

Antaris II and Antaris MX Site and Safety Information



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Introduction

Thank you for choosing an Antaris® II or Antaris MX FT-Near Infrared Analyzer from Thermo Fisher Scientific. These systems are designed to be extremely durable and reliable. While they work under adverse conditions for extended periods, to best ensure accurate results on a repeatable basis you should maintain a stable working environment.

Before installation, please read this manual and consider its points for your system work space. By preparing your site before the system arrives, you can ensure that the qualified factory-trained service representative installs your system without complication. Five major areas are covered in this manual:

Regulatory and safety information — The Antaris system conforms to all applicable safety and regulatory conventions outlined in the General Safety Information section of this manual.

Location — Consult the dimensional drawings of the instrument and accessories when planning the location of your system. Leave extra space around the system for clearance and service access.

Environmental considerations — Avoid excessive static electricity, extreme temperatures, humidity, vibration, and intense magnetic fields.

Utility requirements — Before the system arrives, it is important to install any necessary utilities in the planned work space. You will need electrical power. You may also need a telephone line, network connection, and a source of dry air or nitrogen.

Instrument specifications — Provides information about the physical characteristics of the instruments and their environmental, utility, clearance, accessibility, and serviceability requirements.

If you suspect that you cannot meet these optimal conditions or have other concerns, contact technical support for assistance.

About this manual

This manual discusses the important safety features and explains the spatial and environmental requirements and the services necessary to install and operate these instruments.

Note This document is included on the language pack CD that comes with RESULT software suite version 3.0 or higher. It is a portable document format (PDF) file. To open this file, Adobe® Reader® software, version 7.0 or higher, is required. This software can be installed from your RESULT software CD or downloaded from the Adobe Systems, Inc. web site, www.adobe.com. (See the Adobe Reader on-line help for information about using a PDF.) ▲

Conventions used in this manual

This manual includes safety precautions and other important information presented in the following format:

Note Notes contain helpful supplementary information. ▲

Notice Follow instructions labeled “Notice” to avoid damaging the system hardware or losing data. ▲

⚠ Caution Indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury. It may also be used to alert against unsafe practices. ▲

⚠ Warning Indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury. ▲

⚠ Danger Indicates an imminently hazardous situation which, if not avoided, will result in death or serious injury. ▲

Questions or concerns

In case of emergency, follow the procedures established by your facility. If you have questions or concerns about safety or need assistance with operation, repairs or replacement parts, you can contact our sales or service representative in your area or use the information at the beginning of this document to contact us.

When the system arrives

When the system arrives, we recommend that you leave it in the unopened shipping container until the Thermo Fisher Scientific service engineer arrives to help you unpack and install it.

Notice

Only Thermo Fisher Scientific-certified service and repair engineers are authorized to qualify an installation. ValPro qualification is valid only if the instrument remains in its unopened shipping box until the Thermo Fisher Scientific service representative arrives to unpack and install it.



To prevent damage to the optical components, the shipping box must be stored at room temperature for at least 24 hours before the Thermo Fisher Scientific service representative will open it. ▲

If you did not purchase ValPro and qualified installation, you may unpack the system for inspection. To prevent damage to the instrument, the sealed shipping container must be stored at room temperature for at least 24 hours before opening it. After inspection, replace all of the components in their original shipping containers before the service representative arrives. Thermo Fisher Scientific cannot be responsible for missing components if the shipping container has been opened.

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Regulatory and Safety Information

This chapter contains a summary of the safety precautions that must be followed when using your system.

Each person who will be using the instrument should read this manual. Safety information is also included in other documentation that came with your instrument. If this equipment is used in a manner not specified by Thermo Fisher Scientific, the protection provided by the equipment may be impaired.

In many cases, safety information is displayed on the instrument itself. The illustrations in this manual show the locations of the safety labels. Should any of these labels become loose or unreadable, Thermo Fisher Scientific will supply new ones. The parts list that came with your system contains information about obtaining replacement labels.

General safety information

Each system is designed to comply with domestic and international safety regulations and applicable product standards. The table that follows lists the third party testing laboratories, regulations and product standards. System changes or modifications not expressly approved by Thermo Fisher Scientific could void your authority to operate the equipment.



Model	Regulations and product standards
Antaris II	<ul style="list-style-type: none"> • 73/23/EEC (1973) Low voltage directive • 89/336/EEC (1989) Electromagnetic compatibility directive • 2004/108/EC (2004) Revised electromagnetic compatibility directive • EN 61326 (2003) Electrical equipment for measurement, control and laboratory use - EMC requirements (Class A equipment) • US 47CFR15 Radio frequency devices (Class A digital device) • EN61010-1 (2001) Safety requirements for electrical equipment for measurement, control, and laboratory use - Part 1: General requirements (Installation category II) (Pollution degree 2) • UL61010-1 (2004) Safety requirements for electrical equipment for measurement, control, and laboratory use - Part 1: General requirements (Installation category II) (Pollution degree 2) • CAN/CSA-C22.2 NO. 61010-1 (2004) Safety requirements for electrical equipment for measurement, control, and laboratory use - Part 1: General requirements (Installation category II) (Pollution degree 2) • IEC60825-1 (2001) Safety of laser products - Part 1: Equipment classification, requirements and user's guide • US 21CFR1040.10 Performance standards for light-emitting products - Laser products



Model	Regulations and product standards
Antaris MX	<ul style="list-style-type: none"> • 73/23/EEC (1973) Low voltage directive • 89/336/EEC (1989) Electromagnetic compatibility directive • 2004/108/EC (2004) Revised electromagnetic compatibility directive • EN 61326 (2003) Electrical equipment for measurement, control and laboratory use - EMC requirements, Class A equipment • US 47CFR15 Class A radio frequency devices • EN61010-1 (2001) Safety requirements for electrical equipment for measurement, control, and laboratory use - Part 1: General requirements (Installation category II) (Pollution degree 2) • UL61010-1 (2004) Safety requirements for electrical equipment for measurement, control, and laboratory use - Part 1: General requirements (Installation category II) (Pollution degree 2) • CAN/CSA-C22.2 NO. 61010-1 (2004) Safety requirements for electrical equipment for measurement, control, and laboratory use - Part 1: General requirements (Installation category II) (Pollution degree 2) • IEC60825-1 (2001) Safety of laser products - Part 1: Equipment classification, requirements and user's guide • US 21CFR1040.10 Performance standards for light-emitting products - Laser products

ETL (ETL SEMKO, a division of Intertek Testing Services) — ETL SEMKO is an OSHA accredited Nationally Recognized Testing Laboratory (NRTL), a Standards Council of Canada (SCC) accredited Testing Organization and Certification Organization, an IECEE accredited National Certification Body, and a Notified Body for Europe that provides testing and certification services for the products. The ETL symbol indicates that the instrument has been inspected and approved by an independent testing laboratory.

CE (Conformité Européenne) — The CE mark indicates compliance with the European Union's applicable New Approach Directives. The CE mark is a self declaration and self marking process. Once a manufacturer has proven that the particular equipment meets the requirements of the CE and has collected supporting data, that equipment may be marked. Check the *Declaration of Conformity* that came with your instrument for specific information about conformity with particular European directives and standards.

FCC (Federal Communications Commission) — The FCC is an independent United States government agency, directly responsible to Congress. The FCC was established by the Communications Act of 1934 and is charged with regulating interstate and international communications by radio, television, wire, satellite and cable. The FCC's jurisdiction covers the 50 U.S. states, the District of Columbia, and U.S. possessions.

Radio frequency interference

These systems have been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the documentation that accompanied the system, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference, in which case you will be required to correct the interference at your own expense.

WEEE compliance

Many instruments are required to comply with the European Union's Waste Electrical & Electronic Equipment (WEEE) Directive 2002/96/EC. If compliance is required, the instrument is marked with the following symbol.



Thermo Fisher Scientific has contracted with one or more recycling/disposal companies in each EU Member State, and this product should be disposed of or recycled through them. Further information on our compliance with these Directives, the recyclers in your country, and information on Thermo Scientific products which may assist the detection of substances subject to the RoHS Directive are available at www.thermo.com/WEEERoHS.

Hazardous materials and infectious agents

Instruments, components, accessories and other associated materials may not be returned to Thermo Fisher Scientific or other accessory manufacturers if they are contaminated with radioactive or other hazardous materials, infectious agents, or any other materials and/or conditions that could pose a health or injury hazard to employees.

Contact technical support if you have questions about decontamination requirements. If you live outside the U.S.A., contact your local Thermo Fisher Scientific office.

Fire safety and burn hazards

To avoid a burn injury and the risk of fire or explosion, follow these guidelines:

- Use only nitrogen or dried air to purge your instrument and accessories.
- After you turn off your instrument, wait 5 minutes for internal components to cool before you replace components.
- Use exact replacements for bulbs, fuses and power supplies.
- Never block the vents on the rear panel of the instrument.

The following symbols may appear inside the instrument or on heated accessories to warn you about hot surfaces in the vicinity of the symbol.



The following Cautions and Warnings provide additional information about fire safety and preventing burn hazards.

Caution

The near-infrared source bulb may be very hot. It stays hot for up to 5 minutes after you turn off your instrument. To avoid being burned or starting a fire, handle the source assembly only by the exterior handle. Your User's Guide shows the location of the near infrared source inside your instrument. ▲

Warning

Avoid shock and fire hazards. Always use an exact replacement for the fuses, bulbs, and power supplies. ▲

Note Touching the HeNe laser poses no burn hazard. If you must replace the laser assembly, you can begin the procedure immediately after turning off the instrument power. ▲

⚠ Danger Never use a flammable gas to purge the instrument. Heat from the source or internal electrical components could ignite a flammable gas. The purge gas must be free of moisture, oil and other reactive or infrared-absorbing materials. ▲

Protective housing

A protective housing covers each instrument and sampling module. This protects you from exposure to harmful laser or NIR radiation and from electrical hazards. Never operate the instrument while the housing is damaged or removed from the instrument.

⚠ Caution If a protective cover on the instrument or computer appears damaged, turn off the system and secure it against any unintended operation. Always examine the protective cover for transport stresses after shipping. ▲

Cleaning the instrument

If the outside of the instrument needs cleaning, turn off the power and disconnect the power cord from AC power. Then use a damp (not wet), soft cloth and a mild soap to clean the outside of the instrument. Do not use harsh detergents, solvents, chemicals or abrasives; these can damage the finish. See the section entitled “Powering On” for information about the proper sequence and procedure for powering the instrument and other system components on and off.

⚠ Warning Avoid shock hazard. Do not allow cleaning solutions or liquids to run into the instrument. ▲

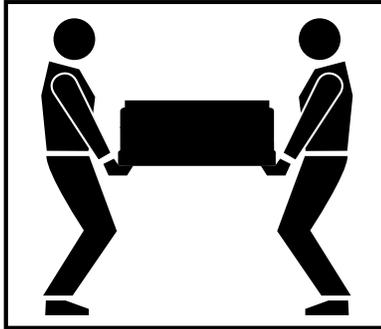
Note Do not use harsh detergents, solvents, chemicals or abrasives; these can damage the finish. Do not attempt to clean or even touch the mirror surfaces inside the instrument. These front-surfaced mirrors are easily scratched. Dust will not harm the near-infrared signal, but fingerprints and scratches can degrade spectral performance or permanently damage the mirrors. ▲

Lifting or moving the instrument

FT-NIR instruments can be heavy. To avoid risk of injury, use proper lifting techniques when lifting or moving the instrument or other system components.

Warning

These instruments cannot be lifted safely by a single person. When lifting or moving an instrument get a second person to help you.



Avoid electrical and crush hazards. Be sure to lift from each side of the instrument, not the front and back. ▲

Notice

Always support the instrument baseplate from underneath when lifting or moving these instruments. Grasping the power supply on the rear panel of the instrument when lifting will damage the instrument. Damage caused by improper lifting is not covered by warranty. ▲

Electrical safety

Your system was designed with protective covers to prevent exposure to dangerous voltage and other electrical hazards. If you see either of the following symbols on your system, there is a risk of electric shock in the vicinity of the symbol.



⚠ Warning Before servicing the instrument, turn off the power and disconnect the power cord from AC power. ▲

⚠ Caution Even after the instrument has been disconnected from all voltage sources, capacitors may remain charged for up to 30 seconds. ▲

You may also see one or more symbols on or near switches and connectors on your instrument. These symbols are often used to identify connectors or help you to locate user-replaceable fuses.

The table that follows shows the symbols and lists the meaning of each. Check the documentation that came with your instrument if you find a symbol that is not included in the table.

Symbol	Description
	Alternating current
	Earth terminal or ground
	Protective conductor terminal
	Fuse
	Power on
	Power off
	To prevent injury, refer to the accompanying documentation

Electrical service

Check the line voltage and frequency at the wall outlet or other AC source that will be used for the instrument before you connect the instrument or turn on the power. This should be done when the system is installed and any time the system is moved or connected to another AC source. Specific service requirements are included in the section entitled “Specifications”, later in this guide.

Danger

To avoid injury, only a qualified person using the appropriate measuring device should check the line voltage, current and line frequency. ▲

Power supplies

These FT-NIR instruments receive power from a power supply, which is mounted on the back panel of the analyzer and can adjust to a variety of AC voltages (90 – 246 VAC) and line frequencies (47 – 63 Hz) automatically.

Warning

Avoid shock and fire hazards. Always use an exact replacement for the fuses, bulbs, and power supplies. ▲

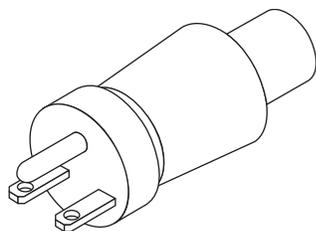
Power cords

You must be sure to use an appropriate power cord for your specific electrical service. The power cord supplied with the analyzer is a 3-wire, grounded power cord, appropriate for use in the country listed as the shipping destination for the system. If the power cord you received is not appropriate for the electrical system at your site, contact Thermo Fisher Scientific Customer Support or your local Thermo Fisher Scientific office and order a new power cord. The illustrations on the next page show the power cord styles that are available from us.

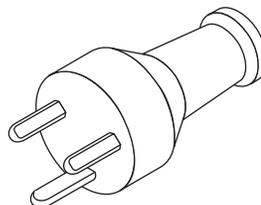
If the power cord becomes damaged, replace it. Contact technical support if you need additional information about replacement cord specifications.

Warning

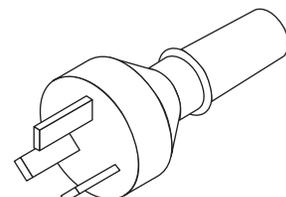
Prevent shock hazard. Do not remove or defeat the ground prong on the power cord. Always use a grounded outlet. ▲



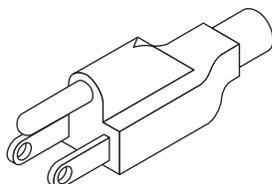
North American 220 Volt
Plug Style: NEMA 6-15



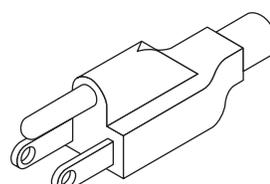
Danish
Plug Style: Afsnit 107-2-01



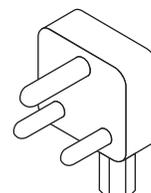
Australian
Plug Style: AS 3112



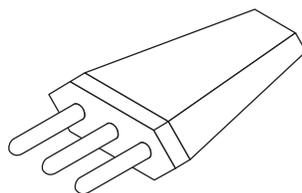
North American grounded plug
Plug Style: NEMA 5-15



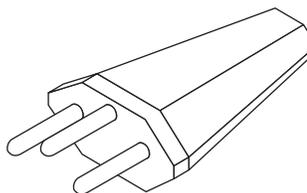
Japanese
Plug Style: JIS 8303



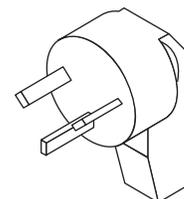
Indian, South African,
old British
Plug Style: BS 546



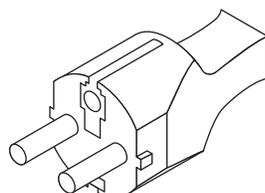
Italian
Plug Style: CEI 23-16/VII



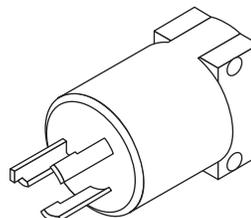
Swiss
Plug Style: SEV 1011



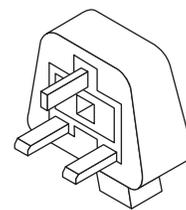
Israeli
Plug Style: SI 32



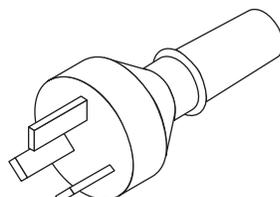
Continental Europe
or Schuko
Plug Style: CEE7/7



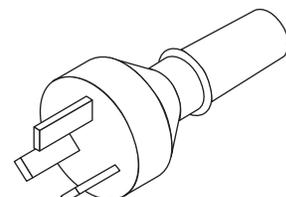
North American
220 Volt locking
Plug Style: NEMA L6-15



British or
United Kingdom
Plug Style: BS 1363
with a 13 amp fuse



Argentinean
Plug Style: IRAM 2073

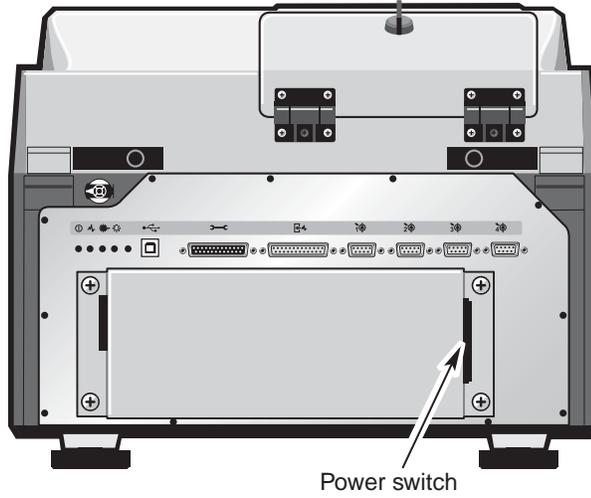


Chinese
Plug Styles: GB2099-1
and GB1002-1

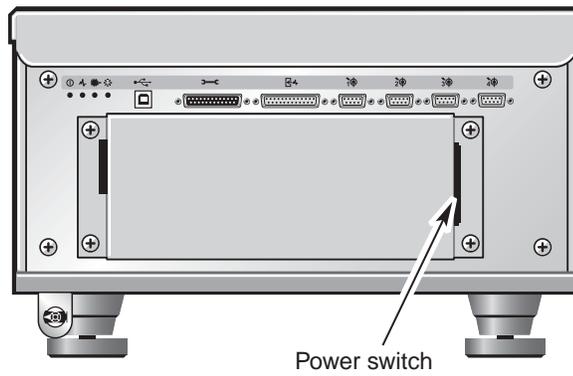
Powering on and off

Power on the instrument by pressing the power switch on the rear panel.

I = on
O = off



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To power off the instrument:

1. Close any software applications that are open and then log off.
2. Shut down the computer.
3. Move the printer power switch to the off position.
4. Move the instrument power switch to the off position. Leave the power supply connected unless you will be servicing the instrument.

Fuses

Two fuses protect the power supply from excessive current. Use replacement fuses which meet the following specifications:

Warning

Avoid shock hazard and overheating. Always use an exact replacement for the fuse. ▲

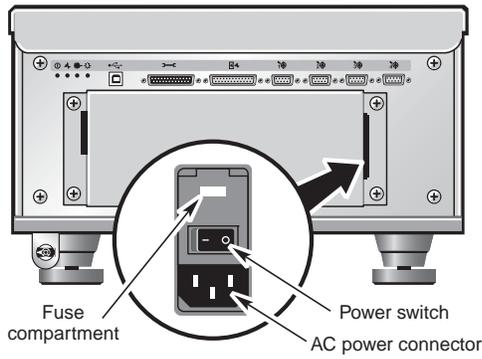
Fuse characteristic	Specification
Current (max)	2 A
Voltage	250 V
Size	6.3 mm x 32 mm 0.25 in x 1.25 in
Action	Fast acting

Warning

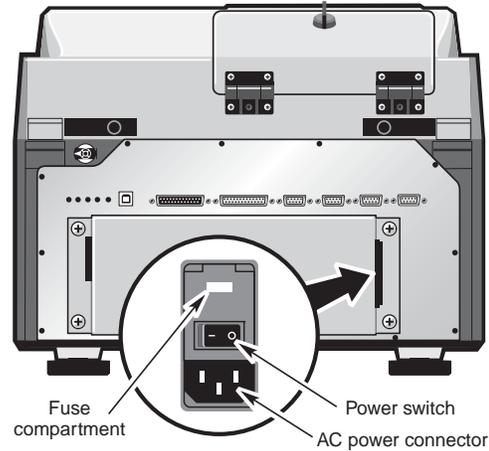
To avoid the risk of electrical shock, always turn off the instrument and disconnect it from the wall outlet or power strip before changing fuses. ▲

To change fuses:

- 1. Move the power switch to the off position and then disconnect the power cord from the wall outlet or power strip.**



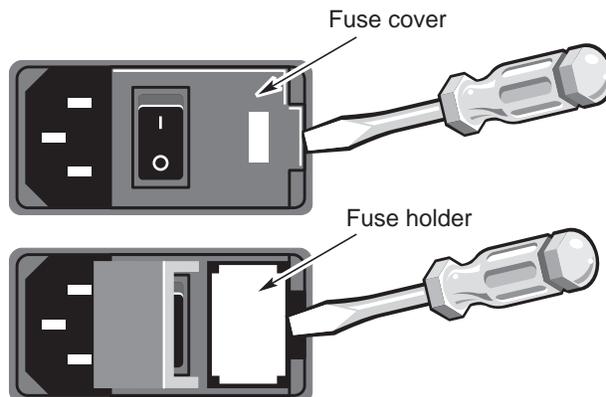
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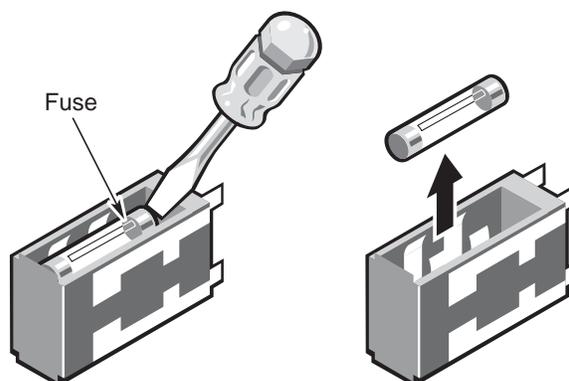
- 2. Remove the fuse holder from the fuse compartment.**

Use a 1/8 in flat-blade screwdriver to pry the fuse cover open, and then pry the fuse holder out of the fuse compartment.



3. Remove a fuse from the holder.

To remove a fuse, use a 1/8 in flat-blade screwdriver to pry the fuse loose from the fuse holder, and then lift it out of the holder.

**4. If a fuse needs to be replaced, remove it from the fuse holder and replace it with a new fuse of the correct type and amperage rating.**

If you need to replace the fuses, use only 6.3 mm x 32 mm (0.25 in x 1.25 in), 2A, 250 VAC, fast-acting fuse.

5. Push the fuse holder back into the fuse compartment until it is completely inserted, and then close the fuse cover.**6. Reconnect the power cord and turn on the power by pressing the power switch on the rear panel of the instrument.**

Optical safety

These instruments are Class I laser products that emit laser and NIR radiation. More than 80 percent of the laser light is lost as it passes through the instrument optical components. This makes the accessible laser radiation very low, less than $10\ \mu\text{W}$ of continuous power. The NIR radiation, however, is very bright, very intense and exposure can be harmful.

The accessible laser radiation levels are below Class I limits defined by the United States Department of Health and Human Services and the International Electrotechnical Committee (IEC).

The laser source in these systems is a helium/neon (HeNe) laser head.

Warning

Never stare into the laser beam or at its bright reflection. Never tamper with the laser head on the main laser assembly, even if you are replacing a defective laser. Injuries from exposure to laser light or high voltage may result. ▲

Caution

Do not stare into the sample window of an Integrating Sphere, the sampling tip of a fiber optic probe, or the fiber optic probe connectors on the front panel of the instrument. Injuries from exposure to intense NIR light may result. ▲

The United States Department of Health and Human Services warns against improper use, as follows:

Warning

Use of controls or adjustments or performance of procedures other than those specified in the User's Guide for these instruments may result in hazardous radiation exposure. ▲

Manufacturer's laser information

In some jurisdictions you may be required to register the instrument; check with your company's safety officer or your local government offices. The following is an excerpt from the laser manufacturer's manual regarding the information that might be needed for registration.

Characteristic	Specification
manufacturer	Melles Griot
type of laser	helium/neon (HeNe)
wavelength	632.8 nm
minimum power	0.9 mW (TEM00)
nominal power	1.0 mW
maximum power	1.6 mW
beam diameter	0.65 cm (1/e ²)
beam divergence	1.5 mrad max
spacing C/2L	1039 MHz
internal operating voltage	1600 VDC
CDRH classification	IIIa

Status indicators

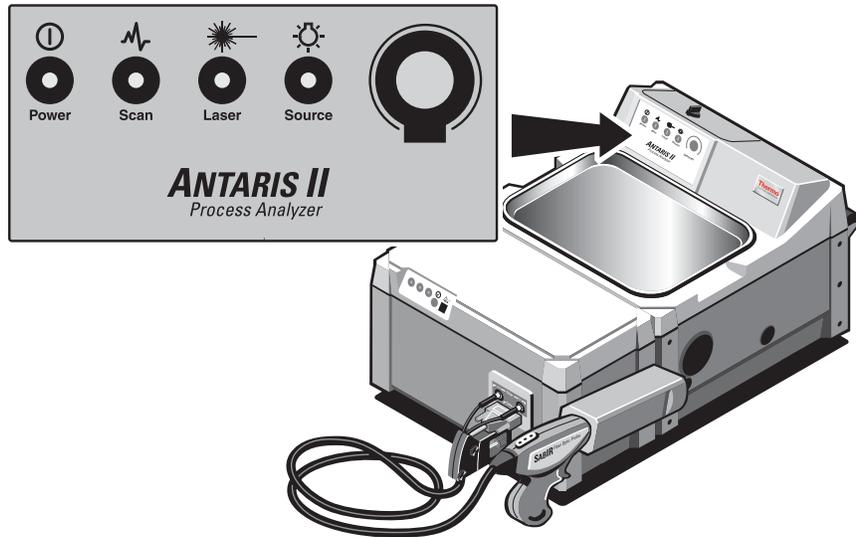
The status indicators show the current status of the instrument.

Power — This indicator lights when the instrument power is on and the power supply voltage is within specifications.

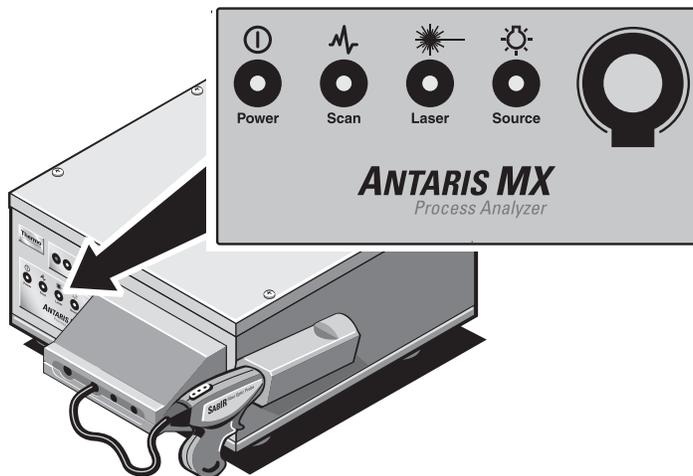
Scan — This indicator flashes with each scan of the interferometer.

Laser — This indicator lights when power is supplied to the laser and it is operating within specifications.

Source — This indicator lights when the source is illuminated and it is operating within specifications.



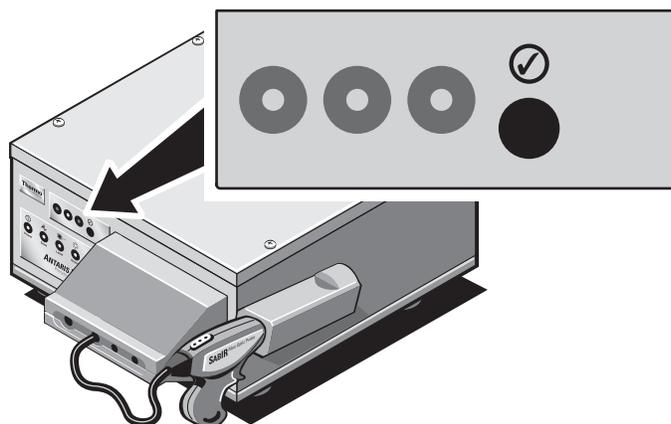
Antaris II



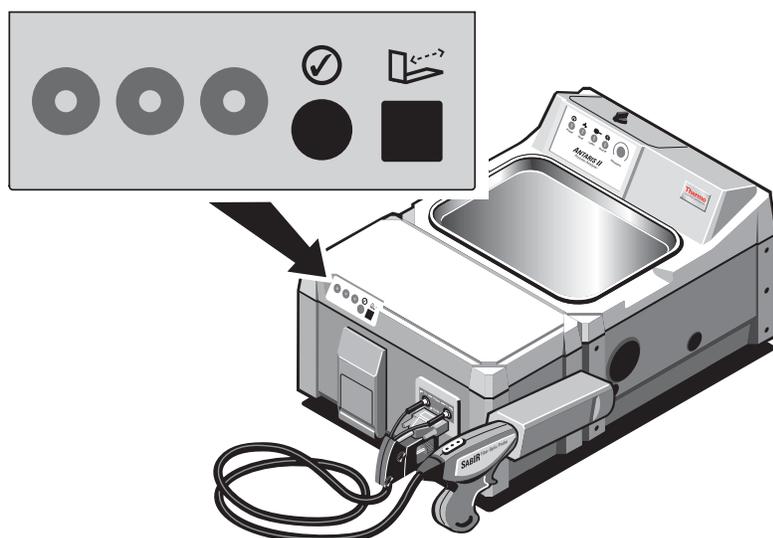
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Operation panel

The operation panel contains indicators that alert the operator to take an action. The round green button allows the operator to initiate an action. If your instrument is equipped with a transmission module, a square black button ejects and retracts the module.



Antaris MX



Antaris II

A flashing light indicates when the operator needs to pay attention to the system monitor. A light on steadily indicates that the operator can initiate the action described on the computer monitor by pushing the green button (or choosing the default button on the computer screen).

Corrosives, solvents, and pressurized gases

Many standard spectroscopy methods are based on the use of solvents. Some experiments involve corrosive or pressurized samples in a gaseous state. All these sample materials can be measured using your instrument, but special precautions must be taken.

Pressurized gases

Pressurized gases may be used for instrument purge, sampling and/or optional cooling devices. The following are general guidelines for the safe use and storage of compressed gases. Check with your fire, public safety, and other regulatory authorities for specific requirements for your location. See the section entitled “Specifications” later in this guide for specific cryogenic and purge gas requirements.

- Wear eye protection when working with or near pressurized lines and cylinders.
- When handling toxic and hazardous gases, be sure the work area is properly ventilated through a non-sparking fume hood, glove box, or ventilated cabinet
- Leave valve protective caps in place until the cylinder is connected to a regulator or manifold. Never lift a cylinder by the cap.
- Always provide a legible label or marking to identify the contents of a cylinder and any precautionary warnings.
- Inspect the cylinders regularly for corrosion, valve damage or leaks, and evidence of tampering. Never use a flame to detect flammable gas leaks.
- Regulate the flow of gas from the gas source into the instrument so that the pressure and flow rate never exceed the specifications for the instrument or cooling device.

Danger

Never use a flammable gas to purge an instrument. Heat from the source or from laser absorption could ignite the gas. The purge gas must be free of moisture, oil and other reactive materials. Use only clean, dried air or nitrogen to purge the instrument. Other gases, even inert gases such as argon (AR), can damage the instrument. ▲

Danger

Nitrogen gas (used to purge systems designed with hazardous location protections) accumulates in the enclosure creating oxygen deficient areas. Wait at least one minute (for breathable air to enter the enclosure) before beginning work on internal components. ▲

Caustic agents

Components may be degraded by exposure to caustic agents or their vapors. To maintain the instrument in safe working condition, avoid caustic agents. Damage caused by caustic agents is not covered by warranty.

Volatile solvents

If you use volatile solvents regularly, purging the instrument with clean, dried air or nitrogen is strongly recommended. Damage caused by volatile solvents is not covered by warranty. Also, to avoid fire or explosion:

- Do not leave exposed solvents near, in, or on the instrument longer than necessary.
- Use sealed sample cells.

These measures help prolong the life of your instrument and can eliminate spectral interference caused by volatile solvent vapors.

▲ Danger

Prevent fire and explosion. The infrared source inside the instrument is an ignition source. If you are using volatile solvents, provide a fume hood or other active venting system that is free of spark and other ignition sources and prevents flammable vapors from collecting in the atmosphere surrounding the instrument. ▲

Solvents containing halogenated hydrocarbons

Chlorinated solvents, perfluorochlorinated solvents, and other materials containing halogenated hydrocarbons are often used as FT-NIR solvents. The pyrolysis of these solvents by a near-infrared source may produce hydrochloric acid (HCl), hydrofluoric acid (HF), or phosgene (COCl₂).

Hydrochloric acid and hydrofluoric acid are highly corrosive and may cause accelerated corrosion of the metallic components in the instrument if the seal on the optical compartment is not properly maintained or the concentration level of corrosive gasses in the air is excessively high due to improper sampling techniques.

▲ Warning

Hydrochloric acid, hydrofluoric acid and phosgene are highly toxic and reactive. If you plan to regularly use solvents containing halogenated hydrocarbons, be sure your work area is properly ventilated and maintain appropriate safety practices. ▲

Solvents containing halogenated hydrocarbons should not be left in or on any of the sampling modules longer than necessary.

Safety labels

The illustrations in this section show the locations of the laser safety labels attached to the instrument. Should any labels come loose or become unreadable, Thermo Fisher Scientific will supply new ones. The parts list that came with your system contains information about obtaining replacement labels.

Antaris II

~	AC Voltage	90-264 VAC
	Frequency	47-63 Hz
	Current	1.7A
⚡	Fuses	2A

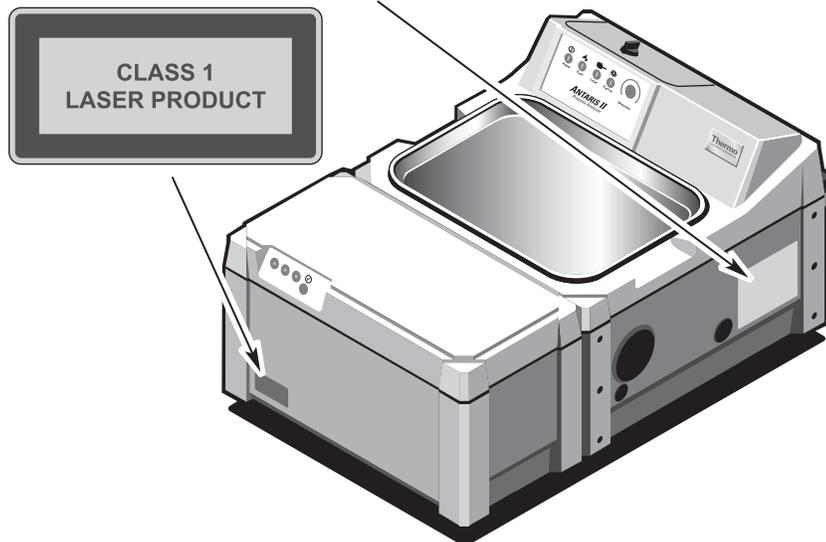
Antaris II Analyzer Series

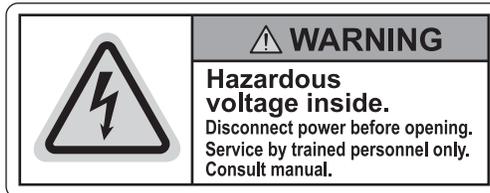
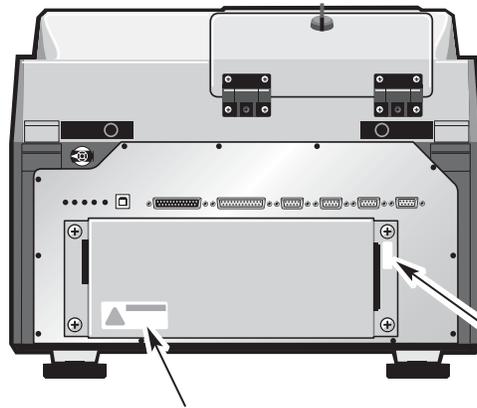
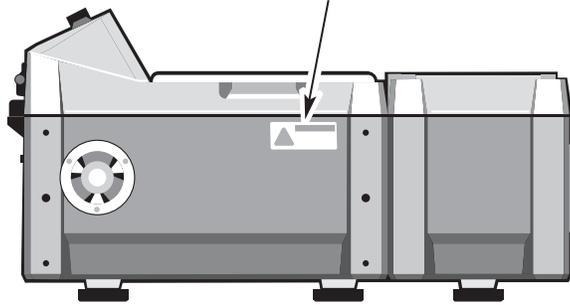
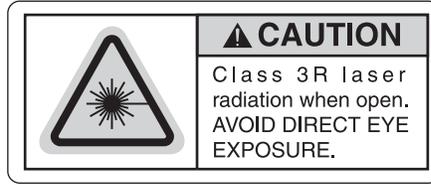
Thermo Thermo Electron Corp., 5225 Verona Road
ELECTRON CORPORATION Madison, WI. 53711 Made in USA

This Class I laser product complies with IEC60825-1: 1993+A1:1997+A2:2001 and the DHHS/CDRH requirements of US 21CFR1040.10 including Laser Notice No. 50 of July 26, 2001.

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

US Patent 6,667,808 Warranty VOID if serial number is removed.



Antaris MX

~	AC Voltage	90-264 VAC
	Frequency	47-63 Hz
	Current	1.7A
⊞	Fuses	2A

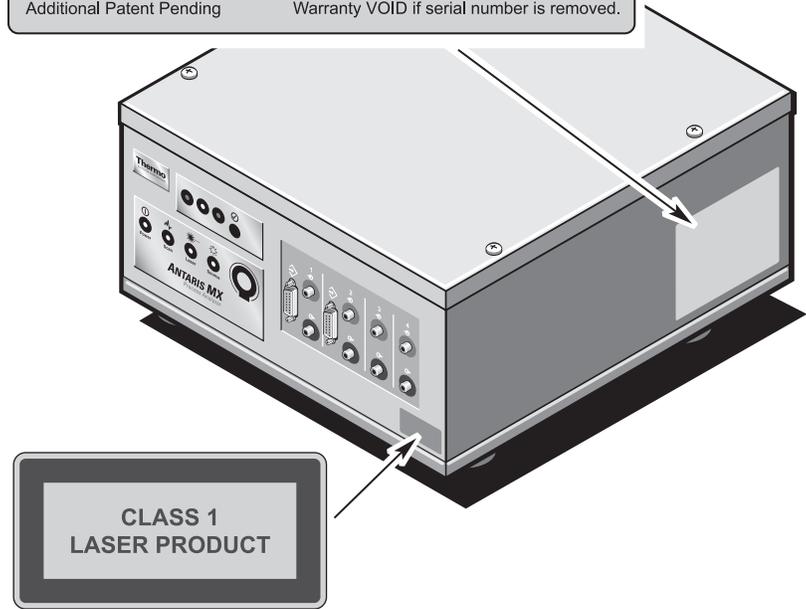
Antaris MX Process Analyzer

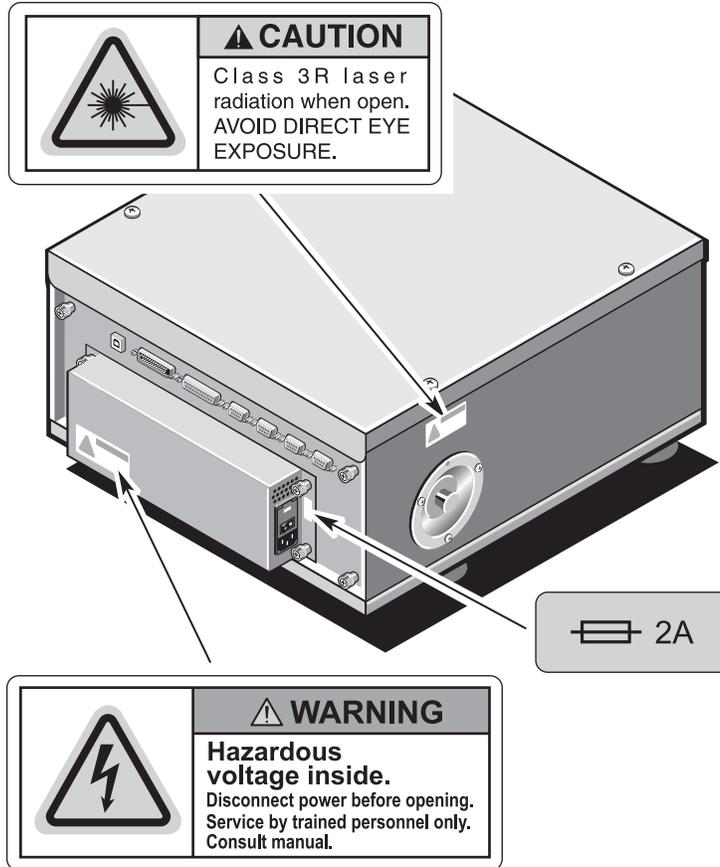
Thermo Thermo Electron Corp., 5225 Verona Road
ELECTRON CORPORATION Madison, WI. 53711 Made in USA

This Class I laser product complies with IEC60825-1: 1993+A1:1997+A2:2001 and the DHHS/CDRH requirements of US 21CFR1040.10 including Laser Notice No. 50 of July 26, 2001.

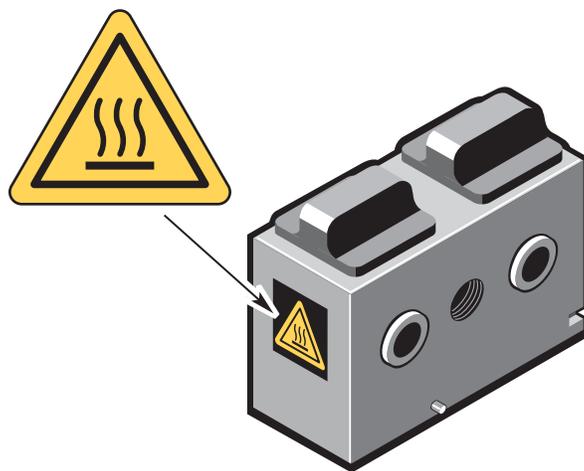
This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

US Patent 6,667,808
Additional Patent Pending Warranty VOID if serial number is removed.



Accessories



Heated cell

Location

Consider these points when planning the location of your system:

- If possible, choose a site easily accessible by Thermo Fisher Scientific personnel and have a telephone near the system. Should the system require technical support or service, these measures will save time.
- Be sure an AC power source is nearby. The instrument has a power cord approximately 2.5 m (8 ft) long.
- Be sure the installation surface is rigid, within 2 °° of level, and capable of supporting twice the instrument weight.
- While vibration will not damage the instrument, excessive vibration may compromise spectral quality and measurements.
- Make sure the system will fit in the work space you choose. Compare the work space with the dimensions shown in the next section and in the “Utility Requirements” chapter.
 - Leave adequate clearance around the system. Access covers must be able to open fully for maintenance and service.
 - Place the system at a height that allows you to work comfortably.

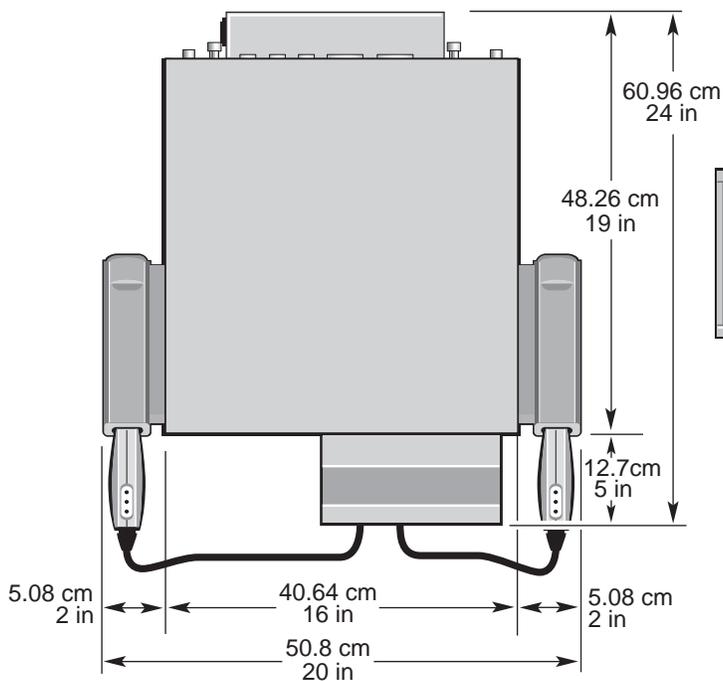
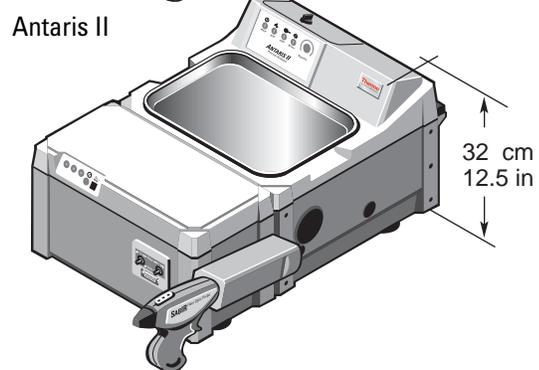
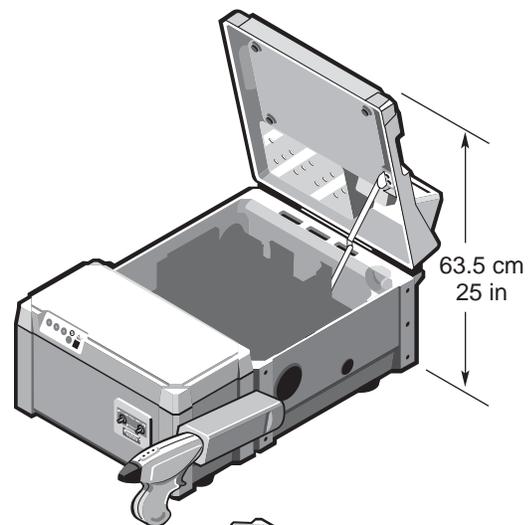
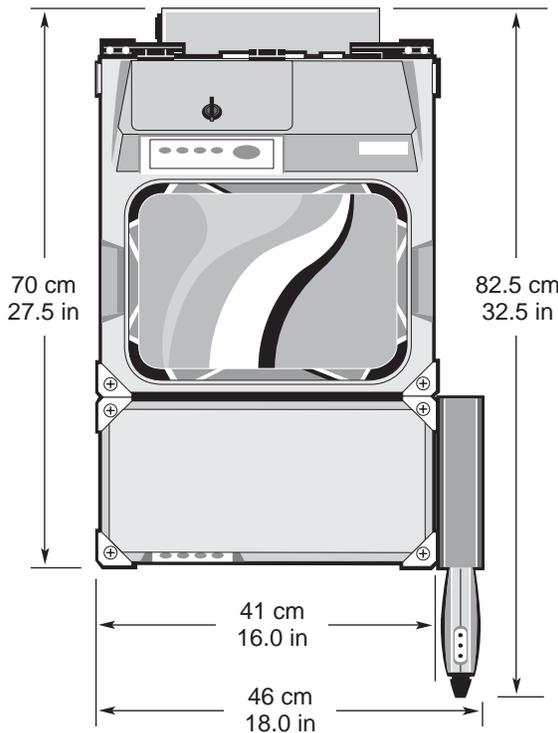
Computer access

Thermo Fisher Scientific service engineers must be allowed access to the computer controlling the system during installation. System administrators have three options

- Set up a Windows logon account with administrative rights to the computer, allowing the service representative to run RESULT software.
- Set up a local logon account with administrative rights to the computer, so that the service representative only can log onto that computer with no network access.
- For customers who are obliged by FDA regulations to limit logons to the system, the network administration or other designated person may log on personally and remain present while the service representative installs the instrument and/or performs maintenance or service functions.

System dimensions

A standard table depth of 76 cm (30 in) will accommodate either of these instruments and any combination of accessories. Be sure the installation surface is rigid, within 2 °° of level, and capable of supporting twice the instrument weight.



Top view Antaris MX
with fiber optic cable strain relief



Front view Antaris MX
without fiber optic cable strain relief
or SabIR holsters

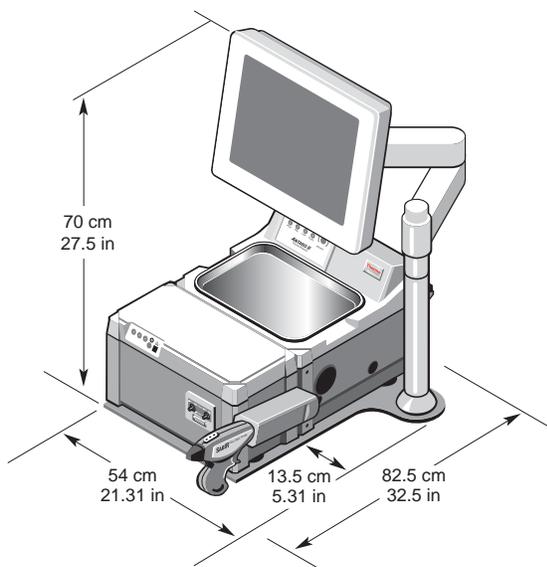
Note Your instrument may look somewhat different, depending on the configuration. ▲

You also must plan space for the computer, monitor and keyboard. Place the computer near the instrument. Standard 3 m (10 ft) data cables connect instrument to the computer. This distance can be extended using optional data cable extenders. Contact technical support for additional information.

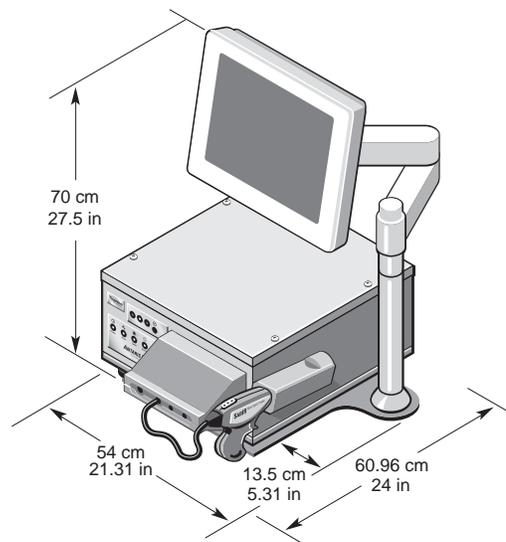
Both desktop and integrated computers are available. Typical computer component dimensions follow.

Item	Height	Width	Depth
Integrated computer (includes monitor)	38 cm (15 in)	30 cm (12 in)	5 cm (2 in)
Desktop computer	48 cm (19 in)	21.5 cm (8.5 in)	46 cm (18.5 in)
Monitor	40 cm (15.5 in) 56 cm (22 in) extended	38 cm (15 in)	22 cm (8.5 in)
Keyboard	6 cm (2.5 in)	48 cm (19 in)	19 cm (7.5 in)

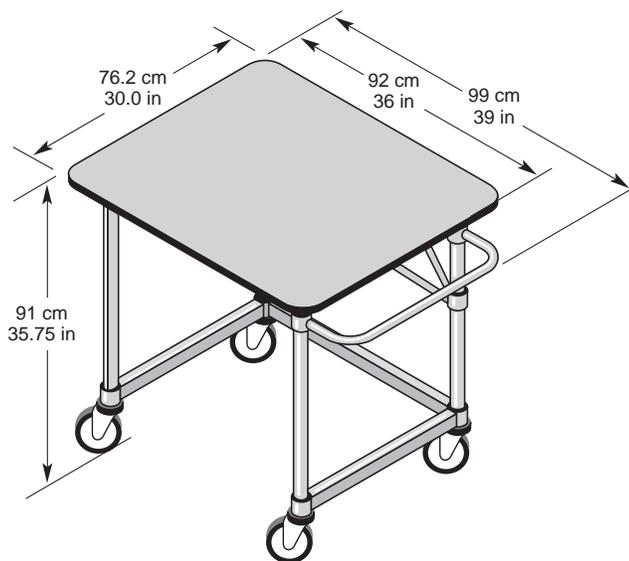
Instruments with an integrated computer may be installed on a table-top, shelf or wheeled cart. The illustrations below provide the additional spatial requirements for integrated computer systems.



Antaris II with integrated computer



Antaris MX with integrated computer

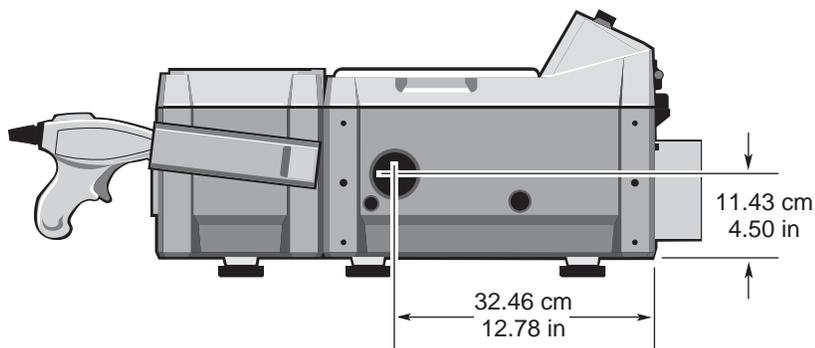


Antaris wheeled cart

Model/installation	depth	width	height
Antaris II			
table top or shelf	82.5 cm (32.5 in)	59.5 cm (23.5 in)	70 cm (27.5 in)
cart	92 cm (35 in)	76 cm (30 in)	161 cm (63.4 in)
Antaris MX			
table top or shelf	61 cm (24 in)	60 cm (23.7 in)	70 cm (27.5 in)
cart	92 cm (35 in)	76 cm (30 in)	161 cm (63.4 in)

External beam port

A beam port on the right side of some models allows you to direct the NIR beam to external samples. Optional optical and mechanical parts are required if you plan to use this capability.



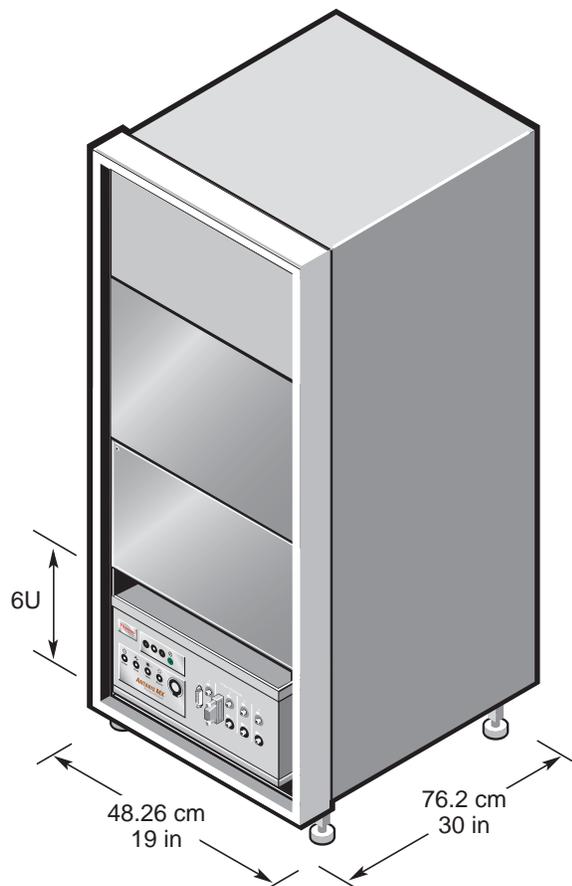
Required clearances

There must at least 63.5 cm (25 in) of clearance above the base of the instrument so that the compartment covers can be fully opened and to allow access to internal parts during servicing.

For instruments with integrated computers, provide an additional 38 cm (15 in) clearance on the pole-mount side during servicing.

Rackmount considerations

The instrument, can be equipped for installation as roll-out components in a standard 30 in (76.2 cm) rack enclosure that meets the EIA Rs-310C, 19 in (48.26 cm) rackmount standard. Six standard rack units (6U) are required for the instrument.



Tip hazard

Due to its weight, the instrument can pose a rack enclosure tip hazard unless appropriate anti-tip extensions, feet, or anchors are in place. Use the information that follows to have them designed by your rack enclosure manufacturer or a qualified structural engineer prior to the installation of the instrument. The structural engineer who designs your restraints will need the weight information for the instrument components and any other items installed in the rack enclosure.

The table that follows lists the weights of rackmount components.

Component	Weight	
Antaris II analyzer	60 kg	131 lb
Antaris MX analyzer	26 kg	57 lb
Rack drawer (includes rails and fasteners)	15 kg	32 lb

Vibration isolation

The rollout drawer is designed to isolate the instrument from minor vibrations caused by power supplies and small moving parts. Do not install vacuum pumps, compressors, clean air or purge gas generators/driers or other motor-driven devices in the same rack enclosure as the instrument system. Motor-driven devices should be installed in a separate enclosure or on a solid, level floor near the instrument enclosure. Vibrations from the motors, compressors, and pumps can distort your spectral data.

Enclosure environment

To prevent damage to the instrument, you must provide cooling and desiccating devices and maintain ambient temperature and humidity inside the rack enclosure as follows.

Temperature — 15 °C and 35 °C (59 °F and 95 °F)

Humidity — 20 % to 80 % noncondensing

Cooling and desiccating devices must be available for the service engineer at the time of installation. Damage to the instrument from improper environmental controls is not covered under warranty.

Environmental Considerations

Environmental considerations include temperature, humidity, vibration, magnetic fields, and static electricity.

Temperature

Frequent fluctuations in temperature may result in long-term drift in the system response.

	Minimum	Maximum
Safe operating	15 °C (59 °F)	35 °C (95 °F)
Optimal performance	20 °C (68 °F)	22 °C (72 °F)
Shipping and storage	-20° to (-4 °F).	50 °C (122 °F)

Avoid placing the instrument near heating or air-conditioning ducts, or areas where the workspace temperature may exceed recommended limits. Keep sources of heat, such as hot plates and heating mantles, away from the instrument.

Humidity

Excessive exposure to moisture may degrade components inside the enclosure. For instruments that are not purged or desiccated, humidity must be maintained at 20% to 50% noncondensing. For instruments that are purged or maintained with fresh desiccant, the following specifications apply.

	Minimum	Maximum
Safe operating	5 % noncondensing	95 % noncondensing
Optimal performance	20 % noncondensing	80 % noncondensing
Shipping and storage	5 % noncondensing	95 % noncondensing

These instruments are typically sealed and desiccated. This provides a moderate level of protection against environmental humidity. However, in environments with high humidity, we recommend that you purge the instrument with dry air or nitrogen and avoid rapid temperature changes that may cause condensation. (We provide instructions for optional purge later in this manual.)

Notice Whenever the instrument has been stored or shipped, immediate exposure to room air can cause condensation damage. *Allow 24 hours for the package to slowly warm to room temperature before opening it.*

If you move the system, protect the instrument from extreme changes in temperature and humidity by resealing it in the protective packaging that the instrument was originally shipped in. Extreme changes in temperature and humidity may cause moisture condensation, which can permanently affect the optical components. ▲

Vibration isolation

Extreme floor vibration or acoustical noise from heavy manufacturing equipment or other sources can affect the performance of your instrument. Minimize or eliminate excessive noise and vibration wherever possible.

The rollout drawer in rack-mounted systems is designed to isolate the instrument from minor vibrations caused by power supplies and small moving parts. Do not install vacuum pumps, compressors, clean air or purge gas generators/driers or other motor-driven devices in the same rack enclosure as the instrument. Motor-driven devices should be installed in a separate enclosure or on a solid, level floor near the instrument enclosure. Vibrations from the motors, compressors, and pumps can distort your spectral data.

Magnetic field and radio frequency immunity

Intense magnetic fields, such as those produced by superconducting magnets, can affect system performance. The instrument should be at least 5.5 m (18 ft) away from these fields. Minimize or eliminate exposure to magnetic fields wherever possible.

These instruments comply with the emissions testing required by IEC 613265. This electromagnetic compatibility test standard outlines testing and measurement techniques for radiated radio-frequency electromagnetic field immunity. Further, they are Class A digital devices as defined by US 47CFR15.

Static electricity

Since static electricity can destroy electronic components, your system was designed to meet the international standard: IEC 61326. This electromagnetic compatibility standard outlines testing and measurement techniques for static discharge immunity.

If you have trouble with static electricity in your facility, protect your system (especially when you are servicing or handling components inside the instrument) by following your company's established guidelines for reducing electrostatic discharges.

Ventilation

There are no special ventilation requirements for an Antaris system. The types of analyses you plan may require special ventilation (for example, if you will be analyzing highly toxic samples or dissolving your samples in solvents that interact with infrared sources). Chlorinated solvents, perfluorochlorinated solvents, and other solvents containing halogenated hydrocarbons are often used as FT-NIR solvents. The pyrolysis of these solvents by a near-infrared source may produce hydrochloric acid (HCl), hydrofluoric acid (HF), or phosgene (COCl_2).

Hydrochloric acid and hydrofluoric acid are highly corrosive and may cause accelerated corrosion of the metallic components in the instrument if the concentration level of corrosive gasses in the air is excessively high due to improper sampling techniques.

⚠ Warning Hydrochloric acid, hydrofluoric acid and phosgene are highly toxic and reactive. If you plan to regularly use solvents containing halogenated hydrocarbons, be sure your work area is properly ventilated and maintain appropriate safety practices. ▲

Be sure to provide storage space for solvents containing halogenated hydrocarbons that is away from the instrument; they should not be left in or on any of the sampling modules for an extended time, and the instrument must be purged while the solvents are used. An optional purge kit is available from Thermo Fisher Scientific.

Utility Requirements

If possible, the power connections for the system should be easily accessible for service purposes. You should have direct control over the electrical and purge gas supply to the instrument.

Note It is important to have all utilities installed before the system arrives. Utility installations must comply with local building and safety codes. ▲

Electrical requirements

Power supplied to the system should be from dedicated, uninterrupted sources. Power must be free of voltage dropouts, transient spikes, frequency shifts and other line disturbances that impair reliable performance. Each wall outlet you use must be equipped with a 3-wire line: live, neutral and ground. If you suspect power quality problems at your site, or if your system will be installed in a heavy industrial environment, we recommend that a power quality audit be performed before installation. Contact Thermo Fisher Scientific or your local electrical authority for more information.

▲ Danger To assure a good ground connection and avoid shock hazard, do not use an outlet that is connected to a conduit ground. The ground must be a non-current carrying wire connected to earth ground at the main distribution box. ▲

Your instrument was designed to meet the international standard IEC 61326 requirements for electrical fast transient burst immunity, surge immunity, and conducted radio frequency noise immunity.

Power line conditioning accessories

Uninterruptable power supplies (UPS) are available from Thermo Fisher Scientific. A UPS reduces the odds of a system shutdown if power is lost elsewhere in the building. Power line conditioners (which ensure that your service is free from sags, surges or other line disturbances) also are available in the U.S.A. from Thermo Fisher Scientific for 120-volt operation. Line conditioners for 100- or 230-volt operation can be purchased locally. Contact Thermo Fisher Scientific customer support for information about power conditioners and uninterruptable power supplies.

Power consumption

Generally, 50 % more power should be available than the entire system (including accessories) typically uses. See the section entitled “Specifications,” for maximum power consumption and heat dissipation specifications. The values are approximate.

Telephone

If possible, install a telephone with an outside line near the instrument. Should you require assistance from Thermo Fisher Scientific, being able to use the phone while operating the instrument will save time.

Purge gas

Standard instruments are sealed and desiccated to prevent damage to optical components from environmental humidity and corrosive solvents. If your instrument environment is excessively humid (above 95 % non-condensing) or contaminated by routine use of potentially corrosive solvents or other agents, we recommend that you purge the instrument. Purging (forcing dried air or nitrogen through the instrument to eliminate water vapor and other airborne contaminants) will better protect the system’s internal components.

Caution

The interaction of chlorinated solvents, perfluorochlorinated solvents or other solvents containing halogenated hydrocarbons (for example, Freon®) with a near-IR source can corrode instrument components. Do not leave exposed solvents around the instrument any longer than necessary. ▲

Notice

When using the fiber optic probes, cap all unused fiber optic input and output ports to maintain system purge. ▲

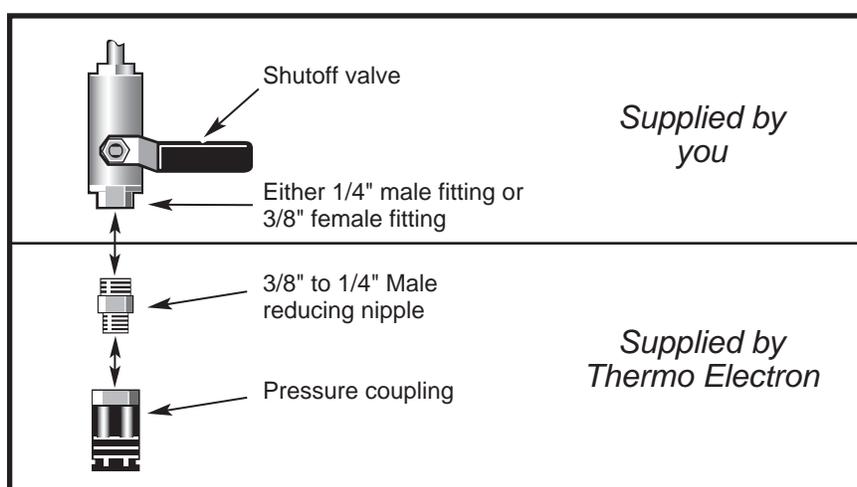
Use only clean, dry air or nitrogen for purge gas. Purge gas must be free of moisture, oil and other reactive materials.

▲ Danger

Never use a flammable gas to purge the instrument. Heat from the source or from laser absorption could ignite the gas. Use only nitrogen or clean, dried air to purge the instrument. Other gases, even inert gases such as argon (Ar), can damage the instrument or cause the near infrared source to overheat. ▲

Fittings

If you ordered the purge kit option for your instrument, install the purge line and the necessary fittings before the system arrives.



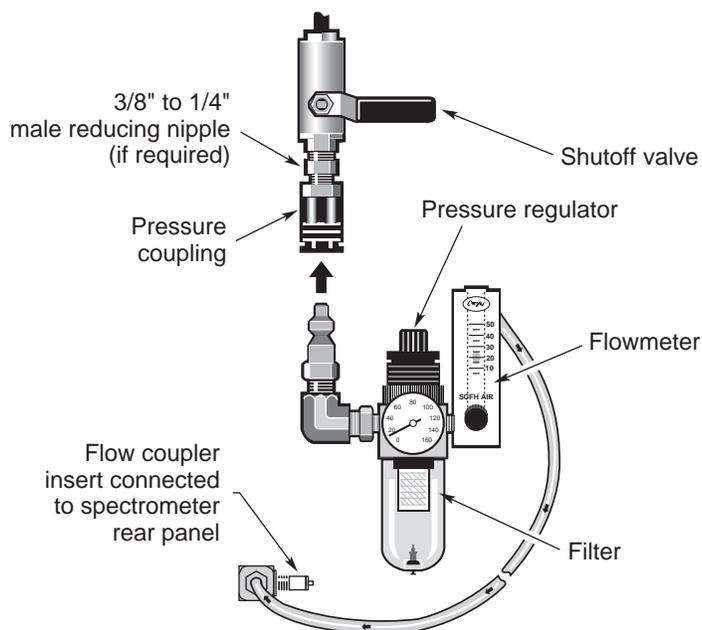
Install the source line within 10 ft of the proposed location for your instrument. The line must be installed vertically to ensure that the pressure gauge scale does not tilt when the gauge and regulator assembly are attached later. This prevents moisture from accumulating in the system.

Once the line is installed, attach:

- a shutoff valve
- a 1/4-inch male fitting or a 3/8-inch female fitting

The rest of the purge equipment (including the reducing nipple, pressure coupling, pressure regulator, and flow meter) will arrive with the instrument. The illustration below shows how the equipment will be connected between the pressure coupling and the instrument.

If you installed a 1/4-inch male fitting, when your instrument arrives, you will need a 1/4-inch open-end wrench to attach the pressure coupling. If you used a 3/8-inch female fitting, you will need a 11/16-inch open-end wrench to tighten a reducing nipple and a 3/4-inch open-end wrench to tighten the pressure coupling. Always use pipe tape to prevent leaks at the fittings.



Purge gas generators

If you need to purge your instrument and your facility does not have a source of clean, dry compressed air or nitrogen, we recommend that you consider using a purge gas generator. The generator cleans and dries the air supplied by your air compressor and provides it to the instrument. (For facilities without an air compressor, a complete dry-air generating system is available; see the next section.)

The instrument works well with the Whatman® (Balston®) purge gas generator models. See the section entitled “Specifications” for part numbers and specifications. The generator supply voltage and frequency are not adjustable, so be sure to order the correct items for your local utility service.

Notice Position the purge gas generator away from the instrument to reduce noise and vibration. ▲

⚠ Caution Purge gas generators require a minimum pressure for proper operation. Failure to supply this pressure may allow moisture to enter the system, causing permanent damage. See the preceding table for the minimum pressure values. ▲

Pure air dryer

Thermo Fisher Scientific also offers a complete dry-air generating system for providing instrument purge. Since this system contains an air compressor, it can be used in facilities that do not have a source of compressed air.

The system includes an air compressor, a dryer, pre-filters, a final filter/moisture indicator and flow controls. Two generator models are available. The “Specifications” section that follows includes specific information about each model.

Note Read the manufacturer’s instructions before installing air-drying equipment or performing any maintenance, such as changing the filters. The installation and maintenance of air-drying equipment is your responsibility. Failure to change the filters at least once a year and perform other routine maintenance can void the warranty. ▲

▲ Caution

Before you connect a pure air dryer to the instrument, it is vital that you purge the dryer of water and particulates by running it for at least 12 hours at nominal air flow. Otherwise, you risk severe damage to the optical components in the instrument when you connect the pure air dryer. ▲

Specifications

Electrical service specifications

The following table lists the specifications for electrical service. Contact your local Thermo Fisher Scientific service representative if you have questions about the requirements. If you are not sure that your power lines meet these requirements, contact our customer support for information about power audits. Locate your power source within 3 m (10 ft) of the instrument rear panel.

Item	Specification
Electrical service	3-wire live neutral earth ground
Nominal operating AC input	90 V to 264 V
Nominal operating current	1.7 A at 115 V 1.0 A at 230 V
Maximum startup AC input & current	15 A at 115 V 30 A at 230 V
Line frequency	47 Hz to 63 Hz
Line disturbances	Sags, surges or other line disturbances must not exceed 10 % of input voltage (even for a half cycle)
Noise	< 2 V (common mode) < 20 V (normal mode)

System components such as the computer, printer and monitor are not included in these specifications. See the documentation that came with those components for specifics.

Power consumption

Component	Power Consumption	
Antaris MX analyzer (including modules)	90 W	307 Btu/hr
Antaris II analyzer (including modules)	110 W	375 Btu/hr
External Heater with block holder*	100 W	340 Btu/hr
Standard computer and monitor*	460 W	1,570 Btu/hr
Integrated computer*	70 W	239 Btu/hr
Whatman purge gas generator	10 W	34 Btu/hr
Whatman pure air dryer	1,000 W	3,414 Btu/hr
Standard printer*	200 W	683 Btu/hr

*Values shown are estimates. See the power specifications on the rear panels or undersides of these units.

Purge gas

Locate the purge source within 10 ft of the instrument.

Item	Specification	
Source line pressure	20 psig min 1.4 atm min	150 psig max 10.2 atm max
Purge pressure	10 psig min 0.7 atm min	20 psig max 1.4 atm max
Flow rate	15 scfh min 7.1 l/m min	20 scfh max 9.4 l/m max
Filtering	10-micron filter	removes particulate matter and oil
Dew point	-70 °C (-94 °F) or below	for best performance

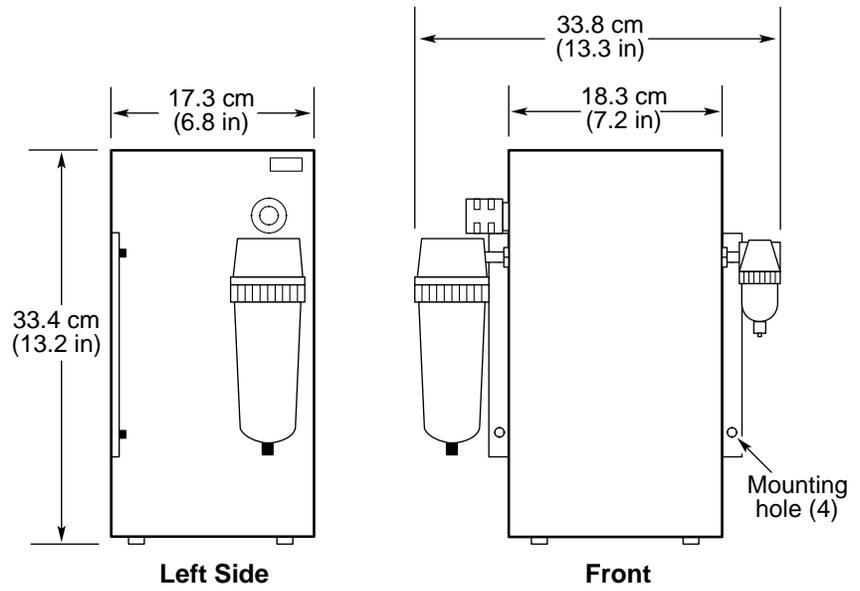
Coolant gas

Some rackmount enclosure require a flow of coolant gas. The following specifications can be used to ensure that an unpurged instrument is protected.

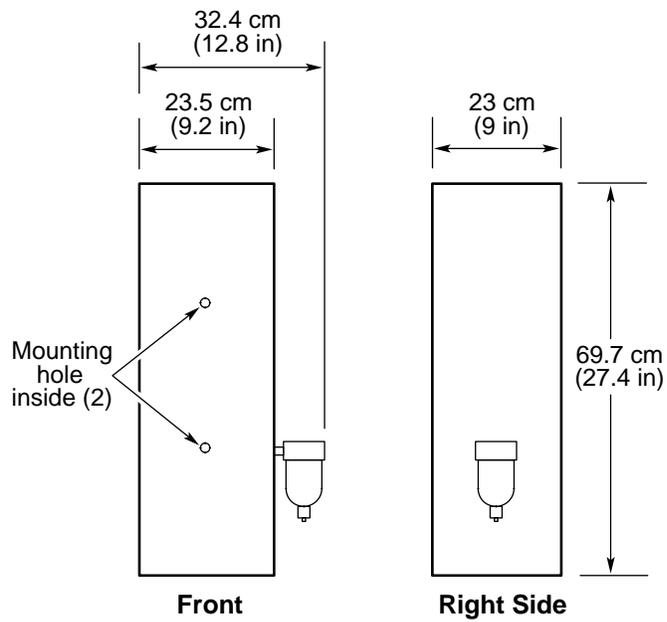
Item	Specification	
Source line pressure	20 psig min 1.4 atm min	150 psig max 10.2 atm max
Purge pressure	10 psig min 0.7 atm min	20 psig max 1.4 atm max
Flow rate	15 scfh min 7.1 l/m min	20 scfh max 9.4 l/m max
Filtering	10-micron filter	removes particulate matter and oil
Dew point	-70 °C (-94 °F) or below	for best performance

Purge gas generator

The following illustrations show the dimensions of the purge gas generators and the locations of holes that can be used for mounting the generators on a wall. Models 75-45 and 75-45EU fit easily on top of a bench or table. When not wall-mounted, Models 75-52 and 75-52EU should be placed on the floor.



Model 75-45 (and 75-45EU)



Model 75-52 (and 75-52EU)

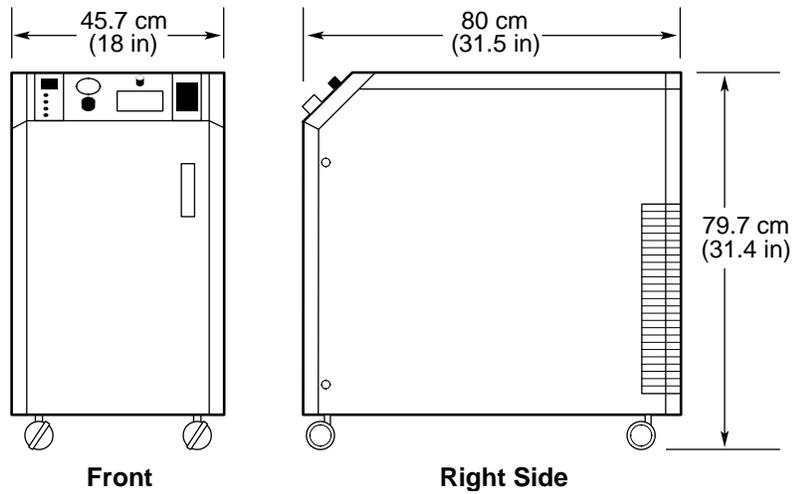
Whatman Model Numbers:	75-45	75-45EU	75-52	75-52EU
Thermo Scientific part number	869-050300	869-050400	869-050500	869-050600
nominal input line voltage	120 V AC	240 V AC	120 V AC	240 V AC
dew point	-73 °C (-100 °F)			
maximum dry (outlet) air flow rate for specified dew points*				
inlet pressure 8.50 atm (125 psig)	17 l/m (36 scfh)	17 l/m (36 scfh)	34 l/m (72 scfh)	34 l/m (72 scfh)
inlet pressure 4.08 atm (60 psig)	9 l/m (18 scfh)	9 l/m (18 scfh)	17 l/m (36 scfh)	17 l/m (36 scfh)
air consumption for regeneration**	14 l/m (30 scfh)	14 l/m (30 scfh)	28 l/m (60 scfh)	28 l/m (60 scfh)
minimum inlet air pressure	4.08 atm (60 psig)			
CO ₂ concentration	< 1 ppm	< 1 ppm	< 1 ppm	< 1 ppm
maximum inlet air temp.***	25 °C (78 °F)			
inlet/outlet port size	1/4 in NPT (female)			
shipping weight	11 kg (25 lb)	11 kg (25 lb)	18 kg (40 lb)	18 kg (40 lb)

* Dew point will be lower than specified at lower air flow.

** Total air required = air loss + process demand (up to maximum dry air flow rate).

*** Outlet dew point will increase at higher inlet compressed air temperatures.

Pure air dryer



Pure Air Dryers

	74-5041	74-5041EU
Thermo Scientific part number	869-065500	869-065600
nom. input line voltage, freq.	110 VAC, 60 Hz	220 VAC, 50 Hz
dew point	-73 °C (-100 °F)	-73 °C (-100 °F)
max. air flow rate at 80 psig	28 l/min (60 scfh)	28 l/min (60 scfh)
CO ₂ concentration	<1 ppm	<1 ppm
outlet port size	1/4 in NPT (female)	1/4 in NPT (female)
shipping weight	114 kg (250 lb)	114 kg (250 lb)

Site Preparation Checklist

Use this check list to ensure that all site-preparation steps have been performed. You will then be ready to schedule the installation.

General

- Affected administrators, such as MIS, shipping, maintenance, metrology, users, and regulatory employees, have been informed that the system is on order and when it will be installed.
- The system remains packed until the Thermo Fisher Scientific service engineer arrives.
- The system administrator is scheduled to be present during the installation to complete the following tasks:
 - Set up users in the Windows operating system
 - Set up Windows security features
 - Change settings for the RESULT Operation audit log, if necessary
 - Set up another RESULT administrator account, if necessary

Note A system administrator must be present during installation of an Antaris system. The Thermo Fisher Scientific service engineer may need to delay or reschedule the installation if a system administrator is not available. ▲

Environmental considerations

- The temperature stays relatively constant between 15 °C and 35 °C (59 °F and 95 °F); between 20 °C and 22 °C (68 °F and 72 °F) for best performance.
- The humidity (non-condensing) stays between 5 % and 95 %; between 20 % and 80 % for best performance.

Location

- The location is easily accessible to a Thermo Fisher Scientific service engineer.
- The system fits through the necessary doorways and elevators.
- There are no excessive floor vibrations.
- There are no intense magnetic fields.
- The floor, table, shelf or cart are strong enough to support the system and the surface is within $\pm 2^\circ$ of level.
- The work height is convenient for use of the instrument.
- There is adequate clearance around and above the system.

Utility service

- A dedicated power line is available.
- There is sufficient power to run the instrument and all accessories.
- There is a definite earth ground (not neutral) for power outlets.
- Adherence to local building and safety codes is verified.
- A source of dry air or nitrogen is installed, if you plan to purge the instrument.

Computer requirements

- Customer-supplied computer meets minimum standards (if applicable).
- Windows network services are configured properly.