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Thermo Scientific

TRACE 1600/1610

Spare Parts Guide

Gas Chromatographs

MI-317000-0035 Revision B August 2022

ThermoFisher SCIENTIFIC

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General Lab Equipment. Not for Clinical, Patient, or Diagnostic Use.

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Declaration

Manufacturer: **Thermo Fisher Scientific**

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

- installation
- re-calibration
- changes and repairs

have been carried out by authorized personnel and if:

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

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

Thermo Fisher Scientific S.p.A.
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Regulatory Compliance

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

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

- Low Voltage Directive:2014/35/EU
- EMC Directive:2014/30/EU
- RoHS Directive 2011/65/EU, including amending Delegate Directive 2015/863/EU

… and conforms with the following product standards:

Safety

This device complies with:

- IEC 61010-1:2010/AMD1:2016, IEC 61010-2-010:2019
- CAN/CSA C22.2 No. 61010-1
- EN 61010-1:2020, EN 61010-2-010:2015
- UL 61010-1

Electromagnetic Compatibility

This device complies with:

- CISPR 11/EN 55011: Group 1 Class A
- IEC 61326-1:2012
- EN 61326-1:2012
- FCC part 15, Subpart B, §15.107(a) and §15.109(a)

IMPORTANT: Class A equipment is intended for use in an industrial environment. In others environments there may be potential difficulties in ensuring electromagnetic compatibility, due to the conducted as well as radiated disturbances.

FCC Compliance Statement

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

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

Notice on Lifting and Handling of Thermo Scientific Instruments

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

Notice on the Proper Use of Thermo Scientific Instruments

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

Notice on the Susceptibility to Electromagnetic Transmissions

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

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Declaration of Conformity

-Original-

EU Declaration of Conformity

CE

ThermoFisher SCIENTIFIC

Thermo Fisher Scientific S.p.A.
Strada Rivoltana
20053 Rodano Milan
Italy

We hereby declare that the following products

Designation:	**Gas chromatograph**
Model:	**Thermo Scientific Trace 1600 Series** *Trace 1600, Trace 1610*

fulfill all the relevant requirements of the following directives:

Low Voltage Directive	**2014/35/EU**
Electromagnetic Compatibility Directive	**2014/30/EU**
RoHS Directive	**2011/65/EU and (EU) 2015/863**

The following relevant harmonized standards were used:

EN 61010-1:2020-03	**EN 61326-1:2013-07**

Person authorized to compile the technical file:

Giacinto Zilioli
(Director, Strategic Projects)
Thermo Fisher Scientific S.p.A.

Giacinto Zilioli

Signature

Milan, March 9, 2022
Date

-Original-

UK Declaration of Conformity

UK CA

ThermoFisher SCIENTIFIC

Thermo Fisher Scientific S.p.A.
Strada Rivoltana
20053 Rodano Milan
Italy

Declares, under sole responsibility, that products

Designation:	**Gas chromatograph**
Model:	**Thermo Scientific Trace 1600 Series** *Trace 1600, Trace 1610*

as originally delivered complies with the essential requirements of the following applicable UK Regulations:

Electrical Equipment (Safety) Regulations	**2016**
Electromagnetic Compatibility Regulations	**2016**
The Restriction of the Use of Certain Hazardous Substances in Electrical and Electronic Equipment (ROHS) Regulations	**2012**

and complies with the following harmonized standards and other technical specifications:

BS EN 61010-1:2010+A1:2019	**BS EN 61326-1:2021**

Signed for and on behalf of: Thermo Fisher Scientific S.p.A.:

Giacinto Zilioli
(Director, Strategic Projects)
Thermo Fisher Scientific S.p.A.

Giacinto Zilioli

Signature

Milan, March 4, 2022
Date

China EEP Hazardous Substances Information

产品中有害物质的名称及含量
China EEP Hazardous Substances Information

部件名称 Component Name	有害物质 Hazardous Substances (TRACE 13x0)					
	铅 (Pb)	汞 (Hg)	镉 (Cd)	六价铬 (Cr(VI))	多溴联苯 (PBB)	多溴二苯醚 (PBDE)
(主机:背部接线电路板) Base Unit: PCBA BACKPLANE	X	O	O	O	O	O
(主机：炉箱电路板) Base Unit: PCBA OVEN CPU	X	O	O	O	O	O
(主机: 主控电路板) Base Unit: PCBA CPU	X	O	O	O	O	O
(主机：存储器电路板) Base Unit: PCBA MEMORY	X	O	O	O	O	O
(主机：接口电路板) Base Unit: PCBA EXTERNAL INTERFACE	X	O	O	O	O	O
(主机：电源供应电路板) Base Unit: PCBA POWER SUPPLY	X	O	O	O	O	O
(主机：显示屏控制电路板) Base Unit: PCBA RSR798	X	O	O	O	O	O
(主机：液晶显示屏) Base Unit: DISPLAY LCD	X	O	O	O	O	O
(分流/不分流进样器电路板) PCBA's MODULE SSL	X	O	O	O	O	O
(程序升温进样器电路板) PCBA's MODULE PTV	X	O	O	O	O	O
(火焰离子化检测器电路板) PCBA's MODULE FID	X	O	O	O	O	O
(电导检测器电路板) PCBA's MODULE ECD	X	O	O	O	O	O
(氮磷检测器电路板) PCBA's MODULE NPD	X	O	O	O	O	O
(热导检测器电路板) PCBA's MODULE TCD	X	O	O	O	O	O
(火焰光度检测器电路板) PCBA's MODULE FPD	X	O	O	O	O	O
(辅助温度模块电路板)PCBA's MODULE AUXILIARY TEMPERATURE	X	O	O	O	O	O
(辅助气体模块电路板) PCBA MODULE AUXILIARY GASES	X	O	O	O	O	O
(模拟输出接口电路板) PCBA MODULE AOI	X	O	O	O	O	O
(脉冲放电检测器电路板) PCBA's MODULE PDD	X	O	O	O	O	O
(通用检测器接口电路板) PCBA MODULE GDI	X	O	O	O	O	O
(辅助炉箱电路板) PCBA's AUXILIARY OVEN	X	O	O	O	O	O
(机加工件) MACHINED PARTS	O	O	O	O	O	O
(模具) MOLDED PARTS	O	O	O	O	O	O
(钣金件) SHEETMETAL PARTS	O	O	O	O	O	O
(电机组件) ELECTROMECHANICAL ASSEMBLIES	O	O	O	O	O	O
(电缆组件) CABLE ASSEMBLIES	O	O	O	O	O	O
(标签) LABELS	O	O	O	O	O	O

本表格依据SJ/T11364的规定编制 This table is compiled according to SJ/T 11364 standard.

O: 表示该有害物质在该部件所有均质材料中的含量均在GB/T26572规定的限量要求以下.
Indicates that the concentration of the hazardous substance in all homogeneous materials for the part is below the relevant threshold of the GB/T 26572 standard.

X: 表示该有害物质至少在该部件的某一均质材料中的含量超出GB/T26572规定的限量要.
Indicates that the concentration of the hazardous substance in at least one homogenous material of the part is above the relevant threshold of the GB/T 26572 standard.

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WEEE Directive
2012/19/EU

This product is required to comply with the European Union's Waste Electrical & Electronic Equipment (WEEE) Directive 2012/19/EU. It is marked with the following symbol:

This symbol indicates that the equipment must not be thrown into general waste and should be collected separately and processed in accordance with local and state requirements.

Thermo Fisher Scientific is registered with one or more recycling/disposal companies in the UK and all other countries of the European Union and in Norway. If this product is located in Europe and you want to participate in the Thermo Fisher Scientific Business-to-Business (B2B) Recycling Program, send an email request to weee.recycle@thermofisher.com with the following information:

- WEEE product class
- Name of the manufacturer or distributor (where you purchased the product)
- Number of product pieces, and the estimated total weight and volume
- Pick-up address and contact person (include contact information)
- Appropriate pick-up time
- Declaration of decontamination, stating that all hazardous fluids or material have been removed from the product

For additional information about the Restriction on Hazardous Substances (RoHS) Directive for the European Union, search for RoHS on the Thermo Fisher Scientific European language websites.

IMPORTANT This recycling program is **not** for biological hazard products or for products that have been medically contaminated. You must treat these types of products as biohazard waste and dispose of them in accordance with your local regulations.

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Directive DEEE

2012/19/EU

Thermo Fisher Scientific s'est associé avec une ou plusieurs sociétés de recyclage dans chaque état membre de l'Union Européenne et ce produit devrait être collecté ou recyclé par celle(s)-ci. Pour davantage d'informations, rendez-vous sur la page www.thermoscientific.fr/rohs.

WEEE Direktive

2012/19/EU

Thermo Fisher Scientific hat Vereinbarungen mit Verwertungs-/Entsorgungsfirmen in allen EU-Mitgliedsstaaten getroffen, damit dieses Produkt durch diese Firmen wiederverwertet oder entsorgt werden kann. Weitere Informationen finden Sie unter www.thermoscientific.de/rohs.

Contents

Preface

This guide contains detailed information about ordering spare parts for the Thermo Scientific™ TRACE™ 1600 and TRACE™ 1610 GC.

About Your System

Thermo Scientific systems provide high-caliber gas chromatography (GC) instrumentation. Your TRACE 1600/1610 GC system can be a stand-alone unit or coupled with other instruments.

GC represents a powerful analytical separation technique. Complex mixtures of individual compounds can be injected into the GC, either manually or by using an autosampler, and then separated the eluate for presentation to the detector. The detector generates signals of the GC eluate and its components. These signals are then processed by a Thermo Scientific Chromatography Data System for qualitative identification, as well as accurate and precise quantification of the individual compounds present in the sample.

IMPORTANT Thermo Scientific systems optimize the separation and detection capabilities of GC by providing high performance analytical capabilities for both research, and routine applications. More information about the use of this system can be found in related documentation sources, and by using the provided contact information.

WARNING Thermo Scientific systems operate safely and reliably under carefully controlled environmental conditions. If the equipment is used in a manner not specified by the manufacturer, the protections provided by the equipment might be impaired. If you maintain a system outside the specifications listed in this guide, failures of many types, including personal injury or death, might occur. The repair of instrument failures caused by operation in a manner not specified by the manufacturer is specifically excluded from the standard warranty and service contract coverage.

WARNING Operation of this system requires the use of chemical substances with different hazard specifications. Before using any chemicals, read the hazard indications and information reported in the Safety Sheet supplied by the manufacturer, referring to the relevant CAS (Chemical Abstract Service) number.

Power Rating

TRACE 1600/1610 gas chromatograph
- 120 Vac ±10%,50/60 Hz, 2000 VA
- 230 Vac ±10%, 50/60 Hz, 2000 VA

Detailed instrument specifications are in the Product Specifications or Product Brochure.

Contacting Us

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

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

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

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

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

Related Documentation

In addition to this guide, Thermo Scientific provides the following documents for the TRACE 1600/1610 gas chromatographs.

TRACE 1600 /1610 Document Set, P/N MI-317AH0-0038

- *TRACE 1600/1610 Preinstallation Requirements Guide,* P/N MI-317000-0032
- *TRACE 1600/1610 Hardware Manual*, P/N MI-317000-0033
- *TRACE 1600 /1610 User Guide,* P/N MI-317000-0034
- *TRACE 1600/1610 Spare Parts Guide*, P/N MI-317000-0035

Safety Alerts and Important Information

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

Special Notices

Notices includes the following:

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

Note Emphasizes important information about a task.

Tip Helpful information that can make a task easier.

Safety Symbols and Signal Words

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

Symbol	Descriptor
	**BIOHAZARD:** Indicates that a biohazard *will*, *could*, or *might* occur.
	**BURN HAZARD:** Alerts you to the presence of a hot surface that *could* or *might* cause burn injuries.
	**ELECTRICAL SHOCK HAZARD:** Indicates that an electrical shock *could* or *might* occur.
	**FIRE HAZARD:** Indicates a risk of fire or flammability *could* or *might* occur.
	**EXPLOSION HAZARD.** Indicates an explosion hazard. This symbol indicates this risk *could* or *might* cause physical injury.
	**FLAMMABLE GAS HAZARD.** Alerts you to gases that are compressed, liquefied or dissolved under pressure and can ignite on contact with an ignition source. This symbol indicates this risk *could* or *might* cause physical injury.
	**GLOVES REQUIRED:** Indicates that you must wear gloves when performing a task or physical injury *could* or *might* occur.
	**CLOTHING REQUIRED.** Indicates that you should wear a work clothing when performing a task or else physical injury *could* or *might* occur.
	**BOOTS REQUIRED.** Indicates that you must wear boots when performing a task or else physical injury *could* or *might* occur.

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

Instrument Markings and Symbols

Table 1 explains the symbols used on Thermo Scientific instruments. Only a few of them are used on the TRACE 1600/1610, which are annotated with an asterisk below.

Table 1. Instrument Marking and Symbols

	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)
		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 2012/19/EU on Waste Electrical and Electronic Equipment (WEEE) placed on the European market after August, 13, 2005.

Hydrogen Safety Precautions

Hydrogen is a colorless, odorless, highly flammable gas with the molecular formula H_2 and an atomic weight of 1.00794, making it the lightest element. Hydrogen gas presents a hazard, as it is combustible over a wide range of concentrations; at ambient temperature and pressure, the range is from about 4 to 74.2% by volume.

Hydrogen has a flash point of - 423 °F (- 253 °C) and an auto-ignition temperature of 1040 °F (560 °C). It has a very low ignition energy and the highest burning velocity of any gas. If hydrogen is allowed to expand rapidly from high pressure, it can self-ignite. Hydrogen burns with a flame that can be invisible in bright light.

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

Before you begin using hydrogen, conduct a risk assessment based on the quantity of hydrogen to be used and the conditions of your laboratory. Ask yourself:

"What hydrogen hazards associated with this project are most likely to occur?"

"What hydrogen hazards associated with this project have the potential to result in the worst consequences?"

- Try to reduce or eliminate the higher risks by using the proper ventilation to remove hydrogen gas before an ignitable concentration can accumulate. Also consider purging the hydrogen to further reduce hazards and ensure that anyone working with hydrogen has basic hydrogen safety training.
- As with laboratory safety in general, be sure to wear safety glasses, laboratory coats, gloves, and so on. Typically there are no specific requirements for gaseous hydrogen, other than eye protection when working with a compressed gas. If working with liquid (cryogenic) hydrogen, wear insulated gloves and protective shoes in addition to eye protection.
- Post "No Smoking" and "No Open Flames" signs to identify hydrogen sources and cylinders. Maintain, inspect, and leak-test all hydrogen sources regularly.
- Clearly mark all hydrogen shutoff valves and label permanent hydrogen piping as such at the supply or discharge point and at regular intervals along its length. Where hydrogen gas piping passes through a wall, be sure to label both sides of the wall.
- Have contingency plans in place should an incident occur.
- Ensure that site emergency response team, as well as the local fire department, knows the location of all hydrogen storage tanks.

Using Hydrogen with TRACE 1600/1610

The use of hydrogen as a carrier gas, or as fuel gas for certain flame detectors, requires strict attention and compliance with special precautions due to the hazards involved.

WARNING - EXPLOSION HAZARD Hydrogen is a dangerous gas that, when mixed with air, might create an explosive mixture. Because of the risk of explosion, operators must take special precautions. Using hydrogen as a carrier gas requires the operator's extreme caution unless an SSL equipped with a Helium Saver-H_2 Safer™ device or a hydrogen sensor is installed in the GC oven.

When using hydrogen as a carrier gas, you must equip your gas chromatograph with a hydrogen sensor or Helium Saver-H_2 Safer device.

Never use hydrogen as a carrier gas in your TRACE 1600/1610 system unless your oven has a hydrogen sensor installed or you equip the system with the Helium Saver-H_2 Safer device. Thermo Fisher Scientific FSEs are not authorized to install or repair any instrument using hydrogen as a carrier gas unless equipped with the appropriate sensor or the Helium Saver-H_2 Safer device.

Contact your Thermo Fisher Scientific sales representative if you do not have a Helium Saver-H_2 Safer or a hydrogen sensor installed in your oven. To comply with instrument safety requirements, a Thermo Fisher Scientific FSE or authorized service personnel should install the sensor into your TRACE 1600/1610.

Hydrogen is a dangerous gas, particularly in an enclosed area when it reaches a concentration corresponding to its lower explosion level (4% in volume). An explosion hazard could develop in the oven when hydrogen is used as a carrier gas in the case oven elements are not perfectly connected to each other, or when the connection materials are worn out, broken, or otherwise faulty.

Use the following safety precautions when using hydrogen:

- Ensure that all hydrogen cylinders comply with the safety requirements for proper use and storage. Hydrogen cylinders and delivery systems must comply with local regulations.
- Make sure the gas supply is turned completely off when connecting hydrogen lines.
- Perform a leak test to ensure that the hydrogen lines are leak-tight before using the instrument. Repeat this test to eliminate all leaks.
- Ensure your TRACE 1600/1610 has a Thermo Fisher Scientific hydrogen sensor or Helium Saver-H_2 Safer device installed. A hydrogen sensor continuously monitors the hydrogen level in the oven.

Hydrogen Connection Guidelines

Use the following guidelines to safely connect hydrogen to your system:

- **Piping**—Hydrogen must be delivered to equipment using appropriate piping and be done in such a way as to pose essentially no hazard to end-users. Piping systems for the delivery of hydrogen should be designed and installed by a person qualified by specific training and experience with hydrogen piping systems.

  Stainless steel is usually recommended because it is a safe, cost-effective material. Piping of *black iron* or copper must not be used, as the pipe can become brittle with age. Elastomeric/plastic tubing of various plastics and polymers should not be used, unless the tubing is approved for use with hydrogen. If elastomeric/plastic tubing is used for hydrogen gas delivery, the tubing should be tested for hydrogen permeability to minimize leakage.

  The hydrogen piping system must be flexible enough to endure routine thermal expansion and contraction. The system should also include considerations for the most severe condition of temperature and pressure expected during service. Piping and supports must be able to withstand static loading introduced by such things as ice and snow; and dynamic loading from high wind and earthquake.

  Caution should be used if burying hydrogen piping. Proper controls should be used to protect against damage and corrosion, and also to prevent Hydrogen from entering a building if there is any leakage.

- **Fittings**—All fittings must be of the proper type approved or designed for use with hydrogen gas. Use as few fittings as possible to minimize the potential for leaks. After installation, ensure that leak testing is carried out prior to system use, and on a regular basis.

  There must be no PTFE tape or other things like *plumber's putty* used to enhance a seal, as this actually is a detriment to a good seal. Ideally the best installation would use stainless steel tubing with appropriate gas-tight fittings.

  Welding is usually preferred for joints in hydrogen piping systems since welding provides a better connection and reduces the potential for leaks compared to mechanical fittings. Soft solder joints are not permitted for hydrogen systems (due to the low melting point of soft solder and its potential for brittle failure at cryogenic temperatures). Brazed joints are permitted, but such joints should be protected against the possibility of external fire.

  Tubing connections should be clamped to barbed or press-fit type connections. Hose clamps or *jubilee clamps* must not be used.

- **Valves**—All valves must be suitable for hydrogen service and for the specific operating conditions. Valves, including regulators, must not be used for hydrogen, unless they are designed and identified for such a use. Ball valves are often chosen because of their superior leak tightness through the valve seat. Pneumatic operators are usually chosen for remotely operated valves so that potential ignition sources (electricity) are remote from the valve.

  Manual shutoff valves should be provided near each point of use, within immediate reach. If a hydrogen cylinder or hydrogen generation system is located within immediate reach, a separate point-of-use shutoff valve is usually not necessary.

Line regulators that have their source away from the point of use should have a manual shutoff valve near the point of use.

An emergency gas shutoff device in an accessible location outside the use area should be provided in addition to the manual point-of-use valve in each educational and instructional laboratory space that has a piped gas supply system.

If necessary, the piping system should have uninterruptible pressure relief. The pressure relief system should be designed to provide a discharge rate sufficient to avoid further pressure increase and should vent to a safe location outside or to a ventilation system exhaust.

Purchasing Hydrogen

Use the following guidelines when purchasing hydrogen:

- **Hydrogen Generator**—Because it minimizes the amount of hydrogen present and reduces the degree of hazard, a hydrogen generator (also called an electrolyzer) is the safest way to purchase hydrogen in the quantity used in gas chromatography/mass spectroscopy systems.

  However, to minimize the degree of hazard, operate the hydrogen generator only in a non-explosive environment because hydrogen buildup can be ignitable. Thus, your ventilation system for the room or lab hood where the hydrogen generator operates must maintain an air exchange rate at least two orders of magnitude greater than the maximum hydrogen production rate of the hydrogen generator. Follow the manufacturers' directions about proper use and maintenance of the regulator.

  To prevent the possibility of releasing hydrogen, set the hydrogen generator to shut down if:

  – There is a loss of flow to the ventilation system

  – A hydrogen detector alarms at 25% of the lower flammable limit of hydrogen in air. The lower flammable limit of hydrogen in air is 4%.

  Vent the oxygen exhausted by the electrolyzer to the outside as well.

  IMPORTANT Use a hydrogen generator that uses a palladium dryer or a proton-exchange membrane to create hydrogen gas from deionized water. Use pressure swing adsorption and molecular sieve technology to remove moisture content down to trace levels.

- **Hydrogen Cylinder**—Hydrogen can be delivered in standard laboratory gas bottles or cylinders. These cylinders have a limited amount of hydrogen in them and are a safe way to transport and store hydrogen. Always secure, compressed hydrogen gas cylinders, like all compressed gas cylinders, in an upright position, ideally with a non-combustible chain or cable. If the cylinder falls over, the valve can fall off, causing the pressurized cylinder to take off like a rocket, leading to the release of hydrogen and possibly an explosion, severe injury, or death. Never crack a hydrogen cylinder valve to remove dust or dirt from fittings prior to attaching a regulator, as there is a risk of self-ignition.

Properly Storing Hydrogen

Storing and handling compressed hydrogen gas and cryogenic liquid hydrogen present potential health and safety hazards. Using proper storage and handling techniques is essential to maintaining a safe work environment.

Use the following guidelines when storing hydrogen:

- Store spare hydrogen gas cylinders outside and away from doors, windows, building air intake vents, structures, and vehicle routes. This precaution applies when the hydrogen is or is not in use. Indoor storage of spare hydrogen cylinders has special requirements, which are beyond the scope of this document. Documentation for each vessel should include a description of the vessel, a list of available drawings or other documents, the most recent inspection results, and the responsible person's name.
- Prevent spare cylinders from toppling by wrapping them with chains. The chains should also be protected against corrosion and excessive heat.
- Separate spare hydrogen cylinders from oxidizing gases (such as oxygen) with a 5 ft. (1.5 m) tall fire barrier with a half-hour fire rating or place the cylinders at least 20 ft. (6 m) apart.
- When moving hydrogen cylinders:
  - Remove the regulator and replace the cylinder valve cap before moving.
  - Move cylinders on cylinder carts or with other appropriate transport devices.
  - Never roll or drop a cylinder and never lift a cylinder by its protective cap.
- Bulk hydrogen systems include either gaseous or liquid hydrogen in fixed installations; in some gas systems a semi-permanent trailer (tube trailer) can be used. Storage vessels for compressed hydrogen gas or liquid hydrogen should be designed, constructed, tested, and maintained in accordance with applicable codes and standards. Bulk hydrogen systems represent a level of complexity again which is beyond the scope of this document; however some general guidelines are provided.
- The bulk hydrogen storage system should not be located beneath electric power lines, close to other flammable gases/liquids, or close to public areas. It should be readily accessible to authorized personnel and delivery equipment, but protected from physical damage or tampering.
- As liquid hydrogen systems also have a cryogenic hazard, additional safety considerations for the use of cryogenic liquids might be necessary.

Hydrogen Safety Codes, Standards and References

The following list of safety codes, standards, and references is in no way an exhaustive list. In fact, there may be federal, state, or local codes that apply to your specific location. Check with all appropriate agencies with jurisdiction before installing or using a hydrogen system.

- Air Products Safetygram #4 Gaseous Hydrogen
- ANSI/AIAA standard for hydrogen safety guidelines is AIAA G-095-2004, Guide to Safety of Hydrogen and Hydrogen Systems
- ASME B31.1, Power Piping Code
- ASME B31.3, Process Piping Code
- ASME B31.8, Gas Transmission and Distribution Systems
- BCGA Code Of Practice CP4 Industrial Gas Cylinder Manifolds and Gas Distribution Pipework
- BCGA Code Of Practice CP33 The Bulk Storage of Gaseous Hydrogen at Users' Premises
- CGA G-5, Hydrogen
- CGA G-5.4, Standard for Hydrogen Piping Systems at Consumer Locations
- CGA G-5.5, Hydrogen Vent Systems
- CGA G-5.6, Hydrogen Pipeline Systems
- CGA G-5.8, High Pressure Hydrogen Piping Systems at Consumer Locations.
- FM Global Property Loss Prevention Data Sheets 7-50: Compressed Gases in Cylinders
- FM Global Property Loss Prevention Data Sheets 7-91: Hydrogen
- IGC Doc 121/04/E, Hydrogen Transportation Pipelines System Design Features
- NASA
- NSS 1740.16 Safety Standard For Hydrogen And Hydrogen Systems Guidelines for Hydrogen System Design, Materials Selection, Operations, Storage, and Transportation
- NFPA 52, Vehicular Fuel Systems Code
- NFPA 55, Standard for the Storage, Use, and Handling of Compressed Gases and Cryogenic Fluids in Portable and Stationary Containers, Cylinders, and Tanks, 2005 Edition
- NFPA 68, Standard on Explosion Protection by Deflagration Venting
- NFPA 70, National Electrical Code
- NFPA 497, Recommended Practice for the Classification of Flammable Liquids, Gases, or Vapors and of Hazardous (Classified) Locations for Electrical Installations in Chemical Process Areas
- NFPA 13, Standard for the Installation of Sprinkler Systems
- NFPA 45, Standard on Fire Protection for Laboratories Using Chemicals

- NFPA 55, Standard for the Storage, Use, and Handling of Compressed Gases and Cryogenic Fluids in Portable and Stationary Containers, Cylinders, and Tanks
- NFPA 68, 2007 Standard on Explosion Protection by Deflagration Venting
- NFPA 69, Standard on Explosion Prevention Systems
- NFPA 91, Standard for Exhaust Systems for Air Conveying of Vapors
- NFPA 255, Standard Method of Test of Surface Burning Characteristics of Building Materials
- OSHA 29CFR1910.103 1910.103 Hydrogen

Hazardous Substances Precautions

WARNING Before using hazardous substances (toxic, harmful, and so on), read the hazard indications and information reported in the applicable Material Safety Data Sheet (MSDS.) Use Personal protection according to the safety requirements.

Venting Toxic Gases

When analyzing toxic compounds be aware that during the normal operation of the GC some of the sample might be vented outside the instrument through the inlet and detector exits; therefore, make sure to vent the exhaust gases to a fume hood. Consult local Environmental and Safety Regulations for instructions in exhausting fumes from your system.

Liquid Nitrogen Safety Precautions

Liquid nitrogen is a colorless, odorless, extremely cold liquid and gas under pressure. It can cause rapid suffocation when concentrations are sufficient to reduce oxygen levels below 19.5%. A Self Contained Breathing Apparatus (SCBA) might be required. Contact with liquid or cold vapors can cause severe frostbite. Cold vapors in the air will appear as a white fog due to condensation of moisture. Oxygen concentrations must be monitored in the release area. All cryogenic liquids produce large volumes of gas when they vaporize.

WARNING Before using Liquid Nitrogen, read the hazard indications and the instructions reported in the Safety sheet supplied by the manufacturer, with reference to the CAS number (Chemical Abstract Service) 7727-37-9.

Use personal protection:

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

Carbon Dioxide Safety Precautions

Carbon dioxide is a colorless, cryogenic liquid. At low concentrations, is odorless. At higher concentrations carbon dioxide will have a sharp, acidic odor. At concentrations between 2 and 10%, Carbon dioxide can cause nausea, dizziness, headache, mental confusion, increased blood pressure, and increased respiratory rate. If the gas concentration reaches 10% or more, suffocation and death can occur within minutes. Contact with the cold gas can cause freezing of exposed tissue. Moisture in the air could lead to the formation of carbonic acid that can be irritating to the eyes. All forms of carbon dioxide are noncombustible. Carbon dioxide is heavier than air and should not be allowed to accumulate in low lying areas.

WARNING Before using carbon dioxide, read the indications of hazard and the instructions reported in the Safety sheet supplied by the manufacturer with reference to the CAS number (Chemical Abstract Service) 124-38-9.

Use personal protection:

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

1

Ordering Spare Parts

This chapter contains illustrations and part numbers for all of the replaceable components in the TRACE 1600/1610. Refer to the *TRACE 1600/1610 Hardware Manual* for information about installing these components in your instrument.

Throughout the TRACE 1600/1610 documentation set, any component with a part number can be ordered from us. Components without a part number are not available.

Contents

Abbreviations

Table 1 lists the abbreviations used in this guide.

Table 1. List of Abbreviations

Abbreviation	Description
AOI	Analog Output Interface
ECD	Electron Capture Detector
FID	Flame Ionization Detector
FPD	Flame Photometric Detector
GC	Gas Chromatograph
GC-MS	Gas Chromatograph and Mass Spectrometer
GDI	Generic Detector Interface
GSV	Gas Sampling Valve
HeS-H_2S S/SL	Instant Connect Helium Saver-H_2 Safer Kit
NPD	Nitrogen Phosphorus Detector
PDD	Pulsed Discharge Detector
SSL	Split/Splitless Injector
SSLBKF	Split/Splitless Injector for Backflush applications
Pkg	Package
PTV	Programmable Temperature Vaporizing Injector
PTVBKF	Programmable Temperature Vaporizing Injector for Backflush applications
TCD	Thermal Conductivity Detector

Identifying a Part

To identify a part, you need to know where the part is located in the TRACE 1600/1610, or the part's relationship to a particular functionality of the TRACE 1600/1610 GC.

Use the categories in the table below to find the location or functionality that relates to the component you need. For example, if you know the part is related to the **SSL Injector** look in the **Injector Component** section. Refer to the illustrations in that category to identify a particular part.

IMPORTANT Components with a part number are available for purchase. The part you are looking for may be shown in an illustration, but if part number is not listed, it is not available.

Column Components

You can purchase the following column components for the TRACE 1600/1610 gas chromatograph. See Table 2.

Be sure to reference the component's part number when placing an order with your local Sales/Service Representative. See the *TRACE 1600/1610 Hardware Manual* for information about installing these components, or Table 2 for a comprehensive list of available components.

Note Images are not to scale.

Table 2. Column Components (Sheet 1 of 3)

Description	Quantity	Part Number
Graphite Ferrule for 0.1 mm - 0.32 mm Column for SSL, SSLBKF, GSV, FID, NPD, TCD, ECD, FPD 	Pkg of 10	290GA139
Graphite Ferrule for 0.45 mm - 0.53 mm Column for SSL, SSLBKF, GSV, FID, NPD, TCD, ECD, FPD 	Pkg of 10	290GA140
Graphite Vespel® Ferrule for 0.1 mm - 0.25 mm Column for SSL, SSLBKF, GSV, FID, NPD, TCD, ECD, FPD 	Pkg of 10	290VA191
Graphite Vespel® Ferrule for 0.32 mm Column for SSL, SSLBKF, GSV, FID, NPD, TCD, ECD, FPD 	Pkg of 10	290VA192
Graphite Vespel® Ferrule for 0.53 mm Column for SSL, SSLBKF, GSV, FID, NPD, TCD, ECD, FPD 	Pkg of 10	290VA193
Polyimide Valcon Reducing Ferrule for 0.36 ≤ 0.4 mm OD Tubing for PDD 	Pkg of 5	29003426
Polyimide Valcon Reducing Ferrule for 0.4 ≤ 0.5 mm OD Tubing for PDD 	Pkg of 5	29003427
Encapsulated Graphite Ferrule for 0.1 - 0.25 mm Column for PTV, PTVBKF, SSLBKF, and GSV (Tee connector) 	Pkg of 10	29053488
Encapsulated Graphite Ferrule for 0.32 mm Column for PTV, PTVBKF, SSLBKF, and GSV (Tee connector) 	Pkg of 10	29053487
Encapsulated Graphite Ferrule for 0.53 mm Column for PTV, PTVBKF, SSLBKF, and GSV (Tee connector) 	Pkg of 10	29053486
SilFlow™ FingerTite Ferrule for ≤ 0.25 mm ID Column for HeS-H_2S S/SL 	Pkg of 10	29063465

Table 2. Column Components (Sheet 2 of 3)

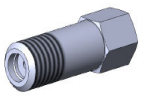
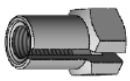
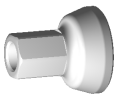
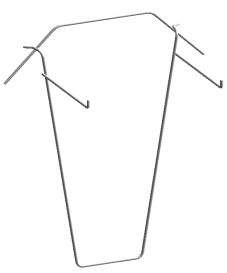
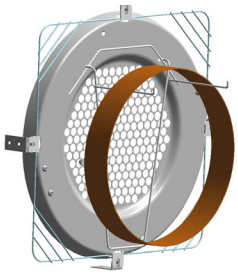
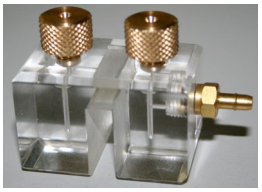
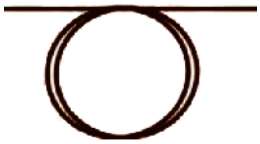
Description	Quantity	Part Number
SilFlow™ FingerTite Ferrule for 0.25 mm ID Column for HeS-H_2S S/SL and NoVent Microfluidics 	Pkg of 10	29063466
SilFlow™ FingerTite Ferrule for 0.32 mm ID Column for HeS-H_2S S/SL and NoVent Microfluidics 	Pkg of 10	29063467
SilFlow™ Blanking Ferrule for HeS-H_2S S/SL and NoVent Microfluidics 	Pkg of 5	290ST414
SilFlow™ Nut for HeS-H_2S S/SL and NoVent Microfluidics 	Pkg of 10	290SF302
SilFlow™ FingerTite Tool (0.4 mm) for HeS-H_2S S/SL and NoVent Microfluidics 	Each	60201-415
SilFlow™ FingerTite Tool (0.5 mm) for HeS-H_2S S/SL and NoVent Microfluidics 	Each	60201-416
SilFlow™ FingerTite Tool for 0.53 mm ID Column for HeS-H_2S S/SL and NoVent Microfluidics 	Each	60201-417
Reducing Graphite Vespel® Ferrule 1/8-1/16-in. HeS-H_2S S/SL 	Each	29003422
Nut 1/16-in. SS ZN1 for HeS-H_2S S/SL 	Pkg of 10	35023099
Ferrule 1/16-in. SSZF1 for HeS-H_2S S/SL 	Pkg of 10	29024283
Blind Ferrule for SSL, SSLBKF, FID, ECD, NPD, TCD, and FPD 	Each	29003421
Blind Ferrule for PTV, and PTVBKF 	Each	29003419
Retaining Nut, Hexagonal, 1/4-in. (M6) 	Pkg of 5	35050458
Column Nut, Helium Saver for HeS-H_2S S/SL 	Each	MI-311AA5-0002
Split Retaining Nut (M4) 	Pkg of 5	35053221

Table 2. Column Components (Sheet 3 of 3)

Description	Quantity	Part Number
Spring Loaded Nut (see kit P/N 19050251) 	Each	1R120434-0010
Column Support (Rack)  	Each	36814159
Column-Flow Meter Connector 	Each	24507000
Tubing pre-cleaned, Pre-cut 316 SS; 1/16-in., 1 m long; 0.25 mm ID for HeS-H_2S S/SL and SSL 	Each	39104801
Pre-column 0.32 mm ID (0.2 m long) to 0.53 mm ID (2 m long) 	Each	60201-387
Pre-column 0.53 mm ID, 2 m long 	Each	26050-0253
iConnect Column Lock 	Each	MI-190000-0028

Oven Components

You can purchase the following oven components for the TRACE 1600/1610 gas chromatograph. See Table 3.

Be sure to reference the component's part number when placing an order with your local Sales/Service Representative. See the *TRACE 1600/1610 Hardware Manual* for information about installing these components or Table 3 for a comprehensive list of available components.

Note Images are not to scale.

Table 3. Oven Components (Sheet 1 of 3)

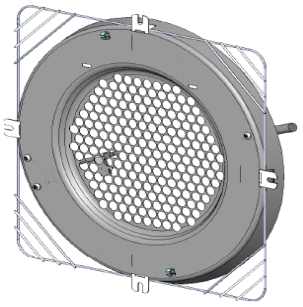
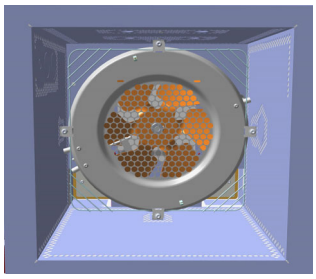
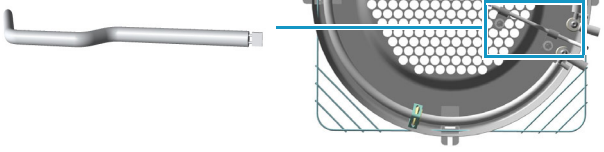
Description		Quantity	Part Number
Oven Light Assembly		Each	MI-897113150-SP
Oven Heater Baffle Assembly (120/230 V)	 	Each	26600800
Oven Heater Temperature Sensor		Each	40303530

Table 3. Oven Components (Sheet 2 of 3)

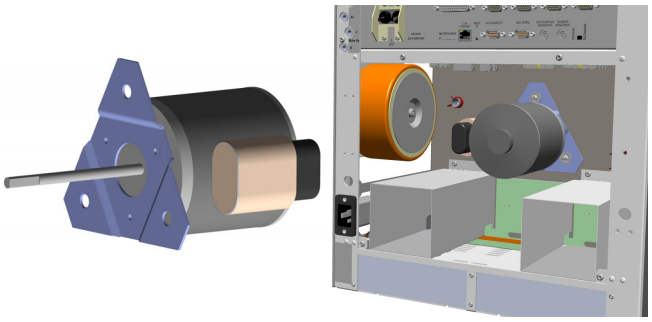
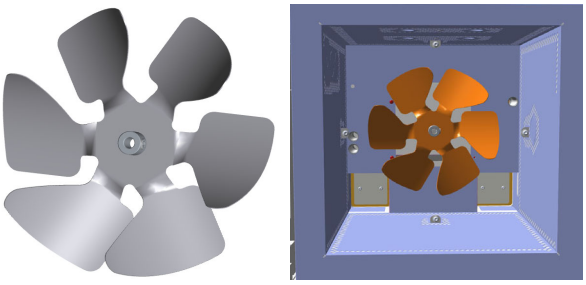
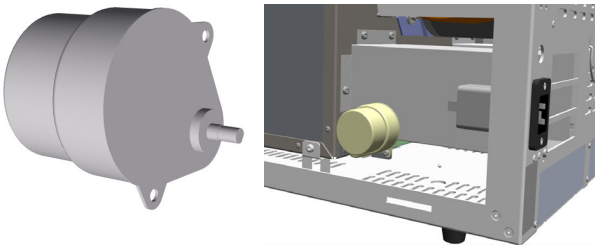
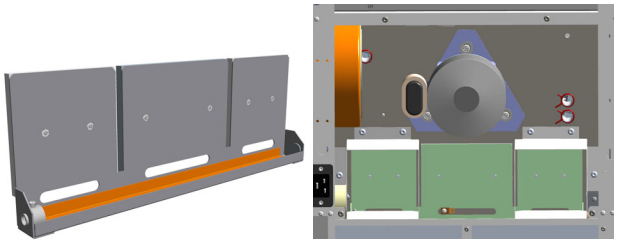
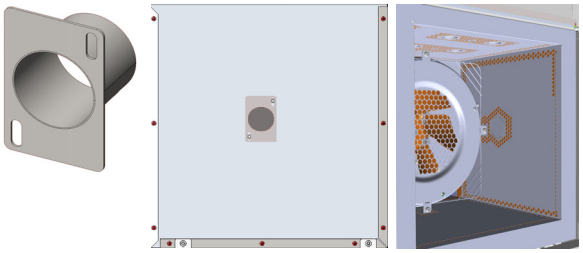
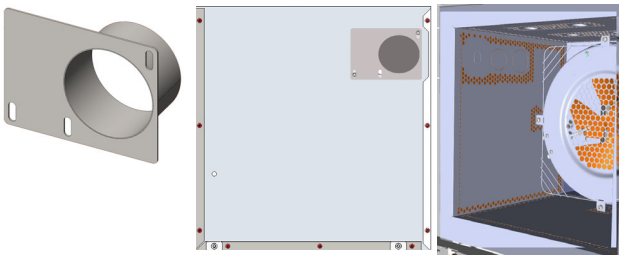
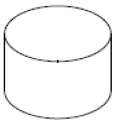
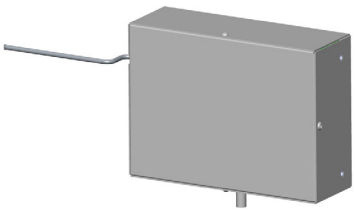
Description	Quantity	Part Number
Oven Motor 	Each	31807047
Oven Blower Fan 	Each	41003510
Flaps Stepper Motor 	Each	23043678
Oven Multiple 	Each	39305418
Duct for TSQ Quantum Mass Spectrometer 	Each	25907015

Table 3. Oven Components (Sheet 3 of 3)

Description	Quantity	Part Number
Duct for ISQ/TSQ Mass Spectrometer 	Each	25907025
Duct Insulator 	Each	30200115
Hydrogen Sensor 	Each	27605006

GC/GC-MS Components

You can purchase the following components for the TRACE 1600/1610 gas chromatograph stand-alone and MS versions (GC/GC-MS). See Table 4.

Be sure to reference the component's part number when placing an order with your local Sales/Service Representative. See the *TRACE 1600/1610 Hardware Manual* for information about installing these components or Table 4 for a comprehensive list of available components.

Note Images are not to scale.

Table 4. GC/GC-MS Components (Sheet 1 of 3)

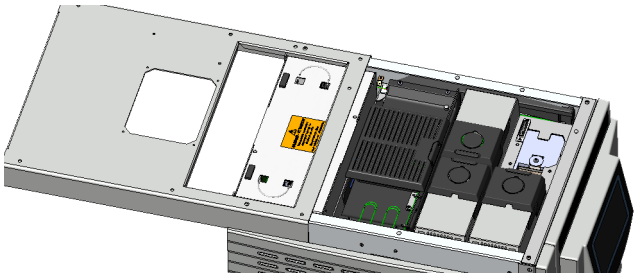
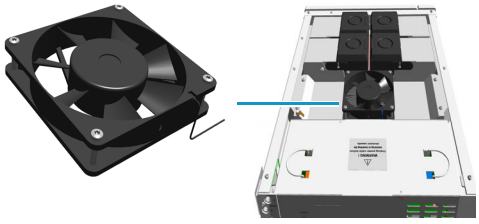
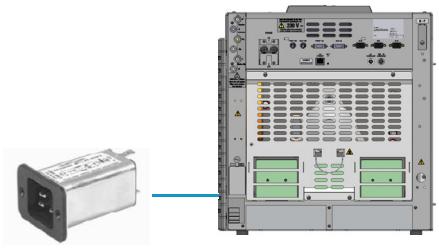
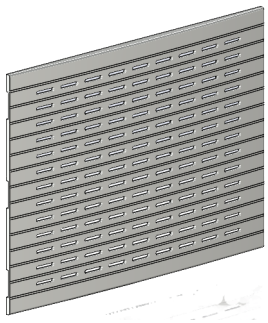
Description	Quantity	Part Number
Top Cover Assembly 	Each	MI-897111145-SP
Cooling Fan 	Each	23043702
High Current Line Filter 16 A; 250 V 	Each	23850005
Right Side Panel 	Each	MI-897111250-SP

Table 4. GC/GC-MS Components (Sheet 2 of 3)

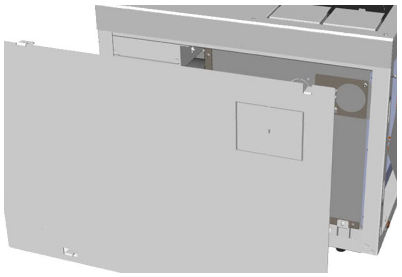
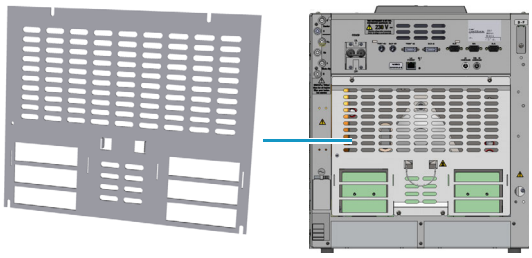
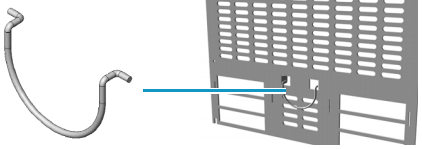
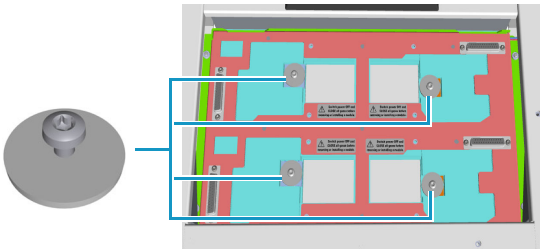
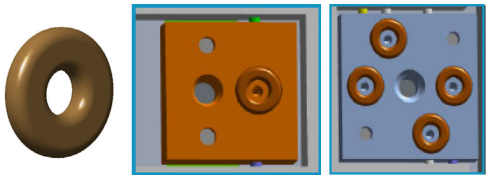
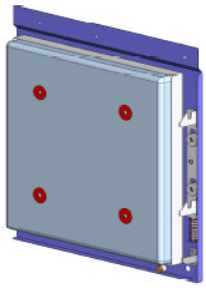
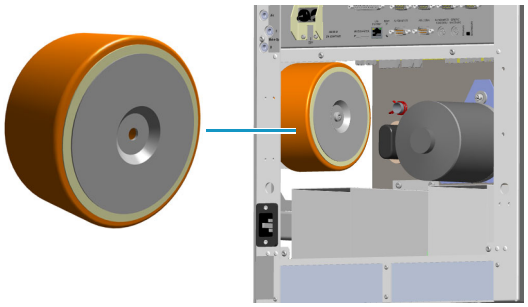
Description	Quantity	Part Number
Left Side Panel 	Each	MI-897111260-SP
Left Panel for ISQ/TSQ MS 	Each	33312000
Rear Cover 	Each	33311025
Cables Holder-Handle 	Each	28502213
Gas Block Plug Kit 	Each	19050773
Injector/Detector Mating Block O-ring 	Pkg of 10	29031303

Table 4. GC/GC-MS Components (Sheet 3 of 3)

Description		Quantity	Part Number
Door Assembly for TRACE 1600		Each	MI-897118220-SP
Door Assembly for TRACE 1610 (with HMI)		Each	MI-897118120-SP
Internal Door Assembly (with insulation)		Each	33315353
Toroidal Transformer 500 VA		Each	41325072
Syringe 10 µL, 50 mm Needle		Each	36500525
Test Column, 7 m, 0.32 mm ID, 0.25 µm F.T.		Each	260E113P

Gas Inlet Manifold Components

You can purchase the following manifold components for the TRACE 1600/1610 gas chromatograph. See Figure 1 and Table 5.

Be sure to reference the component's part number when placing an order with your local Sales/Service Representative. See the *TRACE 1600/1610 Hardware Manual* for information about installing these components or Table 5 for a comprehensive list of available components.

Note Images are not to scale.

Figure 1. Fittings for Gas Inlet Connection

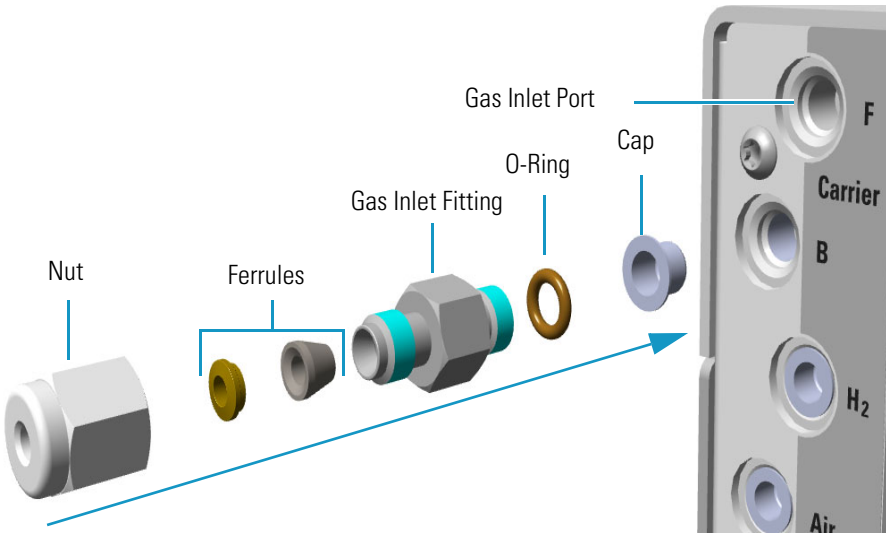
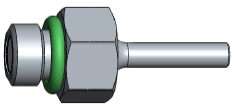
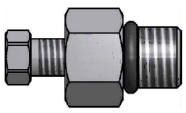


Table 5. Gas Inlet Manifold Components

Description	Quantity	Part Number
Gas Inlet Fittings Kit 	Each	19050751
Gas Inlet Fitting 1/8-in. (for Toggle Valve) 	Each	35008438
TRACE 1600 to 1/16-in. Adapter 	Each	35002123

Injector Module Components

You can purchase the following components for injector modules. Be sure to reference the component's part number when placing an order with your local Sales/Service Representative. See the *TRACE 1600/1610 Hardware Manual* for information about installing these components or Table 6 for a comprehensive list of available components.

The following injector module components can be replaced on the TRACE 1600/1610.

- SSL Injector Module Components
- SSLBKF Injector Module Components
- PTV Injector Module Components
- PTVBKF Injector Module Components
- GSV Module Components
- Helium Saver-H2 Safer Optional Kit (HeS-H2S S/SL) Components
- SSL Injector Port Liners
- PTV Injector Port Liners

Note Images are not to scale.

SSL Injector Module Components

The following SSL injector components can be replaced. See Figure 2 and Table 6.

Figure 2. Split Splitless Injector Components

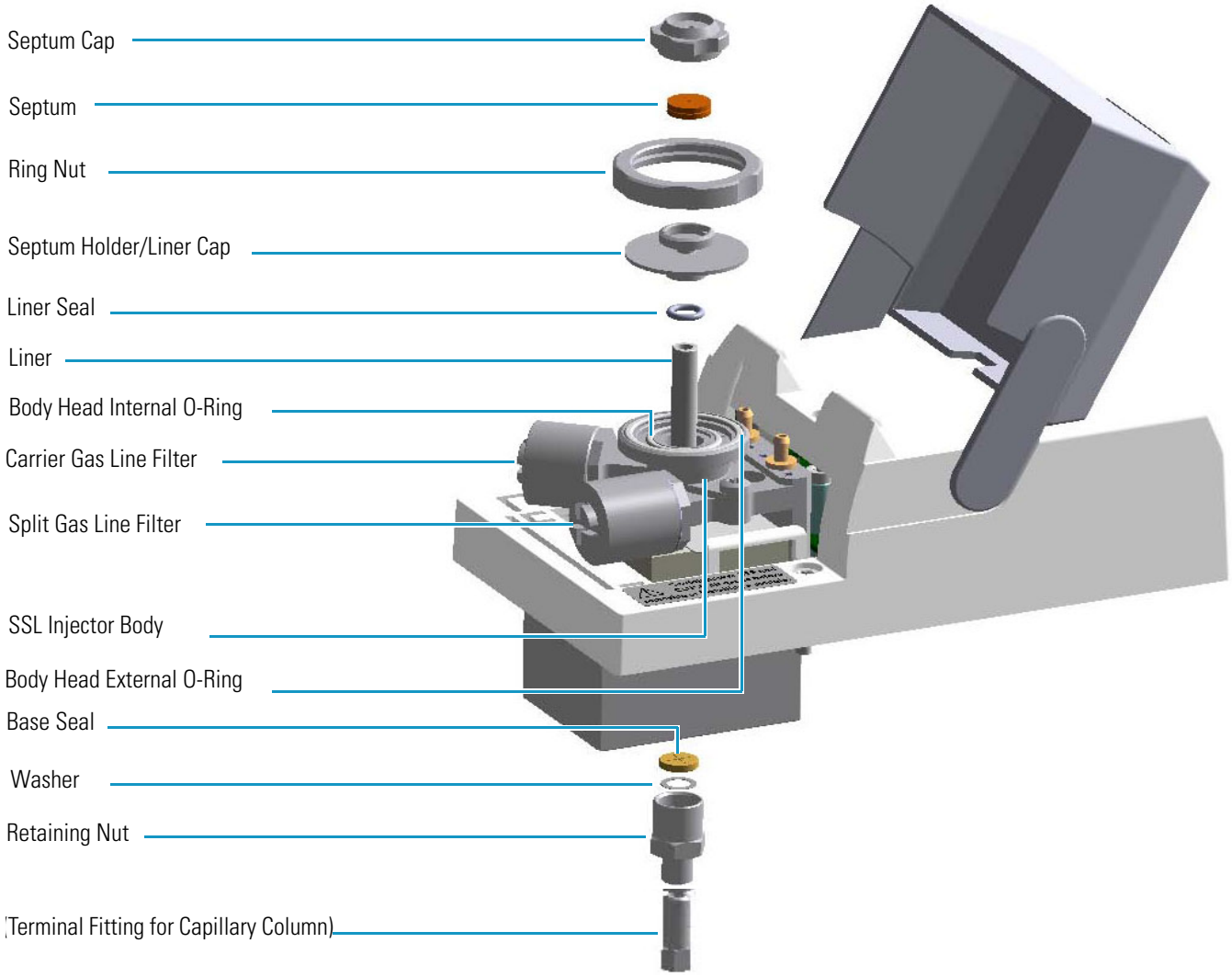


Table 6. SSL Injector Components (Sheet 1 of 2)

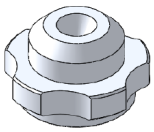
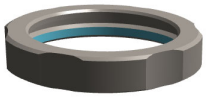
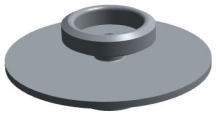
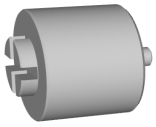
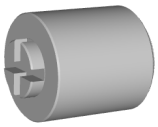
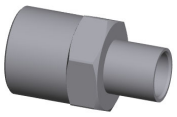
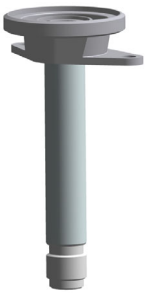
Description		Quantity	Part Number
Septum Cap		Each	35001820
Septum Cap for AI/AS 1610 Autosampler and for HS applications with the TriPlus Autosampler.		Each	35001819

Table 6. SSL Injector Components (Sheet 2 of 2)

Description	Quantity	Part Number
Septum with Center Guide 	Pkg of 50	31303233
Ring Nut 	Each	35001821
Liner Cap/Septum Holder 	Each	40203005
Liner Seal for SSL 	Pkg of 5	29001320
Liner  See SSL Injector Port Liners on page 27	Each	
Body Head Internal O-Ring 	Each	29001313
Body Head External O-Ring 	Each	29001316
Carrier Line Filter 	Each	28113196
Split Line Filter 	Each	28113197
Base Seal and Washer 	Pkg of 10	290GA081
Retaining Nut (for Column Adapter) 	Each	35001126
SSL Injector Body 	Each	24705240
O-ring Parafluor 2-006 for SSL manifold 	Pkg of 3	29011310

SSLBKF Injector Module Components

The following SSLBKF injector components can be replaced. See Figure 3 and Table 7.

Figure 3. Split Splitless Injector for Backflush Components

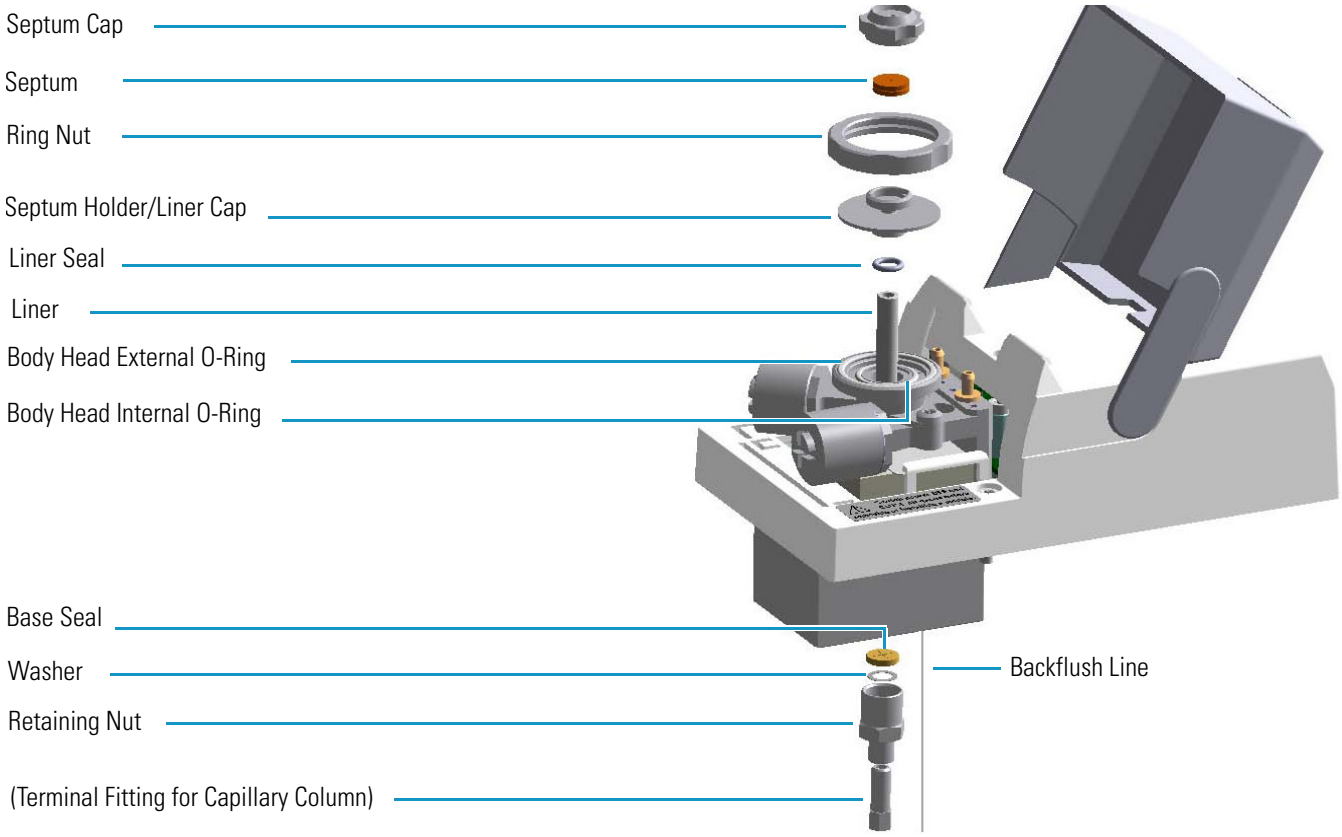


Table 7. SSLBKF Injector Components (Sheet 1 of 2)

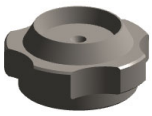
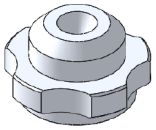
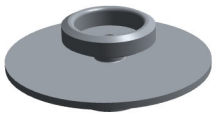
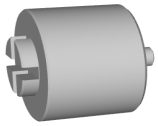
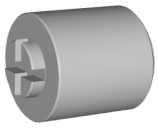
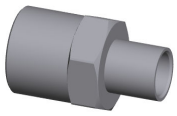
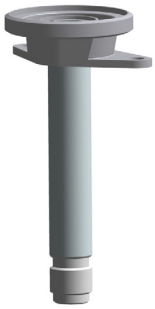
Description		Quantity	Part Number
Septum Cap		Each	35001820
Septum Cap for AI/AS 1610 Autosampler and for HS applications with the TriPlus Autosampler.		Each	35001819
Septum with Center Guide		Pkg of 50	31303233
Ring Nut		Each	35001821

Table 7. SSLBKF Injector Components (Sheet 2 of 2)

Description	Quantity	Part Number
Liner Cap/Septum Holder 	Each	40203005
Liner Seal for SSL 	Pkg of 5	29001320
Liner  See SSL Injector Port Liners on page 27	Each	
Body Head Internal O-Ring 	Each	29001313
Body Head External O-Ring 	Each	29001316
Carrier Line Filter 	Each	28113196
Split Line Filter 	Each	28113197
Base Seal and Washer 	Pkg of 10	290GA081
Retaining Nut (for Column Adapter) 	Each	35001126
O-ring Parafluor 2-006 for SSL Manifold 	Pkg of 3	29011310
SSL Injector Body 	Each	24705240

PTV Injector Module Components

The following PTV injector components can be replaced. See Figure 4 and Table 8.

Figure 4. Programmable Temperature Vaporizing Injector Components

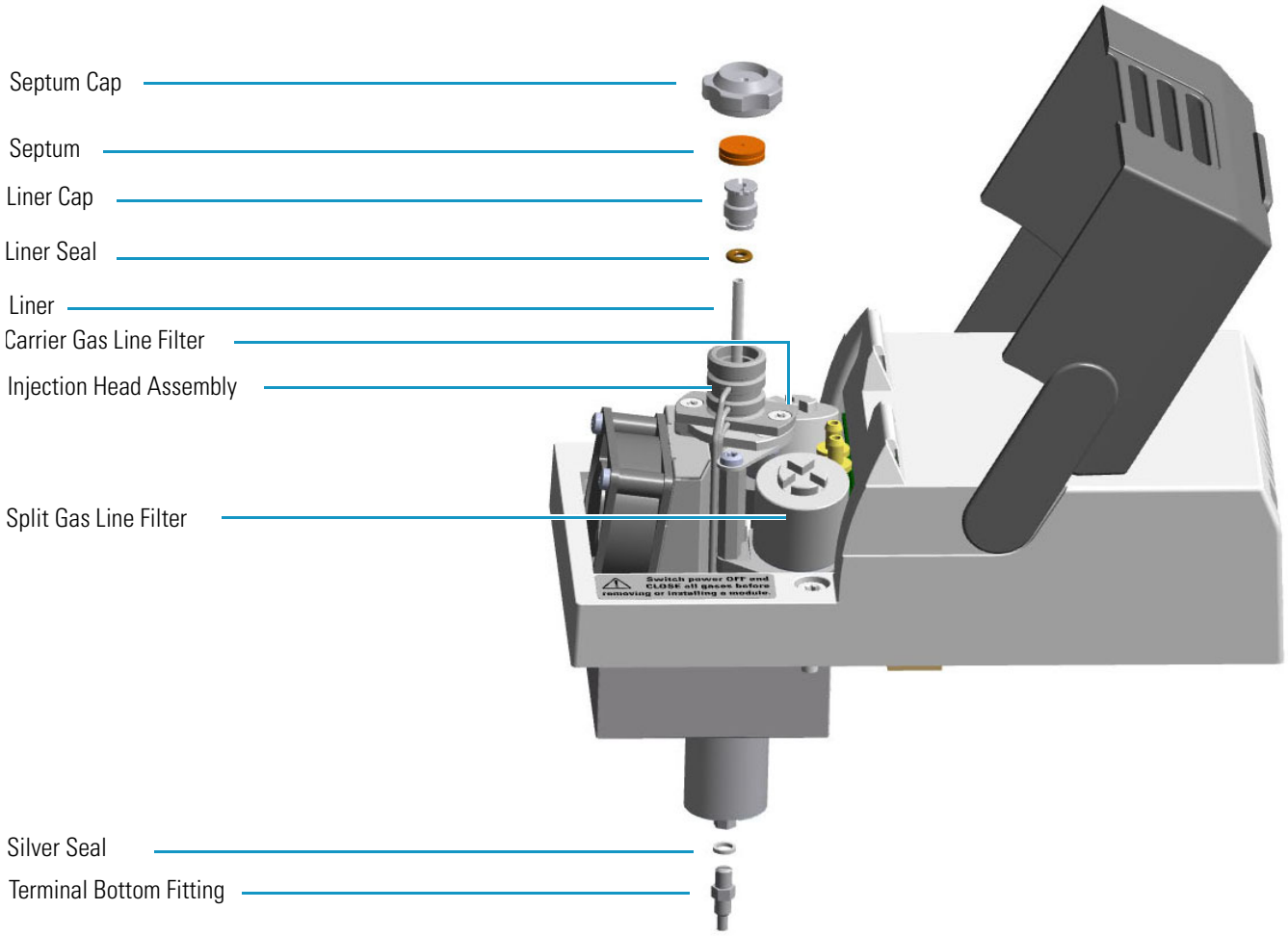


Table 8. PTV Injector Components (Sheet 1 of 2)

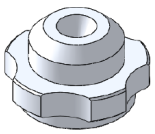
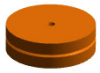
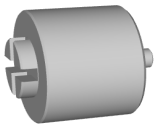
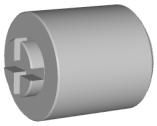
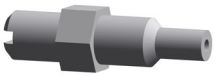
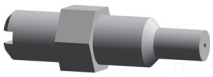
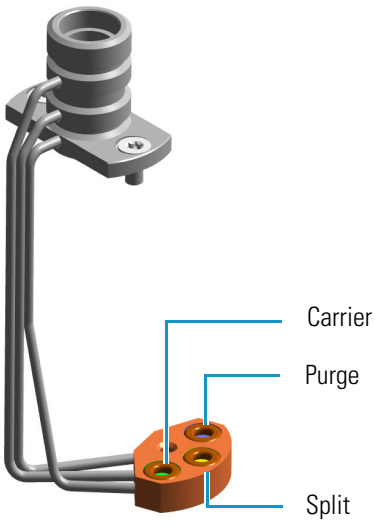
Description		Quantity	Part Number
Septum Cap		Each	35001820
Septum Cap for AI/AS 1610 Autosampler and for HS applications with the TriPlus Autosampler.		Each	35001819
Septum with Center Guide		Pkg of 50	31303233

Table 8. PTV Injector Components (Sheet 2 of 2)

Description	Quantity	Part Number
Liner Cap 	Each	29004014
Liner Seal for PTV 	Pkg of 5	29001325
Liner  See PTV Injector Port Liners on page 27	Each	
Carrier Line Filter 	Each	28113196
Split Line Filter 	Each	28113197
Silver Seal 	Pkg of 2	29013820
Terminal Bottom Fitting 1.0 mm ID for 0.53 mm ID Capillary Columns 	Each	35008429
Terminal Bottom Fitting 0.55 mm ID for 0.25 mm/0.32 mm ID Capillary Columns 	Each	35008428
O-ring Parafluor 2-006 for PTV manifold 	Pkg of 3	29011310
PTV Injector Head Assembly 	Each	40203011

PTVBKF Injector Module Components

The following PTVBKF injector components can be replaced. See Figure 5 and Table 9.

Figure 5. Programmable Temperature Vaporizing Injector for Backflush Components

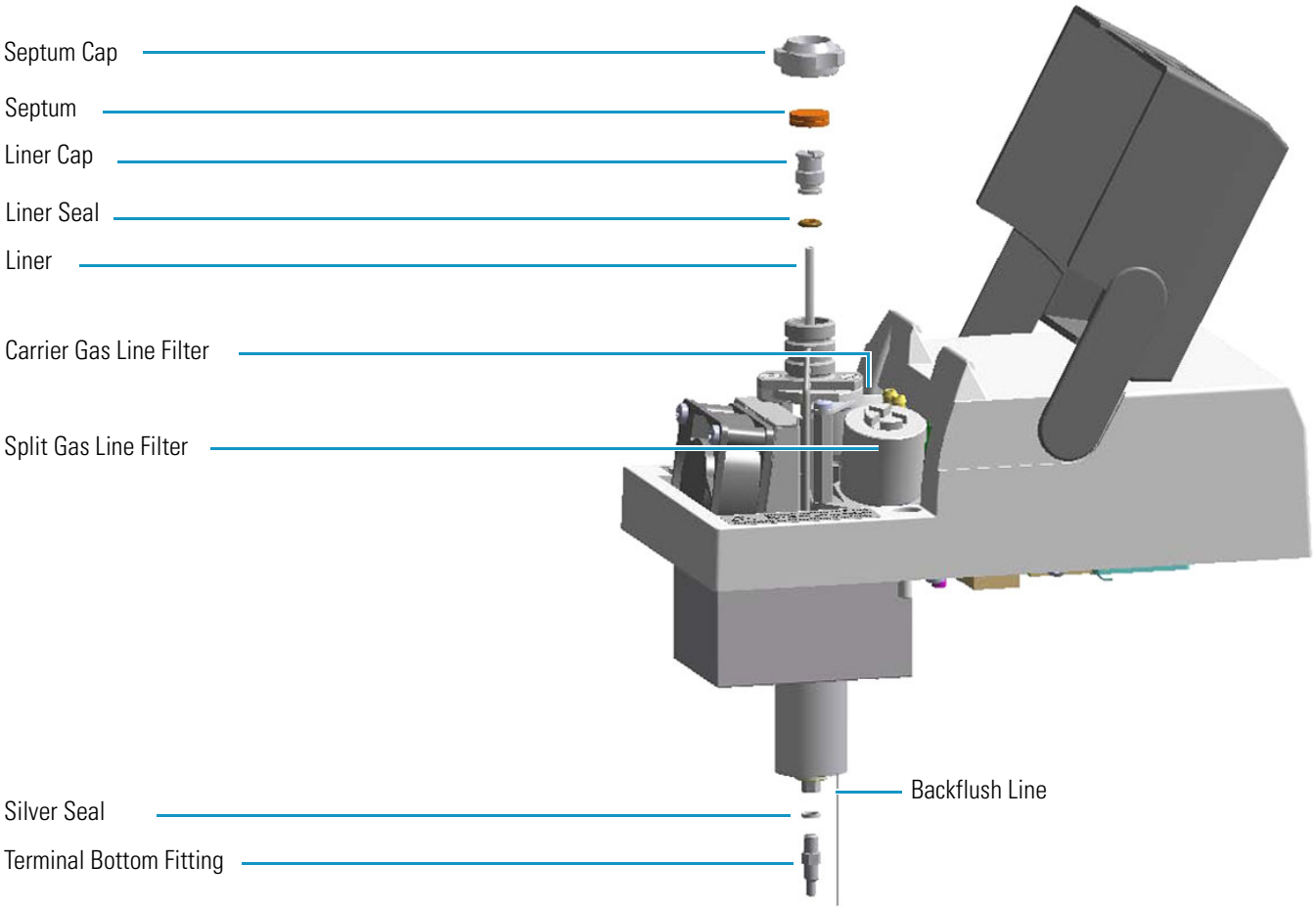


Table 9. PTVBKF Injector Components (Sheet 1 of 3)

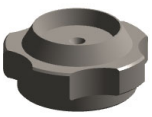
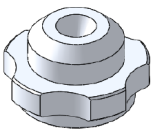
Description		Quantity	Part Number
Septum Cap		Each	35001820
Septum Cap for AI/AS 1610 Autosampler and for HS applications with the TriPlus Autosampler.		Each	35001819
Septum with Center Guide		Pkg of 50	31303233

Table 9. PTVBKF Injector Components (Sheet 2 of 3)

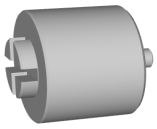
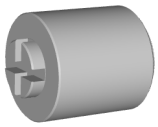
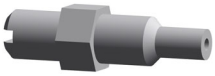
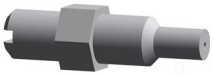
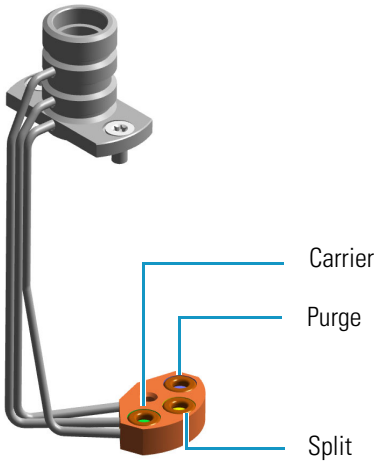
Description	Quantity	Part Number
Liner Cap 	Each	29004014
Liner Seal for PTV 	Pkg of 5	29001325
Liner  See PTV Injector Port Liners on page 27	Each	
Carrier Line Filter 	Each	28113196
Split Line Filter 	Each	28113197
Silver Seal 	Pkg of 2	29013820
Terminal Bottom Fitting 1.0 mm ID for 0.53 mm ID Capillary Columns 	Each	35008429
Terminal Bottom Fitting 0.55 mm ID for 0.25 mm/0.32 mm ID Capillary Columns 	Each	35008428
O-ring Parafluor 2-006 for PTV manifold 	Pkg of 3	29011310
PTV Injector Head Assembly 	Each	40203011

Table 9. PTVBKF Injector Components (Sheet 3 of 3)

Description		Quantity	Part Number
BKF Silflow 3-Port (0.25 mm, 0.25 mm, 1.1 m)l		Each	60201-396
BKF Silflow 3-Port (0.53 mm, 0.25 mm, 1.1 m) l		Each	60201-397
BKF Pre-column 2 m, 0.53 mm, 0.32 mm		Each	60201-387
Silflow FingerTite ferrules 0.70 mm (ID)		10/PK	29063464

GSV Module Components

The following GSV injector components can be replaced. See Figure 6 and Table 10.

Figure 6. Gas Sampling Valve Module Components

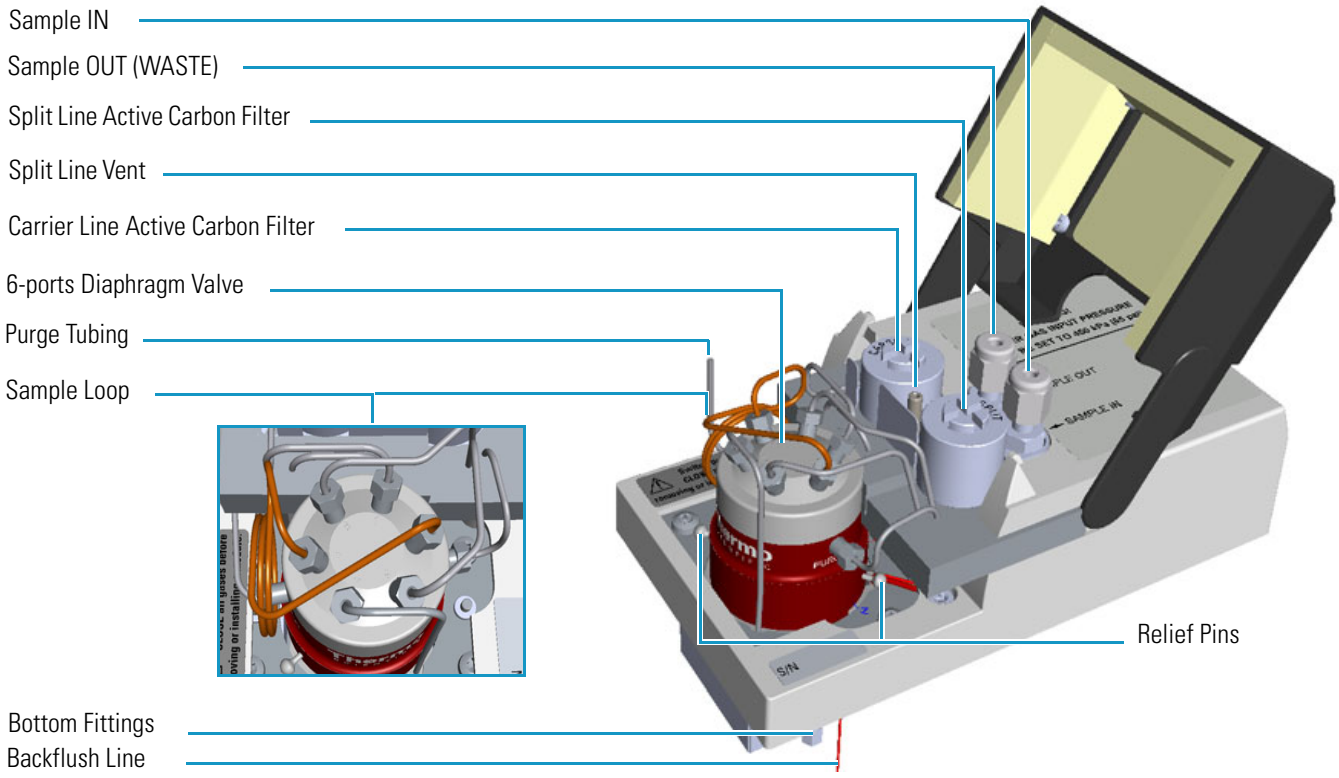


Table 10. Gas Sampling Valve Components (Sheet 1 of 2)

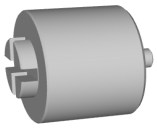
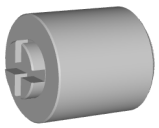
Description	Quantity	Part Number
Carrier Line Filter 	Each	28113196
Split Line Filter 	Each	28113197
Six-port Diaphragm Valve 	Each	40516165

Table 10. Gas Sampling Valve Components (Sheet 2 of 2)

Description		Quantity	Part Number
Kit Sample Loop 20 µL		Each	19071405
Kit Sample Loop 50 µL		Each	19071404
Kit Sample Loop 100 µL		Each	19071403
Kit Sample Loop 250 µL		Each	19071402
Kit Sample Loop 500 µL		Each	19071401
Kit Sample Loop 1000 µL		Each	19071400

Helium Saver-H2 Safer Optional Kit (HeS-H2S S/SL) Components

The following Helium Saver-H_2 Safer optional kit components can be replaced. See Table 11.

Table 11. Helium Saver-H2 Safer S/SL Injector Components (Sheet 1 of 2)

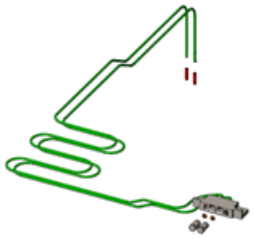
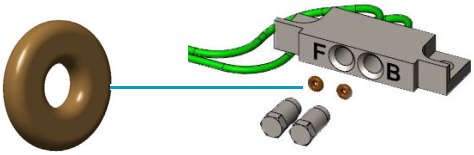
Description	Quantity	Part Number
Helium Saver-H_2 Safer Injector Body 	Each	MI-897215150-SP
Helium Saver-H_2 Safer Valve Box Assembly 	Each	1R119246-0100-SP
Helium Saver-H_2 Safer Gas Net (with connection) 	Each	MI-897215360-SP
Gas Net Connection Nut 	Each	MI-897215365-SP
Helium Saver-H_2 Safer S/SL O-ring 	Pkg of 2	29011302
Pre-Swage Tool, 5 mm 	Each	MI-311AE1-0001

Table 11. Helium Saver-H2 Safer S/SL Injector Components (Sheet 2 of 2)

Description	Quantity	Part Number
Helium Saver-H_2 Safer Column Nut, 2/PK 	Each	290SF303

Injection Port Liners

You can purchase the following injection port liners for the TRACE 1600/1610 gas chromatograph. Be sure to reference the part number when placing an order with your local Sales/Service Representative. See the *TRACE 1600/1610 User Guide* for information about these liners or Table 12 for a comprehensive list of available components.

- SSL Injector Port Liners
- PTV Injector Port Liners

Note Images are not to scale.

SSL Injector Port Liners

The following SSL injector port liners can be replaced. See Table 12.

Table 12. SSL Injection Port Liners

Description	Quantity	Part Number
SSL Split Straight Liner, Deactivated, 4 mm ID x 6.3 mm OD x 78.5 mm Length, Quartz Wool 	Pkg of 5	453A2265
SSL Split Straight Liner, Deactivated, 4 mm ID x 6.3 mm OD x 78.5 mm Length 	Pkg of 5	453A1295
SSL Splitless Liner, Single Taper, Deactivated, 4 mm ID x 6.3 mm OD x 78.5 mm Length, Quartz Wool 	Pkg of 5	453A1925
SSL Splitless Liner, Single Taper, 4 mm ID x 6.3 mm OD x 78.5 mm Length 	Pkg of 5	453A1345
SSL Direct Straight Liner for HS/SPME Liner, Deactivated, 1.2 mm ID x 6.3 mm OD x 78.5 mm Length 	Pkg of 5	453A1335
SSL Mini-LAM Liner, Deactivated, 4 mm ID x 6.3 mm OD x 78.5 mm Length 	Pkg of 5	453A2009

PTV Injector Port Liners

The following PTV injector port liners can be replace. See Table 13.

Table 13. PTV Injection Port Liners (Sheet 1 of 2)

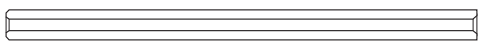
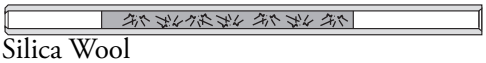
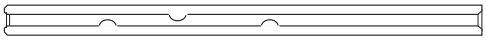
Description	Quantity	Part Number
PTV Siltek Metal Liner, 2 mm ID x 2.75 mm OD x 120 mm Length 	Pkg of 2	45322044
PTV Liner, Non-Deactivated, 2 mm ID x 2.75 mm OD x 120 mm Length 	Pkg of 2	45322045
PTV Straight Liner, Deactivated, 2 mm ID x 2.75 mm OD x 120 mm Length 	Pkg of 5	45352057
PTV Liner, Deactivated, 2 mm ID x 2.75 mm OD x 120 mm Length, Quartz Wool 	Pkg of 5	45352070
PTV Siltek Metal Liner, 1 mm ID x 2.75 mm OD x 120 mm Length 	Pkg of 2	45322046
PTV Straight Liner, Deactivated, 1 mm ID x 2.75 mm OD x 120 mm Length 	Pkg of 5	45352054

Table 13. PTV Injection Port Liners (Sheet 2 of 2)

Description	Quantity	Part Number
PTV Siltek Metal Liner, 2 mm ID x 2.75 mm OD x 120 mm Length, Silica Wool 	Pkg of 2	45322056
PTV Liner with Sintered, Deactivated 2 mm ID x 2.75 mm OD x 120 mm Length 	Pkg of 5	45352060
PTV Liner with Three Baffles, Deactivated, 1 mm ID x 2.75 mm OD x 120 mm Length 	Pkg of 5	45352062
PTV Baffle Liner (Siltek), Deactivated, 2 mm ID x 2.75 mm OD x 120 mm Length 	Pkg of 5	453T2120
PTV Silcosteel Liner Simile OC, 1 mm ID x 2.75 mm OD x 120 mm Length with 0.6 mm ID Restriction 	Pkg of 2	45322052

Detector Module Components

You can purchase the following components for detector modules. Be sure to reference the component's part number when placing an order with your local Sales/Service Representative. See the *TRACE 1600/1610 Hardware Manual* for information about installing these components or the following tables for a comprehensive list of available components.

The following detector module components can be replaced on the TRACE 1600/1610.

- FID Detector Module Components
- NPD Detector Module Components
- ECD Detector Module Components
- TCD Detector Modules Components
- FPD Detector Module Components
- PDD Detector Module Components
- GDI Generic Detector Interface Components

Note Images are not to scale.

FID Detector Module Components

The following FID detector components can be replaced. See Figure 7 and Table 14.

Figure 7. Flame Ionization Detector Components

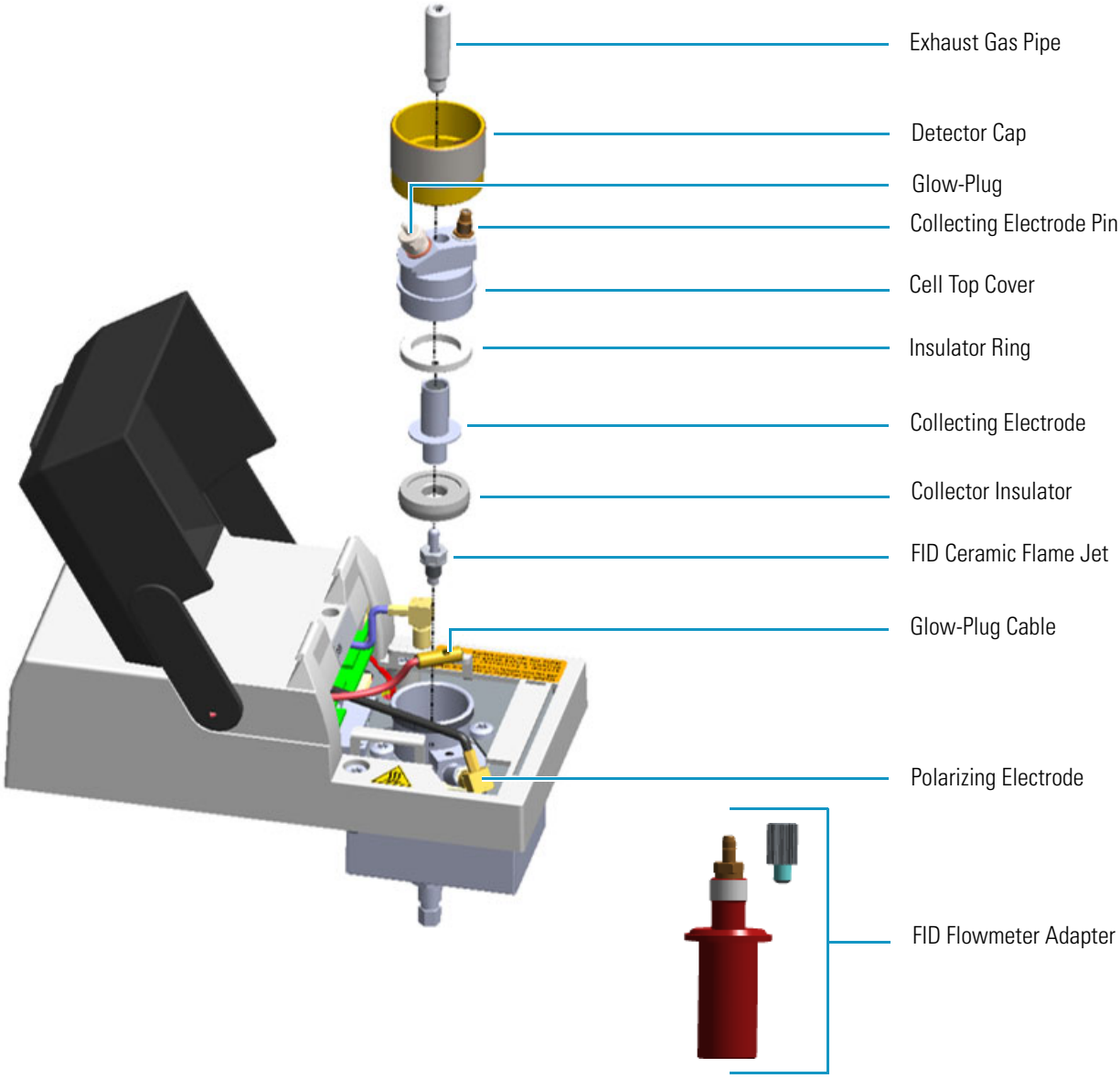


Table 14. FID Detector Components (Sheet 1 of 2)

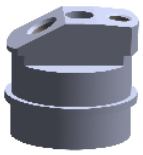
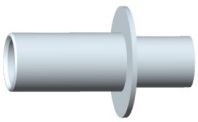
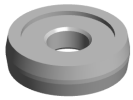
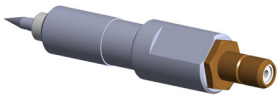
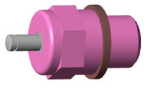
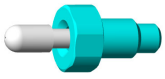
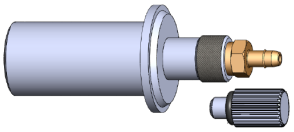
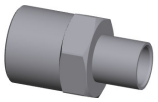
Description	Quantity	Part Number
FID Exhaust Gas Pipe 	Each	MI-897301901
FID Detector Cap 	Each	35001124
FID Cell Top Cover (Top Body) 	Each	24705245
FID Insulator Ring 	Each	29004612
FID Collecting Electrode 	Each	27700900
FID Collecting Electrode Pin 	Each	20601604
FID Collector Insulator 	Each	30202400
FID Polarizing Electrode 	Each	27702330
Polarizing Electrode Holding Screw 	Pkg 20	MI-190000-0037-SP
FID/FPD Glow-Plug (Igniter) 	Each	40303535
FID Glow-Plug Cable 	Each	23043717
FID Ceramic Flame Jet 	Each	40402200

Table 14. FID Detector Components (Sheet 2 of 2)

Description	Quantity	Part Number
FID Measuring Tool Flowmeter Adapter 	Each	34709348
Retaining Nut (for Column Adapter) 	Each	35001126
FID Test Mixture 	Each	33819020

NPD Detector Module Components

The following NPD detector components can be replaced. See Figure 8 and Table 15.

Figure 8. Nitrogen Phosphorus Detector Components

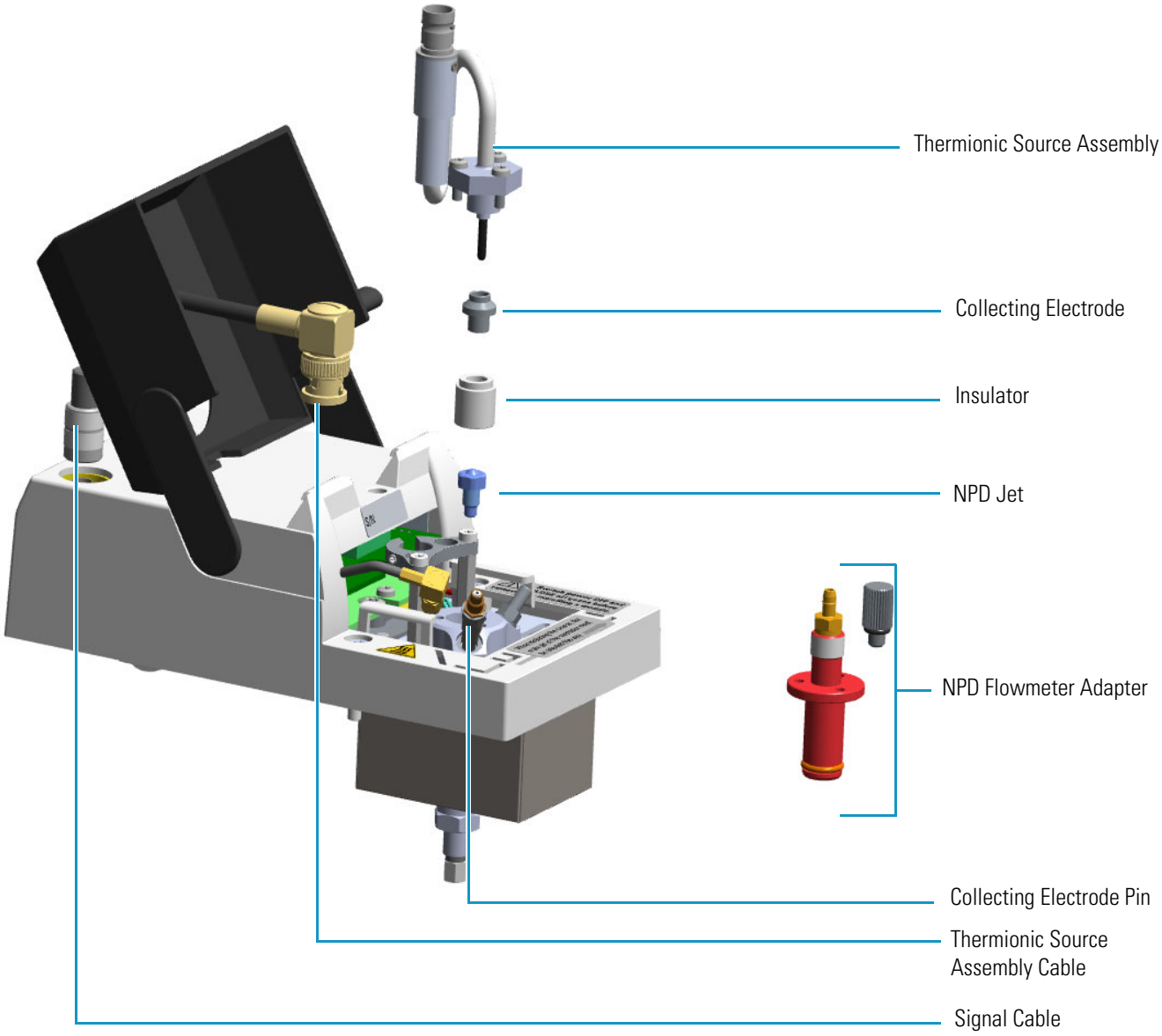
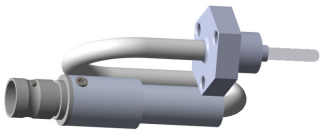
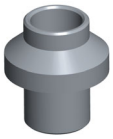
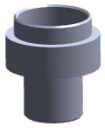
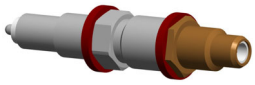
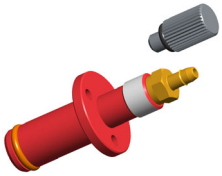
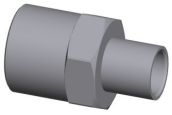


Table 15. NPD Detector Components (Sheet 1 of 2)

Description	Quantity	Part Number
NPD Thermionic Source TID 2 (Black ceramic) for both Nitrogen and Phosphorous detections. **Note** This thermionic source is provided as standard with the NPD detector module.	Each	46500256

Table 15. NPD Detector Components (Sheet 2 of 2)

Description	Quantity	Part Number
NPD Thermionic Source TID 4 (White ceramic) for enhanced Nitrogen response. 	Each	46500257
NPD Thermionic Source Fixing Screw 	Pkg of 5	40921705
NPD Collecting Electrode 	Each	27701600
NPD Collecting Electrode (for BLOS Type Thermionic Source) 	Each	27701605
NPD Collecting Electrode Pin 	Each	20604305
NPD Collecting Insulator (for DET Type Thermionic Source) 	Each	30202405
NPD Jet 	Each	40404516
NPD Measuring Tool Flowmeter Adapter 	Each	34709610
Retaining Nut (for Column Adapter) 	Each	35001126
NPD Test Mixture 	Each	33819006

ECD Detector Module Components

The following ECD detector components can be replaced. See Figure 9 and Table 16.

Figure 9. Electron Capture Detector Components

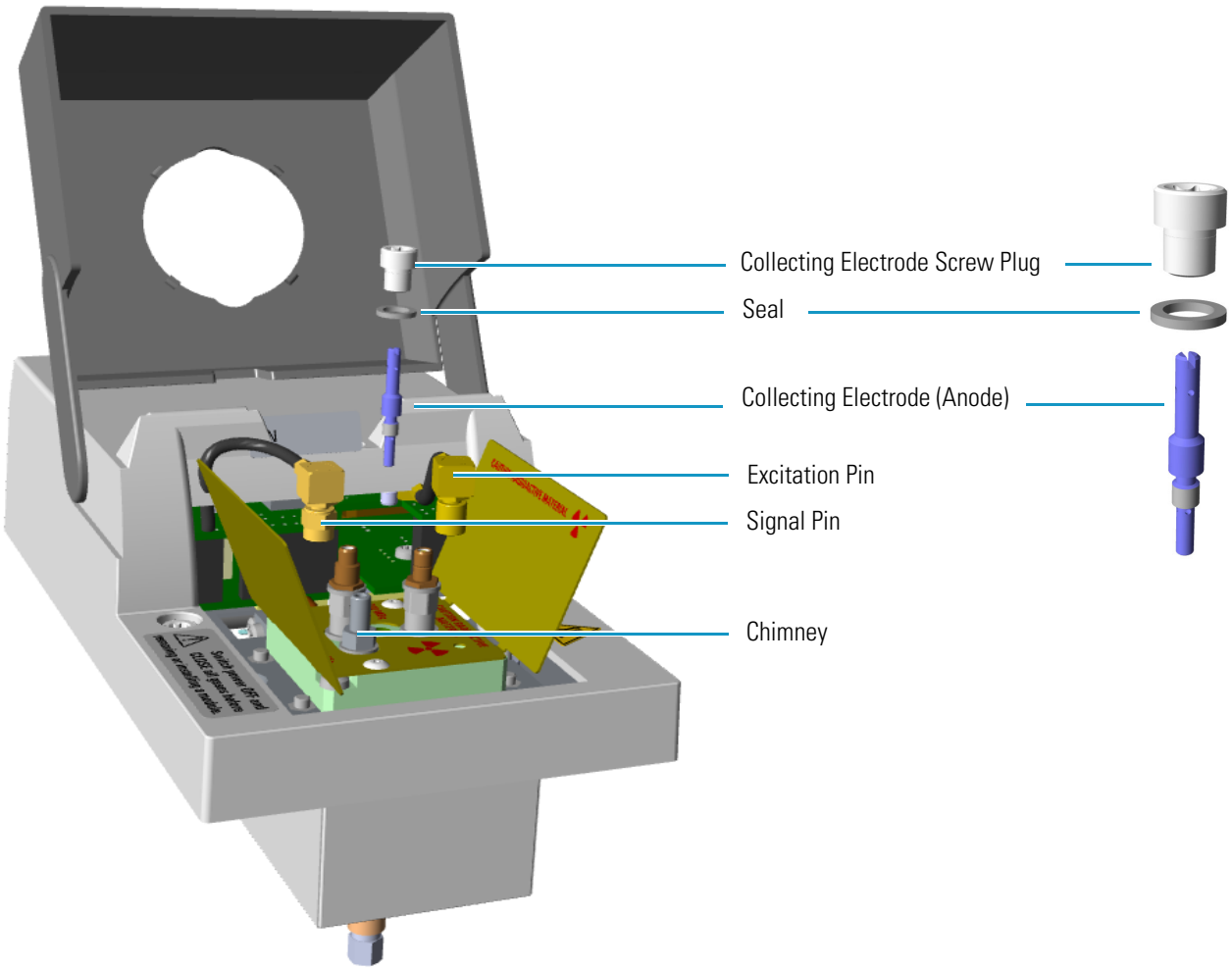
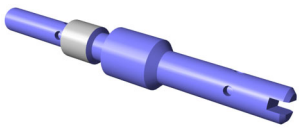
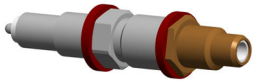
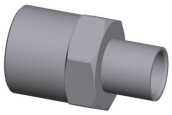


Table 16. ECD Detector Components

Description		Quantity	Part Number
ECD Collecting Electrode (Anode)		Each	21600210
ECD Collecting Electrode (Anode) Screw		Each	35006118
ECD Collecting Electrode Seal		Pkg of 10	29032608
ECD Collecting Electrode Pin		Each	20604305
Retaining Nut (for Column Adapter)		Each	35001126
ECD Test Mixture		Each	33819011

TCD Detector Modules Components

The following TCD detector components can be replaced. See Figure 10 and Table 17.

Figure 10. Thermal Conductivity Detector Components

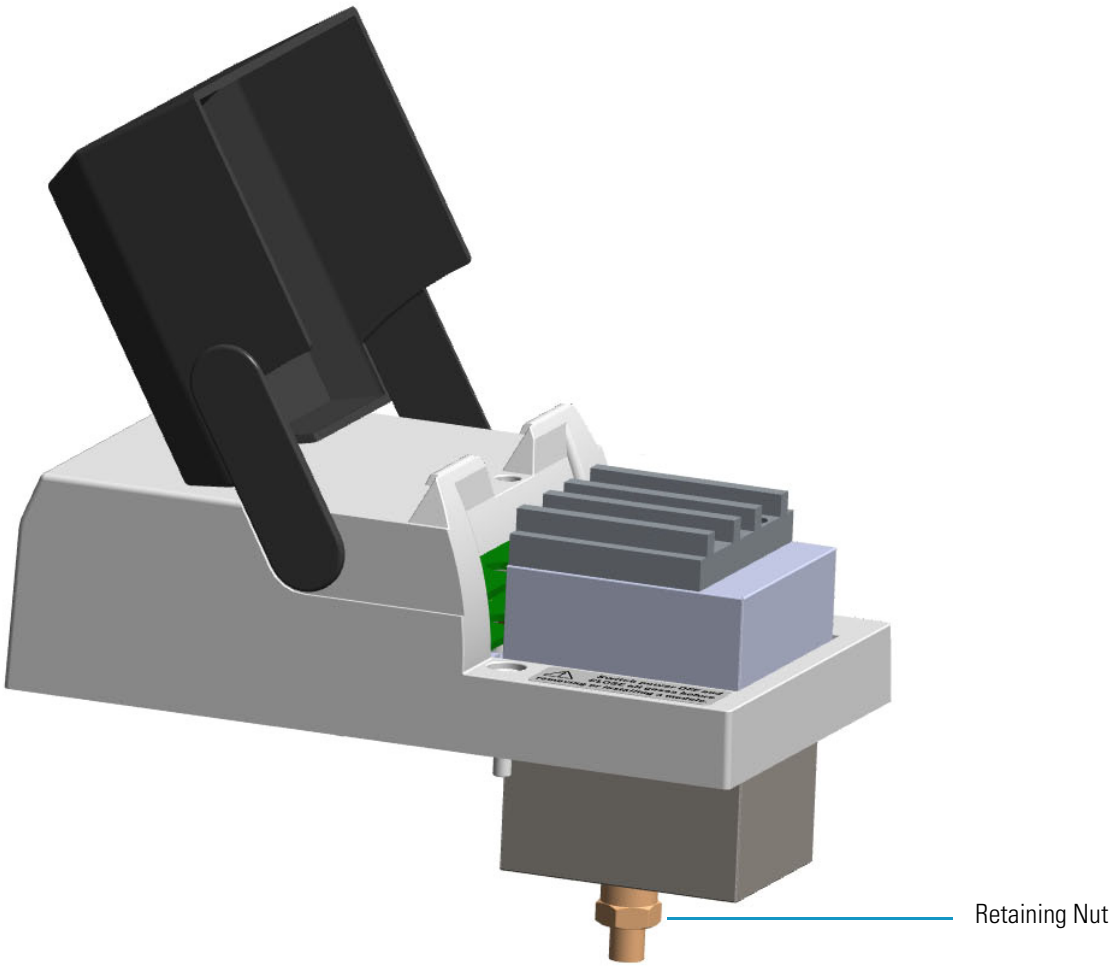
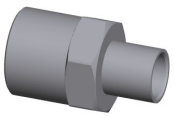


Table 17. TCD Detector Components

Description	Quantity	Part Number
Retaining Nut (for Column Adapter) 	Each	35001126
TCD Test Mixture 	Each	33819016

FPD Detector Module Components

The following FPD detector components can be replaced. See Figure 11, Figure 12, Figure 13, and Table 18.

Figure 11. Flame Photometric Detector Module

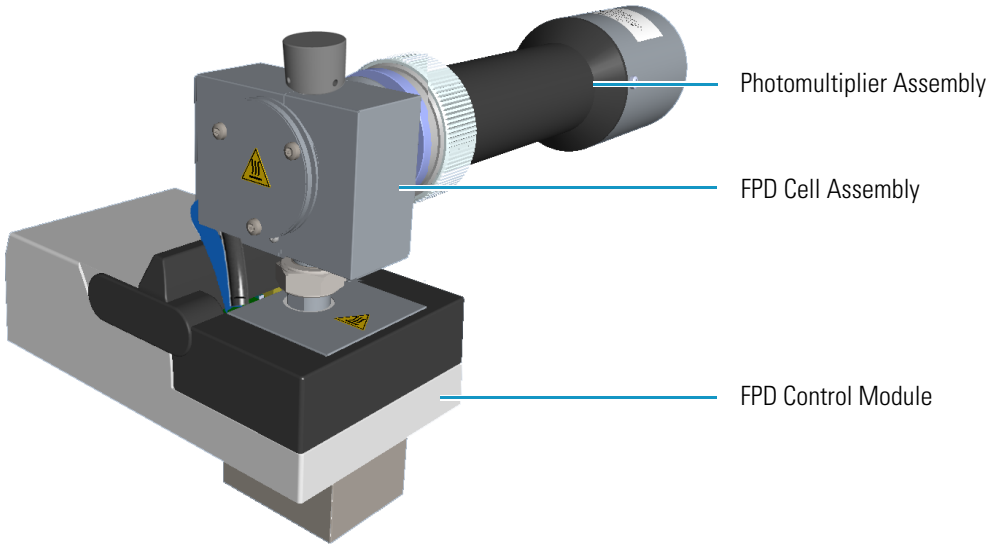
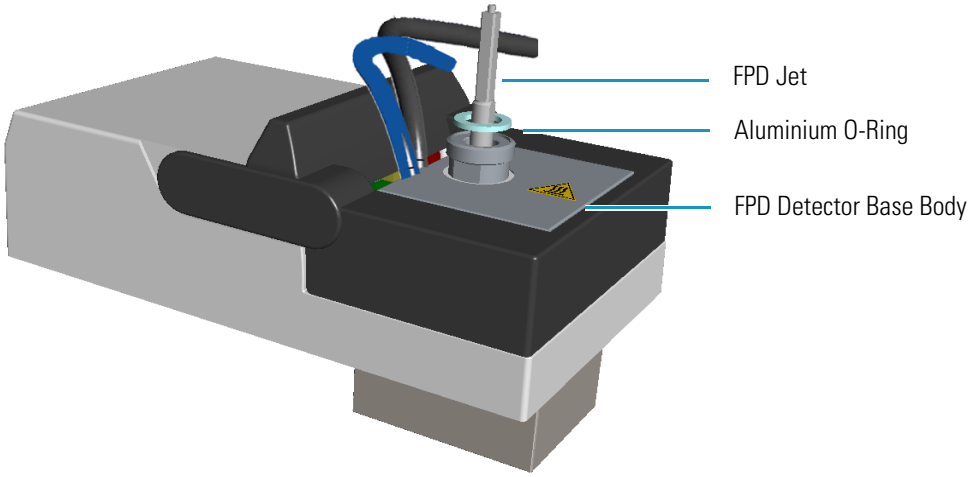
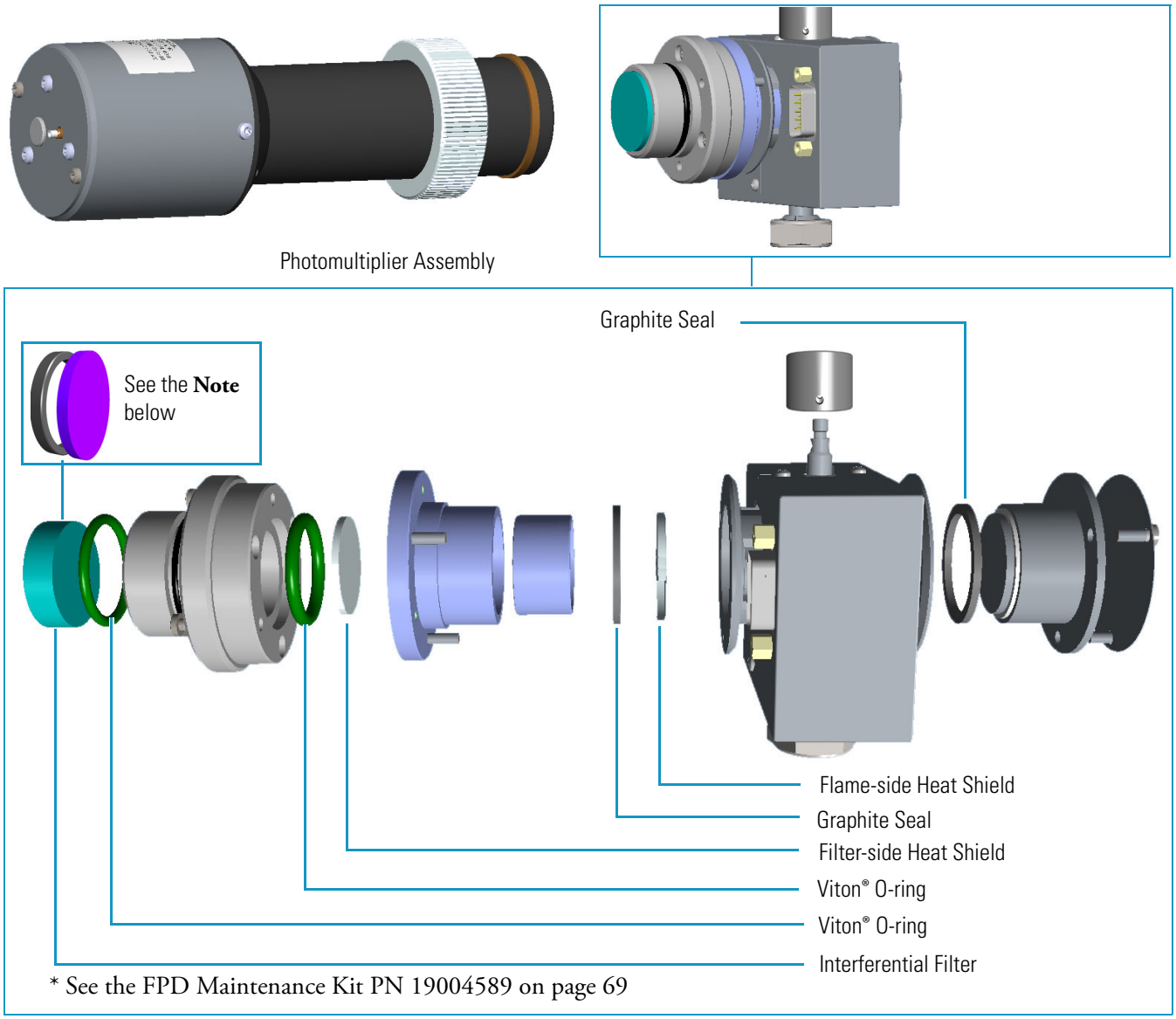


Figure 12. FPD Control Module Components



Note The signal, excitation voltage, and ignition/heating cables will not be shown in the next illustrations for graphic convenience.

Figure 13. FPD Cell Assembly Components



Note Instead of the filters, PN 28107000 and PN 28107100, a new type of interferential filter for sulfur and phosphorous are available as a kit:

- PN 19050785 includes an interferential filter for sulfur (PN 28107101) and a spacer.
- PN 19050786 includes an interferential filter for phosphorous (PN 28107102) and a spacer.

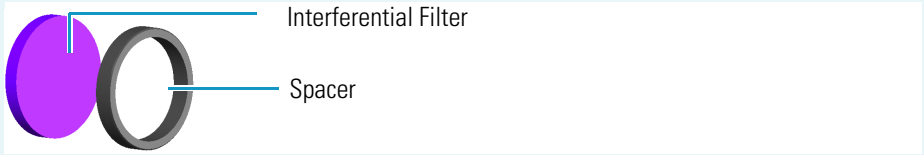
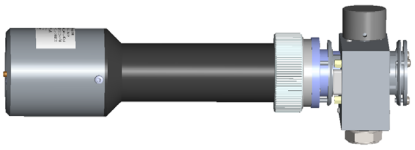
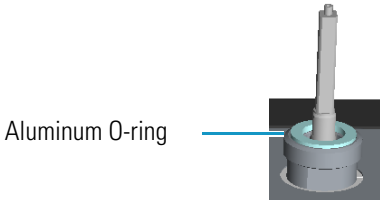
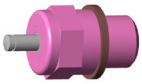
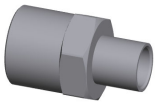
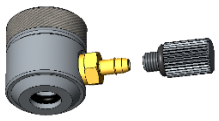


Table 18. FPD Detector Components

Description	Quantity	Part Number
FPD Detector Assembly 	Each	29903110
Kit FPD Interferential Filter for Sulfur (28107101 + Spacer) 	Each	19050785
Kit FPD Interferential Filter for Phosphorus (28107102 + Spacer) 	Each	19050786
FPD Interferential Filter for Sulfur 	Each	28107000
FPD Interferential Filter for Phosphorus 	Each	28107100
FPD Interferential Filter for Tin 	Each	28107001
FPD Jet Deactivated Silcosteel 	Each	40404518
FPD Aluminum O-ring 	Pkg of 10	29032630
FPD Photomultiplier Tube 	Each	28600460
FID/FPD Glow-Plug (Igniter) 	Each	40303535
Retaining Nut (for Column Adapter) 	Each	35001126
FPD Measuring Tool Flowmeter Adapter 	Each	34709630
FPD Detector Fixing Tool (20-22 mm wrench) 	Each	20501608
FPD Test Mixture 	Each	33819006

PDD Detector Module Components

The following PDD detector components can be replaced. See Figure 14, Figure 15, and Table 19.

Figure 14. Pulsed Discharge Detector Module

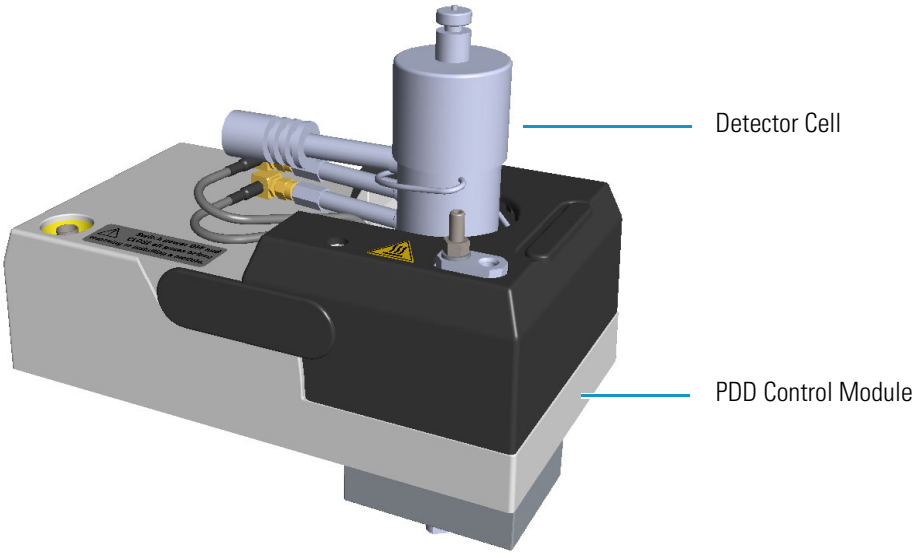


Figure 15. PDD Pulse Generator

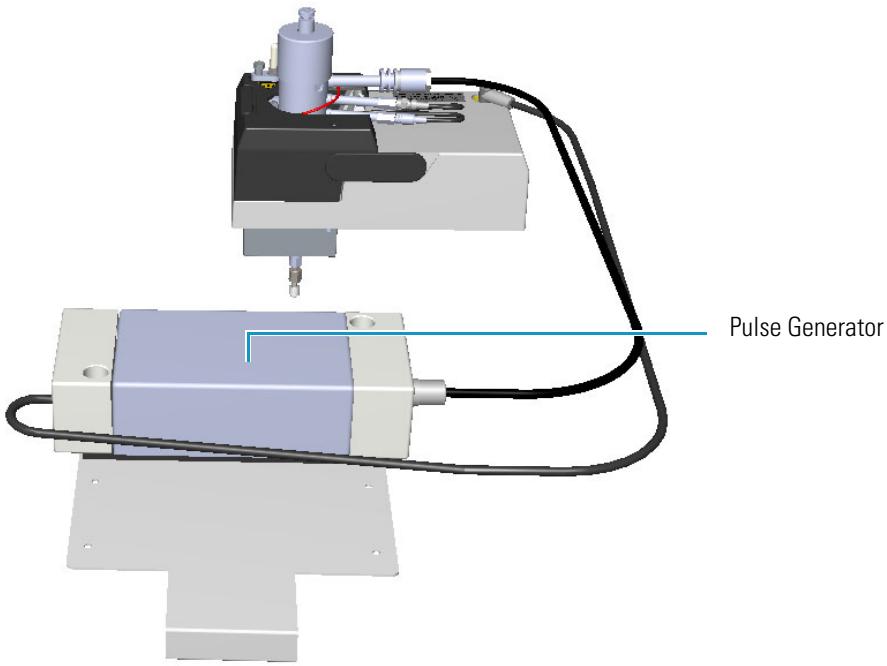
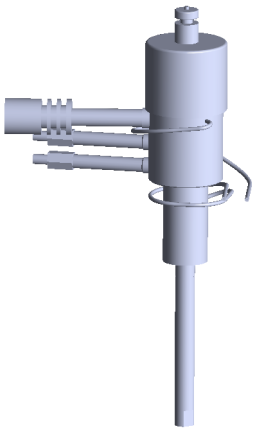
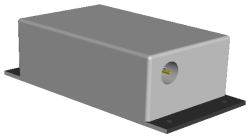


Table 19. PDD Detector Components

Description	Quantity	Part Number
PDD Cell 	Each	41910716
PDD Pulse Generator (Pulser) 	Each	43210075
PDD Purifier Assy 	Each	43210076
PDD Mini Helium Purifier Kit 	Each	19071500
PDD Flow Restrictor	Each	24505908
PDD Packed Column Adapter	Each	26060521
PDD Test Mixture 	Each	33819032

GDI Generic Detector Interface Components

The following GDI Generic Detector Interface components present into the GDI electrical interface can be replaced. See Figure 16, and Table 20.

Figure 16. GDI Electrical Interface

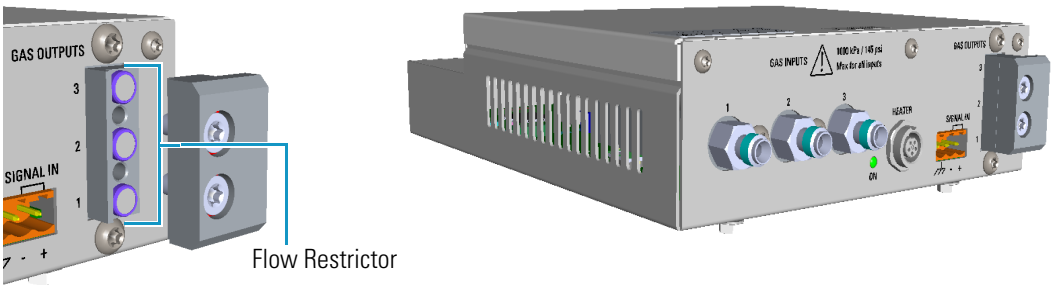


Table 20. GDI Generic Detector Interface Components

Description	Quantity	Part Number
Low Flow Restrictor 	Each	24503330
Medium Flow Restrictor 	Each	24503333
High Flow Restrictor 	Each	24503334

Upgrade Modules

The following upgrade modules are available for the TRACE 1600/1610. See Table 21.

Contact your local Sales/Service Representative to place an order. Once you receive the module, refer to the *TRACE 1600/1610 Hardware Manual* for installation information or Table1 for a comprehensive list of available components.

Note Images are not to scale.

Table 21. Module (Sheet 1 of 4)

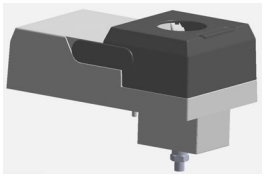
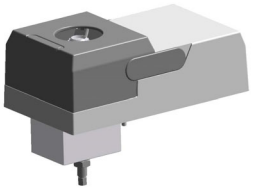
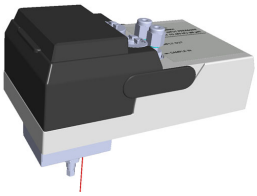
Description		Quantity	Part Number
Dummy Module		Each	19070097
SSL Injector Module		Each	19070010
SSLBKF Injector Module (TRACE 1600 Series)		Each	MI-190000-0019
Gas Sampling Valve Module		Each	19070095
Helium Saver-H_2 Safer Kit		Each	MI-190000-0022
PTVBKF Injector Module (TRACE 1600 Series)		Each	MI-190000-0020

Table 21. Module (Sheet 2 of 4)

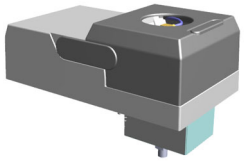
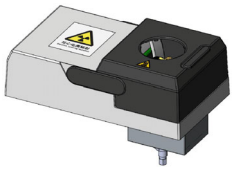
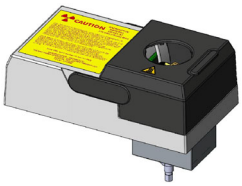
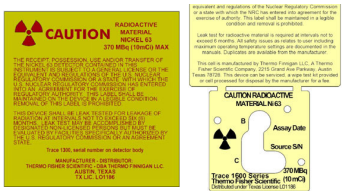
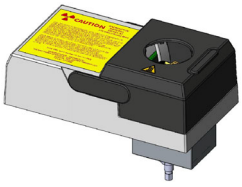
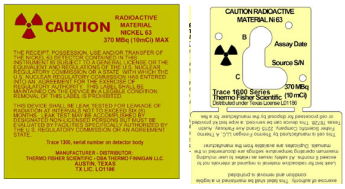
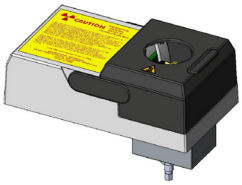
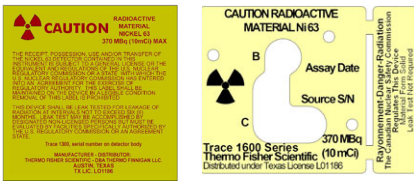
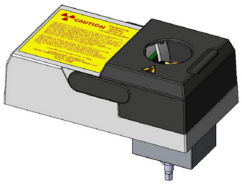
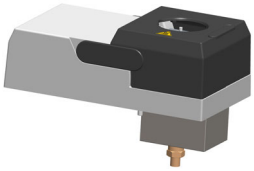
Description		Quantity	Part Number
FID Detector Module		Each	19070001
ECD Detector Module for China Market			Each	19070029
ECD Detector Module for International Market			Each	19070030
ECD Detector Module for USA Market (General License)				19070031
ECD Detector Module for USA Market (Specific License)				19070032
ECD Detector Module for Canada Market				19070033
TCD Detector Module with Nickel-Iron (Ni-Fe) filament cell		Each	19070040

Table 21. Module (Sheet 3 of 4)

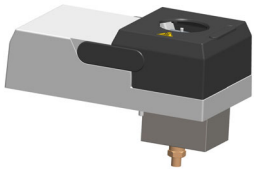
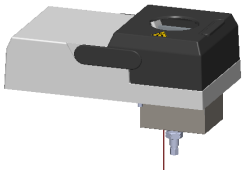
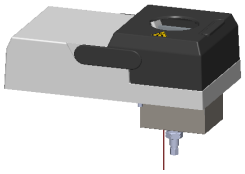
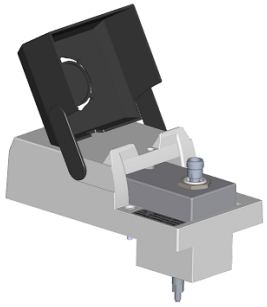
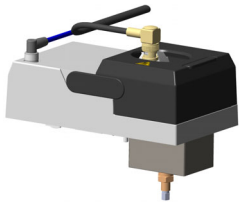
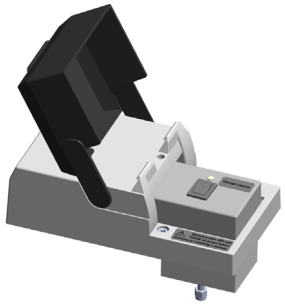
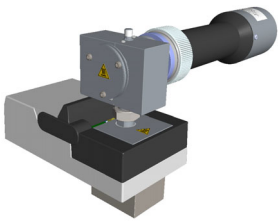
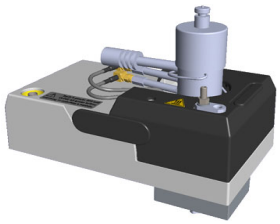
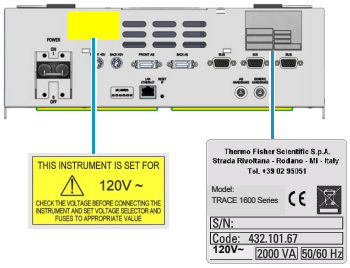
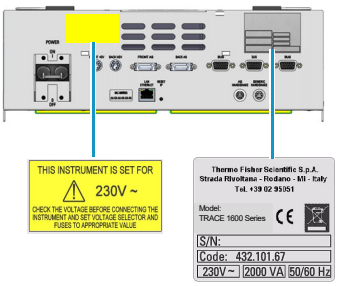
Description		Quantity	Part Number
TCD Detector Module with Tungsten-Rhenium (W-Re) filament cell		Each	19070041
In-Series Connection TCD Detector Module with Nickel-Iron (Ni-Fe) filament cell		Each	19070045
In-Series Connection TCD Detector Module with Tungsten-Rhenium (W-Re) filament cell		Each	19070046
FTIR Make-up Module		Each	19070050
NPD Detector Module		Each	19070060
No Vent Microfluidics Module		Each	19070090

Table 21. Module (Sheet 4 of 4)

Description	Quantity	Part Number
FPD Detector Module 	Each	19070096
PDD Detector Module 	Each	19070014
AOI Analog Output Interface Module 	Each	19070022
Electronic Module 120 Vac 	Each	MI-897117200-SP
Electronic Module 230 Vac 	Each	MI-897117100-SP

Electronic Module Boards

You can purchase the following boards for the electronic module of the TRACE 1600/1610 gas chromatograph. See Table 22.

Be sure to reference the component's part number when placing an order with your local Sales/Service Representative.

Note Images are not in scale.

Table 22. Electronic Board (Sheet 1 of 2)

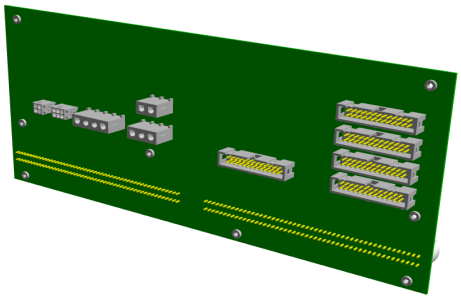
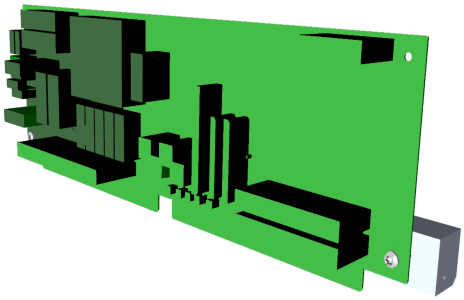
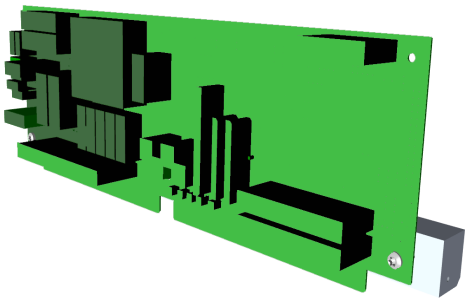
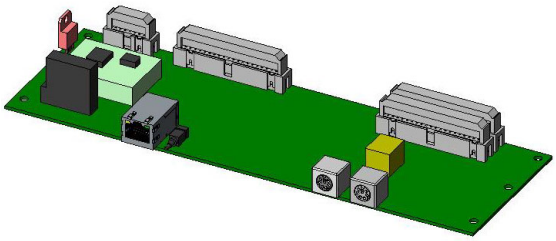
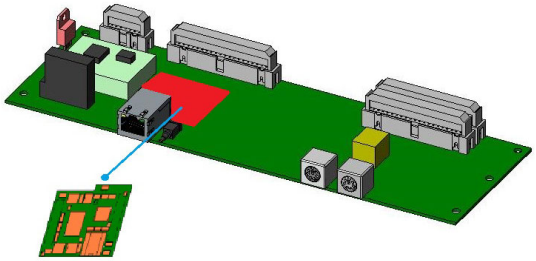
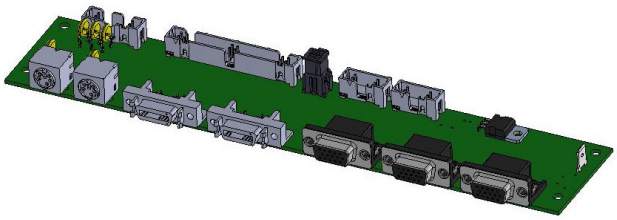
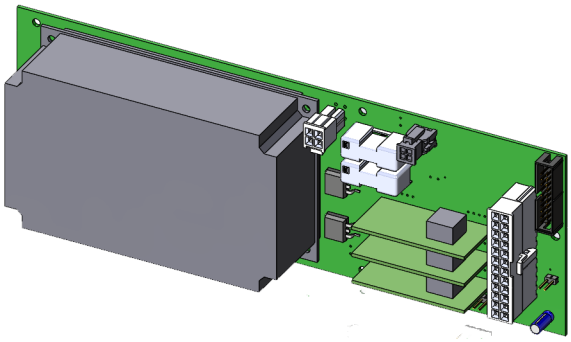
Description		Quantity	Part Number
Rear Backplane Board (BKP-HRM) (TRACE 1600 Series)		Each	MI-PC1256-001-SP
Oven CPU and Power Control Board (OVN-HRM; 230 V; PC1257)		Each	23661010
Oven CPU and Power Control Board (OVN-HRM; 120V; PC1257-01)		Each	23661011

Table 22. Electronic Board (Sheet 2 of 2)

Description		Quantity	Part Number
Main CPU Board (CPU-HRM; PC1258)		Each	MI-PC1258-001-SP
Memory Board (MEM-HRM) (TRACE 1600 Series)		Each	23661020
External Interface Board (EXT-HRM) (TRACE 1600 Series)		Each	MI-PC1361-000-SP
Power Supply Board (TRACE 1600 Series)		Each	MI-PC1360-000-SP

External Modules

The following external modules are available for the TRACE 1600/1610. See Table 23.

Contact your local Sales/Service Representative to place an order. Once you receive the module, refer to the *TRACE 1600/1610 Hardware Manual* for installation information.

Note Images are not to scale.

Table 23. External Modules

Description		Quantity	Part Number
Aux Temperature/Cryo Module		Each	19070070
Auxiliary Gases Module		Each	19070080
NPD Thermionic Source Power Module		Each	43215010

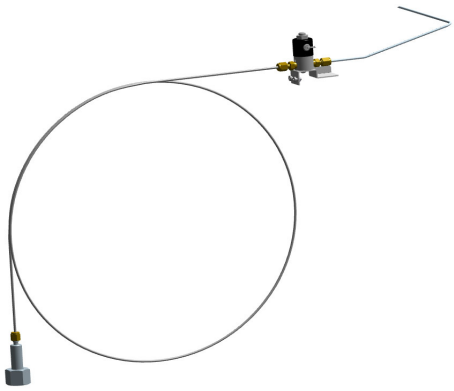
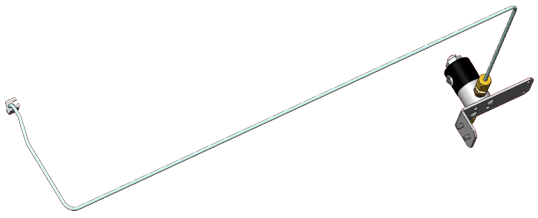
Cryo Components

The following cryogenic components are available for the TRACE 1600/1610. See Table 24.

Contact your local Sales/Service Representative to place an order. Once you receive the module, refer to the *TRACE 1600/1610 Hardware Manual* for installation information.

Note Images are not to scale.

Table 24. Cryo Components

Description	Quantity	Part Number
Oven Cryo CO_2 Assembly 	Each	19050753
Oven Cryo N_2 Assembly 	Each	19050752
PTV Cryo CO_2 Assembly 	Each	19050755
PTV Cryo N2 Assembly 	Each	19050754

Kits, Cables, and Miscellaneous Items

The following kits, cables, and miscellaneous items are available for the TRACE 1600/1610. See Table 25.

Contact your local Sales/Service Representative to place an order. Once you receive the kit, refer to the *TRACE 1600/1610 Hardware Manual* for installation information.

Note Images are not to scale.

Table 25. Kits, Cables, and Miscellaneous Items (Sheet 1 of 5)

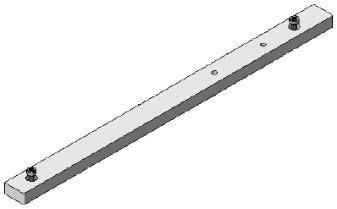
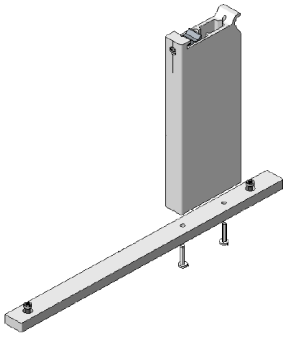
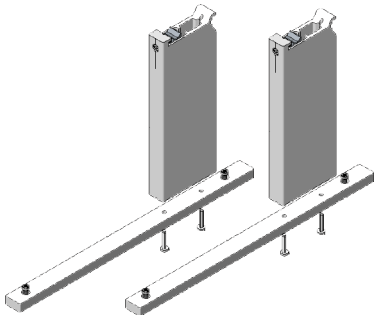
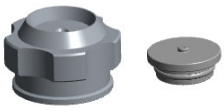
Description		Quantity	Part Number
TriPlus Leg Support for TRACE 1600/1610		Pkg of 2	19050489
TriPlus RSH Mounting Leg		Pkg of 1	1R77010-1066
TriPlus RSH Mounting Kit		Pkg of 2	1R77010-1005
Merlin Valve Kit Kit includes: Merlin Microseal High Pressure Valve Septum Cap		Each	19050735

Table 25. Kits, Cables, and Miscellaneous Items (Sheet 2 of 5)

Description	Quantity	Part Number
Packed Column Adapters Kit The Kit includes:  Adapter for the connection of the 1/8-inch OD packed column to the SSL injector.  Adapter for the connection of the 1/16-inch OD packed column to the SSL injector.  Adapter for the connection of the 1/8-inch OD packed column to the FID, NPD, ECD, TCD, or FPD detector.  Adapter for the connection of the 1/16-inch OD packed column to the FID, NPD, ECD, TCD, or FPD detector. 1/4"- 1/16"wrench 4.5 mm wrench	Each	19050758
Graph-pack (Encapsulated Graphite) Ferrules Kit The Kit includes:  Adapter for the connection to the SSL injector Adapter for the connection to the FID, NPD, ECD, TCD, or FPD detector	Each	19050759
Oven Exhaust Kit 	Each	19050760
Packed Column Adapters Kit for Gas Sampling Valve The Kit includes:  Adapter for the connection of the 1/8-inch OD packed column to the FID, NPD, ECD, TCD, or FPD detector.  Adapter for the connection of the 1/16-inch OD packed column to the FID, NPD, ECD, TCD, or FPD detector. 4.5 mm wrench Open ended wrench 1/4-5/16-inch	Each	19050762

Table 25. Kits, Cables, and Miscellaneous Items (Sheet 3 of 5)

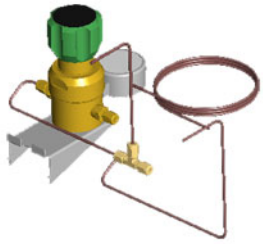
Description		Quantity	Part Number
Pressure Regulator Kit for Gas Sampling Valve		Each	19050763
SSL/SSLBKF/HeS-H_2S S/SL Maintenance Kit	Kit includes: 19050771 SSL O-Ring Kit 28113197 Split Line Filter 290GA082 Base Seal 31303246 Septum BTO with Center Guide (Pkg of 5) 453A1925 SSL Splitless Liner (Pkg of 5)	Each	19050770
SSL/SSLBKF/HeS-H_2S S/SL O-Ring Kit	Kit includes: 29001312 Liner Seal 29001313 Body Head Internal O-ring 29001316 Body Head External O-ring 29011310 Manifold O-rings (Pkg of 3)	Each	19050771
FID Igniter Kit	Kit includes: 40303535 FID/FPD Glow-Plug (Igniter) 20601604 FID Collecting Electrode Pin 24705245 FID Cell Top Cover	Each	19050775
FID Maintenance Kit	Kit includes: 40402200 FID Ceramic Flame Jet 29004612 FID Insulator Ring (Top) 30202400 FID Collector Insulator (Bottom) 40303535 FID/FPD Glow-Plug (Igniter)	Each	19050776
NPD Maintenance Kit	Kit includes: 40404516 NPD Jet 30202405 NPD Collector Insulator 27701600 NPD Collecting Electrode	Each	19050777
ECD Collecting Electrode (Anode) Replacement Kit	Kit includes: 29002608 ECD Collecting Electrode (Anode) Seal (Pkg of 1) 21600210 ECD Collecting Electrode (Anode)	Each	19050779

Table 25. Kits, Cables, and Miscellaneous Items (Sheet 4 of 5)

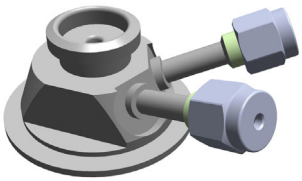
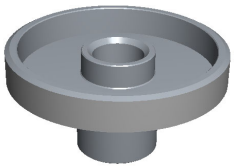
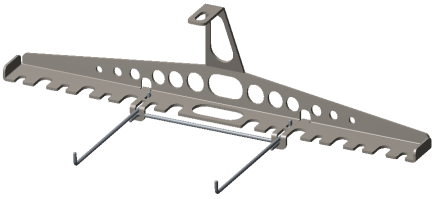
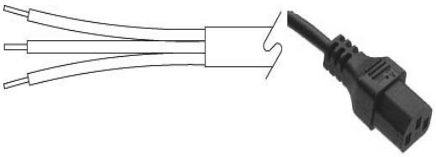
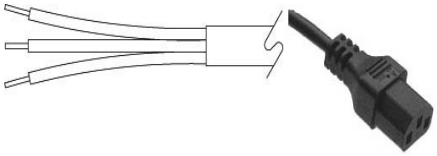
Description		Quantity	Part Number
ECD Exhaust Vent Kit	Kit includes: 29002608 Aluminum Washer 42010022 Silicone Rubber Tubing Fitting M5	Each	19070024
FPD Maintenance Kit	Kit includes: 29003414 Graphite Seal (Pkg of 2) 45101750 Heat Shield (Pkg of 1) 29000050 Viton O-ring 29000381 Viton O-ring	Each	19004589
PTV/PTVBKF Maintenance Kit	Kit includes: 31303246 Septum BTO with Center Guide (Pkg of 5) 45302044 Splitless, Silcosteel Deactivated, 2 mm ID (Pkg of 1) 29001318 Liner Seal 28113197 Split Line Filter 29011310 Head O-Ring (Pkg of 3)	Each	19050780
Dual Detector Microfluidics Kit	Kit includes: 19098026 Microfluidics Kit 19050757 Clamp Bracket for Backflush Kit 31608055 Clamp Assembly	Each	19071030
SSL/SSLBKF Hot Injection Adapter		Each	19050733
Generic Detector Interface Kit	The Kit includes: 29903130 GDI Detector Module  29903131 GDI Control Module 	Each	19070015
Purge & Trap Adapter Kit		Each	19050730

Table 25. Kits, Cables, and Miscellaneous Items (Sheet 5 of 5)

Description	Quantity	Part Number
SSL Liner O-ring (for Purge & Trap Adapter) 	Each	MI-290AA1-0001
SSL Adapter Head for PerkinElmer TurboMatrix™ HS 	Each	34709361
Packed Columns Support Kit 	Each	19070124
Power Cable 16 A, 230 V 	Each	23033025
Power Cable 20A, 120 V 	Each	23033030
LAN Communication Pin-to-Pin Cable 	Each	23043592
LAN Communication Cross Cable 	Each	23043593
MS Start Cable 	Each	23043546

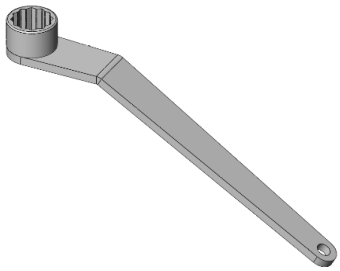
Tools

The TRACE 1600/1610 ships with the tools you will need to perform maintenance on the instrument. See Table 26.

Contact your local Sales/Service Representative to place an order.

Note Images are not to scale.

Table 26. Tools

Description		Quantity	Part Number
Ceramic Column Cutter		Each	60201-318
Wrench, Single Open-Ended, 1/2-in.		Each	20503022