

DSQ II

Preinstallation Guide

120299-0001 Revision C

November 5, 2009

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Ion Trap series refers to ITQ and PolarisQ instruments. DSQ series refers to all DSQ and DSQ II instruments. Information about the TRACE GC and FOCUS GC instruments is included in this document.

INSTRUMENT USAGE: 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 may be impaired. If you maintain a system outside the specifications listed in this guide, failures of many types may occur. The repair of such failures is specifically excluded from the standard Warranty and service contract coverage.

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DSQ II Preinstallation Guide, 120299-0001, Revision C

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The manual is well organized.	1	2	3	4	5
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The instructions are easy to follow.	1	2	3	4	5
The instructions are complete.	1	2	3	4	5
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Examples of operation are clear and useful.	1	2	3	4	5
The figures are helpful.	1	2	3	4	5
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DSQ II Preinstallation Checklist

After you review the DSQ II Preinstallation Guide, you need to print and complete this form. Once items 1-13 are completed, sign and date the form and mail it to your local Thermo Fisher Scientific sales/service office. The address and fax number for all of our offices are listed on the following pages.

- | | |
|---|--|
| <input type="checkbox"/> 1. All items in "Entrance Requirements" on page 2 are met. | <input type="checkbox"/> 7. All items in "Environment Requirements" on page 13 are met. |
| <input type="checkbox"/> 2. All items in "Workbench and Space Requirements" on page 3 are met. | <input type="checkbox"/> 8. I have read and understood the information contained in "Telephone Requirements" on page 15 and "Receiving Requirements" on page 15. |
| <input type="checkbox"/> 3. All items in "Lighting Requirements" on page 5 are met. | <input type="checkbox"/> 10. I have read and understood the information contained in "What Happens Next?" on page 17. |
| <input type="checkbox"/> 4. All items in "Power Requirements" on page 5 are met. Inform your local Customer Service office of the power-plug types in your lab, so they can bring the proper power cords or a 230 V plug. | <input type="checkbox"/> 11. All relevant safety regulations are met. |
| <input type="checkbox"/> 5. All items in "Gas Equipment Requirements" on page 9 are met. | <input type="checkbox"/> 12. The principal operator is available during the installation / certification period. |
| <input type="checkbox"/> 6. All items in "Solvent Requirements" on page 12 are met. | <input type="checkbox"/> 13. No more than three-calendar months has elapsed since the GC/MS arrived. |

Have any special acceptance specifications been agreed to within the contract?

☐ Yes ☐ No

If **YES**, attach full details of specifications.

Is there any additional equipment that needs to be interfaced to the system?

☐ Yes ☐ No

If **YES**, attach full details of additional equipment.

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Note No more than three months can pass before installation or damage can result to the system.

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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. When the system is delivered to you, it meets all pertinent electromagnetic compatibility (EMC) and safety standards as described below.

EMC Directive 89/336/EEC

EMC compliance has been evaluated by Professional Testing.

- PolarisQ, ITQ, and Ion Trap Series standards: EMC EN 55011:1998 + EN 50082-1:1998, Safety EN 61010-1:1990 + A1:1992 + A2:1995
- DSQ standards: EMC EN 61326-1:1998 + A1:1998. Safety EN 61010-1:1990 + A1:1992 + A2:1995
- DSQ II standards: EMC EN 61326-1:1997 + A1:1998 + A2:2001. Safety EN 61010-1:2001
- Direct Probe Controller (DPC) standards: EMC EN 55011:1991 + EN 50082-1:1992. Safety EN 61010-1:1994

Low Voltage Safety Compliance

This device complies with Low Voltage Directive 73/23/EEC and harmonized standard EN 61010-1:2001. 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.

FCC Compliance Statement

Certifications, FCC part 15, Class A

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy. If it is not installed and used in accordance with the instruction manual, it may cause harmful interference to radio communication. Operation of this equipment in a residential area is likely to cause harmful interference. In this case, users will be required to correct the interference at their own expense. Detailed installation requirements are in the respective instrument's preinstallation guide.



WARNING 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.thermo.com/

[WEEERoHS](#) for further information on Thermo Fisher Scientific's compliance with these Directives and the recyclers in your country.

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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.thermo.com/WEEERoHS.

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Preface

This guide contains instructions for preparing your site for DSQ II installation.

About Your System

Thermo Fisher 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 through the use of an optional autosampler and then separated for presentation to the MS. The MS will then generate a mass spectrum of the GC eluent and its components, which can be used for qualitative identification as well as accurate and precise quantification of the individual compounds present in the sample.

IMPORTANT Thermo Fisher Scientific systems are designed to optimize both the separation and detection capabilities of GC/MS techniques and combine them in a synergistic fashion to provide high performance analytical capabilities for both research and routine applications. More information on the use of this system can be found in related documentation sources and through the provided contact information.



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

Power Ratings

Mass Spectrometer (MS)

- 120 VAC +6/-10%, 50/60 Hz, 15 A max
- 230 VAC \pm 10%, 50/60 Hz, 10 A max

Gas Chromatograph (GC)

- 120 VAC +6%/-10%, 50/60 Hz, 16 A max
- 230 VAC \pm 10%, 50/60 Hz, 16 A max

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

Safety Alerts and Important Information

Make sure you follow the precautionary notices presented in this guide. Safety and other special notices appear in boxes and include the following:



WARNING A warning safety alert is used to prevent actions that *could* cause personal injury. It highlights hazards to humans or the environment. When you see a safety alert on your instrument or in the documentation, carefully follow the safety instructions before proceeding.

CAUTION A cautionary safety alert is used to prevent actions that *may* cause personal injury or instrument damage. We use it to highlight information necessary to prevent personal injury or damage to software, loss of data, or invalid test results; or might contain information that is critical for optimal system performance. When you see a safety alert on your instrument or in the documentation, carefully follow the safety instructions before proceeding.

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 and/or instrument damage. 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 *may* cause personal injury and/or instrument damage. The following safety symbols may be found on your instrument and/or in this guide:



BURN HAZARD. This symbol indicates a hot surface that *could* or *may* cause burn injuries.



ELECTRICAL SHOCK HAZARD. This symbol indicates that an electrical shock *could* or *may* occur.



FIRE HAZARD. This symbol indicates a risk of fire or flammability, or that fire/flammability damage *could* or *may* occur.



FLAMMABLE GAS HAZARD. This symbol 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 *may* cause physical injury.



GLOVES REQUIRED. This symbol indicates that you must wear gloves when performing a task or else physical injury *could* or *may* occur.



HAND AND CHEMICAL HAZARD. This symbol indicates that chemical damage or physical injury *could* or *may* occur.



INSTRUMENT DAMAGE. This symbol indicates that damage to the instrument or module *may* occur. This damage may not be covered under the standard warranty.



LIFTING HAZARD. This symbol indicates two or more people are required to lift the object to prevent a physical injury that *could* or *may* occur.



MATERIAL AND EYE HAZARD. This symbol indicates that eye damage *could* or *may* occur.



RADIOACTIVE. This symbol indicates the presence of radioactive material *could* or *may* occur.



READ MANUAL. This symbol alerts you to carefully read your instrument's operational instructions before usage to ensure your safety and the instrument's operational ability. Failing to carefully read the instructions *could* or *may* put you at risk for a physical injury.



TOXIC SUBSTANCES HAZARD. This symbol indicates that exposure to a toxic substance *will*, *could*, or *may* cause personal injury or death.



This is the general warning symbol that the ISO 3864-2 standard refers to as the general warning signal to prevent personal injury. It is a triangle with an exclamation mark that precedes the **WARNING** safety alert word. In the vocabulary of ANSI Z535 signage, this symbol indicates a possible personal injury hazard exists if the instrument is improperly used or if unsafe actions occur. We use this symbol and another appropriate safety symbol to alert to an imminent or potential hazard that *could cause personal injury*.

Contacting Us

There are several ways to contact Thermo Fisher Scientific.

❖ To contact Technical Support

Phone	800-532-4752
Fax	561-688-8736
E-mail	US.Techsupport.Analyzer@thermofisher.com

Find software updates and utilities to download at <http://mssupport.thermo.com>.

❖ To contact Customer Service for ordering information

Phone	800-532-4752
Fax	561-688-8731
Web site	http://www.thermo.com/com/cda/resources/resources_detail/1,,12512,00.html

❖ To suggest changes to documentation or to Instrument Help

- Fill out a reader survey online at www.thermo.com/lcms-techpubs.
- Send an e-mail message to the Technical Publications Editor at techpubsaustin@thermofisher.com.

Related Documentation

In addition to this guide, Thermo Scientific provides the following documents for the DSQ II. These documents are also available on a “Print-By-Request” basis.

DSQ II Document Set, PN 120299

- *DSQ II Preinstallation Guide*, PN 120299-0001
- *DSQ II Hardware Manual*, PN 120299-0002
- *DSQ II User’s Guide*, PN 120299-0003
- *Instrument Help* is available from within the DSQ II Tune software

To suggest ways we can improve the documentation, use your browser to complete our [documentation survey](#).



Site Preparation

This chapter describes how to prepare your site before the Thermo Scientific Field Service Engineer arrives to install the DSQ II.

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- “Entrance Requirements” on page 2
- “Workbench and Space Requirements” on page 3
- “Lighting Requirements ” on page 5
- “Power Requirements ” on page 5
- “Gas Equipment Requirements” on page 9
- “Solvent Requirements ” on page 12
- “Environment Requirements ” on page 13
- “Telephone Requirements ” on page 15
- “Receiving Requirements” on page 15
- “What Happens Next?” on page 17

Entrance Requirements

Use the following guidelines to make sure the entrance to your site will allow delivery of the DSQ II system:

1. Ensure your delivery doors are at least 102 cm (40 in.) across.
2. Consider any additional room you might need for moving the boxes around corners, into elevators, or through doorways.

The DSQ II, rotary-vane pump, and accessories are shipped in boxes with the following approximate dimensions:

Table 1. Box Dimensions

Box	Length	Width	Height	Weight
DSQ II, rotary-vane pump, and accessories	102 cm (40 in.)	102 cm (40 in.)	117 cm (46 in.)	147 kg (325 lbs)
Data System (computer)	These modules, such as the computer, monitor, gas chromatograph, and optional instruments are shipped in their own boxes. They are smaller and weigh less than the DSQ II box.			
Monitor	37 cm (18 in.)	22 cm (15 in.)	51.5 cm (8 in.)	7.7 kg (17 lbs)
TRACE GC Ultra	76 cm (30 in.)	81 cm (32 in.)	86 cm (34 in.)	47.63 kg (105 lbs)

Workbench and Space Requirements

Use the following guidelines to make sure you have enough space for the DSQ II system:

1. Ensure you have at least 2 m (6 ft) of workbench space for the system. Refer to the table below for exact measurements of each component.

Table 2. Workbench and Space Requirements

Instrument	Depth		Width		Height		Weight	
	cm	in.	cm	in.	cm	in.	kg	lbs
DSQ II	68	27	38	15	44	17	45	98
TRACE GC Ultra	65	25.5	61	24	48	19	48	105
FOCUS GC	68	27	36	14	46	18	30	66
Rotary Vane Pump ^{1,2}	45	18	20	8	25	10	24	52
Computer ^{1,2}	44.5	17.5	16.5	6.5	42	16.5	12	27
Monitor ²	43	17	40	16	42	16.5	7.7	17
Keyboard ²	18	7	47	18	2.5	1	1	2
AI/AS 3000 Autosampler ³	30	12	40	16	48	19	6	13
TriPlus Autosampler ³	50	19.7	54	21.3	87	34.3	25	56
Direct Sample Probe ⁴	54	21	33	13	12	5	6	13

¹This item is placed on the floor under the system.

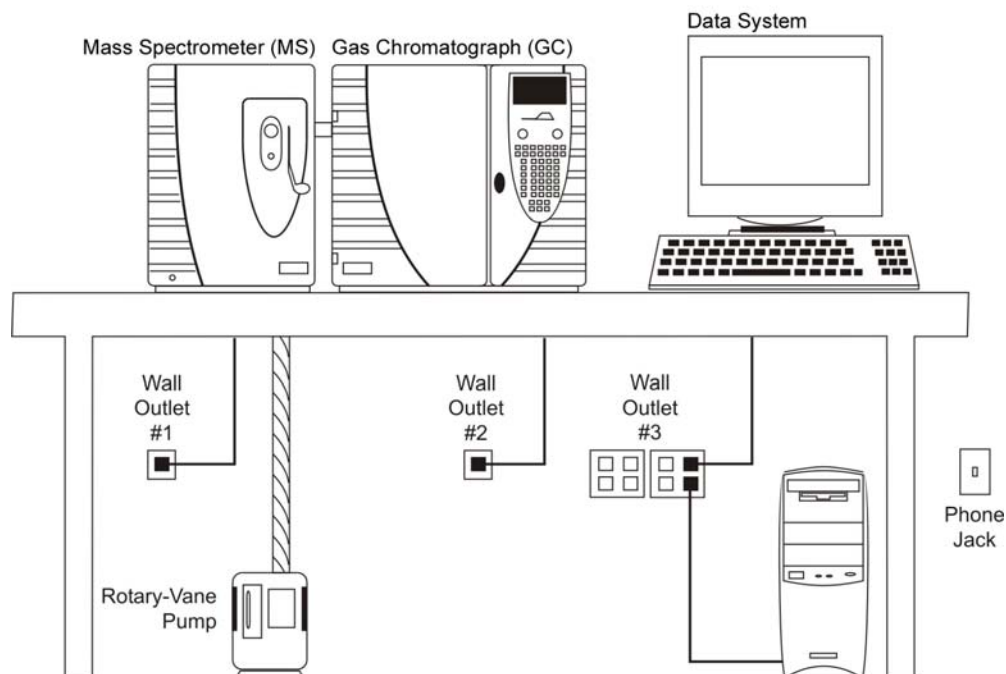
²Dimensions vary per manufacturer, therefore approximations are provided.

³Mounts on top of the TRACE GC Ultra.

⁴Sits on top or to the side of the DSQ II.

You will need 98 cm (39 in.) for the GC/MS, 40 cm (16 in.) to the left of the DSQ II to perform maintenance, and 47 cm (18 in.) for the monitor and keyboard.

Figure 1. Recommended Layout for a Standard DSQ II System



Work bench weight = 119 kg (292 lbs). Workbench length = 2 m (6 ft).

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- Supply a 1-in. i.d. hose to a fume hood or other suitable exhaust port. Consult local Environmental and Safety Regulations for instructions in exhausting fumes from your system.



CAUTION INSTRUMENT DAMAGE. The pump exhaust contains carrier gas, solvents, analytes, and a small amount of oil vapor, which are characteristic for these pumps to emit. For your safety, the exhaust must be vented outside the building. A 1-in. (25.4 mm) hose fitting is provided on the pump exhaust. You must provide a suitable hose to outside the building or a fume hood. Positive pressure exhausts are not suitable.

- Allow at least 30 cm (12 in.) of clearance behind the instrument. This space allows for proper air circulation, clearance of the gas lines, electrical connections, access to power switch, and horizontal movement of the TriPlus “Y” axis arm.
- Make sure you have least 92 cm (3 ft) of clearance above the instrument. This space allows room for optional accessories (such as autosamplers) and proper heat dissipation.
- Make sure your workbench supports at least 113 kg or 262 lbs for a standard DSQ II system. Keep in mind, additional instruments add to the total weight.
- Ensure that your work area is stable and free from vibration. The DSQ II system is a sensitive instrument. Be aware of vibrations caused by equipment located nearby. The rotary-vane pump should be placed on the floor to avoid vibrating the system.

Lighting Requirements

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

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

Power Requirements

The power quality supplied to your system is very important. It must be stable and within the minimum specifications listed in this section.

1. Test the power source quality in your laboratory to offset line voltage problems.
Improving power source quality is a complex task best handled by a company or consultant specializing in that field. Contact your regional Thermo Fisher Scientific Customer Service office for assistance in locating a power consultant. Having a poor quality power source degrades DSQ II system performance. Some examples of poor power source quality are:
 - Harmonic distortion causes noise in the power supply lines and degrades instrument performance. Harmonic distortion is a high-frequency disturbance that may affect operation of your DSQ II. This disturbance appears as distortion of the fundamental sine wave. Total harmonic distortion should be less than 6%. For more information, refer to the “[EMC Directive 89/336/EEC](#)” on [page ix](#). However, the power specifications for the DSQ II system are more exact than those of the IEC.
 - Sags are constant low line voltage, which cause the system to function erratically or not at all.
 - Slow changes are gradual, long-term changes in average root mean square (RMS) voltage level, with typical durations greater than 2 s.
 - Surges are constant high line voltage, which cause overheating and component failure. Sags and surges are slow changes in average root mean square (RMS) voltage level, with typical durations between 50 ms and 2 s.
 - Transients, even of a few microseconds duration cause electronic devices to fail or to degrade and significantly shorten their lives. Transients (or impulses) are brief voltage excursions of up to several thousand volts with durations less than 50 ms.
2. If your laboratory's power source does not meet the previous requirement, you need to get a UPS (Uninterruptible Power Supply) or power line conditioner. Most UPS systems do not produce power that is within our specifications. Therefore, the only UPS approved for use with the DSQ II is the Toshiba 1600EP series.

A UPS is best for situations in which the power is interrupted periodically. If you happen to be in the process of running samples during a power outage, a UPS will ensure that the GC/MS system will continue to run.

- If you are using a 120 V GC/MS system, we recommend the Toshiba 1600EP rated at 6.0 kVA (North American part number BSM6.0DTQ-EP). It is available through Reliable Power Solutions.
- If you are using a 230 V GC/MS system, we recommend the Toshiba 1600EP rated at 6.0 kVA (international part number BSM6.0ITQ-EP). It is available through Reliable Power Solutions.








A power line conditioner is more suitable for conditions in which a laboratory's power has sags, harmonic distortion, surges and transients. In this situation, a power line conditioner will maintain a smooth and steady power source to the GC/MS system so that your data will be unaffected by a power surge. You need to purchase two units per GC/MS system, one for the GC and one for the DSQ II.

- For a 120 V DSQ II, we recommend the 120V power conditioner (North American part number ABC1600-11), which is available through Reliable Power Solutions.
- For a 230 V DSQ II, we recommend the 230 V power conditioner (international part number ABC2000-22INT), which is available through Reliable Power Solutions.
- For a 120 V GC, we recommend the 120 V power conditioner (North American part number ABC2000-11), which is available through Reliable Power Solutions.
- For a 230 V GC, we recommend the 230 V power conditioner (international part number ABC2500-22INT), which is available through Reliable Power Solutions.

To order any of the recommended equipment, reference the part numbers above when contacting Reliable Power Solutions P.O. Box 272658 Boca Raton, FL 33427-2658, Telephone: (800) 777-7434, Fax: (561) 750-1791, info@reliablepowersolutions.com.

3. Use [Table 3](#) or [Table 4](#) to determine how many circuits and wall outlets you need. Keep in mind:
 - Power must be single-phase
 - Wall outlets must have earth-ground hard-wired to the main panel
 - Included power cords are 2 m (6 ft) long
- a. Use your Customer Sales Order to determine if the instrument is 120 V or 230 V because it cannot be reconfigured once the Field Service Engineer arrives.
- b. Contact your local Customer Service office to discuss power cordset concerns.

Table 3. 120 VAC Requirements. 120 VAC+6%/-10%, 16 A, 50/60 Hz \pm 2 Hz, Single-Phase < 6% Total Harmonic Distortion

Instrument	Circuit	Max. Current (A)	Max. Power (VA)	Power cord Provided ¹
DSQ II ² (including rotary-vane pump)	1	15	1800	NEMA 5-20P to IEC 60320-C19 
TRACE GC Ultra ² or	2	16	1920	NEMA 5-20P to IEC 60320-C19
FOCUS GC	2	13.3	1600	
Computer ³	Additional (as needed)	5	600	NEMA 5-15P to IEC 60320-C13 
Monitor ³	Additional (as needed)	2	240	NEMA 5-15P to IEC 60320-C13 
AI/AS 3000 ⁴	Additional (as needed)	0.8	95	NEMA 5-15P to IEC 60320-C13 
TriPlus Autosampler ⁴	Additional (as needed)	2	240	NEMA 5-15P to IEC 60320-C13 
Direct Sample Probe	Additional (as needed)	1.3	160	NEMA 5-15P to IEC 60320-C13 

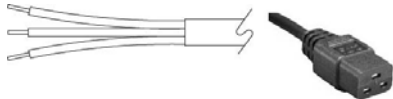
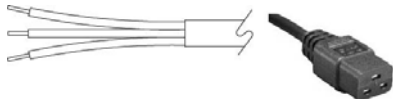


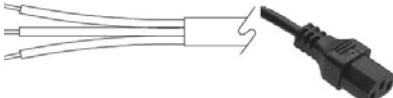
¹Any suitable power cord can be used as long as it meets the voltage and current requirements and conforms to local electrical standards.

²This instrument must be on its own circuit.

³Only North American Cordset supplied from computer manufacturer.

⁴North American Cordset and Continental European Cordset supplied.

Table 4. 230 VAC Requirements: 230 VAC $\pm 10\%$, 20 A, 50/60 Hz ± 2 Hz, Single-Phase < 6% Total Harmonic Distortion

Instrument	Circuit	Max. Current (A)	Max. Power (VA)	Power cord Provided ¹
DSQ II ² (including rotary-vane pump)	1	8	1800	Bare wires to IEC 60320-C19 
TRACE GC Ultra ²	2	10	1920	Bare wires to IEC 60320-C19 
or FOCUS GC	2	8	1600	
Computer ³	Additional (as needed)	2.6	600	None
Monitor ³	Additional (as needed)	1	240	None
AI/AS 3000 ⁴	Additional (as needed)	0.4	95	CEE 7/7 to IEC 60320-C13 
TriPlus Autosampler ⁴	Additional (as needed)	1	240	CEE 7/7 to IEC 60320-C13 
Direct Sample Probe	Additional (as needed)	0.7	160	Bare wires to IEC 60320-C13 

¹Any suitable power cord can be used as long as it meets the voltage and current requirements and conforms to local electrical standards.

²This instrument must be on its own circuit.

³Only North American Cordset supplied from computer manufacturer.

⁴North American Cordset and Continental European Cordset supplied.

Note TRACE GC Ultra, FOCUS GC, and DSQ II 230 VAC power cords terminate to bare wires. Inform your local customer service office as to your plug type so they can bring the proper power cord or plug.

4. Make sure you have at least three separate circuits. They should be within 1.5 m (4 ft) of the instrument (see [Figure 1](#)). For example, use one circuit for the GC, one circuit for the DSQ II, and one circuit for the data system and any options. But, do not connect the GC and DSQ II to the same circuit. The extra outlets illustrated in [Figure 1](#) are for additional options.
5. Make sure that the instruments you plug in do not exceed the maximum circuits and amp rating. Refer to [Table 3](#) or [Table 4](#) for a list of maximum current and power consumption.

Gas Equipment Requirements

Use the following guidelines to make sure you have the gas supplies for your system ready far in advance of installation.

1. Obtain the correct carrier gas and regulator.

You must provide a supply of ultra-high purity helium for the GC carrier gas. A single full-size tank is adequate for the typical flow of 30-50 mL/min. Typical cylinders are about 23 cm (9 in.) wide by 140 cm (55 in.) tall and output >15,000 kPa (2200 psig). A cylinder with about 8 m³ of helium lasts about three months. You must also provide a suitable dual-stage stainless steel diaphragm regulator with a 1/8-in. Swagelok-type connector, female compression terminator.

Table 5. Carrier Gas Specifications

Gas Type	Purity	Outlet Pressure	Regulator	Connector
Helium	99.999% ¹	400-700 kPa (60-100 psig)	Dual stage brass regulator with SS diaphragm. Use our PN 116636-0580 or equivalent.	CGA-580

¹ Ultra-high purity with less than 1.0 ppm each of water, oxygen, and total hydrocarbons and contained in one tank.

2. [Optional] Obtain the correct CI Reagent Gas.

If your instrument is equipped with the chemical ionization (CI) option, you must provide methane. Typical flow rates are only 1-3 mL/min, so smaller tanks such 0.1 m³ can be used, depending on your expected usage. You must also provide a suitable regulator (dual-stage is preferred) with a 1/8-in. Swagelok type connector.

Table 6. CI Gas Specifications

Gas Type	Purity	Outlet Pressure	Regulator	Connector
Methane	99.99% high-purity	35-240 kPa (5-35 psig)	Dual stage brass regulator with SS diaphragm. Use PN 116636-0350 or equivalent	CGA-350
Isobutane	99.9% instrument grade	35-240 kPa (5-35 psig),	Consult gas supplier for specific regulator requirements	CGA-510
Ammonia	99.99%, anhydrous grade	35-240 kPa, (5-35 psig)	Consult gas supplier for specific regulator requirements	CGA-240



CAUTION INSTRUMENT DAMAGE. Do not exceed 240 kPa (35 psig) or damage to the CI reagent gas flow module may result.

Note CI equipped systems use flammable gases, which must be suitably vented.

3. Obtain the correct compressed air, if necessary.

Compressed air is required to cool the direct sample probe option. Refer to the Compressed Air specifications in this table before installation. Usage depends on how often the direct sample probe option is used. You must provide a dual-stage regulator with a 1/8-in. Swagelok female compression terminator.

Table 7. Compressed Air Specifications

Gas Type	Purity	Outlet Pressure	Regulator	Connector
Direct Sample Probes	90% ¹	550-700 kPa (80-100 psig)	Dual stage brass regulator with SS diaphragm. Use PN 116636-0590 or equivalent.	CGA-590

¹ Pure, particle and oil free, and contained in one tank.

4. [Optional] Obtain the correct cryogenic coolant.

If you have purchased a cryogenic cooling option for the GC and PTV injector, then you will need to provide a coolant supply like liquid nitrogen or liquid carbon dioxide. Be sure to specify to your coolant supplier the exact cryogenic cooling option your GC is configured for before you order cryogenic coolant.

Specific details for the TRACE GC Ultra are in the TRACE GC Ultra Site Preparation and Installation Manual. For the latest release of TRACE GC Ultra gas requirements, contact Customer Support for an additional copy of the manual or visit <http://www.thermo.com> and search for “TRACE GC Ultra Manuals”.

5. Check your gas lines if the tanks are not located within 2 m (6 ft) of the instrument. Gas lines should be:
 - As close as possible to the bench where the DSQ II system will be installed
 - Copper or stainless steel for helium, methane, and isobutane
 - Free of oil
 - Free of moisture
 - Stainless steel for ammonia
6. Obtain the correct gas line filters. Gas line filters decrease impurities and contaminants from entering your system. Water, oxygen, and total hydrocarbons should be less than 1 ppm in all cases to avoid high background noise and contaminating the DSQ II system. Otherwise, you can use appropriate gas filters to purify the gas. The DSQ II is supplied with a gas line filter.
7. Store gas tanks and bottles properly so they cannot damage cables or gas lines. Also be sure they are secured in accordance with standard safety practices.

Solvent Requirements

Use the following guidelines to ensure you have the correct solvents for your system:

1. Determine the type of solvent needed to maintain and clean your system.

Table 8. Types of Solvents

Solvent	Grade
Acetone ¹	Reagent or HPLC Grade
Detergent	Alconox, Micro, or equivalent
Glycerol	Reagent Grade
Methanol	Reagent or HPLC Grade

¹Do not use acetone on components made from PEEK or polycarbonate.

2. Store and handle these solvents in accordance with standard safety procedures.
3. Use laboratory grade detergents as specified. Common dishwashing detergents often leave residue from fragrance or lotion additives.

Environment Requirements

Ensure your laboratory meets the minimum environment requirements. Regulating your environment for temperature, humidity, particulate matter, and electrostatic discharge helps maintain system performance.

1. Ensure that your room temperature is 15-31 °C (59-88 °F).

The ideal operating temperature is 18-21 °C (64- 70 °F). Electronic components generate heat while operating; the heat must dissipate into the surrounding air for the components to continue to operate. This is why it is important to maintain a consistent temperature and air flow around the system. Cooling a basic DSQ II system with air-conditioning is approximately 3,940 W (13,450 Btu hr⁻¹) of capacity (see [Table 9](#)). The cost of air-conditioning is more than offset by good sample throughput and reduced repair costs.

Table 9. Maximum Heat Temperatures

	Instrument	Heat Output (in Btu hr ⁻¹)	Heat Output (in W)
Standard	DSQ II	2390	700
	TRACE GC Ultra	8190	2400
	FOCUS GC	5500	1600
	Monitor	820	240
	Computer	2050	600
Options	AS 2000, AI/AS 3000 Autosampler	570	170
	TriPlus Autosampler	820	240
	Tekmar Velocity	2040	600
	Tekmar Aquatek	2570	750
	Tekmar Solatek	2460	720
	Direct Sample Probe	820	240
	Hewlett-Packard DeskJet printer/plotter	410	120
	Hewlett-Packard LaserJet printer	3200	940

2. Ensure that the relative humidity in your laboratory is between 40 and 80%, with no condensation.
 - a. If you operate your DSQ II system in low humidity, static electricity accumulates and discharges, which shortens the life-cycle of electronic components. In contrast, high humidity causes condensation and short circuits to occur.
 - b. Put a temperature and humidity monitor in your laboratory to ensure that temperature and humidity do not exceed these specifications.

3. Ensure that the air in your site is free of excess particulate matter.

For reference, the air should contain fewer than 100,000 particles (larger than 5 µm) per cubic Foot. Dust forms a layer on electronic components that reduces their heat dissipation, causing them to overheat. Dust, smoke and other particulate matter clogs air pathways, reducing air flow around your electronic components.

4. Ensure that your site is free of electrostatic discharge.

Electrostatic Discharge (ESD) damages the electronic components of your DSQ II system. Human beings cannot detect ESD until the potential is about 4000 V. Many electronic Components, however, are damaged by a discharge of electrostatic potential of as little as 100 V. ESD can damage sensitive components, resulting in premature failures.

5. Ensure an earth ground is provided within one foot of the instrument for grounding.

ESD Precautions

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

Note CI-equipped systems use flammable methane, which must be suitably vented.

Telephone Requirements

Use the following guidelines to ensure your site has the correct telephone requirements:

1. Check if your telephone is within 2 m (6 ft) of your system.

This allows you to operate the system while talking on the phone with Thermo Fisher Scientific Technical Support, should the need arise. Thermo Fisher Scientific Technical Support staff are available by phone or fax to help you.

2. Call your Thermo Fisher Scientific Customer Service Representative for questions about parts, instruments, or service.

Receiving Requirements

Follow these steps to ensure your Receiving Department is ready to receive the DSQ II system:

1. Complete the Preinstallation Checklist located at the front of your guide and forward it to Customer Support.
2. When the boxes arrive, determine if your instrument was shipped either Domestic or International, to determine shipping liabilities.

Domestic Shipments

Instruments are shipped in one of two manners: Free On Board (FOB) Austin, TX, USA, or FOB destination.

The method of shipment determines who has responsibility for filing a claim against the carrier if the system is damaged in transit.

Most systems are shipped FOB Austin, TX, and in this instance any damages incurred in shipment are the responsibility of the purchaser and the carrier. If necessary, we will assist with filing claims and (billable) repairs. If the system is shipped FOB destination, we will file a claim against the carrier. However, we do not accept liability for damage if materials are received with obvious damage, and the damage is not recorded on the receiving documents.

International Shipments

Instruments shipped outside of the USA are usually shipped Carriage and Insurance Paid (CIP) to Destination, unless otherwise specified.

If the system is shipped CIP destination and damages occur during shipment, we will file a claim against the carrier. However, we do not accept liability for damage if materials are received with obvious damage, and the damage is not recorded on the receiving documents.

Inspect the boxes for damage when the instrument arrives. Our instruments are shipped by electronic equipment carriers who specialize in the handling of delicate equipment. Occasionally, however, equipment is inadvertently damaged in transit. By following these instructions, you can protect yourself and your company from any possible loss or liability.

Inspect for obvious damage or evidence of rough handling, including triggering of the Shockwatch® or Tiltwatch™ labels when receiving material. If you see external damage:

- a. Do not refuse shipment. Instead, make a note of any damage on the receiving documents and leave the instruments in their original packaging.
- b. Request inspection from the carrier within 15 days of delivery (3 days for international), and contact our Customer Service Representative to report the damage.
- c. Move the cartons to a protected location, preferably the installation site.
- d. Leave the boxes as complete as possible and do not unpack or open the boxes without our Field Service Engineer (FSE) present. Doing otherwise may void your warranty or order.

Notify your Customer Service Representative that you are ready for the instrument to be installed. If your site meets all the criteria listed on the Preinstallation Checklist.

What Happens Next?

Your Field Service Engineer will:

1. Unpack and install your DSQ II system, including optional instruments.
2. Install a TR SQC column in the GC and allow the DSQ II to pump down overnight.
3. Run a series of tests the next day to verify system performance. The Field Service Engineer performs the same series of injections that are performed at the factory before your instrument is shipped.
 - a. First, it is thoroughly checked for leaks in the vacuum systems.
 - b. Next, it is put through a series of diagnostic checks to verify all of the electronics are functioning properly.
 - c. Finally, it is attached to your GC and the complete system is tested.
4. Perform a series of injections with the test compound to verify the system meets signal and noise requirements.
5. Place the instrument methods on your hard-drive for each test and the data file generated on your PC for your review. These methods are stored under *\Xcalibur\Examples\Methods* and the raw data files are stored under *\Xcalibur\Data\Factory Test Data*.
6. Verify that the system is in working order and meets the required ion mode specifications.

Site Preparation

What Happens Next?

Abbreviations

μ micro (10^{-6})

Ω ohm

A

A ampere

ac alternating current

amu atomic mass unit

ADC analog-to-digital converter

ASCII american standard code for information interchange

B

baud rate data transmission speed in events per second.

C

°C degrees Celsius

CD-ROM compact disc read-only memory

CE (F. Conformité Européenne) European conformity. Mandatory european marking for certain product groups to indicate conformity with essential health and safety requirements set out in european directives.

cfm cubic feet per minute

CI chemical ionization

CIP carriage and insurance paid to

cm centimeter

cc or cm³ cubic centimeter

CPU central processing unit (in a computer)

D

Da Dalton

DAC digital-to-analog converter

dc direct current

DDS direct digital synthesizer

DEP™ direct exposure probe

DIP direct insertion probe

DS data system

DSP digital signal processor

E

EI electron ionization

ESD electrostatic discharge

eV electron volt

EN european conformity

F

f femto (10^{-15})

°F degrees Fahrenheit

Abbreviation: G

FCC federal communication commission

FOB Free on Board

ft foot

FSE field service engineer

FTP file transfer protocol

G

g gram

G giga (10^9)

GB gigabytes 1024 MB (billion)

GC gas chromatograph

GC/MS gas chromatograph / mass spectrometer

GND electrical ground

GPB general-purpose interface bus

GUI graphical user interface

H

HV high voltage

Hz hertz (cycles per second)

I

ICIS™ interactive chemical information system

IEC international electrotechnical commission

IEEE institute of electrical and electronics engineers

in. inch

I/O input/output

K

k kilo (10^3 , 1000)

K Kelvin

kb kilobyte 1024 bytes (thousand)

kg kilogram

kPa kilopascal

kVA kilo volt amperes (1000 VA)

L

L liter

LAN local area network

lb pound

LED light-emitting diode

M

m meter; milli (10^{-3})

M mega (10^6)

MB megabyte 1, 048, 576 (million)

M⁺ molecular ion

min minute

mL milliliter

mm millimeter

MS scan power: MS¹, mass spectrometer

m/z mass-to-charge ratio

N

n nano (10^{-9})

P

p pico (10^{-12})

Pa Pascal

PCB printed circuit board

PID proportional / integral / differential

PN part number

P/P peak-to-peak voltage

ppm parts per million

psig pounds per square inch gauge

R

RAM random access memory

RF radio frequency

RMS root mean square

ROM read-only memory

RS-232 industry standard for serial communications

S

s second(s)

SCSI small computer system interface

SIM selected ion monitoring

SI international system of units

S/N signal to noise ratio

T

TIC total ion current

TCP/IP transmission control protocol / Internet protocol

Torr torr

U

URL uniform resource locator

UPS uninterruptible power supply

USB universal serial bus

V

V volt

VAC volts alternating current

VDC volts direct current

Abbreviation: V

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