

Antaris EX Safety, Installation and Site Preparation Guide



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General Information

The Thermo Scientific Antaris™ EX near-infrared (NIR) analyzers are rated for use in a wide range of industrial NIR spectroscopy applications. This guide provides information about the following instrument models:

- Antaris EX-Z1
- Antaris EX-Z2
- Antaris EX-IP

In general, the EX-Z1 and EX-Z2 models are designed for use in hazardous areas where the hazardous area is non-mining, above ground, and the hazard is caused by flammable gases and vapors. EX-Z1 installations are restricted to industrial establishments with restricted public access, where the conditions of maintenance and supervision ensure that only qualified persons service the installation. For EX-IP models, no hazardous area protection is provided. All models are intended for use in wash down/hose down environments.

Review the specification section for your instrument model to ensure that the instrument you ordered is appropriate for your environment and that spatial, environmental, utility, wiring, plumbing and pipe fitting requirements can be met.

This guide is intended for use with the detailed schematics for each instrument model. Your schematics set is labeled and packed with the enclosure. See the *Antaris EX Parts List* that came with your analyzer for the part number and contents of the schematics set for each instrument model. If your schematics are damaged or missing, call Thermo Fisher Scientific for replacement using the contact information provided at the front of this guide.

Manual conventions

The following conventions are used in this manual to draw your attention to important information:

Note Notes contain helpful supplementary information. ▲

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

▲ Caution Indicates a hazardous situation which, if not avoided, could result in minor or moderate injury. ▲

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

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

Questions and 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.

Training installation, maintenance, and service personnel for specific applications

All Thermo Fisher Scientific service engineers who are certified for Antaris EX installations have received basic training in the safety measures required to work in process environments. Specific information about safety precautions, protective clothing, and training requirements for your particular application must be provided at your expense. When scheduling work, be sure to notify the service engineer of the amount of time required for specialized training.

Specialized clothing and tools

Each installation location is expected to provide any specialized training, clothing and tools required for installation, maintenance, and service work. Specialized tools and clothing required for your particular application also must be provided at your expense.

Hot work permits

Each installation visit requires a hot work permit. Service engineers will notify the installation site of the typical amount of time required to complete their work.

Danger

Avoid fire and explosion hazards. Never exceed the time frame cited in the hot work permit. Advise the installation site if the time frame cited on the hot work permit is not sufficient for work required. Never deviate from established plant procedures. ▲

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Safety Considerations

Application suitability and external materials

Equipment classified for hazardous locations may not be suitable for your particular location. The analyzers are limited in their gas group and temperature specification. The certification documentation supplied with these instruments must be checked to ensure suitability.

As with all equipment for use in hazardous or classified areas, your installation and maintenance procedures must be in compliance with local working and installation practices for hazardous equipment. These systems must only be installed by personnel who are aware of the local requirements for installation of electrical equipment within hazardous locations.

Some units are designed to be controlled primarily with pressurized, clean, dry nitrogen or air. During normal use, the atmosphere inside enclosures using pressurized nitrogen becomes oxygen deficient. To protect operators, service and maintenance personnel from this and other hazards, the enclosure is closed and sealed. Consult the Control of Substances Hazardous to Health (COSHH) data sheet or Material Safety Data Sheet (MSDS) that accompanied the pressurized nitrogen for further guidance.

The following materials may be used in the external construction.

- stainless steel
- brass
- aluminum
- polycarbonate
- silicone rubber
- pvc
- mild(carbon) steel
- nylon
- polyurethane
- acrylic
- materials listed in other documentation that accompanies your instrument.

If substances that adversely affect these materials are present in the surrounding environment, consult Thermo Fisher Scientific for further guidance.

Regulatory compliance

Antaris EX-Z1 and Antaris EX-Z2 analyzers are designed for North American or European (depending on the model ordered) use with 220 VAC electrical service, in hazardous areas where the hazardous area is non-mining, above ground, and the hazard is caused by flammable gases or vapors. These models are suitable for hose-washing.

Antaris EX-IP analyzers were designed as a hose-washable, solid-state-air-cooled, near-IR instrument for use with USA and European 110 VAC or 220 VAC electrical services, as follows. No hazardous location protection is provided.

The *Declaration of Conformity* that came with your instrument, instrument labeling, and the specifications for your analyzer model later in this manual contain specific information about conformity with particular directives and standards. The regulatory organizations are described here.

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. After a manufacturer has proven that the particular equipment meets CE requirements and has collected supporting data, that equipment may display the CE mark. For equipment in Zone 1 hazardous locations, the CE mark is tested and certified by a notified body located within the European Union.

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 IECCE 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.

ATEX (ATmosphere EXplosible) — The Equipment and Protective systems intended for use in Potentially Explosive Atmospheres (ATEX) Directive 94/9/EC is a New Approach Directive which provides the technical requirements to be applied to equipment intended for use in potentially explosive atmospheres.

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 company's 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 Thermo Fisher Scientific Customer 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:

- Avoid testing flammable or explosive samples.
- If the instrument will be purged, use a clean, nonflammable purge gas.
- Always engage the vortex or other cooler when the ambient temperature at the installation site exceeds the safe operating temperature for your model.

The following symbols warn you about hot surfaces in the immediate vicinity.



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

⚠ Warning The NIR source bulb may be very hot. It stays hot for up to 3 minutes after you turn off your instrument. To avoid being burned or starting a fire, handle the source assembly only by the exterior handle. The User's Guide shows the location of the NIR source inside the instrument. ▲

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, pressurize or cool the instrument. Heat from the source or internal electrical components could ignite a flammable gas. All gases used to purge, pressurize or cool the instrument must be free of moisture, oil and other reactive or infrared-absorbing materials. Use only clean, dry air or clean, dry nitrogen in the enclosure. Other gases, even inert gases such as argon (Ar), can damage the instrument. ▲

Lifting or moving

These instruments are heavy. For specific weights, see the model specific specifications later in this manual. To avoid injury when lifting or moving the instrument, heed the precautions that follow:

⚠ Danger For enclosures installed on a wheeled cart, use caution when moving the cart.



Push only from the handle. Do not attempt to move the cart up or down inclines greater than 10 degrees. ▲

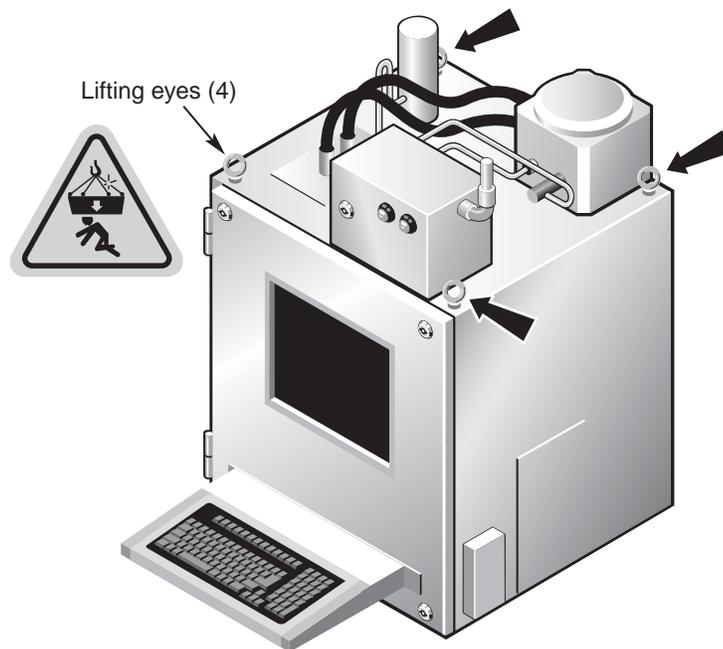
⚠ Danger These systems cannot be lifted safely by fewer than four people, unless a mechanical lifting device is employed. When lifting or moving an instrument, get additional personnel to help you. Be sure to lift from each side of the enclosure, not the front and back.



Use a mechanical lifting apparatus and all 4 lifting eyes, as shown in the schedule drawings and schematics. ▲

⚠ Danger This equipment is heavy and can crush if improperly secured. Always use all 4 lift points when moving this equipment with overhead lift assistance. ▲

Overhead lift assistance is recommended for this equipment. Four eye-style lift points are provided on the top of the instrument enclosure.



Use all 4 lift points when moving the instrument. The enclosure is not equipped with forklift points. To prevent damage when using a forklift to move the instrument, secure the instrument on a pallet and then lift the pallet.

Tip and crush hazards

The instrument and enclosure can be installed on a wall, on a shelf or table-top, on a floor stand, or on a cart. Due to weight, these instruments and their enclosures can pose a tip and crush hazard unless appropriate anchors are in place. Use anchors and anti-tip devices that were designed by a qualified structural engineer. Always use anchors and anti-tip devices that meet applicable local codes and the specifications later in this guide.

Note Thermo Fisher Scientific provides no hardware for attaching the enclosure to the surrounding structure at the installation site. ▲



Danger

The instrument and enclosure are heavy and could crush if they are not securely installed and tip or fall.



Never use an instrument that is not secured with all fasteners. If a bolt or anchor becomes loose, tighten it immediately. If a bolt or anchor is missing, replace it immediately. Always use bolts and anchors that meet the requirements listed specifications sections later in this manual and the schedule drawings and schematics that that were provided with the analyzer. ▲

Cleaning

If the outside of the instrument needs cleaning, be sure that:

- all seals and protective caps are in place
- all plates are tightly screwed down
- all 4 door latches are secured.

The enclosure may be washed or hosed down.

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

⚠ Warning Avoid static potential. Never use solvents. ▲

Notice Do not attempt to clean or even touch surfaces inside the enclosure. The front-surfaced mirrors and other optical components are easily damaged. Dust will not harm the NIR signal, but fingerprints and scratches can degrade spectral performance or permanently damage the mirrors and other optical components. ▲

Opening the enclosure

These instruments are designed to be operated with the enclosure closed and latched. Information about the hazards you may encounter when the enclosure is open is included in documentation that accompanied the enclosure and on labels on the enclosure itself. Be sure to read and heed this information. Refer servicing inside the enclosure to trained personnel only.

⚠ Warning Always disconnect power before opening. Hazardous voltage inside. ▲

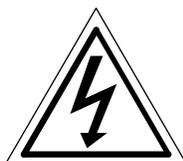
⚠ Warning Avoid explosion and fire hazard. Open the enclosure only when the instrument environment is non-explosive. ▲

Also, be aware that the atmosphere inside the enclosure may be oxygen deficient. If the enclosure is purged or pressurized with inert gas, there may be an asphyxiation hazard. Allow a few minutes for air to enter the enclosure before working inside the enclosure.

⚠ Warning Atmosphere inside the enclosure may be oxygen deficient. Enclosures pressurized or purged with inert gas may be an asphyxiation hazard. ▲

Electrical

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.



- ▲ Danger** Only qualified factory-trained service representatives should attempt to service a component that carries either of these symbols. ▲
- ▲ Danger** 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. ▲
- ▲ Warning** Before servicing the unit, turn off power to the branch circuit. ▲
- ▲ Warning** Even after the instrument has been disconnected from all voltage sources, capacitors may remain charged for up to 30 seconds. ▲

Electrical service

Check the line voltage and frequency at the wall outlet or other AC power source before you connect the system or turn on the power. This should be done when the system is installed and any time the system is moved to a different AC power source.

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

See the specifications for your model later in this manual for electrical service details.

Fuses

The spectrometer inside the enclosure is protected by two, quick acting (also known as F-type or fast-blow) fuses. If you need to replace the fuses, use only fuses that meet the specifications listed below.

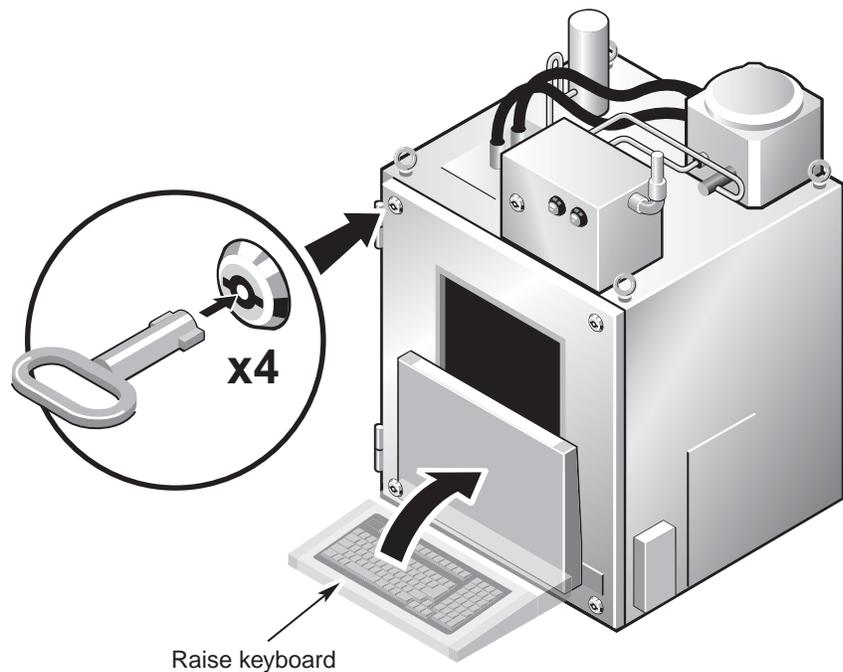
Item	Specification
Current	3 A
Voltage	250 VAC
Size	5 x 20 mm
Action	F-type, quick acting

⚠ Danger Avoid shock and fire hazard. Always use exact replacements for fuses. ▲

⚠ Danger Avoid shock hazard. Always disconnect power from the branch circuit that services the instrument and move spectrometer power switch to the Off position before checking or changing fuses. ▲

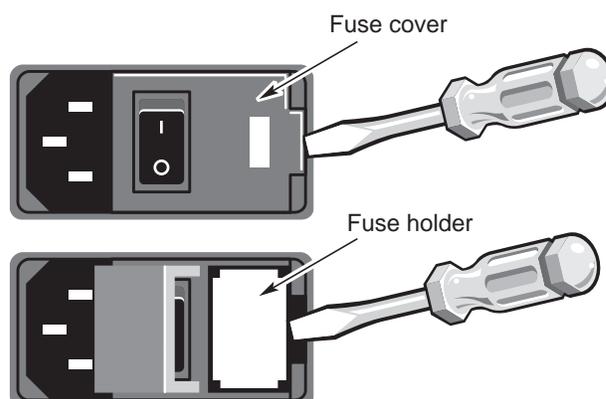
To change a fuse:

1. Open the enclosure.



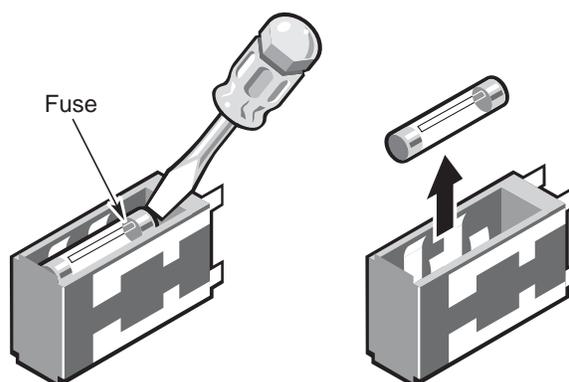
- 2. Disconnect the power cord from the AC power source and spectrometer and then remove the fuse holder from the fuse compartment on the rear panel of the spectrometer.**

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



- 3. Remove the fuse from the holder.**

Use a 1/8-inch flat-blade screwdriver to pry the fuse loose from the fuse holder, and then lift it out of the holder.



- 4. If either fuse needs to be replaced, replace both with fuses that meet the following specifications:**

Item	Specification
Current	3 A
Voltage	250 VAC
Size	5 x 20 mm
Action	F-type, quick acting

If neither fuse requires replacing, re-install the fuses.

- 5. Once the fuses are installed, push the fuse holder back into the fuse compartment until it is completely inserted, and then close the fuse cover.**

- 6. Reconnect AC power and move the power switch on the rear panel of the module to the ON position.**

I = on

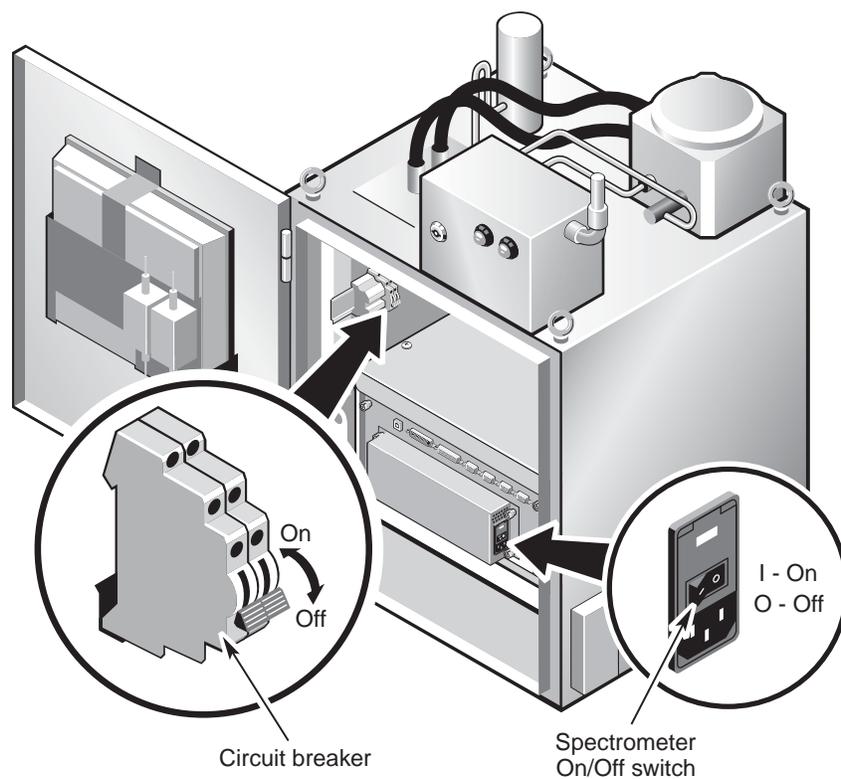
O = off

- 7. Close and latch the enclosure and then apply power to circuit that powers the instrument.**

Switches and circuit breakers

A10 A miniature circuit breaker located on the DIN rail protects internal components from excessive current. A power switch for the spectrometer also is located in the enclosure. For both:

I = On
O = Off



Optical

Antaris EX systems are Class I laser products:

The accessible 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. Exposure to laser light or high voltage may result. ▲

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

Warning

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

Protective housing

A protective housing covers each instrument and protects you from exposure to electrical shock hazards, very bright NIR light and very low laser light. More than 80 % of the laser light is lost as it passes through the instrument optics. The accessible laser radiation at the sampling tip of the fiber optic probe or an unpopulated fiber optic probe connector is very low, less than 500 nW of continuous power.

Caution

Laser and very bright NIR light exposure is possible at the sampling tip of a fiber optic probe and at an unpopulated fiber optic probe connector. Never stare into the sampling tip of a fiber optic probe or an unpopulated fiber optic probe connector. ▲

Notice

Less than 35 mW of near-infrared energy exits the enclosure into the hazardous area. ▲

Manufacturer's laser information

In some jurisdictions you may be required to register the instrument; check with your company safety officer and/or local government offices. The following excerpt from the laser manufacturer's manual lists information that may 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	3.0 mrad
spacing C/2L	1039 MHz
internal operating voltage	1700 ± 100 VDC
CDRH classification	IIIa

Corrosives, solvents, and pressurized gases

The Antaris EX-Z1 or Antaris EX-Z2 models may be exposed to corrosives and/or solvents in the installation atmosphere or due to one of the 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 and atmospheres can be accommodated so long as a positive purge pressure is maintained in the enclosure.

Pressurized gases

Pressurized gases may be used for enclosure 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.

- 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 spectrometer 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 the 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 spectrometer. ▲

⚠ 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 and volatile atmospheres

Components may be degraded by exposure to caustic agents or their vapors. Exposure of the internal components to volatile atmospheres can present a fire and explosion hazard. To maintain the instrument in safe working condition, be sure the enclosure is purged and pressurized before introducing caustic or volatile agents into the surrounding atmosphere. Damage to the internal components caused by caustic and volatile agents is not covered by warranty.

⚠ Danger Prevent fire and explosion. Before operating a system in a volatile atmosphere, be sure the atmosphere inside the enclosure is clear before applying power to the instrument. ▲

Always follow the procedures for opening the enclosure, powering on and powering off.

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 NIR source may produce hydrochloric acid (HCl), hydrofluoric acid (HF), or phosgene (COCl₂).

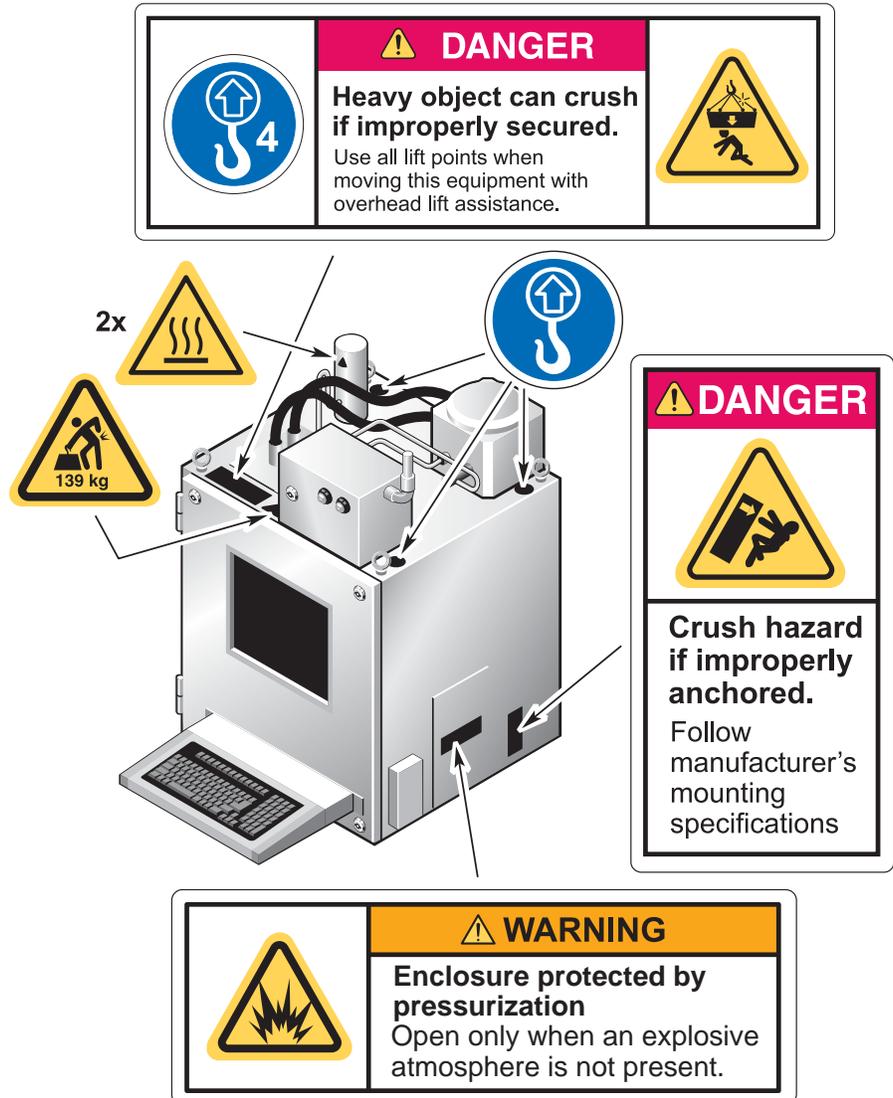
Hydrochloric acid and hydrofluoric acid are highly corrosive and may cause accelerated corrosion of the internal components. To maintain the instrument in safe working condition, be sure the enclosure is purged and pressurized before introducing solvents into the surrounding atmosphere. Damage to the internal components caused by solvents is not covered by warranty.

⚠ Warning Hydrochloric acid, hydrofluoric acid and phosgene are highly toxic and reactive. ▲

Labeling

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 EX-Z1



⚠ DANGER

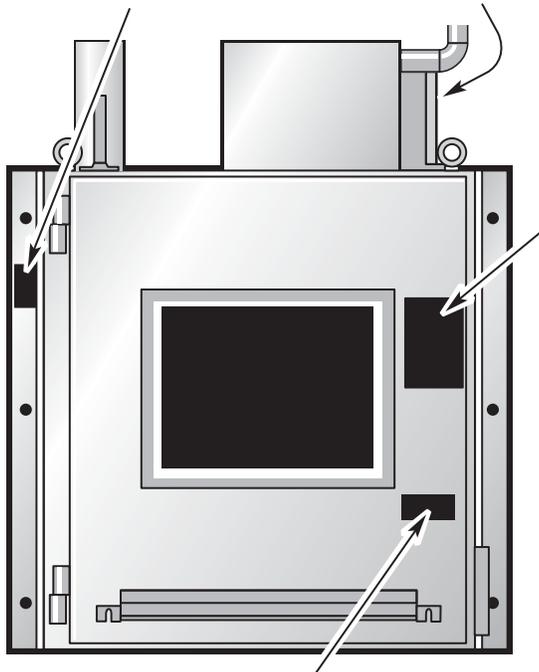


Crush hazard if improperly anchored.
Follow manufacturer's mounting specifications



⚠ WARNING

Explosion-proof enclosure
Open only when an explosive atmosphere is not present.

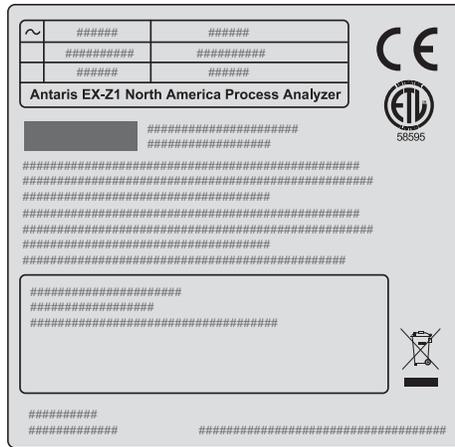
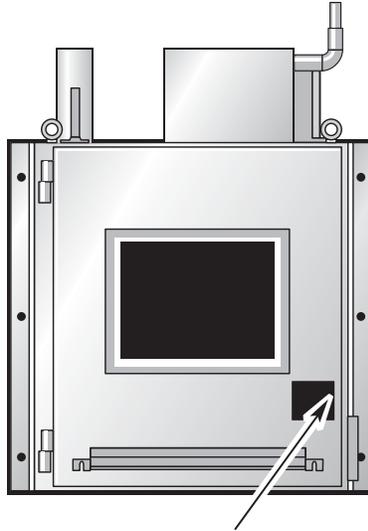



⚠ CAUTION

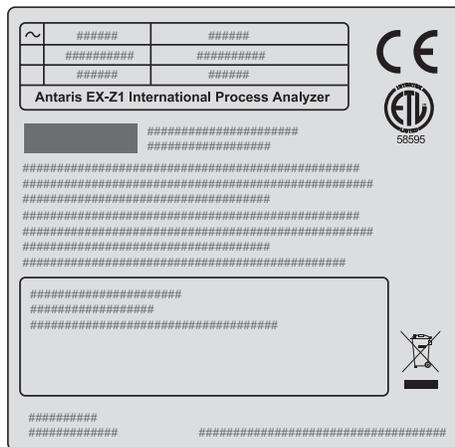
Class 3R laser radiation when open. AVOID DIRECT EYE EXPOSURE.

  	⚠ WARNING	  																														
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Safety Considerations

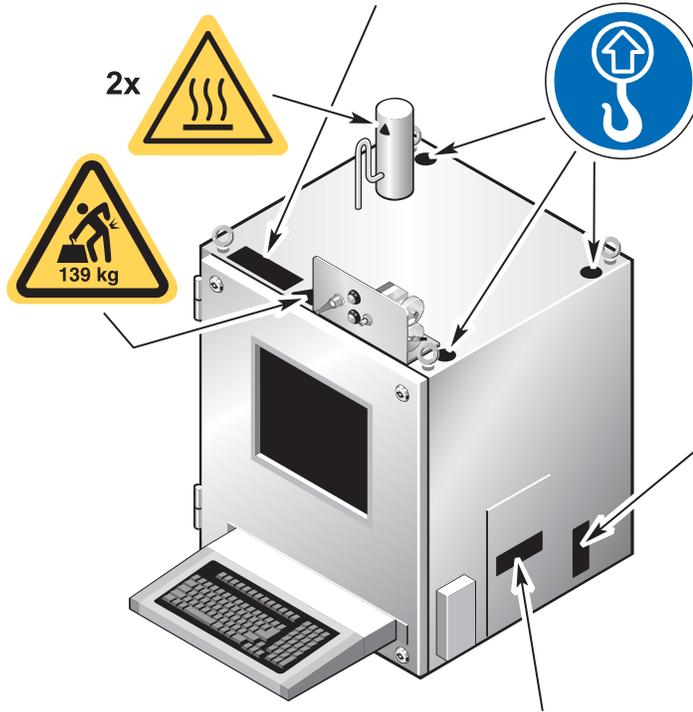


OR



Antaris EX-Z2

	<p>⚠ DANGER</p> <p>Heavy object can crush if improperly secured. Use all lift points when moving this equipment with overhead lift assistance.</p>	
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<p>⚠ DANGER</p>	
	
<p>Crush hazard if improperly anchored. Follow manufacturer's mounting specifications</p>	

	<p>⚠ WARNING</p> <p>Enclosure protected by pressurization Open only when an explosive atmosphere is not present.</p>
---	--

⚠ DANGER

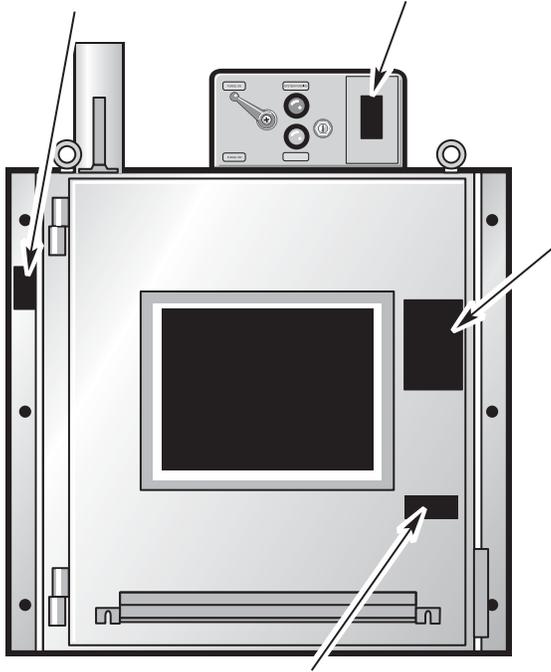


Crush hazard if improperly anchored.
Follow manufacturer's mounting specifications

⚠ WARNING



Avoid explosion hazard
Close and latch enclosure, purge for 9 minutes at a flow rate of 225 l/m (8 scfm) and then apply power.



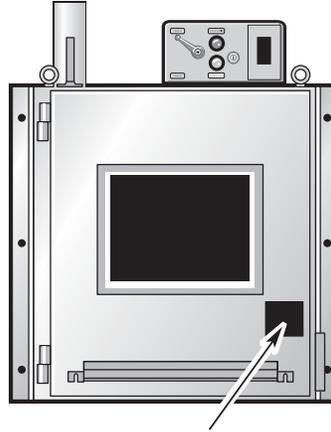
⚠ CAUTION



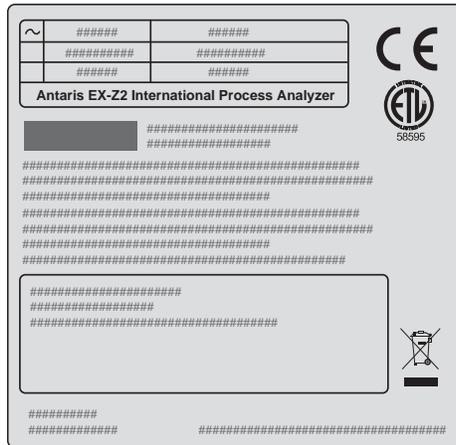
Class 3R laser radiation when open. AVOID DIRECT EYE EXPOSURE.

  	⚠ WARNING	##### ##### ##### ##### #####	  
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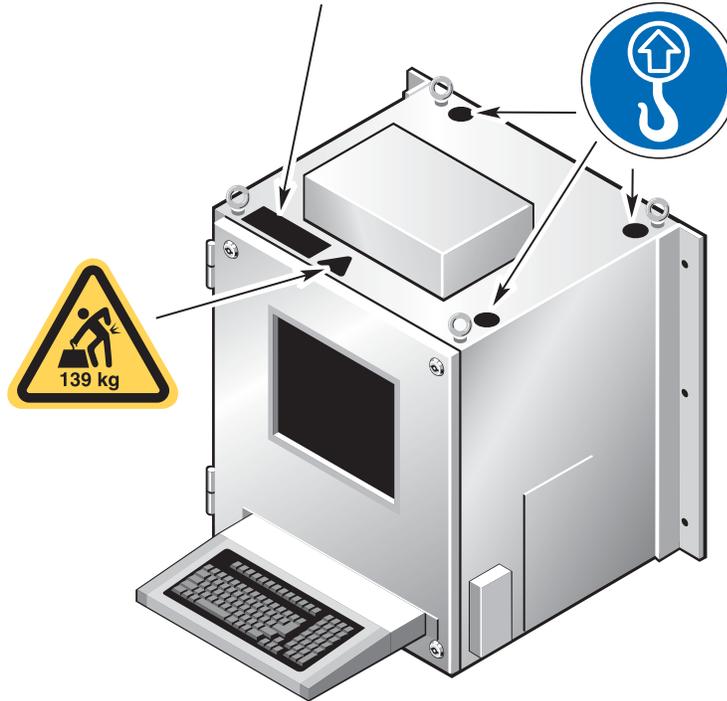


OR



Antaris EX-IP

	<p>! DANGER</p> <p>Heavy object can crush if improperly secured.</p> <p>Use all lift points when moving this equipment with overhead lift assistance.</p>	
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~	AC Voltage	#####
	Frequency	#####
	Current	#####

Antaris EX-IP Process Analyzer

ThermoFisher Thermo Fisher Scientific Inc.
 S C I E N T I F I C 5225 Verona Rd
 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.

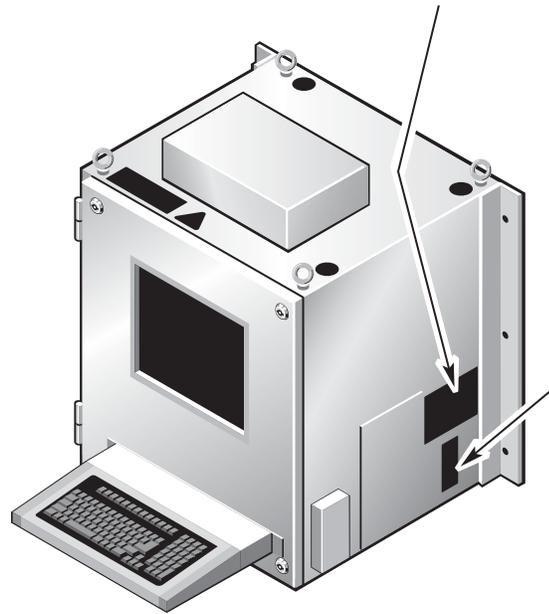
This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

IP65 rated enclosure per IEC60529:1989+A1:1999

US Patent 6,667,808
 Additional Patent Pending

Warranty VOID if serial number is removed.

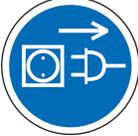


! DANGER

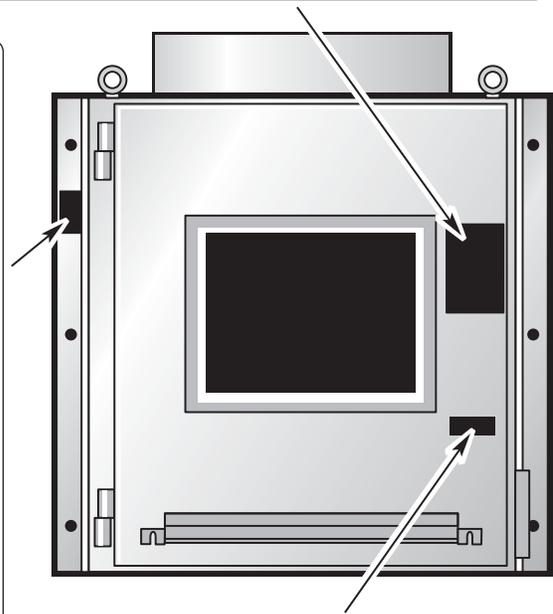


Crush hazard if improperly anchored.
 Follow manufacturer's mounting specifications

 	⚠ WARNING	   
	⚠ WARNING	

⚠ DANGER

<p>Crush hazard if improperly anchored. Follow manufacturer's mounting specifications</p>



	⚠ CAUTION
	<p>Class 3R laser radiation when open. AVOID DIRECT EYE EXPOSURE.</p>

Installation Process

Thermo Fisher Scientific service engineers install all instruments. Prior to the arrival of the service engineer, the enclosure, sampling and utility connections must be installed. Use the information that follows and the specifications for the instrument model to be installed to:

- Install the enclosure
- Run electrical, gas, and computer lines
- Run fiber optic lines
- Commission the analyzer

Installing enclosures

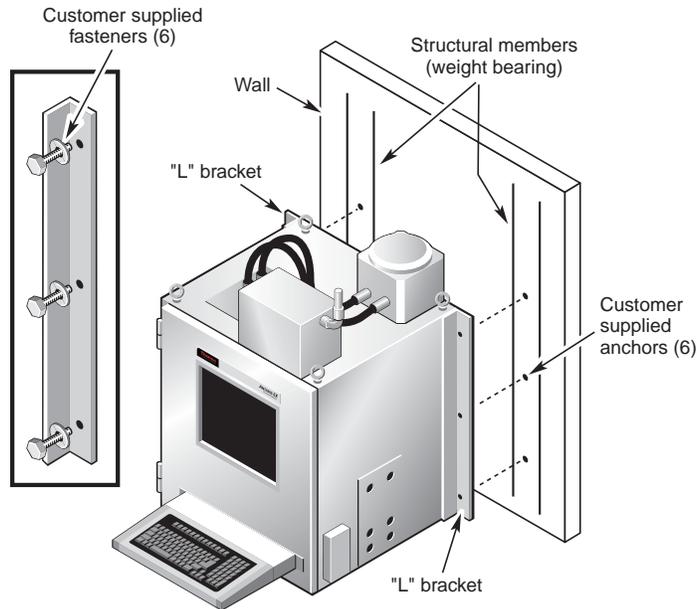
The instrument enclosure may be:

- Wall mounted
- Floor mounted
- Cart mounted (EX-IP model only)

All anchors and fasteners are required and must be customer supplied. The spectrometer cannot be installed in the enclosure if anchors or fasteners are missing or loose.

Wall mount

Each system must be mounted to a structural member capable of supporting four times the weight of the instrument. See the section entitled “Lifting or moving” in the “Safety” chapter earlier in this manual for lifting/moving precautions. See the section entitled “Wall mounting” in the installation and regulatory compliance specifications for your model later in this manual for weight information and anchor and fastener requirements. See the installation drawing that came with your system for dimensions.



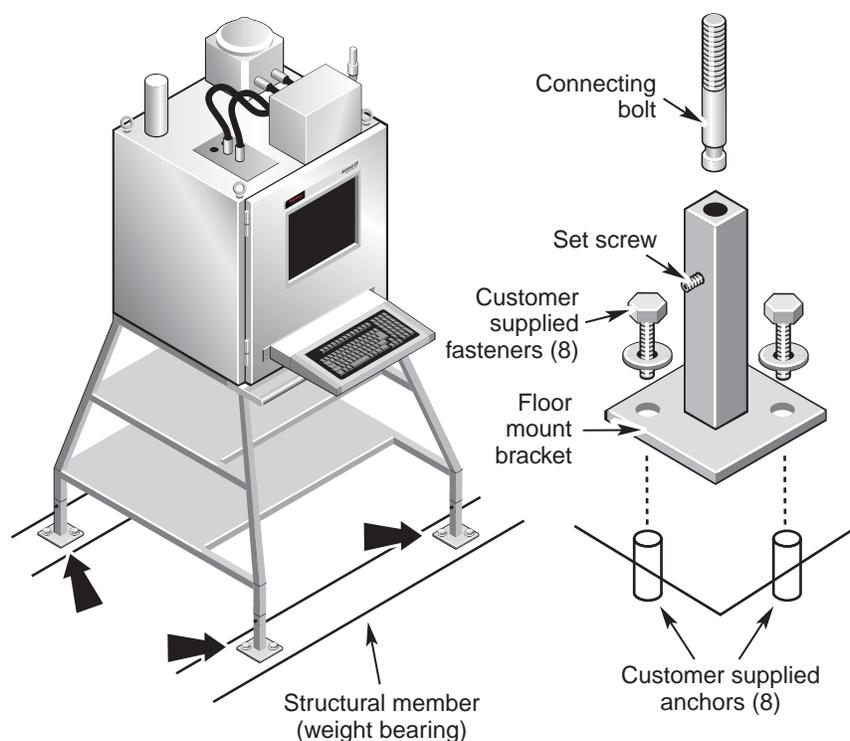
All 6 bolts are required to safely secure the instrument to the wall. The instrument must be accurately secured within 2 degrees of vertical. The wall must be perpendicular to the floor within 2 degrees with respect to horizontal.

Floor mount

Optionally, a system may be mounted to the floor. The floor must be capable of supporting two times the weight of the instrument. See the section entitled “Lifting or moving” in the “Safety” chapter earlier in this manual for lifting and moving precautions. See the section entitled “Floor mounting” in the installation and regulatory compliance specifications for your model later in this manual for weight information and anchor and fastener requirements.

In this configuration, the wall-mount flanges may be removed.

The instrument must be accurately secured within 2 degrees of vertical.



All fasteners and brackets are required to safely secure the instrument to the stand.

For floor mounting:

1. Position the floor-mount brackets on your anchoring system.

All 4 brackets and 8 bolts are required to safely anchor the stand to the floor.

2. Use a 1/8-inch hex driver to loosen the set screw on each bracket and remove the connecting bolts.

3. Install the threaded end of a connecting bolt in each leg of the stand.

4. Align the stand legs with the floor-mount brackets and insert the stand into the brackets.

5. Use a 1/8-inch hex driver to tighten the set screws to secure the stand to the floor-mount.

6. Place the instrument enclosure on the stand with the door facing the open side of the stand.

Align the holes in the stand surface with those in the bottom of the enclosure.

7. Insert bolts through the stand into the bottom of the enclosure and tighten a few turns.

8. Once all 4 bolts are inserted into the enclosure, tighten them all to securely fasten the enclosure to the stand.

Cart, shelf, or table top installations

Optionally, a system may be mounted on a table top, shelf, or wheeled cart (Antaris EX-IP models only). The surface must be capable of supporting two times the weight of the instrument. See the section entitled “Lifting or moving” in the “Safety” chapter earlier in this manual for lifting and moving precautions. See the section entitled “Shelf or table top mounting” or “Cart, shelf, or table top mounting” in the installation and regulatory compliance specifications for your model for weight information and anchor and fastener requirements.

Danger

For enclosures installed on a wheeled cart, use caution when moving the cart.

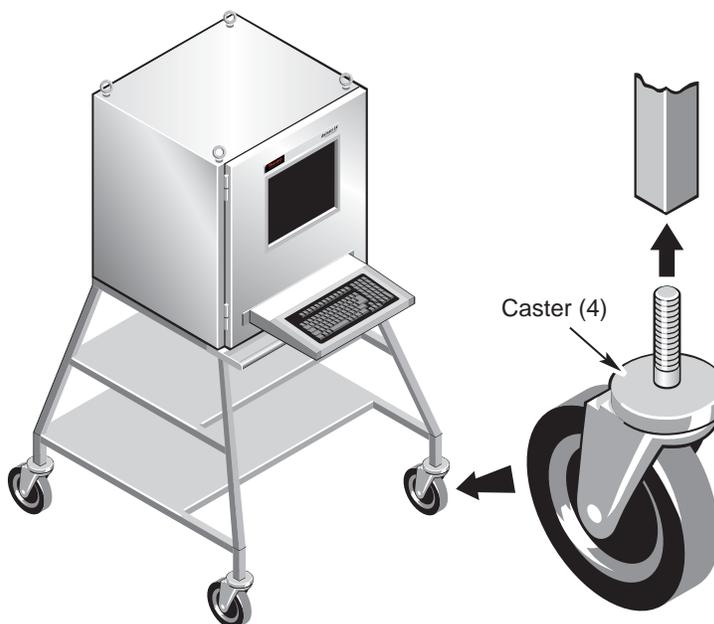


Push only from the handle. Do not attempt to move the cart up or down inclines greater than 10 degrees. ▲

For a cart mount (Antaris EX-IP model only):

1. **Insert the casters into each leg of the cart.**

Engage the brake on each caster before inserting it into the leg.



⚠ Caution

Avoid tip and crush hazards. Once the enclosure is placed on the cart, secure it with bolts before moving the cart. Never move the cart unless all 4 anchor bolts are in place and tightened completely. ▲

2. Place the instrument onto the stand with the door facing the open side of the cart.

Align the holes in the stand surface with those in the bottom of the enclosure.

3. Insert bolts through the stand into the bottom of the enclosure and tighten a few turns.

4. Once all 4 bolts are inserted into the enclosure, tighten them all to securely fasten the enclosure to the stand.

For a table top or shelf installation:

1. Drill the table top or shelf for anchoring bolts.

Check the schedule drawings for your instrument for drill size and placement. Check the installation and regulatory compliance specifications for your instrument (later in this manual) for anchoring bolt specifications.

2. Place the instrument on the table top or shelf, oriented so that the door is accessible and there is adequate clearance to open the door completely.

Align the holes in the bottom of the enclosure with those in the table top or shelf.

- 3. Insert bolts through the stand into the bottom of the enclosure and tighten a few turns.**

- 4. Once all 4 bolts are inserted into the enclosure, tighten them all to securely fasten the enclosure to the shelf or table top.**

Utility runs

All utility runs must comply with local codes and regulations. See the schedule drawings and installation and regulatory compliance specifications for your model for connection type and location information.

Electrical

We recommend that AC power be provided from a switched, dedicated branch circuit with an earth ground.

Warning

Avoid shock hazard. Use an earth ground for all ground and common connections. ▲

Explosion-proof installations

If your instrument is equipped with a flameproof, explosion-proof box, all power to the enclosure, and all I/O signals entering and exiting the enclosure, must be disconnected upon loss of enclosure pressure. These disconnect switches are located outside the enclosure in the flameproof, explosion-proof box. All wiring must be made to the devices in this box. .

Connect the alarm and pressurized signals as shown in the schedule drawings later in this manual. The “alarm” contact closes to “common” when the pressure in the enclosure drops below the minimum requirement. The “pressurized” contact closes to “common” when the pressure in the enclosure is above the minimum requirement.

Power and I/O signals must be connected with a cable gland with armored cable or through a sealed conduit. There are 8 connections available for input and output wiring. Wires 1 through 8 are labeled on the drawing for the explosion-proof box. The signals on these connections depend on the connections inside the enclosure. See the electrical block diagram that accompanied your system.

Wherever possible, provide AC power through a switched, dedicated branch circuit.

Other hazardous environments

If your instrument is not equipped with a flameproof, explosion-proof box but will be used in hazardous areas where the hazardous area is non-mining, above ground, and the hazard is caused by flammable gases or vapors, power and I/O signals must be connected to the enclosure through either a cable gland with armored cable, or through a sealed conduit. Connection ports are located on the top of the enclosure.

You may make additional modifications to the gland plates to suit your installation. See the schedule drawings and schematics that accompanied the enclosure for details.

AC power should be provided on a switched outlet to allow the power-up sequence to be completed conveniently.

Wash down, hose down applications

As shipped from the factory, the instrument AC power cord provided does not provide any water protection at the plug end. You may use either a waterproof outlet box or remove the rewirable plug from the cord for direct wiring applications. The PLC I/O signals must be connected through cable glands that maintain the rating of the enclosure. These ports are located on the top of the enclosure. You may make additional modifications to the gland plates provided to suit your installation. See the schedule drawings later in this manual for locations and specifications.

Sealed USB and Ethernet connectors are provided. Unsealed cables will connect to these components. Sealed mating connectors and cables are available from the Bulgin Components Buccaneer line of products.

If the integrated computer option is installed, there will be 2 USB connectors available for peripheral devices such as printers, drives, and scanners.

There will be 2 Ethernet connectors. If the remote computer option is installed, the “computer” connector will be for connection to the spectrometer. If the integrated computer option is installed, the “computer” connector connects to the computer. If the PLC option is installed, the “PLC” connector connects to the PLC.

Internal enclosure connections

Inside the enclosure, connect the input/output wires according to your particular options. See the schedule drawings and schematics for the analyzer internal wiring for specific details. All connections inside the enclosure should be made to the DIN rail blocks as shown in the schedule drawings.

Ethernet Note that the Ethernet cable inside the analyzer can be connected to the computer, the PLC, or the remote computer module depending on your options and requirements. See the schedule drawings later in this manual for wiring specifications and port locations. Additional drains and ground wires may be connected to the extra pins in the ground blocks. Use wiring colors and connections as follows:

RJ45 Pin Number	Signal	Wire Color	
		T568A	T568B
1	Transmit+	Green/White	Orange/White
2	Transmit-	Green	Orange
3	Receive+	Orange/White	Green/White
4	Unused	Blue	Blue
5	Unused	Blue/White	Blue/White
6	Receive-	Orange	Green
7	Unused	Brown/White	Brown/White
8	Unused	Brown	Brown

PLC Connect the PLC I/O wires inside the enclosure to the desired signals, noting the wire numbers used. To facilitate service and troubleshooting, label the individual wires with the bank, terminal, and signal to which they are connected.

The signals available depend on the modules installed in your PLC. Consult the PLC documentation for specific wiring information for the individual modules. Twelve banks are available for PLC modules. As factory configured, the banks are populated as follows.

PLC Bank	Standard	4ch 4-20mA output kit	4ch 4-20mA I/O kit	8ch 4-20mA output kit	8ch 4-20mA I/O 4 Dig I/O kit
0	Digital In	Digital In	Digital In	Digital In	Digital In
1	open	open	open	open	Digital In
2	Digital Out	Digital Out	Digital Out	Digital Out	Digital Out
3	open	open	open	open	Digital Out
4	open	open	4-20 In	open	4-20 In
5	open	open	open	open	4-20 In
6	open	4-20 Out	4-20 Out	4-20 Out	4-20 Out
7	open	4-20 Out	4-20 Out	4-20 Out	4-20 Out
8	open	open	open	4-20 Out	4-20 Out
9	open	open	open	4-20 Out	4-20 Out
10	open	open	open	open	open
11	open	open	open	open	open

Gas The EX-Z1 and EX-Z2 systems require clean dry air or nitrogen for both the cooler and the purge protection system. EX-IP systems may require purge depending on the environment. See the specification tables for your specific system for plumbing and gas supply details.

Warning Avoid explosion hazard. Never use a flammable gas to purge the analyzer. Purge gas must be free of contaminants. ▲

Notice To avoid damage to the spectrometer, do not use argon as a purge gas. ▲

Fiber optic Follow the manufacturer's specifications and recommendations for fiber optic type, material, maximum run length, minimum turn radius, and care.

For all applications, leave 1m (40") of fiber optic in the enclosure to connect to the spectrometer and allow serviceability. Provide SMA905 connectors to mate with the spectrometer. Label the fiber optics with their sampling location and whether each is the "source" (from the analyzer) or the "return" (to the analyzer) to make service and troubleshooting easier.

Use the instructions included in the spectrometer *User's Guide* for making internal connections to the spectrometer.

Note On EX-Z2 systems and EX-IP systems, fiber optic cables enter the enclosure using the same ports that are available for electrical wiring. ▲

Hazardous installations Fiber optic cable runs in hazardous areas where the hazardous area is non-mining, above ground, and the hazard is caused by flammable gases or vapors, must be connected to the enclosure through either a cable gland with armored fiber optic cable or through a sealed conduit. This is required because the metal shielding in fiber optic cables can be a current-carrying conductor. See the schedule drawings that accompanied the enclosure and the specifications for your model later in this manual for port locations and specifications.

**Wash down,
hose down applications**

For wash down / hose down applications, fiber optic cables must be connected through cable glands that maintain the rating of the enclosure. See the schedule drawings that accompanied the enclosure and the specifications for your model later in this manual for port locations and specifications.

Commissioning an Antaris EX-Z1

Before bringing the analyzer on line for the first time, you must clear the supply line of debris and condensation, verify that the pressure indicators and alarms are operating correctly, and in some cases, fine-tune the leakage compensation valve. You will need the following tools for these procedures:

- MiniPurge enclosure key
- flat-blade screwdriver
- stop watch or other timing device

Clearing the purge supply line

To remove debris and condensation from the purge gas supply line:

- 1. Disconnect the supply pipe from the inlet to the purge system.**
- 2. Blow clean, dried air or nitrogen through the supply line for at least 15 seconds per meter (3 feet) of supply pipe length.**

This removes any debris or condensation.

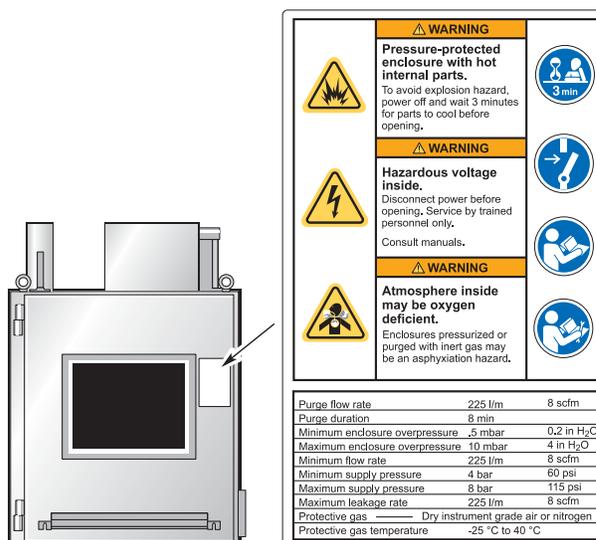
- 3. If there are questions about the supply line pressure, connect a pressure gauge and confirm that the supply line pressure being delivered to the enclosure inlet is between 4 barg and 8 barg, 60 psi and 115 psi, or 400 kPA and 800 kPA.**
- 4. Turn off the purge gas and reconnect the supply line to the MiniPurge inlet.**

Confirming alarm and indicator operation

Each Antaris EX-Z1 analyzer includes a purge system and pressure sensors that control power to the instrument. To verify that the system is operating properly:

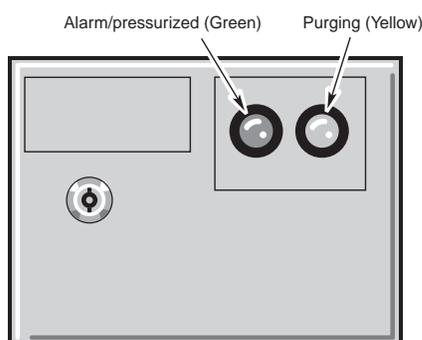
- 1. Turn on the purge gas supply regulator to normal operating pressure.**

Check the label on the front of the analyzer if you are unsure of the correct normal operating pressure.



2. Check the alarm/pressurized and purging indicators.

As the pressure builds, the alarm/pressurized indicator should change from red to green. The purging indicator should change from black to yellow whenever purge gas flows into the system.



- Turn off the purge supply at its source and wait for the Alarm/Pressurized indicator to turn red and the Purging indicator to turn black.
- Repeat steps 1 through 3 several times to confirm indicator operation.

5. **Turn on the purge supply, watch the indicators and begin timing when the Purging indicator turns yellow.**
6. **Verify that power remains off while the enclosure is purging.**
7. **Continue timing until power is applied to the instrument.**

Verify that the instrument powers on and that the time is at or in excess of the minimum purge time listed on the purge specifications label (a tolerance of +20% is acceptable), continue on to verify the leakage compensation valve operation.

If the time is less than the minimum purge time, contact technical support.

Fine-tuning leakage compensation

After power has been applied, the purging valve closes and air flow into the enclosure is controlled by the leakage compensation valve. Setting an appropriate working pressure saves purge gas. .

The leakage compensation valve may need to be adjusted if:

- the enclosure is modified
- gland plates are added or replaced
- changes are made to the purge system
- the enclosure cannot maintain pressure
- air is constantly flowing through the relief valve
- the purging indicator cycles rapidly.

To adjust the valve:

1. **If you have not already done so, turn on the purge supply and wait for the enclosure to pressurize and power to come on.**
2. **Check the air flow through the relief valve.**

If air is constantly flowing, the leakage compensation valve is open too far. Continue to step 3 to adjust the valve.

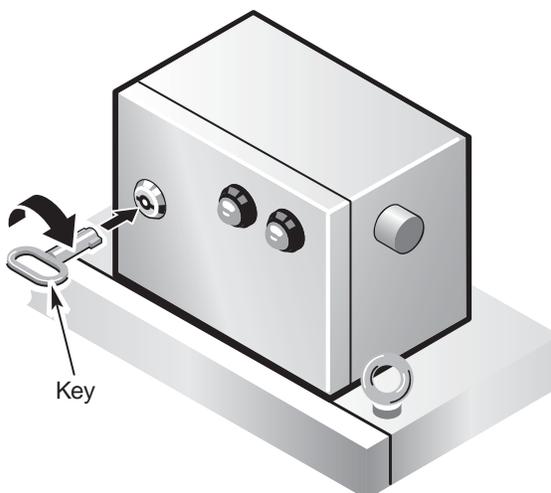
If the valve is opening and closing rapidly, the leakage compensation valve setting requires minor adjustment. Continue to step 3 to adjust the valve.

If the relief valve remains closed but the enclosure cannot maintain pressure, the leakage compensation valve is closed too far. Continue to step 3 to adjust the valve.

If no air is flowing and the compartment remains pressurized, no adjustment is needed. The analyzer is commissioned.

If the relief valve opens occasionally (for example, every 15 seconds or more) and the compartment remains pressurized, no adjustment is needed. The analyzer is commissioned.

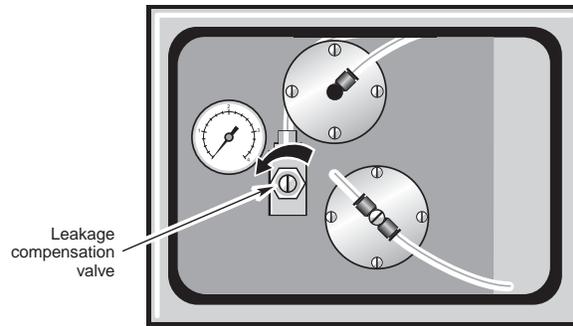
3. Use the key and open the MiniPurge compartment.



4. Use a flat-blade screwdriver to adjust the leakage control valve.

Turn the control clockwise to close the valve.

Turn the control counterclockwise to open the valve.



When properly adjusted, the relief valve should remain closed and the compartment should remain pressurized. The relief valve occasionally opening is not a cause for concern.

If the valve cannot be properly adjusted, recalibrate the purge system.

Commissioning an Antaris EX-Z2

Before bringing the analyzer on line for the first time, you must clear the supply line of debris and condensation, verify that the pressure indicators and alarms are operating correctly, and in some cases, fine-tune the leakage compensation valve. You will need the following tools for these procedures:

- flat-blade screwdriver

Clearing the purge supply line

To remove debris and condensation from the purge gas supply line:

1. **Disconnect the supply line from the inlet to the purge system.**
2. **Blow clean, dried air or nitrogen through the supply line for at least 15 seconds per meter (3 feet) of supply pipe length.**

This removes any debris or condensation.

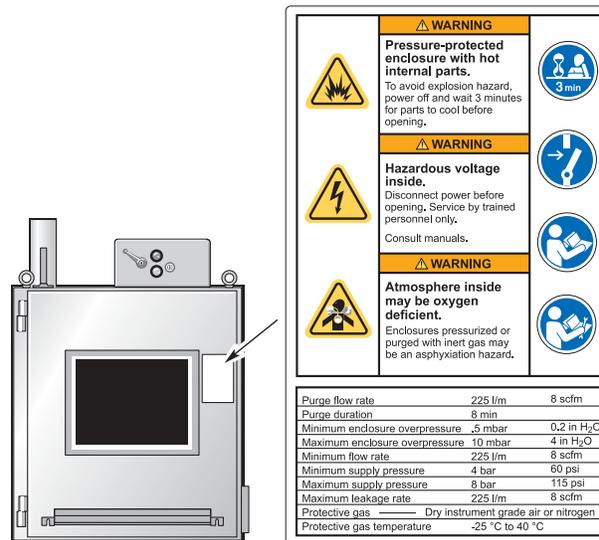
3. **If there are questions about the supply line pressure, connect a pressure gauge and confirm that the supply line pressure being delivered to the enclosure inlet is between 4 barg and 8 barg, 60 psi and 115 psi, or 400 kPA and 800 kPA.**
4. **Turn off the purge gas and reconnect the supply line to the purge inlet.**

Confirming alarm and indicator operation

Each Antaris EX-Z2 analyzer includes a purge system and pressure sensors. To verify that the system is operating properly:

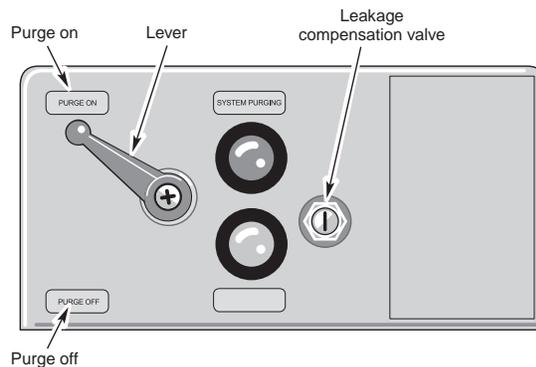
1. **Turn on the purge gas supply regulator to normal operating pressure.**

Check the label on the front of the analyzer if you are unsure of the correct normal operating pressure.



2. Check the alarm/pressurized and purging indicators.

Move the purge valve control lever to the Purge ON position. As the pressure builds, the alarm/pressurized indicator should change from red to green. The purging indicator should change from black to yellow.



3. Turn off the purge supply, wait for the Alarm/Pressurized indicator to turn red and the Purging indicator to turn black.

4. Repeat steps 1 through 3 several times to confirm indicator operation.

Fine tuning leakage compensation

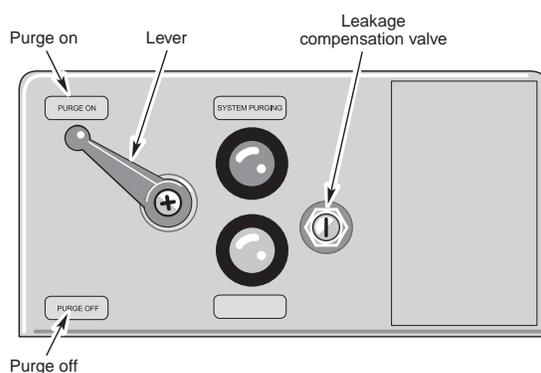
After enclosure has been pressurized, the purge valve needs to be closed to allow the leakage compensation valve to control air flow into the enclosure. Setting an appropriate working pressure saves purge gas.

The leakage compensation valve may need to be adjusted if:

- the enclosure is modified
- gland plates are added or replaced
- changes are made to the purge system
- the enclosure cannot maintain pressure
- air is constantly flowing through the relief valve
- the purging indicator cycles rapidly.

To adjust the valve:

1. **If you have not already done so, turn on the purge supply, move the purge valve lever to the Purge ON position, wait for the enclosure to pressurize and then move the lever to the Purge OFF position.**



2. **Check the air flow through the relief valve.**

If air is constantly flowing, the leakage compensation valve is open too far. Continue to step 3 to adjust the valve.

If the valve is opening and closing rapidly, the leakage compensation valve setting requires minor adjustment. Continue to step 3 to adjust the valve.

If the relief valve remains closed but the enclosure cannot maintain pressure, the leakage compensation valve is closed too far. Continue to step 3 to adjust the valve.

If the alarm/pressurized indicator flashes briefly to red when the purge lever is turned off, the leakage compensation valve is closed too far. Continue to step 3 to adjust the valve.

If no air is flowing and the compartment remains pressurized, no adjustment is needed. The analyzer is commissioned.

If the relief valve opens occasionally and the compartment remains pressurized, no adjustment is needed. The analyzer is commissioned.

3. Use a flat-blade screwdriver to adjust the leakage control valve.

Turn the control clockwise to close the valve.

Turn the control counterclockwise to open the valve.

When properly adjusted, the relief valve should remain closed and the compartment should remain pressurized. The relief valve occasionally opening is not a cause for concern.

If the valve cannot be properly adjusted, follow the procedure “Recalibrating an Antaris EX-Z2” later in this manual.

Commissioning an Antaris EX-IP

If the analyzer will be purged, you must clear the supply line of debris and condensation and connect the purge supply line to the enclosure.

For all systems, the enclosure must be connected to an AC power source.

Connecting purge gas

If you are not purging your system, skip this procedure. If your system will be purged, your facility is responsible for providing a shut off valve and the appropriate plumbing connections. The purge must be regulated to the appropriate pressure and flow rate shown in the specifications tables.

To connect purge:

- 1. Disconnect the purge gas supply line from the inlet to the enclosure purge system.**
- 2. Blow clean, dried air or nitrogen through the supply line for at least 15 seconds per meter (3 feet) of supply pipe length.**

This removes any debris or condensation.

- 3. Turn off the purge supply.**
- 4. Connect the purge line to the purge gas inlet on the side of the enclosure.**

Be sure that the regulators are mounted within 2 degrees of vertical for proper operation.

- 5. Make sure the line is set for the required pressure and flow, and then turn on the purge gas supply.**

Connecting electrical power

Follow these steps to connect the system to an AC power source:

1. **Remove the cap from the power connector on the side of the analyzer and from the plug on the end of the power cord.**
2. **Connect the power cord to the enclosure.**

Carefully align the pins on the cable connector with the holes on the enclosure connector and then press straight in.

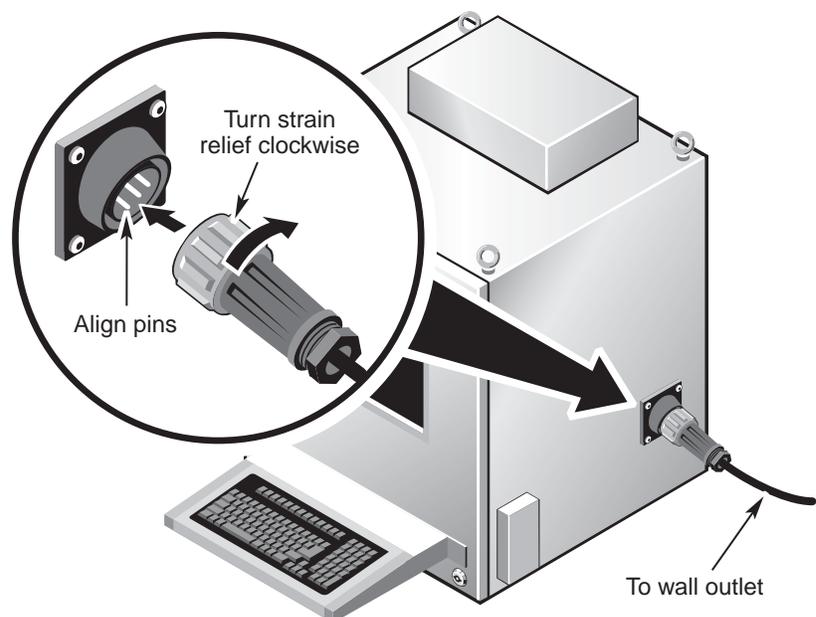
Turn the strain relief clockwise until the seal is tightly closed.

⚠ Warning

Avoid shock hazard. Always verify that the AC power outlet is rated properly for the environment before connecting the power cord. ▲

3. **Connect the power cord to the wall outlet or other AC power source.**

Verify that the outlet is rated for the environment.



Recalibrating the purge system

The purge system, alarms and indicators must be recalibrated whenever:

- new connection ports have been tapped into the enclosure
- gland plate or seals have been replaced
- service procedures are performed
- the system is experiencing false pressure loss alarms
- new components are installed in the purge system

Recalibrating an Antaris EX-Z1

In the event that you cannot fine tune the leakage control valve or the alarm/pressure or purging indicators are not operating correctly, you will need to recalibrate relief valve, recalibrate the alarm/pressurized and pressurizing indicators, and test the pressure loss alarm. You also may need to recalibrate the purge system after replacing supply parts or altering the enclosure. You will need the following tools for these procedures:

- MiniPurge enclosure key
- Flat-blade screwdriver
- 4 mm OD nylon tubing
- a pressure gauge or water manometer
- stop watch or other timing device
- pencil or marker

Clearing the purge supply line

To remove debris and condensation from the purge gas supply line:

- 1. Disconnect the supply pipe from the inlet to the purge system.**
- 2. Blow clean, dried air or nitrogen through the supply line for at least 15 seconds per meter (3 feet) of supply pipe length.**

This removes any debris or condensation.

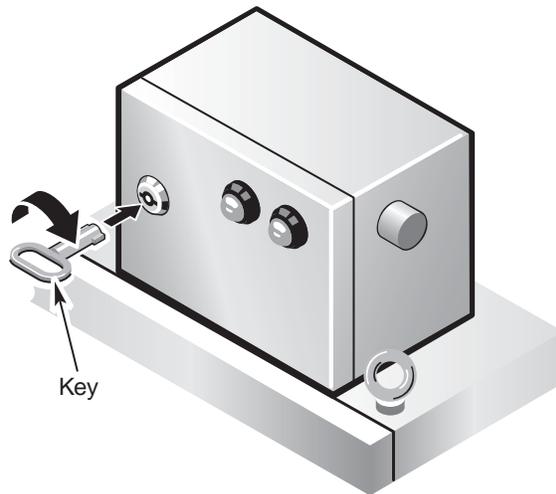
- 3. Connect a pressure gauge and confirm that the supply line pressure being delivered to the enclosure inlet is between 4 barg and 8 barg, 60 psi and 115 psi, or 400 kPA and 800 kPA.**
- 4. Turn off the purge gas and reconnect the supply line to the MiniPurge inlet.**

Calibrating the relief valve

A spark arrestor relief valve protects the enclosure from over pressurization. Use the following steps to confirm that the valve is calibrated properly.

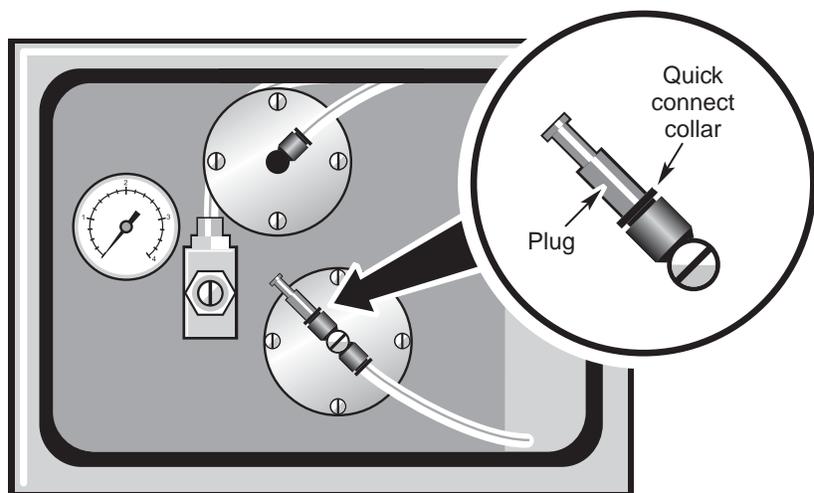
1. Use the key and open the Mini Purge compartment.

If you are unfamiliar with opening the Mini Purge compartment, see the documentation that came with the enclosure.



2. Press down on the quick connect collar and remove the red plug on the low pressure sensor.

This opens the system pressure test point.

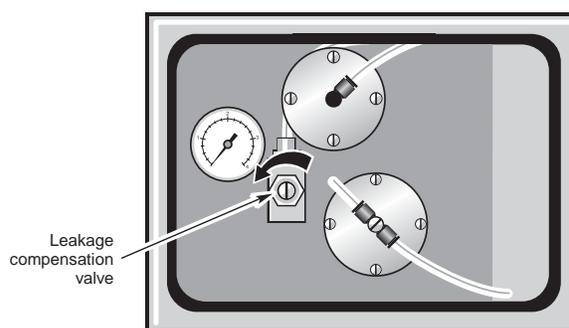


3. Use a 4 mm OD nylon tube to connect a temporary pressure gauge or water manometer to the system pressure test point.

Press down on the quick connect collar and insert nylon tubing into the test point. Release the collar to secure the tubing.

4. Use a flat-blade screwdriver to open the leakage compensation valve completely.

Turn the valve counterclockwise as far as possible.



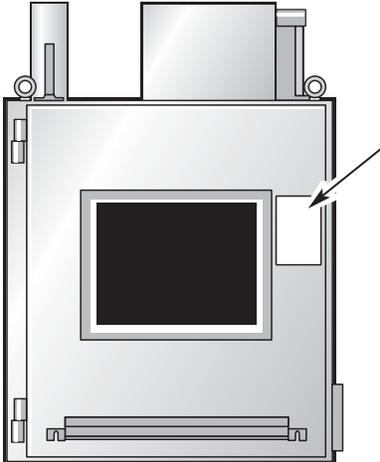
5. Slowly open the supply regulator and allow the enclosure pressure to rise until the relief valve opens.

You will hear gas flowing through the relief valve once the valve opens.

Note The relief valve contains a spark arrestor. ▲

6. Check the pressure gauge or water manometer to be sure that the relief valve opened at or below the maximum pressure indicated on the system purge label.

Tolerances of ± 2 mbar, ± 0.8 in H₂O, and ± 200 Pa are acceptable.



  	⚠ WARNING Pressure-protected enclosure with hot internal parts. To avoid explosion hazard, power off and wait 3 minutes for parts to cool before opening.																															
	⚠ WARNING Hazardous voltage inside. Disconnect power before opening. Service by trained personnel only. Consult manuals.	 																														
	⚠ WARNING Atmosphere inside may be oxygen deficient. Enclosures pressurized or purged with inert gas may be an asphyxiation hazard.																															
<table border="1"> <tr> <td>Purge flow rate</td> <td>225 l/m</td> <td>8 scfm</td> </tr> <tr> <td>Purge duration</td> <td>8 min</td> <td></td> </tr> <tr> <td>Minimum enclosure overpressure</td> <td>.5 mbar</td> <td>0.2 in H₂O</td> </tr> <tr> <td>Maximum enclosure overpressure</td> <td>10 mbar</td> <td>4 in H₂O</td> </tr> <tr> <td>Minimum flow rate</td> <td>225 l/m</td> <td>8 scfm</td> </tr> <tr> <td>Minimum supply pressure</td> <td>4 bar</td> <td>60 psi</td> </tr> <tr> <td>Maximum supply pressure</td> <td>8 bar</td> <td>115 psi</td> </tr> <tr> <td>Maximum leakage rate</td> <td>225 l/m</td> <td>8 scfm</td> </tr> <tr> <td>Protective gas</td> <td colspan="2">Dry instrument grade air or nitrogen</td> </tr> <tr> <td>Protective gas temperature</td> <td colspan="2">-25 °C to 40 °C</td> </tr> </table>			Purge flow rate	225 l/m	8 scfm	Purge duration	8 min		Minimum enclosure overpressure	.5 mbar	0.2 in H ₂ O	Maximum enclosure overpressure	10 mbar	4 in H ₂ O	Minimum flow rate	225 l/m	8 scfm	Minimum supply pressure	4 bar	60 psi	Maximum supply pressure	8 bar	115 psi	Maximum leakage rate	225 l/m	8 scfm	Protective gas	Dry instrument grade air or nitrogen		Protective gas temperature	-25 °C to 40 °C	
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Protective gas temperature	-25 °C to 40 °C																															

7. Turn off the purge gas supply line and then repeat steps 5 and 6 several times to confirm that the relief valve is properly calibrated.

If the valve is properly calibrated continue on to calibrate the alarm/pressurized indicator.

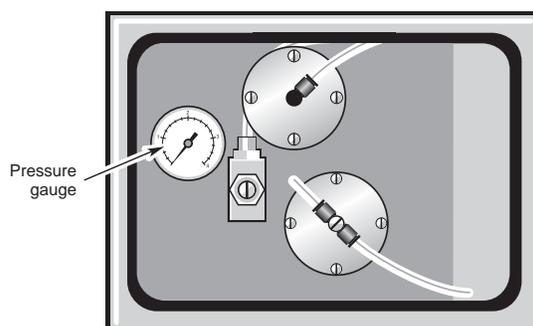
If it is not properly calibrated, contact technical support.

Calibrating the alarm/pressurized indicator

Follow these steps to calibrate the indicators:

1. Turn on the purge gas supply regulator until the pressure delivered to the enclosure inlet is between 4 barg and 8 barg, 60 psi and 115 psi, or 400 kPA and 800 kPA.
2. Check the pressure gauge permanently installed inside the MiniPurge enclosure.

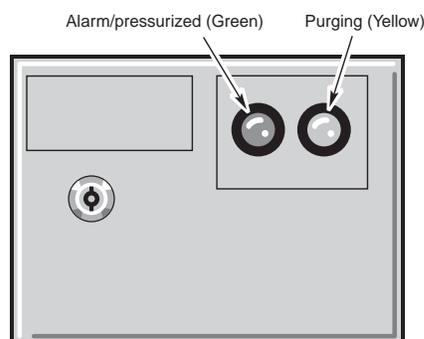
The gauge should read 2 bar, 30 psi or 200 kPA.



3. Check the alarm/pressurized and purging indicators.

Alarm/pressurized should be green.

Purging should be yellow.



4. If the indicators are the correct color, continue on to step 5.

If the indicators are not the correct color, recheck the input pressure and flow to be sure the pressure is in the appropriate range.

If the inlet pressure and flow is correct, but the indicator colors are not correct, contact technical support.

5. Turn off the purge supply, wait for the Alarm/Pressurized indicator to turn red and the Purging indicator to turn black.

6. Turn on the purge supply, watch the indicators and begin timing when the Purging indicator turns yellow.

7. Continue timing until power is applied to the instrument.

If the time is at or in excess of the minimum purge time listed on the purge specifications label (a tolerance of +20% is acceptable), continue on to calibrate the leakage compensation valve.

If the time is less than the minimum purge time, contact technical support.

Calibrating leakage compensation

After power has been applied, the purging valve closes and air flow into the enclosure is controlled by the leakage compensation valve. The initial setting (fully open) is usually too high. Setting an appropriate working pressure saves purge gas.

To adjust the valve:

- 1. Watch the internal gauge and close the leakage control valve slowly until the relief valve closes.**

The leakage control valve was much too far open. Once the leakage control valve is closed enough to allow the relief valve to close, the relief valve starts to open intermittently as the pressure rises to the point where it exceeds the relief valve opening pressure. When the valve opens, pressure falls quickly to the point where the valve closes again and pressure begins to build again.

Note the pressure. This is the cycling pressure.

- 2. Watch the internal gauge and slowly close the leakage control valve until the pressure drops to a point where the relief valve remains closed all the time.**

Note the pressure. This is the stable pressure.

- 3. Watch the internal gauge and slowly open the leakage control valve until the enclosure pressure reaches the mid-point between the cycling pressure and the stable pressure.**

This setting is the working pressure for the enclosure. It should be around 5 mbarg, 2 in H₂O, or 500 Pa

Checking the minimum pressure sensor

The minimum pressure sensor activates and alarm and trips power to the enclosure. To confirm that the sensor is operating correctly:

- 1. Use a pencil or marker to mark the working pressure setting and the “12 o’clock” setting on the leakage control valve.**
- 2. Slowly close the leakage control valve until the alarm/pressurized indicator turns red. Count the number of turns. This will help you quickly return to the working pressure when this check is complete.**

Note the pressure and compare it to the minimum pressure specification on the purge system label. The pressure should be at or above the minimum pressure listed in the specification.

Verify that power trips. If power remains on at pressures below the minimum, contact technical support.

- 3. Return the leakage control valve to the working pressure position.**

The enclosure pressure should immediately settle down at the correct working pressure.

- 4. Turn off the purge supply and then remove the test point gauge and reinstall the red plug.**
- 5. Close and lock the MiniPurge compartment.**
- 6. Turn on the purge gas supply until the pressure delivered to the enclosure inlet is between 4 barg and 8 barg, 60 psi and 115 psi, or 400 kPA and 800 kPA.**

Recalibrating an Antaris EX-Z2

This procedure should be run after the purge system is replaced, when the purge system is not working properly, or when the customer requires it. You must clear supply line of debris and condensation and confirm that the relief valve, alarm/pressurized and purging indicators, and pressure loss alarm are operating correctly. You will need the following tools for these procedures:

- flat-blade screwdriver
- 4 mm OD nylon tubing
- a pressure gauge or water manometer
- stop watch or other timing device
- pencil or other marker

Clearing the purge supply line

To remove debris and condensation from the purge gas supply line:

- 1. Disconnect the supply line from the inlet to the purge system.**
- 2. Blow clean, dried air or nitrogen through the supply line for at least 15 seconds per meter (3 feet) of supply pipe length.**

This removes any debris or condensation.

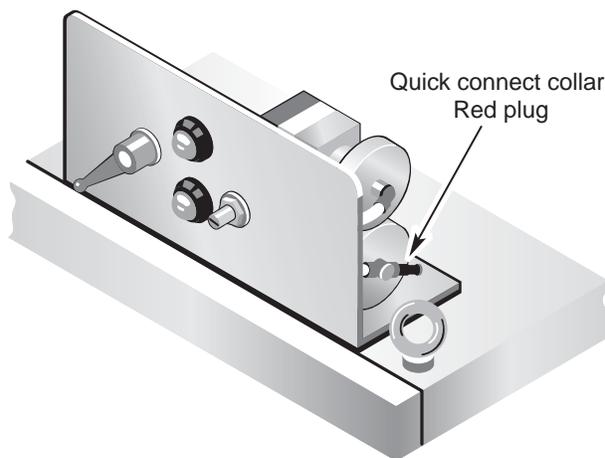
- 3. Connect a pressure gauge and confirm that the supply line pressure being delivered to the enclosure inlet is between 4 barg and 8 barg, 60 psi and 115 psi, or 400 kPA and 800 kPA.**
- 4. Turn off the purge gas and reconnect the supply line to the MiniPurge inlet.**

Checking and calibrating the purge system

Follow these steps to verify that the purge system is operating properly.

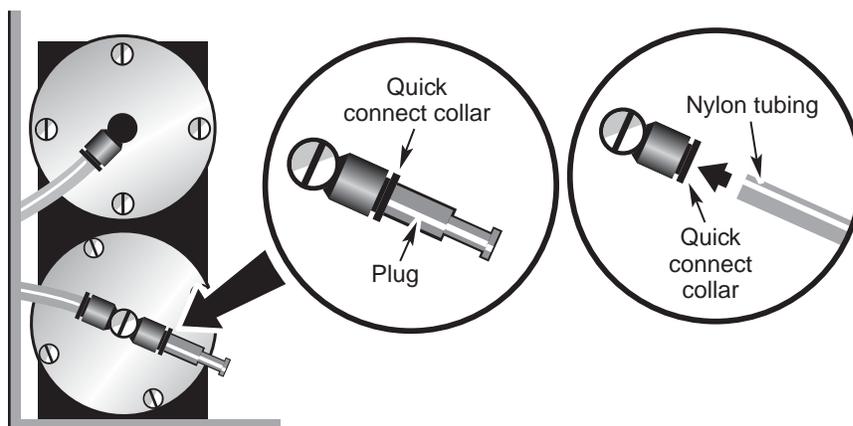
1. **Press down on the quick connect collar and remove the red plug on the low pressure sensor.**

This opens the system pressure test point.



2. **Use a 4 mm OD nylon tube to connect a temporary pressure gauge or water manometer to the system pressure test point.**

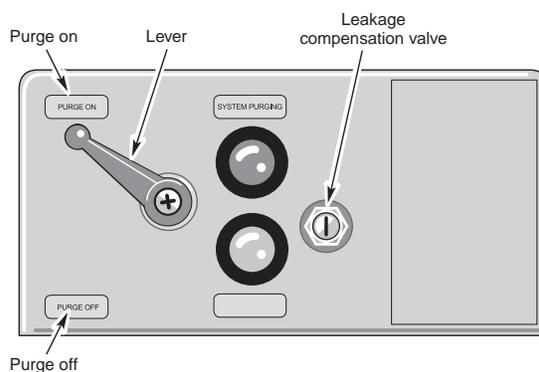
Before you start, be sure to initialize (zero) the meter. To connect the tubing to the instrument, press down on the collar, remove the plug, and insert the nylon tubing into the quick connect test point. Release the collar to secure the tubing.



3. Use a flat-blade screwdriver to close the leakage compensation valve completely.

Turn the valve clockwise as far as possible.

4. Move the lever on the MiniPurge panel to the Purge On position.



5. Slowly open the supply regulator and allow the enclosure pressure to rise until the relief valve opens.

You will hear the valve open and gas flowing through the valve.

Note The relief valve contains a spark arrestor. ▲

6. Check the alarm/pressurized and purging indicators.

Alarm/pressurized should be green.

Purging should be yellow.

7. Turn off the purge supply at the source and check the alarm/pressurized and purging indicators.

Alarm/pressurized should be red.

Purging should be black.

8. Turn on the purge supply and repeat steps 6 and 7.

If the indicators are the correct color, continue on to step 9.

If the indicators are not the correct color, recheck the input pressure and flow to be sure the pressure is in the appropriate range.

If the inlet pressure and flow is correct, but the indicator colors are not correct, contact technical support.

9. Move the lever on the MiniPurge panel to the Purge Off position.

10. Open (turn counter-clockwise) the leakage compensation valve on the front of the purge system until the alarm/pressurized indicator turns green. Then slowly close (turn clockwise) the leakage compensation valve until the alarm/pressurized indicator turns red.

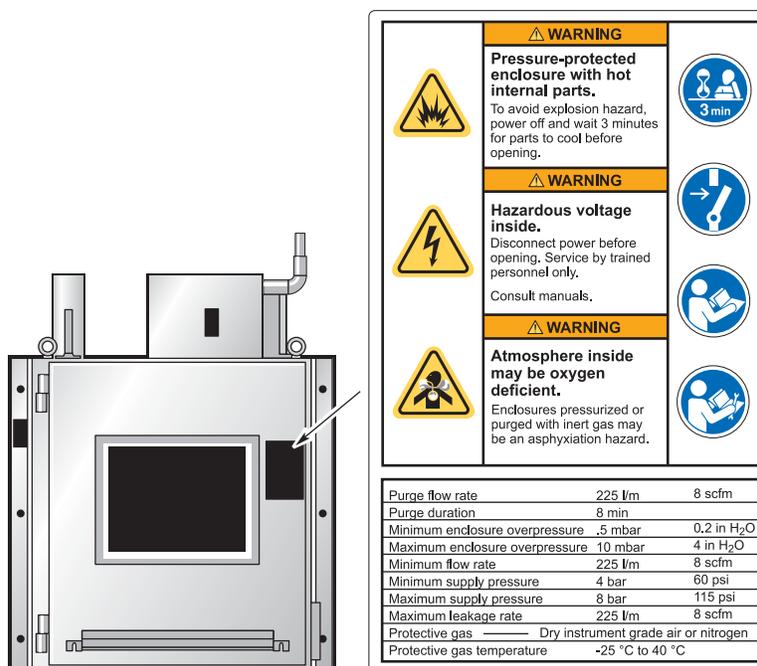
Note the pressure on the gauge just before the indicator turns red and compare it to the minimum pressure specification on the purge system label. The pressure should be at or above the minimum pressure listed in the specification.

11. Open (turn counter-clockwise) the leakage compensation valve until the relief valve on the side of the enclosure opens.

The system purging indicator will turn yellow and stay on. You will hear the valve open and gas flowing through the valve.

12. Check the pressure gauge or water manometer to be sure that the relief valve opened at or below the maximum pressure indicated on the system purge label.

Tolerances of 2 mbarg, 0.8 in H₂O, and 200 Pa are acceptable. If the purge system is not operating within these tolerance specifications, contact Thermo Fisher Scientific technical support.



13. **Close (turn clockwise) the leakage compensation valve until the gauge reads about 2.7 inches of water.**

Close the valve until the purging indicator no longer cycles on and off. The relief valve will be closed and the enclosure will just maintain operating pressure. Setting an appropriate operating pressure saves purge gas.

14. **Turn off the purge supply and then remove the test point gauge and reinstall the red plug.**
15. **Turn on the purge gas supply until the pressure delivered to the enclosure inlet is between 4 barg and 8 barg, 60 psi and 115 psi, or 400 kPA and 800 kPA.**

Normal operation

During the course of operation, you may need to power the analyzer on and off, open the enclosure for scheduled maintenance, and access the internal spectrometer for scheduled maintenance tasks. For flameproof, explosion-proof installations, this may require installing a service override.

Warning

Avoid explosion and fire hazards. Always obtain the appropriate work permits and confirm that the flash point of the surrounding atmosphere is greater than the temperature of the internal components before opening the enclosure for scheduled maintenance. See the maintenance schedule for more details. ▲

Powering on

Once the analyzer has been commissioned, use the following procedures for power on during normal operation.

Danger

Do not operate the instrument without following the safety precautions described in this manual and the documentation that came with the enclosure. ▲

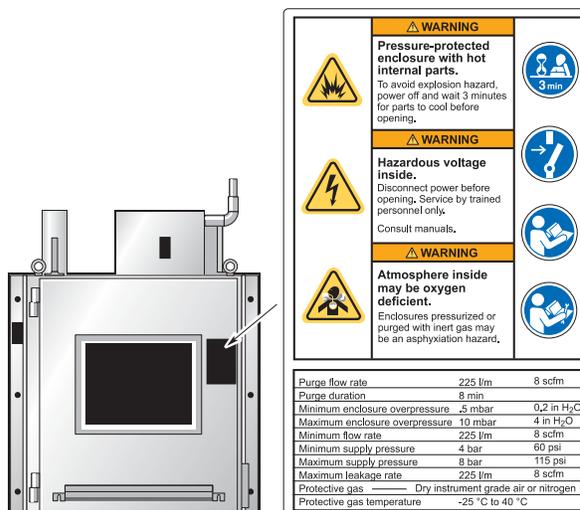
Antaris EX-Z1

For EX-Z1 systems, a leakage compensation system is used. Initially a high flow of protective gas is passed through the enclosure, exiting through the relief valve. After the initial purging, the flow of protective gas continues through an adjustable valve so that it just compensates for any leakage from the pressurized enclosure in addition to maintaining its pressurization.

To turn on the Antaris EZ-Z1:

- 1. Turn on the purge gas flow.**
- 2. Wait for the enclosure pressure and purge flow to come up to the appropriate levels.**

See the label on the enclosure for appropriate pressures and flow rates. Both the pressure and flow rate must be correct to start the purge timer.



3. After the purge cycle completes, power will be applied automatically by the purge timer.

Antaris EX-Z2 In general, the power on procedure for Zone 2 installations includes these steps:

1. Turn on the purge gas supply until the purge gas being delivered to the inlet is at a pressure between 4 barg and 8 barg, 60 psi and 115 psi, or 400 kPA and 800 kPA.
2. Move the lever to the Purge On position.
3. Wait until the purge indicator indicates appropriate pressure and flow has been reached.
4. Check the labeling on the enclosure, and wait the specified purge stabilization time.

5. **Move the lever to the Purge Off position.**

6. **Apply power to the branch circuit.**

Antaris EX-IP

In general, the power on procedure for EX-IP installations includes these steps:



Danger

Avoid explosion and fire hazards. EX-IP systems offer no hazardous location protection. Never apply power to an EX-IP system in a volatile atmosphere. ▲



Warning

Avoid shock hazard. Always use a power outlet that maintains the hose down rating of the analyzer. ▲

1. **Connect the power cord to the EX-IP rated, switched outlet that services the instrument.**

2. **Apply power to the outlet.**

Powering off

Specific information about power-off procedures, as well as component cooling cycles and times, is included in documentation that accompanied the enclosure and on labels on the enclosure itself. Use these instructions whenever you wish to power off the instrument.



Danger

Avoid explosion and fire hazard. The NIR source is very hot. In volatile environments always wait at least the amount of time specified on the labeling on the enclosure before opening the enclosure.



This allows internal components to cool to a safe level. ▲

**Antaris EX-Z1
and Antaris EX-Z2**

In general, the power off procedure for Zone 1 and Zone 2 installations includes these steps:

- 1. Remove the power from the branch circuit servicing the instrument.**
- 2. Turn off the purge gas flow.**
- 3. If you must open the enclosure, wait at least the prescribed time to allow internal parts to cool below the flash point of the surrounding atmosphere.**

Antaris EX-IP

In general, the power off procedure for EX-IP installations includes these steps:

- 1. Remove the power from the branch circuit servicing the instrument.**
- 2. Disconnect the power cord from the outlet.**

Opening the enclosure

Specific information about component cooling cycles and times is included in documentation that accompanied the enclosure and on labels on the enclosure itself. Use these instructions whenever you wish to open the enclosure.

Danger

Avoid explosion and fire hazard. The NIR source is very hot. In volatile environments always wait at least the amount of time specified on the labeling on the enclosure before opening the enclosure.



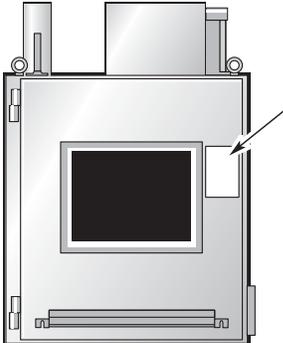
This allows internal components to cool to a safe level. ▲

To open the enclosure:

1. **Remove the power from the branch circuit servicing the instrument.**

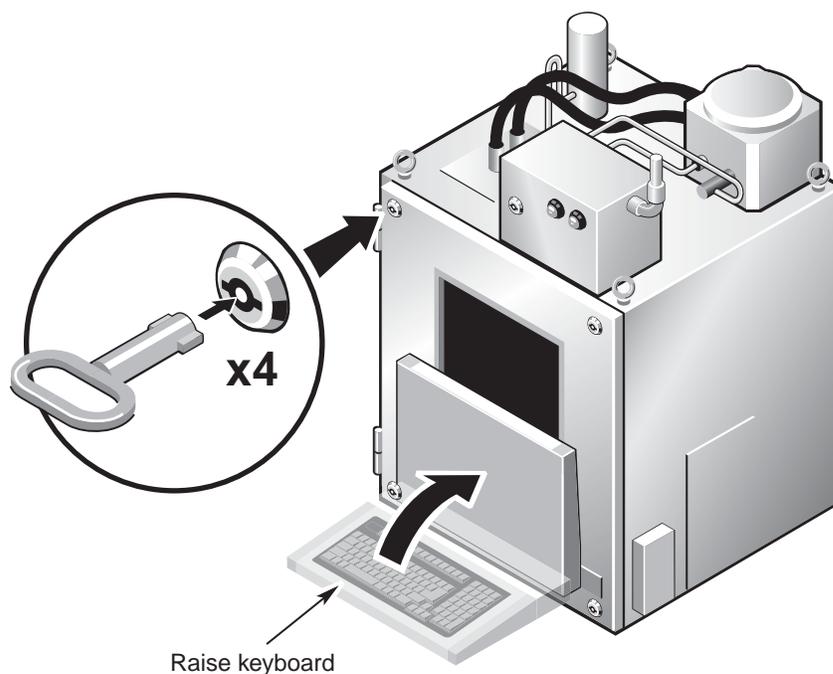
2. **Wait at least at least the specified cooling time before opening the enclosure to allow internal parts to cool below the flash point of the surrounding atmosphere.**

Cooling time is listed on a label on the outside of the enclosure.



	WARNING Pressure-protected enclosure with hot internal parts. To avoid explosion hazard, power off and wait 3 minutes for parts to cool before opening.																															
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3. If the system is equipped with an external keyboard, raise it.
4. Use the key to move all four latches to the unlocked position and then open the enclosure door.



Accessing the internal spectrometer

Data collection is performed by a NIR spectrometer located inside the enclosure. It must be accessed for a variety of periodic maintenance tasks.

To access the internal spectrometer:

1. **Open the enclosure.**
2. **Slide the drawer out.**

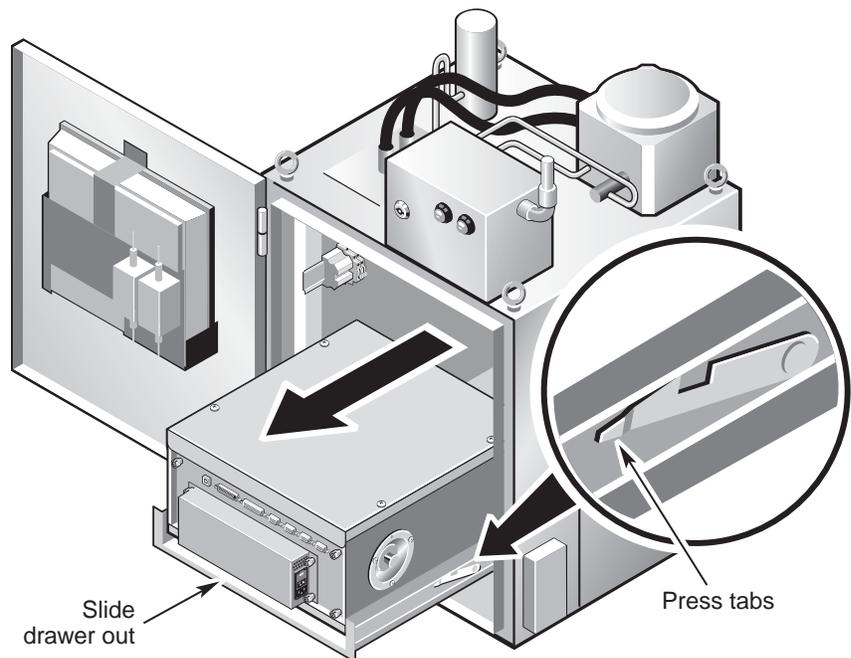
There are three screws on each side of the drawer. The top and bottom screws are a part of the drawer assembly. Do not remove those screws.

The center screw prevents the drawer from sliding. Once you remove this screw from each rail, the drawer easily slides out to allow access to the internal spectrometer.

Save the screws. You will need them to secure the drawer when you are finished.

3. **When you are finished, press the tabs on the drawer rails and slide the drawer back into the enclosure.**
4. **Reinstall the screws you removed earlier.**

These protect the drawer from unintentional sliding.



Service overrides

Antaris EX-Z1 systems are designed to shutdown immediately upon loss of pressure in the enclosure. If the atmosphere is known to be non-hazardous, the enclosure can be opened for maintenance or service while energized. The power must be removed if the atmosphere could become hazardous. The enclosure must be sealed and a normal power up procedure completed once the service procedure is complete.

⚠ Danger Avoid explosion and fire hazard. The NIR source is very hot. In volatile environments always wait at least the amount of time specified on the labeling on the enclosure before opening the enclosure.



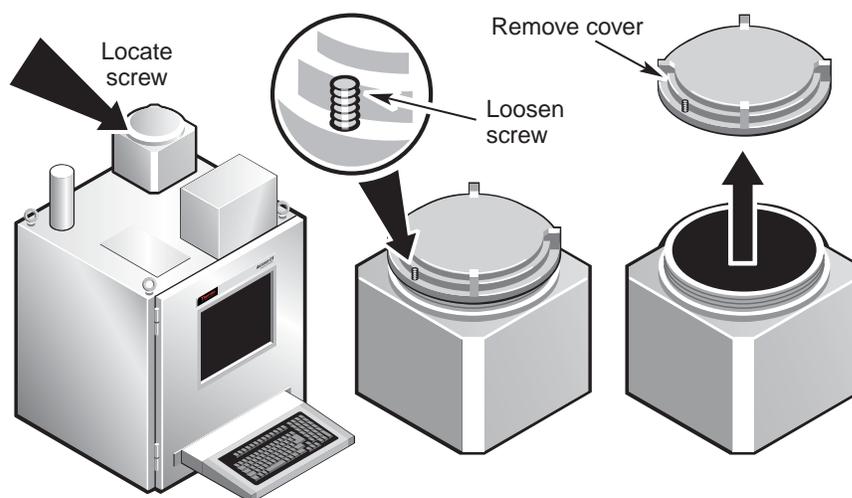
This allows internal components to cool to a safe level. ▲

This procedure requires the following tools:

- Service override switch box
- 1/8-inch flat-blade screwdriver

Use the procedure that follows to override the protections for service and then return the analyzer to normal operating mode.

- 1. Confirm that the atmosphere is non-hazardous.**
- 2. Loosen the set screw on the MiniPurge interface unit (MIU) and then remove the cover.**



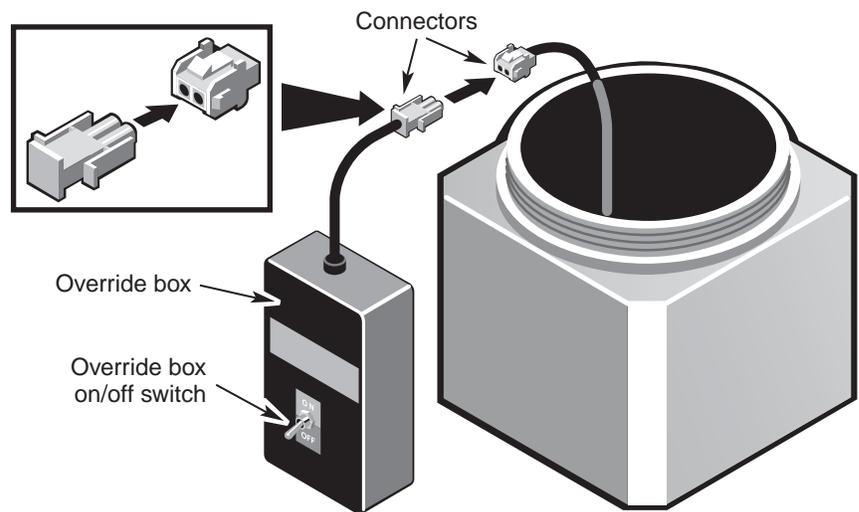
- 3. Locate the Service Override connector inside the MIU and connect the service override switch box.**

The service override connectors are keyed so you cannot plug the switch box in backwards.

4. Use the service override switch to power the analyzer on and off.

ON = On
OFF = Off

The service override switch box bypasses the hazardous location protection systems and immediately applies power to the instrument.



5. Upon completion of the service procedure, disconnect the service override switch box.

To prevent damage to the cable, always grasp the connector when disconnecting the switch box.

6. Replace the MIU cover and tighten the set screw.

7. Follow the instructions in the Installation Process chapter and commission the analyzer.

Antaris EX-Z1 Specifications

North American regulatory compliance

The table that follows lists the regulations and product standards that apply for models intended for installation in North America.

Type	Classifications, regulations and product standards
System classifications	Class I, Division 1, Groups C, D, T4 Class I, Zone 1, d ia [ia] px II B T4
Type of protection	Px according to NFPA496 and CSA-E60079-2 NFPA 496 (2003) Purged and pressurized enclosures for electrical equipment. CAN/CSA-E60079-0 (2002) Electrical apparatus for explosive atmospheres – Part0: General requirements CAN/CSA-E60079-2 (2002) Electrical apparatus for explosive atmospheres – Part2: Pressurized enclosures “P” ANSI/UL-913 (2004) Intrinsically safe apparatus ANSI/UL-1203 (2004) Explosion-proof electrical equipment
Other regulations and product standards	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) EN 61326 (2003) Electrical equipment for measurement, control and laboratory use - EMC requirements (Class A limits) US 47 CFR Part 15 Radio frequency devices (Class A Digital Device) US 21CFR1040.10 Performance standards for light-emitting products - Laser products EN60825-1 (2002) Safety of laser products - Part 1: Equipment classification, requirements and user's guide IEC 60529 (2001) Degrees of protection provided by enclosures (IP65)

International regulatory compliance

The table that follows lists the regulations and product standards that apply for models intended for installation outside North America.

Type	Classifications, regulations and product standards
System classifications	 II 2 G EEx d px IIB T4
Type of protection	Px according to EN 50016 EN 50016 (2002) Electrical apparatus for potentially explosive atmospheres – Pressurized apparatus “P”
Other regulations and product standards	EN61010-1 (2001) Safety requirements for electrical equipment for measurement, control, and laboratory use - Part 1: General requirements. (Installation category II) (Pollution degree 2) 89/336/EEC (1989) Electromagnetic compatibility directive 2004/108/EC (2004) Revised electromagnetic compatibility directive 73/23/EEC (1973) Low voltage directive EN60825-1 (2002) Safety of laser products - Part 1: Equipment classification, requirements and user's guide EN 61326 (2003) Electrical equipment for measurement, control and laboratory use - EMC requirements (Class A limits) EN60825-1 (2002) Safety of laser products - Part 1: Equipment classification, requirements and user's guide IEC 60529 (2001) Degrees of protection provided by enclosures (IP65)

Environmental conditions

To ensure proper operation, maintain the environment within the following specifications.

Item	Specification	
Temperature	Cooler on	-20 °C (-4 °F) min
	Safe operating	40 °C (104 °F) max
	Optimum	10 °C (14 °F) min 30 °C (86 °F)max
	Cooler off	
	Safe operating	-20 °C (-4 °F) min 24 °C (75 °F) max
	Shipping and storage	-20 °C (14 °F) min 50 °C (122 °F) max
Humidity	Purge on	
	Safe operating	0-100% condensing
	Purge off	
	Safe operating	5-95% noncondensing
	Shipping and storage	5-95% noncondensing
Magnetic fields	5.5 meters (18 feet) min to intense fields	
Vibration	Isolation recommended. Vibrations from motors, pumps, and compressors can distort spectral data.	

Utilities

Each system requires an AC electrical service, fiber optic cabling for sample data collection, Ethernet for remote computer and spectrometer control, and nitrogen or air for purge and cooling. Either gas must be cleaned and dried. Depending on your application, optional analog and digital PLC transmission wiring also may be used. All wire must comply with local codes.

Item	Specification	
Electrical	AC service	3-wire: live, neutral, earth ground
		Dedicated, switched, 15A circuit
	Material	10–14 AWG (2–5 mm ²) copper wire
		Tighten input terminals to 0.5 Nm torque
	Input voltage	200 to 264 VAC
	Input current	3.5 A max
	Startup current	15 A max
	Line frequency	50 to 60 Hz
Line disturbance	Sags, surges or other line disturbances must not exceed 10% of input voltage (even for a half cycle)	
Fiber optic	Noise	< 2 volts (common mode) < 20 volts (normal mode)
	Connections	SMA905
	Bend radius	per manufacturer's specification

Continued...

Item	Specification		
Gas	Type	Air or nitrogen clean, dried.	
	Filtering	10-micron replaceable filter	
	Dew point	-70 °C (-94 °F) or lower	
	Pressure and flow rate	Source to purge	4-8 bar gauge 60-115 psi gauge 225 l/m 8 scfm max
		Source to cooler	4-7 bar gauge 60-100 psi gauge 700 l/m 25 scfm max

Electrical

All electrical signals (power, alarm, and I/O) entering or exiting the enclosure must disconnect upon loss of enclosure pressure. Route all electrical signals through the explosion-proof/flameproof switches located outside the enclosure. Entry and exit must be through either a cable gland with armored cable or through a sealed conduit. All wiring must comply with local codes.

Plumbing and pipe fitting

Each system requires an AC electrical service, fiber optic cabling for sample data collection, Ethernet (only for remote computer and spectrometer control), and clean, dried air or nitrogen for purge and cooling. Depending on your application, optional analog and digital PLC transmission wiring also may be used.

Item	Specification
Electrical	enclosure: 0.5-inch NPT (3) male supply line: 0.5-inch NPT (3) female enclosure: 0.75-inch NPT (2) male supply line: 0.75-inch NPT (2) female cable gland with armored cable or sealed conduit
Enclosure purge	enclosure: 0.5-inch NPT male supply line: 0.5-inch NPT female
Cooler purge	enclosure: 0.5-inch NPT female supply line: 0.5-inch NPT male
Fiber optic	spectrometer: SMA 905 threaded connection cable: SMA 905 nut connector 1 meter tail required for spectrometer connection and serviceability. Label with connection and sampling location.

Weight and Mounting

Model	Weight	
	Metric	English
Antaris EX-Z1	137 kg	300 lb
Floor stand	35 kg	75 lb

Wall mounting

Each system must be mounted to a structural member capable of supporting four times the weight of the instrument.

All 6 bolts are required to safely secure the instrument to the wall.

The instrument must be accurately secured within 2 degrees of vertical.

The wall must be perpendicular to the floor within 2 degrees with respect to horizontal.

For anchoring the enclosure, we recommend using high-quality steel 10 mm (3/8 in) bolts that are capable of withstanding the following forces:

Force	Specification
Shear force	4715 N (1060 lb)
Tensile force	2800 N (630 lb)
Pull-out force	2800 N (630 lbs)

Floor mounting

Optionally, a system may be mounted to the floor. The floor must be capable of supporting two times the weight of the instrument and floor stand.

All fasteners, brackets, and bolts are required to safely secure the instrument to the stand.

In this configuration, the wall-mount flanges may be removed.

The instrument must be accurately secured within 2 degrees of vertical.

The floor used for mounting must be within 2 degrees of level for proper operation.

For anchoring the enclosure, we recommend using high-quality steel 10 mm (3/8 in) bolts that are capable of withstanding the following forces:

Force	Specification
Shear force	250 N (56 lb)
Tensile force	300 N (68 lb)
Pull-out force	30 N (68 lb)

Shelf or table top mounting

Optionally, a system may be mounted to a table top or shelf. The surface must be capable of supporting 274 kg (600 lb), or two times the weight of the instrument. See the section entitled “Lifting or moving” in the “Safety” chapter earlier in this manual for lifting/moving precautions.

In this configuration, the wall mount flanges may be removed.

The equipment must be on a surface that is within 2 degrees of level for proper operation.

For anchoring the enclosure, we recommend using high-quality steel 10 mm (3/8 in) bolts that are capable of withstanding the following forces:

Bolt characteristic	Specification
Shear force	250 N (56 lb)
Tensile force	300 N (68 lb)
Pull-out force	30 N (68 lb)

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Antaris EX-Z2 Specifications

North American regulatory compliance

All Antaris EX instruments comply with domestic and international safety regulations and applicable product standards. The table that follows lists the regulations and product standards that apply for EX-Z2 models intended for installation in North America.

Type	Classifications, regulations and product standards
System classifications	Class I, Division 2, Groups A, B, C, D, T4 Class I, Zone 2, nC pz IIC T4
Type of protection	Pz according to NFPA496 and CSA-E60079-2 NFPA 496 (2003) Purged and pressurized enclosures for electrical equipment. CAN/CSA-E60079-0 (2002) Electrical apparatus for explosive atmospheres – Part0: General requirements CAN/CSA-E60079-2 (2002) Electrical apparatus for explosive atmospheres – Part2: Pressurized enclosures “P” Px according to NFPA496 and CSA-E60079-2
Other regulations and product standards	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) EN 61326 (2003) Electrical equipment for measurement, control and laboratory use - EMC requirements (Class A limits) US 47 CFR Part 15 Radio frequency devices (Class A Digital Device) US 21CFR1040.10 Performance standards for light-emitting products - Laser products EN60825-1 (2002) Safety of laser products - Part 1: Equipment classification, requirements and user's guide IEC 60529 (2001) Degrees of protection provided by enclosures (IP65)

International regulatory compliance

The table that follows lists the regulations and product standards that apply for models intended for installation outside North America.

Type	Classifications, regulations and product standards
System classifications	 II 3 G EEx pz IIC T4
Type of protection	Pz according to IEC 60079-2:2001 EN 60079-0 (2004) Electrical apparatus for explosive gas atmospheres – Part 0 General requirements EN 60079-2 (2004) Electrical apparatus for explosive gas atmospheres – Part 2 Pressurized enclosures “P”
Other regulations and product standards	EN61010-1 (2001) Safety requirements for electrical equipment for measurement, control, and laboratory use - Part 1: General requirements. (Installation category II) (Pollution degree 2) 89/336/EEC (1989) Electromagnetic compatibility directive 2004/108/EC (2004) Revised electromagnetic compatibility directive 73/23/EEC (1973) Low voltage directive EN60825-1 (2002) Safety of laser products - Part 1: Equipment classification, requirements and user's guide EN 61326 (2003) Electrical equipment for measurement, control and laboratory use - EMC requirements (Class A limits) EN60825-1 (2002) Safety of laser products - Part 1: Equipment classification, requirements and user's guide IEC 60529 (2001) Degrees of protection provided by enclosures (IP65)

Environmental conditions

To ensure proper operation, maintain the environment within the following specifications.

Item	Specification	
Temperature	Cooler on Safe operating	ADD degrees F -20 °C (-4 °F) min 40 °C (104 °F) max
	Optimum	10 °C (14 °F) min 30 °C (86 °F)max
	Cooler off Safe operating	-20 °C (-4 °F) min 24 °C (75 °F) max
	Shipping and storage	-20 °C (14 °F) min 50 °C (122 °F) max
Humidity	Purge on Safe operating	0-100% condensing
	Purge off Safe operating	5-95% noncondensing
	Shipping and storage	5-95% noncondensing
Magnetic fields	5.5 meters (18 feet) min to intense fields	
Vibration	Isolation recommended. Vibrations from motors, pumps, and compressors can distort spectral data.	

Utilities

Each system requires an AC electrical service, fiber optic cabling for sample data collection, and clean, dried nitrogen or air for purge and cooling. Depending on your application, optional Ethernet (for remote computer and spectrometer control) and analog and digital PLC transmission wiring also may be used.

Item	Specification		
Electrical	AC service	3-wire: live, neutral, earth ground	
	Material	8–18 AWG (0.8–8 mm ²) copper wire	
		Tighten input terminals to 2.4 Nm torque	
		Dedicated 15A circuit	
	Input voltage	85-264 VAC	
	Input current	3.5 A max	
	Startup current	15 A max	
	Line frequency	50 Hz to 60 Hz	
	Line disturbance	Sags, surges or other line disturbances must not exceed 10% of input voltage (even for a half cycle)	
	Noise	< 2 volts (common mode) < 20 volts (normal mode)	
Ethernet	Type	T568A or T568B	
Fiber optic	Shielding	Current -carrying conductor	
	Connections	SMA905	
Purge	Gas	Clean, dried air or nitrogen	
	Filtering	10-micron replaceable filter	
	Dew point	-70 °C or lower	
	Pressure and flow rate	Source to purge	4-8 bar gauge 8 scfm max
		Source to cooler	4-7 bar gauge 25 scfm max

Electrical All electrical signals (power, alarm, and I/O) must enter and exit through either a cable gland with armored cable or through a sealed conduit. All wiring must comply with local codes.

Plumbing and pipe fitting Each system requires a dedicated, switched, branch circuit electrical service, fiber optic cabling for sample data collection, and clean, dried nitrogen or air for purge and cooling. Depending on your application, optional Ethernet (for remote computer and spectrometer control) and analog and digital PLC transmission wiring also may be used.

Item	Specification
Electrical	enclosure: 0.5 –inch NPT (3) male supply line: 0.5 –inch NPT (3) female enclosure: 0.75 –inch NPT (2) male supply line: 0.75 –inch NPT (2) female cable gland with armored cable or sealed conduit
Enclosure purge	enclosure: 0.5-inch NPT male supply line: 0.5-inch NPT female
Cooler purge	enclosure: 0.5-inch NPT female supply line: 0.5-inch NPT male
Fiber optic	spectrometer: SMA 905 threaded connection cable: SMA 905 nut connector 1 meter tail required for spectrometer connection and serviceability. Label with connection and sampling location.

Weight and mounting

Item	Weight	
	Metric	English
Antaris EX-Z2	130 kg	285 lb
Floor stand	35 kg	75 lb

Wall mounting

Each system must be mounted to a structural member capable of supporting 520 kg (11,400 lb), or four times the weight of the instrument.

The instrument must be accurately secured within 2 degrees of vertical.

The wall must be perpendicular to the floor within 2 degrees with respect to horizontal.

All 6 bolts are required to safely secure the instrument to the wall. For anchoring the enclosure, we recommend using high quality steel 10 mm (3/8 in) bolts that are capable of withstanding the following forces:

Force	Specification
Shear force	4715 N (1060 lb)
Tensile force	2800 N (630 lb)
Pull-out force	2800N (630 lbs)

Floor mounting

Optionally, a system may be mounted to the floor. The floor must be capable of supporting two times the weight of the instrument and floor stand.

In this configuration, the wall-mount flanges may be removed.

The instrument must be accurately secured within 2 degrees of vertical.

The floor used for mounting must be within 2 degrees of level for proper operation.

All fasteners, brackets, and bolts are required to safely secure the instrument to the stand. For anchoring the enclosure, we recommend using high quality steel 10 mm (3/8 in) bolts that are capable of withstanding the following forces:

Force	Specification
Shear force	250 N (56 lb)
Tensile force	300 N (68 lb)
Pull-out force	30 N (68 lb)

Shelf or table top mounting

Optionally, a system may be mounted to a table top or shelf. The surface must be capable of supporting two times the weight of the instrument. See the section entitled “Lifting or moving” in the “Safety” chapter earlier in this manual for lifting/moving precautions.

The wall mount flanges may be removed.

The equipment must be on a surface that is within 2 degrees of level for proper operation.

For anchoring the enclosure, we recommend using high quality steel 10 mm (3/8 in) bolts that are capable of withstanding the following forces:

Force	Specification
Shear force	250 N (56 lb)
Tensile force	300 N (68 lb)
Pull-out force	30 N (68 lb)

Antaris EX-IP Specifications

Worldwide regulatory compliance

All Antaris EX instruments comply with domestic and international safety regulations and applicable product standards. The table that follows lists the regulations and product standards that apply for IP models.

Classifications, regulations and product standards

UL61010-1 (2004) Safety requirements for electrical equipment for measurement, control, and laboratory use - Part 1: General requirements (Installation category II) (Pollution degree 2)

EN61010-1 (2001) 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)

89/336/EEC (1989) Electromagnetic compatibility directive

2004/108/EC (2004) Revised electromagnetic compatibility directive

73/23/EEC (1973) Low voltage directive

EN60825-1 (2002) Safety of laser products - Part 1: Equipment classification, requirements and user's guide

EN 61326 (2003) Electrical equipment for measurement, control and laboratory use - EMC requirements (Class A limits)

US 47 CFR Part 15 Radio frequency devices (Class A Digital Device)

US 21CFR1040.10 Performance standards for light-emitting products - Laser products

EN60825-1 (2002) Safety of laser products - Part 1: Equipment classification, requirements and user's guide

IEC 60529 (2001) Degrees of protection provided by enclosures (IP65)

Environmental conditions

To ensure proper operation, maintain the environment within the following specifications.

Item	Specification	
Temperature	Safe operating	-20 °C min 40 °C max
	Optimum	10 °C min 40 °C max
	Shipping and storage	-20 °C min 50 °C max
Humidity	Purge on Safe operating	0-100% condensing
	Optimum	5-95% noncondensing
	Purge off Safe operating	5-95% noncondensing
	Shipping and storage	5-95% noncondensing
Magnetic fields	5.5 meters (18 feet) min to intense fields	
Vibration	Isolation recommended. Vibrations from motors, pumps, and compressors can distort spectral data.	

Utilities

Each system requires an AC electrical service, fiber optic cabling for sample data collection, and clean, dried nitrogen or air for purge and cooling. Depending on your application, optional Ethernet (for remote computer and spectrometer control) and analog and digital PLC transmission wiring also may be used.

Item	Specification	
Electrical	AC service	3-wire: live, neutral, earth ground Dedicated 15A circuit
	Input voltage	Factory set for either 108–132 VAC or 216–254 VAC
	Input current	7.5 A max
	Startup current	15 A max
	Line frequency	50 to 60 Hz
	Line disturbance	Sags, surges or other line disturbances must not exceed 10% of input voltage (even for a half cycle)
	Noise	< 2 volts (common mode) < 20 volts (normal mode)
Ethernet	Type	T568A or T568B
Fiber optic	Shielding	Current -carrying conductor
	Connections	SMA905
Purge	Gas	Clean, dried air or nitrogen
	Filtering	10-micron replaceable filter
	Dew point	-70 °C or lower
	Pressure and flow rate	1-8 bar gauge 10-115 psi gauge 7 l/m 15 scfm minimum

Electrical

All electrical signals enter the enclosure through connectors rated to maintain the enclosure Ingress Protection rating. All wiring must meet local codes.

If the system does not include an internal computer, an Ethernet cable is used to connect the computer to the spectrometer.

Plumbing and pipe fitting

Each system requires fiber optic cabling for sample data collection, and clean, dried nitrogen or air for purge. Depending on your application, optional Ethernet (for remote computer and spectrometer control) and analog and digital PLC transmission wiring also may be used.

Item	Specification
Enclosure purge	enclosure: 0.25-inch NPT female supply line: 0.25-inch NPT male
Fiber optic	spectrometer: SMA 905 cable: SMA 905 nut connector
	1 meter tail required for spectrometer connection and serviceability. Label with connection and sampling location.

Weight and mounting

These instruments may be installed as wall mount or floor mount units. Shelf, table and cart installations are available as well. No anchoring hardware is provided by Thermo Fisher Scientific. Use the following information to work with your structural engineer to obtain appropriate anchors.

Model	Weight	
	Metric	English
Antaris EX-IP	139 kg	305 lb
Floor stand/cart	35 kg	75 lb

Wall mounting

Each system must be mounted to a structural member capable of supporting four times the weight of the instrument. See the section entitled “Lifting or moving” in the “Safety” chapter earlier in this manual for lifting/moving precautions.

All 6 bolts are required to safely secure the instrument to the wall.

The instrument must be accurately secured within 2 degrees of vertical.

The wall must be perpendicular to the floor within 2 degrees with respect to horizontal.

Bolt characteristic	Specification
Shear force	4715 N (1060 lb)
Tensile force	2800 N (630 lb)
Pull-out force	2800N (630 lbs)
Material	high quality steel recommended
Size	10 mm (3/8 in)

Floor mounting

Optionally, a system may be mounted to the floor. The floor must be capable of supporting two times the weight of the instrument and floor stand.

In this configuration, the wall-mount flanges may be removed.

The instrument must be accurately secured within 2 degrees of vertical.

The floor used for mounting must be within 2 degrees of level for proper operation.

All 4 bolts are required to safely secure the instrument to the stand. For anchoring the enclosure, we recommend using high quality steel 10 mm (3/8 in) bolts that are capable of withstanding the following forces:

Bolt characteristic	Specification
Shear force	250 N (56 lb)
Tensile force	300 N (68 lb)
Pull-out force	30 N (68 lb)

Cart, shelf, or table top mounting

Optionally, a system may be mounted to a wheeled cart, table top, or shelf. The surface must be capable of supporting two times the weight of the instrument. See the section entitled “Lifting or moving” in the “Safety” chapter earlier in this manual for lifting/moving precautions.

In this configuration, the wall mount flanges may be removed.

The equipment must be on a surface that is within 2 degrees of level for proper operation.

Danger

For enclosures installed on a wheeled cart, use caution when moving the cart.



Push only from the handle. Do not attempt to move the cart up or down inclines greater than 10 degrees. ▲

For anchoring the enclosure, we recommend using high quality steel 10 mm (3/8 in) bolts that are capable of withstanding the following forces:

Bolt characteristic	Specification
Shear force	250 N (56 lb)
Tensile force	300 N (68 lb)
Pull-out force	30 N (68 lb)
Material	high quality steel recommended
Size	10 mm (3/8 in)

