TSQ Duo

Mass Spectrometer

Spare Parts Guide

1R120587-0004 Revision B December 2015

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Release history: Revision A, September 2014; Revision B, December 2015

Software version: Thermo Foundation 3.1 SP1; Thermo Scientific™ Dionex™ Chromeleon™ 7 (release 7.2 SR3 MUa or later.

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

Contents

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,
- recalibration, and
- 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.

Regulatory Compliance

Thermo Fisher Scientific performs complete testing and evaluation of its products to ensure full compliance with applicable domestic and international regulations. When the system is delivered to you, it meets all pertinent electromagnetic compatibility (EMC) and safety standards as described in the next section or sections by product name.

Changes that you make to your system may void compliance with one or more of these EMC and safety standards. Changes to your system include replacing a part or adding components, options, or peripherals not specifically authorized and qualified by Thermo Fisher Scientific. To ensure continued compliance with EMC and safety standards, replacement parts and additional components, options, and peripherals must be ordered from Thermo Fisher Scientific or one of its authorized representatives.

EMC and Safety Standards

- ITQ, and Ion Trap Series standards: EMC: EN 61326-1:2006. Safety: IEC 61010-1:2001, IEC 61010-2-081:2001
- Direct Probe Controller (DPC) standards: EMC: EN 61326-1:2013. Safety: IEC 61010-1:2001, IEC 61010-2-081:2001
- ISQ Series standards: EMC: EN 61326-1:2013. Safety: IEC 61010-1:2010 (ed. 3); IEC 61010-2-081:2015 (ed. 2); IEC 61010-2-010:2014 (ed. 3); IECEE CB SCHEME CERT NO. DE 3-30000
- TSQ 8000 Evo and TSQ Duo standards: EMC: EN 61326-1:2013. Safety: IEC 61010-1:2010 (ed. 3); IEC 61010-2-081:2015 (ed. 2); IEC 61010-2-010:2014 (ed. 3); IECEE CB SCHEME CERT NO. DE 3-30034

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Low Voltage Safety Compliance

This device complies with Low Voltage Directive 2011/95/EC.

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

Your instrument is designed to work in a controlled electromagnetic environment. Do not use radio frequency transmitters, such as mobile phones, in close proximity to the instrument.

For manufacturing location, see the label on the instrument.

WEEE Compliance

This product is required to comply with the European Union's Waste Electrical & Electronic Equipment (WEEE) Directive 2002/96/EC. It is marked with the following symbol:

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

WEEE Konformität

Dieses Produkt muss die EU Waste Electrical & Electronic Equipment (WEEE) Richtlinie 2002/96/EC erfüllen. Das Produkt ist durch folgendes Symbol gekennzeichnet:

Thermo Fisher Scientific hat Vereinbarungen mit Verwertungs-/Entsorgungsfirmen in allen EU-Mitgliedsstaaten getroffen, damit dieses Produkt durch diese Firmen wiederverwertet oder entsorgt werden kann. Mehr Information über die Einhaltung dieser Anweisungen durch Thermo Fisher Scientific, über die Verwerter, und weitere Hinweise, die nützlich sind, um die Produkte zu identifizieren, die unter diese RoHS Anweisung fallen, finden sie unter www.thermoscientific.com/rohsweee.

Conformité DEEE

Ce produit doit être conforme à la directive européenne (2002/96/EC) des Déchets d'Equipements Electriques et Electroniques (DEEE). Il est marqué par le symbole suivant:

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

Preface

This guide contains information about ordering spare parts for your Thermo Scientific™ TSQ Duo mass spectrometer.

Contents

About Your System

Thermo Scientific systems provide the highest caliber gas chromatography/mass spectrometry (GC/MS) instrumentation available on today's market.

GC/MS represents a combination of two powerful analytical techniques: GC, which acts as a separation technique, and MS, which acts as a detection technique. Complex mixtures of individual compounds can be injected into the GC, either manually or by an autosampler and then separated for presentation to the MS. The MS will generate a mass spectrum of the GC eluate and its components. The mass spectrum can then be used for qualitative identification as well as accurate and precise quantification of the individual compounds present in the sample.

A triple-quadrupole GC/MS/MS system provides the extra selectivity required for trace analysis of compounds in complex matrices.

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.

Related Documentation

The TSQ Duo system includes Help and these manuals as PDF files:

- *TSQ Duo Preinstallation Guide*, PN 1R120587-0001
- *TSQ Duo User Guide*, PN 1R120587-0002
- *TSQ Duo Hardware Manual*, PN 1R120587-0003
- *TSQ Duo Spare Parts Guide*, PN 1R120587-0004
- *TSQ Duo AutoSRM User Guide*, PN 1R120587-0005

❖ To view product manuals

On the desktop go to **Manuals > TSQ Duo**.

❖ To open Help

- From the TSQ Series instrument control software window, choose **Help**.
- If available for a specific window or dialog box, click **Help** or press the F1 key for information about setting parameters.

For more information, visit www.thermoscientific.com.

System Requirements

Your data system must meet these minimum requirements.

System	Requirements
Hardware	• 4.6 GHz processor with 16GB RAM • DVD/CD-ROM drive • Video card and monitor capable of 1680×1050 resolution • 1000 GB hard drive • Quad core processor
Software	• Microsoft™ Windows™ 7 SP1 Operating System (64-bit) • Thermo Foundation[1] • Thermo Scientific™ Dionex™ Chromeleon™ 7 (release 7.2 SR3 MUa or later)[2]

[1]Check release notes for compatibility with TSQ Series instrument control software.
[2]Check release notes for compatibility with Thermo Foundation and TSQ Series instrument control software.

Safety and Special Notices

Make sure you

follow the precautionary statements presented in this guide. The safety and other special notices appear in boxes.

Special Notices

Special notices include 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 Highlights information of general interest.

Tip Highlights 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. A **WARNING** is intended to prevent improper actions that *could* cause personal injury. A **CAUTION** is intended to prevent improper actions that *might* cause personal injury or instrument damage. You can find the following safety symbols on your instrument or in this guide.

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.
	**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.
	**HAND AND CHEMICAL HAZARD:** Indicates that chemical damage or physical injury *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.

Symbol	Descriptor
	**MATERIAL AND EYE HAZARD:** Indicates that eye damage *could* or *might* occur.
	**RADIOACTIVE:** Indicates that exposure to radioactive material *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.
	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.*

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, this ranges from about 4% to 74.2% by volume.

Hydrogen has a flash point of - 423 °F (- 253 °C) and an auto-ignition temperature of 1,040 °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 FIRE 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, you should conduct a risk assessment based on the quantity of hydrogen to be used and the conditions of your laboratory. You should ask yourself:

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

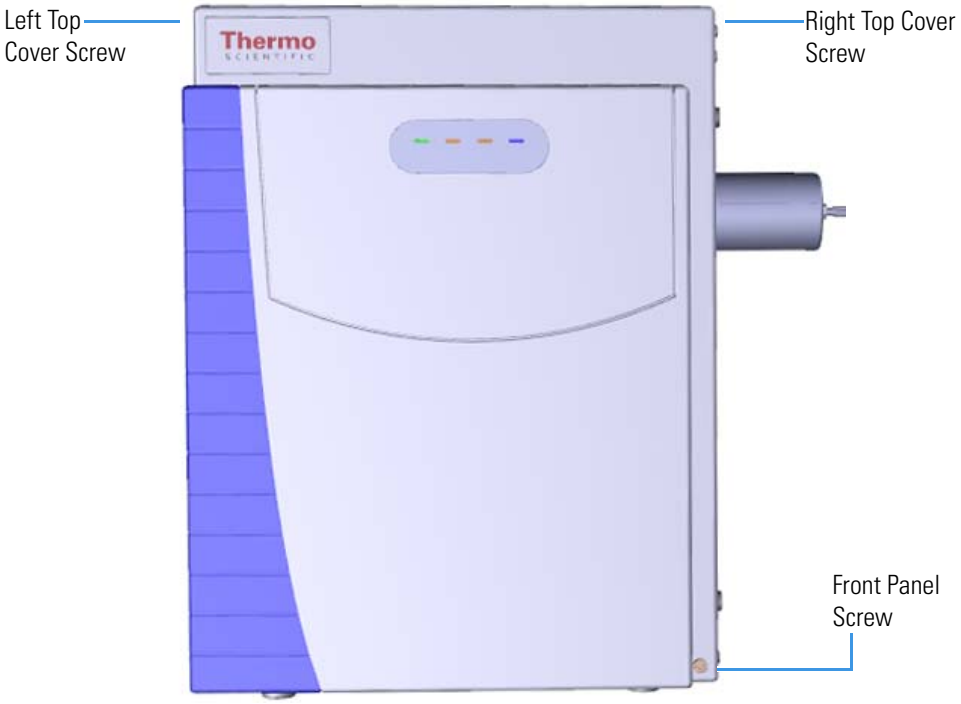
"What hydrogen hazards associated with this project have the potential to result in the worst consequences?"

- Try to reduce or eliminate the higher risks by using the proper ventilation to remove hydrogen gas before an ignitable concentration can accumulate. You should also consider purging the hydrogen to further reduce hazards and ensure anyone who will be working with hydrogen has basic hydrogen safety training.
- As with laboratory safety in general, be sure to wear safety glasses, laboratory coats, gloves, etc. 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, insulated gloves and protective shoes should be worn in addition to eye protection.
- You should post "No Smoking" and "No Open Flames" signs to identify hydrogen sources and cylinders. Maintain, inspect and leak-test all hydrogen sources regularly.
- All hydrogen shutoff valves should be clearly marked and permanent hydrogen piping should be labeled as such at the supply or discharge point and at regular intervals along its length. Where hydrogen gas piping passes through a wall, the piping should be labeled on both sides of the wall.
- There should also be contingency plans in place should an incident occur.
- The site emergency response team, as well as the local fire department, should know the location of all hydrogen storage tanks.

Using Hydrogen with TSQ Duo

To use hydrogen with the TSQ Duo, you must always shut off the GC carrier gas before venting or turning off the TSQ Duo. There are three hydrogen safety screws on the TSQ Duo that **must** be in place. These are attached to your instrument at the factory.

Figure 1. Hydrogen Safety Screws on the TSQ Duo



Before powering on the TSQ Duo system, ensure that:

- All the covers and panels of the TSQ Duo system are firmly attached.
- The vent valve is tightly closed if you vented the system.
- All fittings, ferrules, and o-rings are sealed.

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 GC/MS.

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

  To prevent the possibility of releasing hydrogen, the hydrogen generator should be set 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 oxygen exhausted by the electrolyzer should be vented to the outside as well.

- **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. However, compressed hydrogen gas cylinders, like all compressed gas cylinders, must be secured in an upright position, ideally with a non-combustible chain or cable. If the cylinder falls over, the valve can be knocked off and the pressurized cylinder can take off like a rocket, which leads 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 is 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 might 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), please read the hazard indications and information reported in the applicable Material Safety Data Sheet (MSDS). Use personal protective equipment according to the safety requirements.

Biological Hazard Warning Note

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

The appropriate warning labels are included with the shipment of the instrument. It is the user's responsibility to label the relevant parts of the equipment.

When working with biohazardous materials, you are responsible for fulfilling the following mandatory requirements:

- Providing instructions on how to safely handle biohazardous material.
- Training operators to be aware of potential hazards.

- Providing personal protective equipment.
- Providing instructions for what to do if operators are exposed to aerosols or vapors during normal operation (within the intended use of the equipment) or in case of single fault situations such as a broken vial. The protective measures must consider potential contact with the skin, mouth, nose (respiratory organs), and eyes.
- Providing instructions for decontamination and safe disposal of relevant parts.

WARNING The user or operator is responsible for the safe handling of hazardous chemicals or biological compounds including (but not limited to) bacterial or viral samples and the associated waste, according to international and local regulations.

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 split and purge flow vents; therefore, be sure to vent the exhaust gases to a fume hood. Consult local environmental and safety regulations for instructions in exhausting fumes from your system.

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 www.thermoscientific.com/en/products/mass-spectrometry.html for information about our products.

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

Go to www.thermoscientific.com/en/support-landing/support.html.

❖ **To suggest changes to documentation or to Help**

- Fill out a reader survey online at www.surveymonkey.com/s/PQM6P62.
- Send an e-mail message to the Technical Publications Editor at techpubs-austin@thermofisher.com.

Ordering Spare Parts

This chapter contains illustrations and part numbers for all of the replaceable components in the TSQ Duo mass spectrometer. Refer to the *TSQ Duo Hardware Manual* for information about installing these components in your instrument. Any component with a part number can be ordered from us. Components without a part number are not available.

Contents

Identifying A Part

To identify a part, you need to know where it was located on the TSQ Duo mass spectrometer or the part's relationship to a particular functionality of the instrument. Use the categories in the table below to find a location or functionality that relates to the component you need. For example, if you know the part is related to the calibration gas, look in the Calibration Gas Components category. Then refer to the illustrations in that category to visually identify that particular part.

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

Table 1. Parts That Can Be Reordered (Sheet 1 of 10)

Component	Thermo Scientific Part Number	Category
Single Flow Calibration Gas Module	1R119246-0004	Calibration Gas Components
Dual Flow Calibration Gas Module	1R119246-0003	
Calibrant Reservoir Kit	1R120433-0001	
Transfer Line	1R120402-0001	
O-ring for Transfer Line	1R3814-223	
Screws for Transfer Line	1R76913-0410	
Gas Mixing Chamber Kit	1R120574-KIT	
Gas Mixing Chamber (1)	1R120574-0054	
Source Gas Tube (2 in Kit)	1R120574-0055 (PN orders 1)	
M3 × 8 mm Screw (2 in Kit)	1R76913-0308	
Calibration Gas Line	1R120438-0010	
Delivery Tube	1R120404-1202	
FC-43 Calibration Compound	50010-30059	
Collision Gas Module	1R119246-0005	Collision Gas Components
Tube Fitting, Collision Gas Module to Manifold	1R76256-0045	
Collision Gas Tube	1R120557-0030	
Tee, 1/8 in.	1R76256-0126	

Table 1. Parts That Can Be Reordered, continued (Sheet 2 of 10)

Component	Thermo Scientific Part Number	Category
Graphite Vespel™ Ferrule for 0.25 mm Columns (pkg of 10)	29033496	Column Components
Graphite Vespel™ Ferrule for 0.18 mm Columns (pkg of 10)	1R76458-2016	
Graphite Vespel Ferrule for 0.32 mm Columns (pkg of 10)	1R76458-2019	
Graphite Vespel Ferrule for 0.53 mm Columns (pkg of 10)	1R76458-2020	
2-hole Graphite Vespel Ferrule for <0.32mm Column (pkg of 10)	1R76458-2018	
No-Hole Graphite Vespel Ferrule (pkg of 10)	1R76458-2009	
SilTite™ Ferrule for 0.10-0.25mm ID Column (pkg of 10)	1R76458-2000	
SilTite Ferrule for 0.32mm Columns (pkg10)	1R76458-2024	
SilTite Ferrule for 0.53mm Columns (pkg10)	1R76458-2026	
Graphite Vespel Ferrule for 0.1–0.25 mm Columns for use with Spring-loaded Transfer Line Nut (pkg of 10)	290VA191	
Spring Loaded Transferline Nut	1R120434-0100	
Nut for SilTite Ferrules (pkg of 5)	1R76458-2001	
Nickel-Coated Nut for Graphite Vespel Ferrule (pkg of 5)	1R76256-0060	
Air Deflector	1R120552-0010	Fan and Filter Components
Front Wire Mesh Filter	1R120554-0010	
Left Rear Wire Mesh Filter	1R120554-0020	
Fan Plenum	1R120553-0020	
Fan Filter (Plastic)	1R76475-5005	
Turbo Cooling Fan	1R120443-0003	
Trap O_2 / H_2O, Hydrocarbon	A0950-01600	
Replacement Trap	A0950-R1600	
Chassis Cooling Fan	1R120443-0001	
Nylon Rivet for Cooling Fan	1R3326-5000	

Table 1. Parts That Can Be Reordered, continued (Sheet 3 of 10)

Component	Thermo Scientific Part Number	Category
Source Heater Block	1R120404-1311	Ion Source Components
Repeller Plate	1R120404-1312	
Source-Repeller Thumbscrew	1R120564-0004	
Thumbscrew-Repeller Spacer	1RTSLI053A	
Lens/Source Heater	1R120404-1330	
Lens Heater Block	1R120404-1323	
Lock Washer for Lens Heater Block	1R76902-0004	
Screw for Lens Heater Block	1R76913-0306	
Lens Heater Block Grounding Strap	1R120404-2010	
Lens Plate and Springs	1R120404-1750	
Copper Washer for Lens Plate	1R76483-5003	
Screw for Lens Plate	1R76913-0306	
Source to Ion Guide Spacer	1R120404-1340	
Insulating Spacer	1RTSLI050A	
EI Ion Source Cartridge (Low Activity), which includes:	1R120404-4100	
• Ion Cartridge Sleeve	1R120404-1105	
• EI Ion Volume (Low Activity)	1R120404-4111	
• Ion Volume-Repeller Insulator	1R120404-1114	
• Repeller (Low Activity)	1R120404-1161	
• Ion Volume Locking Ring	1R120404-1118	
• Repeller Spring (pkg of 5)	1R76485-1000K	
• Repeller Nut	1R120404-1120	
• Lens 3/RF Lens	1R120574-0103	
• Lens 1	1R120574-0139	
• Lens 2	1R120404-1140	

Table 1. Parts That Can Be Reordered, continued (Sheet 4 of 10)

Component	Thermo Scientific Part Number	Category
Electron Multiplier Plate	1R120405-1000	Electron Multiplier Components
Electron Multiplier	1R76022-14633	
Large Feedthrough	1R120610-0040	
O-ring for Large Feedthrough	1R3814-113	
Screw for Large Feedthrough	1R76913-0410	
Anode Feedthrough	1R120610-0050	
Anode Feedthrough Assembly Kit, includes:	1R120480-0012	
Anode Feedthrough Assembly	1R120610-0050	
O-ring for Anode Feedthrough	1R3814-110	
Standoff for Anode Feedthrough	1R77005-3010	
Screw for Anode Feedthrough (pkg of 4)	1R76913-0306	
Detector Assembly (Dynode, Electron Multiplier, and Lead Set)	1R120379-0001	
Dual Filament	1R120404-1940	Dual Filament Components
Filament Retaining Spring Kit	1R120404-1405	
Screw for Filament Retaining Spring	1R76913-0305	

Table 1. Parts That Can Be Reordered, continued (Sheet 5 of 10)

Component	Thermo Scientific Part Number	Category
Ion Guide	1R120404-3100	Analyzer Components
Ion-Guide Clamp	1R120404-3214	
Screws for Ion-Guide Clamp	1R76913-0316	
Ion-Guide Wire Set	1R120480-0004	
Analyzer Tray with Source Block and Ion Guide	1R120542-2535	
Quad 1 Wire Set	1R120480-0005	
Quad 3 Wire Set	1R120480-0006	
Q1 Quad Assembly	1R120542-2560	
Collision Cell Assembly	1R120574-0161	
Q3 Quad Assembly	1R120542-2570	
Q1 Exit Lens Wire	1R120542-2515	
Q3 Entrance Lens Wire	1R120542-2514	
Q3 Exit Lens Wire	1R120542-2513	
Q3 Exit Lens Assembly	1R120542-2536	
Wire Routing Clip	1R120542-2511	
Q1 Entrance Lens Endcap	1R120404-3211	
Q1 Entrance Lens Assembly	1R120404-3212	

Table 1. Parts That Can Be Reordered, continued (Sheet 6 of 10)

Component	Thermo Scientific Part Number	Category
Distribution Board	1R120485-0810	Board Components
Screw for Distribution Board	1R76913-0310	
Rear RF Board/Rod Driver Kit	1R120501-1002	
Front RF Board	1R120485-A060	
Rear RF Board	1R120485-A065	
Standoff for Rod Driver Board	1R76350-5003	
Screw for Rod Driver Board	1R76913-0306	
Front Rod Driver Board (50V)	1R120485-0415	
Rear Rod Driver Board (75V)	1R120485-0420	
Lens Driver Board	1R120485-A110	
Controller Interface Board	1R120485-0020	
Source Interface Board	1R120485-0210	
Electrometer Board	1R120354-0500	
Screw (6mm) for Electrometer Board	1R76913-0306	
Screw (16mm) for Electrometer Board	1R76913-0316	
Heat Shield for Source Interface Board	1R120404-2110	
Screw for Heat Shield	1R76913-0410	
Electrometer Shield	1R120368-0010	
Screw for Electrometer Shield	1R76913-0306	
20-pin Feedthrough	1R120610-0020	
O-ring for 20-Pin Feedthrough	1R3814-123	
Screw for 20-Pin Feedthrough	1R76913-0410	
4-pin Feedthrough	1R120610-0030	
O-ring for 4-Pin Feedthrough	1R3814-127	
Screw for 4-Pin Feedthrough	1R76913-0410	
Fan, 5 VDC	1R124170-5003	
Fan, 60 mm	1R120443-0002	
PC Communication Board	1R120354-0010	

Table 1. Parts That Can Be Reordered, continued (Sheet 7 of 10)

Component	Thermo Scientific Part Number	Category
Power Module	1R120544-0002	Power Module Components
Dynode and Multiplier Power Supply and Cables (EI only)	1R120361-0003	
Manifold Door Hinge	1R120565-0001	Manifold Components
Front Manifold Plate	1R120403-0002	
Large Top Glass Cover	1R120542-3000	
Small Top Glass Cover	1R120401-3000	
O-ring, Large for Back Glass	1R3814-376	
Manifold O-ring	1R3815-360	
Screw for Front Plate (M4 × 20 mm)	1R176913-0420	
Vent Valve Knob	1R120403-0104	
O-ring for Vent Valve Knob	1R3814-110	
Source Insertion Guide	1R120564-0001	
Front Door Alignment Pin	1R120564-0003	
Back Tray Alignment Pin	1R120403-0103	
Back Manifold Plate	1R120403-1001	
Magnet Yoke	1R120564-0002	
Source Magnet	1R70001-98195	
Right Side Panel	1R120541-0200	Cover Components
Left Hand Front Panel	1R120541-0003	
Left Hand Sub Panel	1R120541-0500	
Top Cover Panel	1R120541-0001	
TSQ Duo Front Cover	1R120548-0200	
Front Door Hinge	1R3434-5000	
Front Door Hinge Support	1R120445-0001	
Front Door Latch	1R76483-3000	
Rubber Spacers for Right Side Panel	1R3666-0207	
Chassis Foot	1R3666-0208	

Table 1. Parts That Can Be Reordered, continued (Sheet 8 of 10)

Component	Thermo Scientific Part Number	Category
Bushing in the Source Exchange Tool	1R120406-2203	TSQ Duo Tools
Seal in the Source Exchange Tool	1R120406-2204	
Clip in the Source Exchange Tool	1R76483-2102	
Source Exchange Tool	1R120406-2000	
MS Toolkit, which includes:	1R120467-0001	
Source Removal Tool (Small)	1R120406-2250	
Column Measurement Tool	1R120461-0010	
T10 Torxhead Key	1R3812-5T10	
T20 Torxhead Key	1R3812-5T20	
T30 Torxhead Key	1R3812-5T30	
Forceps, 8 in.	1R76360-0008	
Wrench, Open-Ended, 1/4-in., 5/16-in.	1R76360-0109	
Wrench, Open-Ended, 3/8 in., 7/16-in.	1R76360-0108	
Turbomolecular Pump	1R119268-0002	Pump Components
Rough Pump (RV3)	1R76505-3007	
Vacuum Hose (Order 10 ft)	1R76505-0625	
Claw Clamp	1R76505-0017	
Centering Ring	1R76505-2001	
Convectron Gauge	A0105-00501	
Oil Mist Filter	1R76505-0036	
Foreline Adapter	1R119244-0025	
Vacuum Pump Oil	A0301-15101	
Hydrogen Ion Volume	1R120404-4115	Upgrade Equipment
Ion Gauge Upgrade Kit	1R120560-0020	
Ion Gauge Mount	1R120416-0002	
Ion Gauge Tube Shield	1R119605-0012	
Ion Gauge O-ring	1R3814-116	
Replacement Ion Gauge Tube	A0105-06003	
Dust Filter	1R120442-0005	
Ion Gauge Board	1R120485-0120	

Table 1. Parts That Can Be Reordered, continued (Sheet 9 of 10)

Component	Thermo Scientific Part Number	Category
Crossover Cable	1R76396-0052	Cables
Ion Gauge Cable	1R119378-0063	
Electrometer Cable	1R76396-0500	
Transfer Line Cable	1R119378-0056	
Single Flow Calibration Gas Module Cable	1R119378-0061	
Roughing Pump Power Cable	1R76200-0250	
Convectron Gauge Cable	1R119378-0067	
CAT6 Connector	1R76322-0501	
Collision Gas Cable	1R119378-0071	
TSQ Duo Installation Kit	1R120459-0001	Other
TSQ Duo Specification Standards	1R120540-PERF	
TSQ Series Instrument Control Software	1R120579-0031	
Consumables Kit	1R120468-CONSUM	
Aluminum Oxide	1R32000-60340	
Cardinal Health CP100 Nitrile Cleanroom Gloves (Recommended to avoid contaminating instrument)	Fisher Scientific Catalog Number	Gloves
Size X-Small (Case)	19-120-2947	
Size Small (Case)	19-120-2947A	
Size Medium (Case)	19-120-2947B	
Size Large (Case)	19-120-2947C	
Size X-Large (Case)	19-120-2947D	

Table 1. Parts That Can Be Reordered, continued (Sheet 10 of 10)

Component	Thermo Scientific Part Number	Category
TSQ Duo Screw Kit, which includes:	1R120480-0014	—
• M3 x 6 mm Screw (pkg of 10)		
• M3 x 8 mm Screw (pkg of 10)		
• M3 x 10 mm Screw (pkg of 5)		
• M3 x 12 mm Screw (pkg of 5)		
• M3 x 16 mm Screw (pkg of 5)		
• M4 x 16 mm Screw (pkg of 5)		
• M4 x 20 mm Screw (pkg of 10)		
• M4 x 10 mm Screw (pkg of 10)		
• M3 x 8 mm Screw for Hinges (pkg of 5)		
• M4 x 8 mm Screw for Power Supply (pkg of 5)		
• M3 Locking Nut for Front Door Latch (pkg of 2)		
• M3 x 25mm Standoff for RF Board (pkg of 2)		

* All of the screws in this table must be cleaned before you install them inside the vacuum manifold. See *Cleaning Durable Components* in the *TSQ Duo Hardware Manual* for details.

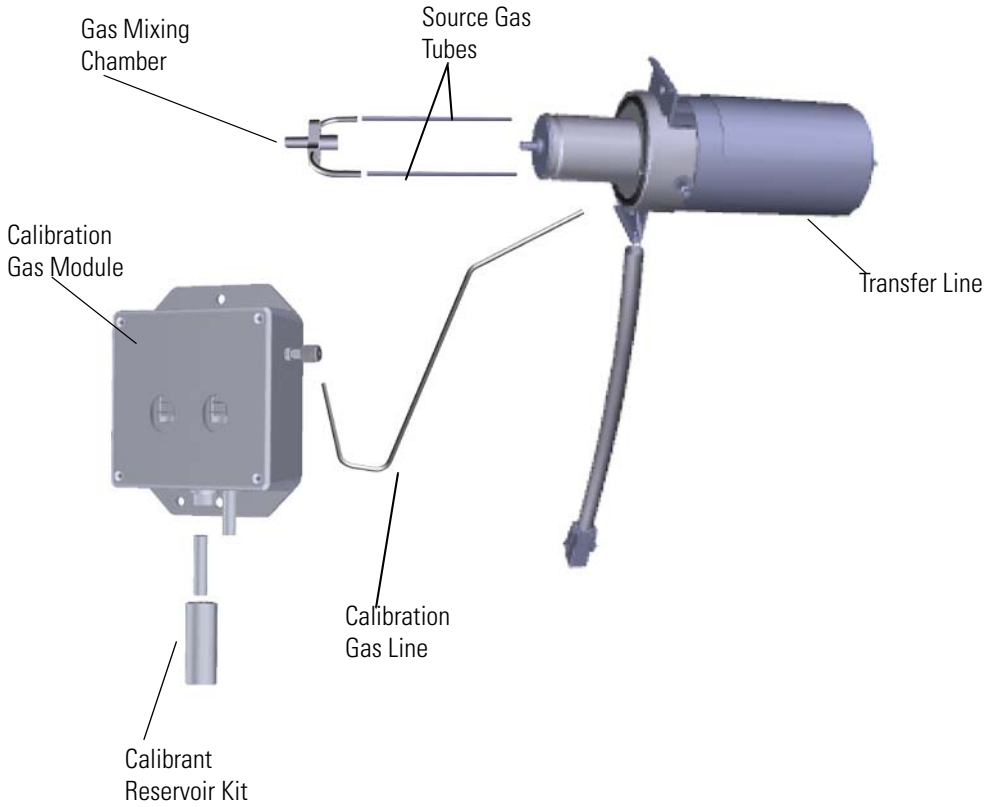
Calibration Gas Components

You can purchase the following calibration gas components for the TSQ Duo mass spectrometer. Be sure to reference the component's part number when placing an order with your local Sales/Service Representative. See the *TSQ Duo Hardware Manual* for information about installing these components or Table 1 for a full list of available components.

The following calibration gas components can be replaced on your mass spectrometer.

- Transfer Line
- Single Flow Calibration Gas Module
- Dual Flow Calibration Gas Module
- Calibrant Reservoir Kit
- Calibration Gas Line
- Gas Mixing Chamber
- FC-43 Calibration Compound

Figure 1. Replaceable Calibration Gas Components



Transfer Line	Quantity: Each

Thermo Scientific Part Number	1R120402-0001

NOTE: To replace all the M4 x 10 mm screws on the transfer line, order two of PN 1R76913-0410. To replace the o-ring on the transfer line, order PN 1R3814-223. PN 1R120402-0001 includes one o-ring initially.

Single Flow Calibration Gas Module	Quantity: Each

Thermo Scientific Part Number	1R119246-0004

NOTE: To replace all the M4 x 10 mm screws on the calibration gas module, order two of PN 1R76913-0410.

Dual Flow Calibration Gas Module	Quantity: Each

Thermo Scientific Part Number	1R119246-0003

NOTE: To replace all the M4 x 10 mm screws on the calibration controller, order two of PN 1R76913-0410.

Calibrant Reservoir Kit	Quantity: Each

Thermo Scientific Part Number	1R120433-0001

Gas Mixing Chamber	Quantity: Each

Thermo Scientific Part Number	1R120574-0054

NOTE: To replace all the M3 x 8 mm screws on the gas mixing chamber, order two of PN 1R76913-0308.

Note The Gas Mixing Chamber (PN 1R120574-0054), two Source Gas Tubes (PN 1R120574-0055), and two M3 × 8 mm screws (PN 1R176913-0308) can be ordered as a kit. To purchase the Gas Mixing Chamber Kit, order PN 1R120574-KIT.

Source Gas Tube	Quantity: Each

Thermo Scientific Part Number	1R120574-0055

Calibration Gas Line	Quantity: Each

Thermo Scientific Part Number	1R120438-0010

FC-43 Calibration Compound	Quantity: Each

Thermo Scientific Part Number	50010-30059

Collision Gas Components

You can purchase the following collision gas components for the TSQ Duo mass spectrometer. Be sure to reference the component's part number when placing an order with your local Sales/Service Representative. See the *TSQ Duo Hardware Manual* for information about installing these components or Table 1 for a comprehensive list of available components.

The following collision gas components can be replaced on your mass spectrometer.

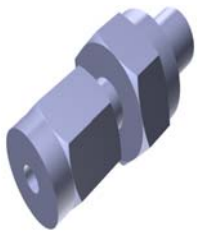
- Collision Gas Module
- Tube Fitting, Collision Gas Module to Manifold
- Collision Gas Tube
- Tee, 1/8 in.

Collision Gas Module	**Quantity: Each**

Thermo Scientific Part Number	**1R119246-0005**

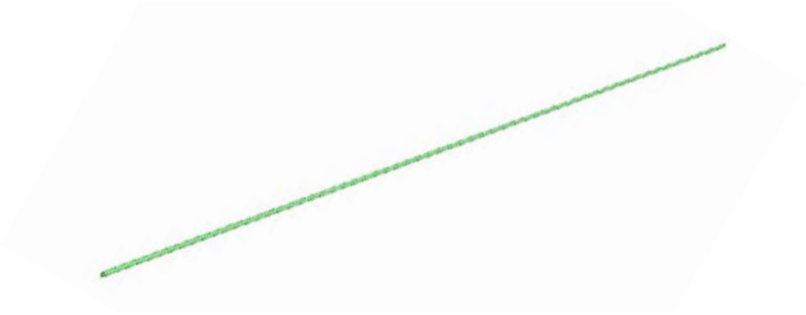
NOTE: This PN includes the module cable (PN 1R119378-0071), tubing (PN 1R120557-0030), and 1/8 in. tee (PN 1R76256-0126).

Tube Fitting, Collision Gas Module to Manifold	**Quantity: Each**



Thermo Scientific Part Number	**1R76256-0045**

Collision Gas Tube	Quantity: Each



Thermo Scientific Part Number	1R120557-0030

Tee, 1/8 in.	Quantity: Each

Thermo Scientific Part Number	1R76256-0126

Column Components

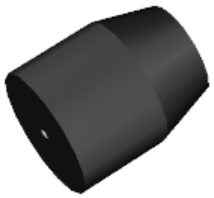
You can purchase the following column components for the TSQ Duo mass spectrometer. Be sure to reference the component's part number when placing an order with your local Sales/Service Representative. See the *TSQ Duo Hardware Manual* for information about installing these components or Table 1 for a comprehensive list of available components.

The following column components can be replaced on your mass spectrometer.

- Graphite Vespel Ferrule for 0.25 mm Columns
- Graphite Vespel Ferrule for 0.18 mm Columns
- Graphite Vespel Ferrule for 0.32 mm Columns
- Graphite Vespel Ferrule for 0.53 mm Columns
- 2-Hole Graphite Vespel Ferrule for <0.32mm Columns
- No-Hole Graphite Vespel Ferrule
- SilTite Ferrule for 0.25 mm Columns
- SilTite Ferrule for 0.32mm Columns
- SilTite Ferrule for 0.53mm Columns
- Graphite Ferrule for 0.1–0.25 mm Columns used with Spring-loaded Transfer Line Nut
- Spring Loaded Transferline Nut
- Nickel-Coated Nut for Graphite Vespel Ferrules
- Nut for SilTite Ferrules

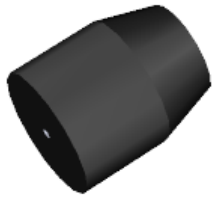
Note Visit www.thermo.com/columns for information about ordering a column.

Graphite Vespel Ferrule for 0.25 mm Columns	**Quantity: Pkg of 10**



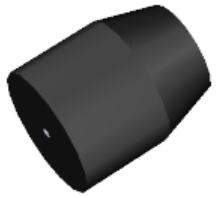
Thermo Scientific Part Number	**29033496**

Graphite Vespel Ferrule for 0.18 mm Columns	Quantity: Pkg of 10



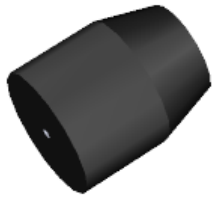
Thermo Scientific Part Number	1R76458-2016

Graphite Vespel Ferrule for 0.32 mm Columns	Quantity: Pkg of 10



Thermo Scientific Part Number	1R76458-2019

Graphite Vespel Ferrule for 0.53 mm Columns	Quantity: Pkg of 10



Thermo Scientific Part Number	1R76458-2020

2-Hole Graphite Vespel Ferrule for <0.32mm Columns	Quantity: Pkg of 10

Thermo Scientific Part Number	1R76458-2018

No-Hole Graphite Vespel Ferrule	Quantity: Pkg of 10

Thermo Scientific Part Number	1R76458-2009

SilTite Ferrule for 0.25 mm Columns	Quantity: Pkg of 10

Thermo Scientific Part Number	1R76458-2000

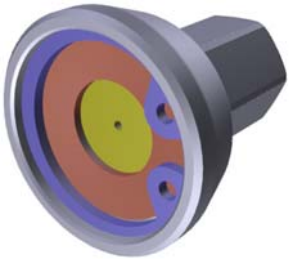
SilTite Ferrule for 0.32mm Columns	Quantity: Pkg of 10

Thermo Scientific Part Number	1R76458-2024

SilTite Ferrule for 0.53mm Columns	Quantity: Pkg of 10

Thermo Scientific Part Number	1R76458-2026

Spring Loaded Transferline Nut	Quantity: Each

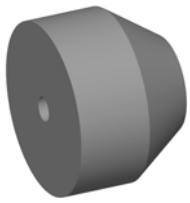


Thermo Scientific Part Number	1R120434-0100

Nut for SilTite Ferrules	Quantity: Pkg of 5

Thermo Scientific Part Number	1R76458-2001

Graphite Ferrule for 0.1–0.25 mm Columns used with Spring-loaded Transfer Line Nut	Quantity: Pkg of 10



Thermo Scientific Part Number	290VA191

Nickel-Coated Nut for Graphite Vespel Ferrules	Quantity: Pkg of 5

Thermo Scientific Part Number	1R76256-0060

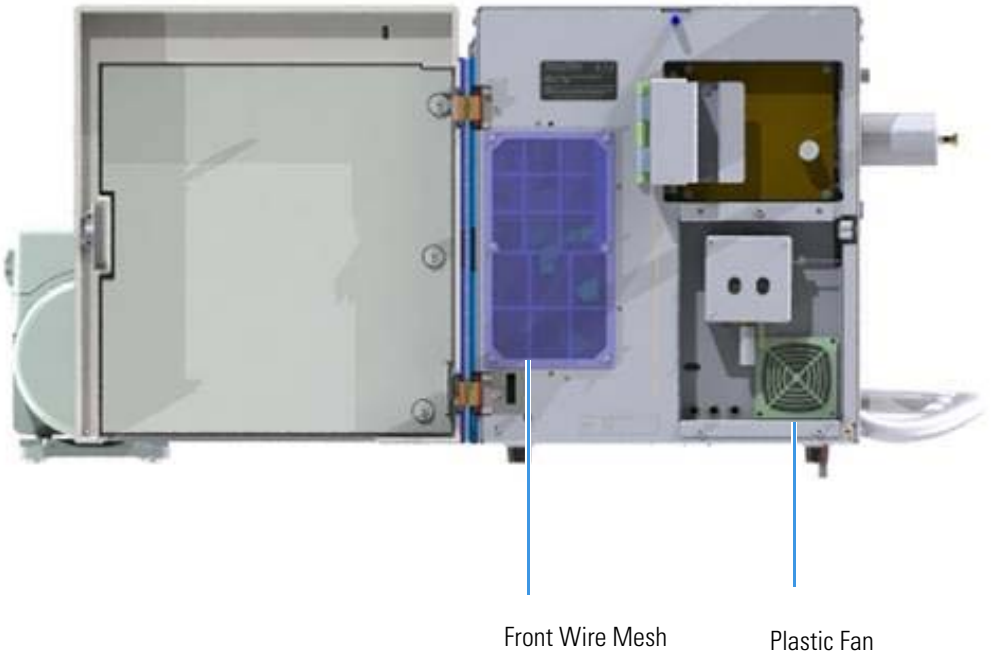
Fan and Filter Components

You can purchase the following fan and filter components for the TSQ Duo mass spectrometer. Be sure to reference the component's part number when placing an order with your local Sales/Service Representative. See the *TSQ Duo Hardware Manual* for information about installing these components or Table 1 for a comprehensive list of available components.

The following fan and filter components can be replaced on your mass spectrometer.

- Air Deflector
- Front Wire Mesh Filter
- Left Rear Wire Mesh Filter
- Fan Plenum
- Fan Filter (Plastic)
- Turbo Cooling Fan
- Chassis Cooling Fan

Figure 2. Fan and Filter Components



Air Deflector	Quantity: Each

Thermo Scientific Part Number	1R120552-0010

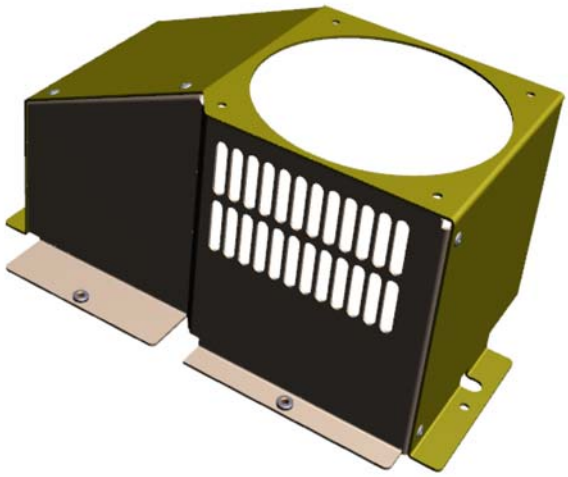
Front Wire Mesh Filter	Quantity: Each

Thermo Scientific Part Number	1R120554-0010

Left Rear Wire Mesh Filter	Quantity: Each

Thermo Scientific Part Number	1R120554-0020

Fan Plenum	Quantity: Each

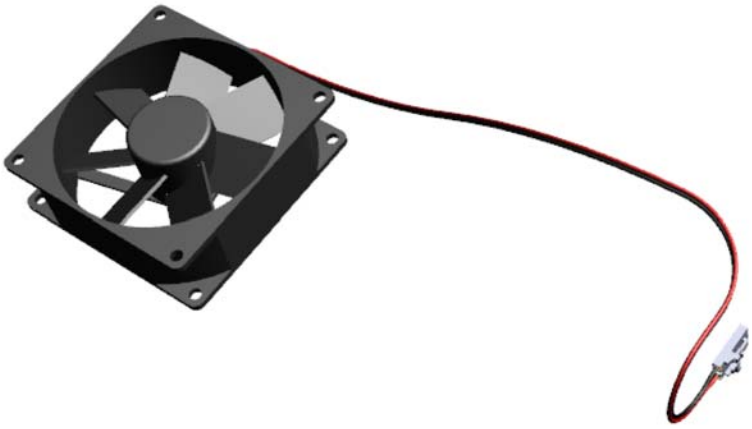


Thermo Scientific Part Number	1R120553-0020

Fan Filter (Plastic)	Quantity: Each

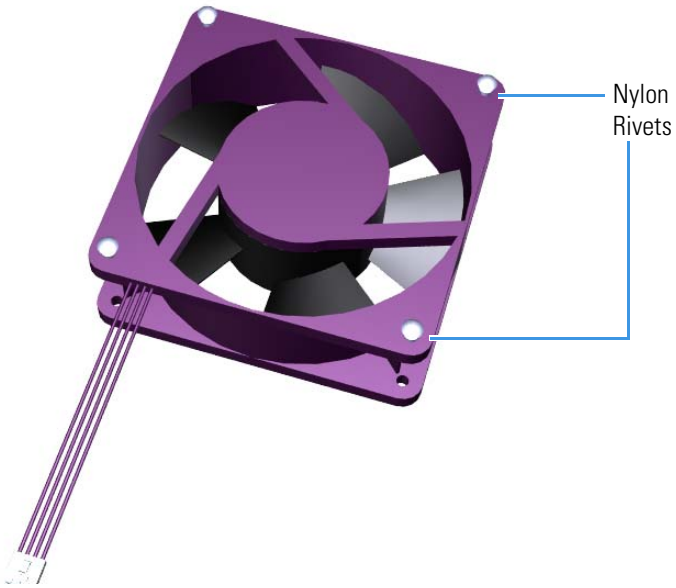
Thermo Scientific Part Number	1R76475-5005

Turbo Cooling Fan	Quantity: Each



Thermo Scientific Part Number	1R120443-0003

Chassis Cooling Fan	**Quantity: Each**



Thermo Scientific Part Number	**1R120443-0001**

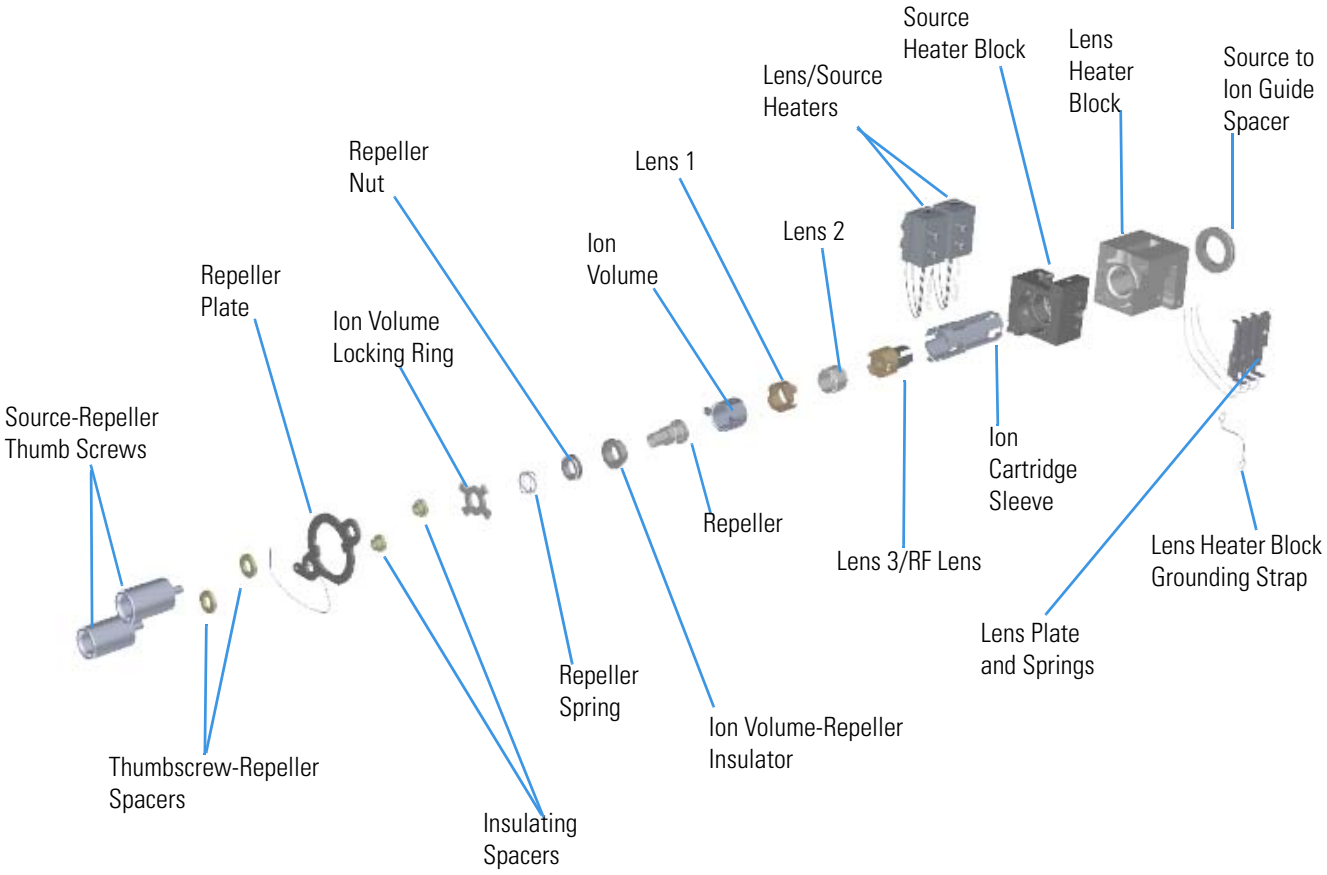
NOTE: To replace all of the nylon rivets on the chassis cooling fan, order four of PN 1R3326-5000.

Ion Source Components

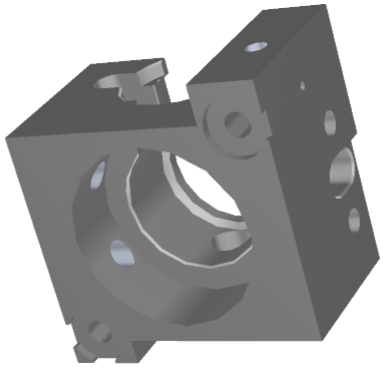
The following ion source components can be replaced on the TSQ Duo mass spectrometer. Be sure to reference the component's part number when placing your order. See the *TSQ Duo Hardware Manual* for information about installing these components or Table 1 for a comprehensive list of available components.

- Source Heater Block
- Repeller Plate
- Source-Repeller Thumbscrew
- Thumbscrew-Repeller Spacer
- Insulating Spacer
- Lens/Source Heater
- Lens Heater Block
- Lens Heater Block Grounding Strap
- Lens Plate and Springs
- Source to Ion Guide Spacer
- Ion Source Cartridge (Low Activity)
  - Ion Cartridge Sleeve
  - EI Ion Volume (Low Activity)
  - Ion Volume-Repeller Insulator
  - Repeller (Low Activity)
  - Ion Volume Locking Ring
  - Repeller Spring
  - Repeller Nut
  - Lens 3/RF Lens
  - Lens 1
  - Lens 2

Figure 3. Replaceable Components of the Ion Source



Source Heater Block	**Quantity: Each**



Thermo Scientific Part Number	**1R120404-1311**

Repeller Plate	Quantity: Each

Thermo Scientific Part Number	1R120404-1312

Source-Repeller Thumbscrew	Quantity: Each

Thermo Scientific Part Number	1R120564-0004

NOTE: There are two source-repeller thumbscrews on the ion source, so to replace them, order two of PN 1R120564-0004.

Thumbscrew-Repeller Spacer	Quantity: Each

Thermo Scientific Part Number	1RTSLI053A

NOTE: There are two thumbscrew-repeller spacers on the ion source, so to replace them, order two of PN 1RTSLI053A.

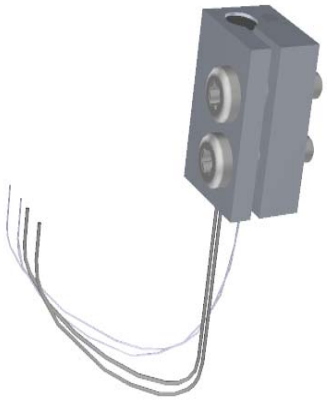
Insulating Spacer	Quantity: Each

Thermo Scientific Part Number	1RTSLI050A

NOTE: There are two insulating spacers on the ion source, so to replace them, order two of PN 1RTSLI050A.

Lens/Source Heater

Quantity: Each

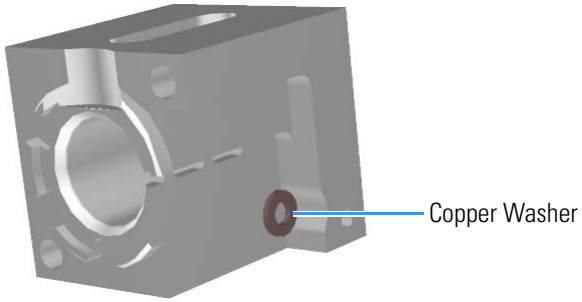


Thermo Scientific Part Number	1R120404-1330

NOTE: There are two lens/source heaters on the ion source, so to replace them, order two of PN 1R120404-1330. To replace the M4 x 20 mm screws on each lens/source heater, order two of PN 1R76913-0420. To replace the lock washers, order PN 1R76902-0004.

Lens Heater Block

Quantity: Each



Thermo Scientific Part Number	1R120404-1323

NOTE: To replace the M3 x 6 mm screw on the lens heater block, order PN 1R76913-0306. To replace the copper washer, order PN 1R76483-5003.

Lens Heater Block Grounding Strap

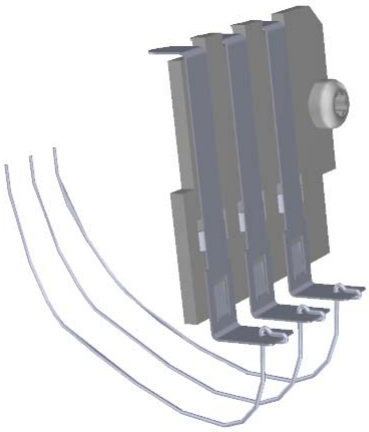
Quantity: Each

Thermo Scientific Part Number	1R120404-2010

NOTE: To replace all the M3 x 6 mm screws on the grounding strap, order two of PN 1R76913-0306.

Lens Plate and Springs

Quantity: Each



Thermo Scientific Part Number	1R120404-1750

NOTE: To replace the M3 x 6 mm screw on the lens plate and springs, order PN 1R76913-0306. To replace the copper washer, order PN 1R76483-5003.

Source to Ion Guide Spacer	Quantity: Each

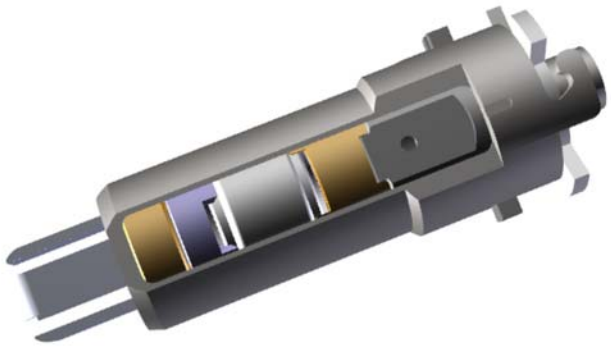
Thermo Scientific Part Number	1R120404-1340

Ion Source Cartridge Components

The ion source cartridge consists of the following components. See the *TSQ Duo Hardware Manual* for information about installing these components or Table 1 for a comprehensive list of available components.

- Ion Source Cartridge (Low Activity)
- Ion Cartridge Sleeve
- EI Ion Volume (Low Activity)
- Ion Volume-Repeller Insulator
- Repeller (Low Activity)
- Ion Volume Locking Ring
- Repeller Spring
- Repeller Nut
- Lens 1
- Lens 3/RF Lens
- Lens 2

Ion Source Cartridge (Low Activity)	**Quantity: Each**



Thermo Scientific Part Number	**1R120404-4100**

Ion Cartridge Sleeve	Quantity: Each

Thermo Scientific Part Number	1R120404-1105

EI Ion Volume (Low Activity)	Quantity: Each

Thermo Scientific Part Number	1R120404-4111

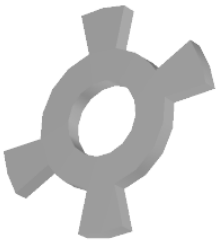
Ion Volume-Repeller Insulator	Quantity: Each

Thermo Scientific Part Number	1R120404-1114

Repeller (Low Activity)	Quantity: Each

Thermo Scientific Part Number	1R120404-1161

Ion Volume Locking Ring	Quantity: Each



Thermo Scientific Part Number	1R120404-1118

Repeller Spring	Quantity: Pkg of 5

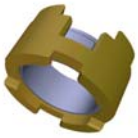
Thermo Scientific Part Number	1R76485-1000K

NOTE: Although the ion source only contains one repeller spring, you will receive a package of five when you order PN 1R76485-1000K.

Repeller Nut	Quantity: Each

Thermo Scientific Part Number	1R120404-1120

Lens 1	Quantity: Each



Thermo Scientific Part Number	1R120574-0139

NOTE: This part replaces PN1R120404-1130.

Lens 3/RF Lens	Quantity: Each

Thermo Scientific Part Number	1R120574-0103

NOTE: This part replaces PN1R120404-1150. If you are upgrading from the legacy Lens 3/RF, the ion guide frequency should be tuned and saved. See the *TSQ Duo User Guide* for instructions.

Lens 2	Quantity: Each

Thermo Scientific Part Number	1R120404-1140

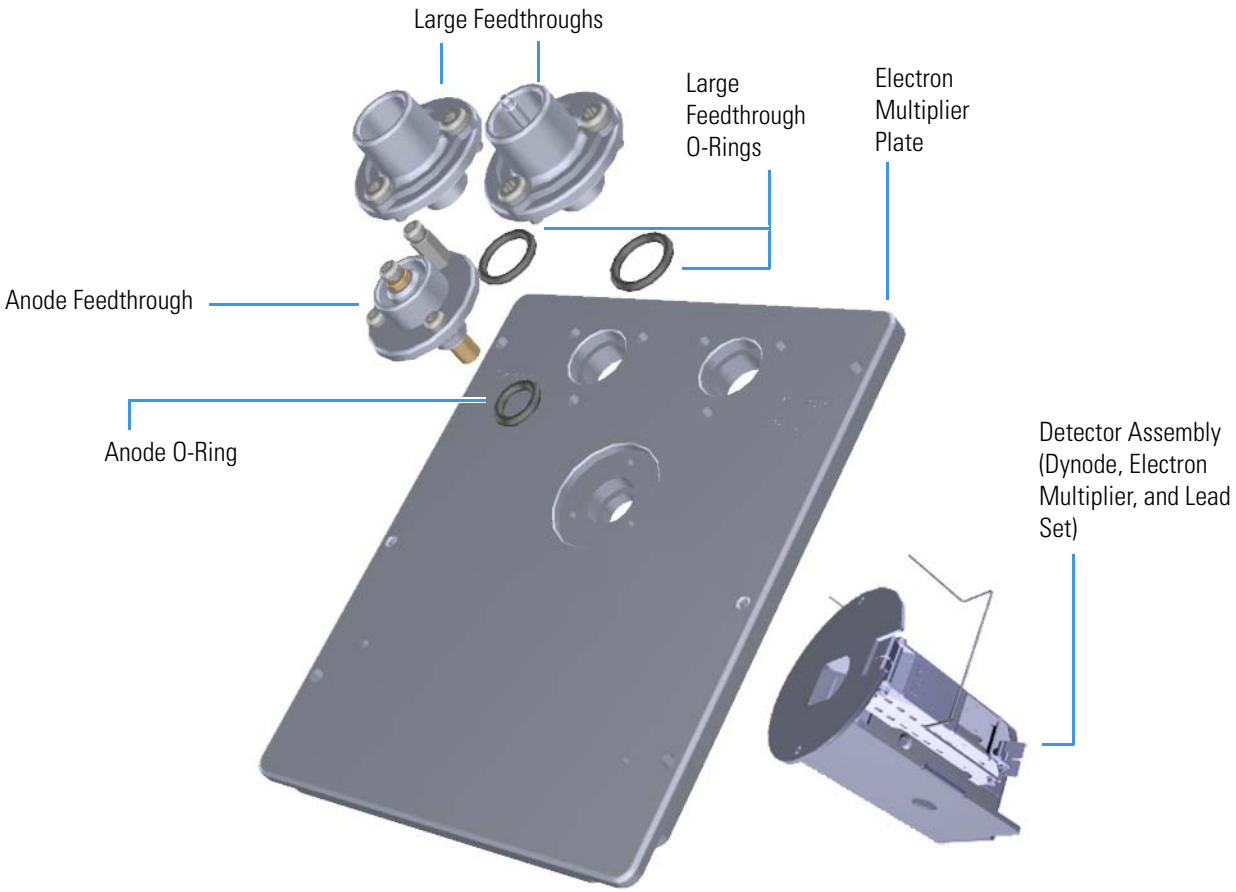
Electron Multiplier Components

You can purchase the following electron multiplier components for the TSQ Duo mass spectrometer. Be sure to reference the component's part number when placing an order with your local Sales/Service Representative. See the *TSQ Duo Hardware Manual* for information about installing these components or Table 1 for a comprehensive list of available components.

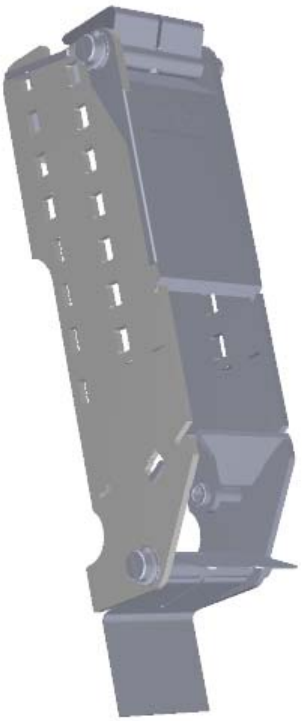
The following electron multiplier components can be replaced on your mass spectrometer.

- Electron Multiplier
- Electron Multiplier Plate
- Large Feedthrough
- Anode Feedthrough
- Detector Assembly (Dynode, Electron Multiplier, and Lead Set)

Figure 4. Replaceable Components of the Electron Multiplier

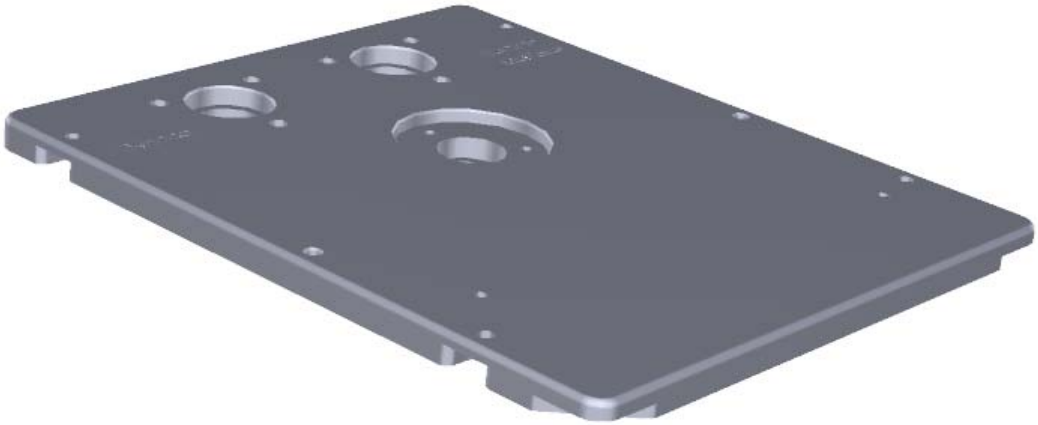


Electron Multiplier	Quantity: Each



Thermo Scientific Part Number	1R76022-14633

Electron Multiplier Plate	Quantity: Each

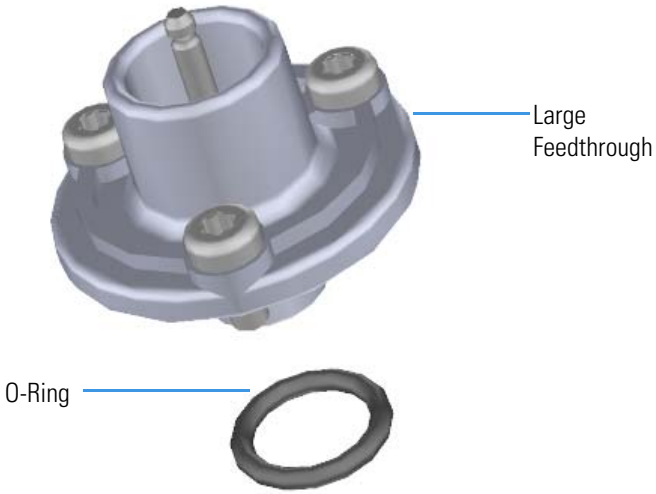


Thermo Scientific Part Number	1R120405-1000

NOTE: To replace the M4 x 10 mm screws, which secure the electron multiplier plate to the manifold, order four of PN 1R76913-0410.

Large Feedthrough

Quantity: Each

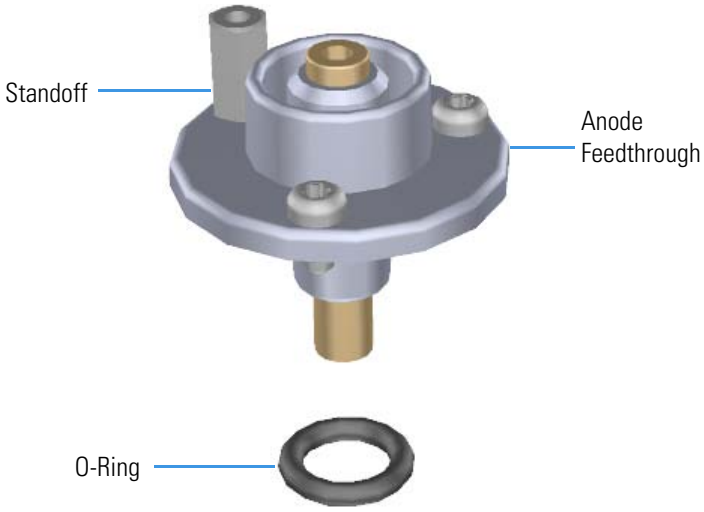


Thermo Scientific Part Number **1R120610-0040**

NOTE: There are two large feedthroughs on the TSQ Duo, so to replace them, order two of PN 1R120610-0040. To replace all the M4 x 10 mm screws on each large feedthrough, order three of PN 1R76913-0410. To replace the o-ring, order PN 1R3814-113.

Anode Feedthrough

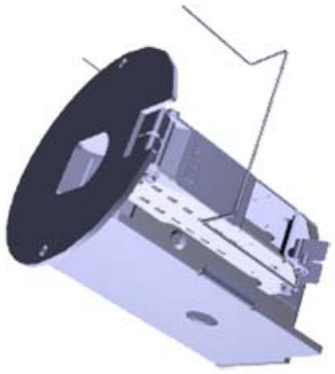
Quantity: Each



Thermo Scientific Part Number **1R120610-0050**

NOTE: To replace all the M3 x 6 mm screws on the anode feedthrough, order two of PN 1R76913-0306. To replace the o-ring, order PN 1R3814-110. To replace the standoff, order PN 1R77005-3010.

Detector Assembly (Dynode, Electron Multiplier, and Lead Set)	Quantity: Assembly



Thermo Scientific Part Number	1R120379-0001

NOTE: To replace the screws, order PN 1R76913-0306. You must clean the screws prior to installing them.

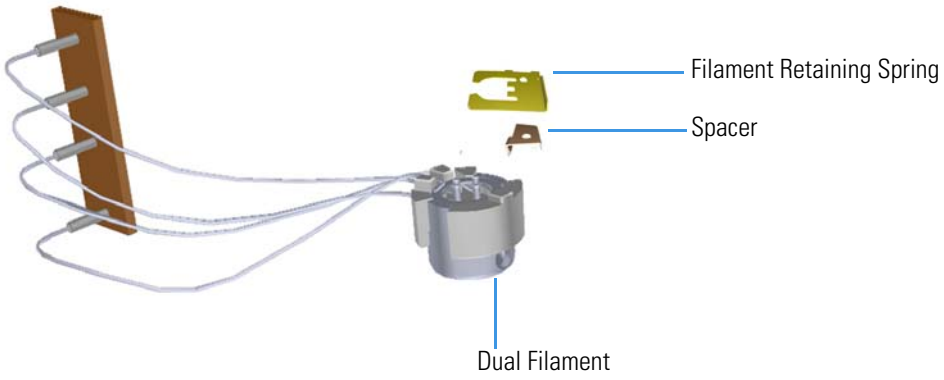
Dual Filament Components

You can purchase the following dual filament components for the TSQ Duo mass spectrometer. Be sure to reference the component's part number when placing an order with your local Sales/Service Representative. See the *TSQ Duo Hardware Manual* for information about installing these components or Table 1 for a comprehensive list of available components.

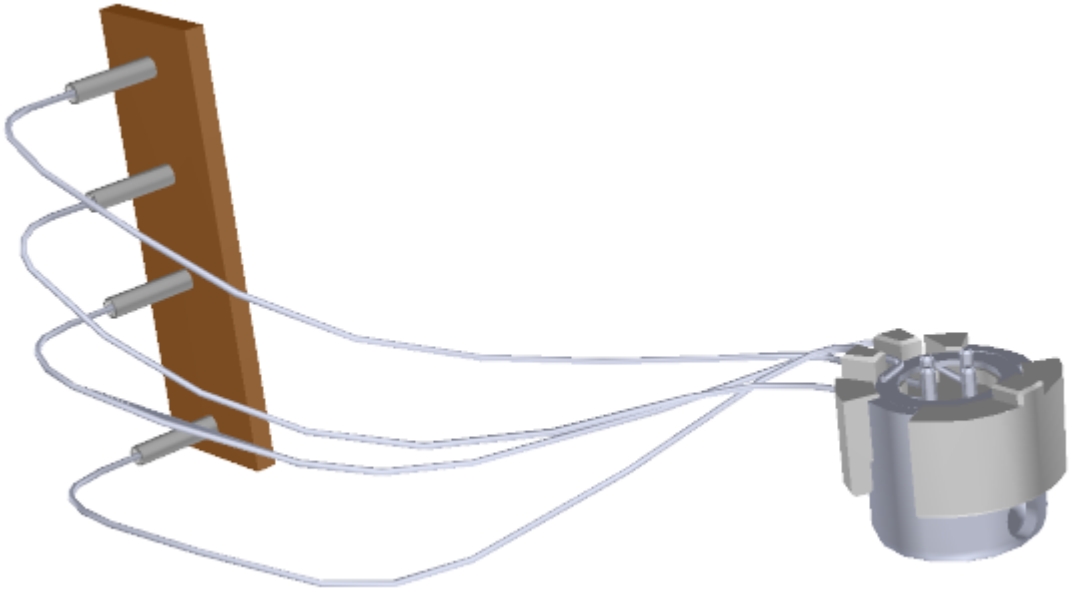
The following dual filament components can be replaced on your mass spectrometer.

- Dual Filament
- Filament Retaining Spring and Spacer

Figure 5. Replaceable Components of the Dual Filament



Dual Filament	Quantity: Each



Thermo Scientific Part Number	1R120404-1940

Filament Retaining Spring and Spacer	Quantity: Each

Thermo Scientific Part Number	1R120404-1405

NOTE: PN 1R120404-1405 contains the filament retaining spring, spacer, and screw. To replace only the M3 x 5 mm screw on the filament retaining spring, order PN 1R76913-0305.

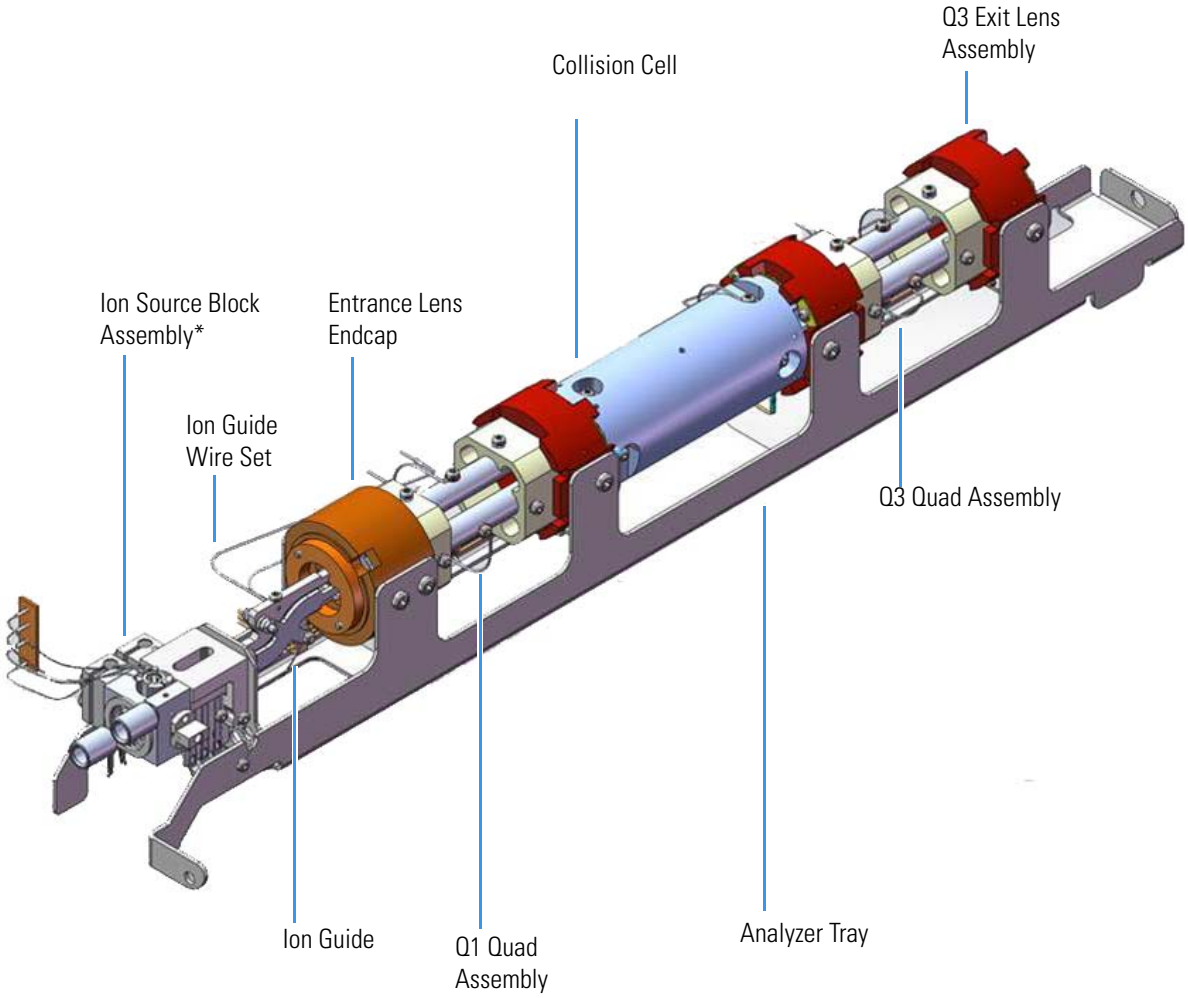
Analyzer Components

You can purchase the following analyzer components for the TSQ Duo mass spectrometer. Be sure to reference the component's part number when placing an order with your local Sales/Service Representative. See the *TSQ Duo Hardware Manual* for information about installing these components or Table 1 for a comprehensive list of available components.

The following analyzer components can be replaced on your mass spectrometer.

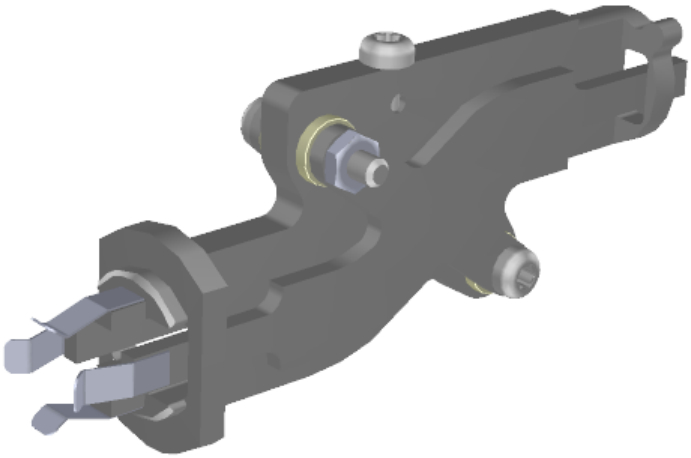
- Ion Guide
- Ion-Guide Clamp
- Ion Guide Wire Set
- Quad 1 Wire Set
- Quad 3 Wire Set
- Q1 Quad Assembly
- Collision Cell Assembly
- Q3 Quad Assembly
- Q3 Exit Lens Assembly
- Q1 Entrance Lens Endcap
- Q1 Entrance Lens Assembly
- Analyzer Tray with Source Block and Ion Guide
- Wire Routing Clip
- Q1 Exit Lens Wire
- Q3 Entrance Lens Wire
- Q3 Exit Lens Wire

Figure 6. Replaceable Components of the Analyzer



* See Ion Source Components for information about ordering the ion source.

Ion Guide	Quantity: Each



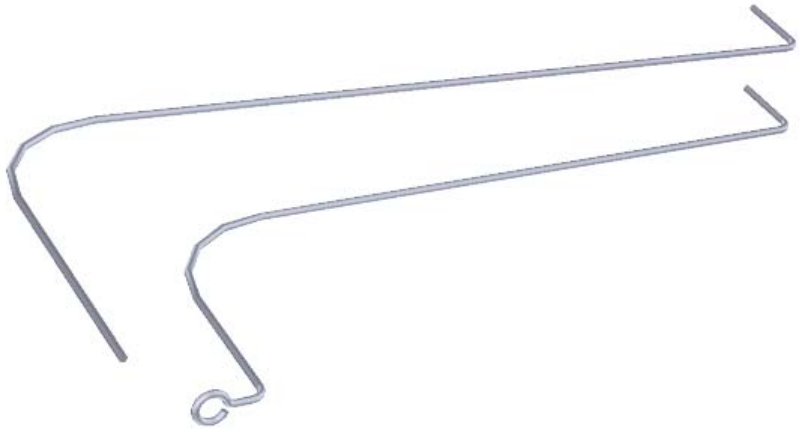
Thermo Scientific Part Number	1R120404-3100

Ion-Guide Clamp	Quantity: Each

Thermo Scientific Part Number	1R120404-3214

NOTE: To replace all the M3 x 16 mm screws on the ion-guide clamp, order two of PN 1R76913-0316.

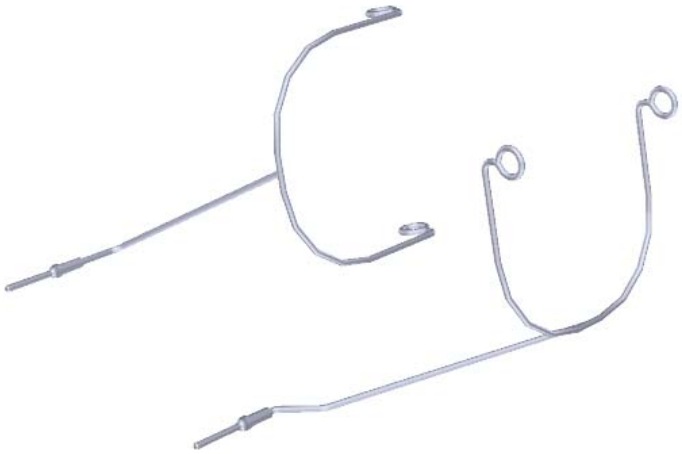
Ion Guide Wire Set	Quantity: Pkg of 2



Thermo Scientific Part Number	1R120480-0004

NOTE: To replace the M3 nut on the ion guide wire set, order PN 1R76904-0003.

Quad 1 Wire Set	Quantity: Pkg of 2

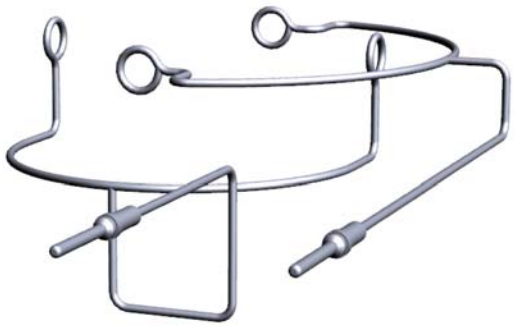


Thermo Scientific Part Number	1R120480-0005

NOTE: To replace all the M3 x 5 mm screws on the quad wire set, order four of PN 1R76913-0305. To replace all the copper washers, order eight of PN 1R76483-5003.

Quad 3 Wire Set

Quantity: Pkg of 2

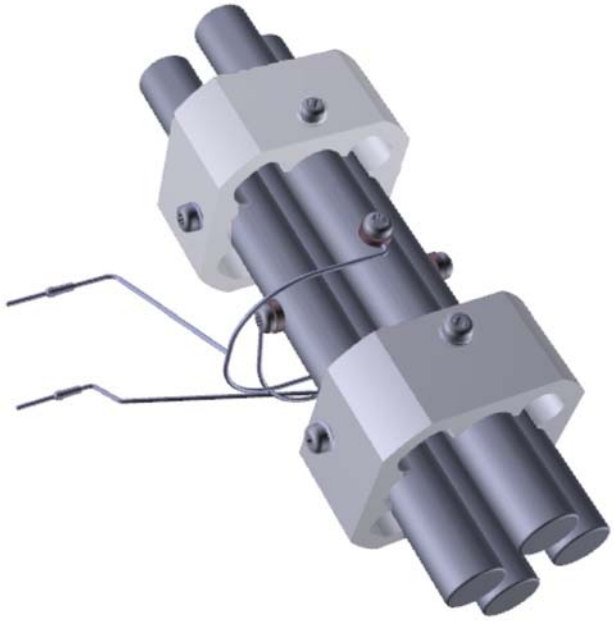


Thermo Scientific Part Number	1R120480-0006

NOTE: To replace all the M3 x 5 mm screws on the quad wire set, order four of PN 1R76913-0305. To replace all the copper washers, order eight of PN 1R76483-5003.

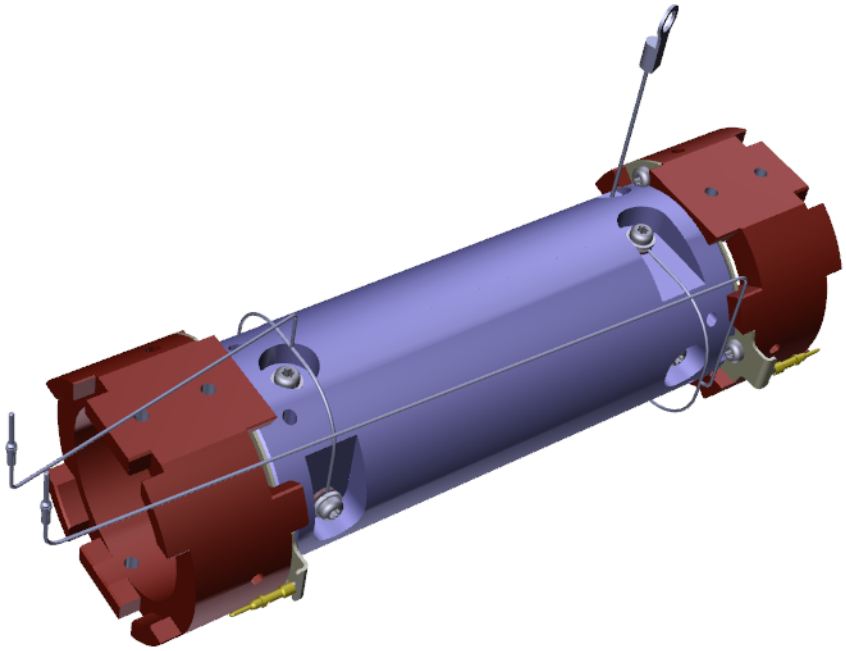
Q1 Quad Assembly

Quantity: Each



Thermo Scientific Part Number	1R120542-2560

Collision Cell Assembly	Quantity: Each



Thermo Scientific Part Number	1R120574-0161

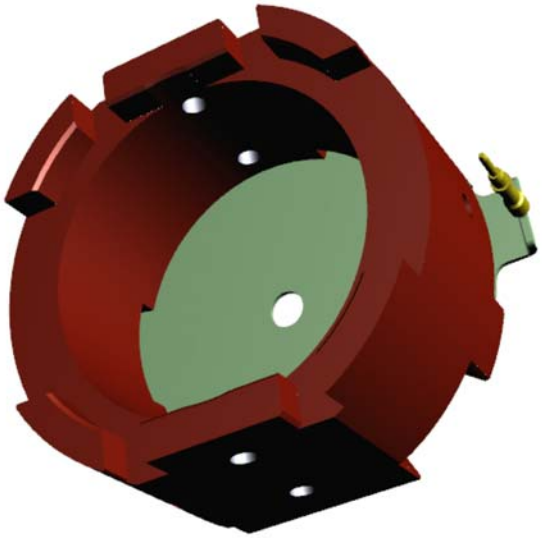
NOTE: To replace all the M4 x 6 mm screws to mount the collision cell to the analyzer tray, order four of PN 1R76913-0306.

Q3 Quad Assembly	Quantity: Each

Thermo Scientific Part Number	1R120542-2570

Q3 Exit Lens Assembly

Quantity: Each

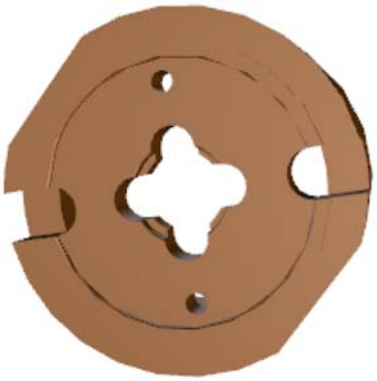


Thermo Scientific Part Number	1R120542-2536

NOTE: To replace all the M4 x 6 mm screws on the Q3 exit lens assembly to mount it to the tray, order two of PN 1R76913-0406.

Q1 Entrance Lens Endcap

Quantity: Each



Thermo Scientific Part Number	1R120404-3211

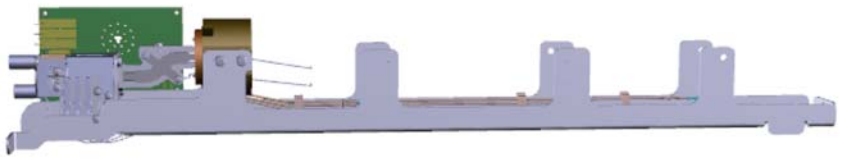
NOTE: To replace all the M4 x 6 mm screws on the plastic quadrupole rod endcap, order four of PN 1R76913-0406.

Q1 Entrance Lens Assembly	Quantity: Each

Thermo Scientific Part Number	1R120404-3212

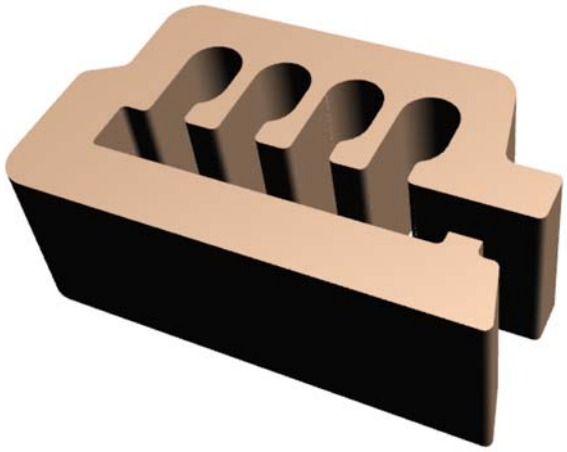
NOTE: To replace all the M3 x 16 mm screws on the quad entrance lens, order two of PN 1R76913-0316.

Analyzer Tray with Source Block and Ion Guide	Quantity: Each



Thermo Scientific Part Number	1R120542-2535

Wire Routing Clip	Quantity: Each



Thermo Scientific Part Number	1R120542-2511

Q1 Exit Lens Wire	Quantity: Each

Thermo Scientific Part Number	1R120542-2515

Q3 Entrance Lens Wire	Quantity: Each

Thermo Scientific Part Number	1R120542-2514

Q3 Exit Lens Wire	Quantity: Each

Thermo Scientific Part Number	1R120542-2513

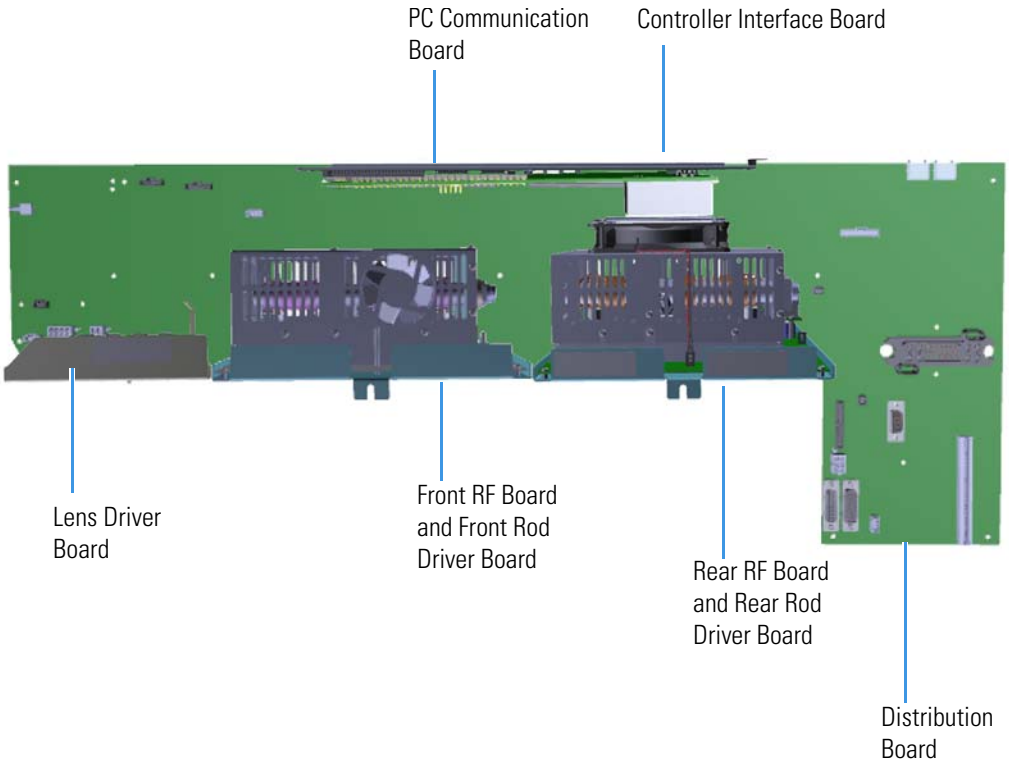
Board Components

You can purchase the following board components for the TSQ Duo mass spectrometer. Be sure to reference the component's part number when placing an order with your local Sales/Service Representative. See the *TSQ Duo Hardware Manual* for information about installing these components or Table 1 for a comprehensive list of available components.

The following board components can be replaced on your mass spectrometer.

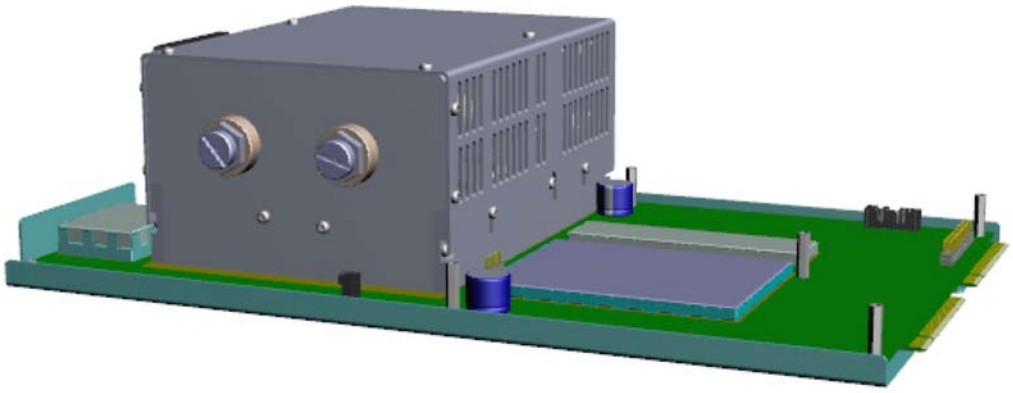
- Front RF Board
- Rear RF Board
- Front Rod Driver Board (50 V)
- Rear Rod Driver Board (75V)
- Lens Driver Board
- Source Interface Board
- Heat Shield for the Source Interface Board
- Electrometer Board
- Electrometer Shield
- Controller Interface Board
- PC Communication Board
- Distribution Board
- 20-Pin Feedthrough
- 4-Pin Feedthrough

Figure 7. Replaceable Board Components



WARNING ELECTRICAL SHOCK HAZARD: For safety reasons, the fuses on the lens driver board can only be replaced by Field Service Engineers.

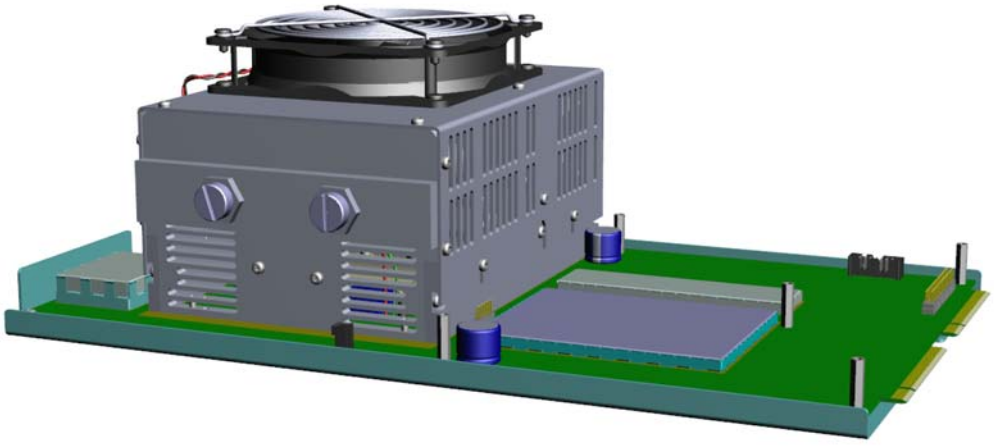
Front RF Board	Quantity: Each



Thermo Scientific Part Number	1R120485-A060

NOTE: If you only need to replace the fan, order PN 1R120443-0002.

Rear RF Board	Quantity: Each



Thermo Scientific Part Number	1R120485-A065

Front Rod Driver Board (50 V)	Quantity: Each

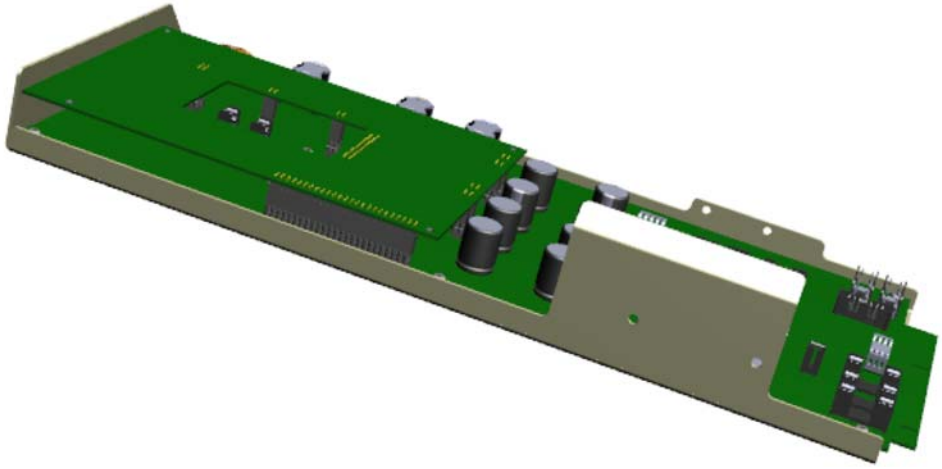
Thermo Scientific Part Number	1R120485-0415

NOTE: If you only need to replace the fan, order PN 1R24170-5003.

Rear Rod Driver Board (75V)	Quantity: Each

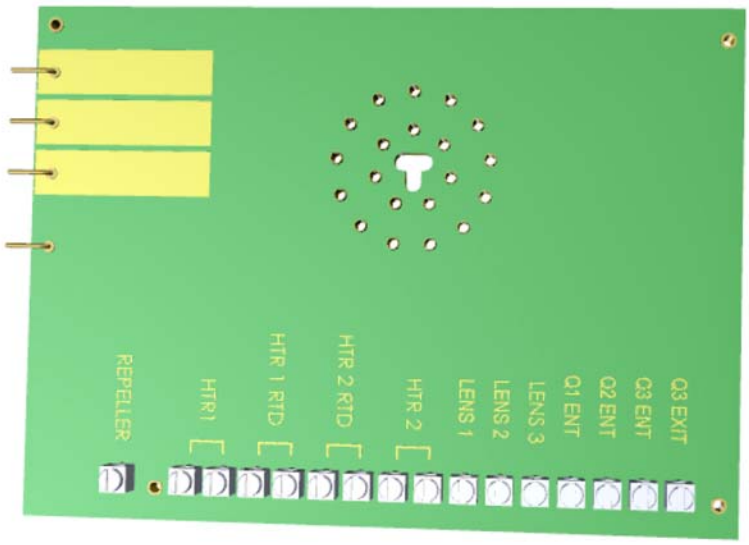
Thermo Scientific Part Number	1R120485-0420

Lens Driver Board	Quantity: Each



Thermo Scientific Part Number	1R120485-A110

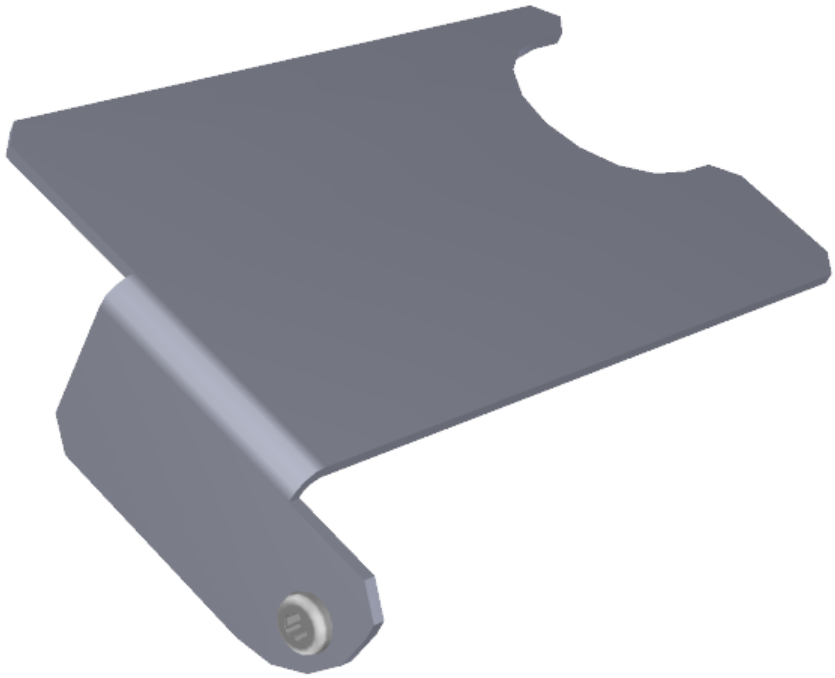
Source Interface Board	Quantity: Each



Thermo Scientific Part Number	1R120485-0210

Heat Shield for the Source Interface Board

Quantity: Each

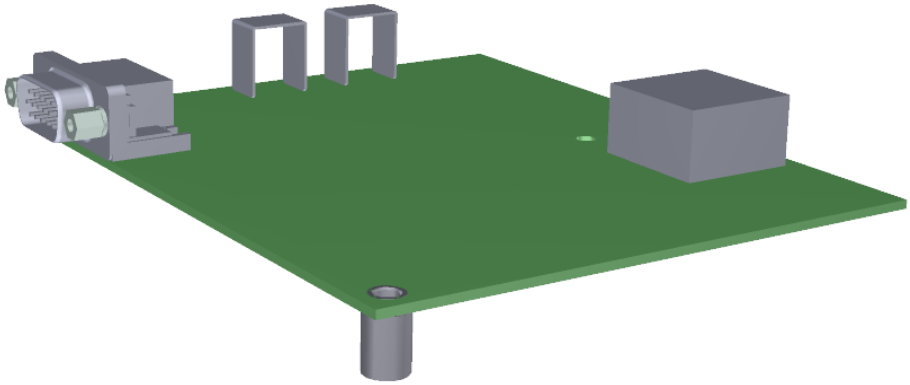


Thermo Scientific Part Number	1R120404-2110

NOTE: To replace the M4 x 10 mm screw on the heat shield, order PN 1R76913-0410.

Electrometer Board

Quantity: Each

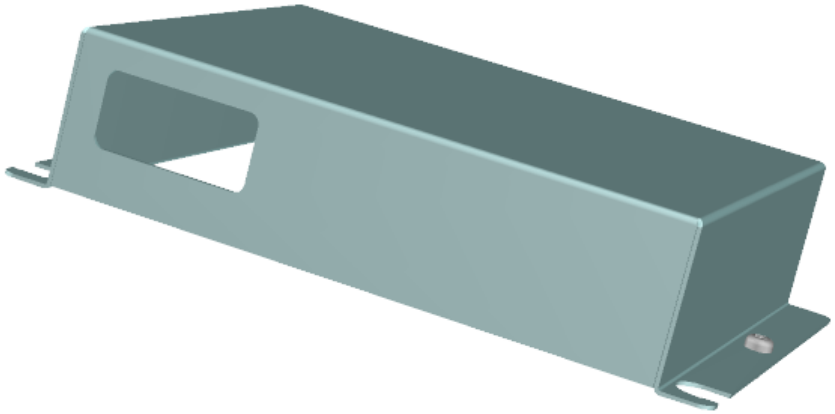


Thermo Scientific Part Number	1R120354-0500

NOTE: To replace all the M3 x 6 mm screws on the electrometer board, order two of PN 1R76913-0306. To replace all the M3 x 16 mm screws, order two of PN 1R76913-0316.

Electrometer Shield

Quantity: Each

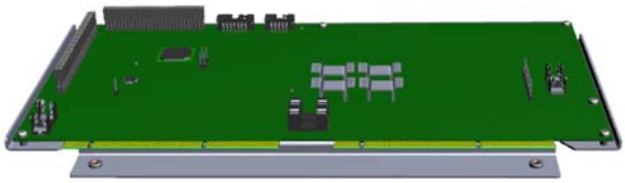


Thermo Scientific Part Number	1R120368-0010

NOTE: To replace all the M3 x 6 mm screws on the electrometer shield, order two of PN 1R76913-0306.

Controller Interface Board

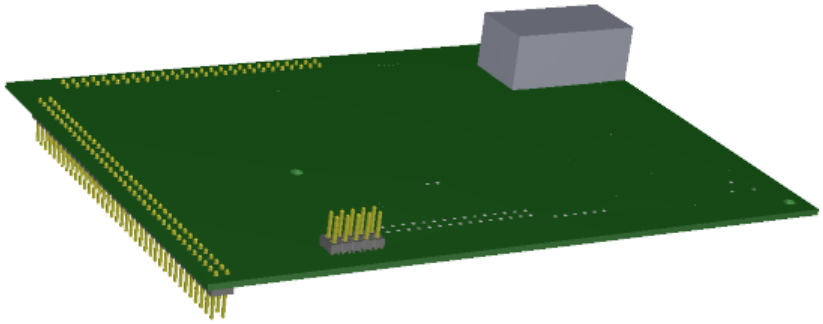
Quantity: Each



Thermo Scientific Part Number	1R120485-0020

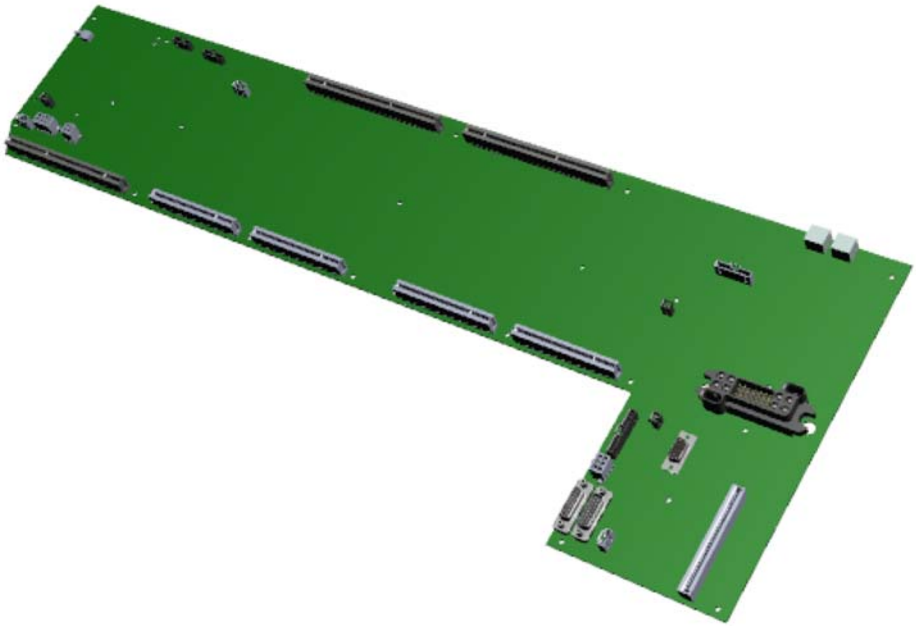
NOTE: To replace all the M3 x 6 mm screws that secure the controller interface board to the chassis, order seven of PN 1R76913-0306. This part ships without the metal rack. Use the metal rack from the old board.

PC Communication Board	Quantity: Each



Thermo Scientific Part Number	1R120354-0010

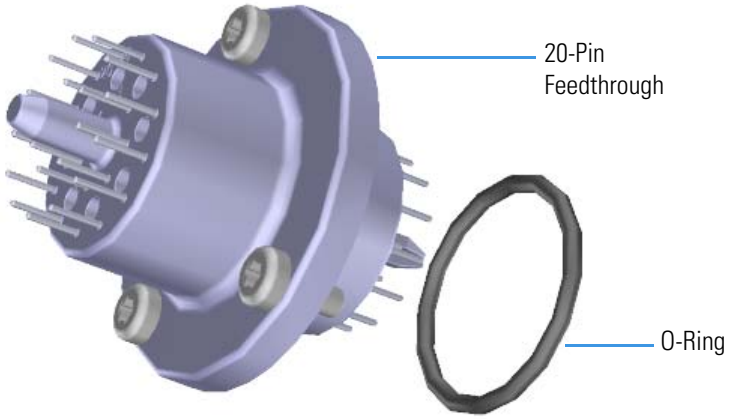
Distribution Board	Quantity: Each



Thermo Scientific Part Number	1R120485-0810

NOTE: To replace all the M3 x 10 mm screws on the distribution board, order 26 of PN 1R76913-0310.

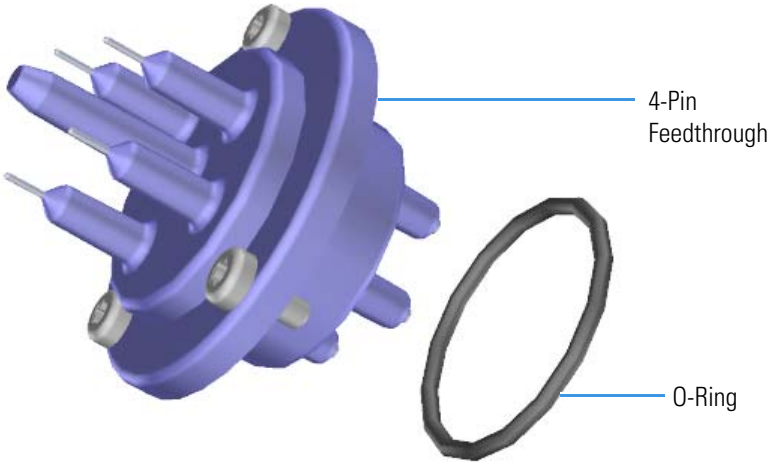
20-Pin Feedthrough	Quantity: Each



Thermo Scientific Part Number	1R120610-0020

NOTE: To replace all the M4 x 10 mm screws on the 20-pin feedthrough, order three of PN 1R76913-0410. To replace the o-ring, order PN 1R3814-123.

4-Pin Feedthrough	Quantity: Each



Thermo Scientific Part Number	1R120610-0030

NOTE: There are two 4-pin feedthroughs on the TSQ Duo system. To replace all the M4 x 10 mm screws on the 4-pin feedthrough, order three of PN 1R76913-0410. To replace the interior o-ring, order PN 1R3814-127.

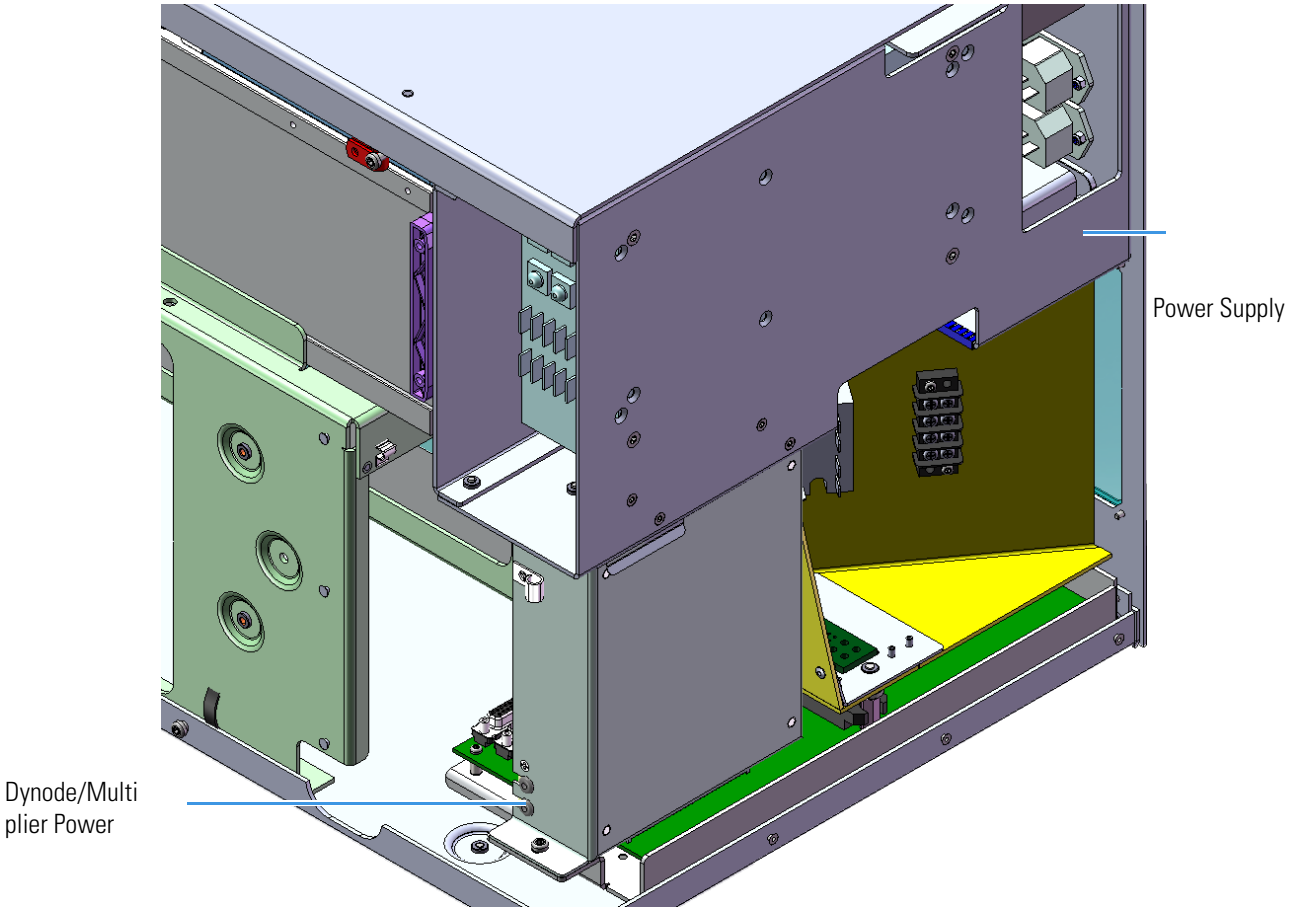
Power Module Components

You can purchase the following power supply components for the TSQ Duo mass spectrometer. Be sure to reference the component's part number when placing an order with your local Sales/Service Representative. See the *TSQ Duo Hardware Manual* for information about installing these components or Table 1 for a comprehensive list of available components.

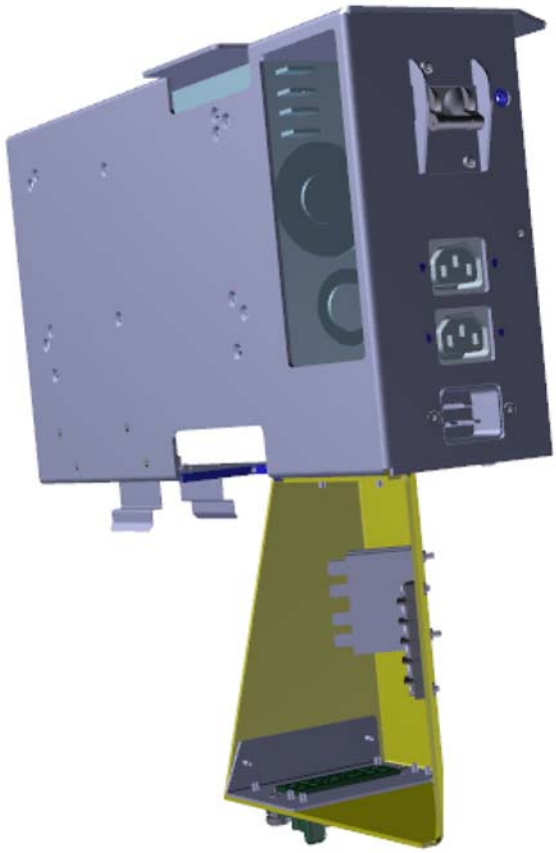
The following power supply components can be replaced on your mass spectrometer.

- Power Module
- Dynode and Multiplier Power Supply and Cables (EI only)

Figure 8. Replaceable Power Supply Components



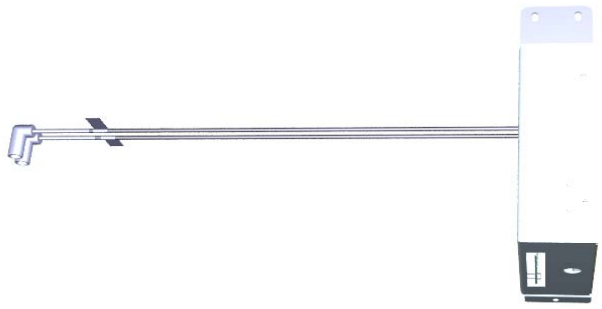
Power Module	Quantity: Each



Thermo Scientific Part Number	1R120544-0002

NOTE: To replace all the M4 x 10 mm flat-head screws on the power supply, order PN 1R76937-0410. To replace all the M4 x 10 mm pan-head screws, order PN 1R76913-0410.

Dynode and Multiplier Power Supply and Cables (EI only)	Quantity: Each



Thermo Scientific Part Number	1R120361-0003

NOTE: To replace the M4 x 16 mm screw, order PN 1R76913-0416.

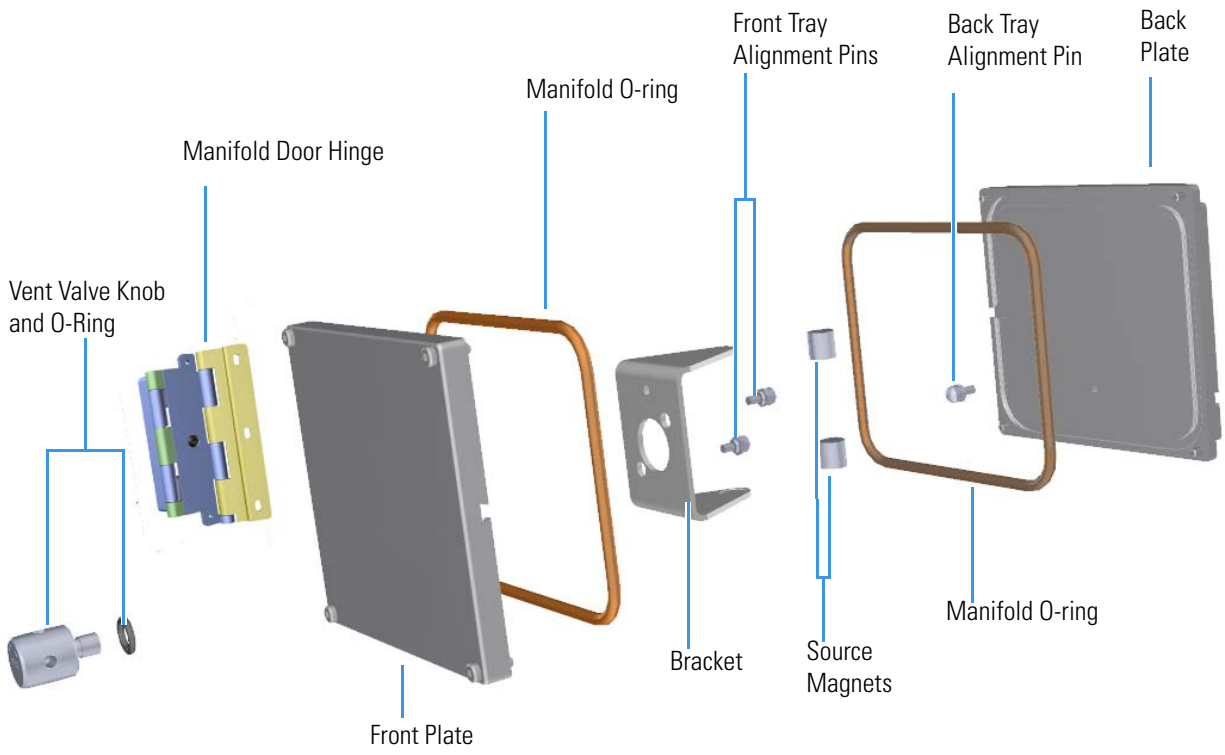
Manifold Components

You can purchase the following manifold components for the TSQ Duo mass spectrometer. Be sure to reference the component's part number when placing an order with your local Sales/Service Representative. See the *TSQ Duo Hardware Manual* for information about installing these components or Table 1 for a comprehensive list of available components.

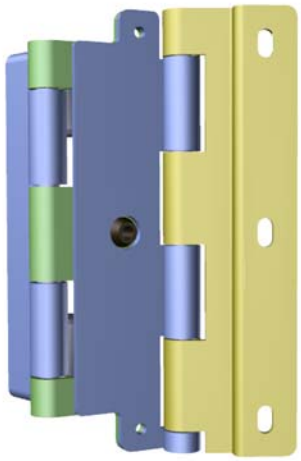
The following manifold components can be replaced on your mass spectrometer.

- Manifold Door Hinge
- Front Manifold Plate
- Large Top Glass Cover
- Small Top Glass Cover
- O-Ring, Large for Back Glass
- Manifold O-Ring
- Vent Valve Knob
- Front Door Alignment Pin
- Magnet Yoke
- Source Magnet
- Delivery Tube
- Source Insertion Guide
- Back Manifold Plate

Figure 9. Replaceable Components of the Manifold



Manifold Door Hinge	**Quantity: Each**

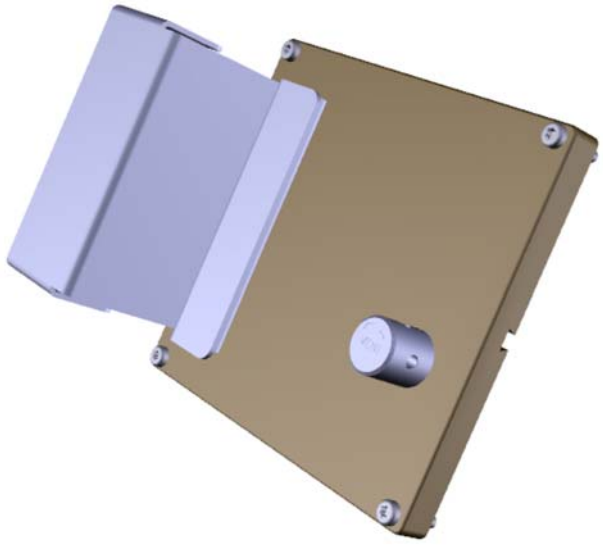


Thermo Scientific Part Number	**1R120565-0001**

NOTE: To replace all the M4 x 10 mm screws on the manifold door hinge, order three of PN 1R76913-0410.

Front Manifold Plate

Quantity: Each



Thermo Scientific Part Number	1R120403-0002

NOTE: To replace all the M4 x 20 mm screws on the front manifold plate, order four of PN 1R76913-0420.

Large Top Glass Cover

Quantity: Each

Thermo Scientific Part Number	1R120542-3000

Small Top Glass Cover	Quantity: Each

Thermo Scientific Part Number	1R120401-3000

O-Ring, Large for Back Glass	Quantity: Each

Thermo Scientific Part Number	1R3814-376

Manifold O-Ring

Quantity: Each

Thermo Scientific Part Number	1R3815-360

NOTE: There are four large manifold o-rings in the TSQ Duo: two on the top of the vacuum manifold, one at the front and one at the back. To replace all of the manifold o-rings, order four of PN 1R3815-360.

Vent Valve Knob

Quantity: Each

Thermo Scientific Part Number	1R120403-0104

NOTE: To replace the o-ring on the vent valve knob, order PN 1R3814-110.

Back Tray Alignment Pin

Quantity: Each

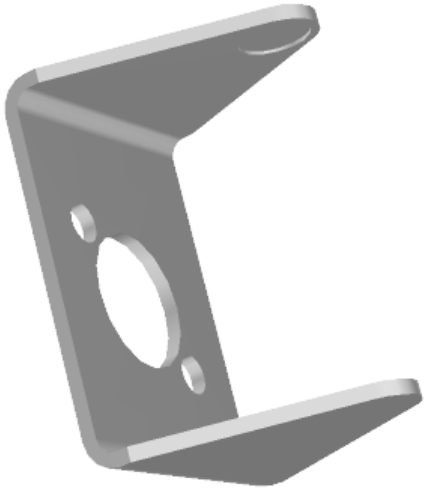
Thermo Scientific Part Number	1R120403-0103

Front Door Alignment Pin	Quantity: Each

Thermo Scientific Part Number	1R120564-0003

NOTE: There are two front door alignment pins on the front of the instrument.

Magnet Yoke	Quantity: Each



Thermo Scientific Part Number	1R120564-0002

Source Magnet	Quantity: Each

Thermo Scientific Part Number	1R70001-98195

NOTE: There are two source magnets in the TSQ Duo, so to replace them, order two of PN 1R70001-98195.

Delivery Tube	Quantity: Each

Thermo Scientific Part Number	1R120404-1202

NOTE: If you are using CI, you need to order two of PN 1R120404-1202.

Source Insertion Guide	Quantity: Each

Thermo Scientific Part Number	1R120564-0001

Back Manifold Plate	Quantity: Each

Thermo Scientific Part Number	1R120403-1001

NOTE: This PN includes the plate, alignment pin (1R120403-0103) and O-ring (1R3815-360). To replace all the M4 x 16 mm screws on the back manifold plate, order four of PN 1R76913-0416.

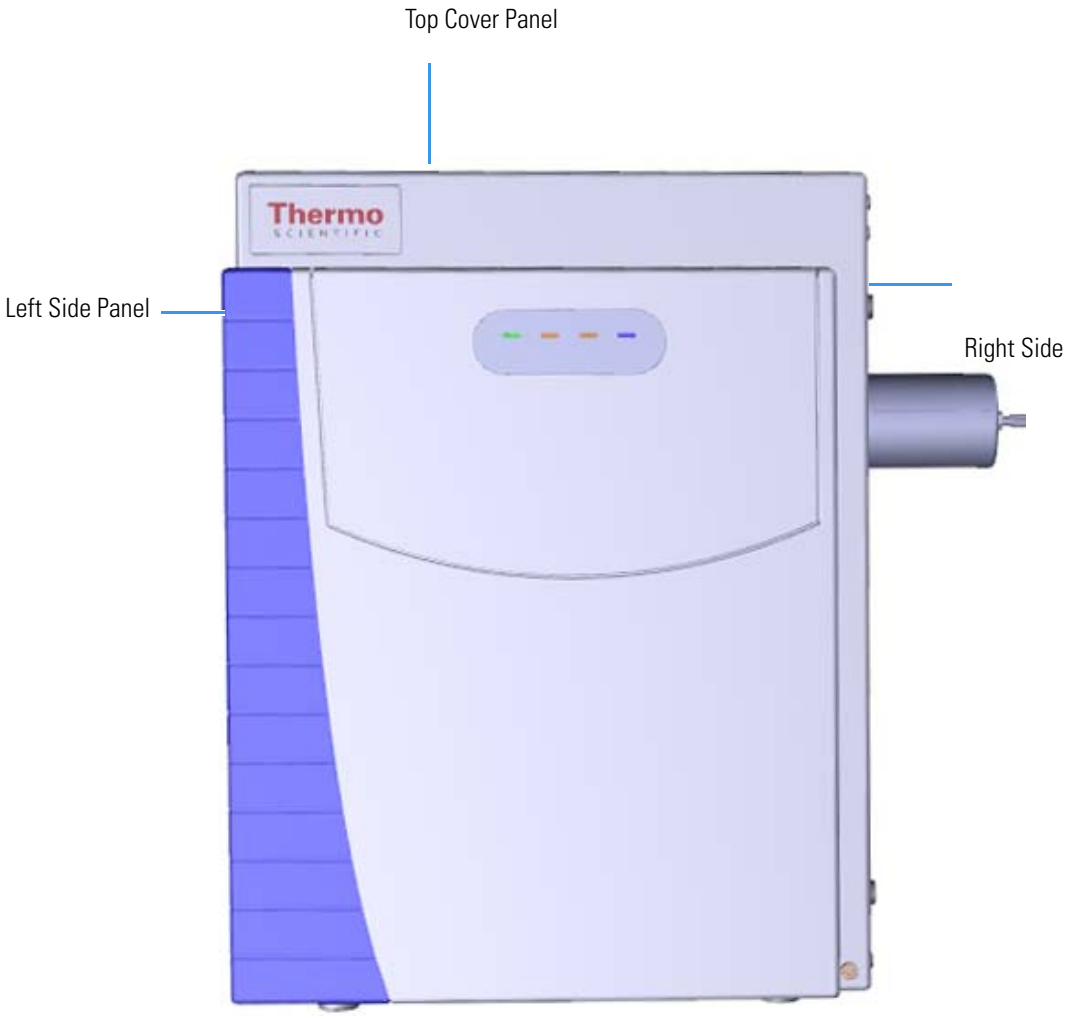
Cover Components

You can purchase the following cover components for the TSQ Duo mass spectrometer. Be sure to reference the component's part number when placing an order with your local Sales/Service Representative. See the *TSQ Duo Hardware Manual* for information about installing these components or Table 1 for a comprehensive list of available components.

The following cover components can be replaced on your mass spectrometer.

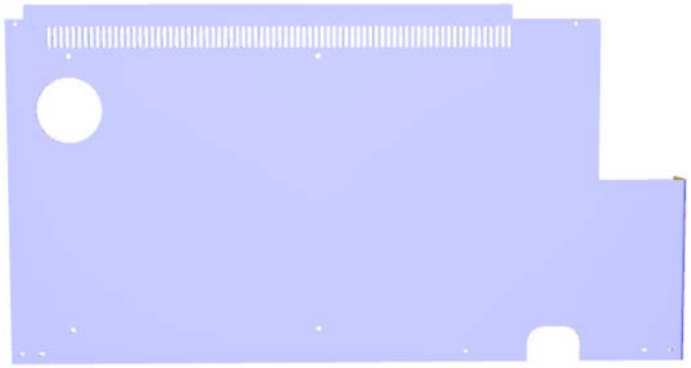
- Right Side Panel
- Left Hand Front Panel
- Left Hand Sub Panel
- Top Cover
- TSQ Duo Front Cover
- Front Door Hinge
- Front Door Hinge Support
- Front Door Latch
- Chassis Foot

Figure 10. Replaceable Covers



Right Side Panel

Quantity: Each

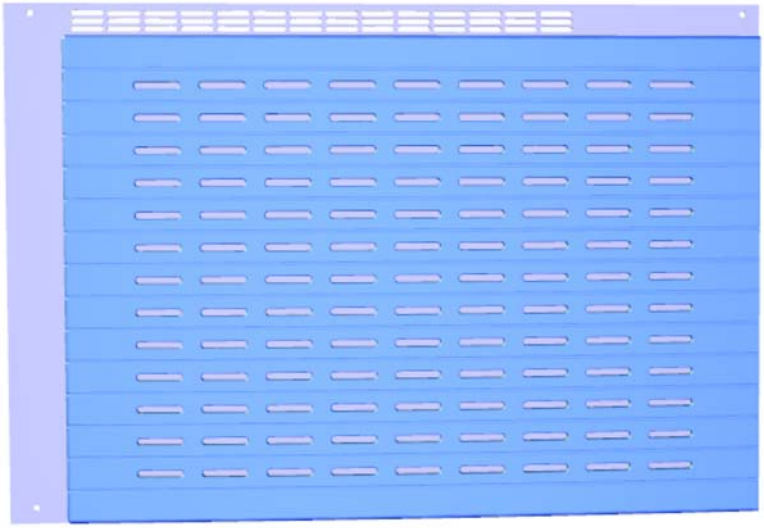


Thermo Scientific Part Number	1R120541-0200

NOTE: To replace all the M4 x 10 mm screws on the right side panel, order four of PN 1R76913-0410. To replace the right side panel feet, order PN 1R3666-0207.

Left Hand Front Panel

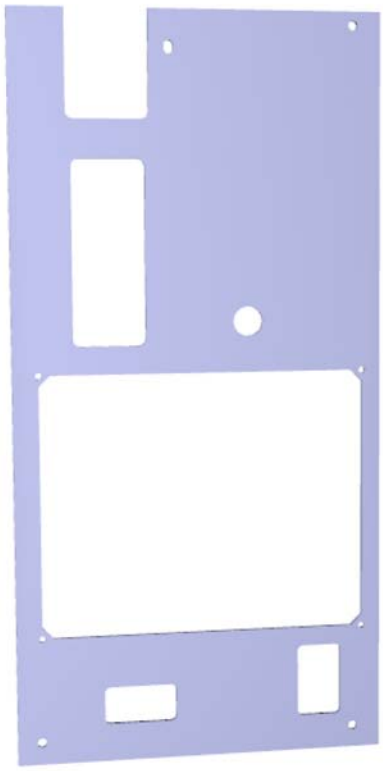
Quantity: Each



Thermo Scientific Part Number	1R120541-0003

NOTE: To replace all the M4 x 10 mm screws on the right side panel, order four of PN 1R76913-0410.

Left Hand Sub Panel	Quantity: Each



Thermo Scientific Part Number	1R120541-0500

Top Cover	Quantity: Each

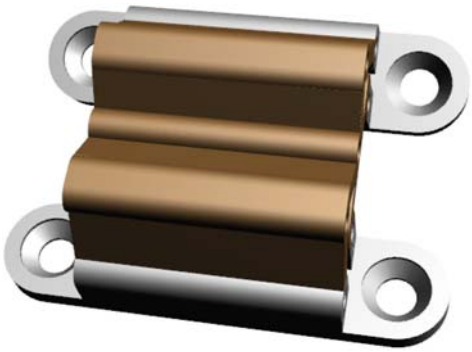
Thermo Scientific Part Number	1R120541-0001

NOTE: To replace all the M4 x 10 mm screws on the top cover panel, order two of PN 1R76913-0410.

TSQ Duo Front Cover	Quantity: Each

Thermo Scientific Part Number	1R120548-0200

Front Door Hinge	Quantity: Each

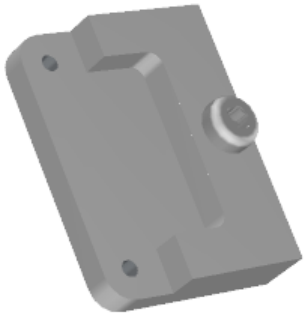


Thermo Scientific Part Number	1R3434-5000

NOTE: To replace all the M3 x 8 mm (flathead) screws on a front door hinge, order two of PN 1R76937-0308. There are two hinges on the front door.

Front Door Hinge Support

Quantity: Each



Thermo Scientific Part Number	1R120445-0001

NOTE: To replace the M4 x 10 mm screw on the front door hinge supports, order PN 1R76913-0410.

Front Door Latch

Quantity: Each

Thermo Scientific Part Number	1R76483-3000

NOTE: To replace all the screws on the front door latch, order two of PN 1R120414-0010. To replace all the M3 locking nuts, order two of PN 1R76944-0100.

Chassis Foot

Quantity: Each

Thermo Scientific Part Number	1R3666-0208

NOTE: There are four feet on the bottom of the TSQ Duo, so to replace them, order six of PN 1R3666-0208. To replace the M4 x 12 mm screw on each chassis foot, order 1R76913-0412.

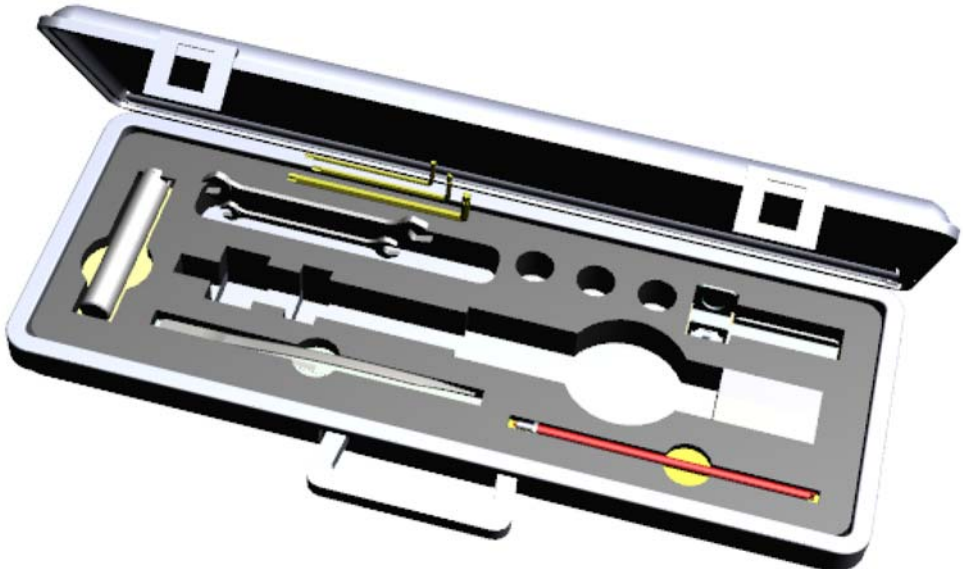
TSQ Duo Tools

The TSQ Duo mass spectrometer ships with a toolkit that contains all the tools you will need to perform maintenance on the instrument. It does not contain any consumable items or cleaning supplies. You can purchase any item in the toolkit individually or you can order a complete kit. Contact your local Sales/Service Representative to place an order. See Table 1 for a comprehensive list of available components.

The following toolkit components can be replaced.

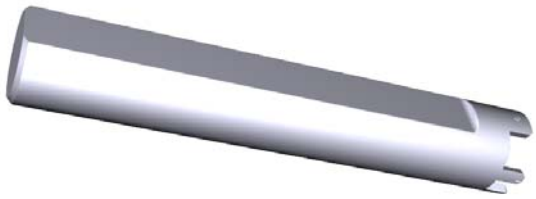
- MS Toolkit
- Source Holder
- T10 Torxhead Key
- T20 Torxhead Key
- T30 Torxhead Key
- Forceps, 8 in.
- Wrench, open-ended, 1/4-in., 5/16-in.
- Wrench, open-ended, 3/8 in., 7/16-in.

MS Toolkit	Quantity: Each



Thermo Scientific Part Number	1R120467-0001

Small Source Removal Tool	Quantity: Each

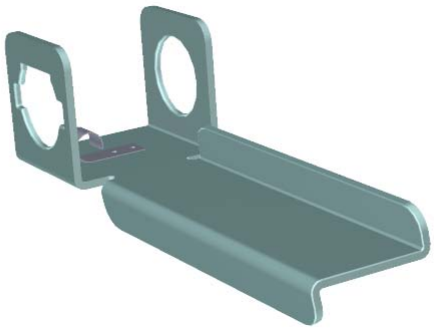


Thermo Scientific Part Number	1R120406-2250

Column Measuring Tool	Quantity: Each

Thermo Scientific Part Number	1R120461-0010

Source Holder	Quantity: Each



Thermo Scientific Part Number	1R120471-0001

T10 Torxhead Key	Quantity: Each

Thermo Scientific Part Number	1R3812-5T10

T20 Torxhead Key	Quantity: Each

Thermo Scientific Part Number	1R3812-5T20

T30 Torxhead Key	Quantity: Each

Thermo Scientific Part Number	1R3812-5T30

Forceps, 8 in.	Quantity: Each

Thermo Scientific Part Number	1R76360-0008

Wrench, open-ended, 1/4-in., 5/16-in.	Quantity: Each

Thermo Scientific Part Number	1R76360-0109

Wrench, open-ended, 3/8 in., 7/16-in.	Quantity: Each

Thermo Scientific Part Number	1R76360-0108

Pump Components

The following pump is available for the TSQ Duo. Contact your local Sales/Service Representative to place an order. Once you receive the equipment, refer to the *TSQ Duo Hardware Manual* for installation information or Table 1 for a comprehensive list of available pumps and pump components.

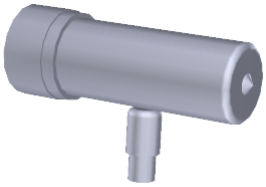
Turbomolecular Pump	**Quantity: Each**

Thermo Scientific Part Number	**1R119268-0002**

Rough Pump (RV3)	Quantity: Each

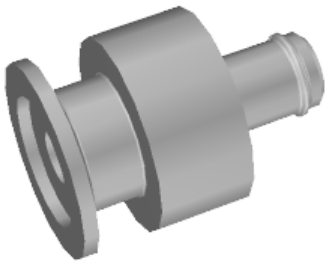
Thermo Scientific Part Number	1R76505-3007

Convectron Gauge	Quantity: Each



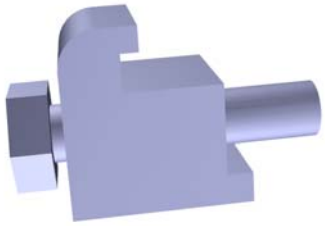
Thermo Scientific Part Number	A0105-00501

Foreline Adapter	Quantity: Each



Thermo Scientific Part Number	1R119244-0025

Claw Clamp	Quantity: Each



Thermo Scientific Part Number	1R76505-0017

Centering Ring	Quantity: Each

Thermo Scientific Part Number	1R76505-2001

Oil Mist Filter	Quantity: Each

Thermo Scientific Part Number	1R76505-0036

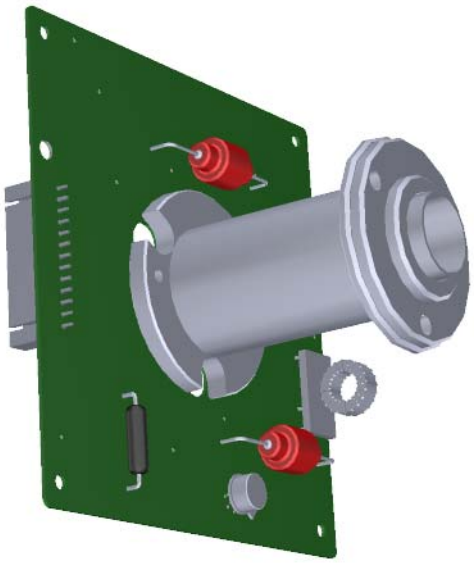
Upgrade Equipment

The following upgrade equipment is available for the TSQ Duo mass spectrometer. Contact your local Sales/Service Representative to place an order. Once you receive the equipment, refer to the *TSQ Duo Hardware Manual* for installation information or Table 1 for a comprehensive list of available components.

Hydrogen Ion Volume	**Quantity: Each**

Thermo Scientific Part Number	**1R120404-4115**

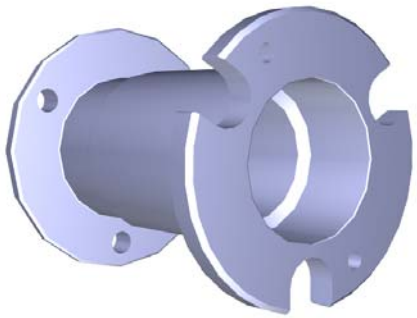
Ion Gauge Upgrade Kit	Quantity: Each



Thermo Scientific Part Number	1R120560-0020

NOTE: To replace the o-ring on the ion gauge, order PN 1R3814-116. To replace the ion gauge tube, order PN A0105-06003.

Ion Gauge Mount	Quantity: Each

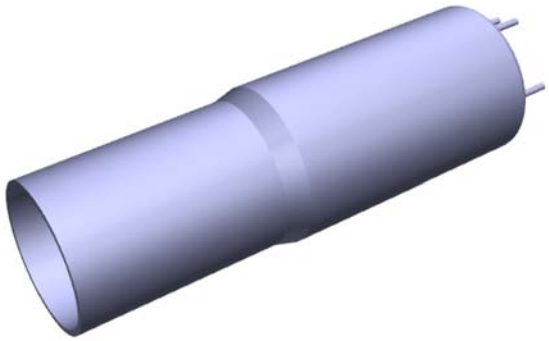


Thermo Scientific Part Number	1R120416-0002

Ion Gauge Tube Shield	Quantity: Each

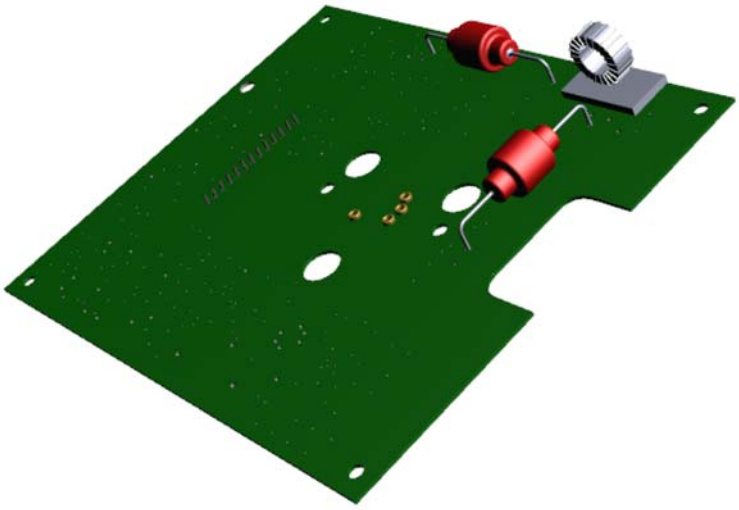
Thermo Scientific Part Number	1R119605-0012

Replacement Ion Gauge Tube	Quantity: Each



Thermo Scientific Part Number	A0105-06003

Ion Gauge Board	Quantity: Each



Thermo Scientific Part Number	1R120485-0120

Dust Filter	Quantity: Each

Thermo Scientific Part Number	1R120442-0005