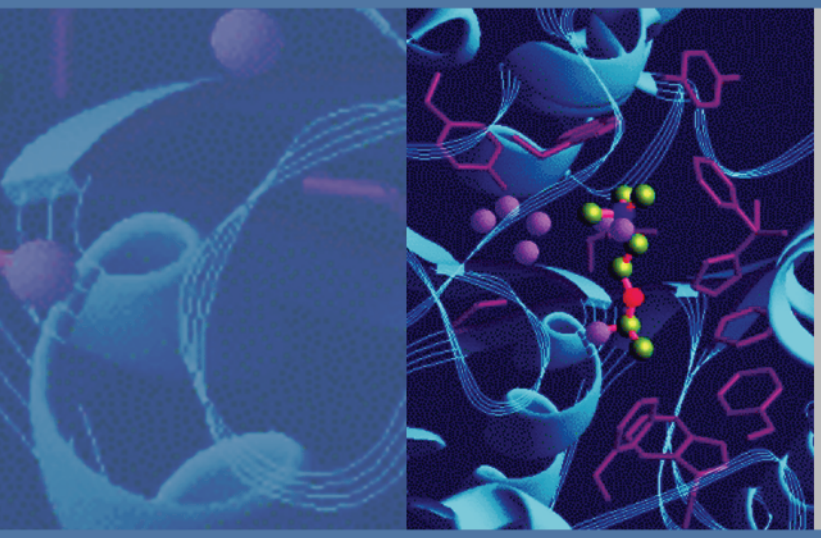


Surveyor MSQ Plus

Preinstallation Requirements Guide

60111-97040 Revision B November 2007

Thermo SCIENTIFIC

Release history: Revision A released in August 2006, Revision B released in November 2007

For Research Use Only. Not regulated for medical or veterinary diagnostic use by U.S. Federal Drug Administration or other competent authorities.

IMPORTANT PREINSTALLATION INFORMATION... PLEASE READ

Thermo SCIENTIFIC

Instrument Name Installation Request Form

Dear User:

Read the Instrument Name Preinstallation Requirements Guide, and then print and complete the following installation request form. After all items on the form are fulfilled, sign and date the form. Then, mail or fax this form to your local Thermo Fisher Scientific sales/service office. The address and fax number for your local office are located on the following pages.

❑ 1. All laboratory remodeling has been completed.
❑ 2. Your *Surveyor MSQ Plus system* is on site.
❑ 3. Principal operator will be available during the installation / certification period.
❑ 4. Doorways, hallways, and so on are a minimum width of 70 cm (28 in.).
❑ 5. Available floor area is sufficient and flooring will support the load.
❑ 6. Sufficient bench space is available for all of the equipment. List the following:
Width: _____
Depth: _____
Height: _____
❑ 7. Workbench can support the load of the MS detector [60 kg (132 lbs)] and the LC [65 kg (143 lbs) Surveyor LC with autosampler, pump, and PDA detector] and is free from vibration.
❑ 8. Lighting is adequate.
❑ 9. Main power is installed and is in compliance with local electrical codes.
❑ 10. Power for test and cleaning equipment is installed.
❑ 11. Power outlets are of the correct configuration.
Note NEMA type: _____
❑ 12. Voltage of power outlet has been measured.
Note ***measured*** voltage: _____
❑ 13. Power is free from fluctuations due to slow changes in the average voltage or changes due to surges, sags, or transients.
❑ 14. Air conditioning is adequate for temperature, humidity, and particulate matter control. The laboratory can be maintained at a constant temperature, between 15 and 27 °C (59 and 81 °F).
❑ 15. Relative humidity is between 40% and 80% with no condensation.
❑ 16. System work area is free from magnetic disruption and electrostatic discharge.
❑ 17. A supply of nitrogen gas is on site, gas lines are installed, appropriate gas regulators are available, appropriate adaptors for connecting to 6 mm OD PTFE tubing are installed on the nitrogen supply line.
List gases and purity: _____
❑ 18. New or recently cleaned HPLC system is available that produces a pulse-free, continuous flow from 50 to 2000 µL/min.
❑ 19. HPLC grade water, methanol, acetonitrile and isopropyl alcohol are available for testing the performance of your instrument.
❑ 20. There is a suitable exhaust system present that is separate from solvent waste.
❑ 21. Provision has been made for collecting solvent waste from the API source.
❑ 22. One voice telephone line is installed near the system.
❑ 23. All relevant safety regulations are complied with.
❑

Have any special acceptance specifications been agreed to in 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.

Note: We reserve the right to invoice against the engineer's time if the installation requirements are not met on the date of the installation.

Print your name, company name, and company address clearly below:

Name _____

Company _____ Telephone_____

Address _____

Address _____

City _____ State _____ Country_____

Signature _____ Date _____

Offices for Thermo Scientific San Jose Products

North America

Northeastern Region

265 Davidson Avenue, Suite 101
Somerset, NJ 08873
Phone.....[1] (732) 627-0220
Fax .....[1] (732) 627-0260

Southern Region

665 Molly Lane, Suite 140
Woodstock, GA 30189
Phone .....[1] (770) 516-5589
Fax .....[1] (770) 516-6916

Central Region

1201 E. Wiley Road, Suite 160
Schaumburg, IL 60173
Phone.....[1] (847) 310-0140
Fax .....[1] (847) 310-0145

Western Region

355 River Oaks Parkway
San Jose, CA 95134
Phone.....[1] (408) 965-6000
Fax .....[1] (408) 965-6123

Canada

5716 Coopers Avenue, Unit 1
Mississauga, Ontario, L4Z 2E8
Phone.....[1] (905) 712-2258
Fax .....[1] (905) 712-4203

Europe

Austria

Wehlistrasse 27b
A-1200 Wien
Phone.....[43] (01) 333 50 34-0
Fax .....[43] (01) 333 50 34-26

Belgium

Technologiestraat 47
B-1082 Brussels
Phone.....[32] (02) 482 30 30
Fax .....[32] (02) 482 30 31

France

(also representing French speaking N. Africa, Algeria, Morocco, and Tunisia)

16 Avenue du Québec
Silic 765
Z.A. de Courtaboeuf
F-91963 Les Ulis Cédex
Phone.....[33] (01) 60 92 48 00
Fax .....[33] (01) 60 92 49 00

Germany

Im Steingrund 4-6
D-63303 Dreieich
Phone.....[49] (06103) 408 0
Fax .....[49] (06103) 408 1222

Italy

Strada Rivoltana
I-20090 Rodano (Milano)
Phone.....[39] (02) 95059 226
Fax .....[39] (02) 95320 370

Netherlands

Takkebijsters 1
NL-4817 BL Breda
Phone.....[31] (076) 587 8722
Fax .....[31] (076) 571 4171

Spain

Sepulveda 7 A
ES-28108 Alcobendas (Madrid)
Phone.....[34] (091) 657 4930
Fax .....[34] (091) 657 4937

Notes: The country code is enclosed in square brackets [ ]. The city code or area code is enclosed in parenthesis ( ). For countries other than the U.S.A., when you are dialing from within the specified country, dial the 0 of the city code. For countries other than Italy, when you are dialing from outside the country, do not dial the 0 of the city code.

Offices for Thermo Scientific San Jose Products - Continued

Europe - Continued

Spain

Acer 30-32
Edificio Sertram – Planta 2, Modulo 3
ES-08038 Barcelona
Phone.....[34] (093) 223 0918
Fax .....[34] (093) 223 0982

Sweden

Pyramidbacken 3
S-141 75 Kungens Kurva (Stockholm)
Phone.....[46] (08) 556 468 00
Fax .....[46] (08) 556 468 08

United Kingdom

Stafford House
1 Boundary Park
Boundary Way
Hemel Hempstead
Hertfordshire HP2 7GE
Phone .....[44] (01442) 233 555
Fax .....[44] (01442) 233 667

Australasia and Asia

Australia

P.O. Box 239 Rydalmere
Unit 14, 38 - 46 South Street
Rydalmere, N.S.W. 2116
Phone.....[61] (02) 9898-9000
Fax .....[61] (02) 9898-9800

Japan

C-2F
3-9 Moriya-cho, Kanagawa-ku
Yokohama, Kanagawa 221-0022
Phone.....[81] (45) 453-9100
Fax .....[81] (06) 453-9110

Japan

Esaka Grand Building
2-3-1 Esaka-cho, Suita City
Osaka 564 - 0063
Phone.....[81] (06) 6387-6681
Fax .....[81] (06) 6387-6641

P.R. China

Room 901, Ping-an Mansion
No. 23, Jin Rong Street
Xi Cheng District
Beijing 100032
Phone.....[86] (010) 6621 0839
Fax .....[86] (010) 6621 0851

P.R. China

23/F Peregrine Plaza
1325 Middle Huaihai Rd.
Shanghai 200031, P.R.China
Phone.....[86] (21) 5465-7588 ext 212
Fax .....[86] (21) 6445-7830

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 as amended by 92/31/EEC and 93/68/EEC

EMC compliance has been evaluated by UNDERWRITERS LABORATORY, INC (UL).

EN 55011	(1998)	EN 61000-4-3	(2002)
EN 61326-1	(1998)	EN 61000-4-4	(2001)
EN 61000-3-2	1995	EN 61000-4-5	(2001)
EN 61000-3-3	1995	EN 61000-4-6	(2001)
EN 61000-4-2	(2001)	EN 61000-4-11	(2001)

CFR 47 Part 15 Subpart B: 2004
Code of Federal Regulations, Part 15, Subpart B, Radio Frequency Devices Unintentional Radiators
Class A

Low Voltage Safety Compliance

This device complies with the EU directive 73/23/EEC (equivalent to IEC 1010-1, 1990 plus Amendment 1, 1991 and Amendment 2, 1995) by meeting the following standard: EN 61010-1: 2001 with Corrigendum No. 1 and 2.

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

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.

Thermo
SCIENTIFIC

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 Fisher 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 Fisher 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.

WEEE Konformität

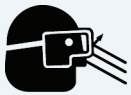
Dieses Produkt muss die EU Waste Electrical & Electronic Equipment (WEEE) Richtlinie 2002/96/EC erfüllen. Das Produkt ist durch folgendes Symbol gekennzeichnet:

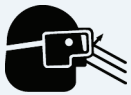
Thermo Fisher Scientific hat Vereinbarungen mit Verwertungs-/Entsorgungsfirmen in allen EU-Mitgliedsstaaten getroffen, damit dieses Produkt durch diese Firmen wiederverwertet oder entsorgt werden kann. Mehr Information über die Einhaltung dieser Anweisungen durch Thermo Fisher Scientific, über die Verwerter,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

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.

CAUTION Symbol	CAUTION	VORSICHT	ATTENTION	PRECAUCION	AVVERTENZA
	**Electric Shock:** This instrument uses high voltages that can cause personal injury. Before servicing, shut down the instrument and disconnect the instrument from line power. Keep the top cover on while operating the instrument. Do not remove protective covers from PCBs.	**Elektroschock:** In diesem Gerät werden Hochspannungen verwendet, die Verletzungen verursachen können. Vor Wartungsarbeiten muß das Gerät abgeschaltet und vom Netz getrennt werden. Betreiben Sie Wartungsarbeiten nicht mit abgenommenem Deckel. Nehmen Sie die Schutzabdeckung von Leiterplatten nicht ab.	**Choc électrique:** L'instrument utilise des tensions capables d'infliger des blessures corprelles. L'instrument doit être arrêté et débranché de la source de courant avant tout intervention. Ne pas utiliser l'instrument sans son couvercle. Ne pas elensver les étuis protecteurs des cartes de circuits imprimés.	**Descarga eléctrica:** Este instrumento utiliza altas tensiones, capaces de producir lesiones personales. Antes de dar servicio de mantenimiento al instrumento, éste debera apagarse y desconectarse de la línea de alimentacion eléctrica. No opere el instrumento sin sus cubiertas exteriores quitadas. No remueva las cubiertas protectoras de las tarjetas de circuito impreso.	**Shock da folgorazione.** L'apparecchio è alimentato da corrente ad alta tensione che puo provocare lesioni fisiche. Prima di effettuare qualsiasi intervento di manutenzione occorre spegnere ed isolare l'apparecchio dalla linea elettrica. Non attivare lo strumento senza lo schermo superiore. Non togliere i coperchi a protezione dalle schede di circuito stampato (PCB).
	**Chemical:** This instrument might contain hazardous chemicals. Wear gloves when handling toxic, carcinogenic, mutagenic, or corrosive or irritant chemicals. Use approved containers and proper procedures to dispose waste oil.	**Chemikalien:** Dieses Gerät kann gefährliche Chemikalien enthalten. Tragen Sie Schutzhandschuhe beim Umgang mit toxischen, karzinogenen, mutagenen oder ätzenden/reizenden Chemikalien. Entsorgen Sie verbrauchtes Öl entsprechend den Vorschriften in den vorgeschriebenen Behältern.	**Chimique:** Des produits chemiques dangereux peuven se trouver dans l'instrument. Proted dos gants pour manipuler tous produits chemiques toxiques, cancérigènes, mutagènes, ou corrosifs/irritants. Utiliser des récipients et des procédures homologuées pour se débarrasser des déchets d'huile.	**Química:** El instrumento puede contener productos quimicos peligrosos. Utilice guantes al manejar productos quimicos tóxicos, carcinogenos, mutagenos o corrosivos/irritantes. Utilice recipientes y procedimientos aprobados para deshacerse del aceite usado.	**Prodotti chimici.** Possibile presenza di sostanze chimiche pericolose nell'apparecchio. Indossare dei guanti per maneggiare prodotti chimici tossici, cancerogeni, mutageni, o corrosivi/irritanti. Utilizzare contenitori aprovo e seguire la procedura indicata per lo smaltimento dei residui di olio.
	**Heat:** Before servicing the instrument, allow any heated components to cool.	**Hitze:** Warten Sie erhitzte Komponenten erst nachdem diese sich abgekühlt haben.	**Haute Temperature:** Permettre aux composants chauffés de refroidir avant tout intervention.	**Altas temperaturas:** Permita que lop componentes se enfríen, ante de efectuar servicio de mantenimiento.	**Calore.** Attendere che i componenti riscaldati si raffreddino prima di effetturare l'intervento di manutenzione.
	**Fire:** Use care when operating the system in the presence of flammable gases.	**Feuer:** Beachten Sie die einschlägigen VorsichtsmaBnahmen, wenn Sie das System in Gegenwart von entzündbaren Gasen betreiben.	**Incendie:** Agir avec précaution lors de l'utilisation du système en présence de gaz inflammables.	**Fuego:** Tenga cuidado al operar el sistema en presencia de gases inflamables.	**Incendio.** Adottare le dovute precauzioni quando si usa il sistema in presenza di gas infiammabili.
	**Eye Hazard:** Eye damage could occur from splattered chemicals or flying particles. Wear safety glasses when handling chemicals or servicing the instrument.	**Verletzungsgefahr der Augen:** Verspritzte Chemikalien oder kleine Partikel können Augenverletzungen verursachen. Tragen Sie beim Umgang mit Chemikalien oder bei der Wartung des Gerätes eine Schutzbrille.	**Danger pour les yeux:** Dex projections chimiques, liquides, ou solides peuvent être dangereuses pour les yeux. Porter des lunettes de protection lors de toute manipulationde produit chimique ou pour toute intervention sur l'instrument.	**Peligro par los ojos:** Las salicaduras de productos químicos o particulas que salten bruscamente pueden causar lesiones en los ojos. Utilice anteojos protectores al mnipular productos químicos o al darle servicio de mantenimiento al instrumento.	**Pericolo per la vista.** Gli schizzi di prodotti chimici o delle particelle presenti nell'aria potrebbero causare danni alla vista. Indossare occhiali protettivi quando si maneggiano prodotti chimici o si effettuano interventi di manutenzione sull'apparecchio.
	**General Hazard:** A hazard is present that is not included in the above categories. Also, this symbol appears on the instrument to refer the user to instructions in this manual.	**Allgemeine Gefahr:** Es besteht eine weitere Gefahr, die nicht in den vorstehenden Kategorien beschrieben ist. Dieses Symbol wird im Handbuch auBerdem dazu verwendet, um den Benutzer auf Anweisungen hinzuweisen.	**Danger général:** Indique la présence d;un risque n'appartenant pas aux catégories citées plus haut. Ce symbole figure également sur l'instrument pour renvoyer l'utilisateur aux instructions du présent manuel.	**Peligro general:** Significa que existe un peligro no incluido en las categorias anteriores. Este simbolo también se utiliza en el instrumento par referir al usuario a las instrucciones contenidas en este manual.	**Pericolo generico.** Pericolo non compreso tra le precedenti categorie. Questo simbolo è utilizzato inoltre sull'apparecchio per segnalare all'utente di consultare le istruzioni descritte nel presente manuale.
	When the safety of a procedure is questionable, contact your local Technical Support organization for Thermo Fisher Scientific San Jose Products.	Wenn Sie sich über die Sicherheit eines Verfahrens im unklaren sind, setzen Sie sich, bevor Sie fortfahren, mit Ihrer lokalen technischen Unterstützungsorganisation für Thermo Fisher Scientific San Jose Produkte in Verbindung.	Si la sûreté d'un procédure est incertaine, avant de continuer, contacter le plus proche Service Clientèle pour les produits de Thermo Fisher Scientific San Jose.	Cuando la certidumbre acerca de un procedimiento sea dudosa, antes de proseguir, pongase en contacto con la Oficina de Asistencia Tecnica local para los productos de Thermo Fisher Scientific San Jose.	Quando e in dubbio la misura di sicurezza per una procedura, prima di continuare, si prega di mettersi in contatto con il Servizio di Assistenza Tecnica locale per i prodotti di Thermo Fisher Scientific San Jose.

CAUTION Symbol	CAUTION	危険警告	危險警告
	**Electric Shock:** This instrument uses high voltages that can cause personal injury. Before servicing, shut down the instrument and disconnect the instrument from line power. Keep the top cover on while operating the instrument. Do not remove protective covers from PCBs.	**電撃：**この計測器は高電圧を使用し、人体に危害を与える可能性があります。保守・修理は、必ず操業を停止し、電源を切ってから実施して下さい。上部カバーを外したままで 計測器を使用しないで下さい。プリント配線板の保護カバーは外さないで下さい。	電擊：儀器設備使用會造成人身傷害的高伏電壓。在維修之前，必須先關儀器設備並切除電源。務必要在頂蓋蓋上的情況下操作儀器。請勿拆除PCB保護蓋。
	**Chemical:** This instrument might contain hazardous chemicals. Wear gloves when handling toxic, carcinogenic, mutagenic, or corrosive or irritant chemicals. Use approved containers and proper procedures to dispose waste oil.	**化学物質：**危険な化学物質が計測器中に存在している可能性があります。毒性、発がん性、突然変異性、腐食・刺激性などのある薬品を取り扱う際は、手袋を着用して下さい。廃油の処分には、規定の容器と手順を使用して下さい。	化學品：儀器設備中可能存在有危險性的化學物品。接觸毒性致癌、誘變或腐蝕／刺激性化學品時，請配帶手套。處置廢油時，請使用經過許可的容器和程序。
	**Heat:** Before servicing the instrument, allow any heated components to cool.	**熱：**熱くなった部品は冷えるのを待ってから保守・修理を行って下さい。	高温：請先等高温零件冷卻之後再進行維修。
	**Fire:** Use care when operating the system in the presence of flammable gases.	**火災：**可燃性のガスが存在する場所でシステムを操作する場合は、充分な注意を払って下さい。	火災：在有易燃氣體的場地操作該系統時，請務必小心謹慎。
	**Eye Hazard:** Eye damage could occur from splattered chemicals or flying particles. Wear safety glasses when handling chemicals or servicing the instrument.	**眼に対する危険：**化学物質や微粒子が飛散して眼を傷つける危険性があります。化学物質の取り扱い、あるいは計測器の保守・修理に際しては防護眼鏡を着用して下さい。	眼睛傷害危險：飛濺的化學品或顆粒可能造成眼睛傷害。處理化學品或維儀器設備時請佩戴安全眼鏡。
	**General Hazard:** A hazard is present that is not included in the above categories. Also, this symbol appears on the instrument to refer the user to instructions in this manual.	**一般的な危険：**この標識は上記以外のタイプの危険が存在することを示します。また、計測器にこの標識がついている場合は、本マニュアル中の指示を参照して下さい。	一般性危險：說明未包括在上述類別中的其他危險。此外，儀器設備上使用這個標誌，以指示用戶本使用手冊中的說明。
	When the safety of a procedure is questionable, contact your local Technical Support organization for Thermo Fisher Scientific San Jose Products.	**安全を確保する手順がよくわからない時は、作業を一時中止し、お近くのサーモエレクトロンサンローゼプロダクトのテクニカールサポートセンターごご連絡ください。**	如对安全程序有疑问，请在操作之前与当地的菲尼根技术服务中心联系。

Contents

Preface

About This Guide

This *Surveyor MSQ Plus Preinstallation Guide* contains information that will assist you in planning for and preparing your lab site prior to delivery and installation of the system. Please read each section carefully to ensure that your laboratory is ready for the installation of the system.

This manual supports the release of the Surveyor MSQ 2.0 instrument software shipped with Xcalibur 2.0 or higher and Quan Devices 2.0.

Related Documentation

In addition to this guide, Thermo Fisher Scientific provides the following documents for the Surveyor MSQ Plus MS detector:

- *Surveyor MSQ Plus Getting Connected*
- *Surveyor MSQ Plus Getting Started*
- *Surveyor MSQ Plus Hardware Manual*

Safety and Special Notices

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

Safety and special notices include the following:

CAUTION Highlights hazards to humans, property, or the environment. Each CAUTION notice is accompanied by an appropriate CAUTION symbol.

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 Helpful information that can make a task easier.

Contacting Us

There are several ways to contact Thermo Fisher Scientific.

❖ **To contact Technical Support**

Phone	800-685-9535
Fax	561-688-8736
E-mail	TechSupport.C+MS@thermofisher.com
Knowledge base	www.thermokb.com

Find software updates and utilities to download at www.mssupport.thermo.com.

❖ **To contact Customer Service for ordering information**

Phone	800-532-4752
Fax	561-688-8731
Web site	www.thermo.com/finnigan

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

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

Introduction

The Surveyor MSQ™ Plus MS detector is designed to operate under carefully controlled environmental conditions.

The purchaser is responsible for providing a suitable location and operating environment, a source of power of acceptable quality, correct gas and solvent supplies, and proper waste and exhaust systems.

CAUTION Operating a system or maintaining it outside the power and operating environment specifications described in this guide might cause failures of many types. The repair of such failures is specifically excluded from the standard warranty and service contract coverage.

For additional information, request specific preinstallation support directly through your local Thermo Fisher Scientific office.

Site Preparation

Before a Thermo Fisher Scientific service engineer can install your instrument, you must prepare the site. Transport of the equipment to the site requires wide entrances and hallways. Supporting the weight of the MS detector, computer, and liquid chromatography (LC) system requires large and strong workbenches. You must install a telephone within reach of the workbench. See Table 1 for a summary of site preparation requirements, and see the pages indicated in the table for details.

It is your responsibility to provide an acceptable installation site.

IMPORTANT The Surveyor MSQ Plus MS detector must be located within 2.5 m of a connection to an external laboratory vent.

Table 1. Site preparation requirements

Requirement	Page
Entrance: For the system to be delivered to the site, your entrances and hallways must be a minimum of 70 cm (28 in.) wide for passage of the instrument.	4
Space and Load Requirements: The total workbench surface must have minimum dimensions of 0.9 × 2 m (3 × 6 ft) to support the Surveyor MSQ Plus MS detector, the Surveyor LC system, the optional cone wash pump, and the data system with user-supplied printer. The workbench surface must be capable of supporting the weight of the Surveyor MSQ Plus MS detector [60 kg (132 lbs)] and the data system (with printer) [39 kg (86 lbs)] plus the weight of your liquid chromatograph and any options.	4
Telephone: A telephone line must be installed near the workbench.	8

Entrance

The entrance to your facility and the width of all hallways, elevators, and so on, must be a minimum of 70 cm (28 in.).[1] However, additional room must be allowed for maneuvering the system around corners, into elevators, or through doorways.

The Surveyor MSQ Plus MS detector and accessories are shipped in a container with the following dimensions: *l* 112 cm (44 in.), *w* 70 cm (28 in.), *h* 78 cm (31 in.). The container and its contents weigh approximately 60 kg (132 lb).[2] Other modules—such as the computer, forepump, monitor, and options—are shipped in their own containers. Their dimensions and weights are less than that of the container for the Surveyor MSQ Plus MS detector.

Space and Load Requirements

See Figure 1 for the Surveyor MSQ Plus system installation and space requirements. See Table 2 for the space requirements and weights of the typical Surveyor MSQ Plus LC/MS system components.

Place the Surveyor MSQ Plus MS detector and the data system components on two separate workbenches next to each other. One workbench will hold the MS detector, the LC, and any other LC/MS options and must have minimum dimensions of 1 × 1.53 m (3 × 5 ft). This workbench must also be capable of supporting the weight of the Surveyor MSQ Plus MS detector [[60 kg (132 lbs)] plus the weight of the liquid chromatograph[3] and any options. Allow about 8 cm (3 in.) of clear space behind the system for proper air circulation and for clearance of the gas lines and electrical connections. In addition, allow at least 92 cm (36 in.) of vertical clearance between the top of the MS detector and any shelves above it.

The second workbench will hold the data system computer, monitor, and printer, and must have minimum dimensions of 1 × 1.22 m (3 × 4 ft). This second workbench must be capable of supporting the weight of the data system and printer [48 kg (105 lb)].Because the total length of the vacuum hose connecting the MS detector to the forepump should not exceed 8 ft., install the forepump on the floor close to the MS detector.

---

[1]Your instrument is shipped in a shipping container with a smallest dimension of 70 cm (28 in.). If the entrance to your laboratory will not accommodate a 92 cm container, you can remove the individual modules from the container before moving them into the room. If you remove the instrument from its shipping container before it is delivered to the lab site, be sure that all the contents of the container remain with the instrument.

[2]If the instrument shipping container, Shock Watch, or other indicator shows any evidence of damage or mishandling during shipment, do NOT open the container. Call your Thermo Fisher Scientific representative for instructions on what to do. If there is no evidence of shipping damage or mishandling, then you can proceed with the instructions that follow.

[3]A Surveyor LC system containing a Surveyor LC Pump, a Surveyor Autosampler, and a Surveyor PDA weighs approximately 65 kg (143 lbs). Add more weight for the solvent platform, which holds the solvent reservoir bottles filled with solvent.

Depending on available space, you have two options for the placement of the forepump and for connecting the vacuum hose from the Surveyor MSQ Plus to the forepump.

- If the workbench has space beneath it, place the forepump under the workbench immediately behind the Surveyor MSQ Plus MS detector as shown in Figure 1. Either run the vacuum hose behind the workbench or make a 6.4 cm (2.5 in.) diameter hole through the bench for the vacuum hose. Allow for room to run the power cords from the forepump through the hole.
- If the workbench has no space under or at the end of it, place the forepump on the floor in front of the Surveyor MSQ Plus MS detector.

CAUTION Whenever possible, provide space under the workbench for the forepump. If placed in front of the Surveyor MSQ Plus, the forepump can block access to drawers and cabinets and can represent a trip hazard.

Note To maintain forepump integrity, route the exhaust tubing from the exhaust port down to the floor, not from the forepump vertically toward the ceiling.

Figure 1. Space requirements for your Surveyor MSQ Plus system

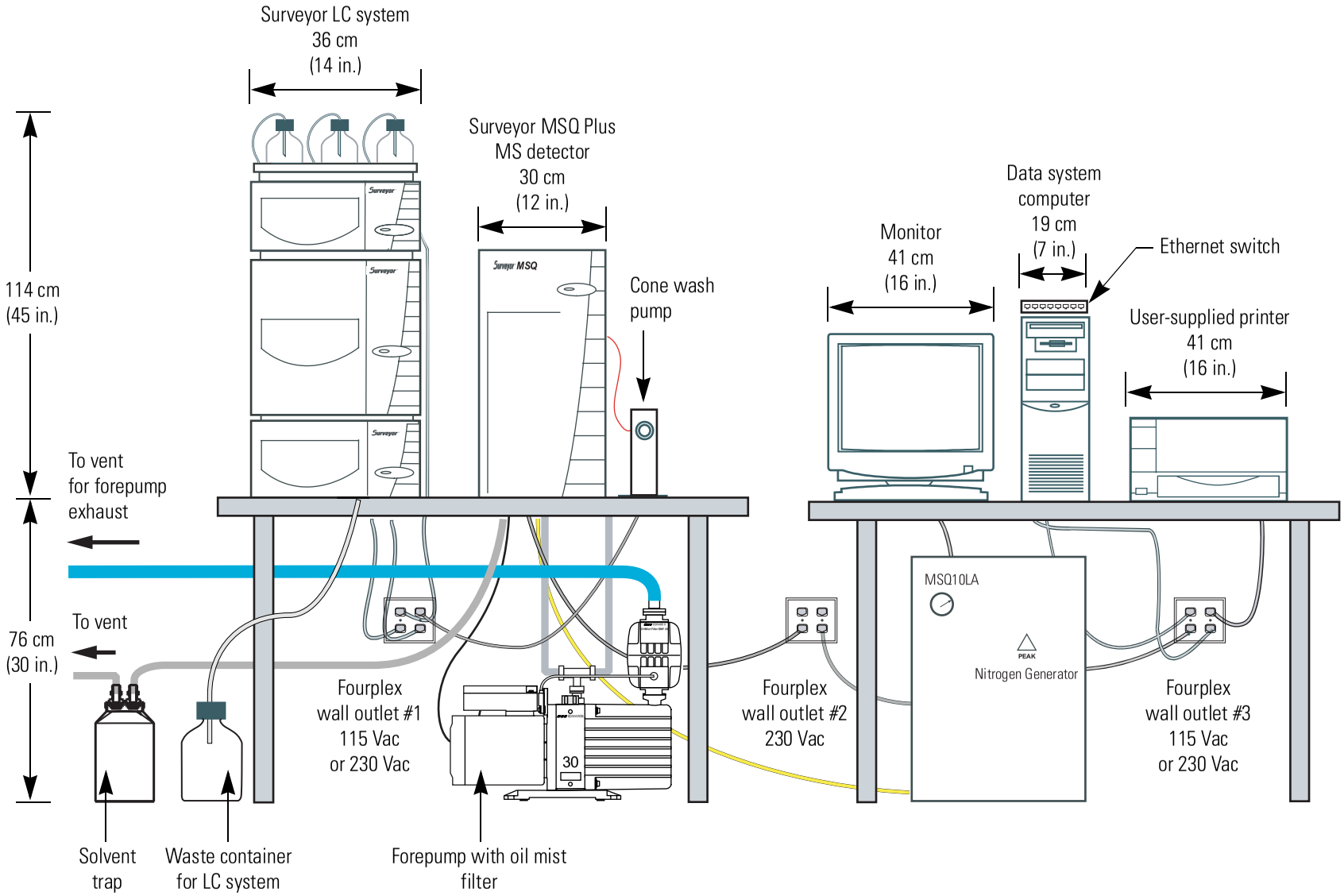


Table 2. Space requirements and weights of system components

	Height		Width		Depth		Weight	
Module	**cm**	**in.**	**cm**	**in.**	**cm**	**in.**	**kg**	**lb**
Surveyor MSQ MS detector	55	22	30	12	70	28	60	132
Surveyor LC system*	114	45	36	14.2	51	20	68	150
Cone wash pump	18	7	12	4.5	12	4.5	2.7	6
Mid-Tower Computer	48	19	18	7	43	17	23	50
Monitor	41	16	41	16	20	8	10	22
Keyboard	3	2	48	19	20	8	1	2
Forepump	30	12	60	24	29	11	34	75
Nitrogen generator (MSQ10LA)	63	25	43	17	41	16	47.5	105

*These dimensions are for a system with an LC Pump, a Surveyor Autosampler, a PDA detector, and a solvent platform with five 1-L solvent bottles filled with solvent.

If you are using the MSQ10LA nitrogen generator, install it on the floor close to the Surveyor MSQ Plus MS detector. Because the gas pressure decreases as the length of the tubing increases, the 6 mm OD tubing that runs from the back of the nitrogen generator to the GAS In port on the rear panel of the MS detector should be no longer than 6 m (20 ft). Allow sufficient slack in the gas line so that you can pull the generator forward for maintenance.

Figure 2. Optional MSQ10LA nitrogen generator

Telephone

Install a telephone in your laboratory near the instrument so that, if necessary, you can conveniently operate the system while you are working by telephone with Thermo Fisher Scientific Technical Support. Place the voice telephone outlet within 2 m (6 ft) of your system.

IMPORTANT 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.

Operating Environment

Attention to the operating environment will ensure continued high performance of your Surveyor MSQ Plus LC/MS system. Any expenditures for air conditioning are more than offset by good sample throughput and reduced repair costs. See Table 3 for more information on operating environment requirements, and see the pages indicated in the table for more details.

It is your responsibility to provide the operating environment necessary for proper operation of the Surveyor MSQ Plus LC/MS system.

Table 3. Summary of operating environment preinstallation requirements

Requirement	Page
Temperature: The laboratory room temperature must be maintained between 15 and 35 °C (59 and 95 °F). Also, ensure that the temperature does not fluctuate by more than ±5 °C to ensure good performance.	10
Humidity: The relative humidity of the operating environment must be between 40% and 80%, with no condensation.	11
Vibration: Workbench must be free from vibration.	11
Lighting: Adequate lighting for instrument operation is required. A high intensity lamp for instrument maintenance is also recommended.	11
Particulate Matter: Air should contain fewer than 100000 particles per cubic foot (3500000 particles per cubic meter) in excess of 5 µm.	11
Electrostatic Discharge: Precautions are recommended, especially when you are operating the system at the lower end of the relative humidity specification listed above.	12

Temperature

For precision instrumentation such as the Surveyor MSQ Plus MS detector, the temperature stability of the environment in which the instrument is installed can affect performance.

The laboratory room temperature must be maintained between 15 and 35 °C (59 and 95 °F). Also, make sure that the temperature does not fluctuate by more than 10 °C to ensure good mass accuracy.

Note As the laboratory temperature increases, system reliability decreases. All electronic components generate heat while operating. This heat must be dissipated to the surrounding air for the components to continue to operate reliably.

There must be a good flow of room air around the system, and the air conditioning system must be capable of maintaining a constant temperature in the immediate vicinity of the system.

Note Do not locate the Surveyor MSQ Plus MS detector under an air duct, near windows, or near heating and cooling sources. Temperature fluctuations of 5 °C or more over a 5 min period of time can affect performance.

The air conditioning load for a Surveyor MSQ Plus MS detector with a Surveyor LC and a data system is approximately 5000 W (17000 Btu/h). Refer to your LC manual for the heat output of your LC equipment.

Table 4 shows the approximate heat output of each module.

Table 4. Heat output for the Surveyor MSQ Plus MS detector, an LC, and the data system (with printer)

Module	Heat output (in Watts)	Heat output (in Btu/h)
Surveyor MSQ Plus MS detector with forepump	3000	10200
Surveyor Liquid chromatograph*	870	3000
Monitor	240	820
Computer	470	1600
Laser printer*	350	1200
Total	4930	16820

*Approximate. The actual values depend upon your equipment.

Humidity

The relative humidity of the operating environment must be between 40% and 80%, with no condensation. Relative humidity must not exceed 80% for temperatures up to 31 °C, decreasing linearly to 50% relative humidity at 35 °C.

Operating a Surveyor MSQ Plus MS detector in an environment with very low humidity can cause the accumulation and discharge of static electricity, which can shorten the life of the electronic components. Operating the system in an environment with high humidity can cause condensation, oxidation, and short circuits. It can also cause the accumulation of dust that can block filters on cooling fans.

It is recommended that your laboratory be equipped with a temperature / humidity monitor to insure that your laboratory is always within the required temperature and humidity specifications.

Vibration

Floors must be free of vibration caused, for example, by equipment in adjoining locations.

Because of the natural vibration of the forepump during operation, install it on the floor beneath the Surveyor MSQ Plus MS detector, not near the system on the workbench.

Lighting

Good lighting makes any work area more enjoyable. A small, high-intensity lamp is recommended for cleaning the mass spectrometer components.

Particulate Matter

The air in your laboratory must not have excessive dust, smoke, or other particulate matter. For reference, the air should contain fewer than 100000 particles per cubic foot (3500000 particles per cubic meter) in excess of 5 µm.

Dust can clog the air filters, causing a reduction in air flow around electronic components. Dust can also form a layer on electronic components that acts as an insulating blanket and thus reduces the transfer of heat from the components to the surrounding air.

Electrostatic Discharge

Electrostatic discharge (ESD) can damage the electronic components of your Surveyor MSQ Plus MS detector.

The Surveyor MSQ Plus MS detector can withstand electrostatic discharges (ESD) up to 8 kV (air discharge) and 4 kV (contact discharge) with all panels in place. However, if the panels are removed and the PCBs are handled without proper precautions, the electronic components might be damaged or fail prematurely.

Static electricity can develop in a variety of ways. A few examples of how electrostatic charge can develop are as follows:

- When walking across a carpet in a room that is at 20% relative humidity, as much as 35000 V of electrostatic potential can be generated on the surface of your body. A similar trip in a room at 80% relative humidity generates about 1500 V of electrostatic potential.
- Sitting and working in a chair padded with polyurethane foam in a room at 20% relative humidity can cause as much as 18000 V of electrostatic potential to develop on your skin or 1500 V at 80% relative humidity.
- Working in laboratory coats and clothing made of synthetic fibers can cause the accumulation of static electricity on your skin.
- Styrofoam® cups and packing materials typically have a considerable electrostatic charge on them.

The discharge of static electricity is not perceptible to a human being until the potential is at least 4000 V. Many electronic components can be damaged by a discharge of electrostatic potential of as little as 50 V. ESD damage can be catastrophic, causing your system to cease functioning. More commonly, however, ESD damage might cause latent problems that are detrimental to sensitive electrical components, causing premature failures.

Therefore, the following precautions are recommended, especially when you are operating your system at the lower end of the relative humidity specification listed in section.

- Use a static-dissipating floor covering (such as tile or conductive linoleum) in the room that houses your instrument.
- Use laboratory chairs covered with natural fiber or other static-dissipating material.
- When you are operating the instrument, wear a laboratory coat and clothing made of natural fiber or other static-dissipating material.
- Do not place Styrofoam cups or packing materials on the instrument.

Line Power

IMPORTANT It is your responsibility as the user to provide a source of power of acceptable quality for the operation of your system.

The performance and longevity of your system can be affected by the quality of line power delivered to the system. To ensure that your instrument performs optimally and is not damaged by line power fluctuations, verify that you comply with all power quality requirements. Refer to Table 5 for a summary of line power requirements. More information on each of the requirements is available on the page indicated in the table.

Table 5. Summary of line power preinstallation requirements

Requirement	Page
Quality of Power Line power must be free from: • Long-term changes in average root mean square (RMS) voltage level, with durations greater than 2 s. • Sudden changes in average RMS voltage level, with durations between 50 ms and 2 s. • Brief voltage excursions of up to several thousand volts with durations of up to 50 µs.	15
Power Monitoring Devices Before connecting your Surveyor MSQ Plus MS detector to line power, it is strongly recommended that the power line be monitored 24 hours a day for seven consecutive days.	15
Power Conditioning Devices To free line power from voltage changes, sags, surges and transients, the following devices are available: • Noise suppression transformer • Buck/boost transformer • Power Conditioning	16

Table 5. Summary of line power preinstallation requirements, continued

Requirement	Page
Available Outlets	20
For systems installed where there is 110 and 230 V: • Nominal voltage of 120 V ac, +6% to -10% and 230 V ac, ±10% and free from voltage variations above or below this operating range • Frequency of 50/60 Hz • Two fourplex outlets (single-phase power) with a minimum power rating of 20 A (120 V ac) • One fourplex outlet (single-phase power) with a minimum power rating of 16 A (230 V ac) • Earth ground hard-wired to the main panel For systems with only 230 V line power: • Nominal voltage of 230 V ac, ±10% (Note: For systems installed in areas with 208 V ac nominal line power, it will be required to use a buck/boost transformer to keep your line power within operating parameters.) • Frequency of 50/60 Hz • Three fourplex outlets, with a minimum power rating of 16 A at each fourplex outlet (In the U.S., only 15 and 20 A power rating options are available, therefore you **must** choose the 20 A option.) • Earth ground hard-wired to the main panel	
Connecting the MS, LC, and Other Modules to Wall Outlets	20
Balance the current load on the circuits to which your system is connected.	
Uninterruptible Power Supply	21
Systems installed in areas with intermittent line power must have uninterruptable power supplies installed.	
Technical Assistance	21
Contact your local office for Thermo Scientific products for additional assistance in monitoring line power or selecting a line conditioner.	

Quality of Power

The quality of power supplied to your Surveyor MSQ Plus MS detector is very important. The line voltage must be stable and within the specifications listed in this guide. The line voltage must be free of fluctuations due to slow changes in the average voltage, surges, sags, or transients.

Below are definitions for the most common voltage disturbances:

- Slow average is a gradual, long-term change in average root mean square (RMS) voltage level, with typical durations greater than 2 s.
- Sags and surges are sudden changes in average RMS voltage level, with typical durations between 50 ms and 2 s.
- Transients (or impulses) are brief voltage excursions of up to several thousand volts with durations of up to 50 µs.

Constant high line voltage, impulses, or surges in voltage can cause overheating and component failures. Constant low line voltage or sags in voltage can cause the system to function erratically or not at all. Transients, even a few microseconds in duration, can cause electronic devices to fail catastrophically or to degrade and eventually shorten the lifetime of your system. Therefore, it is important to establish the quality of the line voltage in your laboratory before your Surveyor MSQ Plus MS detector is installed.

Power Monitoring Devices

A variety of devices are available to monitor the quality of your line power.

These devices provide a continuous record of line performance by analyzing and printing out information on three types of voltage disturbances: (1) slow average, (2) sag and surge, and (3) transient. In the first two cases, the duration as well as the amplitude of the disturbance are indicated by time interval recording. The Dranetz® power line disturbance analyzer is a device capable of detecting and recording most types of line power problems.[1] Line monitors can be rented from electrical equipment suppliers.

Monitor the power line 24 hours a day for seven consecutive days. If inspection of the printout indicates disturbances, terminate the test and take corrective action. Then, monitor the power again as described above.

[1]Thermo Fisher Scientific does not endorse any power monitoring company, nor does it endorse products other than its own. Companies and products listed in this guide are given as examples only.

Power Conditioning Devices

Various line voltage conditioning devices are available that can correct your line voltage problem. If you have good regulation but the power line disturbance analyzer shows transient voltages, then an isolation / noise-suppression transformer should be adequate to resolve the problem. If there are both transient and regulation problems, then consider power conditioners, which can control both of these problems.

CAUTION Any conditioning devices installed with your system must be able to deal with the potentially high currents that are drawn during the initial startup of the system. For example, **the forepump can draw as much as 30 A during startup.** Contact your Service Engineer for more information.

When the line voltage is free from voltage sags, surges, and impulses but is more than 10% outside of the voltage specifications, the line voltage can be lowered (bucked 10%) or raised (boosted 10%) by using a buck/boost transformer.

The buck/boost transformer kit (P/N OPTON-01460) can be ordered from Thermo Fisher Scientific.

Each buck/boost transformer is encased in a metal housing approximately 13 × 13 × 26 cm (5 × 5 × 10 in.) and is equipped with a 2 m (6 ft) power cable. The installation instructions for the transformer are included.

Your electrician should install the buck/boost transformer before the installation of your system is started.

CAUTION Caution or compliance and safety, ensure that your power conditioning devices are certified by recognized domestic and international organizations, such as UL, CSA, TÜV, VDE, and so on.

Available Outlets

The Surveyor MSQ Plus MS detector operates at a nominal voltage of 230 V ac, 50/60 Hz. Line voltages can vary between a minimum of 207 V ac and a maximum of 253 V ac.

CAUTION Systems installed in areas with 208 V power will experience voltage sags during high use periods that might place the line voltage below the operating parameters discussed in this section. In that case, it is required that you protect your instrument by using a buck/boost transformer to ensure that power is within the specified parameters at all times.

The minimum and maximum voltage tolerances are in compliance with IEC 950, Amend 2, 1993, paragraph 1.6.5., as follows:

> "Equipment intended to operate directly from the main supply shall be designed for a minimum supply tolerance of +6% and -10%. If the rated voltage is 230 V ac single phase or 400 V ac three phase, the equipment shall operate safely within a minimum supply tolerance of ±10%."

For systems installed in regions with both 120 V ac and 230 V ac service, the basic power requirements for a Surveyor MSQ Plus MS detector consist of the following:

- Nominal voltage of 120 V ac, +6% to -10% and 230 V ac, ±10% and free from voltage variations above or below this operating range
- Frequency of 50/60 Hz
- Two fourplex outlets (single-phase power) with a minimum power rating of 20 A (120 V ac)
- One fourplex outlet (single-phase power) with a minimum power rating of 16 A (230 V ac). (In the U.S., only 15 and 20 A power rating options are available, therefore **you must choose the 20 A option**.)
- Earth ground hard-wired to the main panel

For systems installed in areas with 230 V ac only service, the basic power requirements for a Surveyor MSQ Plus MS detector consist of the following:

- Nominal voltage of 230 V ac, ±10%
- Frequency of 50/60 Hz
- Three fourplex outlets, with a minimum power rating of 16 A at each fourplex outlet
- Earth ground hard-wired to the main panel

CAUTION The Surveyor MSQ Plus MS detector must have an earth ground hard-wired to the main panel. The interconnected power outlets for the Surveyor MSQ Plus MS detector are to have a common point to one ground connector. If there are two such points, each of which is connected to separate external ground, they can cause noise current to flow through the ground system by way of the ground loop that is formed.

Note

1. Power is to remain On. The Surveyor MSQ Plus MS detector should remain On and pumping continuously for optimum performance.
2. Additional power outlets might be required for test and cleaning equipment, such as an oscilloscope and ultrasonic bath. It is recommended that there be several additional power outlets close to the workbench space within your laboratory.

Figure 1 on page 6 shows the optimum location of the power outlets.

The power cable from the Surveyor MSQ Plus MS detector and the cables from the personal computer, monitor, and printer are approximately 2 m (6 ft) long.

The Surveyor MSQ Plus MS detector ships with a plug appropriate to its shipping destination. The data system ships with a NEMA 5-15P plug, which is rated at 15 A and 125 V ac. Local codes in your area might require that another type of plug and receptacle be installed. The Thermo Fisher Scientific field service engineer for your country will provide the appropriate power plugs.

The NEMA plugs and their corresponding outlets are shown in Figure 3.

Figure 3. NEMA 6-15P and NEMA 5-15P power plugs and their respective outlets

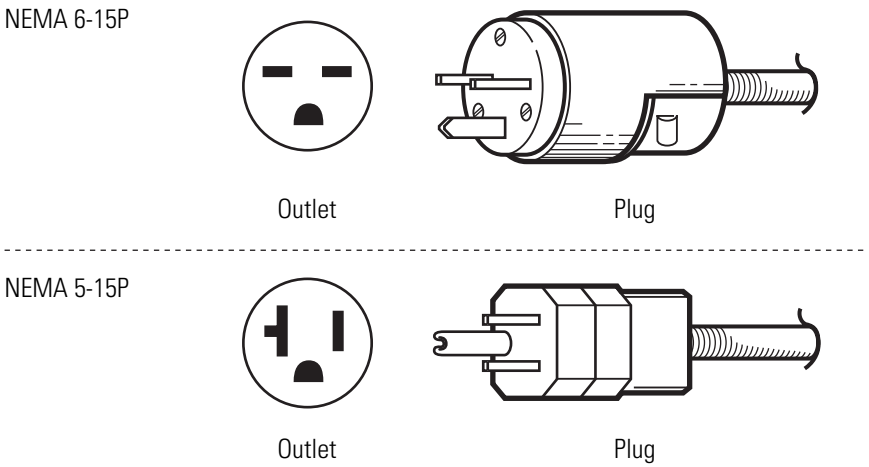


Table 6 shows the maximum current required by each component of a typical Surveyor MSQ Plus MS detector. The Surveyor MSQ Plus MS detector operates with 230 V ac only. The optional MSQ10LA nitrogen generator also requires a 230 V ac power source. Other components can be manually set to 120 V ac or 230 V ac or can be ordered as a 120 V ac or 230 V ac option.

CAUTION The values listed in Table 6 are the average currents drawn by each of the listed components. Any conditioning devices installed with your system must also be able to deal with the potentially high currents drawn during the initial startup of the system. For example, the forepump can draw as much as 30 A during startup. For more details on the surge requirements for your system, consult the forepump manuals. Contact your Service Engineer for more information.

Installing a conditioning device incapable of handling the potentially high currents drawn during the initial startup of the system could lead to personal injury!

Table 6. Maximum current (single phase) for a Surveyor MSQ Plus MS detector at 230 V ac, an LC at 120 or 230 V ac, and the data system (with printer) at 120 or 230 V ac

Module	Voltage 120 V ac Current (in amperes)	Voltage 230 V ac Current (in amperes)
Surveyor MSQ Plus MS detector (230 V only)	NA	3
Forepump	NA	10
Nitrogen generator (MSQ10LA)	NA	4
Liquid chromatograph*	10	5
Monitor	2	1
Computer	4	2
Laser printer*	3	2

*Approximate. The actual value depends on your equipment.

Note Refer to your LC equipment manual for power requirements and specifications.

Installation of a complete LC/MS system can require extensive electrical resources. To plan your power system properly, refer to Table 7 for an example of the number of outlets that might be necessary in your laboratory.

Table 7. Required wall outlets for a sample laboratory set up*

Item	Outlets
HPLC system • Autosampler • Heater • LC Pump • PDA Detector • External Controller	 1 1 1 1 1
Surveyor MSQ Plus MS detector	1 (230V)
Data system • CPU • Monitor • Printer	 1 1 1
Nitrogen generator (Optional MSQ10LA)	1 (230V)
Cone wash pump (Optional)	1 (115V or 230V)
High intensity lamp (Optional: For help in instrument maintenance)	1

Table 7. Required wall outlets for a sample laboratory set up*, continued

Item	Outlets
Laboratory stereoscope for inspecting fused-silica parts (Optional-useful when performing nanoflow or microfluidic experiments)	1
Total outlets required for this configuration • 115 V ac Outlets • 230 V ac Outlets	 6 to 11 1 to 3

*Your setup might vary and depends upon the line voltages and current supplied.

Connecting the MS, LC, and Other Modules to Wall Outlets

Care must be taken to ensure that the wall outlet specifications are not exceeded. The maximum load for a 120 V ac fourplex outlet is typically 20 A, and the maximum load for a 230 V ac fourplex outlet is typically 16 A. Refer to Table 6 for the maximum current ratings for the Surveyor MSQ Plus MS detector and the data system.

Table 8 and Table 9 show examples of how to balance the power load among three wall outlets without exceeding their specifications. (See Figure 1 on page 6 for a typical installation.)

The specifications for the modules in your system might vary from those in this guide. The power specifications on the module always supersede those in the guide.

Table 8. Suggested power connections for a Surveyor MSQ Plus MS detector at 230 V ac, an LC at 120 V ac, and the data system (with printer) at 120 V ac

Module	Fourplex Outlet #1 120 V ac	Fourplex Outlet #2 230 V ac	Fourplex Outlet #3 120 V ac
Surveyor MSQ Plus MS detector		3 A	
Liquid chromatograph*	10 A		
Cone wash pump (optional)			
Nitrogen generator (optional)		4 A	
Monitor			2 A
Computer			4 A
Laser printer*			3 A
Total	10 A	7 A	9 A

*Approximate. The actual value depends on your equipment.

Table 9. Suggested power connections for a Surveyor MSQ Plus MS detector, an LC, and the data system at 230 V ac

Module	Fourplex Outlet #1 230 V ac	Fourplex Outlet #2 230 V ac	Fourplex Outlet #3 230 V ac
Surveyor MSQ MS		3 A	
Liquid chromatograph*	5 A		
Cone wash pump (optional)			
Nitrogen generator (optional)		4 A	
Monitor			1 A
Computer			2 A
Laser printer*			2 A
Total	5 A	7 A	5 A

*Approximate. The actual value depends on your equipment.

CAUTION The Surveyor MSQ Plus MS detector and your LC should never be connected to the same electrical wall outlet circuit.

Uninterruptible Power Supply

If your local area is susceptible to corrupted power or power disruptions, then install an uninterruptible power supply (UPS) in your laboratory.

CAUTION The UPS must be listed or recognized by an NTRL in the USA or by a European Recognized Agency.

Technical Assistance

Occasionally, line power sources of unacceptable quality are encountered that adversely affect the operation of a Surveyor MSQ Plus MS detector. Correcting line power problems is the user's responsibility. Contact your local office for Thermo Scientific products for assistance in monitoring the line voltage in your laboratory and in selecting a line conditioner.

Specifying power conditioning equipment is a complex task that is best handled by a company or consultant specializing in that field. Contact your local Thermo Fisher Scientific office for assistance in locating a power consultant in your area.

Gases and Solvents

IMPORTANT It is your responsibility as the user to provide correct gas and solvent supplies for the operation of your system.

Your instrument requires high purity nitrogen gas and HPLC solvents. The Service Engineer might also require certain solvents for the installation verification of your system. Refer to Table 10 for a summary of gas and solvent requirements. More information on each of the requirements is available on the page indicated in the table.

Table 10. Summary of solvent and gas preinstallation requirements

Requirement	Page
Fittings and Parts: It is your responsibility to supply all fittings and parts necessary for connecting gases during the installation of your system. The tubing for the nitrogen supply to the Surveyor MSQ Plus MS detector is 6 mm OD PTFE. The installation kit for the Surveyor MSQ Plus MS detector includes a 6 mm × 1/4-in. BSP half union fitting.	24
Gases: High purity (99%). The required gas pressure is 520 kPa (75 psi).	24
Solvent Recommendations: Some solvents modifiers might be necessary for the installation of your system.	25

Fittings and Parts

Table 11 lists the minimum parts that are required to connect your Surveyor MSQ Plus MS detector to your gas delivery system. **Your connections and gas delivery system might vary, and it is your responsibility to supply any fittings or connections necessary during installation.**

Table 11. Gas connection hardware required

Description	Quantity
6 mm OD, PTFE nitrogen supply tubing	2 m (6 ft) provided. You might require additional length.
Nitrogen regulator adaptor, half union 6 mm - 1/4 BSP*	1
Connection for the opposite end of the Teflon™ hose to the nitrogen gas source	Not provided in kit. You supply these parts.

*British Standard Pipe

Gases

Your system can use large amounts of nitrogen gas during daily operations. It is essential that the nitrogen gas is delivered with the necessary pressure and purity.

CAUTION Contaminants introduced during the installation of house lines used for gas delivery can cause damage to the system. Ensure that all gas lines used with your system have been cleaned of all particulates and oils. You are responsible for any damage to the instrument caused by contaminates introduced from your gas delivery system.

The **nitrogen** for the API sheath gas and auxiliary gas needs to be high purity (99%). The required gas pressure is 520 ± 140 kPa (75 psi).

Note To calibrate the Surveyor MSQ Plus MS detector nitrogen gas proportioning valves, a nitrogen gas regulator must be available that can be adjusted from 0 to 690 kPa (0 to 100 psi).

Run the nitrogen gas line to the rear of the Surveyor MSQ Plus MS detector. Terminate the nitrogen gas supply line with the half union 6 mm - 1/4 BSP. If you are connecting to the MSQ10LA nitrogen generator, limit the nitrogen gas supply line to 6 m (20 ft). Particulate filters can be a source of contamination; they are not recommended.

Typical nitrogen gas consumption is approximately 11 L per min in the ESI mode and 8 L per min the APCI mode. Based on a 24 hour day, maximum usage can be up to 15800 L (560 ft^3) per day. Therefore, it is recommended that nitrogen be supplied from one of the following sources:

- A large, sealed, thermally insulated cylinder containing liquid nitrogen from which the nitrogen gas is boiled off. The 230 psi model is recommended. The 35 and 80 psi models do not provide sufficient gas pressure. A typical cylinder of size 240 L yields 143850 L (5080 ft^3) of gas.

  Note Liquid nitrogen conversion factors:

  - 1.0 lb of liquid nitrogen = 0.5612 L
  - 1.0 kg of liquid nitrogen = 1.237 L

- A nitrogen generator with a minimum capacity of 12 L per min at 99% purity with 75 to 80 psi at the side panel. Nitrogen generators require an air compressor. Some models of air compressor are quite noisy. Therefore, be careful to select a quiet compressor. This is a continuous source; no replacement is required.

Solvent Recommendations

The solvents listed in Table 12 are useful in operating and maintaining your Surveyor MSQ Plus MS detector. Installation of the Surveyor MSQ Plus MS detector requires HPLC grade methanol and water. Solvent modifiers might also be required during the installation of some systems.

Note Some solvent impurities are transparent to UV/Vis detectors. Therefore, some HPLC grade solvents might contain contaminants that interfere with the performance of the Surveyor MSQ Plus MS detector. For operation of your Surveyor MSQ Plus MS detector, choose high purity solvents with minimum contamination.

Table 12. Solvents and reagents and modifiers

Solvents / Reagent	Specifications
Methanol	HPLC grade
Acetonitrile	HPLC grade
Water	HPLC grade
Isopropyl alcohol	HPLC grade
Ammonium acetate	A.C.S. reagent
Acetic acid (modifier)	A.C.S. reagent

Note

1. Do not filter solvents. Filtering solvents can introduce contamination.
2. It is recommended that solvents from the following manufacturers are used: Merck, Mallinckrodt, or Burdick & Jackson.

Store and handle all chemicals in accordance with standard safety procedures.

Waste and Exhaust

IMPORTANT It is your responsibility as the user to provide proper waste and exhaust systems for the operation of your system.

The proper performance of your system can be affected by the waste and exhaust arrangements for the instrument. Vacuum and solvent wastes must be vented separately, and wastes must be collected and disposed of properly. Refer to Table 13 for a summary of exhaust and waste system requirements. More information on each of the requirements is available on the page indicated in the table.

Table 13. Summary of waste and exhaust preinstallation requirements

Requirement	Page
Exhaust System: Vacuum pumps and solvent wastes must both be vented to fume exhausts. The pumps must be connected to a fume exhaust system that is separate from that to which solvents are vented.	28 and 31
Solvent Waste: A suitable container for the solvent wastes must be installed with the system. A solvent trap is supplied with the Surveyor MSQ Plus MS detector.	31

Exhaust System

IMPORTANT It is your responsibility as the user to provide an adequate exhaust system.

Much of what is introduced into the Surveyor MSQ Plus MS detector is eventually exhausted from the forepump, along with the small amount of oil vapor that these pumps characteristically emit. Therefore, the forepump should be connected to a fume exhaust system.

Note An efficient fume exhaust system is required for the proper operation of your forepump. Most API applications contribute to the accumulation of solvents in the forepump. These solvents must be purged from the mechanical pump oil periodically by opening the ballast valve located on the top of the pump. When the ballast valve is opened, a large volume of volatile solvent waste might enter the fume exhaust system. Therefore, your fume exhaust system must be able to accommodate the periodic purging of the solvents. The frequency of the purging is dependent on the throughput of your system.

The forepump has two functions:

1. Providing a vacuum for the capillary skimmer of the API source.
2. Providing backing pressure for the turbomolecular pump.

Consult local regulations for the proper method of exhausting the fumes from your system. There are two exhaust lines to consider:

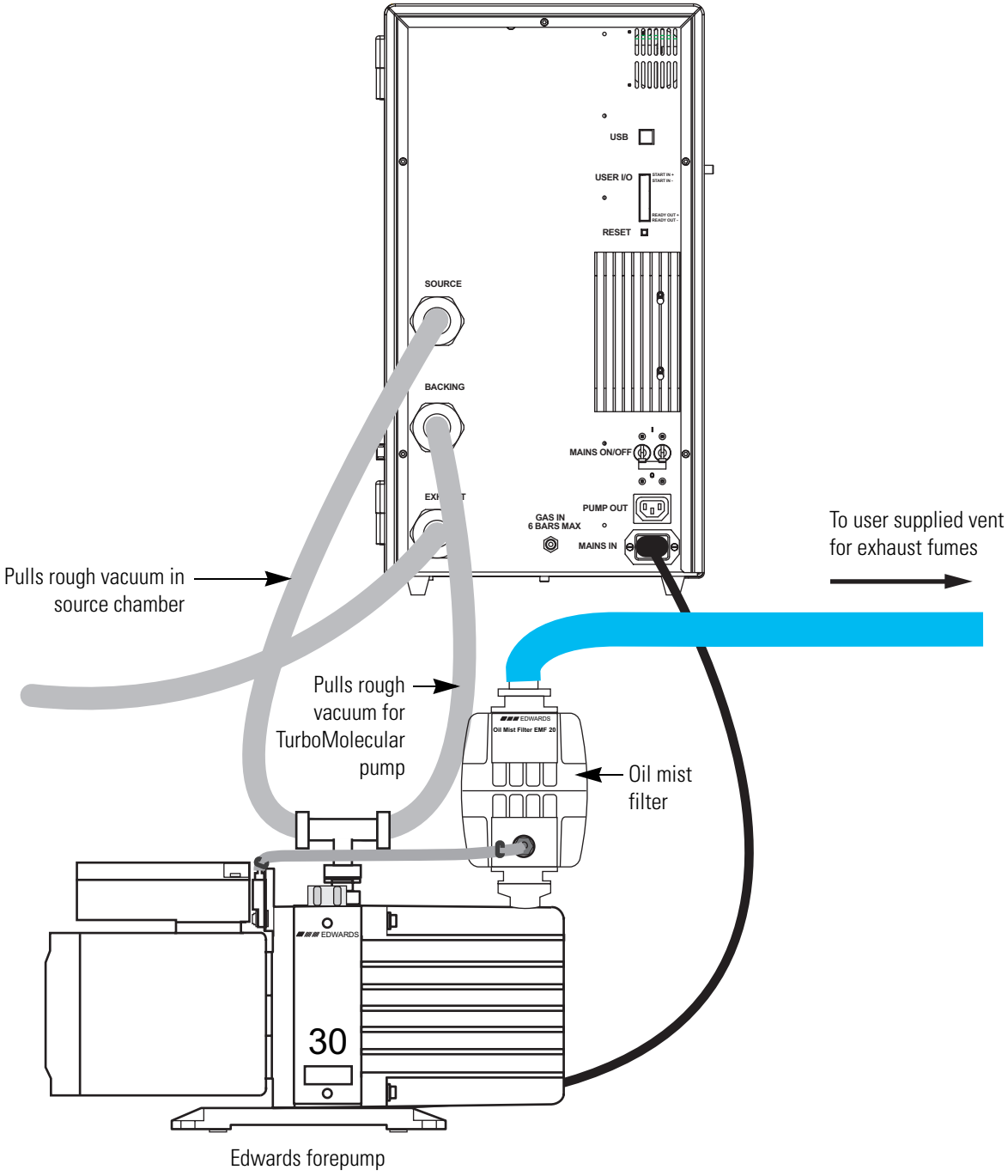
- Forepump Exhaust
- Electrospray / APCI Exhaust

CAUTION You laboratory must contain an appropriate exhaust system. The lack of an appropriate exhaust system can lead to personal injury.

Forepump Exhaust

The exhaust line from the forepump must be vented to the atmosphere, external to the laboratory. This must be by way of a user-supplied fume hood or industrial vent exclusive to the forepump. See Figure 4.

Figure 4. Forepump exhaust system using oil mist filter

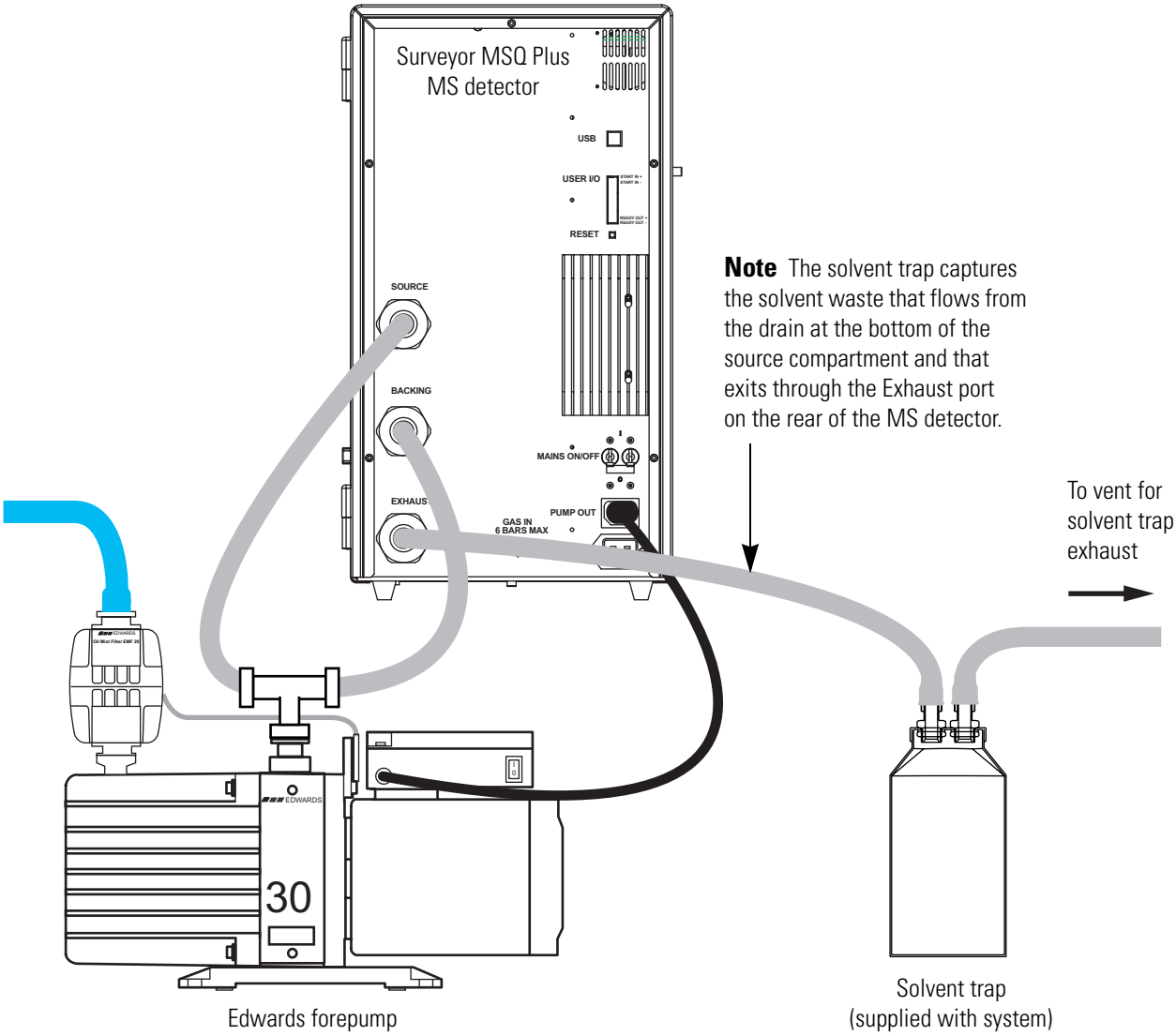


Electrospray / APCI Exhaust

The exhaust line that connects the drain at the bottom of the source compartment to the Exhaust port on the rear panel of the Surveyor MSQ Plus MS detector must be connected to a solvent trap. The solvent trap must be vented to the atmosphere, external to the laboratory. During installation, a Thermo Fisher Scientific field service engineer will connect the solvent trap to a user-supplied fume hood or industrial vent by using the 2.5 m × 19 mm ID tubing supplied with the system. See Figure 5.

CAUTION Serious damage to the instrument as well as personal injury might occur if the electrospray / APCI exhaust line is connected to the forepump exhaust line.

Figure 5. Source compartment exhaust system for the Surveyor MSQ Plus MS detector



Solvent Waste

The API source can accommodate high solvent flow rates and is fitted with a drainage port in its bottom. Therefore, provisions must be made to collect the waste solvent that exits the exhaust manifold on the rear panel of the Surveyor MSQ Plus MS detector. The 19 mm (0.75 in.) ID drain tube that exits the exhaust manifold must be connected to the solvent trap that is supplied with the system. The solvent trap is a 4-L wide-mouth square bottle with two brass fittings on the top. The drainage tubing that extends from the exhaust manifold is connected to one fitting. Additional tubing long enough to reach a user-supplied fume hood or industrial vent is connected to the other fitting (Figure 5).

CAUTION Do **not** vent the drain tubing (or any vent tubing connected to the waste container) to the same fume exhaust system to which you have connected the forepump.

Instrument Arrival

The Surveyor MSQ Plus MS detector is shipped by electronic equipment carriers who specialize in the handling of delicate machinery. Occasionally, however, equipment inadvertently does get damaged in transit.

Please take the following precautions when receiving material:

- Check carefully for obvious damage or evidence of rough handling.
- If external damage is apparent, note this fact on all copies of the receiving documents and describe briefly the extent of the damage. The driver should sign (or initial) next to your comments to signify agreement with your observations.
- Contact the Traffic Department, telephone [1] (408) 965-6000, at the Thermo Fisher Scientific office in San Jose, California USA to report the damage.

Note Freight insurance requires that obvious damage be noted on the receiving documents.

Domestic Shipments: Instruments are shipped using one of the following methods: (a) FOB (free on board) San Jose, California, USA or (b) 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 San Jose, and in this instance any damage(s) incurred in shipment is the responsibility of the purchaser and the carrier. However, Thermo Fisher Scientific San Jose will assist with claims filing and (billable) repairs if necessary.

If the system is shipped FOB destination, Thermo Fisher Scientific San Jose will file a claim against the carrier.

Note Thermo Fisher Scientific San Jose will not accept liability for damage if materials are received with obvious damage and the damage is not recorded on the receiving documents.

When your system arrives, move it to a protected location indoors. If you have questions about moving your system, contact your local office for Thermo Scientific products. Telephone and fax numbers for the offices are listed in the Preface of this guide.

International Shipments: Instruments shipped outside of the USA are shipped CIP (carriage and insurance paid to) destination unless specified differently. If the system is shipped CIP destination and if any damages are incurred in shipment, Thermo Fisher Scientific San Jose will file a claim against the carrier.

Note Thermo Fisher Scientific San Jose will not accept liability for damage if materials are received with obvious damage and the damage is not recorded on the receiving documents.

Installation

Prior to installation, make sure that all preparations described in the previous chapters are complete.

When your lab site preparation is completed, the Surveyor MSQ Plus MS detector Installation Request Form has been mailed or faxed to your local office for Thermo Scientific products, and the system is delivered, please call your Thermo Fisher Scientific office to arrange for an installation date. Refer to the Installation Request Form at the front of this guide. Telephone and fax numbers for Thermo Fisher Scientific San Jose offices are listed in the Preface of this guide and immediately following the **Installation Request Form**. Refer to Table 14 for a summary of information about installing your system. More information on each of the items is available on the page indicated in the table.

Table 14. More information on the installation of your system

	Page
Preinstallation Survey: The Installation Request Form at the front of this guide must be completed and faxed or mailed to your local service representative before the Service Engineer arrives to install your system.	36
Installation Kits and Components: Some kits are supplied to help you complete the installation of your system. You might require additional parts or chemicals to complete the installation of your system.	37
Installation: The Service Engineer will complete the installation of the system and demonstrate that your system meets specifications. Do not plan to use the system before the engineer has demonstrated that your system operates within specifications.	39
Preventive Maintenance: You are responsible for the proper maintenance of your system.	39

Preinstallation Survey

Verify that your lab meets the following list of preinstallation requirements before your instrument is installed. Use the Surveyor MSQ Plus MS detector Installation Request Form at the front of this guide to check off each item as it is completed or verified.

Note Your instrument is shipped in a shipping container, the smallest dimension of which is 70 cm (28 in.). If the entrance to your laboratory will not accommodate a 70 cm container, you can remove the individual modules from the container before moving them into the room. If you remove the instrument from its shipping container before it is delivered to the lab site, be sure that all the contents of the container remain with the instrument.

1. All laboratory remodeling has been completed.
2. Doorways, hallways, etc. are a minimum width of 70 cm (28 in.).
3. Available floor area is sufficient and flooring will support the load.
4. Sufficient bench space is available for all of the equipment. Please list the following:

   Width:
   Depth:
   Height:
5. Workbench can support the load of the mass spectrometer, LC system, and data system [170 kg (370 lbs)] and is free from vibration.
6. One voice telephone line is installed near the system.
7. Air conditioning is adequate for temperature, humidity, and particulate matter control. The laboratory can be maintained at a constant temperature, between 15 and 35 °C (59 and 95 °F).
8. Relative humidity is between 40% and 80%, with no condensation.
9. Lighting is adequate.
10. System work area is free from magnetic disruption and electrostatic discharge.
11. Main power is installed and is in compliance with local electrical codes.
12. Power for test and cleaning equipment is installed.
13. Power outlets are of the correct configuration.
    Please note NEMA type:
14. Voltage of power outlet has been measured.
    Please note ***measured*** voltage:
15. Power is free from fluctuations due to slow changes in the average voltage or changes due to surges, sags, or transients.

16. The required nitrogen gas is on site, gas lines are installed, and appropriate gas regulators are available. In addition, an adaptor for connecting to 6 mm OD PTFE tubing is installed on the nitrogen supply line.
    Please list the purity of the nitrogen gas supply:
17. New or recently cleaned HPLC system is available that produces pulse-free, continuous flow from 50 to 2000 µL/min.
18. HPLC grade water, methanol, acetonitrile, ammonium hydroxide, and isopropyl alcohol are available for testing your instrument.
19. There is a suitable exhaust system present that is separate from solvent waste.
20. Provision has been made for collecting solvent waste from API source.
21. All relevant safety regulations are complied with.
22. Your Surveyor MSQ Plus MS detector is on site.
23. The principal operator will be available during the installation / certification period.

Installation Kits and Components

The following kits are shipped with the Surveyor MSQ Plus MS detector:

- Surveyor MSQ Plus Installation kit, which contains the cables and connectors required to install the Surveyor MSQ Plus MS detector
- Xcalibur 2.0 and Thermo MSQ software CDs
- MSQ Tool kit, which contains the tools required to install and maintain the Surveyor MSQ Plus system
- Surveyor MSQ Plus Sensitivity Test kit, which contains the necessary chemicals for demonstrating system performance specifications
- Mechanical Pump kit, which contains the oil mist filter kit, the drain oil return kit, and the pump connection fittings

In addition to these kits, these components are shipped with the MS detector:

- Surveyor MSQ Plus calibrant (P/N 60111-01001)
- Universal cable (P/N FM100673)
- USB cable (P/N FM103073)
- Solvent trap assembly (P/N FM103894)
- Edwards rotary pump oil (P/N 00301-15102)
- APCI probe (P/N FM102587)

To inject calibrant, you must connect an LC pump to your Surveyor MSQ Plus MS detector. To inject samples, you need to connect an LC pump and an autosampler.

The Surveyor MSQ Plus MS detector is shipped with Quan Devices 2.0, which supports HPLC instruments manufactured by Agilent and Thermo Fisher Scientific. Refer to Table 15 for the kit that you need to order to connect your HPLC system to the Surveyor MSQ Plus MS detector.

Note The Agilent 1200 Series G1369A LAN card is compatible with the Agilent 1100 Series LC modules.

Table 15. Surveyor MSQ Plus connection kits or parts for LC systems supported by Quan Devices 2.0

LC System	Part Number
Agilent 1100 LC	
Ethernet Communication Kit contents: • Ethernet switch • Contact Closure PCB • External contact trigger cable, 2-wire DB15 • Ethernet cable, CAT5, RJ45, straight shield	OPTON-30012
HP 1100 LC - not already controlled from Xcalibur	
Xcalibur JetDirect® Ethernet Control Kit contents: • JetDirect 400N PCB • Ethernet switch • Contact Closure PCB • External contact trigger cable, 2-wire DB15 • Ethernet cable, CAT5, RJ45, straight shield	OPTON-30018
HP 1100 devices - already controlled from Xcalibur	
• HP JetDirect 400N PCB • Ethernet 10 Base-T cable (2) • Ethernet switch	00825-01140 00012-70008 00825-01-00024

Note It is the responsibility of the customer to replace any consumables used during the installation.

Installation

When your new Surveyor MSQ Plus MS detector is on site, and it is ready for installation, a Thermo Fisher Scientific field service engineer will install it.

During the installation, the field service engineer will demonstrate the following:

- The basics of equipment operation and routine maintenance.
- The marketing specifications that are in force at the time of the purchase of the system.

Note To receive maximum benefit from this on-site training opportunity, the instrument's operator(s) need to be available during the entire installation.

Do not plan to use your new system for sample analysis until the installation is complete and the Acceptance Form has been signed.

Preventive Maintenance

Routine and preventive maintenance of Surveyor MSQ Plus MS detector and data system is your responsibility as the user.

Regular preventive maintenance is essential. It increases the life of the system, maximizes the uptime of your system, and provides you with optimum system performance. Maintenance procedures are covered in the following manuals:

- *Surveyor MSQ Plus Hardware Manual*
- Manuals that come with your data system computer and other modules of your system

Index

O

P

S

T

U

V

W