of solvents • Solvent selection • Cycles • Solvent volume • Wash solvent depth • Waste depth • Solvent filling speed
Rinse with sample	• Move to vial on tray • Aspirate sample from vial • Move to waste station • Eject to waste	• Rinses number • Rinse volume • Needle speed in vial

Table 6-7. Basic Double Pro (Continued)

Action	Movement	Parameter
Bubble elimination	• Move to vial on tray • Plunger strokes on sample vial	• Filling volume • Plunger strokes • Bubble elimination pull-up speed • Delay between strokes • Sampling vial depth
Aspirate sample	• Aspirate sample from vial	• Sample volume • Air volume • Sample pull-up speed • Viscosity delay • Delay after plunger strokes
Open OC if enabled	• Move to injector • Actuator opens	
Inject sample on 2° injector	• Inject	• Injection depth • Injection speed • Pre-inj dwell time • Post-inj dwell time
Close OC if enabled	• Actuator closes	
Clean with solvent/s post injection	• Move to washing station • Aspirate solvent/s from wash station • Move to waste station • Eject to waste	• Number of solvents • Solvent selection • Cycles • Solvent volume • Wash solvent depth • Waste depth • Solvent filling speed
Autozero on X,Y,Z axis and plunger	• Home position	

7

Maintenance and Troubleshooting

This chapter provides maintenance and troubleshooting guidelines for the TriPlus sampler.

Chapter at a Glance…

Operating Sequences

Maintenance

Current Maintenance

The TriPlus does not generally require maintenance, except emptying of the waste container when full, cleaning of the sample tray and replacement of the syringe. For any other operation, contact Thermo Fisher Scientific Technical Service.

OPERATING SEQUENCE

Sampler Removal from the GC

WARNING! This operation must be performed by TWO persons who must stand each on one side of the crossrail X.

When it is necessary to remove the sampler from the GC, proceed as follows.

1. Switch Off the power module that supplies the instrument, then disconnect the power cable.
2. Disconnect the 25-pin cable form the connector marked POWER SUPPLY located on the rear panel of the power module.
3. Unscrew and remove the screws that are fixing the two support bars on the GC cover.
4. Put your hands under the crossrail X, then carefully lift the sampler.
5. Place the sampler over an appropriate flat surface.
6. To reassemble the sampler on the GC, perform the inverse sequence.

OPERATING SEQUENCE

Emptying of the Waste Container

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

1. If necessary, move the turret to have free access to the washing and waste tray.
2. Take out the container.
3. Remove the cap and empty the container.
4. Put on the cap again and reposition the container into its seat.

OPERATING SEQUENCE

Cleaning of the Sample Tray Accessory

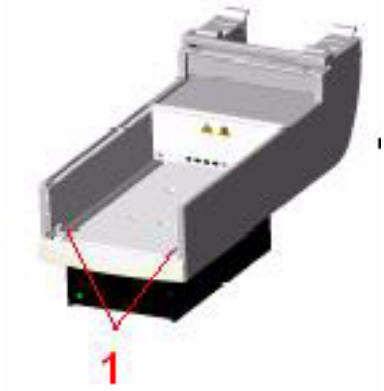
The sample tray must be periodically cleaned.

1. Use a water and soap solution or a household non abrasive product. Dry using a clean cloth.

OPERATING SEQUENCE

Cleaning the Thermostatted Tray Holder

Perform this operation periodically in order to prevent the occurrence of mildew and fungus on the two condenser strips located on the lower edges of the tray holder as shown in Figure 7-1.



1. Condenser Strips

Figure 7-1. Thermostatted Tray Holder Condenser Strips

The frequence of this maintenance is proportional to the amount of condensation formed.

1. The Benzalkonium Chloride solution 50% is required to treated the condenser strips.
2. Dilute the solution 1:12 in water.
3. Dry the tray holder from the condensation by using a clean cloth.
4. By using a little brush dispense the obtained solution on the condenser strips.

OPERATING SEQUENCE

External Cleaning of the Sampler

WARNING! The external cleaning must be performed with the instrument off and the power cord disconnected. Avoid using solvents and spraying on electrical parts.
For the removal of possible dangerous substances (toxic, harmful etc.), read the hazard indications and information reported in the Safety Sheet supplied by the manufacturer referring to the relevant CAS (Chemical Abstract Service) number. Use proper protective gloves.

1. Clean the instrument on the outside with a water and soap solution or with a household non abrasive product. Pay special attention when cleaning the back side of the sampling unit. Do not spray, but clean using a cloth imbued with the same substance.

2. Dry with a clean cloth.

In case the operator suspects that any substance used for cleaning or submitted to analysis may have entered the instrument, though it is very unlikely, he/she shall immediately switch off the instrument and call the authorized Technical Service for proper action.

OPERATING SEQUENCE

Triplus AS Syringe Installation and Replacement

The installation of the syringe or its replacement is a simple operation. However, it must be performed with caution to avoid damages to the syringe needle and ensure an optimal performance of the injection device. This operation is possible with the instrument either on or off.

Syringe Removal

1. Open the safety door of the turret.

NOTE If the instrument is on, power supply to the motors is immediately cut off.

2. Take out the syringe holder assembly from the turret.

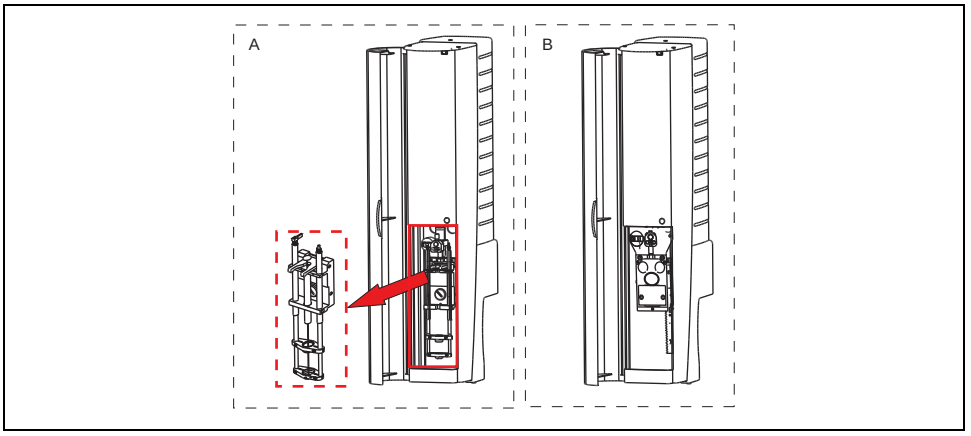


Figure 7-2. TriPlus AS: Syringe Holder Removal

Remove the syringe referring to Figure 7-3 and proceeding as follows:

3. Gently lift the syringe lock lever on the top of the syringe holder.

4. Completely take out the syringe.

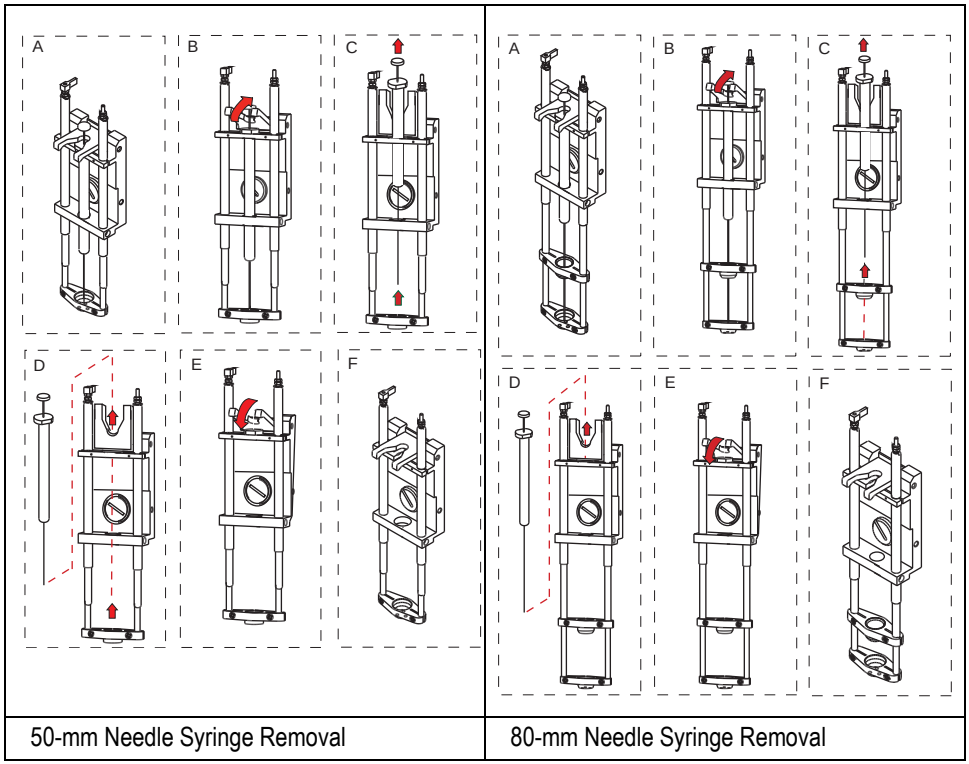


Figure 7-3. TriPlus AS: Syringe Removal

Syringe Installation

Install the syringe referring to Figure 7-4 and proceeding as follows:

1. Take a new syringe.

2. Select the syringe volume of the syringe on the volume selector located on the sliding plate of the injection device. This to record the volume of the syringe installed.

3. Slip and guide the syringe body into its seat on the syringe holder until the needle goes into the touch sensor.

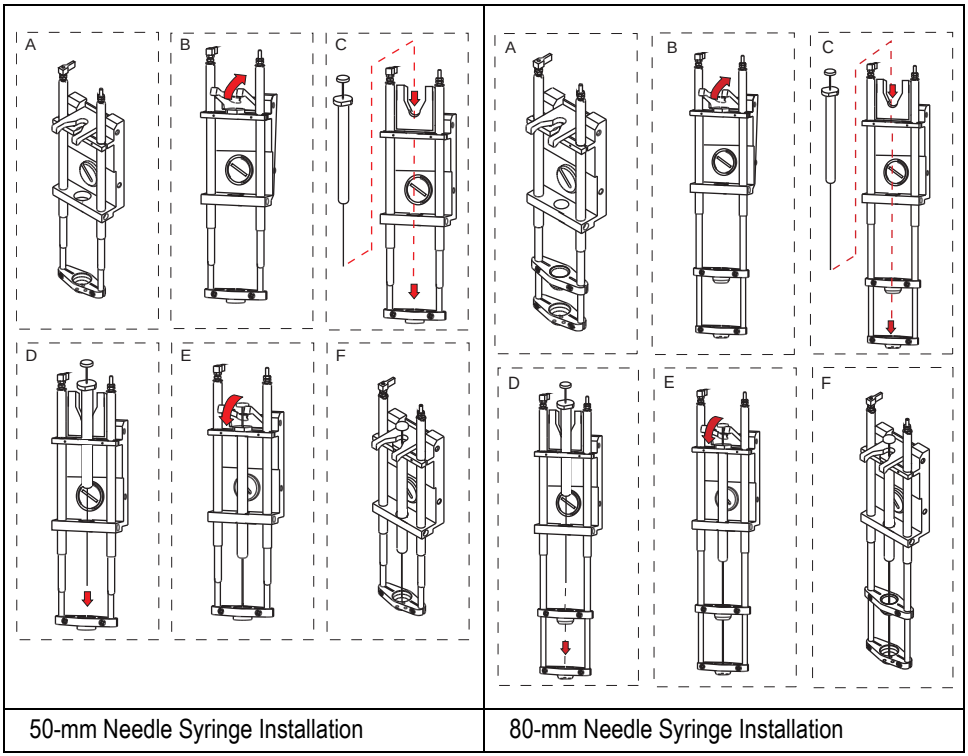


Figure 7-4. TriPlus AS: Syringe Installation

4. When the syringe flange touches the syringe holder, lower the syringe lock lever on the top of the syringe holder. The syringe is now firmly housed in its seat.

5. Apply the syringe holder to the sliding plate, paying attention to simultaneously introduce the pins and the plunger head into their relevant guides.

6. Close the safety door of the turret.

NOTE If the instrument is switched on, at the closing of the safety door the sampler automatically performs the control of the syringe zero. If the instrument is switched off, the operation will be performed at the lighting during the initial test.

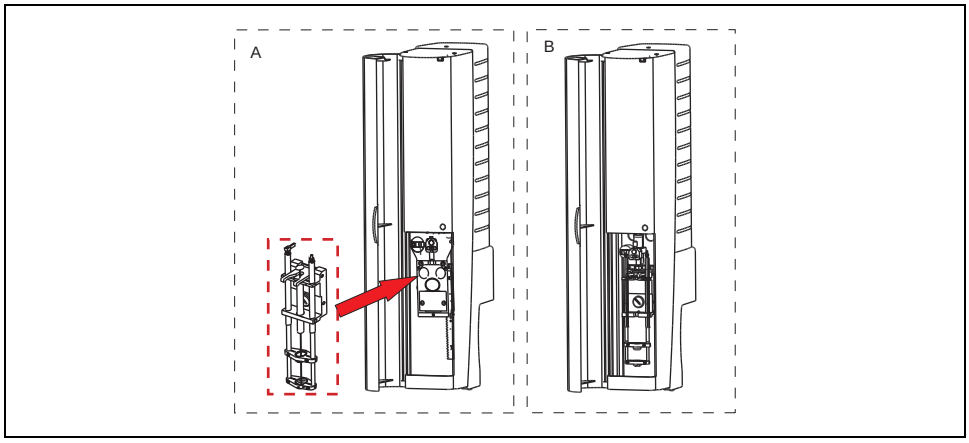


Figure 7-5. TriPlus AS: Syringe Holder Installation

NOTE

Before starting operation, remember to open the **Configuration Mismatch** page from the user interface in use, in order to automatically update the system with the new installed syringe.

OPERATING SEQUENCE

TriPlus HS Syringe Installation and Replacement

The installation of the syringe or its replacement is a procedure that requires careful attention in order to prevent damage and to guarantee optimal performance of the injection unit.

WARNING! The syringe and the syringe holder may be HOT.

Figure 7-6 shows the parts of the injection block.

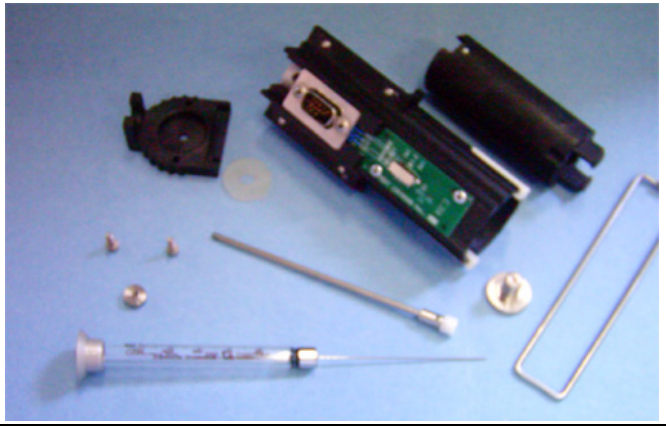


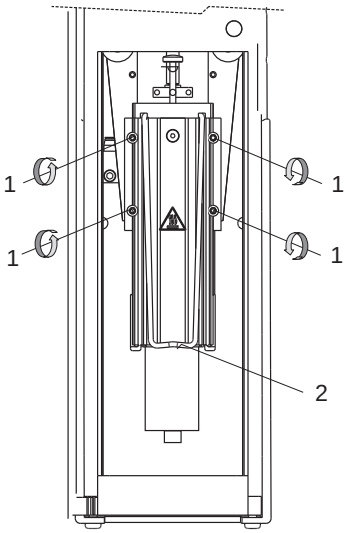
Figure 7-6. Parts of the Injection Block

1. Open the safety door of the turret.

NOTE If the instrument is on, power supply is immediately cut off.

The 2.5 mm Allen key provided in the standard outfit is required to carry out the syringe installation and replacement operation.

2. Using the same Allen key, loosen the four screws that fix the injection device to the injection sliding plate.



1. Fixing Screws 2. Lever

Figure 7-7. TriPlus HS: Injection Block Removal

3. Pulling the lever forward, carefully remove the injection block, from the turret.

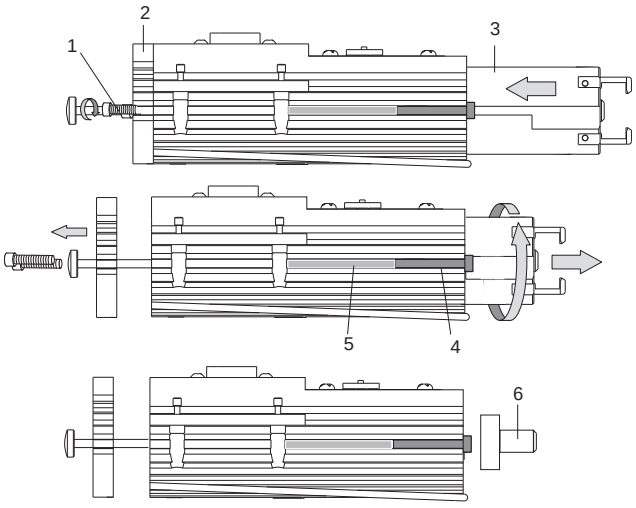
4. Remove the syringe holder upper cover by undoing the two fixing screws by means of the 2.5 mm Allen key.

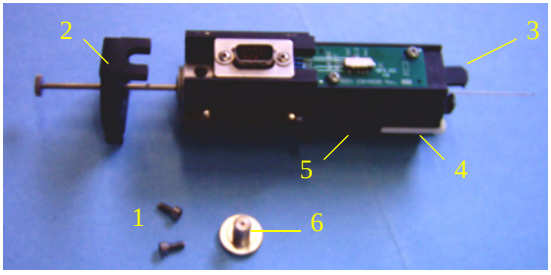
CAUTION **The needle is now without protection. Be careful not to damage it.**

5. Remove the vial capture device retractable mechanism by pushing it inside the syringe holder.

6. Rotate the mechanism by 90° clockwise in order to release the slot guides from the two locking pins and to extract the vial capture device.

7. Remove the needle guide.



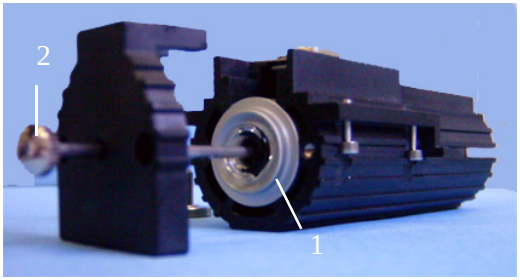


1. Fixing Screws	2. Upper Cover
3. Retractable Mechanism	4. White Locking Pins
5. Slot Guides	6. Needle Guides

Figure 7-8. TriPlus HS Syringe Installation (1)

Syringe Removal

As shown in Figure 7-9, the syringe top is surrounded by a plunger button that ensures the correct positioning of the syringe inside the heating block. This metal ring has appropriate dimensions for the 1 or 2.5 mL syringe (for 5 mL syringe, it is not necessary).

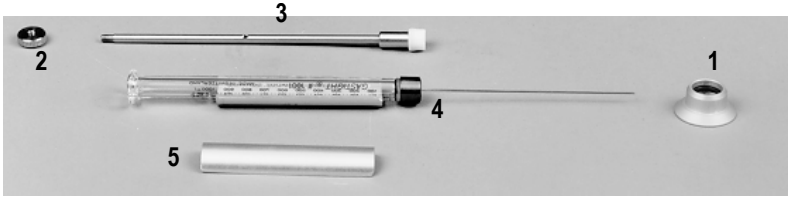


1. Flange
2. Plunger Metal Ring

Figure 7-9. TriPlus HS Syringe Installation (2)

1. By using a suitable tool (for example, a small screwdriver) gently pull out the flange **1** of Figure 7-9, until the syringe is completely out of its holder. Inside the syringe holder there are two semi-cylindrical sleeves that can be removed by upturning the heating block; the sleeves are used when 1 or 2.5 mL syringes are chosen.

2. Figure 7-10 shows those parts of the syringe that are removed:



1. Flange
2. Metal Ring
3. Syringe Plunger
4. Syringe Body
5. Sleeve

Figure 7-10. Syringe Removal

Syringe Replacement

1. Ensure that the 1mL or 2.5 mL syringe is provided with the appropriate sleeve and metal ring.

2. Place the sleeve around the syringe body then gently insert the complete assembly inside the syringe holder. The syringe needle must protrude easily through the hole located at the bottom of the syringe holder.

Injection Device Assembling

1. Capture Device	2. Syringe Holder
3. Locking Pins	4. Syringe Needle
5. Washer	6. Needle Guide
7. Needle Seal	8. Nut
9. Syringe Volume Selector	

Figure 7-11. Injection Device Assembly

1. Insert the needle seal **7** and the washer **5** of Figure 5-6.
2. Holding the syringe firmly, screw the nut **8** on the syringe fixing block **4** of Figure 5-6.
3. Insert the needle guide **6** onto the needle turning the widest section upwards.
4. Insert the syringe plunger and its seal into the syringe body.

5. Insert the vial capture device **1** into the heating block coupling the slot guides to the locking pins.

6. Place the lever into its seat paying attention that the curved section is facing forward.

7. Reinstall the heating block upper cover and fix it using the two fixing screws. Do not tighten excessively to avoid damage to the screw seat.

8. Screw the button on the syringe plunger.

Reinstallation of the Injection Device on the Sliding Plate

1. Select the syringe volume on the selector present on the rear panel of the syringe holder, to record the type of syringe installed.

2. Insert the injection block gently into the turret ensuring that the 9-pin connector and the flushing gas nozzle couple with their relevant parts on the heating block.

3. Move the syringe plunger upwards to insert the plunger button into its seat in the syringe barrel holder.

4. Very carefully and gently screw the four fixing screws to secure the injection block to the turret sliding plate, then reinstall the syringe barrel housing cover and secure it with the relevant screw.

5. Close the safety door of the turret.

NOTE If the instrument is switched on, at the closing of the safety door the sampler automatically performs the control of the syringe zero. If the instrument is switched off, the operation will be performed at the lighting during the initial test.

Before starting operation, remember to open the **Configuration Mismatch** page from the user interface in use, in order to automatically update the system with the new installed syringe...

OPERATING SEQUENCE

Triplus SPME Fiber Holder Installation and Replacement

The installation of the fiber holder, or its replacement, is a simple operation. However, it must be performed with caution to avoid damages to the protective needle and ensure an optimal performance of the injection device. This operation is possible with the instrument either on or off.

Fiber Holder Removal

1. Open the safety door of the turret.

NOTE If the instrument is on, power supply to the motors is immediately cut off.

2. Take out the syringe holder assembly from the turret paying attention to don't remove the plunger adapter.

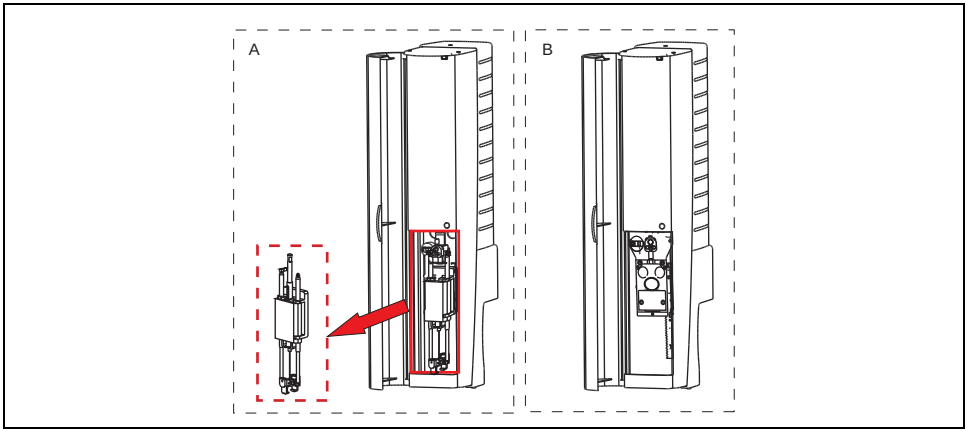


Figure 7-12. TriPlus SPME: Fiber Holder Removal

Remove the fiber holder referring to Figure 7-13 and proceeding as follows:

3. Gently open the syringe holder door.

4. Completely take out the fiber holder from the syringe holder.

5. Close the syringe holder door.

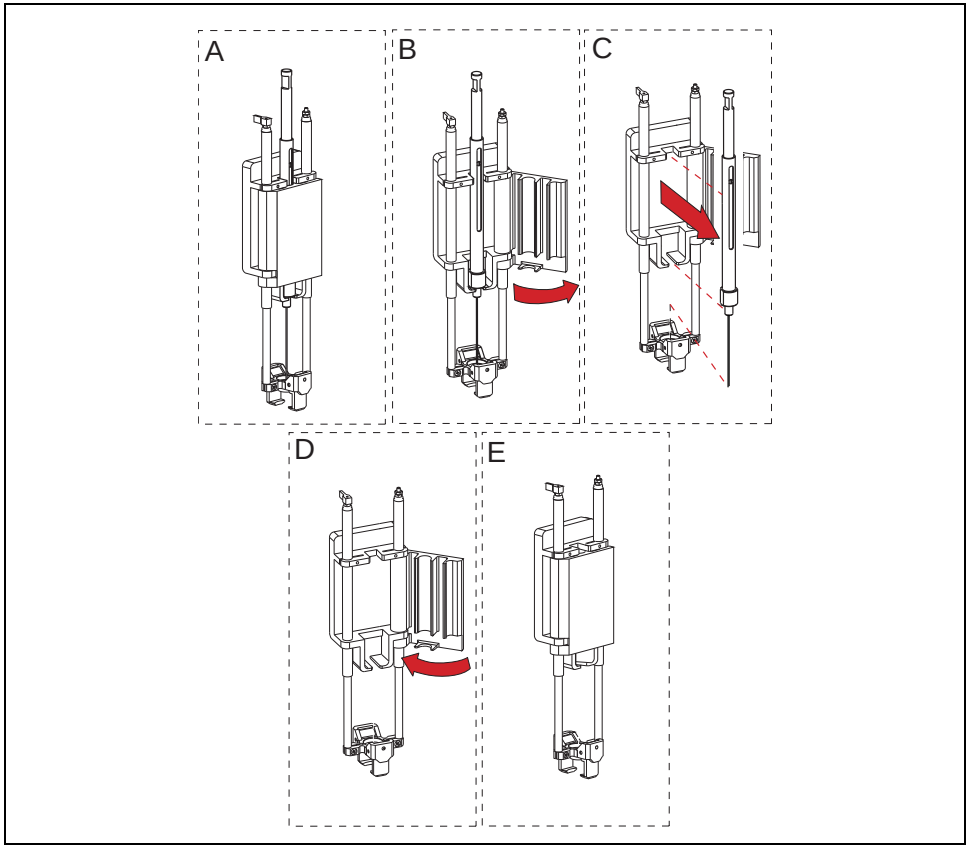


Figure 7-13. TriPlus SPME: Fiber Holder Removal

Fiber Replacement

CAUTION **This operation must be carried out only when necessary.**

To replace the fiber refer to Figure 7-14 and proceed as follows:

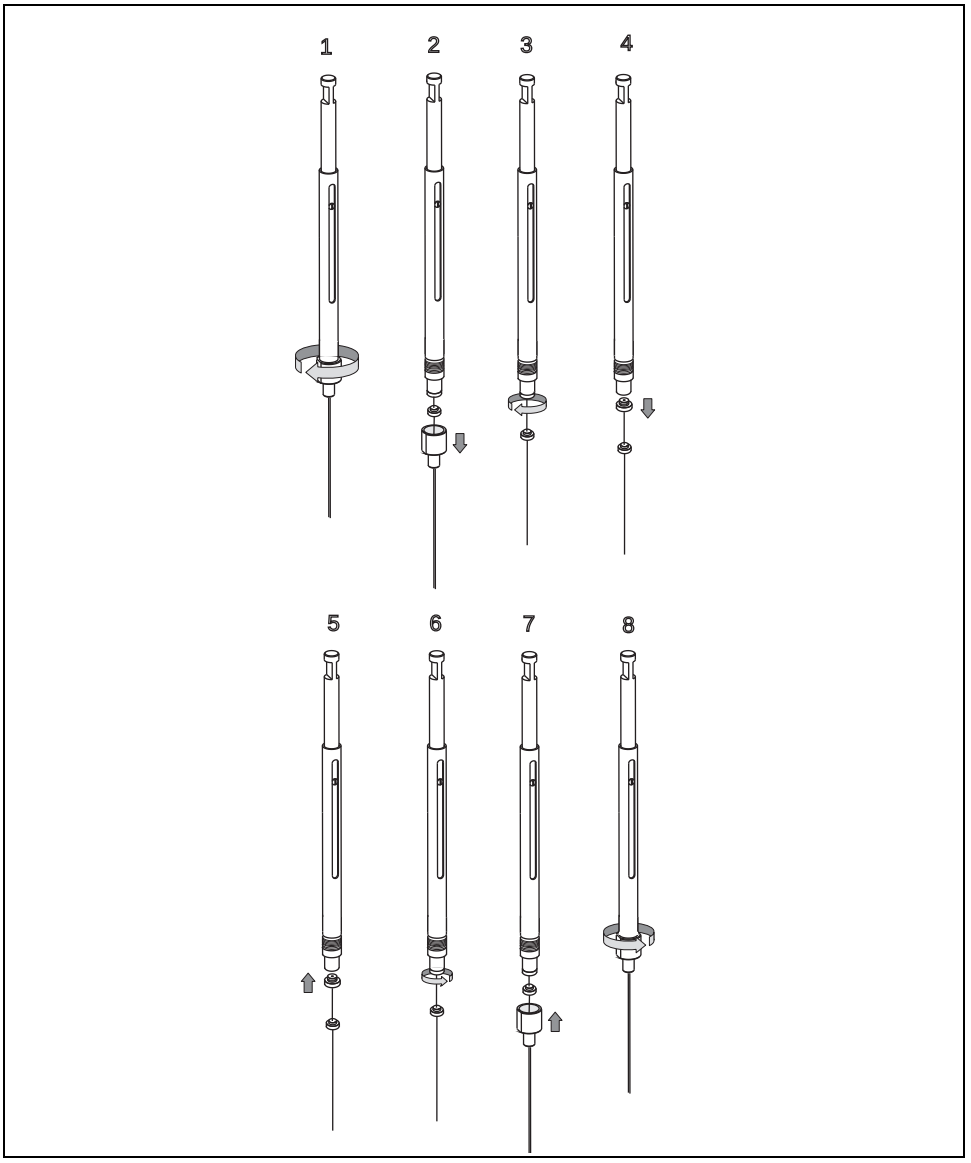


Figure 7-14. Fiber Replacement

1. Unscrew and remove the protective needle from the fiber holder. See **1** and **2** of Figure 7-14.
2. Unscrew and remove the fiber with its seal from the fiber holder. See **3** and **4** of Figure 7-14.
3. Screw the new fiber with its seal to the fiber holder. See **5** and **6** of Figure 7-14.
4. Screw the new fiber and its seal to the fiber holder. See **5** and **6** of Figure 7-14.
5. Insert the fiber into the protective needle then screw it to the fiber holder. See **7** and **8** of Figure 7-14

Fiber Holder Installation

Install the fiber holder into the syringe holder referring to Figure 7-15 and proceeding as follows:

1. Gently open the syringe holder door.
2. Guide and accommodate the fiber holder in the syringe holder.
3. When the fiber holder is correctly installed, close the syringe holder door.

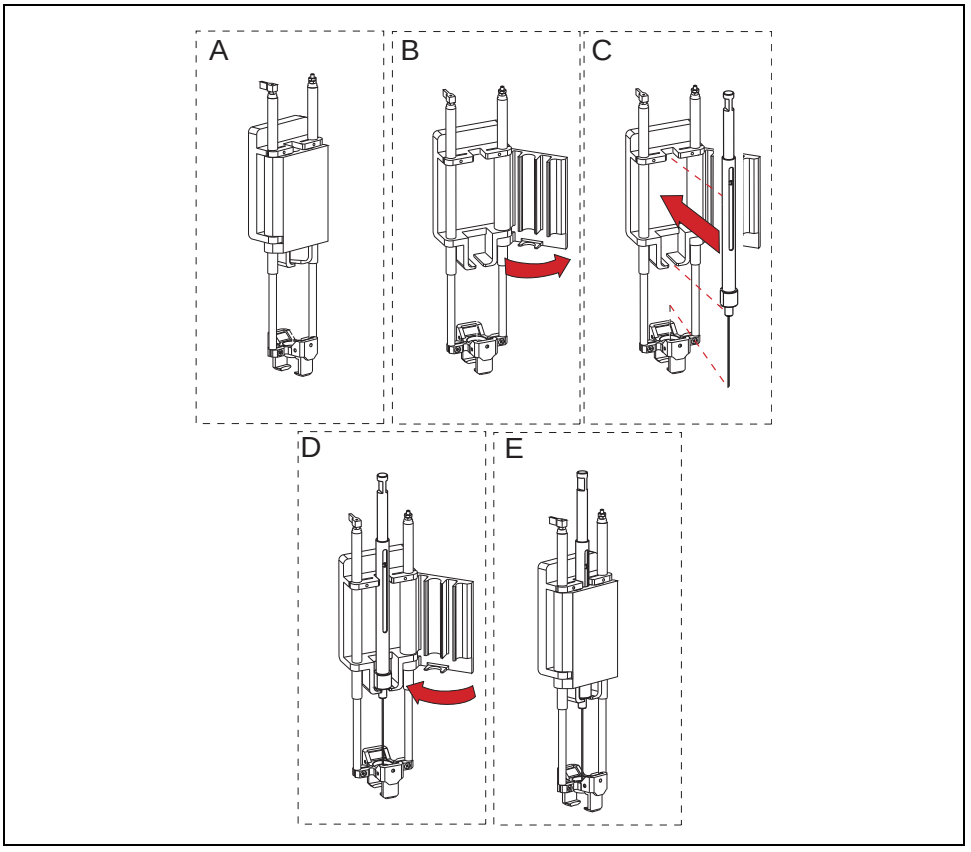


Figure 7-15. TriPlus SPME: Fiber Holder Installation

4. Apply the syringe holder to the sliding plate, paying attention to simultaneously introduce the pins and the plunger head into their relevant guides.

5. Close the safety door of the turret.

NOTE If the instrument is switched on, at the closing of the safety door the sampler automatically performs the control of the syringe zero. If the instrument is switched off, the operation will be performed at the lighting during the initial test.

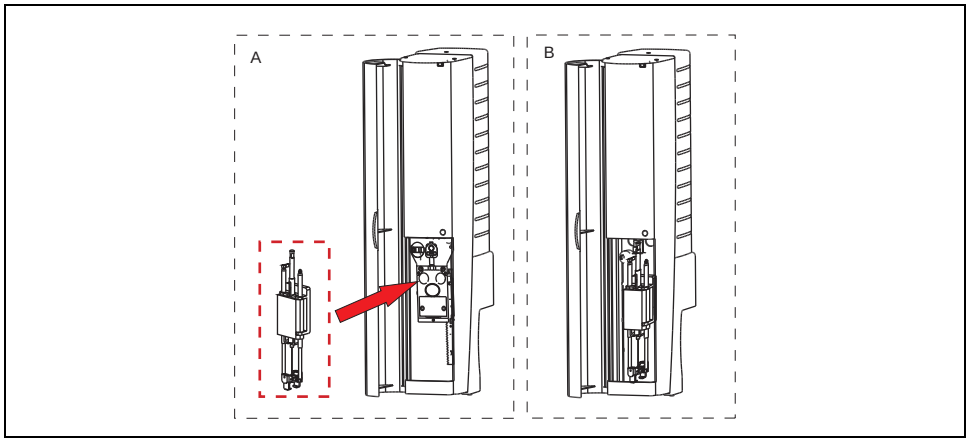


Figure 7-16. TriPlus SPME: Syringe Holder Installation

NOTE Before starting operation, remember to open the **Configuration Mismatch** page from the user interface in use, in order to automatically update the system.

OPERATING SEQUENCE

Cleaning of the Syringe

The syringe cleaning is advisable every 100-200 samples, particularly if the sample analyzed contains solids in suspension, or if poorly lubricant solvents are used, such as water and methanol.

1. Remove the syringe as described in the operating sequence *Triplus AS Syringe Installation and Replacement* or *TriPlus HS Syringe Installation and Replacement*.

2. Completely take out the syringe plunger and clean it gently using a soft cloth or a paper tissue.

3. Reintroduce the syringe plunger and gently move it repeatedly along its whole travel drawing an organic solvent (e.g. hexane).

1. Reinstall the syringe as described in the operating sequence *Triplus AS Syringe Installation and Replacement* or *TriPlus HS Syringe Installation and Replacement*.

Messages

This paragraph provides the list of the status and error messages that may be displayed before or during the TriPlus runs.

These messages will be displayed in the status bar located on the bottom of the ***Instrument Setup*** page currently open. (refer to the data system in used.

The instrument operating conditions are also indicated by the status LED, located on the right side of the crossrail X, showing a continuous or intermittent light. Refer to *Status LED* in Chapter 2.

Status Messages

The messages listed in the Tables 7-1 and 7-2 inform the operator about the activity that the sampler is currently doing.
Any intervention from the operator it is not required.

Table 7-1. Status Messages

General Status Messages
Unknown response or sampler not connected
Start-up procedure, initializing....
Stand-by
Initializing positions
Checking solvent
Checking vial
Identifying sample with barcode
Sample injected
Eliminating bubbles
Rinsing with sample
Filling sample
Filling internal standard
Injecting

Table 7-1. Status Messages

General Status Messages
Incubating and agitating
Moving vial
Agitating sample
Flushing syringe
Waiting GC ready input
Moving to next position
Doing Pre-injection wash
Doing Post-injection wash

Table 7-2. Other Messages

Other Messages	
Wait... Serving Main Instrument	
Wait... Serving Secondary Virtual Instrument	
Sampler is already controlled by another host	
Retrieving configuration from Sampler...	
Com port unavailable or already in use	
Unknown	
Not present	
Ready	
Above set	
Below set	
Safety cut off	Refer to *Safety Cut Off*
None	
LV washing station 2 solvents	
Washing station 4 solvents	
Primary tray holder	
Secondary tray holder	

Table 7-2. Other Messages

Other Messages
Syringe driver
Head Space agitator
Tray 54 positions (55 to 108)
Tray 150 positions (151 to 300)
Barcode reader
Injection port A
Injection port B
Injection port C
Injection port D
On Column actuator 1
On Column actuator 2
X Axis driver
Y Axis driver
Z Axis driver
Liquids syringe plunger driver
Head space syringe plunger driver

Error Messages

The following table lists the messages that may be displayed in case of user's forgetfulness and/or error. The intervention of the operator is required.

Table 7-3. Error Messages

Error Messages	Comments
Undefined object error	***Generic error.*** Call the Thermo Fisher Scientific Technical Support communicating the type of error visualized.

Table 7-3. Error Messages (Continued)

Error Messages	Comments
Sample vial not found	The sampler does not found the sample vial. Verify that the sample vial is complete of septa and cap and placed into the sample tray. If the ***bar code reader*** is present, the vial must be equipped also of metal top cap.
Solvent vial missing, or washing station disabled	Verify that the solvent vial is complete of septa and cap and placed into the washing station. In the ***Sample Set-up Page*** verify that the washing station is enabled **Yes**.
Injector A missing, or disabled	Verify that the injection device is properly aligned with the injector. In the ***Sample Set-up Page*** verify that the injector in use is enabled **Yes**.
Injector B missing, or disabled	
Injector C missing, or disabled	
Injector D missing, or disabled	
Injector A is On-Column, but is missing actuator	The injector A, B, C, or D has been set as On-Column but it is not present in the sampler configuration.
Injector B is On-Column, but is missing actuator	
Injector C is On-Column, but is missing actuator	
Injector D is On-Column, but is missing actuator	
Configuration is changed, therefore method in memory is invalid	Check the method/sampler configuration in ***Configuration Mismatch Page*** Restore the correct configuration.
Volume mismatch, required volumes exceed 90% of the syringe volume	Check the method/sampler configuration in ***Configuration Mismatch Page*** Restore the correct volume.
Internal standard vial missing	The sample does not found the internal standard vial. Verify that the internal standard vial is complete of septa and cap and placed into the sample tray. If the ***bar code reader*** is present, the vial must be equipped also of metal top cap.

Table 7-3. Error Messages (Continued)

Error Messages	Comments
Sampler is processing previous command, can't accept a new one	Before sending a new command, wait until the sampler has end to process the previous command.
Obstacle on the route. Sampler stopped	Verify and remove the obstacle.
Barcode error	Verify that the label with the bar code has been properly attached on the vial.
Head Space sampler only available for main instrument, see configuration.	Verify the instrument configuration in the **Configuration Page.** Set the HS sampler as main instrument.
Washing station not available	Verify that the washing station is properly installed, connected and enabled.
Tray conflict, samples are not unique, two samples 1, 55, or 151	Two sample trays having not unique samples numeration are installed on the sampler. Remove the tray that produces the conflict.
Washing station conflict, Solvents are not unique, two solvents A and B	Two washing stations are installed on the sampler. Remove the washing station that produces the conflict.
On-Column actuator error	Verify that the on-column injector actuator is properly installed, connected and enabled.
Waste bottle missing	Verify that the waste bottle is placed into the washing station.

Alarm Messages

The following tables list alarm messages that may be displayed in case of error or fault.

Main Alarm Messages

The error condition is visualized through the status LED by intermittent green-red lights with **1 hit** of green light and a sequence of **n** hits of red light according to the number and the type of error. See Table 7-4.
The intervention of the local Thermo Fisher Scientific Technical Support could be required.

Table 7-4. Main Alarm Messages

No of Red Light Hits	Type of Error
1	12 C Bus alarm
2	Boot alarm from a peripheral
3	Peripheral message error
4	Sensor #1 not found, can't do zero
5	Stepper motion error, or still moving
6	Timeout on stepper new position
7	Tray ID alarm
8	Expected object height is wrong, position error
9	Peripheral incorrect parameter
10	Peripherals not detected
11	Speed or Acceleration/Deceleration error
12	Vial sensing sensor always busy
13	New position request out of limits
14	Peripheral position out of limits
15	Syringe type selection error
16	Tray alarm, no data available
17	General alarm on X, Y, Z, or plunger
18	Waste bottle missing

Boot Alarm Messages

The error condition is visualized through the status LED by intermittent green-red lights with **2 hits** of green light and a sequence of **n** hits of red light according to the number and the type of error. See Table 7-5.
The intervention of the local Thermo Fisher Scientific Technical Support could be required.

NOTE

The re-loading or upgrading the firmware, available in Milan tech support web site, is always suggested to perform as first remedy.

Table 7-5. Boot Alarm Messages

No of Red Light Hits	Type of Error
1	Flash memory erasing not correct
2	Flash memory programming or checksum not correct
3	Time-out data receiving error.
4	Checksum Main Program wrong
5	Program Main into Flash corrupted
6	Internal error
7	Type 1 inizialization chip serial wrong
8	Type 2 inizialization chip serial wrong
9	Type 3 inizialization chip serial wrong
10	EEprom not recognized

Safety Cut Off

It informs the user about an unexpected TriPlus LC condition. When this status takes place, the syringe and the incubation oven power are cut off for safety reason. The Safety Cut Off status is followed by an error message.

8

LAN Set-up

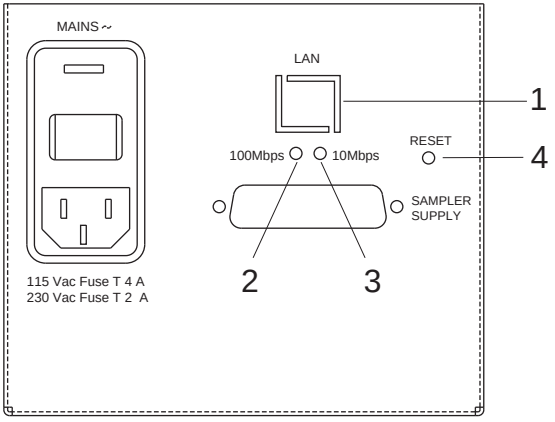
This chapter contains a few notes on how to set-up and start using the TriPlus autosampler with the LAN option.

Chapter at a Glance…

Operating Sequences

Introduction

The TriPlus featuring LAN (Local Area Network) is easily recognizable by the presence on the rear panel of the power module of a RJ45 connector, 2 LEDs for LAN activity and a reset button.



1. RJ45 Connector
2. LED marked 100 Mdps
3. LED marked 10 Mdps
4. Reset button

Figure 8-1. Power Module Rear Panel

IP Address and LAN Communication Port

The TriPlus LAN autosampler is shipped with a factory IP address, that may not match the needs of the LAN of the site where the autosampler must be installed.

To change the values, contact your LAN administrator and ask for the IP address to be assigned, the netmask, and eventually the port.

- The IP address is a 3 digits x 4 fields number given by the network administrator e.g. 192.168.127.10
- The netmask is a 3 digits x 4 fields number given by the network administrator e.g. 255.255.255.0

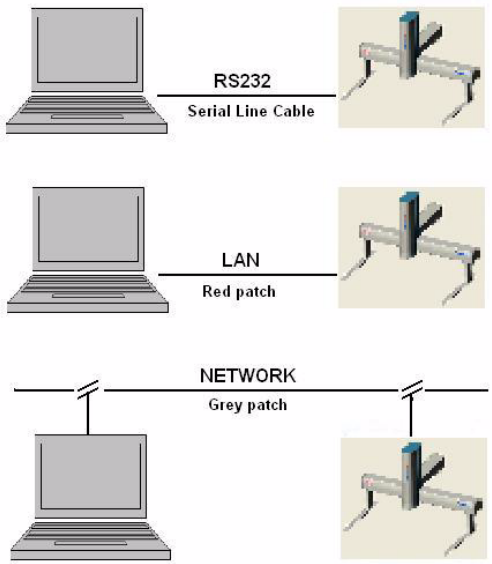
- The port is a 5 digits number given by the network administrator e.g. 4001 (4001 is usually the CPU/LAN default)

Network Cables

Two network cables are included in the standard outfit of the TriPlus LAN autosampler:

- a reversed RED patch for computer to TriPlus direct connection. This is used for the initial set-up operation.
- a standard GREY patch for TriPlus to local area network connection. This is used for normal use.

The principle of connection between TriPlus and PC is schematically shown in the following figure.



Set-Up

This paragraph provides instruction to set the desired IP and set up the LAN communication port of the TriPlus autosampler then to configure the data system.

ATTENTION Before starting, please read the type of LAN module installed on the label located on the rear panel of the TriPlus autosampler power module.

NE-4110S Series LAN Module

If the NE-4110S Series LAN module is installed, please follow the instruction reported in the *How to Set up the NE-4110S Series LAN Module* operating sequence

Reset Button

To reset and re-initialize the LAN interface, by push the reset button, located on the rear panel of the Triplus autosampler power module. This operation does not affect the IP address.

DE-311M Series LAN Module

If the DE-311M Series LAN module is installed, please follow the instruction reported in the *How to Set up the DE-311M Series LAN Module* operating sequence.

Reset Button

To reset the IP address and communication port to default value, push the reset button, located on the rear panel of the Triplus autosampler power module., for at least 5 seconds.

OPERATING SEQUENCE

How to Set up the NE-4110S Series LAN Module

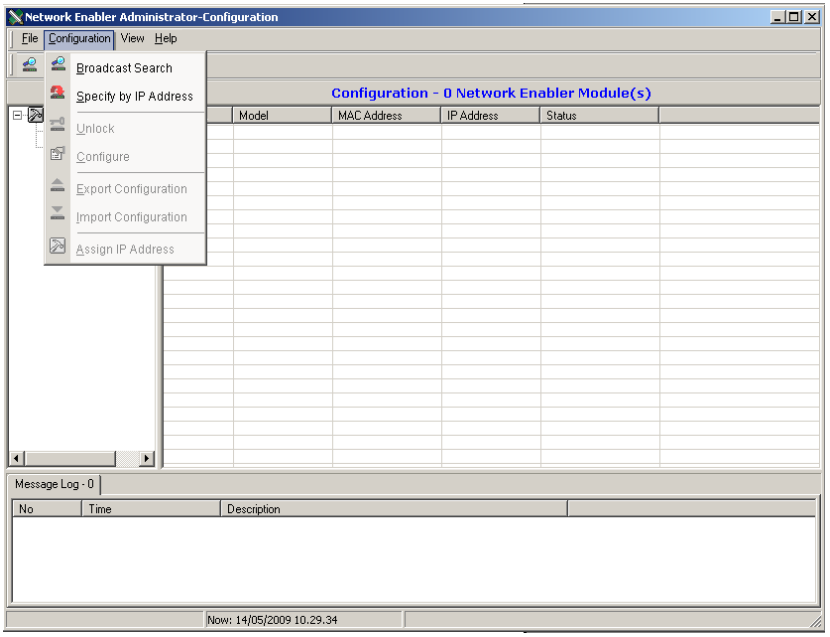
Material required

- PC (desktop or portable)
- Network connecting RED cable
- Network connecting GREY cable
- Network Enabler Administrator setup program

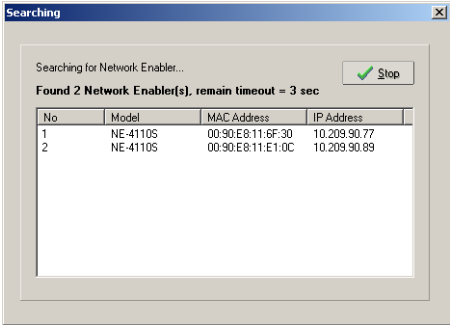
To properly set the desired IP and set up the LAN communication port of the TriPlus autosampler, perform the following steps:

Verify that the autosampler and the PC are switched off.

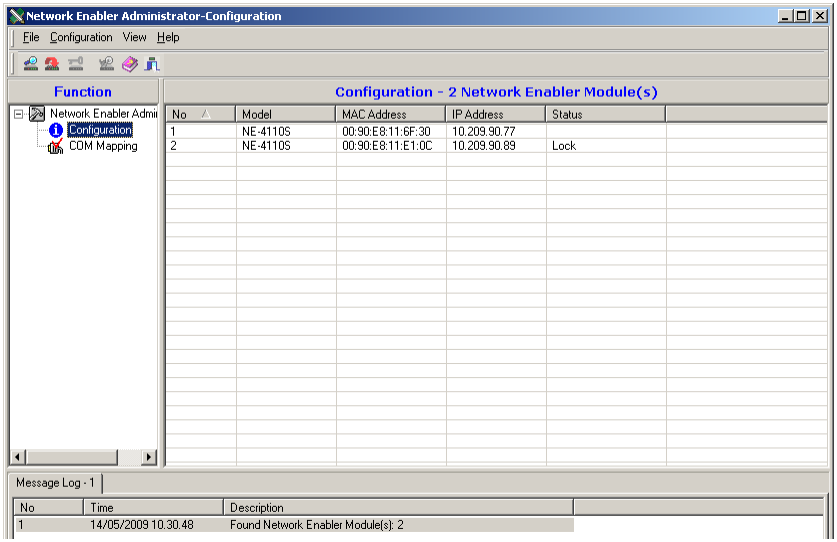
1. By using the LAN reversed RED patch included in the standard outfit, connect a PC (desktop or portable) directly to the RJ45 connector marked LAN located on the rear panel of the TriPlus autosampler power module.
2. Switch on the autosampler as well as the PC.
3. Start the **Network Enabler Administrator** setup program to begin the installation. When the **Welcome** window opens, click on **Next**.
4. Continue to click on **Next**, then click on **Install** to install program files in the default directory.
5. The **Installing** window reports the progress of the installation.
6. Click on **Finish** to complete the installation.
7. The **Network Enabler Administrator** starts opening the **Configuration** window.



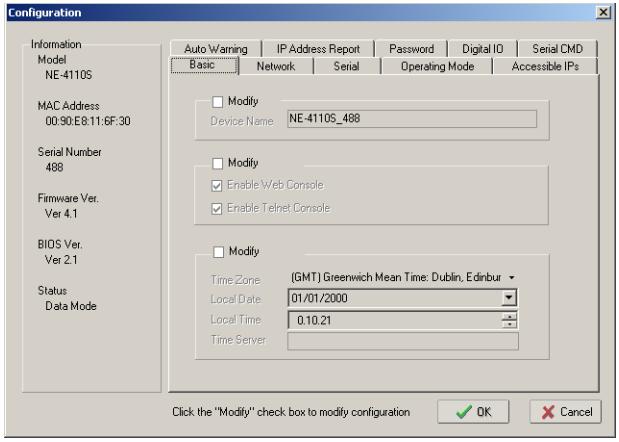
8. Click on **Configuration** from the menu bar, and then select **Broadcast Search** from the drop-down menu. to find all NE-4110S Series modules that are connected to the same LAN. A **Searching** window is open.



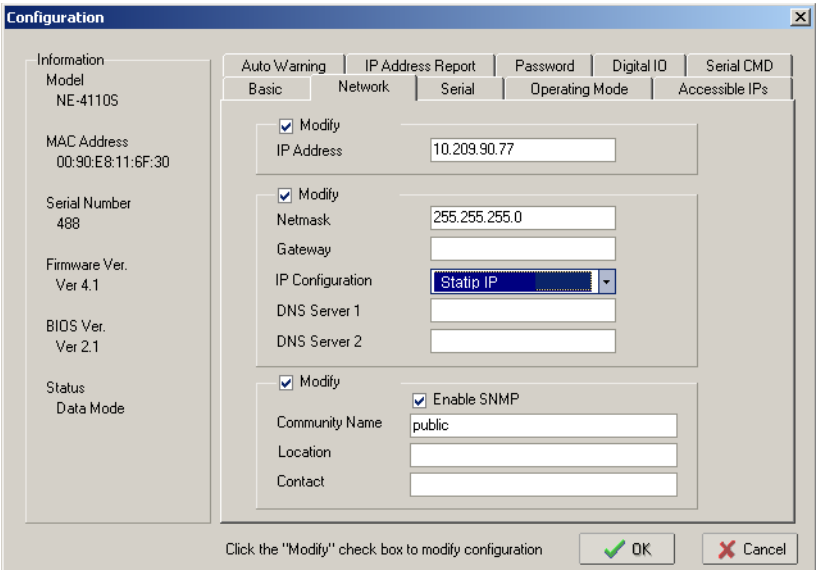
9. After the search is finished, all NE-4110S modules that were found will be shown in the right panel of the **Configuration** window as shown in the following example.



10. Locate and double-click on the string of the module to configure. The following **Configuration** window appears.

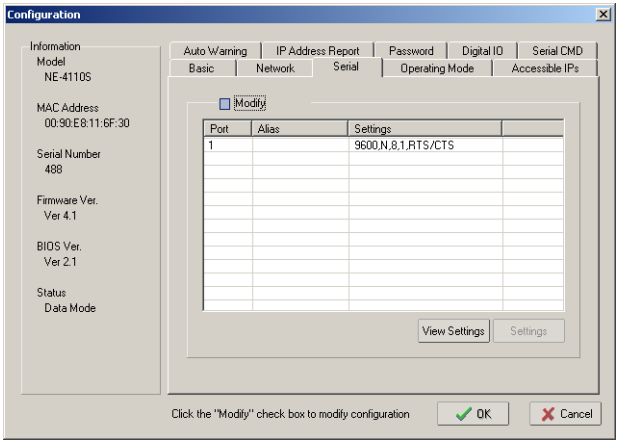


11. Select **Network** tag.



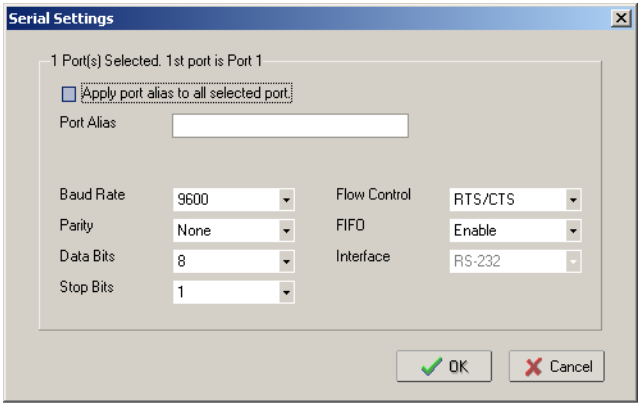
12. Check the **Modify** check box to modify the configuration. Modify **IP Address** and **Netmask** according to the numbers given by your network administrator.

13. Select **Serial** tag. The following window appears.



14. Verify that **Settings** of the serial port is **9600,N,8,1,RTS/CTS**. If not, check **Modify** check box.

15. Double click on the string to open the **Serial Settings** page.

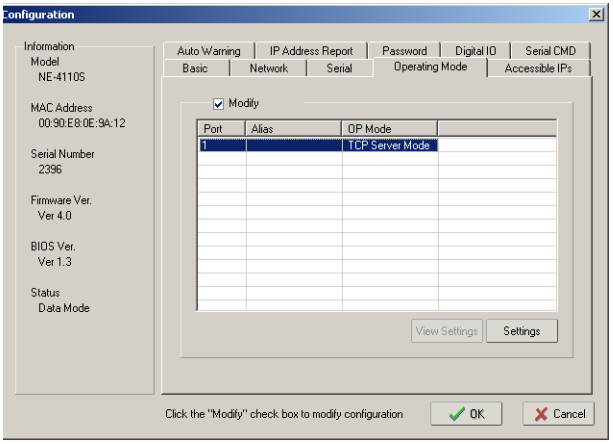


Set the serial port parameters as follows:

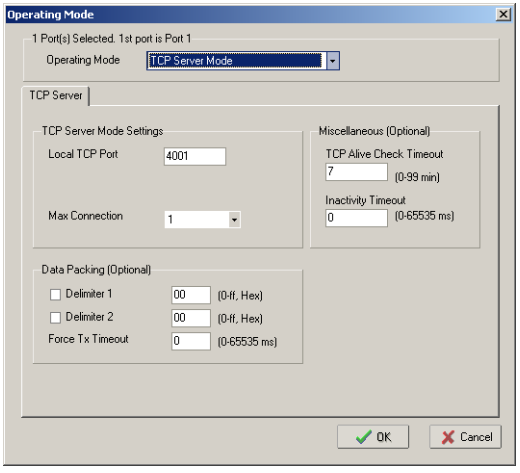
- Baud Rate 9600
- Parity None
- Data Bits 8
- Stop Bits 1
- Flow Control RTS/CTS
- FIFO Enable

16. Click **OK** to confirm. The Configuration window is visualized again.

17. Select **Operating Mode** tag. The following window appears.



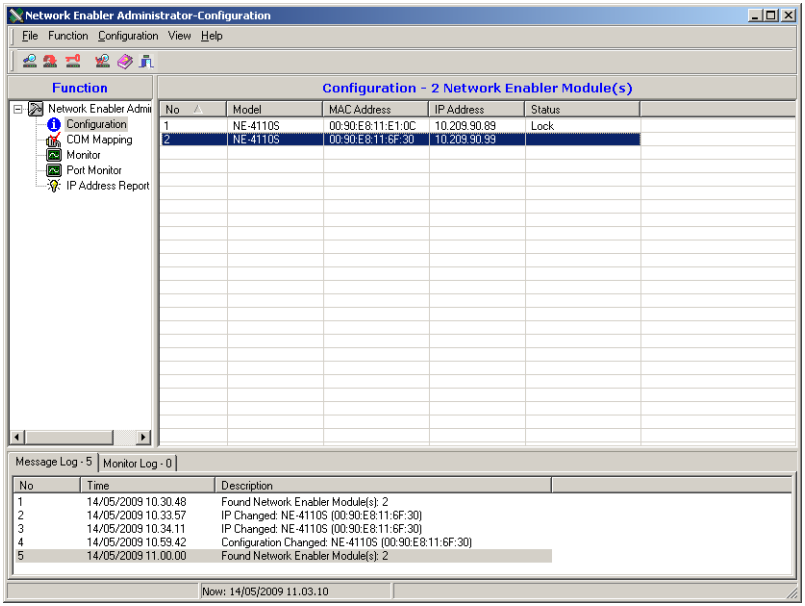
18. Check the **Modify** check box to modify the configuration. Double click on the string **TCP Server Mode** to open the **Operating Mode** window.



19. Verify that **Inactivity Timeout** is set to **0** ms. If the data system used is **XCalibur 2.1** or higher, set this parameter to **10000** ms.

20. Click **OK**, then **OK** again. The configuration process starts.

21. At the end of the configuration process, the new IP address will be visualized on the **Configuration** window as shown in the following example.



22. In the bar menu select **File > Exit** to exit the program.

The TriPlus autosampler is now ready for LAN control through the Thermo Fisher Scientific Corporation Data systems. Now it is necessary to configure the data system to access the TriPlus autosampler through the configured IP address.

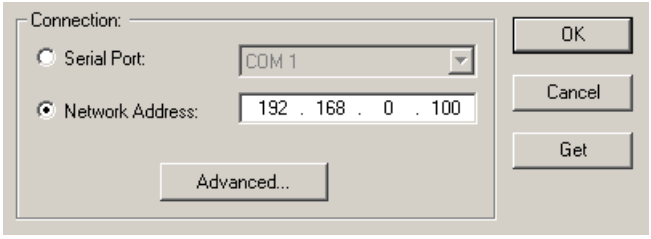
The data systems that support the TriPlus autosampler LAN control are:

- Xcalibur
- ChromQuest
- ChemStation
- Chrom-Card
- GC Link

Data System Configuration

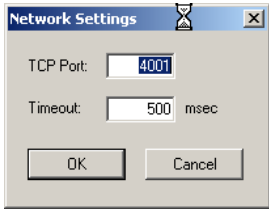
It is advisable to use the self adhesive labels you find in the standard outfit of the TriPlus autosampler LAN to annotate the IP address and the TCP Port that have been set in the TriPlus LAN. Stick the label in a place that can be easily referenced when it will be necessary to configure the data system.

23. Install, and start the Data System as described in the specific manual, and go to **Instrument configuration**. The TriPlus autosampler configuration page features the possibility to control the autosampler through the COM ports or to specify a direct TCP/IP address.



24. Just enter the IP address of the TriPlus and complete the configuration in the usual way.

    When the **ADVANCED** button is pressed, it is possible to set the communication port used by the TCP/IP protocol and the timeout.



    The parameters set by default are those necessary for standard operations; however your LAN may be provided with Firewall services that may prevent the Port 4001 to be used.

    For this reason you have here the possibility to set an alternative port number. However, the number of the port entered in this box must correspond to the

port assigned to TriPlus autosampler LAN setup.
Moreover the TriPlus autosampler **Instrument configuration** advanced settings feature a box for Timeout. This timeout is set by default to 500 ms, and it's appropriate for most of the LAN environments. However should the LAN be extremely slow, this time can be increased to allow slower access to the autosampler.

WARNING! If the connection is performed through hubs over a 10 Mbit/s network, it is suggested that no more than five TriPlus autosampler LAN are connected on the same network trunk. In the case of switched network, this warning can be ignored.

OPERATING SEQUENCE

How to Set up the DE-311M Series LAN Module

Material required

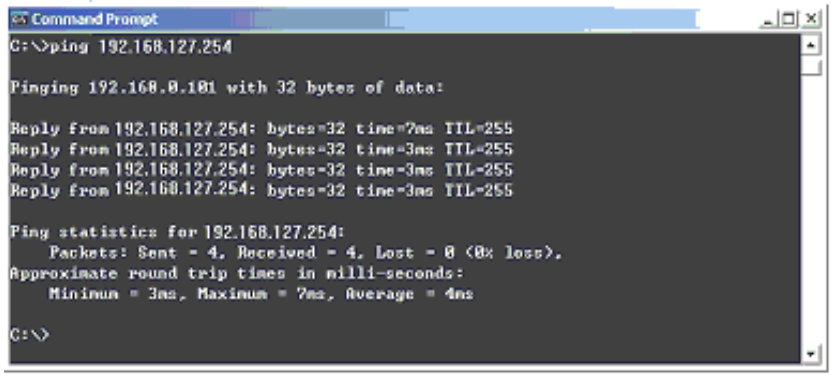
- PC (desktop or portable)
- Network connecting RED cable
- Network connecting GREY cable

To properly set the desired IP and set up the LAN communication port of the TriPlus autosampler, perform the following steps:

1. By using the LAN reversed RED patch included in the standard outfit, connect a PC (desktop or portable) directly to the RJ45 connector marked LAN located on the top of the TriPlus autosampler.

2. Switch on the GC as well as the PC

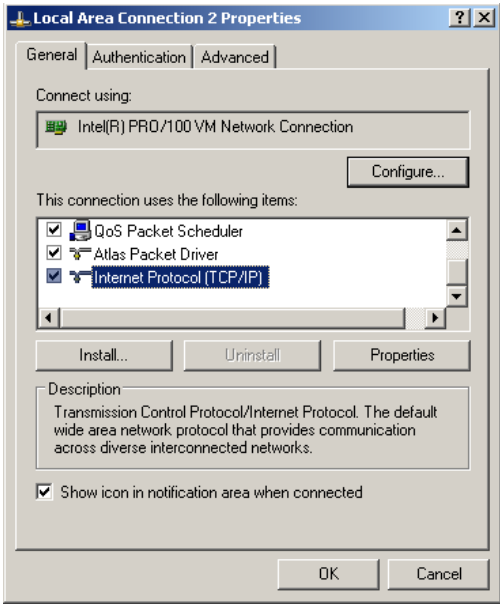
3. Make sure your PC communicates with the CPU/LAN IP. To do this, from the Microsoft™ Start menu, run "Prompt Command" and type "**Ping 192.168.127.254**". The TriPlus autosampler LAN should answer as reported in the following figure.



- If the default IP address 192.168.127.254 is reachable, please jump to paragraph *How to operate when the IP is reachable*.
- If your PC is not able to communicate with the default IP address, it is necessary to set your computer to a different IP address, following the instructions reported in paragraph *How to operate when the IP address is not reachable*.

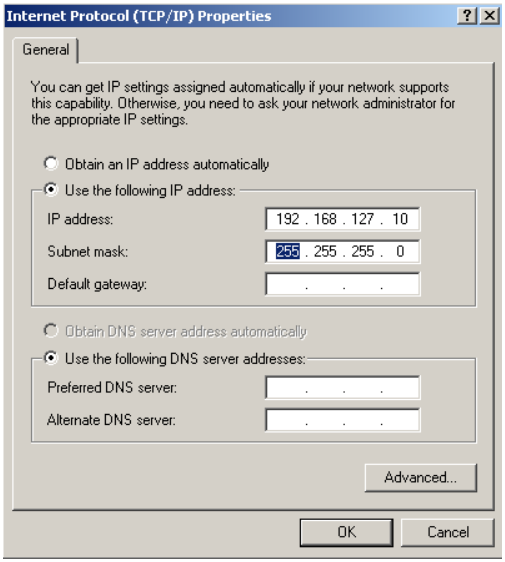
How to operate when the IP address is not reachable

1. Select the Local Area Network connection properties of your computer (please refer to specific operating system instructions to access this configuration).



2. Select the “Internet Protocol TCP/IP and then click on **`Properties`**.

3. Make sure the IP address of the computer you are using is set for same subnet of the default IP address of the TriPlus autosampler LAN.
   It may be any IP in the range 192.168.127.1 to 192.168.127. 253. Please also set the subnet as described.



4. At this point confirm by pressing **OK**, and restart from point **c** to make sure the TriPlus autosampler LAN default IP is now reachable.

NOTE Should you still have problems, please check the cable connection, and go through the reset procedure of the TriPlus autosampler CPU. The CPU/LAN is hence reset to the default IP address. It may happen that for any reason the IP address has been previously changed from default to another IP address and therefore a reset procedure is advisable. Refer to *Reset Button* on page 356.

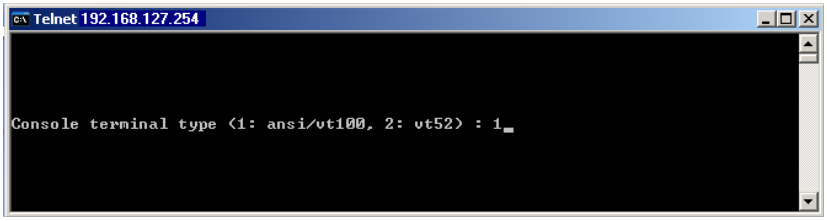
5. Proceed following the instructions reported in paragraph *How to operate when the IP is reachable*

How to operate when the IP is reachable

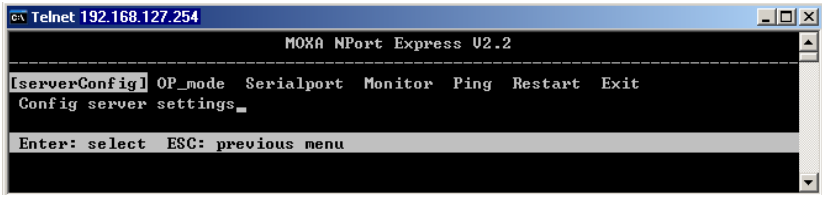
When the IP has been reached it means that the PC is communicating with the TriPlus autosampler LAN. It is now possible to set the LAN communication port.

1. Start a command prompt and type **telnet 192.168.127.254**

2. The telnet program connects to the IP 192.168.127.254 and shows the following page:

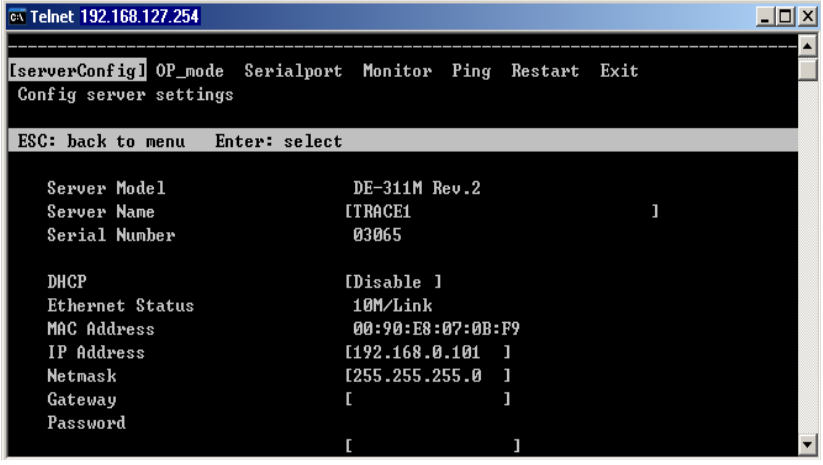


3. Confirm the default selection (1), by pressing **ENTER**. The following page will be visualized.



With **ARROWS**, **ENTER** and **ESC** keys you'll navigate the program.

4. Select **serverConfig** to enter the new IP address and netmask.

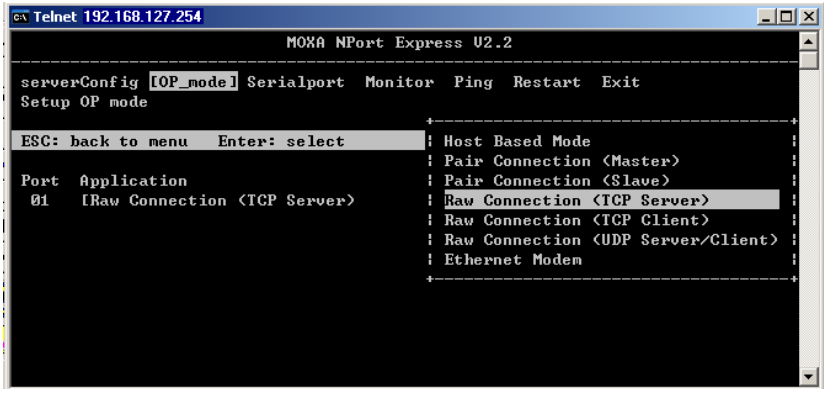


With **ARROWS** and **ENTER** keys you'll point to the different parameters to be set.
In this page you'll need to enter the new IP assigned needed for the LAN environment where the TriPlus autosampler is installed. Also the netmask is entered in the same menu section.

In this example the IP set is 192.168.0.101, so when the setup procedure is completed, the TriPlus autosampler LAN will be communicating with a new IP.

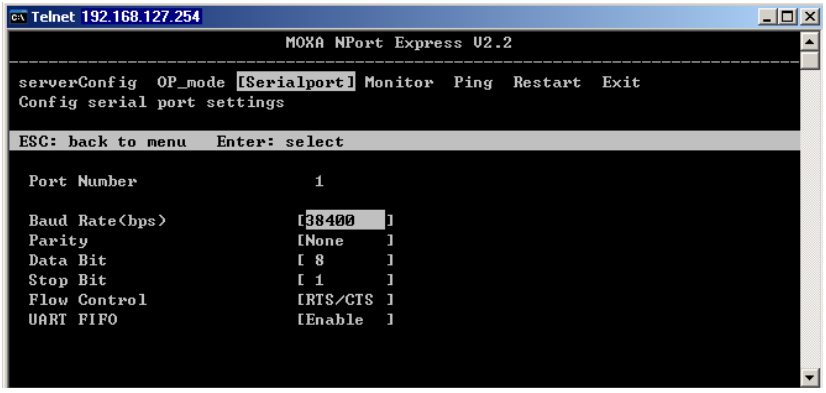
Press **ESC** when done with the settings of this menu, to return to upper level menu.

Press the right arrow key to select **OP_mode**, and then press **ENTER**.



5. By moving the selection with the up/down arrow keys, make sure that **Raw connection (TCP Server)** is selected and then confirm with **ENTER**.
   Press **ESC** when done, to return to upper level menu.

6. Use the arrow key to select **Serial Port**.

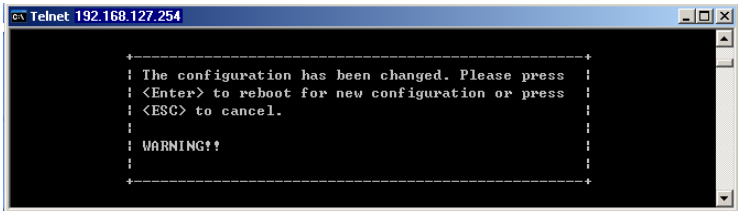


Make sure the **Serial port** is selected as follow:

- Baud Rate 9600
- Parity None
- Data Bits 8
- Stop Bits 1
- Flow Control RTS/CTS
- UART FIFO Enable

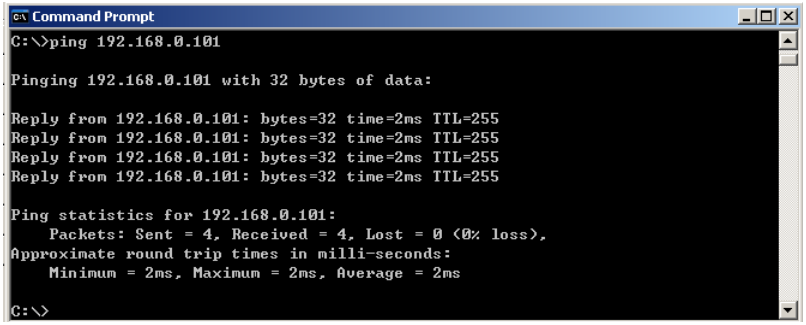
Press **ESC** when done, to return to upper level menu

7. When back to main menu, please select **`Exit`**.



CAUTION **Please confirm to make the changes effective, and remember that from now on, the TriPlus autosampler LAN will respond to the newly assigned IP Address.**

8. Disconnect the TRACE GC from direct RED patch, and connect it to its final destination LAN environment.
   At this point, as a final check, start from the computer that should be used for controlling the newly installed TriPlus autosampler and run **Command Prompt**. Then type **ping xxx.xxx.xxx.xxx**, where the xxx.xxx.xxx.xxx is the new IP you just configured.
   The TriPlus autosampler LAN should answer as follows.



The TriPlus autosampler is now ready for LAN control through the Thermo Fisher Scientific Corporation Data systems. Now it is necessary to configure the data system to access the TriPlus autosampler through the configured IP address.

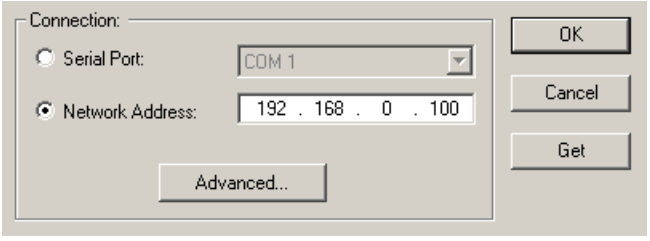
The data systems that support the TriPlus autosampler LAN control are:

- Chrom-Card
- GC Link
- XCalibur
- ChromQuest
- ChemStation

Data System Configuration

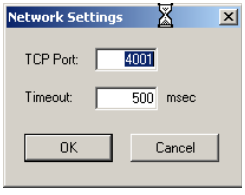
It is advisable to use the labels you find in the standard outfit of the TriPlus autosampler LAN.
A couple of self-adhesive label are available to annotate the IP address and the TCP Port that have been set in the GC LAN.
Please write on one of the label the two set parameters, and stick the tag in a place that can be easily referenced when it will be necessary to configure the data system. The back of the instrument, the side cover or the front door may be suitable places where the label can be stuck.

9. Install, and start the Data System as described in the specific manual, and go to **Instrument configuration**. The TriPlus autosampler configuration page features the possibility to control the GC through the COM ports and to specify a direct TCP/IP address.



10. Just enter the IP address of the TRACE GC and complete the configuration in the usual way.

    When the **ADVANCED** button is pressed, it is possible to set the communication port used by the TCP/IP protocol and the timeout.



The parameters set by default are those necessary for standard operations, however your LAN may be provided with Firewall services that may prevent the Port 4001 to be used.
For this reason you have here the possibility to set an alternative port number.

However, the number of the port entered in this box must correspond to the port assigned to TriPlus autosampler LAN setup described on step 9.

After selecting **Raw connection (TCP server)**, it will be possible to enter the **Select for more setting** menu and enter a different TCP port rather than the default 4001.
Moreover the TriPlus autosampler **Instrument configuration** advanced settings feature a box for Timeout. This timeout is set by default to 500 ms, and it's appropriate for most of the LAN environments. However should the LAN be extremely slow, this time can be increased to allow slower access to the GC.

WARNING! If the connection is performed through hubs over a 10 Mbit/s network, it is suggested that no more than 5 TriPlus LAN are connected on the same network trunk. In the case of switching network, this warning is not valid.

Alternative Configuration

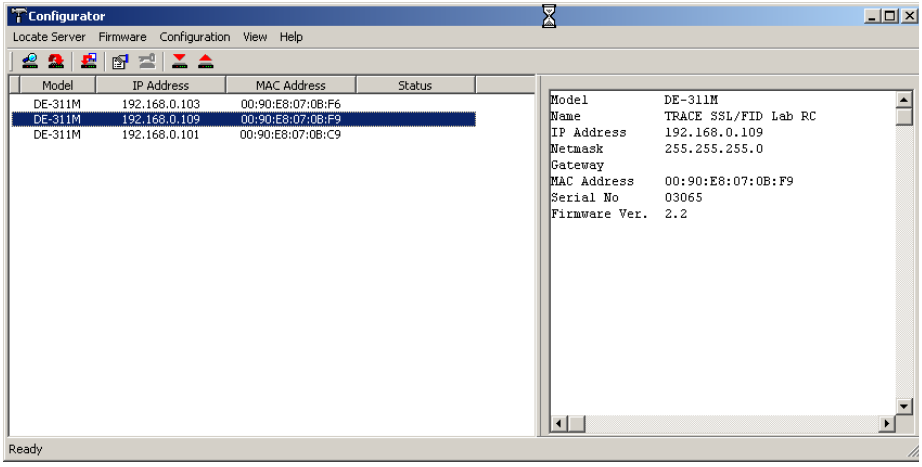
An alternative to the direct setup of the TriPlus autosampler LAN, it is also possible to use a management program designed for sites where multiple TRACE GCs with LAN option are available.
In this case a specific program must be installed and used to monitor, setup, or update each of the instruments connected.
The program to be installed is named **DSSETUP.EXE**, and it is in the CD of the Chrom-Card data system, as well as included in the CD of this manual.

1. By running the installation setup program DSSETUP.EXE:

2. Deselect the check box COM Port Mapping Tools, since it is not required in the management of TRACE GCs.

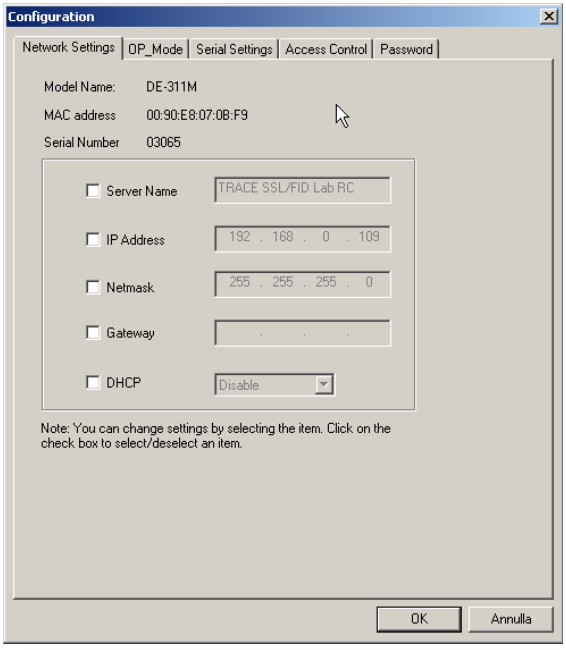
Please just follow the detailed route proposed step-by-step by the installation program, and when finished, you can run the program. The first time after the installation the program starts automatically.

3. From main menu select the **Locate Server** and the program will automatically search for all TriPlus autosampler connected to the network.



The program is a valid replacement of the step to step set up previously described in the document. By double-clicking on any of the found TriPlus autosampler, you can also setup it directly.

This enables also to use more advanced functionality than previously described, and can be directly modified by the relevant Tab.



Any change can be entered individually for a certain parameter, and when OK is pressed, the parameter is updated to the instrument on edit.

9

TriPlus Control from the Pocket PC

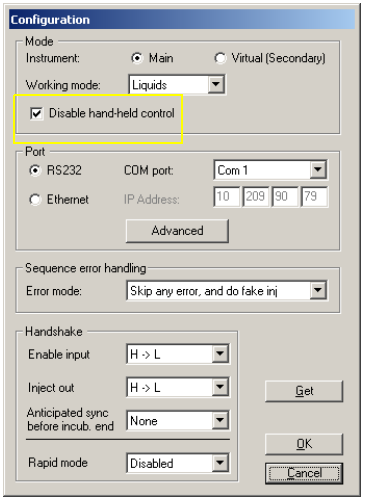
This chapter provides the information to control the TriPlus from the Pocket PC.

Chapter at a Glance...

Pocket PC Connection

This paragraph provides the instruction to connect the TriPlus sampler to a Pocket PC.

CAUTION **Before starting, from the data system in use, open the TriPlus Configuration Page and verify that the *Disable hand-held control* box is unchecked. This box must be unchecked to allow the use of the pocket PC that otherwise would be disabled.**



Materials Required

The following material is required:

- Host PC with Windows 2000 or XP operative system
- Pocket PC Dell Axim X5 or equivalent having:
  - — Pocket PC 2003 operative system
  - — Pocket PC to PC desktop Serial port connecting cable
  - — WLan CompactFlash Card (Wireless)
- Adapter cable for Triplus sampler to Pocket PC Serial connecting cable. Refer to *Connection Via Serial Port*

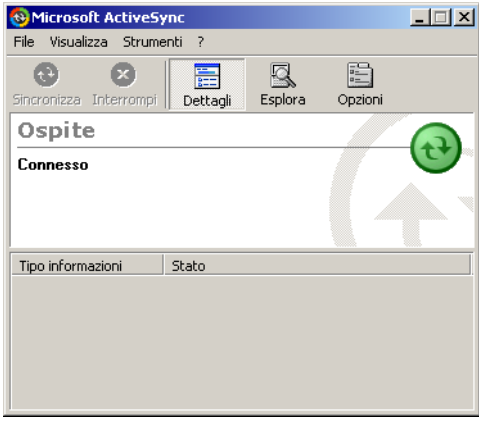
- CD-Rom containing the TriPlus program installation file

TriPlus Software Installation

To install the TriPlus software it is necessary to copy the **TriPlus.ARM.CAB** file from the CD-ROM, provided in the TriPlus sampler Standard Outfit, to the pocket PC.
Before starting, use your serial /USB cable or cradle to connect your pocket PC to a host PC, then operate as follows:

1. Install the **Microsoft ActivSync** software, provided with the pocket PC, on the host PC following the instructions reported in the relevant manual.
   In order to synchronize data, there must be a partnership between the pocket PC and host PC.

2. Insert the Pocket PC into its cradle and verify that the **Microsoft ActivSync** software is launched and communicating with the pocket PC.

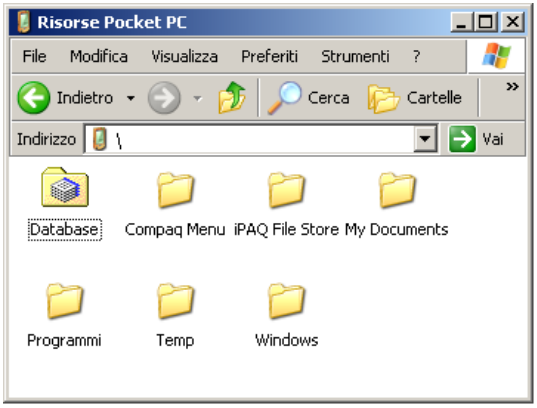


1. Insert the CD-ROM provided into the CD reader of the host PC.

2. From the Microsoft ActiveSync **File** menu, select the function **Explore**.

3. Address the CD-ROM unit, then select the **TriPlus.ARM.CAB** file and copy it by using the option **Copy** in the **Modify** menu.

4. Address to **Pocket PC Resources** clicking on the “pocket PC” icon.



5. Select the **Temp** folder.

6. Paste the **TriPlus.ARM.CAB** file into the **Temp** folder by using the **Paste** option in the **Modify** menu**.**

Now the **TriPlus.ARM.CAB** is copied in the **\Temp** folder.

7. Remove the Pocket PC from the cradle.

8. On the Pocket PC go to **Start** >> **Programs >> Explore file >> Device >> Temp**.

9. Tap on the **TriPlus.ARM.CAB** file to start the installation procedure of the **Triplus** software.

10. At the end of the installation, the 

icon will be available in the list of the **Programs**. To start the TriPlus sampler software tap on the icon.

Connection Options

The user can connect the Pocket PC to the TriPlus sampler through the following options:

- **Serial Port**
  Refer to: *Connection Via Serial Port*
- **Infrared Transceiver**
  Refer to *Configuration of the TriPlus Software*
- **Wireless Network**
  Refer to *Connection Via Wireless Network*
- **Ethernet Card**
  Refer to *Connection Via Ethernet Card*

CAUTION **Before connecting the sampler to the Pocket PC via Ethernet, the LAN Set-up procedure reported in Chapter *LAN Set-up* must have been performed.**

Connection Via Serial Port

Connect the adapter cable provided, shown in Figure 9-1, to the 9-pin connector marked **RS232-1** or **RS232-2** located on the rear panel of the TriPlus sampler. Connect the Pocket PC to the adapter cable by using the Pocket PC serial cable not provided.

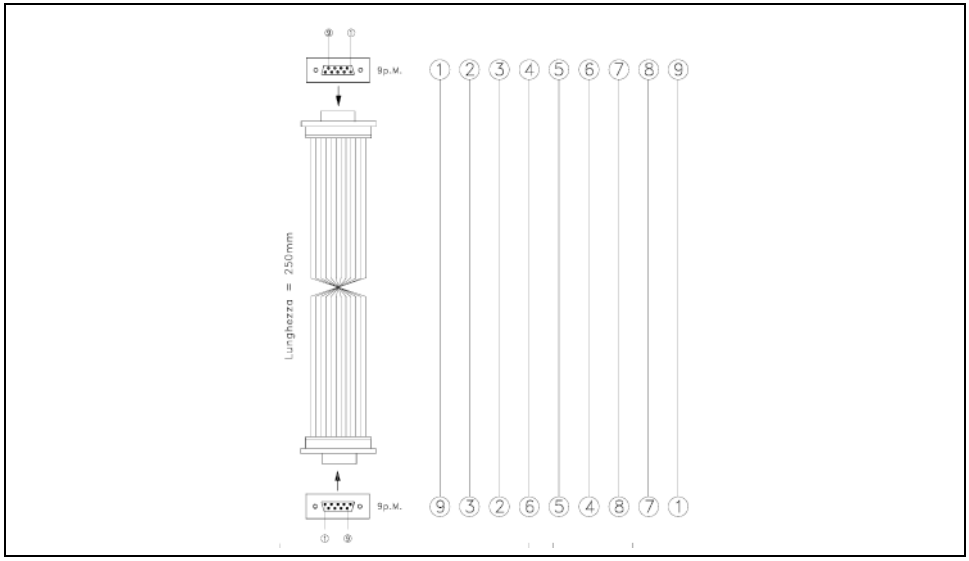


Figure 9-1. Adapter Cable

Connection Via Infrared Transceiver

No hardware connection is required. To communicate via infrared transceiver (IrDA) the pocket PC must operate at a maximum distance of 1 m and with an angulation of 30° respect to the infrared transceiver located on the right side of the sampler front panel.

Connection Via Wireless Network

Use the CD-Rom provided with the WLAN CompactFlash option to install the relevant WLAN drivers.
Follow the instructions reported in the *Start Guide* provided with the Wireless card. At the end of the installation procedure insert the Wireless card, if not already included in the Pocket PC, into the flash card slot on the top of the Pocket PC.

On the Pocket PC go to **Start** >> **Programs** >> **Dell Client** to verify the proper wireless connection.

Connection Via Ethernet Card

By using the cable provided, connect a LAN Ethernet card installed inside the power module of the TriPlus sampler, to the Ethernet connection on the top of the Pocket PC.

The communication may take place through:

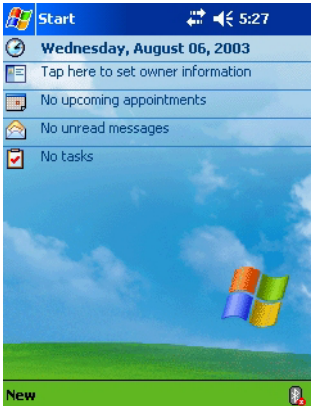
1. **Local network at which the TriPlus is connected**
   It is performed by using a CompactFlash Ethernet 10/100 card (e.g. Socket 10/100) and the standard GREY patch.
   Set the IP address assigned by the local server where the access point is connected.

2. **Ethernet direct connection between Pocket PC and TriPlus**
   It is performed by using a CompactFlash Ethernet 10/100 card (e.g. Socket 10/100) and the “crossover” RED patch.
   Set the specific IP address.

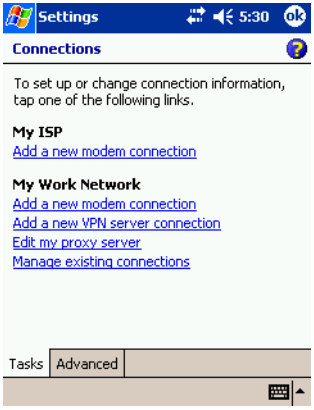
To connect your Pocket PC via Wireless or Ethernet network, refer to the *Connect the Pocket PC via Network*.

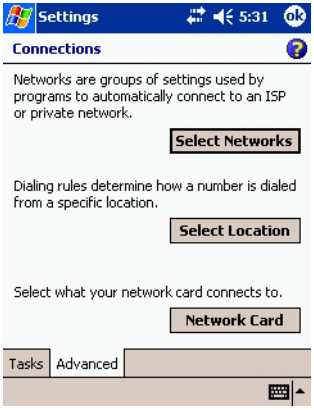
Connect the Pocket PC via Network

From the main page, tap on the two arrows  to enable/disable the LAN connection. If the connection is disabled  , verify that the system is reachable.

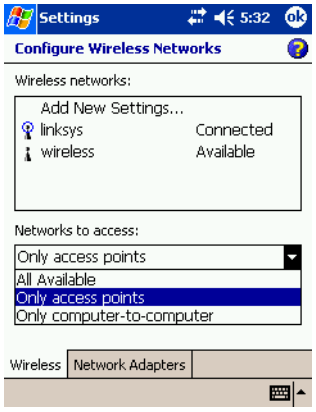


Select **Setting** then tap on the **Advanced** button.

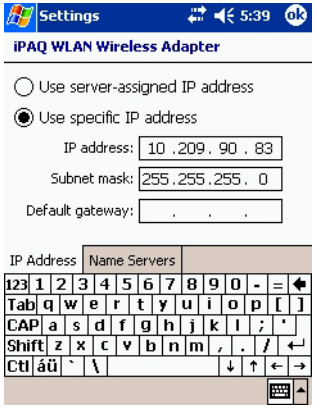


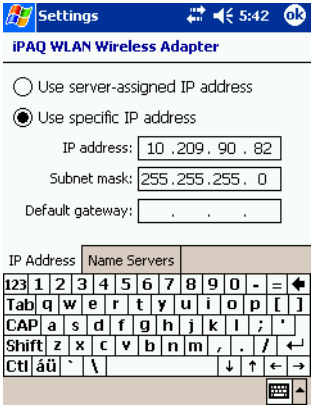


Verify that **All Available** or **Only access Point** option is selected in the **Network to access** combo box.



Tap on the **Network Adapters** button and select the available network. In the next screens, enter your network setting.



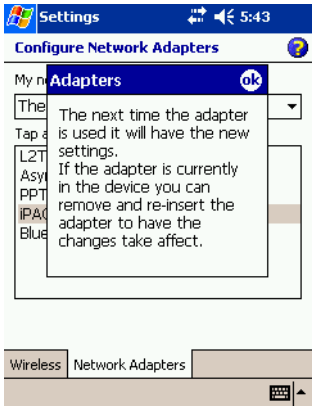


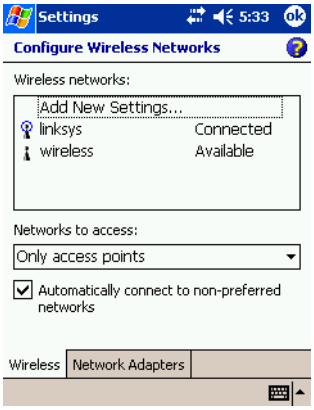
Select **Use server-assigned IP address** to set the IP address assigned by the local server where the access point is connected. If needed, tap on the Name Servers tab to enter DNS and WINS addressed.

Select **Use specific IP address** to set the specific network address.

The first three octets of the IP address are the same as that assigned to the sampler. Also the Subnet mask is the same as the sampler. The last octet of the IP address assigned to the sampler must be changed with a closed number.

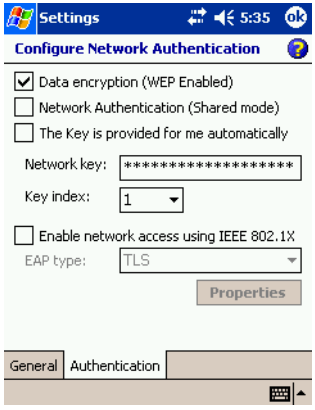
In Add New Setting frame, select the connected device and tap on **OK** button.

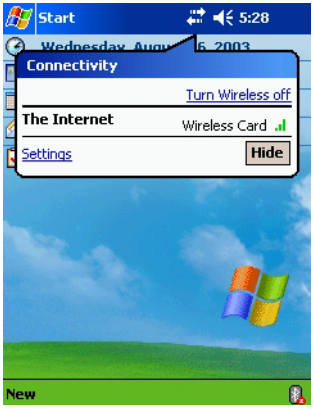




In the **Adapters** screen, tap on **OK**, then authenticate the network configuration and type the network key.

Tap OK and return to the main page and verify the connectivity selecting the **Turn Wireless** option **Off** and then **On**.



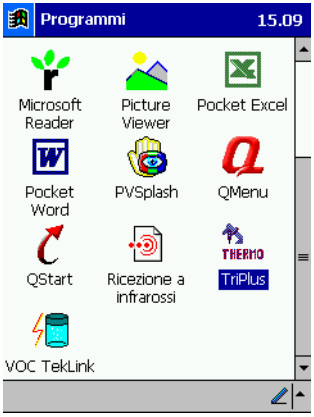


Configuration of the TriPlus Software

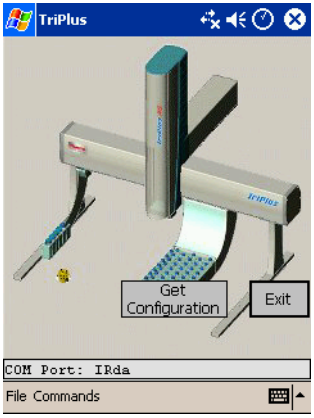
Proceed as follows:

1. Go to **Start** >> **Programs**, then tap the 

icon to launch the TriPlus software.



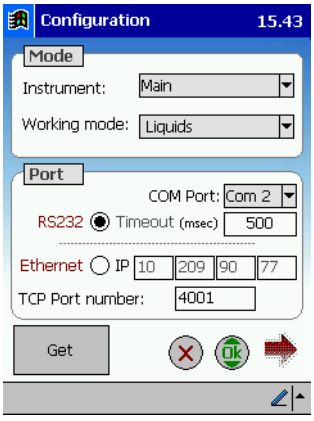
2. After waiting a few seconds for the software loading, the initial TriPlus software initial page will be displayed:



3. In **File** menu select the **Configuration** function to open the configuration page.

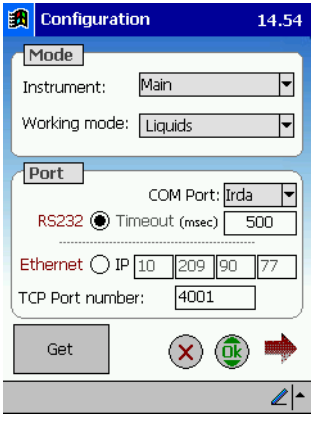
a. Configure the Serial Port

If the connection is performed via Serial Port, select the **RS232** Radio-button, then select the proper communication port (**COM 1**) in the COM Port combo box.



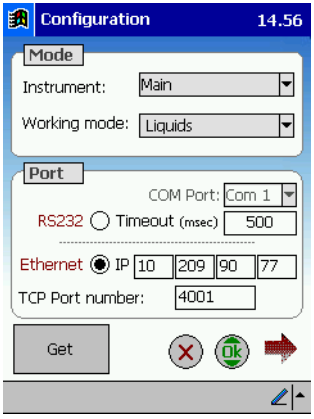
b. Configure the IrDA

If the communication is performed via infrared transceiver, select the **RS232** Radio-button, then select the **IrDA** option in the COM Port combo box.



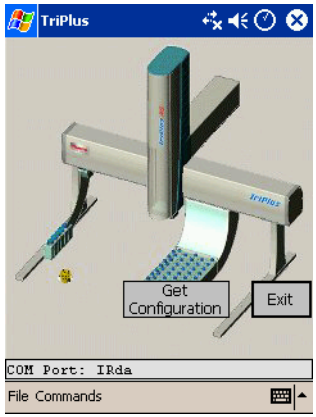
c. Configure Ethernet Network

If the communication is performed via Ethernet (the sampler is connected to an Access Point, e.g. “22 Mbps Wireless Access Point”), select the **Ethernet** Radio-button. In the relevant boxes, enter the **IP** address and the **TCP** Port number.



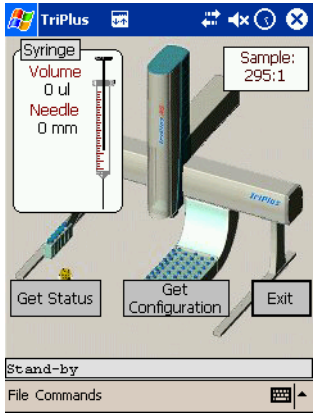
4. To verify the connection, tap the **GET** button. If the connection fails, the error message `Unknown response or sampler not connected` will be displayed. Try again the connection after few seconds. If the connection fails again, check connection and configuration previously performed.

5. Return to Main Menu taping the **OK** button.



6. The type of connection used is displayed in the status bar on the bottom of Main Menu.

7. Tap the **GET CONFIGURATION** button. The pocket PC communicates with the sampler asking the current status. The sampler status will be displayed in the status bar on lower part of Main Menu. Useful informations will be also displayed.



NOTE

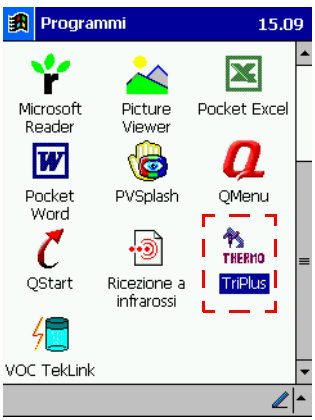
When the IrDA configuration is used, the **Get Status** button is displayed to allow the update of the sampler status.
When serial or wireless configuration is used, the **Get Status** button does not remain displayed because the sampler status will be automatically updated every 2-3 seconds.

User Interface

The TriPlus sampler functions are controlled and programmed through a Pocket PC connected via RS232, IrDA (infrared transceiver), or Ethernet (Lan or WirelessLan) by a dedicated software.

This paragraph describes only the user interface to program the TriPlus sampler operating parameters through the Pocket PC. For all the others operations with the Pocket PC refer to the relevant manual for details.

Launch the TriPlus Software



To launch the TriPlus software select **Start** >> **Programs**, then tap the  icon.

After waiting any seconds for the software loading, the initial page of the TriPlus software will be displayed:

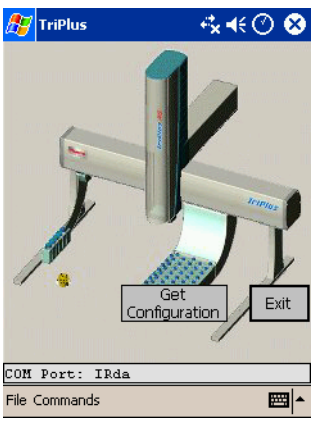
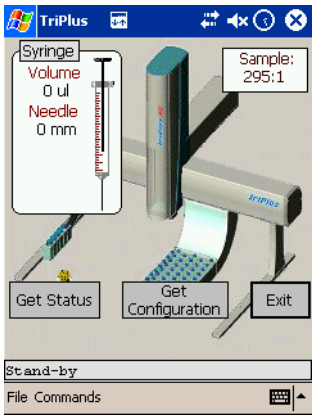


Figure 9-2. TriPlus Software Initial Page

Initial Page

In the Inital Page the virtual image of the sampler is displayed with all the components currently installed and the syringe data. The following figure shows an example of this page.

Initial Page Overview



Get Status

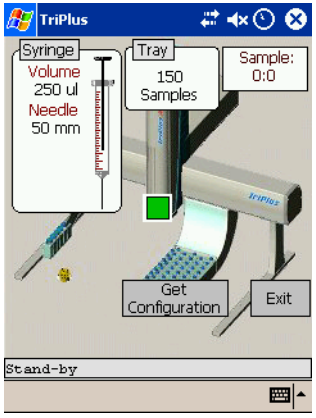
Tap on this button to get the current TriPlus status. The sampler status will be displayed in the status bar on the bottom of the Initial Page. Useful informations will be also displayed.
When the IrDA configuration is used, the **Get Status** button remains displayed to allow the update of the sampler status.

Get Configuration

Tap on this button to transfer the configuration data from the TriPlus to the Pocket PC.

Exit

Tap on this button to exit TriPlus application. Confirm yes or not.



Status Bar

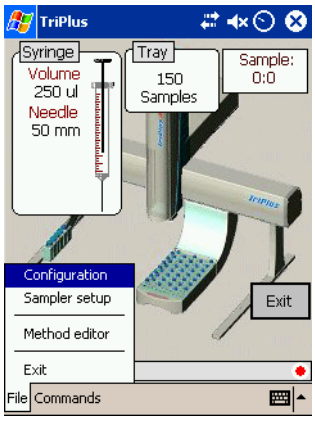
This bar displays the current status of the TriPlus sampler.

Menu Bar

The menu bar allows to access the **File** and **Commands** Pull-down Menu

File Menu

The File menu allows to access the following functions:



Configuration

Select this function to open the *Configuration Page* where the sampler communication parameters can be set.

Sampler Setup

Select this function to open the *Sampler Setup Page* where the working components, such as injectors, sample trays, washing station, etc., can be set and configured.

Method Editor

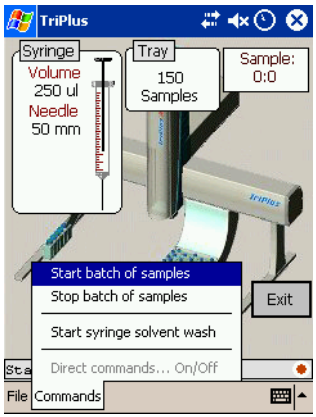
Select this function to access the *Method Selection Page* where the parameters of the method should be set according to the for Liquids or for Head Space sampler configuration and to the relevant injection mode chosen.

Exit

Select this function to exit the program.

Commands Menu

Commands menu allows to access the following functions:



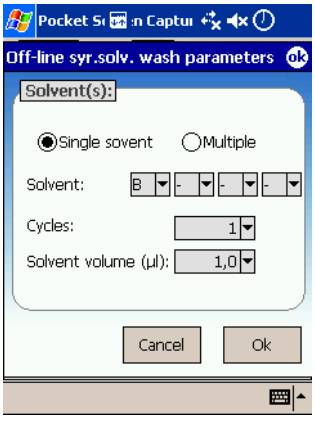
Start Batch of Samples

This function allows to start the sequence of a batch of samples. The relevant dialog window is displayed where the following parameters are to be set:

- **First vial in Batch**
  Indicates the number of the first vial of the sample sequence
- **Last Vial in Batch**
  Indicates the number of the last vial of the sample sequence
- **Repetition**
  Number of injections that may be performed from the same vial in the sequence.
- **Start**
  Tap on this button to begin the sequence of the samples. The method used is the last loaded.

Stop Batch of Sampler

This function stops the sample sequence currently run.



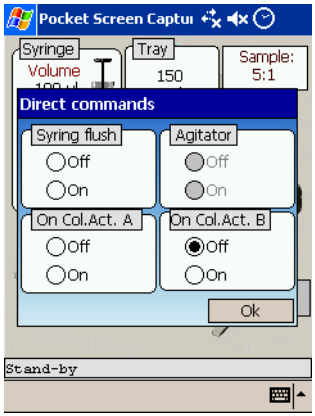
Off-line Syringe Solvent Flush

This function permits to start a syringe cleaning cycle. The relevant dialog window is displayed where the following parameters are to be set:

Solvent (s)

It is possible to select one of the four solvents selecting Single option, or to select up to four different solvents selecting Multiple option.

- **Single** Select this option when a single cleaning solvent should be used.
- **Multiple** Select this option when more than one cleaning solvents should be used.
- **Solvent** This parameter specifies the solvent(s) to be used according to the Single or Multiple option selected. The sampler may use up to 4 different solvents and you can select which to use as rinse solvent(s). Select A, B, C or/and D.
- **Cycles** This parameter allows to set how many syringe washing cycles with solvent have to be run. Set a number between 0 and 15.
- **Solvent volume** (µl) It specify the rinse solvent volume. It depends on the syringe volume.
- **Ok** Tap on this button to start the cleaning cycle.



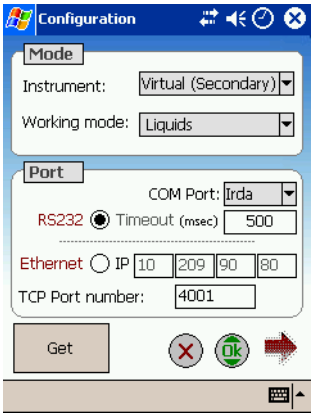
Direct Commands

Select this menu to open the dialog page where it is possible to set the commands for the manual activation of the components indicated in the page.

- **Syringe Flush** It enables (On) or disables (Off) the activation of the syringe flush.
- **Agitator** It enables (On) or disables (Of)f the activation of the agitator status.
- **On.Col Act A** It enable the automatic actuator to open (On) or close (Off) the rotary valve of the On- column injector when present.
- **On.Col Act B** It enable the automatic actuator to open (On) or close (Off) the rotary valve of a second On-column injector when present.

Configuration Page

Set in this page the mode, the communication port and the handshake signals to allow correct interpretation between the TriPlus sampler and the GC.



Tap on the arrow to open the second part of the Configuration Page See Handshake

Mode

In this section configure the sampler as main or secondary instrument and select the sampler for Liquids (AS) or Head Space (HS) version.

- **Instrument Main** Check this option button to configure the sampler as main instrument. The start signal is generated at the output of the GC1 connector on crossrail X.
- **Instrument Virtual** (Secondary) Check this option button to configure the sampler as virtual secondary instrument to operate with a second GC controlled by a second independent data system. The start signal is generated at the output of the GC2 connector on the crossrail X

WARNING! Main and Virtual functions are usable only with the TriPlus AS version.

NOTE

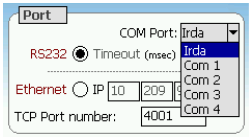
In case of TriPlus HS version, the Instrument Virtual function is not usable. To inject in two GCs, it is necessary to use the *Constant DoublePro* incubation mode connecting the two start/stop cables to the two GCs separately.

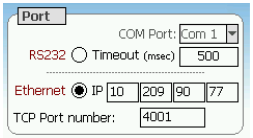
- **Working mode** Select the Liquids or Head Space working mode according to the AS or HS version of the sampler.

Port

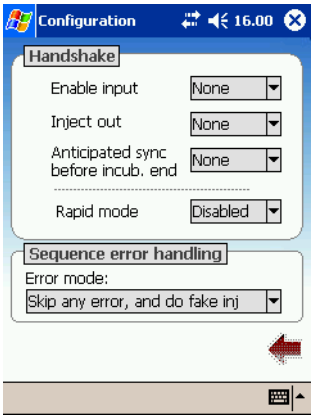
Select the type of communication between the sampler and the PDA device.

- **RS232** Check this option button when the communication take place via RS232 serial line.
- **COM Port** Select which COM port (see the back of your CPU) where your sampler is connected. If the Pocket PC is connect to the sampler via infrared transceiver, select IrDA.





- **Timeout** It indicates the RS232 timeout. This value is generally 500.
- **Ethernet** Check this option button when the communication takes place through LAN (Local Area Network) either for cable or wireless.
- **IP Address** Enter the IP address to allow the LAN control of the GC through the Pocket PC.
- **TCP Port Number** It indicates the LAN communication port used by the protocol of TCP-IP. Generally the value is 4001.



Tap on the arrow to return to the first part of the Configuration Page

NOTE To Configure the TriPlus sampler for multiple GC, please refer to Appendix A *TriPlus Sampler for Multiple GC Configuration*

Handshake

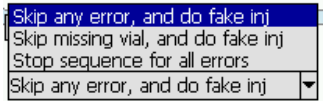
This section allows to specify how the signals will change for the proper interpretation between TriPlus sampler and GC. Each pulse signal may be configured High to Low, Low to High, or None.

- **Enable input** This parameter signals to the sampler to start the run.
- **Inject out** This parameter signals to the GC that the sampling has ended
- **Anticipated synch before incub. End (For TriPlus HS version only)**. It is the synchronism signal with the Cold Trap. For TriPlus HS version only. This parameter allows the sampler to generate a pre-trigger signal, before the end of the sample conditioning time, starting the trap cooling. This synchronism allows to minimize the time the trap remains at the conditioning phase, thus saving on cooling agent.
- **Rapid Mode** This parameter allows to enable/disable the sampler function to remain waiting for the GC READY signal after having performed the preliminary operations to prepare for sampling ignoring the GC phases.

Sequence Error Handling

This frame allows to configure how treating the vial missing errors according to what the operator desires.

- **Error Mode** For default a recoverable error as vial missing, solvent missing, or injector missing is treated with a fake injection.
  Nevertheless there are cases in which it is not wanted to continue, but it is desired to attend the operator. In this case it is need to inform the sampler with this selection in the configuration:



Get

Tap on this button to transfer the configuration from the sampler to the Pocket device.

X

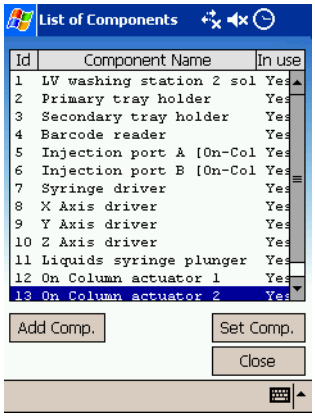
Tap on this button to exit the Configuration Page and to return to Initial Page.

Ok

Tap on this button to confirm the modification entered.

Sampler Setup Page

This dialog window allows to visualize the drivers, the recognized components and those in memory (injection ports).



Sampler Setup Page Grid

The grid shows the name of the components automatically recognized by the sampler. These components can be enabled or disabled but cannot be deleted. The component that can be added and/or deleted is the injection port indicated as **Injection port A.D**.
The name between brackets indicates the type of injector specified in the Sampler Setup Page.

ID

It indicates the number of each component listed in the grid.

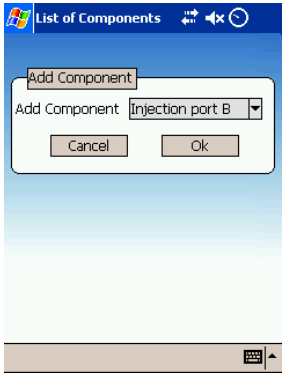
Component name

It indicates the name of the component installed and recognized by the sampler (tray holder, wash station, etc.).

In use

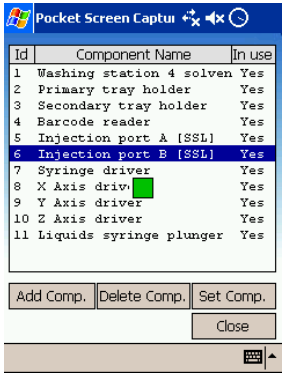
It indicates the component status **Yes** or **Disabled**.

Add component



This button allows to add components. The page where the desired component is selected is displayed.

Delete component



This button is only visualized when an injection port is selected in the grid. Tapping on this button, the injection port selected will be deleted from the list.

Set component

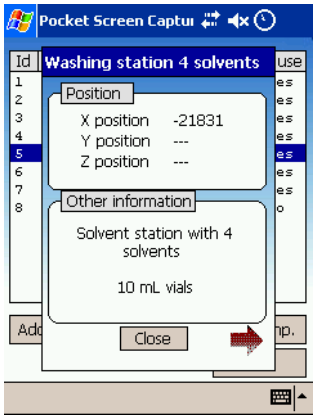
After having selected the desired component present in the grid, tap on this button to open the relevant setup page.
If an automatically recognized component was selected, the *Component Information Page* will be visualized.
If an injection port was selected, the *Injector Setup Page* will be visualized.

Close

Tap on this button to exit the Sampler Set-up dialog window.

Component Information Page

This dialog window provides information on the component selected in the Sampler Set-up Dialog window as shown in the following example. The 4 solvents washing station and the barcode reader are considered as selected components.



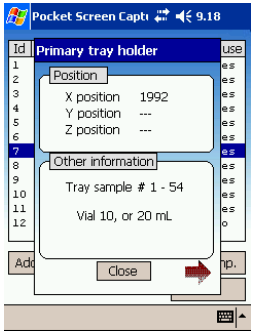
Tap on the arrow to open the second part of the Component Information Page

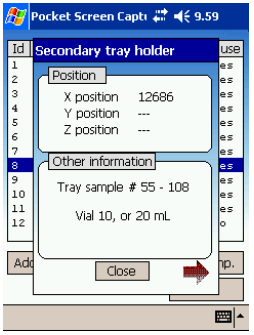
Position

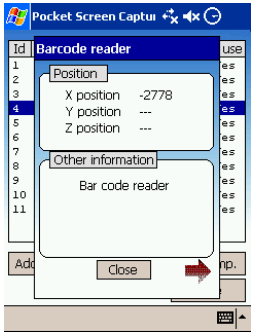
This not editable parameter shows the coordinates of the sampler axes in comparison with the selected component.

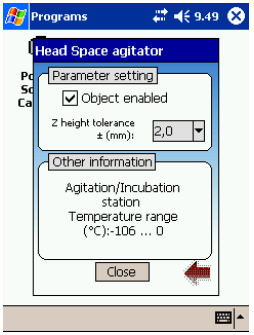
Other Information

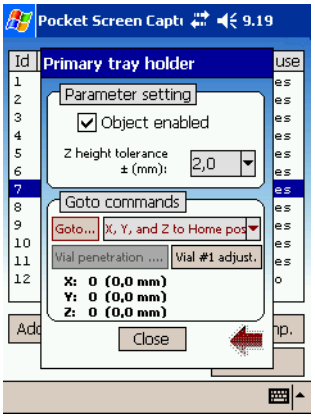
Other information are provided on the component of interest.











Tap on the arrow to return to the first part of the Component Information Page

Parameter Setting

- **Object Enabled Check Box** Check this box to enable the operation of the selected component:
- **Z height tolerance (mm)** It indicates the window within which the touch sensor of the syringe carriage assembly has to recognize the type of vials accommodated in the sampler tray.

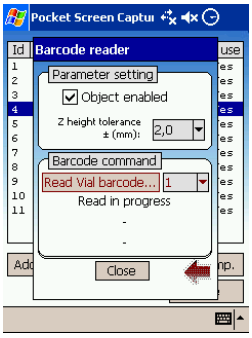
Goto Commands

These commands allow to move the injection device on the vial position indicated and to verify the relevant alignment.

To move the injection device, select in the combo box the desired option, then click on **GOTO** button.

According to the selected component containing vials, such as Washing Station and Primary Tray Holder, the relevant options are available in Component Information Page. Refer to *Goto Commands*.

In case of the other components, such as Barcode, On-Column actuator, etc., the relevant command will be visualized.



Vial Penetration

This button is enabled when the vial of interest has been selected.

Tap on this button to verify the correspondence between the penetration percentage of the needle into the selected vial and the same value expressed in millimeters and vice-versa.

Refer to *Vial Penetration* button.

Vial #1 adjust.

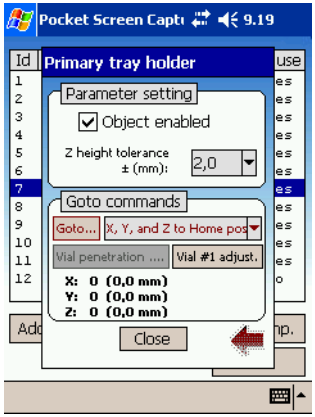
This button is enabled when Primary Holder is selected. Refer to *Vial #1 Adjustment*.

This command is ONLY for service experts.

Close

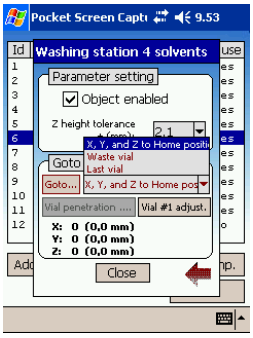
Tap on this button to exit and to return to the Component Information page.

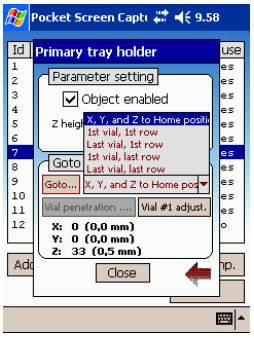
Goto Commands



Tap on the arrow to open the first part of the Component Information Page

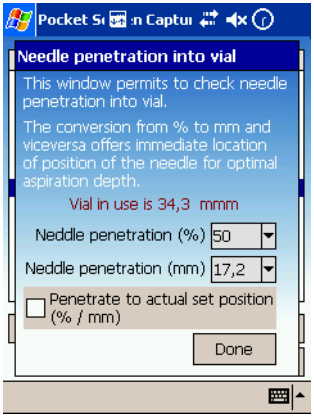
List of the Goto Commands





- **X, Y, Z Home Position** Select this function to return in stand-by condition.
- **Waste via**l Select this function to move the injection device on the Waste vial of the washing station
- **Last vial** Select this function to move the injection device on the last vial of the washing station
- **First vial of 1st row** Select this function to move the injection device on the first vial of first row of the sample tray
- **Last vial of 1st row** Select this function to move the injection device on the last vial of the first row of the sample tray
- **First vial of last row** Select this function to move the injection device on the first vial of the last row of the sample tray
- **Last vial of last row** Select this function to move the injection device on the last vial of the last row of the sample tray

Vial Penetration



Needle Penetration Into Vial

In the relevant combo box select the percentage or the millimeters of the needle penetration. The percentage value must be reported in the method if the same penetration, defined in the setup, is desired.

CAUTION **In the case of irregular vials (vial with conical insert or vial with conical bottom) the measure of the needle penetration must carefully be defined considering the real depth of the vial.**

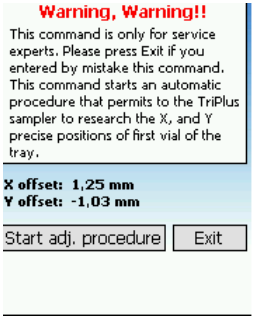
Check the **Penetrate to actual set position** box if you want to define the needle penetration into the selected vial according to its height. Tap on **DONE** button to perform the operation.

Done

This button has the double function.

1. It allows to perform the operation when enabled
2. It allows to exit this window.

Vial #1 Adjustment



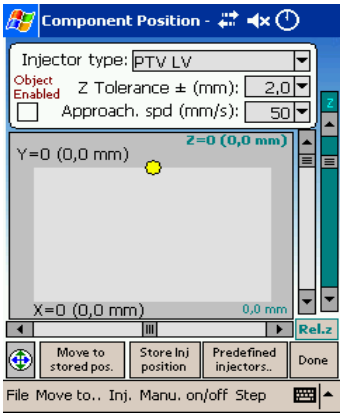
Vial #1 Adjustment Command

WARNING! **This command is ONLY for service experts. Please press EXIT button if you entered by mistake this command.**

This command starts an automatic procedure that permits to the TriPlus sampler to research the X, Y precise positions of first vial of the tray.

Injector Setup Page

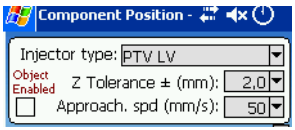
This page allows to define the mechanical alignment between the injector of the GC and the syringe carriage assembly of the sampler. This will permit to correctly align the syringe needle with the injector inlet of the GC.



Component Position

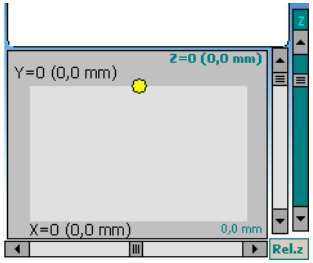
Position Grid

Component Position Group Box



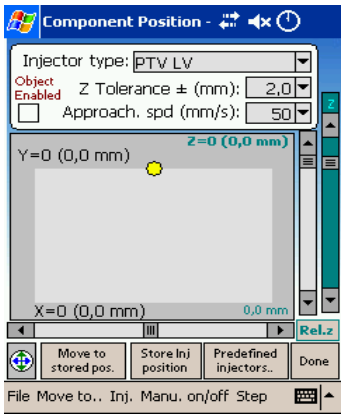
- **Injector type** It indicates the type of injector in use.
- **Object enabled check box** Check this box to enable the operation of the selected injection port corresponding to the injector selected.
  The *Sampler Setup Page* will display: **yes**, if the injection port is in use, or **disabled**, if it is not active.
- **Z tolerance (mm)** It indicates the window within which the touch sensor of the syringe carriage assembly has to recognize the type of vials accommodated in the sampler tray.
- **Approach speed (mm/s)** It indicates the penetration speed of the syringe needle into the injector. The box indicates the default value according to the injector type used.

Position Grid



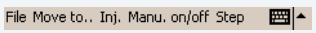
This section of the Component Position Page shows the area for the coarse alignment of the sampler axes X, Y and Z respect to the injector.
The yellow little ball represent the touch sensor of the syringe carriage assembly.

In the box XY the work area of the sampler is represented.
In the box Z the work area of the syringe carriage assembly is represented.
Modifying the position of the axes by moving the relevant slider bars will change the position of the sampler alignment with the injector.



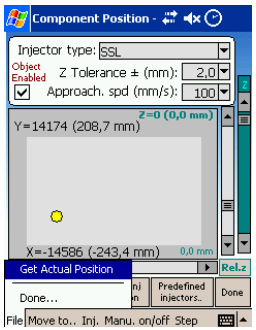
Menus

Menu Bar



It allows to access the following menu.

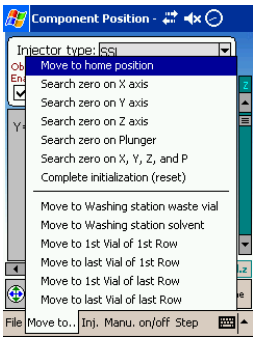
File Menu



This menu allows to access the following functions:

- **Get Position** Select this function to transfer the position data from the sampler to the Pocket PC.
- **Done** Select this function to exit this page. It has the same effect as the **DONE** button.

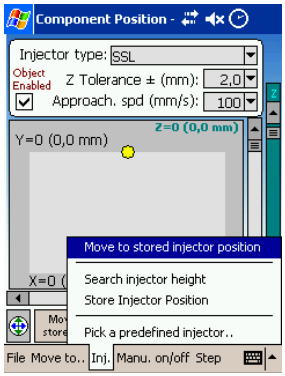
Move To Menu



- **Move to home position** Select this function to move the sampler to stand-by condition.
- **Search zero on X axis** Select this function to perform the autozero of the axis X only.
- **Search zero on Y axis** Select this function to perform the autozero of the axis Y only.
- **Search zero on Z axis** Select this function to perform the autozero of the axis Z only.
- **Search zero on Plunger** Select this function to perform the autozero of the syringe plunger.
- **Search zero on X, Y, Z and P** Select this function to perform the autozero of all the three axes and of the syringe plunger.

- **Complete initialization (reset)** Select this function to reset the instrument and to start the initial autocheck during which the TriPlus performs the scan of the axis X to search and recognize the present components.
- **Move to Washing station waste via**l Select this function to move the injection device on the Waste vial of the washing station.
- **Move to Washing station last vial** Select this function to move the injection device on the last vial of the washing station.
- **Move to 1st vial of 1st row** Select this function to move the injection device on the first vial of the first row of the sample tray.

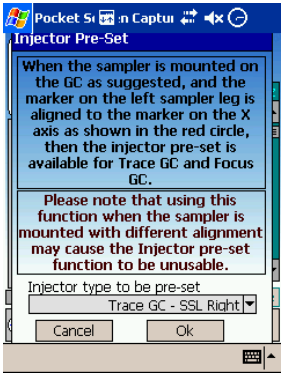
- **Move to last vial of 1st row** Select this function to move the injection device on the last vial of the first row of the sample tray.
- **Move to 1st vial of last row** Select this function to move the injection device on the first vial of the last row of the sample tray
- **Move to last vial of last row** Select this function to move the injection device on the last vial of the last row of the sample tray

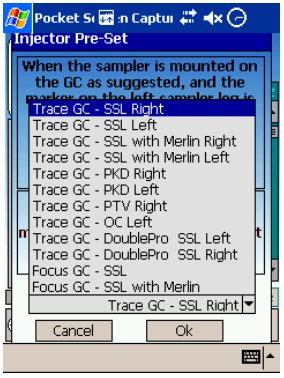


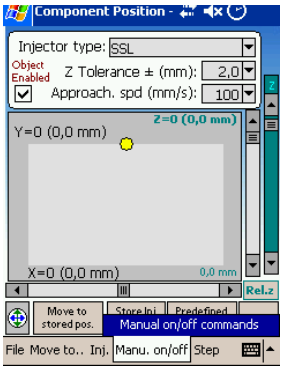
Injector Menu

Injector menu allows to access the following functions which permit to move the injection device on the injector and to verify the alignment.

- **Move to stored injector position** This function allows to move the injection device on the stored injection position. It has the same effect as the **MOVE TO STORED POS** button.
- **Search injector height** This function allows to move the injection device on the injector to search its height.
- **Store Injector Position** Select this function to store the injector position. It has the same effect as the **STORE INJ. POSITION** button.
- **Pick a predefined Injector** This function allows to use the injector pre-set alignment. It has the same effect as the **PREDEFINED INJECTORS** button.
  The following page is visualized. Select the injector type to be aligned and tap on **OK**.



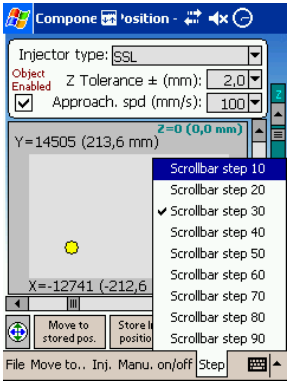




Manual On/Off Menu

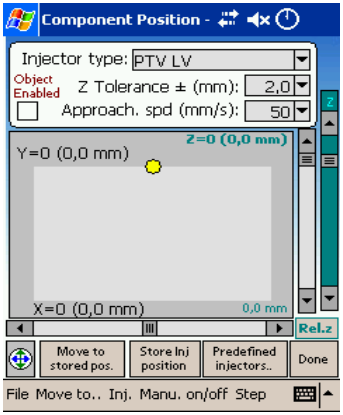
This menu allows to access the following functions which permit to set the manual commands.

- **Manual On/Off Commands** This function opens the dialog page where it is possible the set the commands for the manual activation of the components indicated.



Step Menu

This menu allows to choose the desired movement steps of the syringe carriage during its alignment on the GC injector.



Buttons

Button Bar

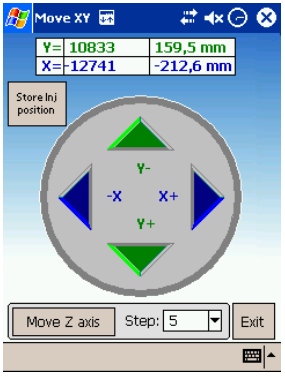
It allows to access the following buttons.

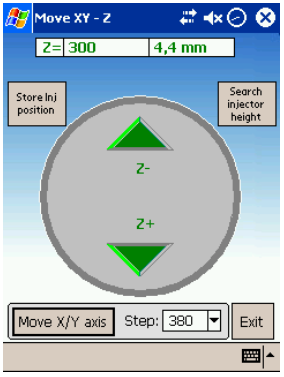
Navigator Button

Tap on this button to perform the fine alignment of the syringe carriage assembly on the injector of interest.

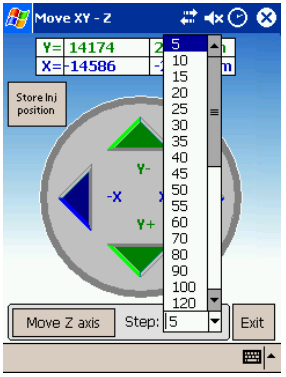
The following pages are displayed. Perform the fine alignment by using the arrows reported on the navigator bottom.

It is possible to use the navigator button of the Pocket PC also paying attention to tap on the **MOVE Z AXIS** button to pass from XY to Z.





- **MOVE X/Y AXIS, MOVE Z AXIS**. Tap on these buttons to pass from a page to the other.
- **Step** In this combo box choose the desired movement step of the syringe carriage.
- **SEARCH INJECTOR HEIGHT** Tap on this button to move the injection device on the injector to search its height.
- **STORE INJ. POSITION** Tap on this button to store the injection position.
- **EXIT** Tap on this button to exit the current page.



CAUTION **If the movements of the X axis are too rapid, the sampler move the Z axis upwards, avoiding to foul the injector or other objects located in the working area.**

Move to stored pos.

Tap on this button to move the injection device on the stored injection position. It has the same effect as the **Move to stored position** function in Injector Menu.

Store Inj. Position

Tap on this button to store the injection position. It has the same effect as the **Store Injector Position** function in Injector Menu.

Predefined injector

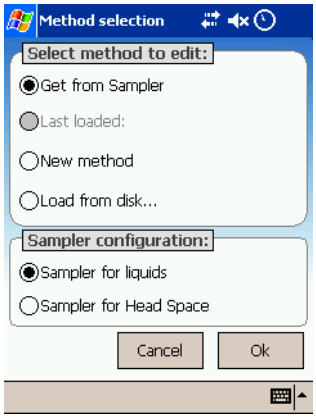
Tap on this button to use the injector pre-set alignment. It has the same effect as the Pick a predefined injector function in Injector Menu.

Done

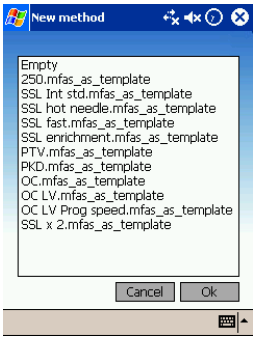
Click on this button to exit this page. It has the same effect as the Done function in File Menu.

Method Selection Page

This page allows to select the method to use.



Select Method to Edit



- **Get from sampler** Select this option box to transfer the method data from the sampler to the Pocket PC
- **Last loaded** Select this option box and tap on **OK**. The page Method related to the last loaded method will be visualized.
- **New method** Select this option box to create a new method of the sampler and tap on **OK**. According to the sampler version in use, the system will open the relative window of selection shown on the right.
- **Load from disk** Select this option box to load any method saved on disk and tap on **OK**. The system opens the dialog box where the name of the file to open must be specified. The relevant Method Setup Page will be visualized containing all the analytical parameters used when the method was developed and saved.

Sampler Configuration

Select the option box according to the version of the TriPlus sampler.

- **Sampler for Liquid**
- **Sampler for Head Space**

The relevant **Method Setup Page** will be visualized showing the default parameters and those recommended for that type of injection. According to the version of the TriPlus sampler, refer to:
TriPlus AS Method Setup Page or *TriPlus HS Method Setup Page*

Ok

Tap on this button to open the dialog window of the selected option. All entered parameters become active only after selecting this function.

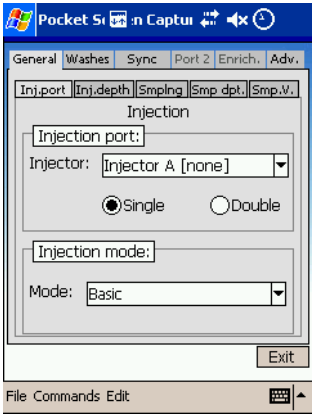
Cancel

Tap on this button to quit Configuration Page without modifying the parameters in memory.

TriPlus AS Method Setup Page

This page contains the parameters of the method required to perform injections with the sampler for liquids TriPlus AS.

Method Setup page is composed of several subsidiary pages (tags), some of which will only be visualized following the selected options. According to the type of injector, the syringe installed and the desired injection mode, the page will show suggested values that can be changed by the operator.



Related Topics

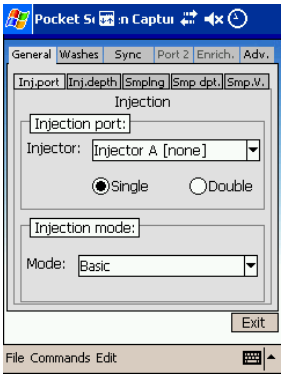
•*TriPlus AS Method Setup Page Description*

•*Configuration Mismatch Page*

The Method Setup Page for TriPlus AS includes the following tags:

- *TriPlus AS Method Setup: General Tag*
- *TriPlus AS Method Setup: Washes Tag*
- *TriPlus AS Method Setup: Synch. Tag*
- *TriPlus AS Method Setup: Synch / Int.Std Tag*
- *TriPlus AS Method Setup: Synch / Solvent Flush Tag*
- *TriPlus AS Method Setup: 2nd Inj. Port Tag*
- *TriPlus AS Method Setup: Enrichment Tag*
- *TriPlus AS Method Setup: Advanced Tag*

TriPlus AS Method Setup Page Description



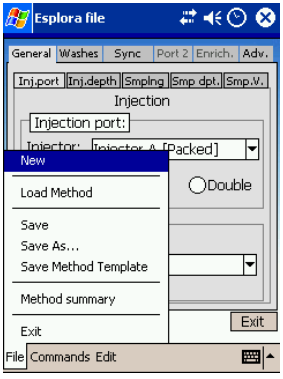
Menu Bar

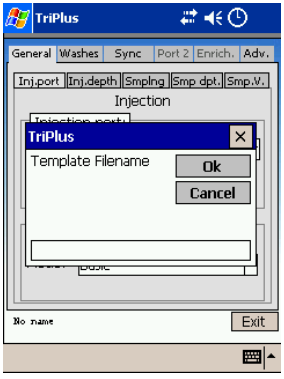
It allows to access the following menu.

File Menu

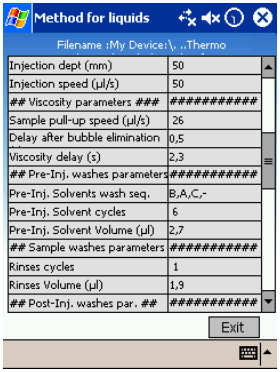
File Menu allows to access the following functions.

- **New** This function creates a new sampler method starting from the data currently in memory or from the default parameters previously stored with `Save As` function. Select this function to create a new method of the sampler and tap on OK. According to the sampler version in use, the system will open the relevant window of selection.
- **Load Method** This function permits to load the Sampler analytical method from disk into the computer memory. You can retrieve the same analytical method as it was in memory when you saved the method with the function **Save Method as.**
- **Save** This function permits to save the method currently in use. The system will ask for the filename and the directory; all the analytical conditions are immediately saved in the desired file with the extension**. mfas**.
- **Save as...**This function permits to save the sampler analytical method onto disk. When using `Save as...`.it is possible to save the method under a new filename.
- **Save Template method** This function permits to save a sampler analytical method as template method. It is useful when several methods having the same typology must be created. You may find the template method by using `New` option. Using `Save as...`.function it is possible to save the method under a new file name.





- **Method Summary** Select this option to open the page reporting the summary of the method parameters set.



- **Exit** Select this option to exit from Method Setup Page

Commands Menu

Commands Menu allows to access the following functions:

- **Send Method** It allows to transfer method data from the PC memory to the sampler.
- **Get Method** It allows to transfer method data from the sampler to the PC.

Edit Menu

Edit Menu allows to access the following functions:

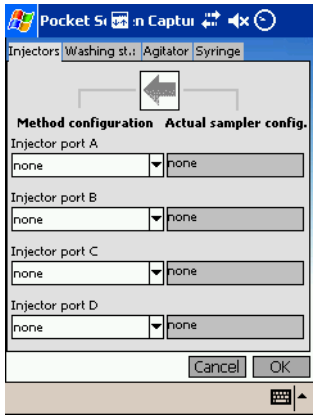
- **Check method / sampler configuration match** This function allows to verify the compatibility between the analytical method and the configuration of the sampler. If the method and the configuration of the sampler are not compatible, following the relative error message, the Configuration mismatch page will be visualized.
- **Edit method / sampler configuration Match** This function allows to open the Configuration mismatch page in which it is possible to set the configuration of the method or to restore the actual configuration.

Refer to *Configuration Mismatch Page*.

Exit

Tap on this button to exit from Method Setup Page.

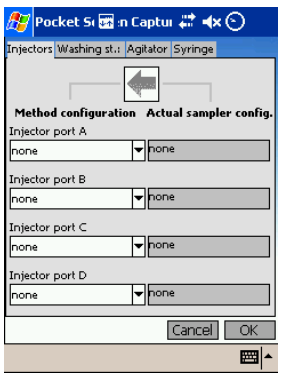
Configuration Mismatch Page

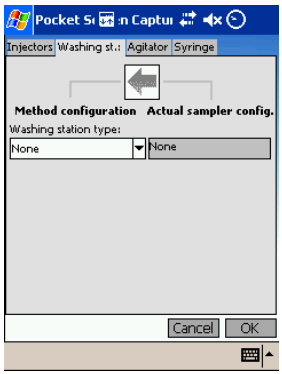


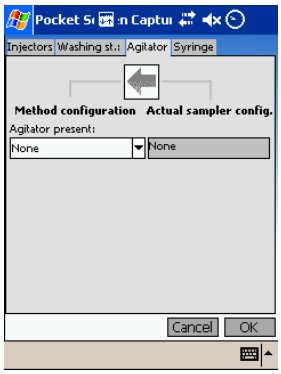
Tap on the arrow to move from the right side to the left side of the page

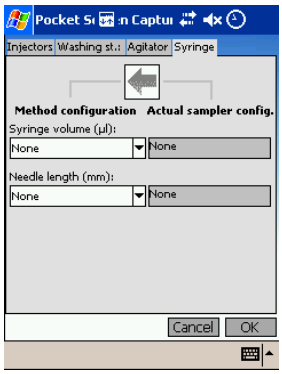
The page consists of four tags, each of them is divided into two parts:

- on the right side, not editable, the actual configuration saved in memory is shown.
- on the left side the same editable scheme is proposed where the operator can vary the configuration

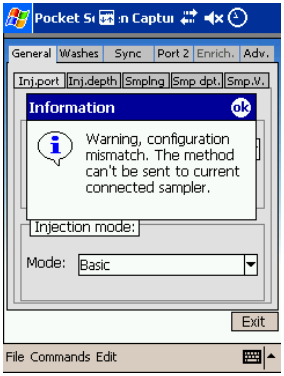








At the end of the changes tap on the **OK** button. If the configuration results to be compatible with the sampler the Method page will be visualized, otherwise an error message will appear and the resolution of the conflict will have to be handled.



Ok

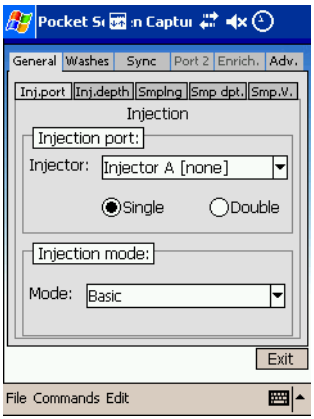
Tap on this button to open the dialog window of the selected option. All entered parameters become active only after selecting this function.

Cancel

Tap on this button to quit **Configuration Page** without modifying the parameters in memory.

TriPlus AS Method Setup: General Tag

This tag allows to plan the parameters of sampling and injection.



General Tag: *Inj. port*

Injection Port Frame

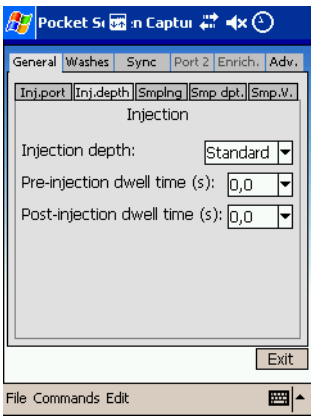
This frame includes the following options:

- **Injector** It indicates the injector selected during the setup.
- **Single** Select this option box when the sampling will be performed in a single injector.
- **Double** Select this option box when the sampling will be performed in two injectors. In this case the *TriPlus AS Method Setup: 2nd Inj. Port Tag* will be displayed where the required parameters for the second injector should be set.

Injection Mode Frame

This frame includes the following options:

- **Mode** Select the injection mode of interest choosing between the listed options.
  - Basic
  - Internal standard Post
  - Internal standard double
  - Needle solvent wash
  - Solvent flush post
  - Solvent flush double
  - Enrichment
  - Enrichment needle solvent wash



General Tag: *Inj. depth*

Injection depth

This parameter defines the penetration depth of the syringe needle into the injector. Set the parameter choosing one of the following options:

- **Standard** (default value) The syringe needle goes into the injector to the maximum possible depth according to the injector used and to the length of the needle.
- **Minimum** The syringe needle enters the injector and stops immediately beyond the septum. Use Minimum only if injecting with cold needle *(Cold Needle technique*) When Minimum is selected, **Pre and Post-inj dwell time (s)** boxes are not enabled.
- **Custom** It allows to select the penetration depth and the injection speed. The **Injection depth (mm) and Inj. Speed (µl*s)** parameters boxes are enabled.

General Tag: *Inj. Depth*...*Continued*

Pre-injection dwell time (s)

This parameter is active when the option **Standard** has been selected in **Injection depth:**. This parameter specifies how long the syringe needle must remain inside the injector before injection. This allows the needle to be heated before the sample injection. (*Hot Needle Injection*).

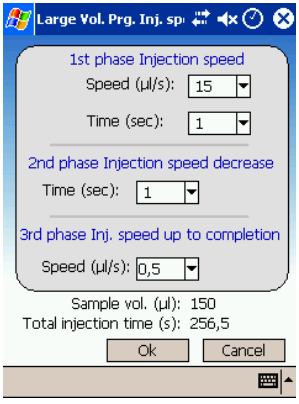
Post Injection dwell time (s)

This parameter is active when the option **Standard** has been selected in **Injection depth:**. This parameter specifies how long the syringe needle must remain inside the injector after injection. This allows the safe sample removal from the needle before it is withdrawn.

Injection depth (mm)

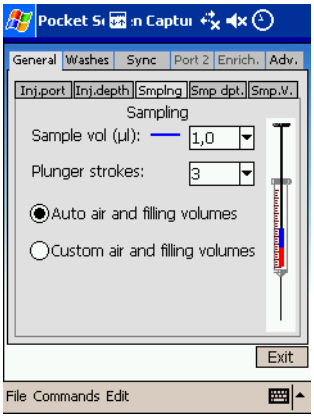
This parameter is enabled when **Custom** option has been selected. Select the desired penetration depth of the syringe needle into the injector.

Inj speed (µl*s)



This parameter is enabled when **Custom** option has been selected. Set the injection speed.

When a Large Volume injector (PTV or OC) is selected, the option **Program** is enabled. Selecting Program a dialog window is visualized where it is possible to create a speed gradient specially used during LVPTV or LVOC injection.



General Tag: *Sampling*

Sample vol (µl)

This parameter specifies the sample volume to be pulled up into the syringe and subsequently injected into the GC. This volume is a function of the syringe installed.

Plunger strokes

It allows to specify the number of plunger strokes to eliminate air bubbles forming during sample drawing.

Auto air and filling volumes

This option button is enabled when Basic or Enrichment injection mode has been selected. Check this option button when the automatic control of the volumes of air and sample to be pulled up into the syringe is desired.

Custom air and filling volumes

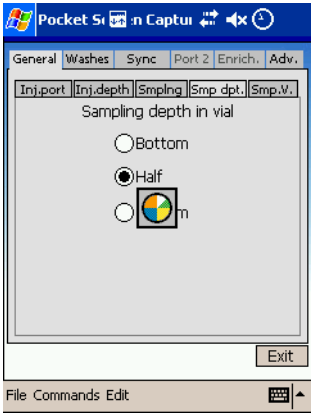
This option button is enabled when Basic or Enrichment injection mode has been selected. Check this option button when the manual control of the volumes of air and sample to be pulled up into the syringe is desired.

Air vol (µl)

This parameter is enabled if the **Custom air and filling volumes** option button has been checked. Set the desired volume of air to be pulled up after the needle is moved out of the vial.

Filling vol (µl)

This parameter is enabled if the **Custom air and filling volumes** option button has been checked. Set the desired volume of sample to be used for the syringe cleaning.



General Tag: *Smp Depth*

Sample depth in vial

This parameter specifies the penetration depth of the syringe needle into the vial.

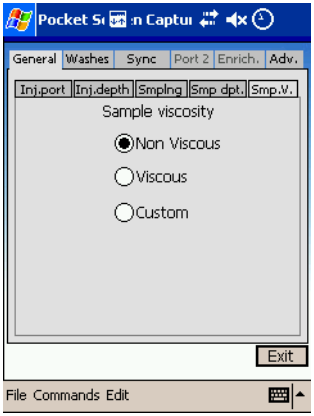
Set the parameter choosing one of the following options:

- **Bottom** The needle goes down to the bottom of the vial.
- **Half** The needle goes down to half vial. Select **Half** if the sample vial may contain solid residues on the bottom.
- **Custom** Check this option button to select the desired penetration depth. The Sampling Vial depth% parameter is enabled.

Sampling Vial depth%

This parameter is enabled when **Custom** option has been selected.

Select the desired penetration depth of the syringe needle into the vial expressed as percentage of the vial height.



General Tag: *Smp V.*

Sample Viscosity

These parameters define the sample drawing speed as a function of the sample viscosity. Choose one of the following options:

- **Non Viscous** When the sample has low viscosity.
- **Viscous** When the sample has high viscosity.
- **Custom** Check this option button to select the desired drawing parameters. The boxes of the following parameters will be enabled.

Sample Pull-up speed (µl/s)

This parameter is enabled when Custom option has been selected.

Delay after plug strokes (s)

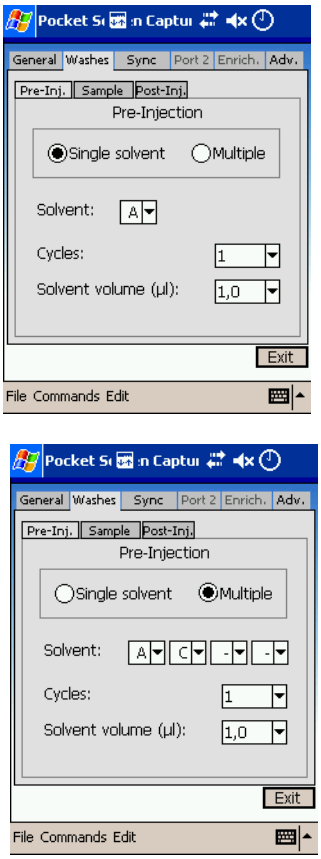
This parameter is enabled when **Custom** option has been selected. It specifies how long the plunger will remain in the low position after the last stroke to eliminate bubbles before the sample drawing.

Viscosity delay

This parameter is enabled when **Custom** option has been selected. It specifies how long the plunger will remain at the top of the stroke after the sample drawing (to account for viscous samples). This allows the sample to fill in the syringe barrel.

TriPlus AS Method Setup: Washes Tag

This tag allows to set the parameters of pre- and post-washing with solvent, and washing with sample.



Washes Tag: *Pre-Injection*

Pre-Injection

In this frame the parameters of pre-washing with solvent are specified. The sampler can use up to four different solvents for the cleaning before and after the injection. It is possible to select one of the four solvents checking the **Single** option button; to select up to four different solvents, check the **Multiple** option button.

- **Single** Check this option button when a single cleaning solvent should be used. Refer to Solvent parameters.
- **Multiple** Check this option button when more than one cleaning solvent should be used. Refer to Solvents parameter.

Solvent

This parameter specifies the solvent(s) A, B, C e/o D to be used according to the Single or Multiple option selected.

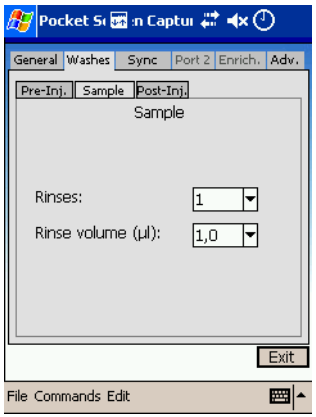
NOTE When a solvent vial is used as Internal Standard or as Solvent Flush it cannot be selected as solvent wash.

Cycles

This parameter allows to set how many syringe pre-washing cycles with solvent have to be run before injection.

Solvent volume (µl)

Specify the volume of the pre-rinse solvent. It depends on the syringe volume.



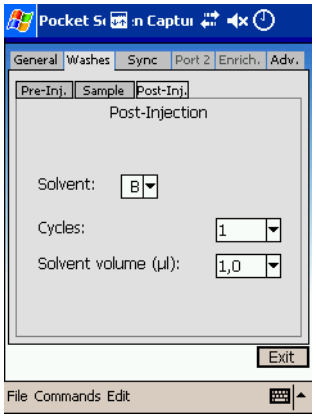
Washes Tag: *Sample*

Rinses

It allows to set the number of syringe pre-washing cycles with sample to be run.

Rinse volume (µl)

Specify the volume of pre-rinse sample. It depends on the syringe volume.



Washes Tag: *Post-Injection*

Post Injection

In this frame the parameters of post-washing with solvent are specified.

Solvent

This parameter specifies the solvent(s) A, B, C e/o D to be used according to the Single or Multiple option selected.

NOTE When a solvent vial is used as Internal Standard or as Solvent Flush it cannot be selected as solvent wash.

Cycles

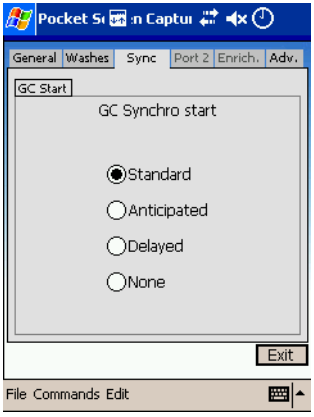
This parameter allows to set how many syringe post-washing cycles with solvent have to be run after injection.

Solvent volume (µl)

Specify the volume of the post-rinse solvent. The solvent volume depends on the syringe volume.

TriPlus AS Method Setup: Synch. Tag

This tag allows to set in which step of the sampling phase the sampler sends the Start Signal to the GC.



Synch. Tag

GC Synchro start

To select in which step of the sampling phase the sampler will sends the Start Signal to the GC you may choose among four different synchronism options listed below.

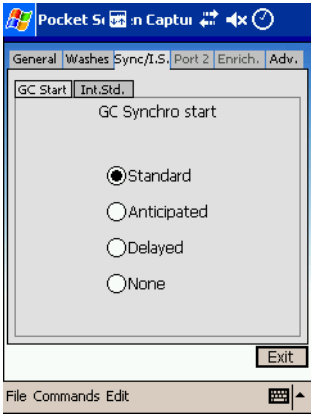
- **Standard** Selecting this option, the Start signal is sent at the beginning of the sample injection.
- **Anticipated** The Start signal is generated when the sliding plate touches the injector before injection. Select this when the GC run must start before that the injection takes place.
- **Delay** The Start signal is generated when the sample injection is completed. It is particularly useful in the *Large Volume Injection Technique* to avoid adjustment of the time of the parameters related to the quantity of injected solvent or to the speed of injection.
- **None** No signal is sent to the GC.

TriPlus AS Method Setup: Synch / Int.Std Tag

This tag is visualized when the injection mode **Internal standard Post** or **Standard Internal double** has been selected in the *TriPlus AS Method Setup: General Tag*.

The sampler supports the *Internal Standard* injection technique. The quantitative or qualitative analysis is more accurate with the automatic addition of an internal standard. The sampler will automatically compensate for any factors that may affect the sample sequence. This ensures the highest precision and accuracy of the analytical results. The *Internal Standard* technique consists of programmable volumes of an internal standard and a sample. Both are sequentially drawn from the syringe and injected together. Air gaps can be used to separate the sample from the internal standard.

- When **Internal standard post** mode is used, a single volume of air is drawn between the internal standard or the solvent, and the sample.
- When **Internal standard double** mode is used, a volume of air is drawn twice. The syringe body will contain a sequence consisting of: air, internal standard, air, and sample.

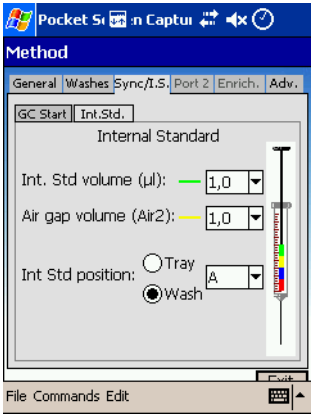


Synch / Int. Std Tag: *GC Start*

GC Synchro start

To select in which step of the sampling phase the sampler will sends the Start Signal to the GC.You may choose among four different synchronism options listed below.

- **Standard** Selecting this option, the Start signal is sent at the beginning of the sample injection.
- **Anticipated** The Start signal is generated when the sliding plate touches the injector before injection. Select this when the GC run must start before that the injection takes place.
- **Delay** The Start signal is generated when the sample injection is completed. It is particularly useful in the *Large Volume Injection Technique* to avoid adjustment of the time of the parameters related to the quantity of injected solvent or to the speed of injection.
- **None** No signal is sent to the GC.



Synch / Int. Std Tag: *Int. Std*

Int. Std volume (µl)

It indicates the volume of the internal standard.

Air gap volume(µl)

It indicates the air gap between internal standard and the sample.

Internal standard position

It indicates the position of the vial containing the internal standard.

- **Tray** Check this option box if the vial containing the internal standard is located in the sample tray. It indicates the position number.
- **Wash** Check this option box if the vial containing the internal standard is located in the wash station. It indicates the position A, B, C or D.

TriPlus AS Method Setup: Synch / Solvent Flush Tag

This tag is visualized when the injection mode **Needle solvent wash**, **Solvent flush post**, **Solvent flush double** or **Enrichment needle solvent wash** has been selected in *TriPlus AS Method Setup: General Tag*.

The sampler supports the *Solvent flush* injection technique which uses a *plug* of solvent, which is drawn before the sample. During the injection, the solvent flushes out the sample from the syringe needle. This technique minimizes the analyte discrimination during injection. Air gaps can be used to separate the sample from the solvent.

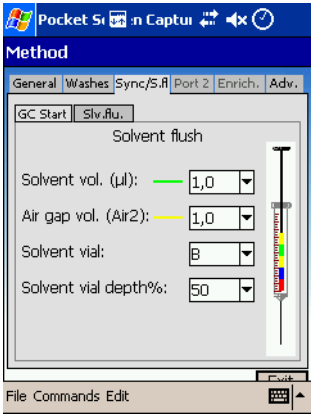
- When **Solvent flush post** mode is used, a single volume of air is drawn between the solvent and the sample.
- When **Solvent double** mode is used, a volume of air is drawn twice. The syringe body will contain a sequence consisting of: air, solvent, air, and sample.

Synch / Solv F Tag: *GC Start*

GC Synchro start

To select in which step of the sampling phase the sampler will sends the Start Signal to the GC.You may choose among four different synchronism options listed below.

- **Standard** Selecting this option, the Start signal is sent at the beginning of the sample injection.
- **Anticipated** The Start signal is generated when the sliding plate touches the injector before injection. Select this when the GC run must start before that the injection takes place.
- **Delay** The Start signal is generated when the sample injection is completed. It is particularly useful in the *Large Volume Injection Technique* to avoid adjustment of the time of the parameters related to the quantity of injected solvent or to the speed of injection.
- **None** No signal is sent to the GC.



Synch / Solv F Tag: *Solv Flush*

Solvent volume (µl)

It indicates the volume of the solvent.

Air gap volume(µl)

It indicates the gap between solvent and sample.

Solvent vial

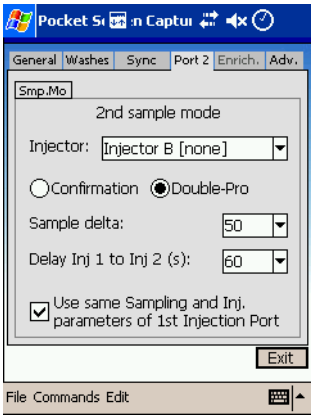
It indicates the position A, B, C or D of the vial containing the solvent.

Solvent vial deph%

This parameter is visualized when the injection mode **Needle solvent wash**, or **Enrichment needle solvent wash** has been selected.

TriPlus AS Method Setup: 2nd Inj. Port Tag

This tag is visualized when **Double option** has been selected in the *TriPlus AS Method Setup: General Tag* to perform the sampling in two injectors. Set here the required parameters for the second injector.



2nd Inj. Port Tag: ***Port 2is***

Injector

Select the second injector. Choose one of the following modalities of injection.

Confirmation

When this box is checked, the sampler injects the same sample into two injectors.

Double-pro

When this box is checked, the sampler injects a different sample into each injector. The **Sample delta** box is enabled.

Sample delta

This box is enabled only when Double-pro option button is checked. Specify the interval between two batches of vials containing different samples.

E.g. if the first batches of vials is from **1** to **25** and the second batches from **35** to **45**, the value of sample delta to set is **10** (35-25).

Delay Inj. 1 to Inj. 2 (s)

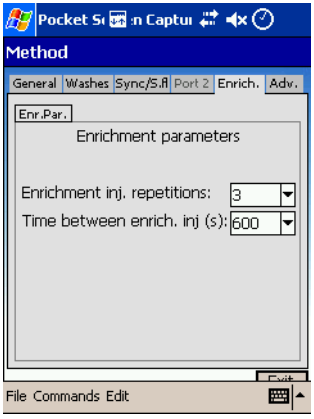
It indicates the waiting time before the sample is injected into the second injector.

Use same Sampling and Inj. Parameters of 1st Injection Port

Check this box if the second injector will use the same sampling and injection parameters as the first one. Otherwise the programming section for the second injector parameters will be visualized.
Set the sampling and injection parameters for the second injector proceeding as described in *TriPlus AS Method Setup: General Tag*.

TriPlus AS Method Setup: Enrichment Tag

This tag is visualized when the injection mode Enrichment has been selected in *TriPlus AS Method Setup: General Tag*. It is useful when the PTV injector is used with appropriate packing of the liner for the injection of gases or liquids. It is used sometimes instead of the normal programmed injection speed for large volume of liquids.



Enrichment Tag: *Parameters*

Enrichment injection repetitions

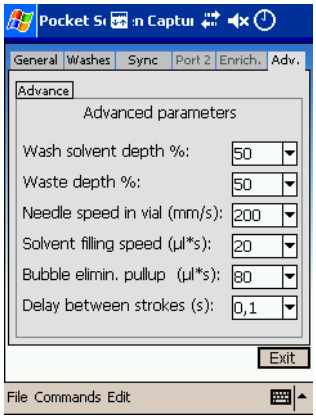
This parameter allows to inject the same sample vial several times before the start signal is sent to the GC.

Time between enrich. Inj.(s)

This parameter indicates the waiting time between an enrichment and the next.

TriPlus AS Method Setup: Advanced Tag

This tag contains some parameters that may be eventually used for a refinement of the method.



Advanced Tag: ***Parameters***

Wash solvent depth%

Specify at which percentage of the solvent vial the syringe needle must penetrate. 0% and 100% correspond respectively to the top and the bottom of the vial respectively. In the example, setting 50% means that the needle must penetrate up to half vial.

Waste depth%

Specify at which percentage of the waste vial the syringe needle must penetrate. 0% and 100% correspond to the top and the bottom of the vial respectively. In the example, setting 50% means that the needle must penetrate up to half vial.

Needle speed in vial (mm/s)

Specify the penetration speed of the syringe needle into the sample vial. It is modified according to the septa and needle characteristics.

Solvent filling speed (µl/s)

Specify at which speed the syringe plunger is pulled up to draw the wash solvent into the syringe. It is related to the viscosity of the solvent and the syringe type used.

Bubble elim. Pull-up (µl/s)

Specify at which speed the syringe plunger is pulled up and pushed down as the needle is held in the sample vial. This eliminates air from the syringe, thereby clearing it of bubbles.

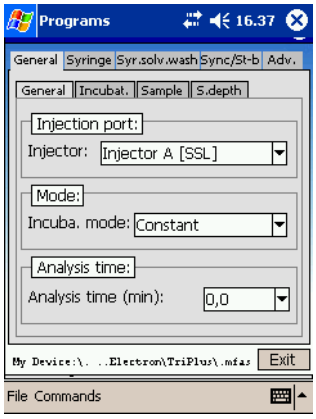
Delay between strokes (s)

Specify the delay between each plunger stroke.

TriPlus HS Method Setup Page

This page contains the parameters of the method required to perform injections with the sampler for head space TriPlus HS.

Method Setup page is composed of several subsidiary pages (tags), some of which will only be visualized following the selected options. According to the type of injector, the syringe installed and the desired injection mode, the page will show suggested values that can be changed by the operator.



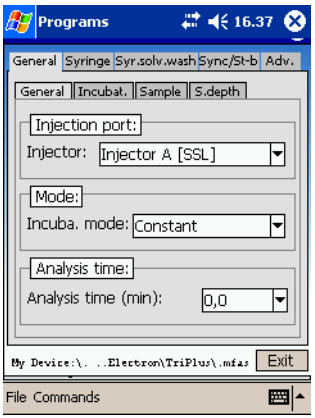
Related Topics

- *TriPlus HS Method Setup Page Description*
- *Configuration Mismatch Page*

The Method Setup Page for TriPlus HS includes the following tags:

- *TriPlus HS Method Setup: General Tag*
- *TriPlus HS Method Setup: Syringe Tag*
- *TriPlus HS Method Setup: Syringe Solvent Wash Tag*
- *TriPlus HS Method Setup: Synch / St-by Tag*
- *TriPlus HS Method Setup: Advanced Tag*

TriPlus HS Method Setup Page Description



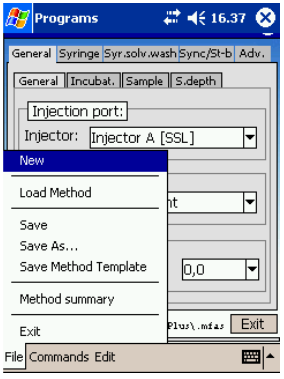
Menu Bar

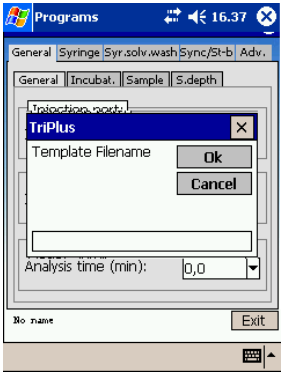
It allows to access the following menu.

File Menu

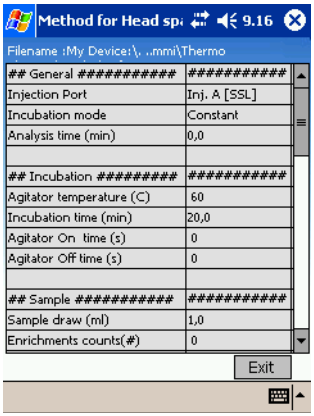
File Menu allows to access the following functions:

- **New** This function creates a new sampler method starting from the data currently in memory or from the default parameters previously stored with `Save As` function. Select this function to create a new method of the sampler and tap on OK. According to the sampler version in use, the system will open the relevant window of selection.
- **Load Method** This function permits to load the Sampler analytical method from disk into the computer memory. You can retrieve the same analytical method as it was in memory when you saved the method with the function **Save Method as.**
- **Save** This function permits to save the method currently in use. The system will ask for the filename and the directory; all the analytical conditions are immediately saved in the desired file with the extension**. mfas**.
- **Save as...**This function permits to save the sampler analytical method onto disk. When using `Save as...`it is possible to save the method under a new filename.
- **Save Template method** This function permits to save a sampler analytical method as template method. It is useful when several methods having the same typology must be created. You may find the template method by using `New` option. Using `Save as...`function it is possible to save the method under a new file name.





- **Method Summary** Select this option to open the page reporting the summary of the method parameters set.



- **Exit** Select this option to exit from Method Setup Page

Commands Menu

Commands Menu allows to access the following functions:

- **Send Method** It allows to transfer method data from the PC memory to the sampler.
- **Get Method** It allows to transfer method data from the sampler to the PC.

Edit Menu

Edit Menu allows to access the following functions:

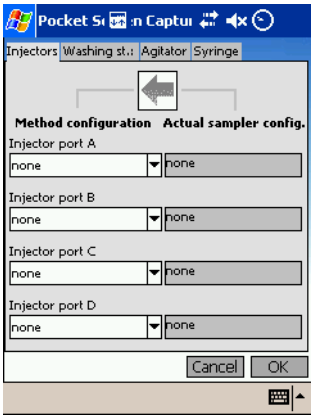
- **Check method / sampler configuration match** This function allows to verify the compatibility between the analytical method and the configuration of the sampler. If the method and the configuration of the sampler are not compatible, following the relative error message, the Configuration mismatch page will be visualized.
- **Edit method / sampler configuration Match** This function allows to open the Configuration mismatch page in which it is possible to set the configuration of the method or to restore the actual configuration.

Refer to *Configuration Mismatch Page*.

Exit

Tap on this button to exit from Method Setup Page.

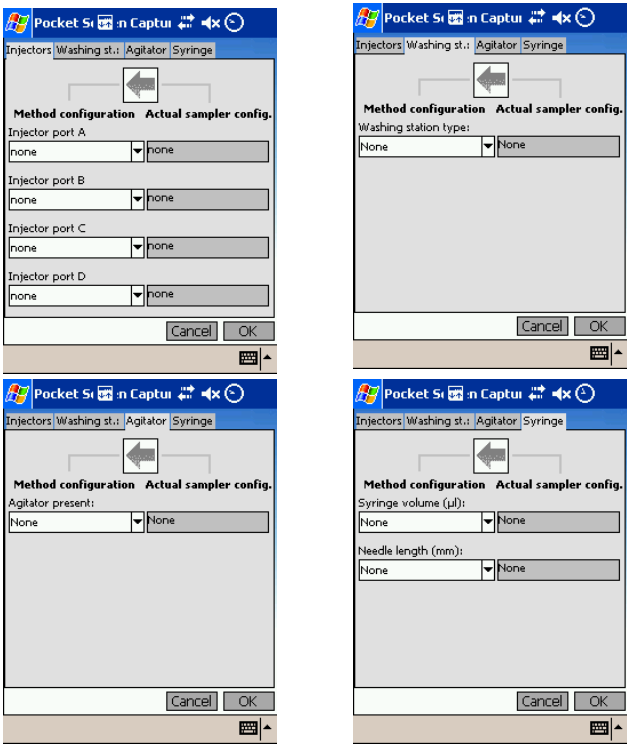
Configuration Mismatch Page



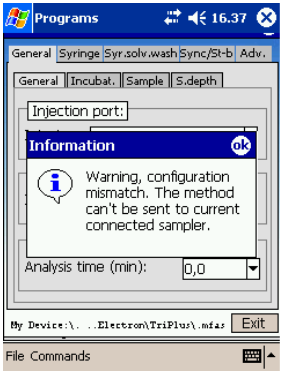
Tap on the arrow to move from the right side to the left side of the page

The page consists of four tags, each of them is divided into two parts:

- on the right side, not editable, the actual configuration saved in memory is shown.
- on the left side the same editable scheme is proposed where the operator can vary the configuration



At the end of the changes tap on the **OK** button. If the configuration results to be compatible with the sampler the Method page will be visualized, otherwise an error message will appear and the resolution of the conflict will have to be handled.



Ok

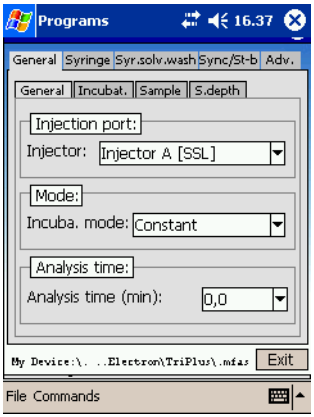
Tap on this button to open the dialog window of the selected option. All entered parameters become active only after selecting this function.

Cancel

Tap on this button to quit Configuration Page without modifying the parameters in memory.

TriPlus HS Method Setup: General Tag

This tag allows to plan the parameters of sampling and incubation.



General Tag: ***General***

Injection Port

This frame includes the following options:

- **Injector** It indicates the injector selected during the setup.

Mode

Incubation mode parameter specifies how the sample must be conditioned. It is possible to choose between four incubation modes:

- **Constant** Choose this option to allow the sample to be sequentially conditioned at a programmed temperature with a constant conditioning time.
- **Progressive** Choose this option to allow the sample to be conditioned at a programmed temperature with a conditioning time that increases for each sample according to a programmed additional time.
- **Multiple Extraction** Choose this option to allow automatic multiple extraction steps of headspace from the same sample vial repeatedly.
- **Constant DoublePro** Choose this option to allow a couple of samples to be sequentially conditioned at a programmed temperature with a constant conditioning time and injected into two separated injectors. See *Double Pro 2nd injector*.

Analysis Time

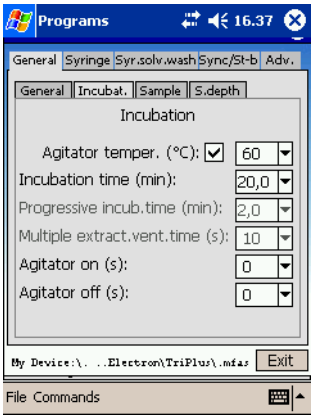
This frame contains the following function:

- **Analysis time (min)** This box contains the full runtime of a single sample and it is used for calculation of the multiple sample incubation when incubation time is longer than the analysis runtime. The Sampler updates automatically this box sample by sample with the last runtime.

Double Pro 2nd injector

This frame is enabled only when **Constant DoublePro** incubation mode has been selected. In this modality, the sampler injects a different sample into each injector respecting the relevant incubation times.

- **Injector** It indicates the second injector defined in the Sampler Setup Page.
- **Sample delta** It specifies the interval between two batches of vials containing the different samples.
- **Delay Inj. 1 to Inj. 2 (s)** It indicates the interval time before injecting the sample into the second injector. To have the correct retention time repeatability, set this time at a value little bit greater than the time necessary at the sampler to prepare the sample to inject.

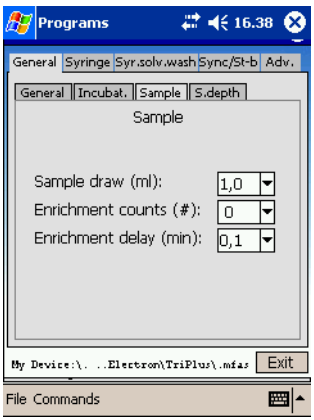


General Tag: *Incubation*

Incubation

Specify the conditioning and shaker parameters. The vial shaking is used to decrease the time necessary for the sample equilibrium.

- **Agitator temperature (°C)** Check this box to enable the agitator temperature control. The temperature is thermoregulated from 40 to 150 °C. If this box is unchecked, the temperature below 40 °C is not thermoregulated but the agitator is ready only if its temperature is really below 40 °C.
- **Incubation Time (min)** This box specifies the incubation time for all samples to be analyzed with the method in use. The time here specified is in minutes.
- **Progressive incubation time (min)** This parameter is visualized when Progressive has been selected as incubation mode. Specify in the box the time progressively added to the incubation time for all samples to be analyzed with the method in use. The time here specified is in minutes.
- **Multiple extraction venting time (s)** This parameter is visualized when Multiple Extraction has been selected as incubation mode. Specify in this box the venting flushing time of the headspace gas, contained in the vial, performed after each injection. The time here specified is in minutes.
- **Agitator on (s)** This box specifies the time in minutes for shaker on. The vial shaking is used to decrease the time necessary for the sample equilibrium.
- **Agitator off (s)** This box specifies the time in minutes for shaker off.

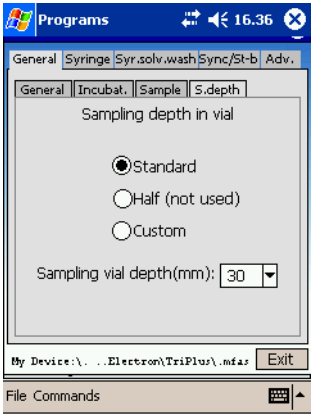


General Tag: *Sample*

Sample

This frame of controls is used to set parameters for the sample drawing.

- **Sample Draw (ml)** It specifies the volume of vapor to be drawn and injected. The maximum injectable value is 10% less than the syringe capacity.
- **Enrichment counts (#)** This label specifies the number of samplings to be carried out from the same sample vial. When >1, the headspace vapors are injected into the GC the number of times selected. The start signal to the GC is sent after the last injection.
- **Enrichment delay (min)** This label specifies the delay time between one enrichment and the next.



General Tag: *Sample Depth*

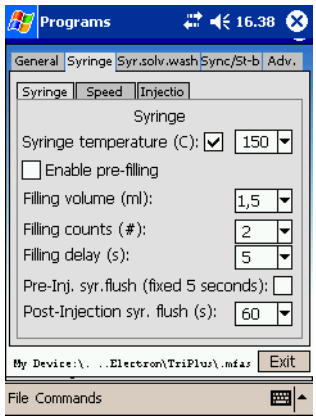
Sample Depth

Set the penetration depth of the syringe needle into the vial.

- **Standard** The syringe needle penetrates into the vial at a predefined depth. Check this option button to select this function.
- **Custom** Check this option button to select the desired penetration depth. The *Sampling vial depth (mm)* parameter is enabled.
- **Sampling vial depth (mm)** This parameter is visualized when the option *Custom* has been selected. In the box set the desired penetration depth of the needle into the vial.

TriPlus HS Method Setup: Syringe Tag

This tag allows to set the syringe parameters.

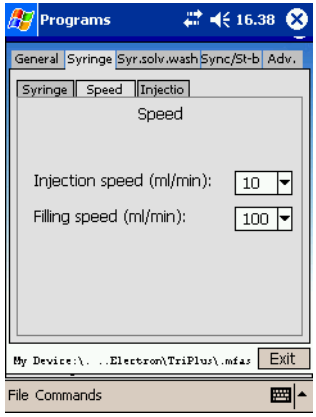


Syringe Tag: *Syringe*

Syringe

This frame contains the syringe parameters.

- **Syringe temperature (°C)** Check this box to enable the syringe temperature control. The temperature is thermoregulated from 40 to 150 °C. If this box is unchecked, the temperature below 40 °C is not thermoregulated but the syringe is ready only if its temperature is really below 40 °C.
- **Enable Pre-filling** When enabled, this function allows the vial to be pressurized before sampling the headspace vapors. The volume used to pressurize the vial is the *sample draw* volume. Check this box to enable the function.
- **Filling volume (ml)** This parameter specifies the sample volume to be initially drawn into the syringe to purge it and the needle.
- **Filling count (#)** This parameter specifies the number of the syringe plunger strokes from the same vial to have a homogeneous phase between the headspace gas in the vial and the sample in the syringe.
- **Filling delay (s)** This parameter specifies the delay time between the plunger pull-up and the sample ejection while the syringe is filled with the sample.
- **Pre-Inj. Syringe flush** (fixed 5 seconds) Check this box when a syringe flush cycle is desired before the injection.
- **Post injection syringe flush (sec)** Set the time to be used for the syringe flush after the injection or ***Continuous*** option to flush the syringe throughout the analytical run.

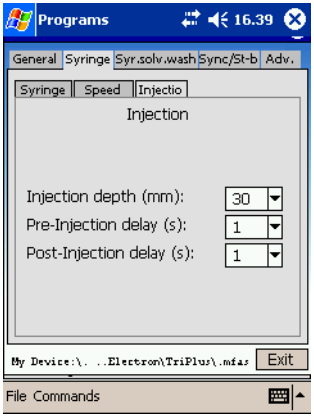


Syringe Tag: *Speed*

Speed

This frame contains the parameters to control the speed of the sample drawing into the syringe and the speed of injection into the inlet.

- **Filling speed (ml/min)** It specifies the speed at which the sample is withdrawn from the headspace into the syringe.
- **Injection (ml/min)** It specifies the transfer speed of the sample from the syringe to the inlet.



Syringe Tag: *Injection*

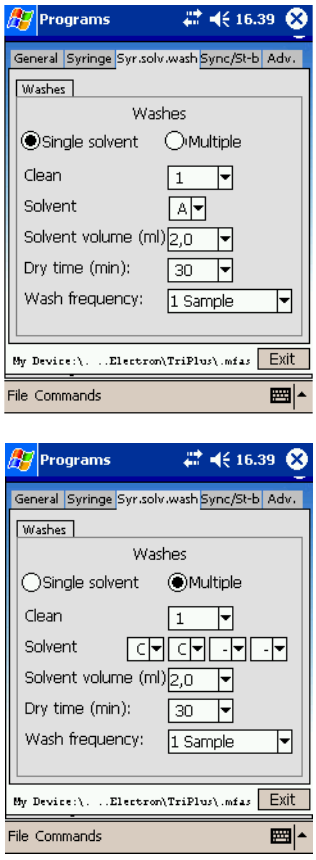
Injection

This frame contains the parameters for the penetration depth and the amount of time the syringe needle resides in the injector before or after the sample is injected.

- **Injection Depth (mm)** This parameter defines the penetration depth of the syringe needle into the injector.
- **Pre-Injection delay (s)** This parameter specifies the syringe needle waiting time in the injector **before** the sample is injected.
- **Post-Injection Delay** This parameter specifies the syringe needle waiting time in the injector **after** the sample is injected.

TriPlus HS Method Setup: Syringe Solvent Wash Tag

This tag contains the parameters for the periodic washing of the syringe.



Syringe Solvent Wash Tag: *Washes*

Washes

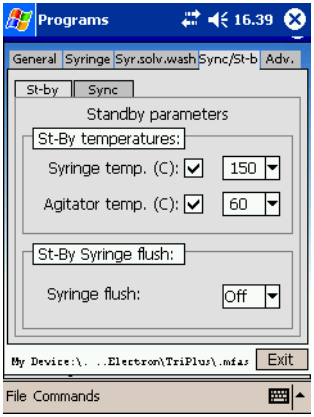
The sampler can use up to four different solvents for the syringe cleaning. It is possible to select one of the four solvents checking the ***Single*** option button, or to select up to four different solvents checking the ***Multiple*** option button.

- **Single** Check this option button when a single cleaning solvent should be used.
- **Multiple** Check this option button when more than one cleaning solvent should be used.

- **Clean** This parameter allows to set how many syringe cleaning cycles with solvent have to be run.
- **Solvent** This parameter specifies the solvent(s) A, B, C or/and D to be used according to the ***Single*** or ***Multiple*** option selected.
- **Dry time (min)** This parameter specifies the time required to dry the syringe after having performed the cleaning with the solvent.
- **Wash frequency** This parameter allows to select how many samples after which the syringe cleaning must be performed.

TriPlus HS Method Setup: Synch / St-by Tag

This tag allows to select in which step of the sampling phase the sampler sends the Start Signal to the GC. It also allows to set the sampler stand-by condition parameters.



Synch/St-by Tag: *St-By*

St-by Temperature

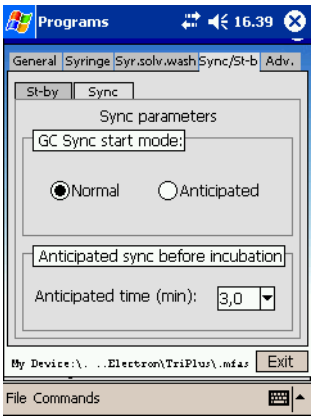
Set in this frame the stand-by temperatures.

- **Syringe temperature (°C)** This parameter allows to set a temperature for the syringe to stay while the sampler is not running (stand-by condition). Check this box to enable the stand-by temperature control. The temperature is thermoregulated from 40 to 150 °C. If this box is unchecked, the temperature below 40 °C is not thermoregulated but the syringe is ready only if its stand-by temperature is really below 40 °C.
- **Agitator temperature (°C)** This parameter allows to set a temperature for the agitator (incubation oven) to stay while the sampler is not running (stand-by condition). Check this box to enable the stand-by temperature control. The temperature is thermoregulated from 40 to 150 °C. If this box is unchecked, the temperature below 40 °C is not thermoregulated but the agitator is ready only if its stand-by temperature is really below 40 °C.

St-by Syringe flush

Enable the syringe flush during the stand-by condition if desired.

- **Syringe flush** This parameter allows to enable the syringe wash with inert gas when the sampler is not running. To enable the function select On.



Synch/St-by Tag: *Synch*

GC Synch start mode

This parameter specifies the synchronism mode between the sampler and the GC.

- **Normal** Sends the Start signal to the GC at the end of the sample injection.
- **Anticipated** Sends the Start signal to the GC before the sample injection.

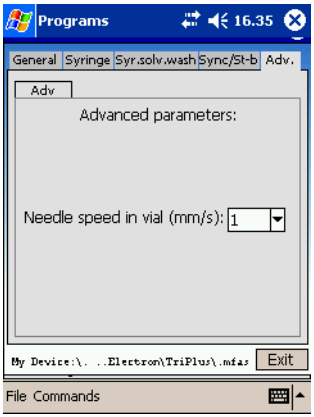
Anticipated sync before incubation end

Synchronism signal with the Cold Trap. This parameter allows the sampler to generate a pre-trigger signal, before the end of the sample conditioning time, starting the trap cooling. This synchronism allows to minimize the time the trap remains at the trapping temperature, thus saving on cooling agent.

- **Anticipated time (min)** Set the required time to reach the cold trap temperature.

TriPlus HS Method Setup: Advanced Tag

This tag contains parameters that may eventually used for a refinement of the method.



Advanced Tag

Advanced Parameters

This frame allows to set the following parameters.

- **Needle speed in vial (mm/s)** Specify the penetration speed of the syringe needle into the sample vial.

A

TriPlus Sampler for Multiple GC Configuration

The TriPlus sampler is a versatile instrument designed for single instrument configuration as well as for two gas chromatographs.

The unique design of the TriPlus sampler internal operating system permits to double its sample throughput serving simultaneously two gas chromatographs alternatively.

Both gas chromatographs can be configured with any of the supported data systems, and the TriPlus is seen by each data system as owned by each one. The TriPlus will handshake with the two instruments and will serve both when necessary. If both gas chromatographs require the injection at the same time, the TriPlus will serve the first requiring attention, and immediately after will serve the other one.

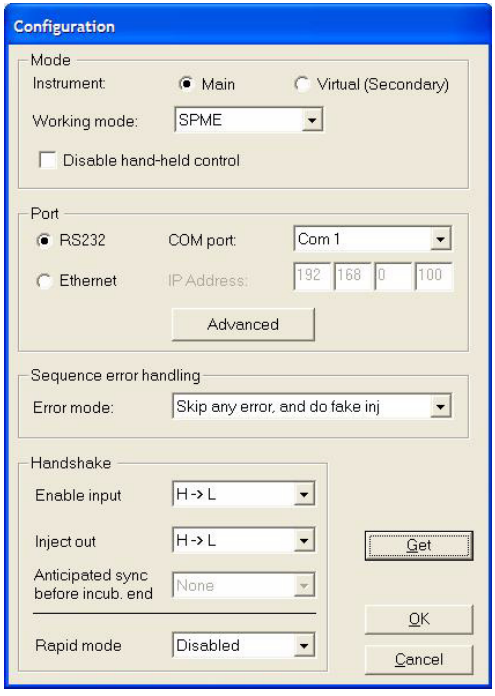
Since the sample handling and injection is usually much shorter than the analysis time, the overall system performance will result in a smooth and powerful service for both GCs.

Thanks to the multiple communication lines available in the TriPlus sampler, and thanks to independent handshake for each one GC (ready, inject out) h/w signals, the 2 gas chromatographs sharing the same TriPlus can be driven by any supported data systems, even mixing them as needed.

The TriPlus is supported by many data systems:

- ChromQuest
- EzChrom
- Xcalibur
- Chrom-Card
- Thermo GCs for ChemStation (for Trace or Focus GC)
- Thermo GCs for ChemStation (for Agilent 6890, 6850, 5890, and TriPlus)

All of the above data systems feature the same configuration window.



CAUTION **The Rapid Mode must be Disabled when TriPlus is serving two gas chromatographs.**

The TriPlus configuration window features the section Mode, with the drop-down list named **“Instrument”** that allows to select “**Main**” or “**Virtual**”.

There is priority difference between Main and Virtual, both offer the same capability, the name is just for differentiating one from the other, and meaning that in fact the sampler is physically one, but there is second one, virtual, performing the productivity of two samplers.

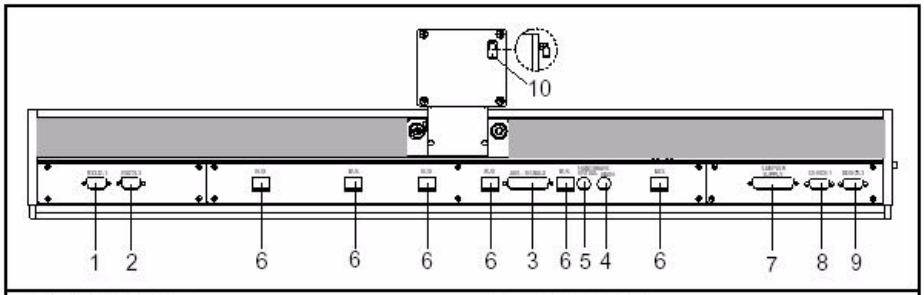
The only necessary step to configure the TriPlus full service for two gas chromatographs is just this parameter that needs to be Main for one GC configuration, and Virtual for the second one.
The great flexibility of the drivers and the TriPlus firmware design, permit to mix any kind of supported data systems. In fact you may have one GC controlled by Xcalibur, and the second controlled by ChromQuest, or any other in the list previously described. In such a mixed environment, both data systems will drive the TriPlus as it would be owned by each one data system.

Mix of different Data Systems is possible also in addition to mix of different GCs type. In fact the TriPlus is available with many different mounting legs and brackets to support 2 Trace, 2 Focus, 1 Trace and 1 Focus, 2 Agilent 6890, 2 Agilent 6850, as well as 2 Agilent 5890. All of the double GC mounting legs provide beside the TriPlus legs for the specified GC type, also a bracket that keeps the two GCs locked together such to avoid slipper with consequent loss of injection points position.

In principle it is also possible the mix of GC model of different brands, such as a Trace GC with an Agilent 6890. However the mounting legs of the TriPlus must be one of the two and the second GC must be positioned close to the main one. It has however to be known that in this specific case the two GCs distance may change due to vibrations or table shock, and consequently will be necessary a frequent Injectors alignment.

Each Data System (one per GC) will connect to TriPlus independently through RS232-1 Connector, RS232-2 Connector, or LAN RJ45 if available.

Each GC requires a specific cable for handshake connection with TriPlus sampler. On the back panel of the TriPlus there are two connectors marked Handshake Main, and Handshake Virtual.



1. RS232-1 Connector	2. RS323-2 Connector
3. AUX SIGNAL Connector	4. HANDSHAKE VIRTUAL Connector
5. HANDSHAKE MAIN Connector	6. BUS Connector
7. SAMPLER SUPPLY Connector	8. DEVICE 1 Connector
9. DEVICE 2 Connector	10. Syringe Flush Gas Inlet

Please note that the GC configured as "**Main**" must be connected to Handshake Main, and the other GC configured as "**Virtual**" must be connected to Handshake Virtual.
The Handshake cables are included in the Mounting leg kits, the TriPlus configuration is specific to GC type and they are here below described.

For Trace and Focus GC Connection:

1. Make sure the ***Trace or Focus GC*** have the following configuration:

   `"CONFIGURATION, HANDSHAKE, GC READY OUT"`

   set for `READY WHEN LOW`

   `"CONFIGURATION, HANDSHAKE, REMOTE START IN"`

   set for `HIGH TO LOW`

2. Make sure the ***TriPlus*** have the following configuration:

   "TriPlus Sampler, Handshake, `Enable Input`"

   set for `H > L`

3. Please note that if not properly set, the Sampler injects without waiting GC Ready, or never injects.

   “TriPlus Sampler, Handshake, `Inject out`"

   set for `H > L`"

4. Please note that if not properly set, the GC will not start when TriPlus injects.

5. Make sure the TriPlus is set for ***Main*** or ***Virtual*** as required, and verify the connection between the TriPlus and Trace/Focus GC is made through **MAIN** handshake for **Main** or **VIRTUAL** handshake for **Virtual** with the cable P/N 230 435 77:

For Agilent 6890, 6850, and 5890 GC Connection:

1. Make sure the TriPlus have the following configuration:

   "TriPlus Sampler, Handshake, `Enable Input`"

   set for `H > L`"

2. Please note that if not properly set, the Sampler injects without waiting GC Ready, or never injects.

   "TriPlus Sampler, Handshake, `Inject out`"

   “set for `H > L`"

3. Please note that if not properly set, the GC will not start when TriPlus injects.

4. Make sure the TriPlus is set for ***Main*** or ***Virtual*** as required, and verify the connection between the TriPlus and the GC is made through **MAIN** handshake for **Main** or **VIRTUAL** handshake for **Virtual**, with the cables:

   - P/N 230 436 13 for 6890 and 6850 GC
   - P/N 230 436 14 for 5890 GC

B

Customer Communication

Thermo Fisher Scientific provides comprehensive technical assistance worldwide and is dedicated to the quality of our customer relationships and services.

This appendix also contains a one-page *Reader Survey*. Use this survey to give us feedback on this manual and help us improve the quality of our documentation.

How To Contact Us

Use http://www.thermo.com/com/cda/resources/resource_detail/1,,12512,00.html address for products information.

Use http://www.gc-gcms-customersupport.com/WebPage/Share/Default.aspx address to contact your local Thermo Fisher Scientific office or affiliate GC-GC/MS Customer Support.

Reader Survey

Product: **TriPlus** Automatic Sampling System
Manual: Operating Manual
Part No.: **317 094 41**

Please help us improve the quality of our documentation by completing and returning this survey.
Circle one number for each of the statements below.

	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
The manual is well-organized.	1	2	3	4	5
The manual is clearly written.	1	2	3	4	5
The manual contains all the information I need.	1	2	3	4	5
The instructions are easy to follow.	1	2	3	4	5
The instructions are complete.	1	2	3	4	5
The technical information is easy to understand.	1	2	3	4	5
Examples of operation are clear and useful.	1	2	3	4	5
The figures are helpful.	1	2	3	4	5
I was able to install the system using this manual.	1	2	3	4	5

If you would like to make additional comments, please do. (Attach additional sheets if necessary.)

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Glossary

This section contains an alphabetical list and descriptions of terms used in this manual. This also includes abbreviations, acronyms, metric prefixes, and symbols.

A

A	ampere
ac	alternating current
ADC	analog-to-digital converter

B

b	bit
B	byte (8 b)
baud rate	data transmission speed in events per second

C

ºC	Celsius
CIP	Carriage and Insurance Paid To
cm	centimeter
CPU	central processing unit (of a computer)
CSE	Customer Service Engineer

D

d	depth
DAC	digital-to-analog converter
dc	direct current
DS	data system

E

ECD	Electron Capture Detector
EMC	electromagnetic compatibility
ESD	electrostatic discharge

F

°F	Fahrenheit
FID	Flame Ionization Detector
FOB	Free on Board
FPD	Flame Photometric Detector
ft	foot

G

g	gram
gain	A measure of the ability of an electronic circuit or device to increase the magnitude of an electronic input parameter.
GC	gas chromatograph
GND	electrical ground

H

h	height
h	hour
harmonic distortion	A high-frequency disturbance that appears as distortion of the fundamental sine wave.
HV	high voltage
HOT OC	High Oven Temperature Cold On-Column Injector
Hz	hertz (cycles per second)

I

ID	inner diameter
IEC	International Electrotechnical Commission
impulse	See *transient*
in.	inch
I/O	input/output

K

k	kilo (10^3 or 1024)
K	Kelvin
kg	kilogram
kPa	kilopascal

L

l	length
l	liter
LAN	Local Area Network
lb	pound
LED	light-emitting diode
LVOCI	Large Volume On-Column Injector
LVPTV	Large Volume Programmable Temperature Vaporizing
LVSL	Large Volume Splitless

M

m	meter (or milli [10^{-3}])
M	mega (10^6)

µ	micro (10^{-6})
MBq	Megabecquerel
mCi	Millicurie
Meniscus	The curved upper surface of a column of liquid
min	minute
mL	milliliter
mm	millimeter
m/z	mass-to-charge ratio

N

n	nano (10^{-9})
NPD	Nitrogen Phosphorous Detector

O

OCI	On-Column Injector
OD	outside diameter
Ω	ohm

P

p	pico (10^{-12})
Pa	pascal
PCB	printed circuit board
PDD	Pulsed Discharge Detector
PID	Photo Ionization Detector
PKD	Packed Column Injector
PN	part number

PPKD	Purged Packed Column Injector
psi	pounds per square inch
PTV	Programmable Temperature Vaporizing Injector

R

RAM	random access memory
<Return>	<Return> key on the keyboard
RF	radio frequency
ROM	read-only memory
RS-232	industry standard for serial communications

S

s	second
S/SL	Split/Splitless Injector
sag	See *surge*
slow average	A gradual, long-term change in average RMS voltage level, with typical durations greater than 2 s.
SOP	Standard Operating Procedures
source current	The current needed to ignite a source, such as a detector lamp.
SPME	Solid Phase Micro Extraction
surge	A sudden change in average RMS voltage level, with typical duration between 50 µs and 2 s.

T

TCD	Thermal Conductivity Detector

transient	A brief voltage surge of up to several thousand volts, with a duration of less than 50 µs.

U

UFM	Ultra Fast Module

V

V	volt
V ac	volts, alternating current
V dc	volts, direct current
VGA	Video Graphics Array

W

w	Width
W	Watt

NOTE The symbol for a compound unit that is a quotient (for example, degrees Celsius per minute or grams per liter) is written with a negative exponent with the denominator. For example:
°C min^{-1} instead of °C/min
g L^{-1} instead of g/L

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Operating Sequences

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