

Orbitrap Astral Zoom

Mass Spectrometer

Preinstallation Requirements Guide

BRE0066007 Revision A • April 2025

Orbitrap Astral Zoom installation request form

Refer to the *Orbitrap Astral Zoom Preinstallation Requirements Guide* (P/N BRE0066007) for the complete site requirements. On this form, circle either Yes or No for each question to indicate if the site meets the requirements as specified in this guide. Provide the additional information where requested. After Thermo Fisher Scientific receives this checklist, your local Field Service Representative will contact you to schedule the installation.

1. **Yes No** All laboratory remodeling has been completed and the space available is sufficient to meet the minimum requirements for the configuration ordered? The floor is certified to meet the load requirements of the system?
2. **Yes No** Your instrument has been delivered and is either in the laboratory or can be delivered immediately on the arrival of the installation engineer?
3. **Yes No** The key operator will be available during the installation period. The person with the authority to accept the instrument at the end of the installation will also be available to sign the required acceptance document?
Please provide the names of these individuals:

4. **Yes No** The entrance to the laboratory and the route from the loading dock are at least 88 cm (34 ⁵/₈ in.) wide with additional space at corners?
5. **Yes No** Sufficient bench space is available for all of the equipment? List the following:
Width: _____, Depth: _____, Height: _____
Width: _____, Depth: _____, Height: _____
6. **Yes No** Workbench can support the load of the system including optional equipment and is free from vibration?
7. **Yes No** Lighting is adequate?
8. **Yes No** Floor vibrations and electromagnetic interferences are below the specified levels?
9. **Yes No** Main power is installed and in compliance with local electrical codes?
10. **Yes No** Additional power outlets are available for the forepump and three peripherals?
11. **Yes No** The power outlets are of the correct configuration? Please note the type of country cable kit required: _____
If you have ordered the optional Ardia Platform, also note the type of country cable kit required for it: _____
12. **Yes No** The electrical power for the mass spectrometer has been measured?
Please note voltage: _____ Vac input to ground.
Please note voltage: _____ Vac neutral to ground.
Please note voltage: _____ Vac input to neutral.
13. **Yes No** Power is free of voltage surges, sags, or transients?
14. **Yes No** Air conditioning is adequate for temperature, humidity, and particulate matter control? The laboratory can be maintained at a constant temperature, between 18 and 27 °C (64 and 81 °F)?
15. **Yes No** The relative humidity is between 20% and 80%, with no condensation?
16. **Yes No** The system work area is free from magnetic disruption and electrostatic discharge?

17. **Yes No** All gases required are on site, gas lines are installed, and appropriate gas regulators are available?
List gases and purity:

18. **Yes No** Is there is a suitable exhaust system present that is separate from solvent waste? You must provide one exhaust system for the API source and a second exhaust system for the forepump(s).

19. **Yes No** Provision has been made for collecting solvent waste from the API source?

20. **Yes No** There is a functional telephone close to the system?
Phone number: _____

21. **Yes No** Provide the dedicated PC name for the control PC according to the local IT requirements: _____

22. **Yes No** All relevant local safety regulations have been met and the equipment installed will not affect compliance?

23. **Yes No** All required chemicals and equipment for installing the system are on site?

24. **Yes No** Have any special acceptance specifications been agreed within the contract? If **YES**, please attach full details of specification.

25. **Yes No** Is there any additional equipment that needs to be interfaced for the system? If **YES**, please supply details.

I, the undersigned, confirm that the site requirements as stated above have been accomplished and the laboratory is prepared for the installation of the Thermo Scientific instrument. I understand that I may be liable for a Field Service Representatives' travel or lodging expenses if they are unable to carry out the installation on the pre-scheduled date due to insufficient lab preparation.

Signed: _____

Print name: _____

Company name: _____

Email: _____

Date: _____

Phone: _____

Send to: Local Thermo Fisher Scientific service representative

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Technical data

The table summarizes the most important technical data of the Orbitrap Astral Zoom system. See the respective chapters of the manual for details and additional instrument properties.

Table 1 Technical data of Orbitrap Astral Zoom systems

Parameter	Specification	Value	
Instrument properties			
Mass spectrometer	Length × width × height	1,963 mm × 952 mm × 1,394 mm	
	Weight	680 kg	
Forepump ^a	Length × width × height	654 mm × 420 mm × 344 mm	
	Weight	78 kg	
Complete system (incl. data system)	Noise emission	< 70 dB(A)	
	Heat output	Operation: 1650 W, Bakeout: 2750 W	
Power requirements			
Mass spectrometer	Input	Nominal voltage	2 × 208–240 Vac (± 10%), 50/60 Hz, 10 A
		Fuse ^b	2 × 15/16 A (tripping characteristic C)
		Operation	Apparent power: 1000 VA; effective power: 900 W
		Bakeout	Apparent power: 2500 VA; effective power: 2000 W
	Output	4x	208–240 Vac, 50/60 Hz, 3 A total
	Protection degree		IP20
	Protection class		Class I
	Overvoltage category		II
	Forepump	Input	Nominal voltage
Power			700 W
Fuse ^b			15/16 A (tripping characteristic C)

^a Edwards nXL110iDE dry pump, or approved equivalent model. This forepump is installed in a cabinet below the Astral analyzer.

^b Dedicated wall outlet.

Parameter	Specification	Value
Data system	Input	Nominal voltage 100–240 Vac, 50/60 Hz
		Power 100 W
		Fuse 15/16 A
Gas requirements		
Source gas (minimum requirement)	Type	Nitrogen
	Purity	99% or greater (high purity)
	Supply rate	Max. 45 NL/min
	Pressure	0.6 ± 0.05 MPa
HCD gas / reagent carrier gas (mandatory)	Type	Nitrogen
	Purity	99.999% or greater (ultra high purity)
	Supply rate	Max. 0.07 NL/min ^c
	Pressure	0.6 ± 0.05 MPa
Operating environment		
	Laboratory temperature	18–27 °C
	Max. temperature fluctuation	0.5 °C/10 min
	Humidity	20–80%, non-condensing and non-corrosive atmosphere
	Pollution degree	2
	Max. altitude	3,000 m above sea level
Pump exhaust requirements	Inrush flow rate	10 L/min
	Continuous flow rate	7 L/min
Ion source exhaust requirements	Maximum flow rate	45 L/min

TIP

The unit *NL* refers to liters at normal conditions, measured at a temperature of 0 °C and a pressure of 1013.25 hPa(a). These reference conditions are indicated by the added letter “N” in the unit of volume used.

^c When the Internal Calibration source is switched off, the maximum consumption of UHP nitrogen is 0.04 NL/min.

About this manual

IMPORTANT

Export classification: not listed / Exportklassifizierung: nicht ausfuhrgenehmigungspflichtig

The Orbitrap Astral Zoom™ system is a member of the Thermo Scientific™ family of mass spectrometers that are powered by Orbitrap™ and Astral technology.

Contents

- [Special notices and safety symbols](#)
- [Typographical conventions](#)
- [Access documentation](#)
- [Reference documentation](#)

This *Orbitrap Astral Zoom Preinstallation Requirements Guide* is intended primarily for those who are responsible for the site planning of a laboratory in preparation for the installation of a new Orbitrap Astral Zoom instrument. Retain this guide for guidance in the event that your instrument needs to be relocated in future.

The purchaser is responsible for providing the following:

- A suitable location and operating environment
- A power source of acceptable quality
- Proper gas and solvent supplies
- Proper waste and exhaust systems

This *Orbitrap Astral Zoom Preinstallation Requirements Guide* provides information to assist you in planning and preparing your lab site for the system prior to delivery and installation. Read each topic of this guide carefully to be sure that your laboratory is ready for the installation of your system. For additional information, request specific preinstallation support directly through your local Thermo Fisher Scientific representative.

Thermo Scientific mass spectrometers are designed to operate reliably under carefully controlled environmental conditions. Operating a system or maintaining it in a condition 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.

Special notices and safety symbols

Make sure you understand the special notices, symbols, and caution labels in this guide. Most of the special notices and cautions appear in boxes; those pertaining to safety also have corresponding symbols.

NOTICE

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 product.

NOTE

Highlights information of general interest.

TIP

Highlights helpful information that can make a task easier.



CAUTION

Indicates a hazardous situation that can lead to minor or medium injury if it is not avoided.



WARNING

Indicates a hazardous situation that can lead to severe injury or death if it is not avoided.



DANGER

Indicates a hazardous situation that leads to severe injury or death if it is not avoided.

For comprehensive information about machine safety, refer to the Operating Manual for your instrument.

Typographical conventions

Different typographical conventions have been established for Thermo Fisher Scientific manuals.

Viewpoint orientation

The expressions *left* and *right* used in this manual always refer to the viewpoint of a person that is facing the front side of the instrument.

Data input

Throughout this manual, the following conventions indicate data input and output with the computer:

- Messages displayed on the screen are represented by capitalizing the initial letter of each word and by italicizing each word.
- Input that you enter by keyboard is identified by quotation marks: single quotes for single characters, double quotes for strings.
- For brevity, expressions such as “choose **File > Directories**” are used rather than “pull down the **File** menu and choose **Directories**.”
- Any command enclosed in angle brackets < > represents a single keystroke. For example, “press <F1>” means press the key labeled *F1*.
- Any command that requires pressing two or more keys simultaneously is shown with a plus sign connecting the keys. For example, “press SHIFT + F1” means press and hold the <Shift> key and then press the <F1> key.
- Any button that you click on the screen is represented in bold face letters. For example, “click **Close**.”

Access documentation

You can access full product documentation before your scheduled instrument installation. The documentation (including release notes, installation instructions, and operation manual) is maintained on the Thermo Fisher Scientific Chromatography and Mass Spectrometry Help Portal. This documentation portal is regularly updated with the latest content, including video tutorials. Go to docs.thermofisher.com.

With a Thermo Fisher Scientific account, you can use features on the documentation portal, such as bookmarking documents, saving searches, and compiling documents into collections for easy reference.

Procedure

1. Go to docs.thermofisher.com/p/TechDocAccess to display a registration form.
2. Fill out the form to request access as a customer. Among other data, you have to provide the serial number (S/N) of your instrument. You can find the serial number of your instrument on the name plate. Refer to the Operating Manual of your instrument for information about its location.
3. Click **Submit Form**. The form contents will be sent using your default email client. You will receive an email with additional login information.

Result

Upon submitting the form, you will be directed to home page of the doc portal.

Reference documentation

Reference documentation for the Orbitrap Astral Zoom mass spectrometer includes the following:

- *Orbitrap Astral Zoom Operating Manual*
This manual contains precautionary statements that can prevent personal injury and instrument damage. It also describes the modes of operation and principle hardware components of the instrument. In addition, this manual provides instructions for cleaning and maintaining the instrument.
- *Orbitrap Astral Performance Maintenance Manual*
This manual describes the user maintenance for the quadrupole and the bent flatpole.
- *Orbitrap Astral Zoom Software Manual*
This manual describes the features of the instrument software.

You can access PDF files of the documents listed above and of this manual from the data system computer. Refer also to the user documentation provided by the manufacturers of the following third-party components:

- Forepump
- Turbomolecular pumps
- Syringe pump
- Data system computer and monitor
- Safety data sheets

Site preparation

Before your instrument can be installed by the Thermo Fisher Scientific field service engineer, the site must be prepared. The hallways and doors must be wide enough to allow passage of the instrument.

IMPORTANT

You are responsible for providing an acceptable installation site for the instrument before the Thermo Fisher Scientific service engineer arrives.

Contents

- [Instrument arrival](#)
- [Entrance requirements](#)
- [Instrument dimensions and space requirements](#)
- [Place the forepump](#)

Entrance requirements

For shipping, the system is disassembled and packed in several crates or boxes. The following table lists the dimensions of the crates and boxes of a typical system.

NOTE

The actual dimensions might be different for your system.

Table 2 Dimensions for packed units of a typical Orbitrap Astral Zoom system

Module	Size (l × w × h)	Weight
Basic unit	2,186 mm × 1,220 mm × 1,596 mm 86 ¹ / ₁₆ in. × 48 in. × 62 ¹³ / ₁₆ in.	830 kg (1,830 lb)
Auxiliary box	1,560 mm × 1,320 mm × 1,280 mm 61 ⁷ / ₁₆ in. × 52 in. × 50 ³ / ₈ in.	315 kg (694 lb)

The listed shipping containers might be replaced by other containers because of the legal requirements in the receiving countries, the mode of transportation, or the climate (for some tropic regions). As a result, the dimensions and weights of the packages of your system will differ from those shown in the previous table.

NOTICE

Do not remove the instrument from its shipping container unless you are authorized by Thermo Fisher Scientific personnel. Make sure that all the contents of the container remain with the instrument.

The chemicals that are needed for installation are shipped in a separate package.

Uncrate the instrument

The Thermo Fisher Scientific field service engineer uncrates the instrument and removes the panels during installation, which allows the unit to fit through doors that have an inner width of 88 cm (34⁵/₈ in.). This part of the instrument comes on wheels and is easy to move.

To move the instrument parts into the laboratory, the entire path from the loading dock to the desired laboratory placement (including the entrance to your facility, the width of all hallways, doors, elevators, and so on.) must be wide enough for the instrument parts.

Consider any additional space required to move the items around corners and through doors, and ensure that elevators have weight limits that can accommodate the unit. When unpacking the system, consider the additional space that is required for pulling down the ramp.



CAUTION

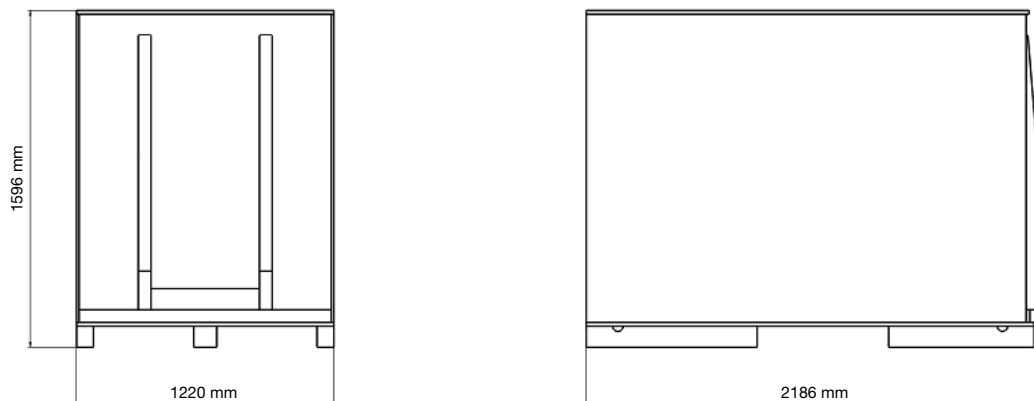
Risk of injury

The instrument is transported in a wooden box. The instrument is rolled out of the box on wheels to its final position. When you move the instrument out of the box, you might get hurt by wood splinters or nails. The instrument might move uncontrollably and cause injuries. Wear steel-reinforced safety shoes and work gloves during the installation.

Remove the instrument from the shipping crate

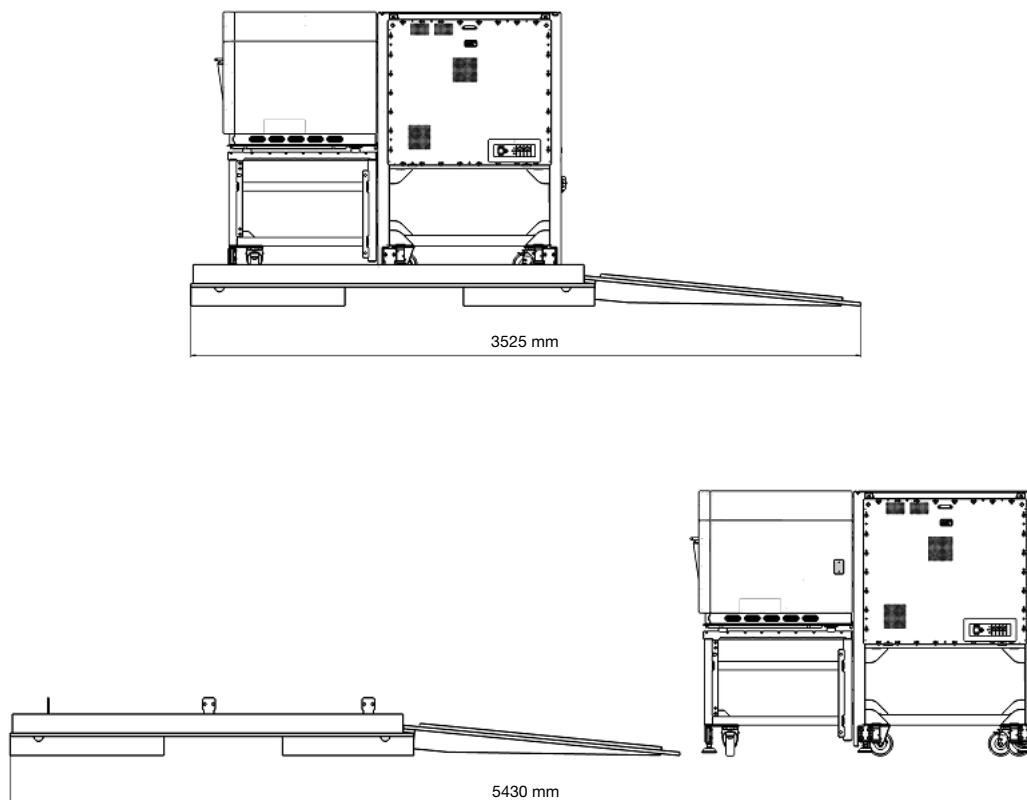
The shipping crate needs to be placed on a flat surface with even access to the lab building. The shipping crate is roughly 220 cm long and 122 cm wide.

Figure 1 Dimensions of the shipping crate



The service engineer must have enough walking clearance to access the front and back of the crate. The recommended width of the unboxing area is >2 m. The combined length of the pallet and ramp is ~353 cm. The minimum required length of the unboxing area is 550 cm. To avoid injury and strain, the recommended length is 6–7 m. In most cases, the unboxing area is a hallway or corridor.

Figure 2 Dimensions of the shipping crate and ramp



Move the instrument

The bottom side of the Orbitrap Astral Zoom mass spectrometer has six casters, where the casters in the center are fixed for stability when all other casters are rotated inwards. Therefore, the instrument rotates around the center and cannot be pushed sideways.



CAUTION

Heavy objects

The mass spectrometer and the forepump might move uncontrollably and cause injuries. Wear steel-reinforced safety shoes and gloves during installation or maintenance.

At least 2 people are required to unpack the instrument and move it to the lab.



NOTE

Before moving this instrument, all participating personnel must carefully read and follow the instructions provided in this manual. For information about moving the forepump, see [Place the forepump](#).

The Orbitrap Astral Zoom mass spectrometer is supported by six height-adjustable feet that each have a diameter of 80 mm. The casters touch the ground when you lift the feet.

Procedure

1. Make sure that the six height-adjustable feet are lifted.
2. Carefully roll the instrument on its casters to its final location.
3. When the instrument is in its final location, lower and fasten the six supporting feet.

Result

The instrument is lifted, and the casters hang in the air slightly above the floor.

Floor requirements

The weight of the Orbitrap Astral Zoom mass spectrometer (basic system with forepump, without optional components) is about 760 kg. Its center of gravity lies 894 mm above the floor. See [Instrument dimensions and space requirements](#).

The floor must be flat with a maximum slope of 0.5°. The floor of your laboratory must be able to accommodate the weight of:

- The installed mass spectrometer, including the forepump
- The data system
- The liquid chromatograph
- Workbenches
- Any optional components

The instrument has a maximum surface load of 730 kg per m². The load is halved when the six height-adjustable feet (each with a diameter of 80 mm) are lowered.

The instrument stands on six casters when it is moved. Because the middle casters are quite close to the center of gravity, each caster can accommodate a short-term load of 350 kg when tilting on uneven ground. Because the instrument always stands on at least three casters, the load remains permanently below 350 kg.

Instrument dimensions and space requirements

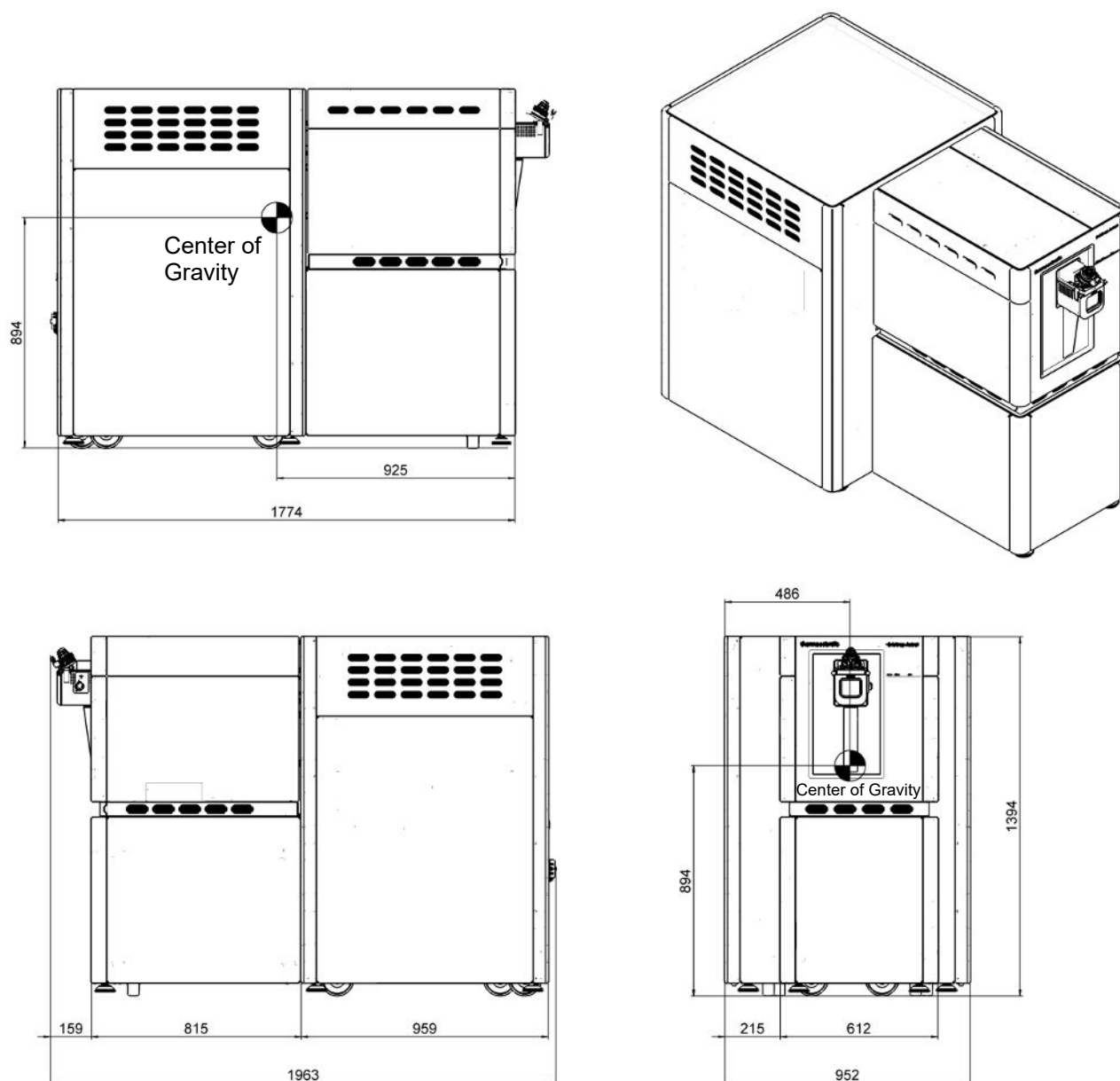
The instrument without the source and side covers is 871 mm wide and 1,849 mm long. The instrument with source and side covers is 952 mm wide and 1,963 mm long.

Table 3 Dimensions and approximate weight of mass spectrometer

Length	Width	Height	Weight ^d
1,963 mm	952 mm	1,394 mm	758 kg
77 ¹ / ₄ in.	37 ¹ / ₂ in.	54 ⁷ / ₈ in.	1,671 lb

^d The weight includes the forepump.

Figure 3 Dimensions of the Orbitrap Astral Zoom mass spectrometer



Clearance

The connections for Ethernet, gas, and electric power are located at the back side of the instrument. The exhaust lines for the forepump and the solvent waste container are also led out of the instrument here.

Make sure that you have the following minimum clearances around the instrument:

- 500 mm ($19\frac{11}{16}$ in.) between the top of the system and any shelves above it.
- 300 mm ($13\frac{13}{16}$ in.) between the left, right, and back sides of the instrument and any other components for operating the instrument.

- 800 mm (31½ in.) between the left and right sides of the instrument and any other components used for performing maintenance.



To make sure that you can shut down the mass spectrometer in an emergency, do not block access to the main power switch at the rear side of the instrument.

NOTICE

Do not block the ventilation slots of the instrument. Items might fall behind the instrument and inhibit airflow, which can cause the system to overheat.

Workbench requirements

To set up a typical LC/MS system, Thermo Fisher Scientific recommends that you have a minimum of two workbenches. Thermo Fisher Scientific recommends that workbenches have a load capacity of at least twice the combined weight of all expected devices.

Table 4 Recommended minimum workbench surface dimensions

Equipment	Surface
Data system	120 cm × 100 cm (47¼ in × 39⅜ in.)
LC system	65 cm × 61 cm (25⅑/16 in × 24 in.)

IMPORTANT

Only workbenches with four legs provide sufficient stability for the instrument and other equipment. The workbench top must be dry and clean (free of grease). Thermo Fisher Scientific recommends that you use a workbench with a skidproof top.

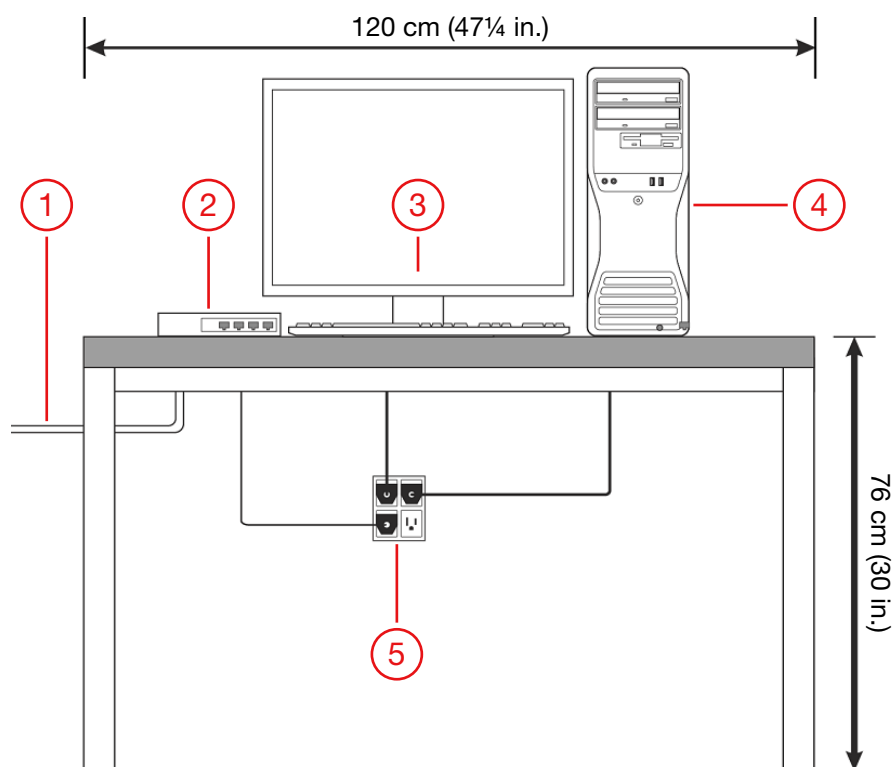
Workbench for the data system

Use one workbench to hold the data system computer and the monitor. The recommended surface dimensions provide sufficient space for an optional printer. Make sure that the workbench can support the weight of the data system and the printer, if applicable.

NOTE

A printer is not a standard part of the data system. The actual values depend upon your equipment.

See the following table and figure for the space requirements and weights of the typical data system hardware components.

Figure 4 Typical data system workbench

No.	Description	No.	Description
1	Ethernet communication cables	4	Minitower computer
2	Ethernet switch	5	Wall outlet for data system components (120 or 230 Vac)
3	Monitor		

Table 5 Space and weights of typical data system components

Module	Size	Weight
Monitor	18 cm <i>l</i> × 51 cm <i>w</i> × 46 cm <i>h</i> (7 ¹ / ₁₆ in. <i>l</i> × 20 ¹ / ₁₆ in. <i>w</i> × 18 ¹ / ₈ in. <i>h</i>)	5 kg (11 lb)
Minitower computer	43 cm <i>l</i> × 18 cm <i>w</i> × 48 cm <i>h</i> (16 ¹⁵ / ₁₆ in. <i>l</i> × 7 ¹ / ₁₆ in. <i>w</i> × 18 ⁷ / ₈ in. <i>h</i>)	14 kg (30 lb)

Place the mass spectrometer, the data system workbench, and the LC workbench adjacent to each other to prevent strain on the interconnecting Ethernet communications cables. The Ethernet port of the mass spectrometer is located at the back side of the instrument.

Workbench for the LC system

Use one workbench that can hold and accommodate the weight of all the components of the LC system (including optional components). The workbench must stand in a secure and level position.

TIP

The usual placement of the LC system is to the left of the mass spectrometer. However, in the case of a Thermo Scientific EASY-nLC™ system, the optimal position of the LC system is in front of the mass spectrometer.

The following table shows the space and load requirements for a Thermo Scientific Vanquish™ Neo system containing a system controller, pump, autosampler, display, and column compartment.

Table 6 Space and load requirements of a Vanquish Neo system

Height	Width	Length	Weight
82 cm (32 ¹ / ₄ in)	45 cm (17 ³ / ₄ in)	65 cm (25 ⁹ / ₁₆ in)	79 kg (174 lb)

NOTE

Allow at least 116 cm (46 in.) of vertical height for the stack with the pump, autosampler, detector, column compartment, solvent platform, and standard 1 L solvent bottles. This height provision allows sufficient access to the 1 L solvent bottles in the solvent platform. If you plan to use larger solvent containers, use a location with more vertical space.

Place the forepump

The mass spectrometer is shipped with a dry pump with two vacuum ports. Install the pump on the floor below the Astral compartment. Before you place the pump, Thermo Fisher Scientific strongly recommends that you review the information in Vibration. Because of the low noise level of 57 dB(A), the dry pump is shipped without a noise reduction cover.

Table 7 Space and load requirements of dry pump

Height	Width	Length	Weight
344 mm (13 ⁹ / ₁₆ in.)	308 mm (12 ¹ / ₈ in.)	654 mm (25 ³ / ₄ in.)	78 kg (172 lb)

**CAUTION****Heavy object**

Because of its weight, the forepump might move uncontrollably and cause injuries. Wear steel-reinforced safety shoes when you move the pump during the installation.

**CAUTION****Heavy object**

Use suitable lifting equipment when you move the pump during installation. For detailed instructions (such as maximum tilt angle), refer to the manufacturer's documentation that is shipped with the pump.

Figure 5 Forepump



Connect the forepump

The forepump is connected to the mass spectrometer and the laboratory via the following components:

- Vacuum hose
- Exhaust hose
- Power supply for forepump
- Contact closure signals

Vacuum hoses

The large vacuum hose of the forepump has an inner diameter of 38 mm (1½ in.). The small vacuum hose of the forepump has an inner diameter of 19 mm (¾ in.). Both vacuum hoses have lengths of 0.8 m and are made of reinforced material. However, because of their bending radii, the actual lengths of the hoses are significantly shorter.

Procedure

1. Connect the vacuum hose to the large vacuum port of the mass spectrometer.
2. Connect the vacuum hose to the small vacuum port of the mass spectrometer.

To avoid a vacuum leak, position the hose clamp about 2 mm away from the end of the vacuum port, where the metal tube is not curved.

3. Lead out the exhaust hose of the forepump through the recess at the bottom of the back side of the instrument, then connect it to the exhaust system of the laboratory.

NOTICE

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.

The maximum length for the exhaust hose of the forepump is 10 m.

4. Connect the power supply cord of the forepump to a wall outlet.

NOTICE

To prevent an unwanted operation of the forepump, connect the mass spectrometer and the pump to the power supply as follows:

- When you install a system, first connect the switch cable between the instrument and the pump, then connect the power supply cords.
- When you uninstall or service a system, first disconnect the power supply cords, then disconnect the switch cable between the instrument and the pump.

Result

The forepump is switched on and off by a contact closure signal from the mass spectrometer.

Operating environment

Maintain an optimal operating environment to ensure the continued high performance of your Orbitrap Astral Zoom system. Any expenditures for air conditioning are more than offset by good sample throughput and reduced repair costs. The air conditioning must maintain a constant temperature in the immediate vicinity of the system without producing excessive draft.

IMPORTANT

You are responsible for providing an acceptable operating environment for the instrument.

Contents

- [Temperature](#)
- [Humidity](#)
- [Lighting](#)
- [Altitude](#)
- [Dust-free environment](#)
- [Vibration](#)
- [Radio frequencies](#)
- [Electrostatic discharge](#)

Temperature

Keep the laboratory room temperature between 18 °C and 27 °C (64 °F and 81 °F).

All electronic components generate heat while operating. This heat must be dissipated to the surrounding air for the components to continue to operate reliably.

Thermo Fisher Scientific recommends that you install an air conditioning system to maintain a constant temperature (within the recommended temperature range) in the immediate vicinity of the system. An air conditioner with a flow controller valve and PID microprocessor control (e.g., available from Landis & Gyr, Polygyr RWX), see www.landisgyr.com) is preferred. This setup ensures that any temperature drifts are within the recommended temperature range.

NOTICE

Do not put the mass spectrometer below an air duct, near windows, or near heating and cooling sources. Temperature fluctuations of 0.5 °C or more over a 10-minute period can affect instrument performance.

If the temperature in the laboratory has changed for more than 2 °C since the last mass calibration, Thermo Fisher Scientific strongly recommends that you refresh the mass calibration.

TIP

The bakeout time required to achieve the operating vacuum in the UHV chamber increases with the temperature in the laboratory. To quickly achieve the optimal operating vacuum, Thermo Fisher Scientific recommends keeping the laboratory temperature at the lower end of the range.

Heat output of Orbitrap Astral Zoom LC/MS systems

The maximum air conditioning load for a typical Orbitrap Astral Zoom MS system (with data system and forepump) is approximately 2.75 kW (9380 BTU/h). Refer to your LC manual for the heat output of your LC equipment. The following table shows the approximate heat output of each module.

Table 8 Heat output for a typical Orbitrap Astral Zoom LC/MS system

Module		Heat output [W]	Heat output [BTU/h]
Mass spectrometer (including forepump and data system)	Operation	1650	5630
	Bakeout	2750	9380
Dionex™ UltiMate™ 3000 RSLCnano UHPLC system (optional)		265	900
EASY-nLC™ 1200 system (optional)		125	430

Humidity

The instrument is designed to be operated in an environment that is rated with a pollution degree of 2. This means that only non-conductive pollution occurs.

The relative humidity of the operating environment must be between 20% and 80%, with no condensation. Thermo Fisher Scientific recommends installing a temperature and humidity monitor in your laboratory to ensure the operating environment is always within the specified temperature and humidity ranges.

NOTICE

Operating the instrument at very low humidity might cause the accumulation and discharge of static electricity, which can shorten the life of electronic components. Operating the system at high humidity might cause condensation, oxidation, and short circuits, and also blocks the filters on the cooling fans.

Lighting

Because a lot of work is done on the computer terminal, it might be convenient to have dimmed lights to reduce eyestrain. A small, high-intensity lamp is recommended for cleaning instrument components, inspecting the source, and manipulating small components. Contact your local safety officer for advice and regulations on adequate working place conditions.

Altitude

The Orbitrap Astral Zoom mass spectrometer is designed for indoor use at an altitude of up to 3,000 m (10,000 ft) above sea level. To check whether a peripheral (for example, LC or printer) is suitable for the intended altitude, refer to the peripheral's manual or contact Thermo Fisher Scientific.

Dust-free environment

Particulate matter might contaminate the samples, the sample introduction, and the ion source, and it might limit the background level of the instrument. The air in your laboratory must not contain excessive dust, smoke, or other particulate matter. For reference, the air must contain fewer than 35×10^6 particles per cubic meter (1×10^6 particles per cubic foot) in excess of 5 μm .

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

NOTICE

Be aware of dust when you perform instrument maintenance. Keep the instrument under vacuum and keep the source housing mounted with the automatic source background flow activated. Only open the instrument when you have to perform maintenance. Otherwise, keep the instrument closed.

Vibration

Floors must be free of vibration, for example, vibrations caused by equipment in adjoining locations. Excessive vibration can lead to a reduced lifetime of the system's mechanical components and can impact performance. Thermo Fisher Scientific recommends that you maintain vibration levels below the levels for office spaces as defined in ISO 9241-6:1999.

NOTICE

Because of the natural vibration of the forepump during operation, it must not have any mechanical contact with the mass spectrometer, with the exception of the vacuum hose. Otherwise, the vibration might affect instrument performance.

Radio frequencies

The instrument can withstand electromagnetic fields of 1 V/m in the frequency range 26 MHz to 1 GHz without any influence to operation.

The 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.

If strong radio transmitters are operating close to your laboratory, you should contact your local Thermo Fisher Scientific representative for advice. Because of the complexity of such influences, no general suggestion can be given in this guide.

Electrostatic discharge

Static charges and electrostatic discharge (ESD) are common natural phenomena. Although ESD is not always perceptible to a human being, it can cause damage to the electronic components of your instrument. Thermo Scientific instruments (with all panels in place) are designed to withstand ESDs up to 4000 V from air discharge and 4000 V from contact discharge. 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 various ways, including the following:

- Walking across a carpet in a room with 20% relative humidity can generate as much as 35,000 V of electrostatic potential on the surface of your body. This same motion in a room with 80% relative humidity generates about 1,500 V of electrostatic potential.
- Sitting and working in a chair padded with polyurethane foam in a room with 20% relative humidity can generate as much as 18,000 V of electrostatic potential on your skin, or 1,500 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.
- Polystyrene cups and packing materials typically have a considerable electrostatic charge on them.

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. However, more commonly, ESD damage might cause latent problems that are detrimental to sensitive electrical components, which causes premature failures. Therefore, Thermo Fisher Scientific recommends the following precautions, especially when operating your system at the lower end of the relative humidity specification (see [Humidity](#)):

- 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 operate the instrument, wear laboratory coats and clothing made of natural fiber or other static-dissipating material.
- Do not place polystyrene cups or packing materials on the instrument.

Line power

The performance and longevity of your system can be affected by the quality of line power supplied to the system. To ensure that your instrument performs optimally and that it is not damaged by line power fluctuations, verify that you comply with all power quality requirements.

IMPORTANT

You are responsible for providing an acceptable source of power for the operation of your system.

Contents

- [Basic power requirements](#)
- [Power supply](#)
- [Power cords](#)
- [Connect the mass spectrometer and the modules to wall outlets](#)
- [Quality of power](#)

Basic power requirements

The mass spectrometer provides electric power for the syringe pump and the optional switching valve(s). Any conditioning devices that are installed with the system must be able to handle the potentially high currents that are drawn during the initial startup of the system. The system inrush (start) current for the Orbitrap Astral Zoom mass spectrometer is 25 A. The average duration of the forepump's inrush current is less than 1 second. Therefore, this initial energy demand from the AC power line is very low. See the sample laboratory setup in [Power outlets in laboratories](#) for the recommended number of power outlets.

Table 9 Basic power requirements of the Orbitrap Astral Zoom LC/MS system

System or component	Nominal voltage	Fuse [°]	Power
Mass spectrometer	2 × 208–240 Vac (± 10%), 50/60 Hz, single phase	2 × 15/16 A (tripping characteristic C)	(Operation) Apparent power: 1000 VA; Effective power: 900 W <hr/> (Bakeout) Apparent power: 2500 VA; Effective power: 2000 W
Forepump	200–230 Vac, 50/60 Hz, single phase	15/16 A (tripping characteristic C)	700 W
Data system (computer, monitor, and Ethernet switch) and LC system	100–240 Vac, 50/60 Hz, single phase	15/16 A	100 W

The power consumption of the instrument depends on the active operating mode. The values in the following table include the power consumption of the forepump.

Table 10 Power consumption depending on instrument mode

Mode	Consumption [W]
Low-flow mode / Standby	1400
High-flow mode	1500
Bake-out	2800

Power supply

The Orbitrap Astral Zoom mass spectrometer operates at nominal voltages between 208 Vac and 240 Vac (50/60 Hz).

NOTICE

The instrument is tested and certified for a line voltage between 208 V and 240 V. In some areas of the world, voltage sags during high use periods might decrease the working voltage. For nominal voltages below 208 V or

[°] Dedicated wall outlets

for areas with working voltages below 187 V due to voltage sags, you must protect your instrument by using a suitable power conditioner or an uninterruptible power supply (UPS).

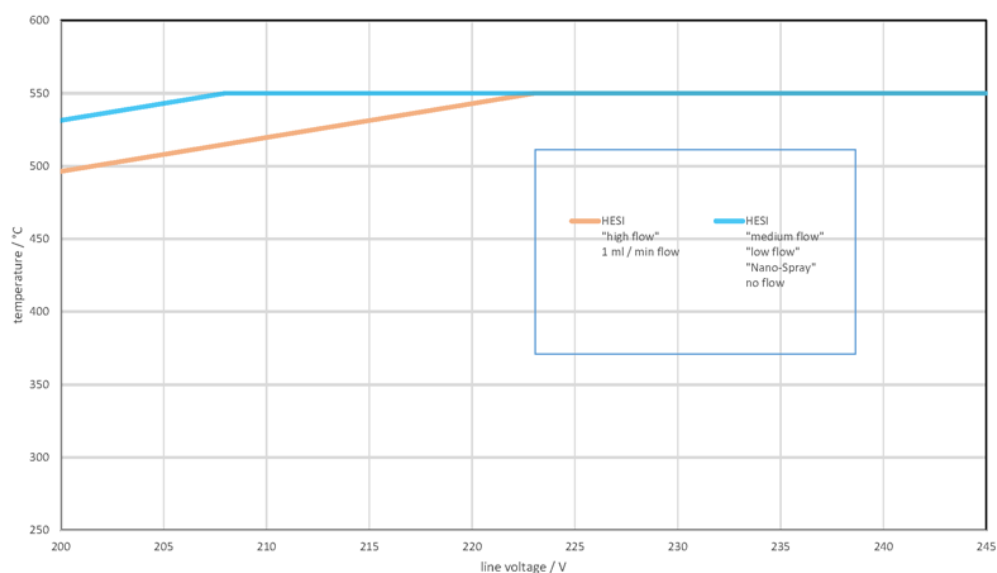
The mass spectrometer must be properly grounded. For this reason, the power cords of the mass spectrometer must be connected to wall outlets with grounding pins. Make sure that the grounding pins of the power cords are connected to earth ground, even when a buck/boost transformer or other upstream equipment (for example, a UPS) is used.

The interconnected power outlets for the system must have a common point to one ground connector. If there are two such points, and each one is connected to a separate external ground, noise current flows through the ground system via the ground loop that is formed.

Voltage dependency of the ion source heater

The heater of the ion source operates with line voltage. If the main supply voltage drops below its nominal value, the maximum temperature of the heater might not be available anymore. The following figure shows the derating curve of the maximum vaporizer temperature in dependence of the line voltage and the operating conditions for the HESI source.

Figure 6 Maximum vaporizer temperature vs. line voltage



Power cords

Thermo Fisher Scientific provides six power cords for the mass spectrometer, forepump, data system, monitor, and Ethernet switch. They are approximately 2.5 m (8 ft) long. One power cord fits into a standard IEC 60320 C19 socket on the forepump. The other cords fit into standard

IEC 60320 C13 sockets on the mass spectrometer and the other system components. Power cables and connectors for the options are standard equipment delivered by the manufacturers.

TIP

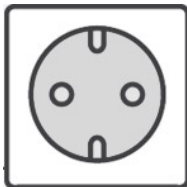
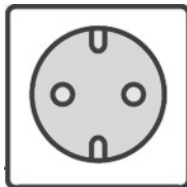
The mass spectrometer provides the electric power for the syringe pump and can also supply the electric power for the Ethernet switch. This allows you to position the Ethernet switch near the mass spectrometer and the LC system.

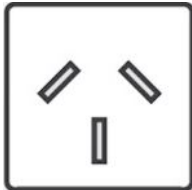
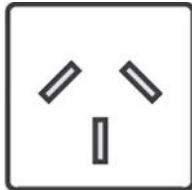
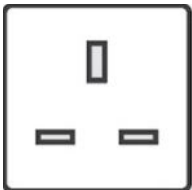
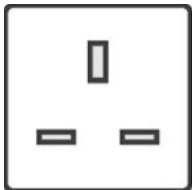
NOTICE



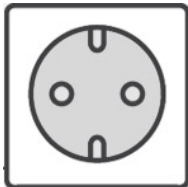
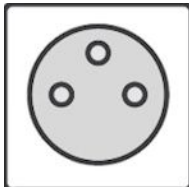
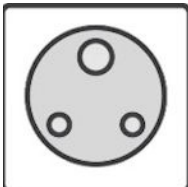
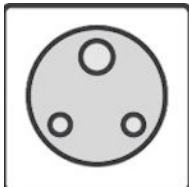
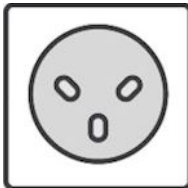
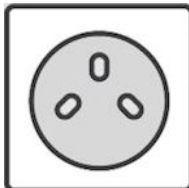
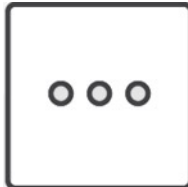

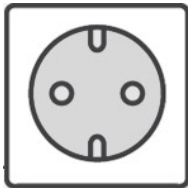
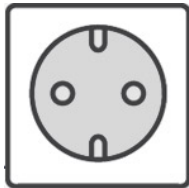
The instrument is equipped with a detachable mains cable. Use only mains supply cords with an adequate rating. All spare parts and consumable items used must be approved by Thermo Fisher Scientific. Both power connectors must be connected to the power supply in the laboratory to operate the instrument.


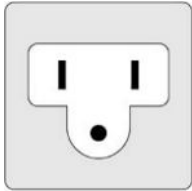


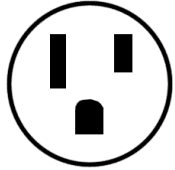





Depending on the location of your laboratory, various types of plugs might be required. The following table gives an overview of the possible wall outlets and their corresponding country kits. Write the part number of the applicable country kit into the Installation Request Form at the beginning of this guide and send it to the factory before the installation. For more information on the correct cable kit, contact your certified Thermo Fisher Scientific service representative.

Table 11 Country kits for the mass spectrometer




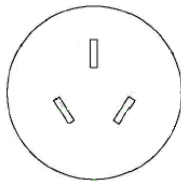
P/N	Designation	Socket for forepump (C19 plug)	Socket for MS system, PC, monitor, and Ethernet switch (C13 plug)	Qty.
BRE0016334	Country Kit Continental Europe (Afghanistan, Algeria, Angola, Armenia, Austria, Azores [Portugal], Belarus, Belgium, Benin, Bosnia-Herzegovina, Bulgaria, Burundi, Cambodia, Cameroon, Canary Islands [Spain], Rep. of Cape Verde, Central African Rep., Chad, Chile, Congo, Croatia, Czech. Rep., Rep. of Djibouti, Egypt, Equatorial Guinea, Estonia, Ethiopia, Finland, France, French Guiana, Gabon, Germany, Greece, Guadeloupe, Guinea, Guinea-Bissau, Hungary, Iceland, Indonesia, Iran, Iraq, Ivory Coast,	 CEE 7 plug	 CEE 7 plug	1+5

P/N	Designation	Socket for forepump (C19 plug)	Socket for MS system, PC, monitor, and Ethernet switch (C13 plug)	Qty.
	Jordan, Kyrgyzstan, Laos, Latvia, Lebanon, Liberia, Libya, Lithuania, Luxembourg, Madagascar, Mali, Martinique [France], Mauritania, Moldova, Monaco, Mongolia, Morocco, Mozambique, Netherlands, New Caledonia, Niger, North Korea, Norway, Oman, Paraguay, Peru, Poland, Portugal, Romania, Russia Federation, Rwanda, Saudi Arabia, Senegal, Slovakia, Slovenia, South Korea, Spain, Svalbard [Norway], Sweden, Syria, Thailand, Togo, Tunisia, Turkey, Ukraine, Uruguay, Vietnam, and Yugoslavia)			
BRE0017109	Country Kit Australia/New Zealand (American Samoa, Australia, Christmas Is. [Austral.], Cocos Is. [Austral.], Cook Is. [N.Z.], New Zealand, Papua New Guinea, Fiji, Tonga, and Western Samoa)			1+5
		AS 3112 plug	AS 3112 plug	
BRE0017112	Country Kit United Kingdom/Ireland (Anguilla [U.K.], Antigua, Bahrain, Bangladesh, Botswana, Burkina Faso, Channel Islands, Cyprus, Dominica, England, Gambia, Ghana, Gibraltar, Grenada, Hong Kong, Ireland, Rep. of Kenya, Kuwait, Lesotho, Macao, Malawi, Malaysia, Maldives, Malta, Mauritius, Myanmar [formerly Burma], Rep. of Namibia [W.S.Africa], Nigeria, North Ireland, Qatar, Scotland, Seychelles, Sierra Leone, Singapore, South Africa, Sri Lanka, St. Kitts & Nevis, St. Lucia, St. Vincent, Sudan, Swaziland, Tanzania, Uganda, United Arab Emir., United Kingdom & Ire., Wales, Yemen, Zambia, and Zimbabwe)			1+5
		BS 1363 plug	BS 1363 plug	

P/N	Designation	Socket for forepump (C19 plug)	Socket for MS system, PC, monitor, and Ethernet switch (C13 plug)	Qty.
BRE0017114	Country Kit Denmark (Denmark and Greenland [Den.])			1+5
		DS 60884-2-D1 plug	DS 60884-2-D1 plug	
BRE0017116	Country Kit France/Belgium (Belgium and France)			1+5
		CEE 7 plug	CEE 7/7 plug	
BRE0017124	Country Kit India/ South Africa (India, Nepal, Pakistan, Pitcairn Is. [U.K.], and Somalia)			1+5
		BS 546 15 A	BS 546 15 A	
BRE0017127	Country Kit Israel (Israel)			1+5
		SI 32 plug	SI 32 plug	
BRE0017129	Country Kit Italy (Italy)			1+5
		IT2-16P	YP-45	
				1+1
		CEE 7 plug	CEE 7 plug	

P/N	Designation	Socket for forepump (C19 plug)	Socket for MS system, PC, monitor, and Ethernet switch (C13 plug)	Qty.
BRE0017132	Country Kit Japan (Japan)	 NEMA L6-20P	 JIS C 8303	1+4
			 NEMA L6-20	2
BRE0017135	Country Kit NA (Aruba, Bahamas, Barbados, Belize, Bermuda, Bolivia, Brazil, Canada, Cayman Islands, Colombia, Costa Rica, Cuba, Curacao Is., Dominican Rep., Ecuador, El Salvador, Guam, Guatemala, Guyana, Haiti, Honduras, Jamaica, Mexico, Montserrat, Neth. Antilles, Nicaragua, Panama, Philippines, Puerto Rico, St. Pierre & Miquelon [Fr.], Suriname, Tahiti, Taiwan, Thailand, Trinidad & Tobago, United States, Venezuela, and Virgin Islands)	 NEMA L6-20P*	 NEMA 5-15	1+4
			 NEMA L6-20P*	1
* One socket supplies the source vacuum pump, and the other socket supplies the mass spectrometer.				
BRE0017141	Country Kit Switzerland (Liechtenstein and Switzerland)	 SW2-16P	 SEV 1011: 2009	1+5
BRE0017143	Country Kit Brazil (Brazil)	 NEMA L6-20P	 NEMA L6-20P	1+5

Connect the mass spectrometer and the modules to wall outlets

P/N	Designation	Socket for forepump (C19 plug)	Socket for MS system, PC, monitor, and Ethernet switch (C13 plug)	Qty.
		NBR 14136 (BR3-20P)	NBR 14136 (BR3-20P)	
BRE0017145	Country Kit Argentina (Argentina)			1+5
		IRAM2073 AR2-20P	IRAM2073 RA/3	
BRE0017147	Country Kit China (China)			1+5
		CH2-16P	PRC/3	

Connect the mass spectrometer and the modules to wall outlets

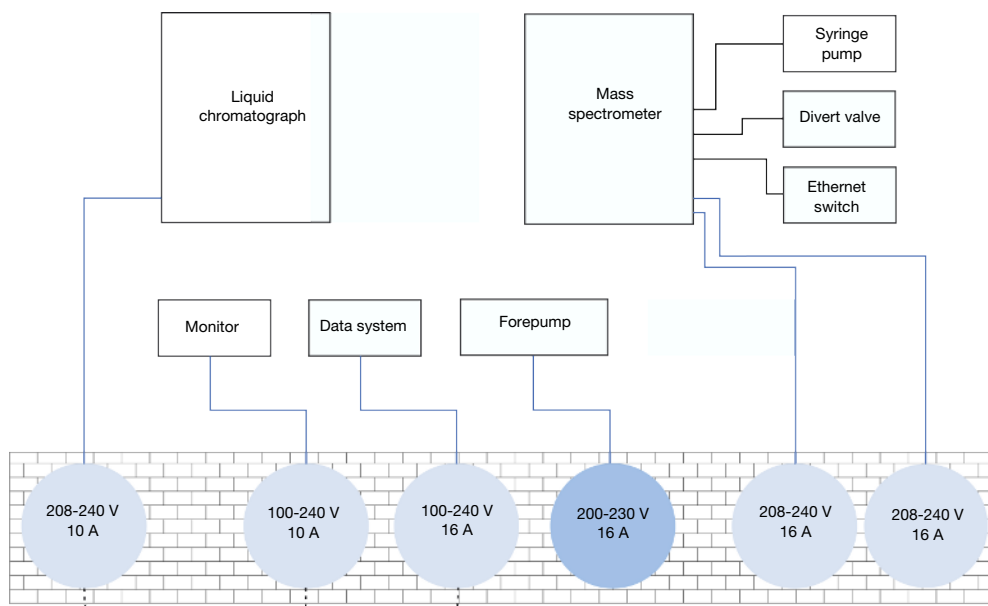
Make sure that the wall outlet specifications are not exceeded. The mass spectrometer must have a separate “clean” line that leads to a main fuse to guarantee disturbance-free operation. Locally supplied personal computer hardware must use the same power line and ground connection as the mass spectrometer.

All single-phase auxiliary wall outlets must use the same ground as the power line of the instrument.

NOTE

The specifications on the individual modules might vary from those in this guide. Refer to the manuals that came with your modules for power requirements and specifications. The power specifications on the module and in the respective manual always supersede those in this guide.

The figure shows a block diagram of the line power connections for the components of the Orbitrap Astral Zoom LC/MS system.

Figure 7 Line power installation

Note the following:

- Four outlets for secondary consumers are available on the mass spectrometer. The total maximum current of the secondary consumers must not exceed 3 A.
- You can connect the Ethernet switch to a wall outlet with a power cord that is shipped with the instrument.
- A power bar is not part of the standard system. You have to provide it.

NOTICE

Both power connectors of the mass spectrometer must be connected to the power supply in the laboratory to operate the instrument. To prevent overloading the circuit, do not connect the mass spectrometer and the LC system to the same electrical wall outlet circuit.

Place the power outlets

Place the outlets for the MS system, forepump, and LC system behind the LC system's workbench. Place the outlets for the data system—computer, monitor, Ethernet switch, and (optional) printer—behind the data system workbench.

For the LC system, use wall outlets. Additional power outlets might be required for testing and cleaning equipment, such as an oscilloscope and ultrasonic bath. See [Power outlets in laboratories](#) for a sample laboratory setup.

The maximum load for a 120 Vac fourplex outlet is typically 20 A, and the maximum load for a 230 Vac fourplex outlet is typically 16 A. Thermo Fisher Scientific recommends that you have at least 6 spare outlets behind the system and 3 spare outlets close to the workbench space within your laboratory.

Power outlets in laboratories

Installing a complete LC/MS system can require extensive electrical resources. Plan your power system so that it includes numerous outlets to ensure that you can connect and power all of your equipment. See the sample laboratory setup in the following table for the recommended number of outlets.

Table 12 Sample laboratory setup

System	Item	Outlets
LC system	Autosampler	1
	LC pump	1
	UV/Vis or PDA detector (optional)	1
	Column heater (optional)	1
	External controller (optional)	1
MS system	Mass spectrometer	2 (208–240 Vac)
	Forepump	1 (208–240 Vac)
	Syringe pump	— ^f
Data system	Data system computer	1
	Monitor	1
	Printer (optional)	1
	Ethernet switch	1
Optional	High intensity lamp (for help in instrument maintenance)	1
	Laboratory stereoscope (for inspecting fused-silica parts)	1
	Nitrogen generator	1
	Switching valve(s)	— ^f

^f Power is supplied by the mass spectrometer.

System	Item	Outlets
	Total outlets required for this configuration	7–14

TIP

If your local area is susceptible to corrupted power or to power disruptions, Thermo Fisher Scientific recommends that you install a UPS in your laboratory. Use the values listed in Basic power requirements as a guideline for selecting an appropriate UPS.

Install a residual current device (RCD) in the laboratory building

The instrument and peripheral must be protected by a residual current device (RCD) with a tripping current of maximum 30 mA. If an RCD is available in your laboratory, the instrument and peripheral must be included in that fuse circuit. If no RCD is available, Thermo Fisher Scientific provides an in-line RCD box to separately protect the instrument and peripheral. In this case, contact your local service office.

**CAUTION****Risk of electric shock**

Under extremely rare conditions, accessible parts of the instrument might come into contact with the mains voltage. Grounding therefore prevents users and the instrument from damage. In rare cases, an additional protection via GFCI or RCD is necessary. Supply your instrument with an in-line RCD. If the RCD cannot be switched On, call the certified Thermo Fisher Scientific service representative to get support.

**WARNING****Risk of electric shock**

If the RCD switches Off and cannot be switched On again, or if the RCD repeatedly switches Off, disconnect the RCD from the power socket and call the certified Thermo Fisher Scientific service representative to get support.

An RCD is also called ground fault circuit interrupter (GFCI). When it senses an imbalance between the outgoing and incoming current, this device instantly breaks the electric circuit to prevent serious harm from an outgoing electric shock.

NOTICE

For the installation of an RCD in the building, the local installation requirements must be followed.

If an insulating type transformer, insulating type UPS or insulating type power conditioner is used, the RCD must be connected between the insulating device and the instrument. The in-line RCD box can be used here as well:

- in-line RCD box for North America
- in-line RCD box for other countries



TIP

For more information, refer to the *Safety information for the RCD kit*.

Quality of power

The quality of power supplied to your system is very important for its performance.

The most common voltage disturbances are as follows:

- **Harmonic distortion:** A high-frequency disturbance that appears as distortion of the fundamental sine wave, and that might affect the operation of your system.
- **Slow average:** A gradual, long-term change in the average root mean square (RMS) voltage level, with typical durations greater than 2 s.
- **Sags and surges:** Sudden changes in the average RMS voltage level, with typical durations between 50 ms and 2 s.
- **Transients (or impulses):** Brief voltage excursions of up to several thousand volts, with durations of less than 50 ms.

The instrument is tested in accordance with EN 61326. However, excessive distortion, slow average disturbances, transients, as well as sags and surges on the power line can affect the quality of the measurement. Non-standard power fluctuations and excessive noise on the power lines degrade electronic components over time, which reduces their life span. Use power monitoring and conditioning devices to ensure stable performance of the instrument.

Power monitoring devices

Power monitoring devices help to determine whether a power conditioning device is needed.

Power line disturbance analyzers can detect and record most types of power supply problems. These instruments provide a continuous record of line performance by analyzing and printing out information on three types of voltage disturbances:

- Slow average
- Sag and surge
- Transient

In the first two cases, the duration as well as the amplitude of the disturbance is indicated by time interval recording.

The power line must be monitored continuously for seven consecutive days, 24 hours a day. If the inspection of the printout indicates disturbances, terminate the test and take corrective action. Then, the power should be monitored again as described above.

You can rent line monitors from electrical equipment suppliers. If necessary, your local Thermo Fisher Scientific representative can assist in the interpretation of the results and recommend appropriate corrective measures.

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, use an isolation/noise suppression transformer. If there are both transient and regulation problems, consider using power conditioners, which can control both of these problems.

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

TIP

For compliance and safety, make sure that your power conditioning devices are certified by recognized domestic and international organizations (for example, UL, CSA, TÜV, and VDE).

Uninterruptible power supply

If your local area is susceptible to corrupted power or power disruptions, install a UPS in your laboratory.

TIP

For compliance and safety, make sure that your UPS devices are certified by recognized domestic and international organizations (for example, UL, CSA, TÜV, and VDE).

Technical assistance

Occasionally, Thermo Fisher Scientific encounters line-voltage sources of unacceptable quality that adversely affect the operation of the instrument. Rectifying such power supply problems is the responsibility of the operator. Upon request, Thermo Fisher Scientific can try to diagnose your power supply quality problems, but does not perform actions to isolate and correct the problems.

Contact your Thermo Fisher Scientific representative for assistance in monitoring the line voltage in your laboratory, in selecting a line conditioner, or in locating a power consultant in your area.

Consumables

Your instrument requires gases and solvents that must meet defined purity specifications. The Thermo Fisher Scientific field service engineer might also require certain solvents for the installation verification of your system.

IMPORTANT

You are responsible for providing the correct gas and solvent supplies for the operation of your system.

Contents

- Nitrogen gas
- [Solvent recommendations](#)
- [Cleaning agents](#)

Nitrogen gas

The mass spectrometer requires nitrogen gas for its different components. The required gas pressure is 600 ± 50 kPa (87 ± 7 psi), and the maximum line pressure is 650 kPa (94 psi).

NOTICE

Your laboratory gas supply might provide nitrogen also for other consumers or peripherals. In this case, make sure that the supply for the mass spectrometer always meets the requirements for pressure, purity, and stability described in this topic.

The instrument can operate reliably only when the pressure of the source gas stays within the required limits. If your laboratory gas supply also provides nitrogen for other consumers, then you must install a pre-regulator in the gas line that leads to the source-gas port of the mass spectrometer. Contaminants that are introduced during the installation of house lines that are used for gas delivery can cause damage to the system. Make sure that all gas lines that are used with your system are free of all particulates and oils. You are responsible for any damage to the instrument that is caused by

contaminants introduced from your gas delivery system. Because particulate filters can be a source of contamination, Thermo Fisher Scientific does not recommend their use.

Your system can use large amounts of gas during daily operations. The gas consumption strongly depends on the type of analysis the instrument is used for. It is essential that the different gas types be delivered with the necessary pressure and purity, as described in the following tables.

Table 13 Nitrogen supply requirements

Gas type	Pressure	Purity	Connector size	Maximum flow	Consumption
Source gas	0.6 ± 0.05 MPa	99% (HP)	6 mm	45 NL/min	65,000 L/day
Reagent carrier gas / HCD collision gas		99.999% (UHP)	1/16 in.	0.07 NL/min	100 L/day

NOTE The use of ultra-high purity nitrogen (UHP, 99.999%) for the reagent carrier gas and HCD collision gas (and C-Trap bath gas) is mandatory.

Table 14 Typical nitrogen consumption of LC/MS applications

Application	LC flow rate (approximate)	Source settings [arbitrary units]	Consumption [NL/min]	
			Source gas	HCD collision gas
Nano-Spray	N/A	Sheath gas: 0, aux gas: 0, sweep gas: 0	0	0.07
Low flow	5 µL/min	Sheath gas: 5, aux gas: 0, sweep gas: 0	7	
Medium flow	200 µL/min	Sheath gas: 35, aux gas: 10, sweep gas: 0	15	
High flow	1 mL/min	Sheath gas: 60, aux gas: 20, sweep gas: 5	28	

NOTE

When the Internal Calibration source is switched off, the maximum consumption of UHP nitrogen gas is 0.04 NL/min.

The following table shows the estimated nitrogen consumption for different calibration types at ambient pressure and with low-flow settings (source gas consumption: 7 NL/min).

Table 15 Estimated nitrogen consumption for a calibration

Action	Estimated duration	Estimated consumption
Manual spray stability optimization	30 min	195 NL

Action	Estimated duration	Estimated consumption
Mass calibration	1 min	5 NL
Full system calibration	2 h	800 NL

NOTE

The duration of the full system calibration includes 30 minutes to ensure a stable spray.

Make sure that the maximum flow rate of the nitrogen source of your choice matches the requirements of your applications. You can supply the nitrogen for your instrument from one source (single supply) or two sources (dual supply). See the following table for an overview.

Table 16 Gas supply properties for single supply and dual supply

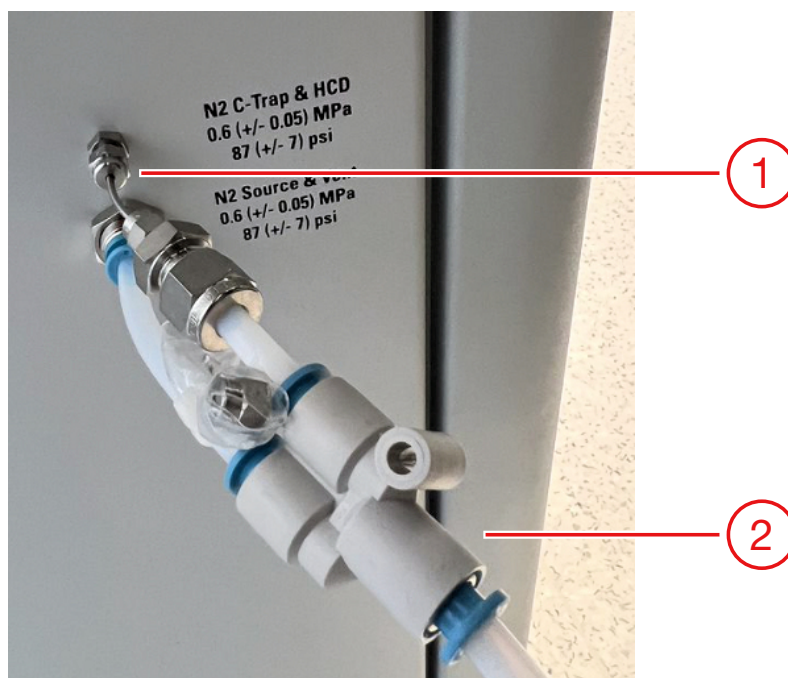
Supply type	Nitrogen purity	Nitrogen source (Examples)
Single Supply	>99.999% purity (<0.001% oxygen content)	LN2 evaporator, cylinder bundle, PSA nitrogen generator
Dual Supply	Collision gas: >99.999% purity (5.0)	LN2 evaporator, cylinder bundle, PSA nitrogen generator
	Source gases: Required: >95% (<5% oxygen content)	Membrane nitrogen generator
	Recommended: >99% (<0.5% oxygen content)	LN2 evaporator, cylinder bundle, PSA nitrogen generator

TIP

A nitrogen generator can expel a considerable amount of water (about 10 L per day) from its drain port, dependant on the ambient humidity. Connect the drain tubing to a suitable drain connection or container. If a container is used, it should be emptied at regular intervals. The container must not have an air tight seal because water and air are expelled at pressure. Fix the drain ending of the tube firmly to prevent it from vibrating during draining.

The instrument is prepared for single supply. It comes with a Y-piece that has a 6 mm press-in fitting for the hose coming from the nitrogen source. A short segment of 6 mm hose connects the Y-piece to the source-gas port of the instrument. A 6 mm-to-1/16 in. adapter connects the Y-piece to the HCD collision gas port of the instrument.

Figure 8 Y-piece attached to gas ports



No.	Description	No.	Description
1	Gas inlets: C-Trap & HCD (top), Source & Vent (bottom)	2	Y-piece

If you want to use two nitrogen sources of different purities, you can connect them to the instrument with 6 mm hoses. Use the Y-piece as an adapter to connect the hose for the UHP nitrogen to the HCD collision gas port of the instrument. A 6 mm plug is shipped with the Y-piece to close the unused tube, so you do not need to provide 1/16 in. stainless-steel tubing.

Fittings and parts

The following table lists the minimum parts that are required to connect the mass spectrometer to your gas delivery system.

Table 17 Gas connection hardware required

Description	Provided / Not provided
6 mm OD Teflon™ hose (P/N 0690280)	10 m (33 ft) provided. You might require additional length.

Description	Provided / Not provided
Connection for the opposite end of the Teflon hose to the nitrogen gas source	Not provided in kit. You must supply these parts.

TIP

Your connections and gas delivery system might vary, and it is your responsibility to supply any fittings or connections necessary during installation.

If the pressure regulator of the laboratory gas supply has a 1/8 inch NPT outlet, you can use the following Swagelok™ 1/8-in.-to-6-mm adapters: B-6M0-7-2 (female) and B-6M0-1-2 (male).

Solvent recommendations

The installation of the instrument requires LC/MS-grade methanol and water. Solvent modifiers might also be required during the installation of some systems. The following solvents are useful in operating and maintaining your instrument:

- Methanol
- Acetonitrile
- Water
- Isopropanol
- Acetic acid (modifier)
- Formic acid (modifier)
- Trifluoro acetic acid (modifier)

Some solvent impurities are transparent to UV/VIS detectors. Therefore, some LC/MS-grade solvents might contain contaminants that the detector does not detect but that interfere with the performance of the mass spectrometer. To operate your instrument, use high purity solvents with minimum contamination.

You can order LC/MS grade consumables from Thermo Fisher Scientific, which are sold under its Fisher Scientific™ brand. Visit www.fishersci.com. Use only Optima™ LC/MS grade chemicals for operating your system.



CAUTION

By law, producers and suppliers of chemical compounds are required to provide their customers with the most current health and safety information in the form of Safety Data Sheets (SDSs). The SDSs must be freely available to lab personnel to examine at any time. These data sheets describe the

chemicals and summarize information on the hazards and toxicities of specific chemical compounds. They also provide information on the proper handling of compounds, first aid for accidental exposure, and procedures to remedy spills or leaks.

Read the SDS for each chemical you use. Store and handle all chemicals in accordance with standard safety procedures. Always wear protective gloves and safety glasses when you use solvents or corrosives. Also, contain waste streams, use proper ventilation, and dispose of all laboratory reagents according to the directions in the SDS.

NOTICE

Do not filter solvents. Filtering solvents can introduce contamination.

Cleaning agents

Thermo Fisher Scientific recommends that you have the following agents for cleaning surfaces and equipment available:

- A solvent like isopropanol (in accordance with your local safety practices)
- A detergent, for example, Liquinox™
- Several liters of distilled water

NOTICE

Prevent any liquids from entering the inside of the instrument. Leaking liquids might get into contact with electronic components and cause a short circuit.

Exhaust and waste

The proper performance of your system can be affected by the waste and exhaust arrangements for the instrument. The vacuum waste and the solvent waste must be vented separately, and the wastes must be collected and disposed of properly.

IMPORTANT

You are responsible for providing proper waste and exhaust systems for the operation of your system.

Contents

- [Exhaust system](#)
- [Solvent waste](#)
- [Ventilation](#)

Exhaust system

The Orbitrap Astral Zoom mass spectrometer is shipped with a large forepump, which is placed below the Astral module. The forepump provides both a vacuum for the API source and backing pressure for the turbomolecular pumps in the instrument.

You must connect the forepump to a fume exhaust system. The forepump eventually exhausts much of what is introduced into the mass spectrometer. It is your responsibility to provide an adequate exhaust system.

Connect the exhaust port of the forepump to an exhaust gas line that leads out of the building or to an exhaust system. The inner diameter of the pipe must be at least 25 mm (1 in.). An exhaust hose (13 mm [$\frac{1}{2}$ in.] ID; 20 mm [$\frac{25}{32}$ in.] OD; and 5 m (16 ft) length) for connecting it to the exhaust system comes with the system. The hose for the pump exhaust is led out of the instrument at its back side.

Table 18 Forepump fume exhaust requirements

Parameter	Requirement
Initial inrush flow rate	10 L/min (21.2 ft ³ /h)
Continuous flow rate	7 L/min (14.8 ft ³ /h)
Maximum flow rate	50 L/min (106 ft ³ /h)

NOTICE

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.

The maximum length for the exhaust hose of the forepump is 10 m.

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

The exhaust hose must travel at floor level for a minimum of two meters (78 ½ in.) before it reaches the external exhaust system. This tubing acts as a trap for exhaust fumes that would otherwise recondense.

Solvent waste

The mass spectrometer comes with components that collect the solvent waste from the API source. Because the API source can accommodate high flow rates, you must collect solvent waste in a way that avoids pressure buildup in the source. The solvent drain/waste exhaust port is at the left side of the instrument. The hose for the solvent waste exhaust is led out of the instrument at its back side.

NOTICE

Always operate the API source with the drain tubing assembly mounted to the instrument. The drain tubing must lead to a waste container that is connected to a dedicated fume exhaust system. The exhaust system for the API source must accommodate a flow rate of up to 45 L/min (95 ft³/h).

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.

To prevent the laboratory from being accidentally contaminated by solvent waste, secure the waste container so that it does not overturn.

The waste container is installed in the compartment under the Orbitrap part. Mount the container with its holder to the frame.

Set up the API source drain

Procedure

1. Use the provided Tygon™ tubing to connect the solvent waste container to the instrument.
2. Use the provided black spiral tubing to connect the waste container to the exhaust system.

NOTE

Make sure that your lab exhaust system can accommodate this tubing (1 in. ID; 1 ¼ in. OD) without using reducing connectors along the solvent waste path.

3. To prevent solvent waste from backing up into the mass spectrometer, make sure that the tubing in the following locations is above the level of liquid in the waste container:
 - Between the mass spectrometer and the solvent waste container
 - Between the solvent waste container and the exhaust system

TIP

The cap adapter insert of the solvent waste container has a small vent. If the exhaust port of the laboratory is always at negative pressure, Thermo Fisher Scientific recommends that you remove the cap that covers the vent. This makes the atmosphere in the solvent waste container independent of the fume exhaust system.

For additional information, refer to the *Orbitrap Astral Zoom Operating Manual*.

Ventilation

A significant amount of the gas that is introduced into the API source can potentially escape into the laboratory atmosphere. Therefore, provide good air exchange to prevent the accumulation of source gas in the laboratory.

Installation

Before the installation, make sure that all preparations described in following topics are complete:

- [Instrument arrival](#)
- [Prepare the installation](#)
- [Dispose of packaging material](#)
- [Advanced training courses](#)
- [Preventive maintenance](#)

When your lab site preparation is completed and the system is at your site, call your Thermo Fisher Scientific representative to arrange for an installation date.

Instrument arrival

Thermo Scientific instruments are transported either by carriers who specialize in the handling of delicate machinery or by airfreight for long distance shipment. However, equipment occasionally gets inadvertently damaged in transit.

Take the following precautions when receiving material:

- Carefully check for obvious damage or evidence of rough handling.
- If external damage is apparent, take photographs and briefly note the damage on all copies of the receiving documents.

NOTE

Drivers sign (or put their initials) next to your comments to signify agreement with your observations.

- Contact your Thermo Fisher Scientific representative to report any damage and let a certified Thermo Fisher Scientific service representative check for further damage.

If the instrument shipping container, ShockWatch™, 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 the system arrives safely, proceed with the rest of the site preparation.

NOTE

Freight insurance requires that obvious damage is noted on the receiving documents. Thermo Fisher Scientific will not accept liability for damage if materials are received with obvious damage and the damage is not recorded on the receiving documents.

NOTE

After arrival, move the instrument as packed by Thermo Fisher Scientific to a protected indoor location. See [Technical data](#) for more information.

Transportation risk

Transportation risk depends on the agreed upon terms of delivery. The terms of shipment determine who has responsibility for filing a claim against the carrier if the system is damaged in transit.

Transportation risk

Transportation risk depends on the agreed upon terms of delivery. The terms of shipment determine who has responsibility for filing a claim against the carrier if the system is damaged in transit.

Prepare the installation

It is the policy of Thermo Fisher Scientific that the customer must not unpack the system or accessory items before the installation of the system.

TIP

Where buck/boost transformers or power conditioning units are supplied, it is the responsibility of the operator to have these units installed by an electrician before instrument installation.

A forklift or a pallet jack can help with unpacking the instrument components and transporting them in-house.

Install the system

When your new instrument is on site and ready for installation, a certified Thermo Fisher Scientific service representative installs it.

During the installation, the certified Thermo Fisher Scientific service representative demonstrates the following:

- The basics of equipment operation and routine maintenance.
- The performance specifications that are applicable at the time of the purchase of the system.

TIP

Consumables sent with the system are intended for use by the certified Thermo Fisher Scientific service representative during the installation.

Key operator

Thermo Fisher Scientific recommends that you designate one person as the key operator to oversee the operation and maintenance of the system in your laboratory. This person also manages the communication between your laboratory and Thermo Fisher Scientific. Make sure that the key operator is available during the installation of your system.

TIP

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

Equipment needed for installation

The mass spectrometer requires a syringe pump for delivering sample solution from a syringe into the API ion source. A suitable syringe pump is shipped with the mass spectrometer. Place the syringe pump next to the API source in the accessories cabinet of the mass spectrometer.

Calibration solution

The chemicals that are needed for the installation of the instrument do not come with the mass spectrometer. They are shipped separately as part of the Preinstallation Kit.

The Thermo Scientific™ Pierce™ FlexMix™ Calibration Solution is a mixture of 16 highly pure, ionizable components (mass ranges: 40 to 3000 *m/z*). This mixture is designed for both positive and negative ionization calibration with the Instrument Control Software for the Orbitrap Astral Zoom mass spectrometer and other Thermo Scientific instruments that are powered by Orbitrap™ technology.

This solution comes ready-for-use, so you may directly load it into a syringe and inject it into the instrument without any preparation. The solution is also stable at room temperature for up to 18 months.

The stable solution is provided in a leak-proof, high-purity PTFE bottle.

Table 19 Available calibration solution packages

Product name	Unit size	Product number
Pierce™ FlexMix™ Calibration Solution	10 mL	A39239

You can order the calibration solution from www.thermofisher.com or www.fishersci.com. The calibration solution is shipped at ambient temperature. Keep it in a dry, cool and well-ventilated place. Keep it in a properly labeled container. Store it in accordance with local regulations.



CAUTION

Hazardous chemicals



Samples and solvents might contain toxic, carcinogenic, mutagenic, or corrosive/irritant chemicals. Avoid exposure to potentially harmful materials. Always wear protective clothing, gloves, and safety glasses when you handle solvents or samples. Also contain waste streams and use proper ventilation. Refer to your supplier's Safety Data Sheet (SDS) for proper handling of a particular solvent.

Dispose of packaging material

Upon receiving the instrument, we advise you to properly dispose of any packaging material that is used to secure the instrument during the shipping process.

Refer to the international recycling codes defined by the European commission and dispose of any packaging materials accordingly. The packaging of your instrument may differ.

Table 20 International recycling codes

Code	Example
	The wooden crate 2 (shipping box of the instrument)
	All bands 1 and metal clips 3 (made of stainless steel, for example) arranged at the wooden crate



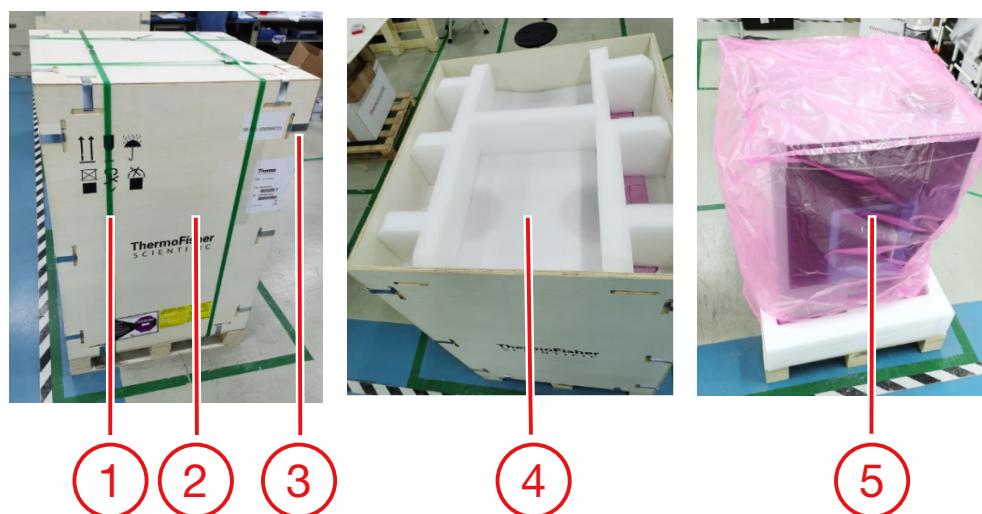
Code	Example
	All damping foam inlays 4 used to fix the instrument within the wooden crate (made of Polythene, for example)
	All plastic covers, bags and foils 5 (made of PE, for example)

Figure 9 Packaging materials to be disposed of correctly



No.	Description	No.	Description
1	Bands	4	Foam inlays
2	Wooden crate	5	Bags
3	Clips		

For information on waste disposal sites, refer to your local waste provider.

Advanced training courses

Thermo Fisher Scientific offers both introductory and advanced training courses in analytical techniques, together with specialized courses for Thermo Scientific products.

Thermo Fisher Scientific recommends that, some time after your instrument has been installed, the key operator undergoes advanced training from Thermo Fisher Scientific for the operation and maintenance of the system. After this training, the key operator can conduct an in-house training program on your site for your own people and can certify others to operate the instrument.

For information concerning course schedules and fees, contact your local Thermo Fisher Scientific representative.

Preventive maintenance

Routine and preventive maintenance of the instrument is the responsibility of the operator. Included in this category are the replacement of worn parts, the exchange of operating resources, and similar activities.

Regular preventive maintenance is essential, because it increases the life of the system, results in maximum uptime of the system, and ensures optimal system performance.

NOTE

Refer to the Operating Manual for your Thermo Scientific instrument for appropriate maintenance techniques. Refer also to the manufacturers' manuals shipped with the chiller, autosampler, and other accessories.

Your local Thermo Fisher Scientific office can provide details for different levels of service contracts.

Ardia Platform

The Ardia Platform is available as option for the Orbitrap Astral Zoom LC/MS system.

Contents

- [Introduction](#)
- [Installation tracks](#)
- [Possible configurations](#)
- [Technical specifications of the Dell PowerEdge T550 system](#)
- [Place the Ardia hardware](#)

Introduction

Designed to support your digital transformation journey, the Thermo Scientific Ardia™ Platform is a scalable software solution for modern, dynamic (often cloud-based) environments. It connects and organizes projects, people, and instruments on a global level, and it provides web-based access and secure centralized data storage. Using the Ardia platform, scientists can more efficiently collaborate and gain insight into their research.

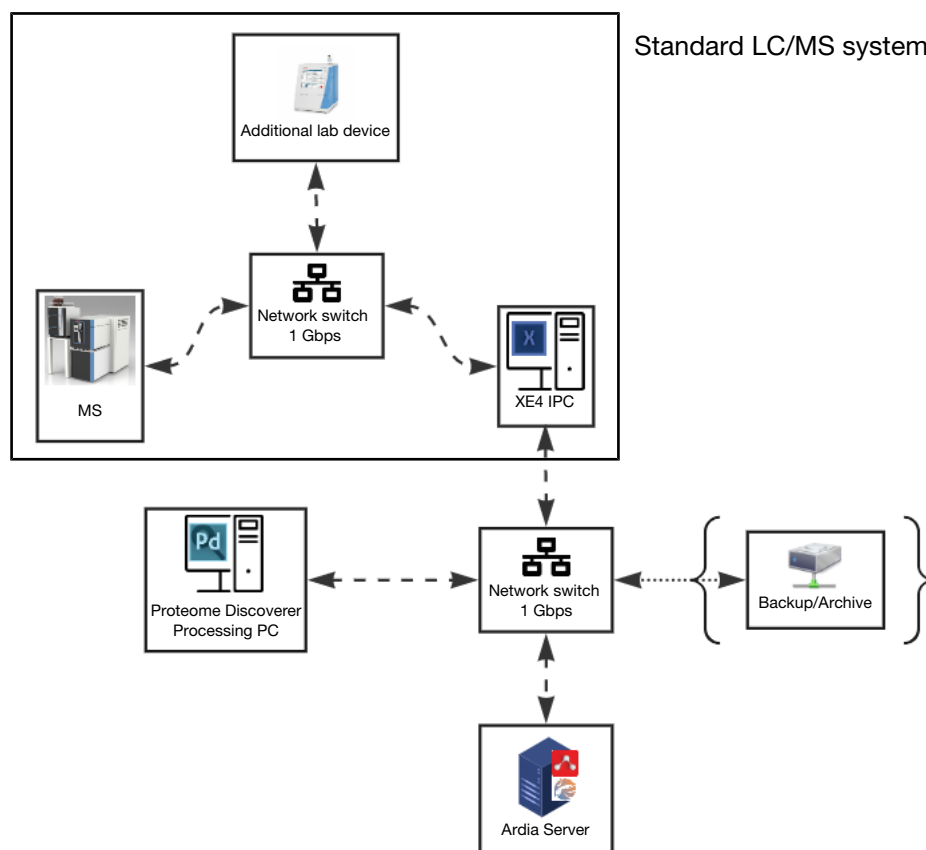
With the Ardia platform, you can create a flexible laboratory data ecosystem with the ability to integrate the Chromeleon CDS, Xcalibur data system, BioPharma Finder application, and Proteome Discoverer application. These applications can directly utilize the centralized data storage of the connected environment, which lets you access and view data within the platform to support your discovery goals, clarify results, and empower research.

The Ardia platform includes the following:

- **Ardia Core software:** User and data management tools designed to streamline your administrative tasks to manage users, track actions, and simplify data backup and archival.
- **Ardia Instruments application:** The driving force behind managing, scheduling, and monitoring your connected systems, which helps you to get the most out of your instruments.

- **Ardia Data Viewer application:** A single application with a simple, intuitive interface for reviewing data acquired from either the Chromeleon CDS or Xcalibur data system.

Figure 10 Ardia network



Installation tracks

The installation of the Ardia platform comprises two tracks, as described in the following table.

Table 21 Ardia installation tracks

Designation	Properties	Responsible party
Track 1	Installation of an isolated network environment that does not connect to the customer's network or the Internet.	Service engineer
Track 2	Implementation of an Ardia platform network into the customer's network.	Thermo Fisher Scientific software support (during site readiness process)

Possible configurations

The following are examples of the possible configurations of the Ardia platform:

- Orbitrap Astral Zoom MS system + Instrument PC (without Ardia platform)

NOTE

This configuration is identical to the standard Orbitrap Astral Zoom LC/MS system as it is described in the previous topics of this manual.

- Orbitrap Astral Zoom MS system + Instrument PC + Ardia platform
- Orbitrap Astral Zoom MS system + Instrument PC + Ardia platform + Proteome Discoverer PC

NOTE

These configurations do not consider the presence of an LC system.

The following table lists the components of the possible configurations and the required power sockets.

Table 22 Orbitrap Astral Zoom MS system + Instrument PC (without Ardia platform)

Component	Power sockets
Orbitrap Astral Zoom MS system (including forepump)	2 × (208–240 Vac), 2 × 15/16 A fuses; 1 × (200–240 Vac), 1 × 15/16 A fuse
Data station computer + monitor	2 × (100–240 Vac), 2 × 15/16 A fuses
Ethernet Switch 1 GByte	1 × (100–240 Vac), 1 × 15/16 A fuse

Table 23 Orbitrap Astral Zoom MS system + Instrument PC + Ardia platform

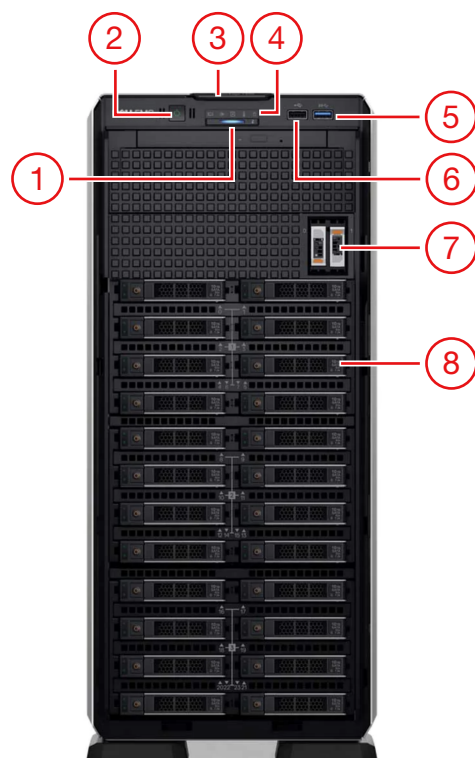
Component	Power sockets
Orbitrap Astral Zoom MS system (including forepump)	2 × (208–240 Vac), 2 × 15/16 A fuses; 1 × (200–240 Vac), 1 × 15/16 A fuse
Data station computer + monitor	2 × (100–240 Vac), 2 × 15/16 A fuses
Ethernet Switch 1 GByte	1 × (100–240 Vac), 1 × 15/16 A fuse
Dell™ PowerEdge™ T550 system + monitor (VGA connection)	2 × (100–240 Vac), 2 × 15/16 A fuses 1 × (100–240 Vac), 1 × 15/16 A fuse
QNAP Switch 10 GByte	1 × (100–240 Vac), 1 × 15/16 A fuse

Table 24 Orbitrap Astral Zoom MS system + Instrument PC + Ardia platform

Component	Power sockets
Orbitrap Astral Zoom MS system (including forepump)	2 × (208–240 Vac), 2 × 15/16 A fuses; 1 × (200–240 Vac), 1 × 15/16 A fuse
Data station computer + monitor	2 × (100–240 Vac), 2 × 15/16 A fuses
Ethernet Switch 1 GByte	1 × (100–240 Vac), 1 × 15/16 A fuse
Dell PowerEdge T550 system + monitor (VGA connection)	2 × (100–240 Vac), 2 × 15/16 A fuses 1 × (100–240 Vac), 1 × 15/16 A fuse
QNAP Switch 10 GByte	1 × (100–240 Vac), 1 × 15/16 A fuse
Proteome Discoverer PC + monitor	2 × (100–240C Vac), 2 × 15/16 A fuses

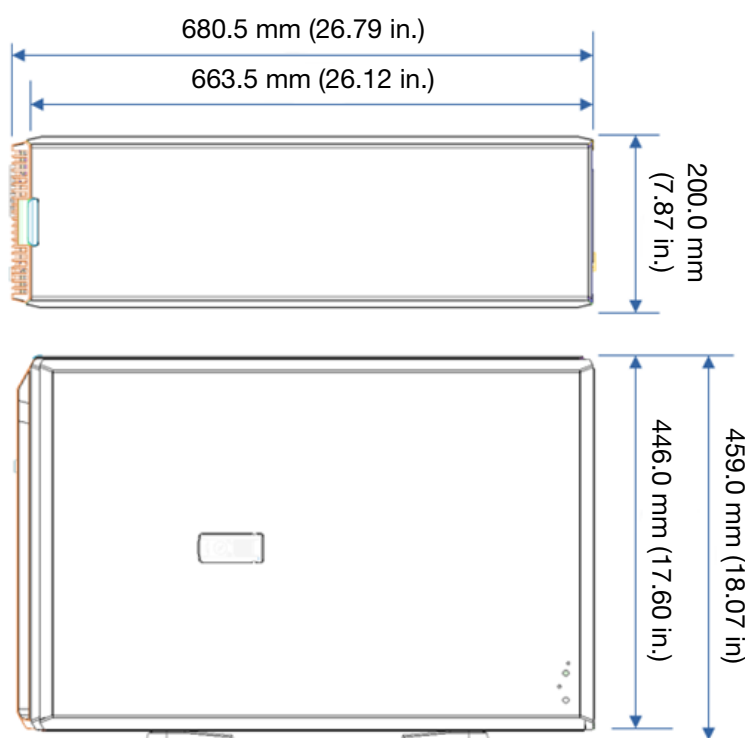
Technical specifications of the Dell PowerEdge T550 system

The software for the Ardia platform resides in the Dell PowerEdge T550 system. Its dimensions and power specifications are listed in this topic.

Figure 11 Dell PowerEdge T550 System, front view

No.	Description	No.	Description
1	System health and ID indicator	5	USB 3.0 port
2	Power button	6	USB 2.0 port
3	Information tag	7	BOSS S2 module (optional)
4	Status LED indicators	8	Drive

Figure 12 Chassis dimensions of the Dell PowerEdge T550 system



Maximum weight (with all drives/SSDs): 45 kg (99 lb)

Table 25 Power specifications of the Dell PowerEdge T550 system

PSU	Heat dissipation (maximum)	Frequency	Voltage	AC		Current
				High line 200–240 V	Low line 100–120 V	
2400 W Mixed Mode	2640 W 9000 BTU/hr	50/60 Hz	100–240 V	2400 W	1400 W	16–13.5 A

NOTE The PowerEdge T550 system requires two power cords with C19 plugs. They are contained in the Ardia Country Kit that is shipped with the Ardia platform. See [Place the Ardia hardware](#).

Manufacturer information

Detailed information about the Dell EMC PowerEdge T550 system is available from the manufacturer at the following websites:

- [Technical specifications](#)
- [Technical guide](#)

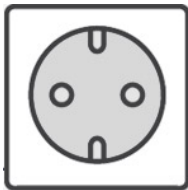
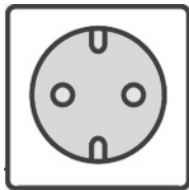
Place the Ardia hardware

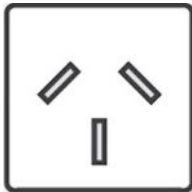
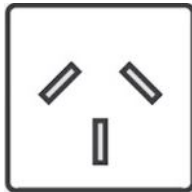

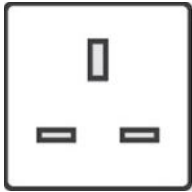
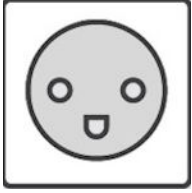
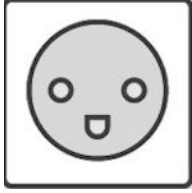
In addition to the PowerEdge T550 system, the minimum hardware for the Ardia platform includes a 10 GByte Ethernet switch and a monitor. According to the tables in [Possible configurations](#), a minimum of four wall outlets (100–240 Vac) are necessary for running an Ardia system without a Proteome Discoverer instrument computer.

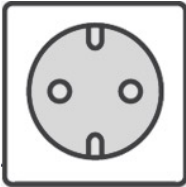
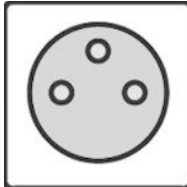
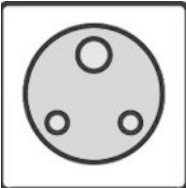
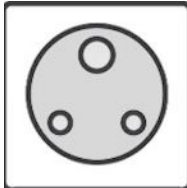

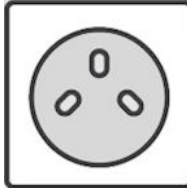
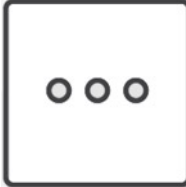
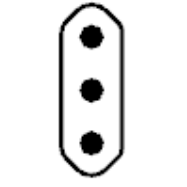
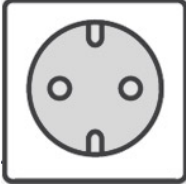
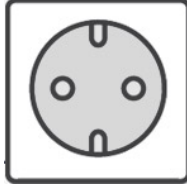


Depending on the location of your laboratory, various types of plugs might be required.



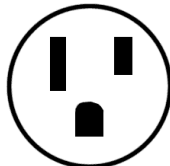







The following table gives an overview of the possible wall outlets and their corresponding country kits. Write the part number of the applicable country kit into the Installation Request Form at the beginning of this guide and send it to the factory before the installation.


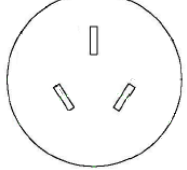
Table 26 Country kits for the Ardia platform

P/N	Designation	Socket for server (C19 plug)	Socket for monitor and Ethernet switch (C13 plug)	Qty.
BRE0062202	Country Kit Continental Europe (Afghanistan, Algeria, Angola, Armenia, Austria, Azores [Portugal], Belarus, Belgium, Benin, Bosnia-Herzegovina, Bulgaria, Burundi, Cambodia, Cameroon, Canary Islands [Spain], Rep. of Cape Verde, Central African Rep., Chad, Chile, Congo, Croatia, Czech Rep., Rep. of Djibouti, Egypt, Equatorial Guinea, Estonia, Ethiopia, Finland, France, French Guiana, Gabon, Germany, Greece, Guadeloupe, Guinea, Guinea-Bissau, Hungary, Iceland, Indonesia, Iran, Iraq, Ivory Coast, Jordan, Kyrgyzstan, Laos, Latvia, Lebanon, Liberia, Libya, Lithuania, Luxembourg, Madagascar, Mali, Rep. of Martinique, Mauritania, Moldova, Monaco, Mongolia, Morocco, Mozambique, Netherlands, New Caledonia, Niger, North Korea, Norway, Oman, Paraguay, Peru, Poland,	 CEE 7 plug	 CEE 7 plug	2+2

P/N	Designation	Socket for server (C19 plug)	Socket for monitor and Ethernet switch (C13 plug)	Qty.
	Portugal, Romania, Russia Federation, Rwanda, Saudi Arabia, Senegal, Slovakia, Slovenia, South Korea, Spain, Svalbard [Norway], Sweden, Syria, Thailand, Togo, Tunisia, Turkey, Ukraine, Uruguay, Vietnam, and Yugoslavia)			
BRE0062203	Country Kit Australia/New Zealand (American Samoa, Australia, Christmas Is. [Austral.], Cocos Is. [Austral.], Cook Is. [N.Z.], New Zealand, Papua New Guinea, Fiji, Tonga, Western Samoa)			2+2
		AS 3112 plug	AS 3112 plug	
BRE0062204	Country Kit United Kingdom/Ireland (Anguilla [U.K.], Antigua, Bahrain, Bangladesh, Botswana, Burkina Faso, Channel Islands, Cyprus, Dominica, England, Gambia, Ghana, Gibraltar, Grenada, Hong Kong, Ireland, Rep. of Kenya, Kuwait, Lesotho, Macao, Malawi, Malaysia, Maldives, Malta, Mauritius, Myanmar [formerly Burma], Namibia [W.S.Africa], Nigeria, North Ireland, Qatar, Scotland, Seychelles, Sierra Leone, Singapore, South Africa, Sri Lanka, St. Kitts & Nevis, St. Lucia, St. Vincent, Sudan, Swaziland, Tanzania, Uganda, United Arab Emir., United Kingdom & Ire., Wales, Yemen, Zambia, and Zimbabwe)			2+2
		BS 1363 plug	BS 1363 plug	
BRE0062207	Country Kit Denmark (Denmark and Greenland [Den.])			2+2
		DS 60884-2-D1 plug	DS 60884-2-D1 plug	

P/N	Designation	Socket for server (C19 plug)	Socket for monitor and Ethernet switch (C13 plug)	Qty.
BRE0062208	Country Kit France/Belgium (Belgium and France)			2+2
		CEE 7 plug	CEE 7/7 plug	
BRE0062209	Country Kit India/South Africa (India, Nepal, Pakistan, Pitcairn Is. [U.K.], and Somalia)			2+2
		BS 546 15 A	BS 546 15 A	
BRE0062211	Country Kit Israel (Israel)			2+2
		SI 32 plug	SI 32 plug	
BRE0062212	Country Kit Italy (Italy)			2+2
		IT2-16P	YP-45	
				2+2
		CEE 7 plug	CEE 7 plug	
BRE0062213	Country Kit Japan (Japan)			2+2
		NEMA L6-20P	JIS C 8303	

P/N	Designation	Socket for server (C19 plug)	Socket for monitor and Ethernet switch (C13 plug)	Qty.
				2
			NEMA L6-20	
BRE0062214	Country Kit NA (Aruba, Bahamas, Barbados, Belize, Bermuda, Bolivia, Brazil, Canada, Cayman Islands, Colombia, Costa Rica, Cuba, Curacao Is., Dominican Rep., Ecuador, El Salvador, Guam, Guatemala, Guyana, Haiti, Honduras, Jamaica, Mexico, Montserrat, Neth. Antilles, Nicaragua, Panama, Philippines, Puerto Rico, St. Pierre & Miquelon [Fr.], Suriname, Tahiti, Taiwan, Thailand, Trinidad & Tobago, United States, Venezuela, and Virgin Islands)			2+2
		NEMA L6-20	NEMA 5-15	
				2
			NEMA L6-20	
BRE0062215	Country Kit Switzerland (Liechtenstein and Switzerland)			2+2
		SW2-16P	SEV 1011: 2009	
BRE0062216	Country Kit Brazil (Brazil)			2+2
		NBR 14136 (BR3-20P)	NBR 14136 (BR3-20P)	
BRE0062217	Country Kit Argentina (Argentina)			2+2
		IRAM2073 AR2-20P	IRAM2073 RA/3	


P/N	Designation	Socket for server (C19 plug)	Socket for monitor and Ethernet switch (C13 plug)	Qty.
BRE0062219	Country Kit China (China)	 CH2-16P	 PRC/3	2+2

Customer feedback

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- [WEEE Compliance statement](#)
- [EU REACH statement](#)

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- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the receiver into an outlet on a circuit that is different from that to which the equipment is connected.
- Consult the dealer or an experienced radio or TV technician for help.

WEEE Compliance statement

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

Figure 13 WEEE symbol



Thermo Fisher Scientific is registered with B2B Compliance (B2Bcompliance.org.uk) in the UK and with the European Recycling Platform (ERP-recycling.org) in all other countries of the European Union and in Norway.

If this product is located in Europe and you want to participate in the Thermo Fisher Scientific Business-to-Business (B2B) Recycling Program, send an email request to weee.recycle@thermofisher.com with the following information:

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



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

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The European Commission promulgated legislation that covers the registration, evaluation, authorization and restriction of chemicals within the European Union community under (EC) No 1907/2006. This regulation is commonly known as REACH. Thermo Fisher Scientific is committed to meeting all compliance obligations under REACH. As per Article 33 of the Regulation, this product may include items that contain more than 0.1% by weight of some SVHC Candidate Substance. Some electronic parts and copper alloys can contain lead.

Release history

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