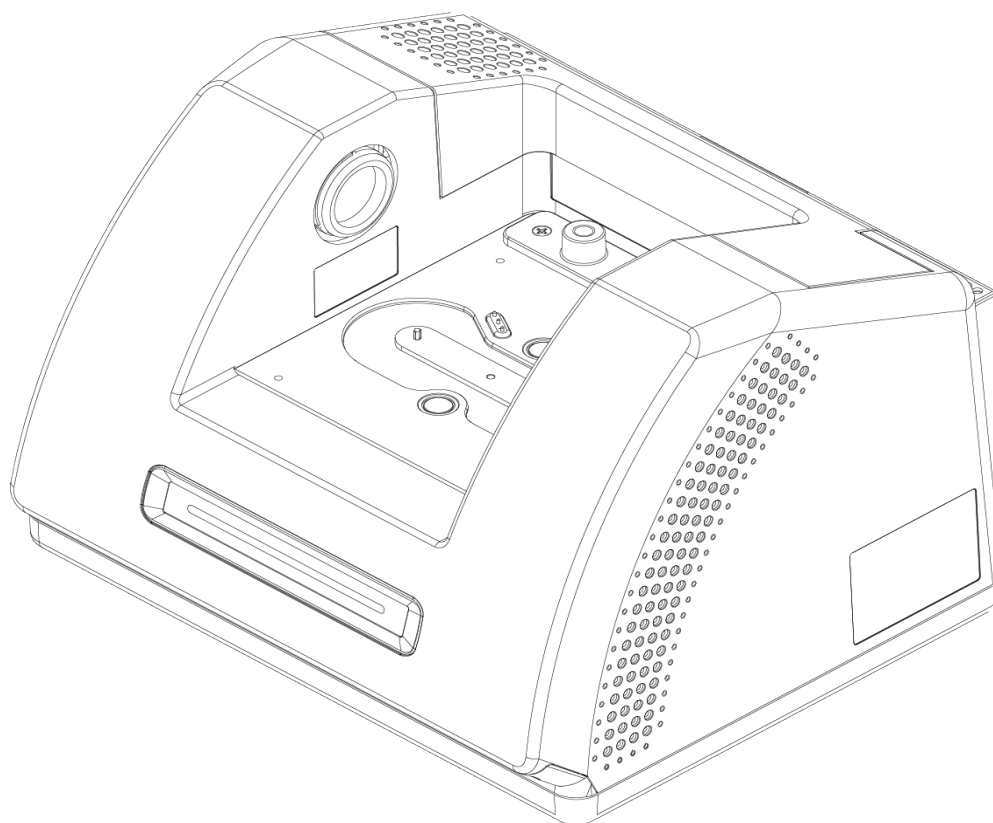


# Nicolet Summit LITE

## FTIR Spectrometer



## USER GUIDE

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## **WARNING**



**Avoid an explosion or fire hazard.**

This instrument or accessory is not designed for use in an explosive atmosphere.

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# Welcome

The Thermo Scientific Nicolet Summit LITE Fourier transform infrared (FTIR) spectrometer lets you perform chemical analyses of sample materials by collecting data in the mid-IR spectral range using a variety of accessories. The system has integrated verification features, a powerful software suite, and many other features that make data collection easy. You can install optional hardware and perform several service and maintenance procedures yourself. This document, or other provided documentation, contains the information you need.

Be sure to read the safety guide that came with the system before operating the instrument.

**Note** We recommend that you maintain seal and desiccation and/or purge your instrument at all times. Equipment damage due to failure to maintain seal and desiccation and/or purge is not covered by the warranty. If you have questions about this requirement, please contact us.

# Conventions Used

Safety precautions and other important information use the following format:

## DANGER



**Avoid hazard.** Indicates a hazardous situation which, if not avoided, will result in serious injury or death.

## WARNING



**Avoid hazard.** Indicates a hazardous situation which, if not avoided, could result in serious injury or death.

## CAUTION



**Avoid hazard.** Indicates a hazardous situation which, if not avoided, could result in minor or moderate injury.

## NOTICE

Follow instructions with this label to avoid damaging the system hardware or losing data.

**Note** Contains helpful supplementary information.

## **Ordering Parts**

To order parts, contact us.

If you need to send the instrument or an accessory to us for repair, call or e-mail us first for any shipping requirements or other instructions.

## **Contacting Us**

For Technical Support, please contact: [www.thermofisher.com](http://www.thermofisher.com)

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# Get Started with Your Nicolet Summit LITE Spectrometer

To get started with your new Nicolet Summit LITE Spectrometer, review the site and safety requirements before the instrument arrives, unpack and setup the instrument, and connect any additional accessories.

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# Before Your Summit Spectrometer Arrives

Prepare a suitable workspace for your spectrometer before it arrives to ensure the most accurate data and the best long-term performance.

This article explains what to do when your spectrometer arrives and introduces environmental and electrical factors that can influence your spectrometer's performance. For a more comprehensive explanation of these requirements, see the Site and Safety Information for the spectrometer.

## Unpacking the Spectrometer

Before you open the box, there are two important steps to take as soon as the instrument arrives:

- Check the exterior of the shipping box for damage

If you notice any signs of damage, contact us or your local distributor for instructions.

- Allow the spectrometer to come to room temperature

Inside the shipping box, the spectrometer is sealed in a plastic bag to keep it dry. **You must allow 24 hours for the spectrometer to reach room temperature before you open the bag.** If you open the bag before the spectrometer is warmed up, condensation could form that could damage internal optical components and cause permanent damage.

The warranty will not cover damage due to improper moving techniques or removing the sealed plastic bag before the instrument has come to room temperature.

## Preparing the Workspace

Before your instrument arrives, make sure your workspace will be able to properly support the spectrometer. In addition to allowing enough room for the spectrometer, consider several environmental and electrical requirements.

## Spectrometer Dimensions

The Summit spectrometer requires a fairly small space, but make sure you also leave room around the instrument so that heat can dissipate from the vents and so that you can easily access the instrument's ports, power switch, and cables.

- Summit instrument weight: 9.6 Kg (21 lbs)
- Dimensions (W x H x D): 34 cm x 24 cm x 32 cm; (13.3 in. x 9.6 in. x 12.7 in.)

## Environmental Factors

The Summit spectrometer is a robust instrument designed to be used in many environments. However, for best performance, keep it in a relatively dust-free and low-humidity environment. The spectrometer operates reliably at temperatures between 15 and 35 °C, but for optimal performance should be kept between 20 and 22 °C.

Humidity can cause condensation to form inside the instrument, which could damage internal components. A few precautions can typically protect your instrument from humidity:

- Maintain the instrument's desiccant, including while the instrument is in storage.
- Avoid rapid changes in temperature.
  - Keep the instrument away from sources of cool or hot air, such as near heating and air conditioning vents or large windows.

If your spectrometer will be kept in an especially humid environment, consider installing a purge gas kit.

## Electrical Requirements

Power supplied to the spectrometer must be from dedicated, uninterrupted sources and free from the following issues:

- Voltage dropouts
- Transient spikes
- Frequency shifts
- Other line disturbances

If you suspect problems with your power, we recommend a power quality audit. Contact us or your local electrical authority for more information.

## Electrical Service Specifications

The following table lists specifications for electrical service. Contact our service representative in your area if you have questions about the requirements.

Requirements	Specification
Input Current	1.5 A Max

Requirements	Specification
Input Voltage	100 to 240 VAC
Line Frequency	50 to 60
Line Disturbances	Sags, surges, or other line disturbances must not exceed 10% of input voltage
Noise	Less than 2 V (common mode) Less than 20 V (normal mode)

# Personal Safety with the Summit Spectrometer

While the Nicolet Summit LITE Spectrometer is designed to be a safe instrument, you should take a few precautions to protect yourself from potential hazards that can arise during normal use and maintenance.

## CAUTION



This guide is an introduction to potential dangers that you should be aware of, but it is not a comprehensive guide. Before using the instrument, see the Site and Safety Information for the spectrometer for a full description of these potential hazards.

## Potential Hazards during Normal Use

During normal use, most hazards are due to following sources:

- Potentially hazardous samples and solvents
- Exposure to zinc selenide (ZnSe)
- Parts of the spectrometer that are hot or emit heat
- The instrument's laser

You can avoid possibly harming yourself or damaging the instrument by understanding potential hazards and by taking a few precautions.

## Hazardous Samples and Solvents

Take special precautions if you are using or plan to measure potentially hazardous samples or solvents, such as pressurized gases or corrosive or flammable solvents.

### USE PROPER VENTILATION

There are no special ventilation requirements for your spectrometer, but you may need additional ventilation during certain types of analysis. Ensure that you have proper ventilation if you will be analyzing highly toxic samples, dissolving your samples in solvents that may interact with the infrared source, or sampling flammable gases.

The pyrolysis of solvents containing halogenated hydrocarbons may produce hydrochloric acid (HCl), hydrofluoric acid (HF), or phosgene ( $\text{COCl}_2$ ).

### WARNING



**Avoid toxic inhalation.** Hydrochloric acid, hydrofluoric acid, and phosgene are highly toxic. If you are using solvents containing halogenated hydrocarbons, ensure your work area is properly ventilated.

### VOLATILE AND FLAMMABLE SOLVENTS

The infrared source inside the spectrometer can ignite flammable and volatile samples and solvents. Take the following actions when working with samples and solvents that are flammable:

- Work with the sample compartment windows installed.
- Ensure that the workspace is properly ventilated with an active venting system that is free of spark or other sources of ignition and that prevents flammable vapors from collecting in the atmosphere surrounding the instrument.
- Do not leave flammable solvents or samples near the instrument.
- Do not leave flammable solvents or samples in the sample compartment for longer than necessary.
- Purge the spectrometer with clean, dry air or nitrogen.

### CORROSIVE SOLVENTS

Solvents that produce HCl or HF vapors in the sample compartment may severely damage the system. If you are using halogenated solvents, purge the instrument with clean, dry air or nitrogen.

### NOTICE

Your warranty does not cover equipment damage that is due to a failure to purge the instrument.

HCl and HF vapors may also compromise the coating of KBr sample compartment windows. If you are planning to work with corrosive solvents regularly, consider installing ZnSe sample compartment windows, instead.

### BIOHAZARD OR RADIOACTIVE MATERIALS AND INFECTIOUS AGENTS

Biological samples, such as tissues, body fluids, infectious agents, and blood, have the potential to transmit infectious diseases. Follow your organization's Biosafety Program protocols for working with potentially infectious materials.

## Toxic Materials

The Nicolet Summit OA spectrometer includes a zinc selenide (ZnSe) ATR Crystal, and other Summit instruments may use the optional ZnSe sample compartment windows.

### WARNING



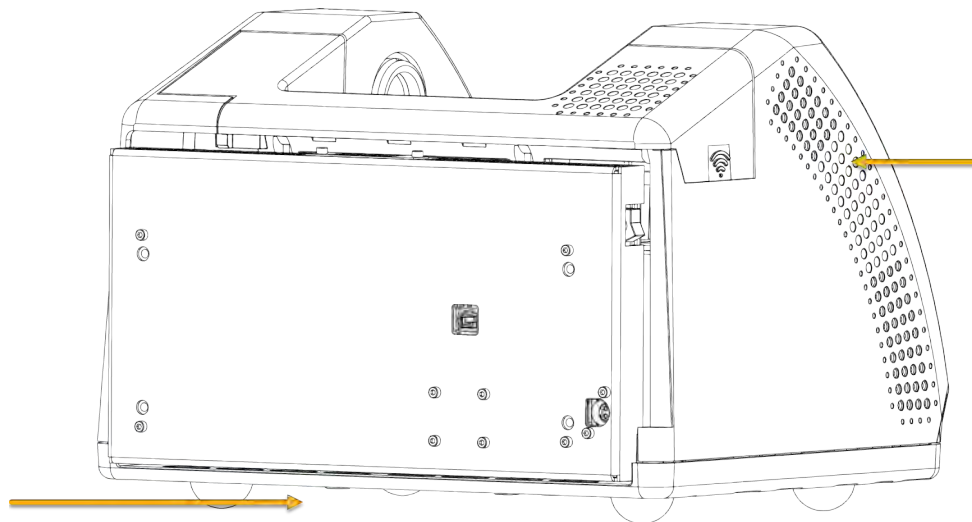
**Avoid toxic inhalation and ingestion.**

Zinc selenide (ZnSe) is toxic. Refer to the manufacturer's ZnSe Safety Data Sheet at [www.specac.com](http://www.specac.com) for handling and exposure controls.

## Sources of Heat

Parts of the spectrometer can become quite hot during normal use. Be careful around the spectrometer's infrared source and the vents.

**Figure 2-1:** Take care around the instrument's infrared source and the vents



The outward facing surface of the infrared source is located on the bottom of the instrument and can become quite hot. Do not touch the underside of the instrument during operation or shortly after use.

The spectrometer's vent is located on the left side of the instrument. During normal use, the spectrometer dissipates hot air from internal components to the area outside the spectrometer through these vents. Leave enough space around the instrument vents for hot air to dissipate.

## Laser and Optical Safety

You will never be exposed to unsafe levels of laser radiation during normal use of the spectrometer. If the cover is removed during a service procedure, you may need to take special precautions, such as using protective eyewear. Your service person will notify you if this is necessary.

### WARNING



**Avoid personal injury.**

Never stare into the laser beam or at its reflection. Never tamper with the laser, even if you are replacing a defective laser, or you could be exposed to laser light or to high voltage.

## Potential Hazards during Maintenance

You may be exposed to different hazards while performing maintenance on the instrument than you would encounter during normal use. During maintenance, the primary hazards involve purging the instrument and working with the instrument's internal components.

## Purging the Instrument

In especially humid environments, we recommend installing a source of clean, dry air or nitrogen to purge the spectrometer. Purging the instrument can help protect internal optical components from damage caused by a moist environment or corrosive solvents, and it can ensure more accurate results.

See ["Install and Maintain a Purge Kit"](#) for details on purchasing and installing a purge kit for your spectrometer.

### DANGER



**Avoid fire and explosion hazard.**

- Use only dried air or nitrogen to purge your spectrometer.
- Never use a flammable, combustible, or toxic gas to purge this instrument. The purge gas must be free of oil and other reactive materials. Heat from the source or from laser absorption may ignite flammable gases or reactive materials in the purge gas.

## Working with Internal Components

Typically, there should be no reason for you to remove the instrument cover or attempt to replace internal components. However, if you need to remove the cover for maintenance, be aware that you risk being shocked, burned, and exposed to laser light.

### CAUTION



#### Avoid shock hazard.

Even after this instrument has been disconnected from all voltage sources, capacitors may remain charged for up to 30 seconds and can cause an electrical shock.

### CAUTION



#### Avoid burn hazard.

Internal components, especially the infrared source, can become extremely hot during normal operation. Turn off the instrument and wait at least 10 minutes before replacing any components.

### WARNING



#### Avoid personal injury.

- Never stare into the laser beam or at its reflection. Never tamper with the laser. You could be exposed to laser light or high voltage.
- If you adjust the laser or perform procedures that are not described in the user guides and manuals, you could be exposed to hazardous radiation.

## REPLACING THE DESICCANT

When you open the desiccant compartment, you must prevent flammable liquids or gases from entering the compartment. For instructions on changing the desiccant, see ["Replace the Desiccant"](#).



**DANGER**



**Avoid explosion hazard.**

Before you open the desiccant compartment, turn off the instrument power, unplug the power cord and remove all accessories and samples from the system. Entry of flammable liquids or gases into the desiccant compartment could cause an explosion. If such entry occurs, contact us immediately and do not apply power to the instrument until the condition has been corrected.

**REPLACING THE IR SOURCE**

The IR source becomes extremely hot during use. If you need to replace the IR source, avoid burn and explosion hazards.

**CAUTION**



**Avoid burn hazard.**

The source becomes extremely hot during normal use. Always allow the source to cool for at least 10 minutes after the spectrometer is turned off before you work with the source.

**DANGER**



**Avoid explosion hazard.**

Before you remove the source from the spectrometer, turn off the instrument power, unplug the power cord, disconnect any purge lines, and remove all accessories and samples from the system. Entry of flammable liquids or gases into the source compartment could cause an explosion. If such entry occurs, contact us immediately and do not apply power to the instrument until the condition has been corrected.

## Summary

The Nicolet Summit LITE spectrometer is a safe and rugged instrument, but you can be exposed to hazards during use and maintenance. During normal operation, use caution when handling potentially hazardous samples and solvents and avoid parts of the spectrometer that are hot or emit heat. During maintenance, take precautions to avoid harm or damage that could occur when purging the instrument, handling internal components, or changing the desiccant.

# Unpack and Get Started with the Spectrometer

Unpacking and setting up your Thermo Scientific Nicolet Summit LITE Spectrometer requires you to place the instrument in your workspace, to connect and power on the spectrometer, and to run a short performance test.

## Before You Begin

### NOTICE

Wait 24 hours before taking the spectrometer out of its plastic shipping bag to prevent condensation from forming that can damage internal optics. The warranty will not cover damage due to opening the sealed plastic bag before the instrument has come to room temperature.

**Reminder:** Review the spectrometer's Site and Safety Information to ensure that the workspace is safe and suitable for the instrument.

## Unpacking and Setup

The steps for unpacking and setting up your spectrometer vary somewhat depending on the options you purchased.

### 1. Unpack the shipping box

Remove the spectrometer from the shipping box and bag and remove additional packing materials.

### NOTICE

Use care when lifting the spectrometer.

- Do not touch the sample compartment windows while unpacking the instrument. Touching the windows could cause permanent damage.



#### 2. (Optional) Replace the sample compartment windows.

If you purchased the ZnSe windows option, replace the windows. For instructions on replacing the windows, see ["Replace the Sample Compartment Windows"](#).

#### 3. Turn on the spectrometer.

- a. Connect the power supply to the spectrometer and to a properly grounded AC power source.
- b. Press the instrument's power switch to turn on the spectrometer. The spectrometer's LightBar displays a cycling green light while the instrument warms up and shows a solid green bar when the instrument is ready for use.



#### 4. Install OMNIC Paradigm software.

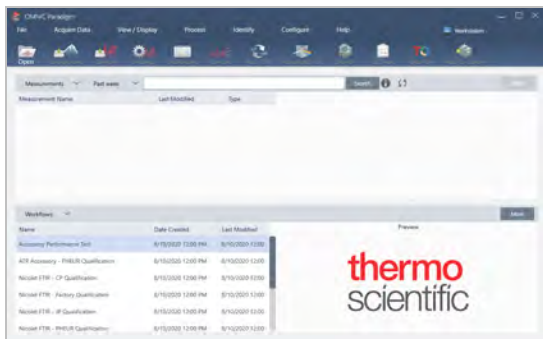
- a. Insert the OMNIC Paradigm software DVD.
- b. If the DVD does not start automatically, open the DVD files and click Start to begin the installation. Follow the on-screen prompts to install OMNIC Paradigm software.

The software installation may take up to 20 minutes to complete. You will need to restart the computer to complete the installation.

#### 5. Connect the spectrometer

## Get Started with Your Nicolet Summit LITE Spectrometer

- a. Use the USB Type A to Type B cable to connect the spectrometer to your computer. The spectrometer has a USB Type B receptacle.
- b. Open OMNIC Paradigm software. The first time you open the application, it opens in Workstation mode.



- c. After you connect the spectrometer, OMNIC Paradigm software recognizes the spectrometer automatically and displays the instrument type in the upper right corner of the screen. If the instrument is not connected automatically, you may have to connect manually.

To connect manually, go to **Configure > Connectivity** and select the Summit LITE from the connectivity dialog.

The software may take several minutes to start and to connect to the instrument. The software displays the connection status in the upper right corner of the screen. When the status shows you are connected, proceed to the next step.

**Note** If you open any menus in the software before the instrument is connected, **Align** and **Calibrate** will be disabled. To enable them, when the instrument is connected, click **Dashboard** in the toolbar.

### 6. Verify the spectrometer's performance.

Before taking the following steps, make sure there is not a sampling accessory in the sampling compartment.

- a. Align the spectrometer optics.
  - i. From the dashboard of OMNIC Paradigm software, go to **Acquire Data > Diagnostics > Align Spectrometer**.
  - ii. Select **Start** to begin alignment. The screen says "Align complete" when alignment has finished successfully.

## Get Started with Your Nicolet Summit LITE Spectrometer

- b. Calibrate the laser.
  - i. Go to **Acquire Data > Diagnostics > Laser Calibration**.
  - ii. Select **Start** to begin calibration.

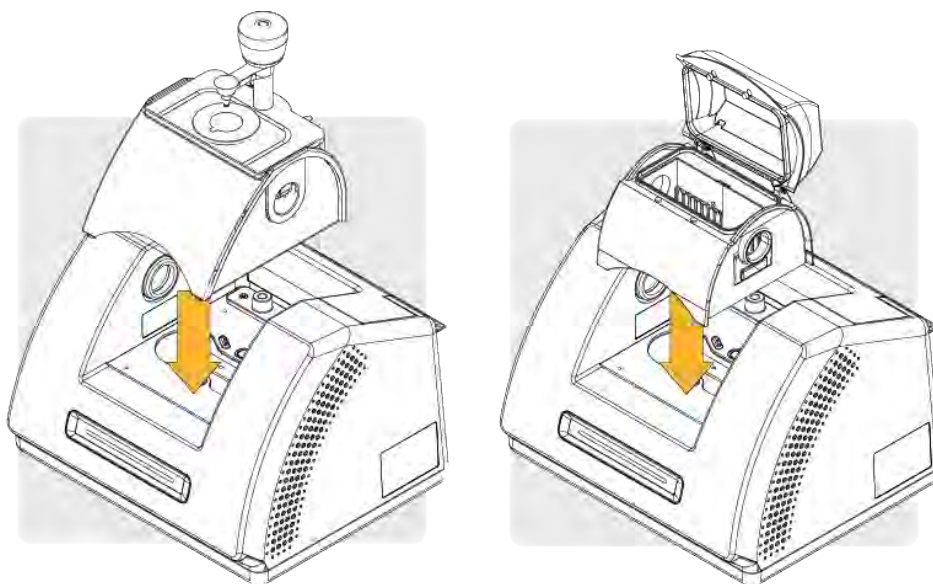
Laser calibration may take several minutes to complete. When calibration is finished, the display shows "Measurement complete" and indicates any change in laser frequency.

The instrument takes up to 12 hours to come to thermal equilibrium. For best results, re-run alignment and calibration after the first 12 hours of operation.

- c. Run the **Nicolet FTIR - Factory Qualification** workflow. Performance verification and qualification workflows use a polystyrene reference material inside the spectrometer to run a series of standard tests to verify your instrument operation and to ensure the accuracy of your data.
  - i. Return to the Dashboard.
  - ii. Scroll to the Workflows pane and select **Nicolet FTIR - Factory Qualification**.
  - iii. Right click the workflow and select **Run** to start the workflow.

### 7. Insert a sampling accessory.

To install the optional Everest ATR accessory or iD1 Transmission accessory, grasp the accessory by the front and rear handholds and lower the accessory onto the spectrometer. Sampling accessories fit over two alignment pins on the spectrometer baseplate and are held in place by strong magnets.



- For details on installing an accessory, see ["Install a Sampling Accessory"](#).

## **Next Steps**

Congratulations! Your instrument is ready for use. For more on identifying and analyzing samples with your spectrometer, see the OMNIC Paradigm guides and tutorials at [thermofisher.com/ftir-help](http://thermofisher.com/ftir-help).

# Install a Sampling Accessory

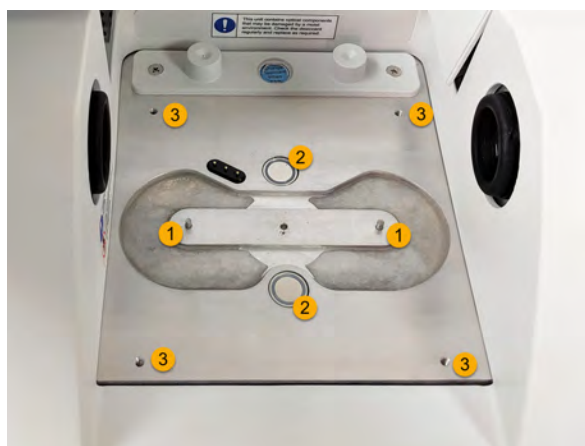
The Nicolet Summit LITE Spectrometer accommodates a wide variety of sampling accessories, including integrated accessories and those that require additional adapters.

Integrated accessories and baseplates are easy to install and remove and are recognized automatically by OMNIC Paradigm software.

## Installing Integrated Accessories

Integrated accessories such as the Thermo Scientific™ Everest™ ATR Accessory fit over two alignment pins on the spectrometer baseplate and are held in place by magnets.

**Figure 2-2:** Location of alignment pins and magnets shown on a Nicolet Summit.



1. Pins
2. Magnets
3. Tapped holes

### ❖ To install an integrated accessory

1. Hold the accessory by the front and rear handles and lower it into the spectrometer sample compartment. Magnets hold the accessory in place.

**Figure 2-3:** Lowering an accessory into place on a Nicolet Summit PRO.



2. If you are purging your instrument, attach the purge line labeled “To accessory” to the purge inlet on the back of the accessory. See ["Install and Maintain a Purge Kit"](#) for more information.



**Note** To remove an accessory, disconnect the purge line if necessary and then grasp the accessory by the handles and lift it up. When not using an accessory, store it in a dust-free environment, such as a cabinet or box.



## Installing Baseplate-mounted Accessories

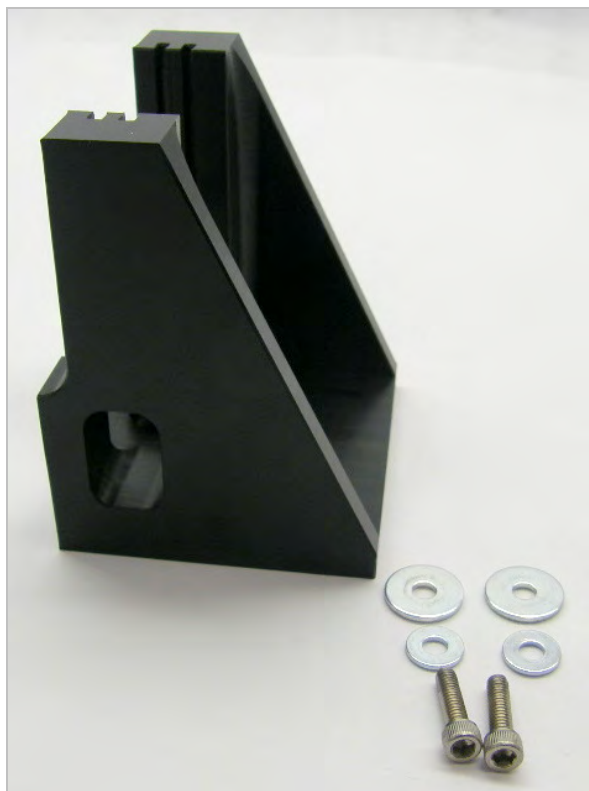
The iD Base Adapter accommodates a wide variety of accessories for FTIR sampling, including large transmission accessories and other specialized accessories.



**Note** Avoid installing the iD Base Adapter without an attached accessory. Very strong magnets hold the adapter in place; you may need to use a tool to pry it free.

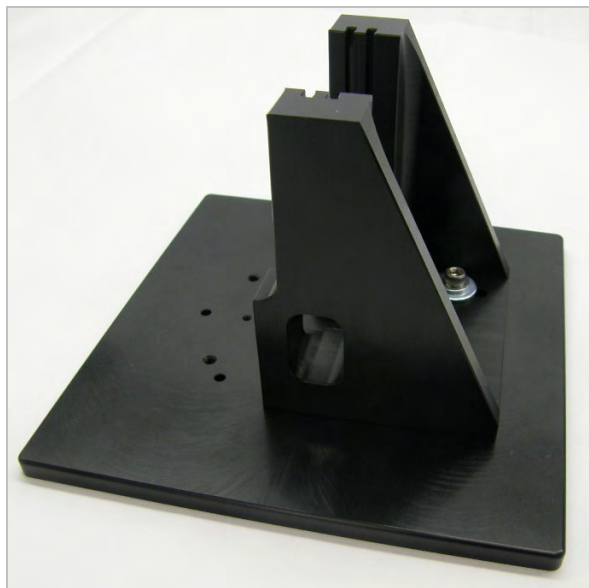
For slide-mounted accessories that are too big for the iD1 Transmission Accessory, a slide mount that fits the iD base is available.

## Get Started with Your Nicolet Summit LITE Spectrometer



The iD Base Adapter has two sets of screw holes so the slide mount can be installed facing either direction. To install the slide mount, position it over the screw holes, and then insert and tighten the two washers and screws.

Use the height adjustment screw to raise or lower a sample or accessory to align it in the infrared beam.



❖ **To install an accessory using the iD Base Adapter**

1. Attach the accessory to the iD Base Adapter.
2. Place the iD Base Adapter on the two pins in the spectrometer baseplate. Strong magnets hold the adapter and accessory in place.
3. Some specialized baseplate-mounted accessories are secured to the instrument using 4 screws supplied with the accessory.

## Installing Slide-mounted Accessories

The iD1 Transmission accessory is designed to accommodate gas or liquid transmission cells and thin film or pellet holders that have a 2" X 3" slide mount.



❖ **To install a slide-mounted accessory**

1. Slide the accessory into one pair of slots in the iD1 Transmission Accessory.

Choose a pair of slots that will place the center of the accessory at the beam focus (designated by

## Get Started with Your Nicolet Summit LITE Spectrometer

arrow heads on the accessory housing).

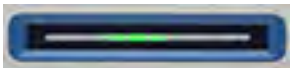


# Understand the Spectrometer LightBar



The Thermo Scientific Nicolet Summit LITE Spectrometer features a convenient LightBar that gives you a quick, visual pass/fail indication of product quality and instrument status at a glance.

The following tables describes all of the LightBar's signals.



## WARMING UP

Signal	System Status	Description
<b>Green Cycle</b> 	System is on and warming up	Green light moves from left to right repeatedly. Warm-up time is approximately 2 minutes.

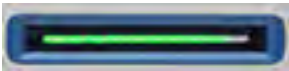

## TRADITIONAL COLLECTION

Signal	System Status	Description
<b>Solid Green</b> 	Ready for use	The full LightBar displays solid green
<b>Green Comet</b> 	Collecting data	Small section of green light bounces back and forth


### SMART COLLECTION

Signal	System Status	Description
<b>Blue Pulse</b> 	Collecting Smart Background	Full LightBar pulses blue
<b>Blue Comet</b> 	Collecting sample data (user initiated)	Small section of blue light bounces back and forth

### ANALYSIS RESULTS

Signal	System Status	Description
<b>Green % Fill</b> 	Match value or QCheck result above threshold	Green fill to reflect match value. For example, fills approximately 90% for a match value of 90.
<b>Orange % Fill</b> 	Match value or QCheck result below threshold	Orange fill to reflect match value. For example, fills approximately 30% for a match value of 30.

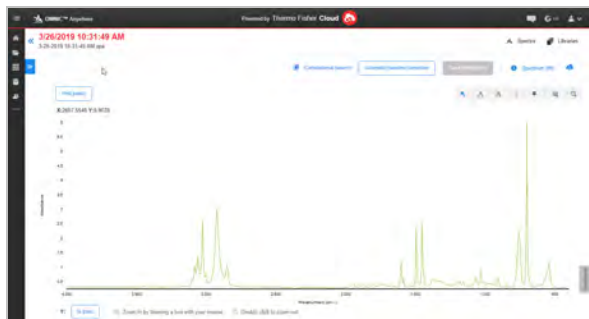
### DIAGNOSTICS

Signal	System Status	Description
<b>Red Flash</b> 	System error	Full LightBar flashes red. See <b>System Status</b> in OMNIC Paradigm software for a description of the error.

# View Your Data with the OMNIC Anywhere App

OMNIC Anywhere is a cloud-based application that allows you to view, explore, or share your data from a connected PC, Apple computer, Android or iOS device.

Figure 1. OMNIC Anywhere in the web browser



With a Nicolet Summit LITE spectrometer and a free Connect account, measure samples in the classroom or lab, upload the data to your Connect account, and view, explore, or share the data on another device in your dorm or workspace.

For instructions on creating a Connect account and viewing your data with OMNIC Anywhere, visit [“Cloud-enabled FTIR Spectroscopy”](#).



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# Options and Accessories

The Nicolet Summit LITE can be used with the optional purge kit and is compatible with a wide range of sampling accessories.

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# Sampling Accessories for the Summit Spectrometer

The Thermo Scientific Nicolet Summit LITE FTIR spectrometers are compatible with Thermo Scientific™ Nicolet™ iS5 iD sampling accessories and hundreds of other third-party accessories.

For instructions on installing a sampling accessory, see ["Sampling Accessories for the Summit Spectrometer"](#)

With the following accessories and adapters, the Summit spectrometer can quickly and easily measure a wide range of samples.

## EVEREST ATR ACCESSORY



The Everest™ ATR accessory is a high-performance, versatile single-bounce attenuated total reflectance accessory and is ideal for analyzing liquids, solids, pastes, or powders. The Everest ATR accessory was specifically designed to fit Summit spectrometers.

[Contact us](#) for more information.

## ID1 TRANSMISSION ACCESSORY



The iD1 Transmission accessory is convenient for sampling films, pellets, liquids, and gases and fits a wide range of transmission accessories. The sample compartment fits gas cells and cuvettes up to 10 cm.

[Contact us](#) for more information.

### ID5/ID7 ATR ACCESSORIES



The iD5 and iD7 ATR accessories—designed for the Nicolet iS™5 spectrometer—are alternatives to the Everest ATR accessory. While these ATR accessories are excellent multi-purpose accessories, the Everest ATR accessory is recommend for use with Summit spectrometers.

For details, see [“iD5 ATR Accessory for the Nicolet™ iS5 Spectrometer.”](#) or [“iD7 ATR Accessory for the Nicolet™ iS5 Spectrometer.”](#)

### ID BASE ADAPTER PLATE



The iD Base Adapter accommodates a wide variety of third-party accessories for FTIR sampling, including large transmission accessories and other specialized accessories. Pair the iD Base Adapter with the slide mount sample holder for even more options.

For details, see [“iD Base Adapter.”](#)

### SLIDE MOUNT SAMPLE HOLDER



Pair a slide mount sample holder with the iD Base adapter to use slide-mounted accessories that are too large for the iD1 Transmission accessory.

[Contact us](#) for more information.

### GOLDEN GATE ATR ACCESSORY



The Golden Gate ATR accessory features a sapphire anvil for high pressure contact and a rugged exterior, allowing you to analyze a range of samples, from single particles and fibers or hard solids to corrosive liquids. The Golden Gate ATR accessory is also ideal for macro sampling.

For details, see [“Thermo Scientific™ Golden Gate ATR for Nicolet iS5 FTIR Spectrometer.”](#)

# Install and Maintain a Purge Kit

Purging the spectrometer with dry air or nitrogen protects the internal components from moisture and other environmental contaminants. Installing the purge kit requires you to assemble the valves and regulators, replace the desiccant cartridge, connect the purge gas, and set the pressure and flow rate.

## WARNING



### Avoid explosion hazard

Never use a flammable, combustible, or toxic gas to purge this instrument. The purge gas must be free of oil and other reactive materials. Heat from the source or from laser absorption may ignite flammable gases or reactive materials in purge gas. Use only dried air or nitrogen to purge your instrument.

## NOTICE

We recommend maintaining the seal and desiccating and/or purging the instrument at all times. The warranty does not cover damage caused by a failure to properly desiccate or purge the instrument. If you have questions about this requirement, please contact us.

## SETUP NEEDED

Before installing the purge kit, you will need a source of dry air or nitrogen that meets Thermo Scientific specifications for the Nicolet™ Summit Spectrometer. See the instrument's Site and Safety guide for details.

**Note** For best results, dry the purge gas to a dew point of -70 °C (-94 °F) or below.

## MATERIALS NEEDED

Your purge kit includes the following:

- Dual zone purge manifold
- Purge desiccant assembly, with purge desiccant cartridge and O-ring

In addition to the purge kit, you will need the following tools and materials:

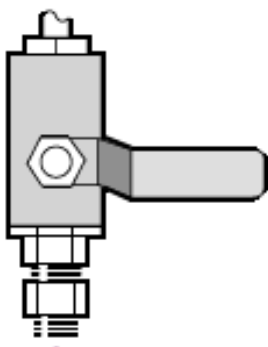
- 3/4-inch open-ended wrench
- 11/16-inch open-ended wrench

## Options and Accessories

- #2 Phillips head screwdriver
- Thread seal tape (“plumber’s tape” or “Teflon tape”)

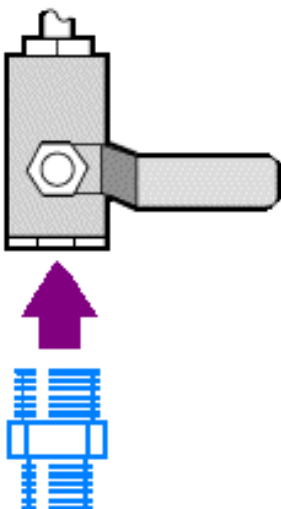
### ❖ To install a purge kit

1. Attach the plumbing assembly to the purge gas source.
  - a. Install the regulator valve and either a 1/4-inch male fitting or a 3/8-inch female fitting on the purge gas source. (Choose a valve and fittings that are appropriate for the purge gas source.)



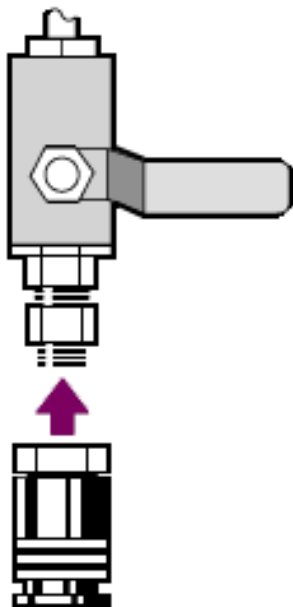
- b. If you used a 1/4-inch male fitting, proceed to the next step.

If you used a 3/8-inch female fitting on the purge gas source, install the 3/8-inch to 1/4-inch reducing nipple that was included with your purge kit. Wrap the reducing nipple with thread seal tape before you install it, and use an 11/16-inch open-ended wrench to tighten the connection.

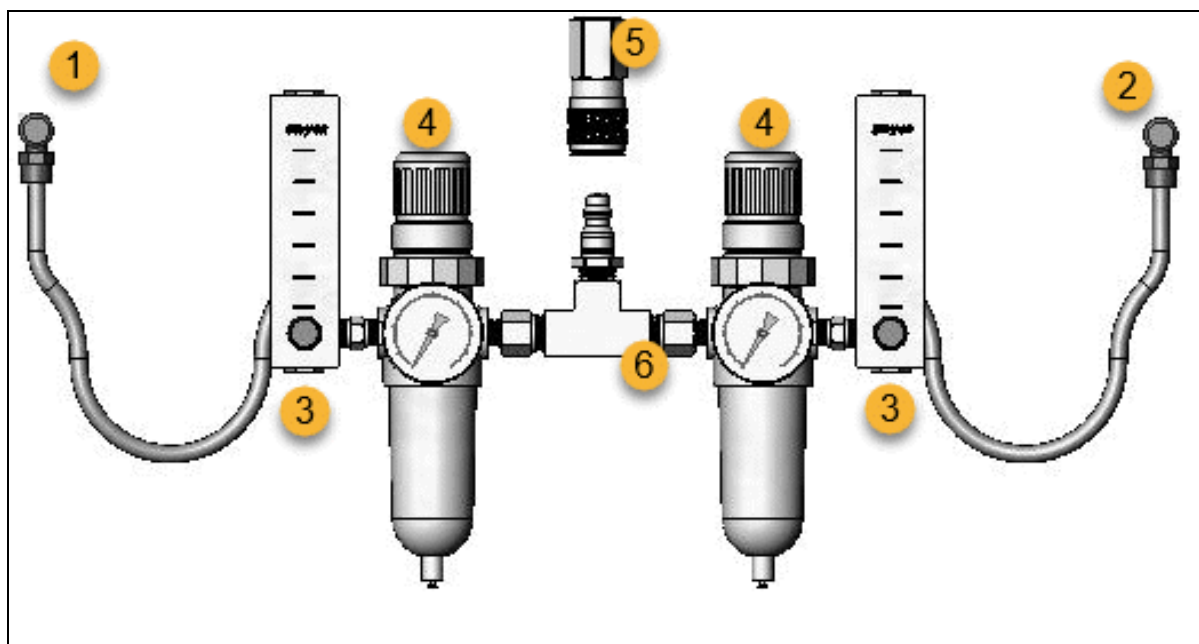


## Options and Accessories

- c. Wrap the reducing nipple or the 1/4-inch male fitting with thread seal tape, and then install the pressure coupling. Use a 3/4-inch open-ended wrench to tighten the connection.



- d. Snap the male inlet of the wall plumbing assembly firmly into the quick release fitting.



1. To accessory
2. To spectrometer
3. Flowmeter



## Options and Accessories

4. Pressure regulator
  5. Quick release fitting
  6. Wall plumbing assembly
2. Replace the desiccant cartridge.
    - a. Turn off the instrument power, unplug the power cord, and remove all accessories and samples from the system.

### WARNING



#### Avoid explosion hazard.

Before opening the desiccant compartment, turn off the instrument power, unplug the power cord and remove all accessories and samples from the system. Entry of flammable liquids or gases into the desiccant compartment is an explosion hazard. If such entry occurs, contact us immediately and do not apply power to the instrument until the condition has been corrected.

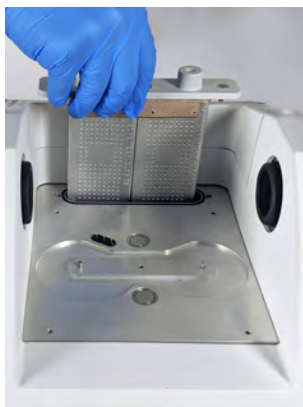
- b. Loosen the two captive Phillips head screws from the standard desiccant cartridge, and lift the cartridge straight up and out of the instrument.



**Note** If the standard desiccant cartridge is stored in a dry box or sealed bag (you can use the bag the purge cartridge came in), the cartridge can be reused.

- c. Remove and discard the large O-ring.

## Options and Accessories



- d. Open the purge kit and the sealed desiccant packet.
- e. Remove the O-ring from the packet and install it on the instrument base plate (see previous image). Press (rather than roll) the new O-ring into place to be sure it is properly seated in the groove.
- f. Remove the desiccant cartridge with purge fittings from the packet, insert the cartridge in the desiccant compartment, ensure that it is seated properly over the O-ring, and then secure it using the two screws.

Note the correct orientation of the cartridge. You should be able to read the label on the cartridge from the front of the instrument when the cartridge is installed.



1. Purge inlet

## Options and Accessories

2. Relief valve
3. Purge dessiccant cartridge
3. Connect the purge gas source to the instrument.
  - a. Connect the flow coupler from the wall plumbing assembly (labeled “to spectrometer”) to the purge inlet on the desiccant cartridge.
  - b. Install any sampling accessory you removed previously.
  - c. If you are purging the accessory, connect the straight flow coupler from the plumbing assembly (labeled “to accessory”) to the purge inlet on the installed accessory.
4. Set the purge gas controls.
  - a. Open the main regulator valve and set the purge gas controls as indicated below (see Setting the Purge Gas Controls for details). If you are not purging the accessory, set the pressure regulator for accessories to zero.

Hardware	Pressure (psig)	Flow Rate (scfh)
Summit Spectrometer	5	1
Everest Accessory	5	4-10
iD1 Transmission Accessory	5	4-10
iD3 ATR Accessory	5	4-10
iD5 ATR Accessory	5	4-10
iD7 ATR Accessory	5	4-10
iD Foundation	5	4-10

- b. Plug in the power cord to the instrument and turn on the power.
- c. Wait 30 - 60 minutes for the instrument to fully purge.

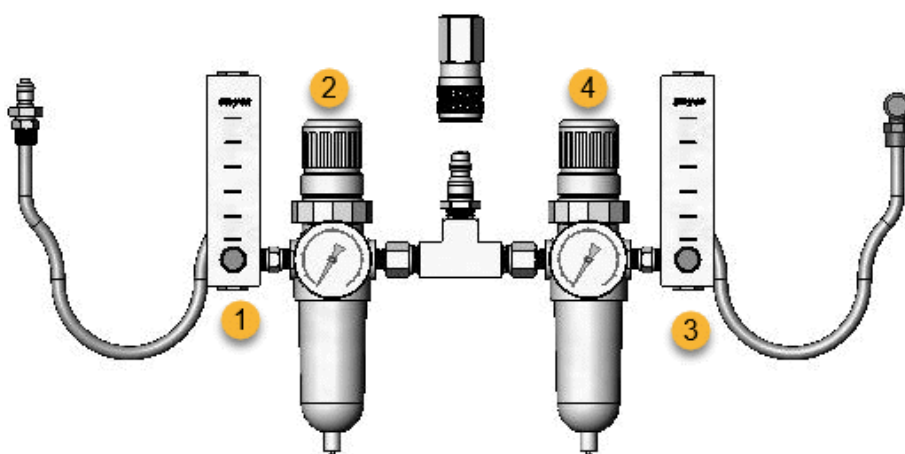
## Set Purge Gas Controls

Correctly setting your purge gas controls will protect your spectrometer from humidity without introducing vibration.

For best results, the purge gas should be dried to a dew point of  $-70\text{ }^{\circ}\text{C}$  ( $-94\text{ }^{\circ}\text{F}$ ) or below.

### ❖ To set the purge gas controls

1. Open the main valve to start the flow of purge gas through the regulator.
2. Adjust the pressure regulator for the spectrometer until the gauge indicates that the pressure is 5 psig (34 kPa).



1. Set accessory flow
  2. Set accessory pressure
  3. Set spectrometer flow
  4. Set spectrometer pressure
3. Set the flowmeter for the spectrometer to 1 scfh (0.47 l/min).
  4. If you are using an accessory that is purged, set the purge gas controls for the accessory as indicated below.
    - Accessory pressure, 5 psig (34 kPa)
    - Accessory flow: 4 -10 scfh (1.9 - 4.7 l/min)

## NOTICE

Flow rates greater than recommended values can cause vibration, which can affect the quality of your data.

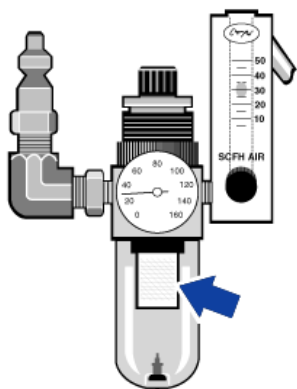
## Check and Change the Purge Gas Filter

Replace the purge filter when it is yellow, or otherwise discolored, or if it is contaminated with debris or foreign particles.

## NOTICE

We recommend maintaining seal and desiccation and/or purging the instrument at all times. Equipment damage due to failure to maintain seal and desiccation and/or purge is not covered under the warranty. If you have questions about this requirement, please contact us.

**Figure 3-1:** The purge filter is located inside of the plastic bowl below the pressure gauge

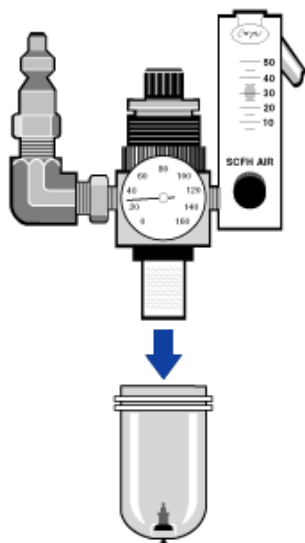


**Note** To order parts, contact Technical Support.

### ❖ To change the purge gas filter

1. Turn off the purge gas at the main valve. Do not turn down the flowmeter or the pressure regulator.
2. Remove the plastic bowl that houses the filter and then remove the filter. (You can unscrew them both by hand.)

## Options and Accessories



3. Install the new filter and then reinstall the bowl.
4. Open the main valve to turn on the purge flow to the instrument and verify proper purge gas flow rate.

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# Maintenance

Your Nicolet Summit LITE FTIR Spectrometer requires little upkeep and no daily maintenance. However, basic care will ensure continued peak performance.

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# Maintenance Schedule for the Summit Spectrometer

Your Thermo Scientific Nicolet Summit LITE FTIR Spectrometer requires little upkeep and no daily maintenance. However, basic care will ensure continued peak performance. Follow the guidelines in this article. For best performance, leave the spectrometer powered on.

## NOTICE

Static electricity can permanently damage critical components in your spectrometer. To help prevent such damage, follow these recommendations:

- Before you disconnect the power supply, discharge any static electricity you may have accumulated by touching the spectrometer's metal base.
- Leave replacement parts in their protective packaging until you are ready to install them in the instrument.

## Weekly Maintenance

### VERIFY THE SPECTROMETER PERFORMANCE

The OMNIC Paradigm software includes qualification and performance verification (PV) workflows for your Summit spectrometer. The qualification workflows are standard industry-wide qualification tests you most likely recognize (for example, European Pharmacopoeia, Japanese Pharmacopoeia, etc.). The PV workflow runs a series of standard tests to verify instrument operation and ensure the accuracy of your data. Any required reference standards are supplied inside the instrument and controlled by the OMNIC Paradigm software.

We recommend that you run the PV workflow or your preferred qualification workflow at least once a week.

### CLEAN THE SPECTROMETER

The spectrometer can be cleaned only as recommended. See ["Clean the Spectrometer"](#).

# Monthly Maintenance

## CHECK THE HUMIDITY INDICATOR

The spectrometer’s optical components can be easily damaged by excessive moisture in the air. The spectrometer is sealed and its components are protected by two desiccant canisters that absorb moisture. Monitor the instrument humidity in OMNIC Paradigm software.

The spectrometer’s optical components can be easily damaged by excessive moisture in the air. The spectrometer is sealed and its components are protected by two desiccant canisters that absorb moisture. A humidity indicator located here monitors the humidity level inside the spectrometer.

You can also monitor the humidity through OMNIC Paradigm software. In the Desktop interface, click the instrument icon to view the system status, or in the Touchscreen interface, select the Diagnostics icon. The humidity level is listed in the Environment section.

Figure 4-1: Location of Humidity Indicator



Check the humidity indicator at least once a month and change the desiccant canisters when needed (see the table below), or purchase and install a purge kit. See ["Install and Maintain a Purge Kit"](#) for more information.

Table 1 - Humidity Indicator States and Recommendations

Humidity Indicator State	Meaning	Action
Blue	Desiccant is fully charged	None

Humidity Indicator State	Meaning	Action
Light blue	Desiccant is becoming saturated with moisture and no longer providing sufficient protection	Replace the desiccant
Pink or white	Desiccant has expired	Replace the desiccant and the humidity indicator

For more information, see ["Replace the Desiccant"](#).

### NOTICE

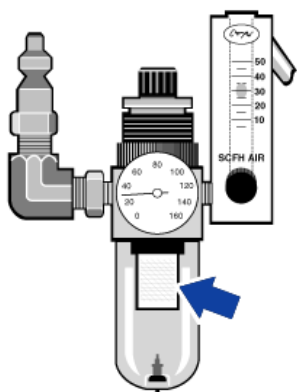
We recommend that you keep the spectrometer sealed and desiccated, or sealed and purged with dry air or nitrogen, at all times. Equipment damage due to failure to maintain seal and desiccation and/or purge is not covered under the warranty. If you have questions about this requirement, please contact us.

### CHECK THE PURGE GAS FILTER

If your spectrometer is purged with nitrogen or dry air, check the purge filter at least once a month.

Replace the filter when it is yellow, or otherwise discolored, or if it is contaminated with debris or foreign particles. For more information, see ["Check and Change the Purge Gas Filter"](#).


**Figure 4-2:** The purge filter is located inside of the plastic bowl below the pressure gauge



# Align the Spectrometer Optics


Align your spectrometer's optics if a qualification workflow, such as the Nicolet FTIR - Factory Qualification workflow, indicates a failing test. Aligning the spectrometer optimizes the energy that reaches the detector and maximizes the detector signal. If a performance or qualification test fails, align the spectrometer's optics, calibrate the laser frequency, and run the test again. If the test still fails, contact your local technical support representative for help.

## ❖ To align the spectrometer optics (touchscreen interface)

1. On the home screen, select the Diagnostics icon [- 2. Open the Align tab and select **Align**.

The system automatically aligns the spectrometer and indicates when alignment is complete.

## ❖ To align the spectrometer optics (operator interface)

1. Navigate to the Administrator area, select the Diagnostics icon [- 2. Open the Align tab and select **Align**.

The system automatically aligns the spectrometer and indicates when alignment is complete.

## ❖ To align the spectrometer optics (desktop interface)


1. Select **Acquire Data > Diagnostics > Align Spectrometer**.
2. In the Align Spectrometer dialog, click **Start**.

The system automatically aligns the spectrometer and indicates when alignment is complete.

# Calibrate the Laser Frequency


Calibrate your laser frequency if a qualification workflow, such as the Nicolet FTIR - Factory Qualification workflow, indicates a failing test. When a test fails, first align the spectrometer, then calibrate the laser frequency and run the test again. If the test still fails, contact your local technical support representative for help.

## ❖ To calibrate the laser (touchscreen interface)

1. On the home screen, select the Diagnostics icon [] to open the Diagnostics view.
2. Open the Laser Calibration tab and select **Calibrate** to begin.

When laser calibration is complete, a message indicates whether the laser frequency has been changed and displays the new frequency.

## ❖ To calibrate the laser (operator interface)

1. Navigate to the Administrator area, and select the Diagnostics icon [] to open the Diagnostics view.
2. Open the Laser Calibration tab and select **Calibrate** to begin.

When laser calibration is complete, a message indicates whether the laser frequency has been changed and displays the new frequency.

## ❖ To calibrate the laser (desktop interface)

1. Select **Acquire Data > Diagnostics > Laser Calibration**.
2. In the Laser Calibration dialog box, click **Start** to calibrate the laser.

When the system is finished calibrating the laser, a message indicates whether the frequency was changed and displays the new frequency.

# Clean the Spectrometer

Before cleaning the Thermo Scientific Nicolet Summit LITE spectrometer, turn it off and disconnect the power supply.

## Clean the Summit Spectrometer

Gently clean the exterior of the instrument with a soft, clean cloth lightly dampened with mild soap.

Dust can collect on the electronics enclosure on the back of the instrument and can potentially interfere with heat dissipation, which may reduce the lifetime of the electronic components.

To remove dust from the back of the instrument, use compressed air to blow the dust off. Do not use any liquid when removing dust from the back of the spectrometer.

### CAUTION



**Avoid shock hazard.** To avoid shock hazard, do not allow liquid to run into the power supply or the back of the instrument.

### NOTICE

Do not use harsh detergents, solvents, chemicals, or abrasives; these can damage the finish. Do not allow liquid to contact any windows in the sample compartment.

### NOTICE

Windows can be scratched and ruined very easily. Do not touch or attempt to clean them. Dust will not affect the signal, but fingerprints can degrade the performance of the instrument and permanently damage mirrors or windows. If you wish to remove dust from a mirror or window, blow it off with a gentle stream of clean, dry air or nitrogen. Never allow any liquid to come into contact with a window or optical component in the instrument.

# Replace the Desiccant

If your instrument is not equipped with a purge kit, or if the purge is turned off, you must monitor the humidity level inside the spectrometer. Replace the desiccant when the paper humidity indicator turns pink (can be light pink or almost white). Replace the paper humidity indicator each time you replace the desiccant.

Replacing the desiccant requires you to remove the desiccant cartridge and replace the desiccant canisters and the O-ring.

## TOOLS NEEDED

Before you begin, you will need the following:

- Desiccant replacement kit
- A 0.05-inch hex key
- A #2 Phillips head screwdriver
- Gloves, finger cots, or laboratory tissue (to handle the humidity indicator)

## WARNING



### Avoid explosion hazard.

Before opening the desiccant compartment, turn off the instrument power, unplug the power cord and remove all accessories and samples from the system. Entry of flammable liquids or gases into the desiccant compartment is an explosion hazard. If such entry occurs, contact us immediately and do not apply power to the instrument until the condition has been corrected.

## NOTICE

Make sure nothing falls into the instrument while the desiccant cover is removed.

## WARNING



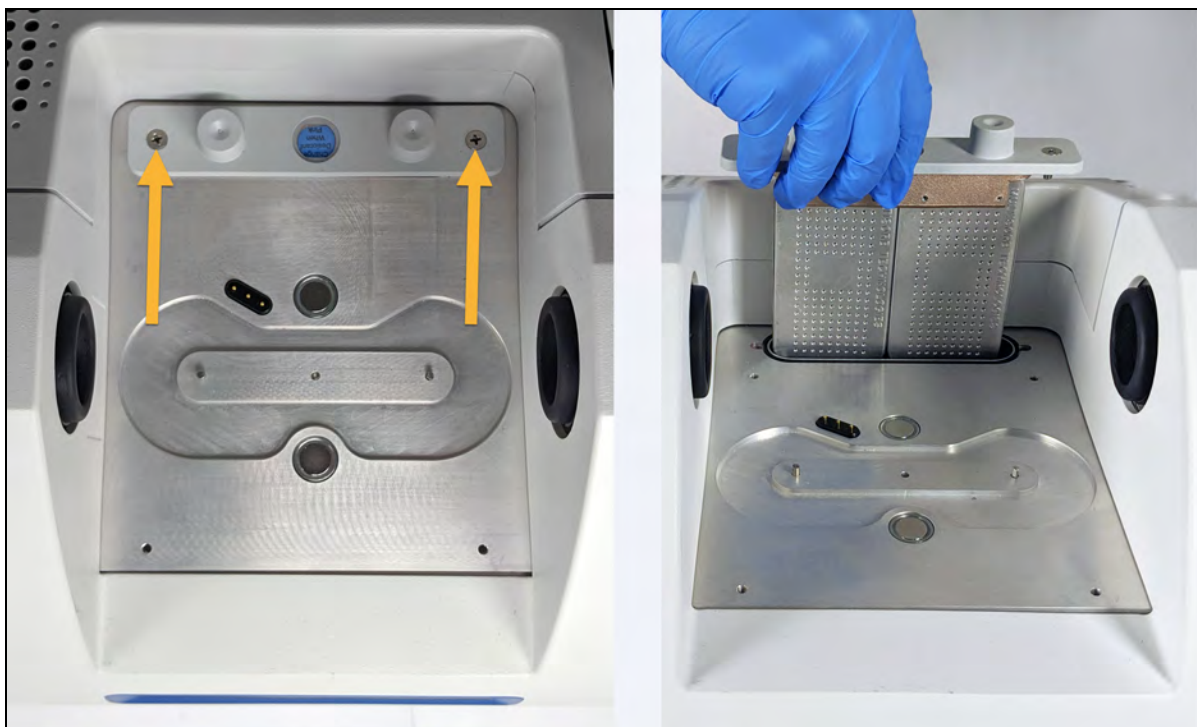
Replace the desiccant only with replacement parts supplied by us.

### ❖ To replace the desiccant

1. Turn off the spectrometer.
  - a. To turn off the spectrometer, press the power button.
  - b. Unplug the power cord.
  - c. Turn off the purge, if applicable, and disconnect the purge line to the instrument and any accessory.

**Note** You can use either desiccant cartridge (with or without the purge connector) to maintain the required humidity. The illustrations below show the nonpurged version of the desiccant cartridge. The instructions for replacing the desiccant canisters are the same for both cartridges.

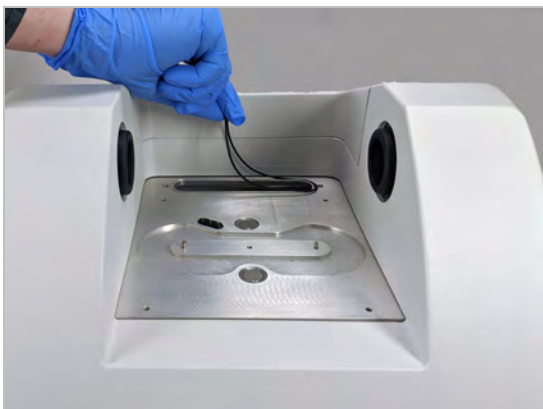
2. Remove the desiccant cartridge.
  - a. Remove any installed accessory and all samples from the instrument.
  - b. Use the #2 Phillips head screwdriver to loosen the two captive screws from the desiccant cartridge, and lift the cartridge straight up and out of the instrument.





## Maintenance

- c. Remove and discard the large O-ring.



**Note** Be careful to not drop the O-ring into the desiccant compartment.

3. Remove the desiccant canisters and replace the humidity indicator.

### WARNING



The contents of the desiccant canisters (hydrated metal aluminosilicate molecular sieve) could be harmful if ingested. If you discard the saturated desiccant canisters, make sure they are properly disposed of.

- a. Use the 0.05-inch hex key to loosen (approximately two turns) the eight screws that hold the two saturated desiccant canisters to the desiccant cartridge. Remove the canisters.



1. Desiccant cartridge
  2. Remove these screws (four on each side)
  3. Desiccant canisters
- b. Turn the desiccant cartridge upside down and peel the old humidity indicator off the window. Discard the used indicator.

### NOTICE

Always wear lab gloves or finger cots, or use laboratory tissue, when handling a new humidity indicator. Oil or moisture from skin can discolor the indicator.

4. Install the new desiccant canisters.
  - a. Open the sealed packet that contains the new desiccant (must be sealed to maintain the desiccant) and remove the new humidity indicator.
  - b. Turn the desiccant cartridge upside down and press the blue indicator onto the window so that the flat edges of the indicator are aligned with the edges of the cartridge. The text should be visible through the window when you turn the cartridge right side up.

### NOTICE

Make sure that the indicator is pressed tightly against the window so that it does not come loose in the desiccant compartment when you reinstall the cartridge.

- c. Insert the canisters into the channel of the desiccant cartridge and tighten the eight screws (approximately 2 turns) until they are flush with the cartridge channel.
5. Insert the desiccant cartridge.
  - a. Remove the new O-ring from the packet and install it on the instrument base plate.

Press, rather than roll, the new O-ring into place to be sure it is properly seated in the groove.
  - b. Insert the desiccant cartridge into the spectrometer so that the text on the humidity indicator can be read by someone standing in front of the instrument.

Make sure the cartridge is seated properly over the O-ring and then use the #2 Phillips head screwdriver to tighten the two captive screws.
6. Turn on the spectrometer.
  - a. Plug in the power cord to the instrument and turn on the power.
  - b. Reconnect the purge line to the instrument, if applicable, and turn on the purge.
  - c. Reconnect the spectrometer to the computer.
7. Verify the spectrometer's performance.

Before taking the following steps, make sure there is not a sampling accessory in the sampling compartment.

  - a. Align the spectrometer optics.
    - i. From the dashboard of OMNIC Paradigm software, go to **Acquire Data > Diagnostics > Align Spectrometer**.
    - ii. Select **Start** to begin alignment. The screen says "Align complete" when alignment has finished successfully.
  - b. Calibrate the laser.
    - i. Go to **Acquire Data > Diagnostics > Laser Calibration**.
    - ii. Select **Start** to begin calibration.

## Maintenance

Laser calibration may take several minutes to complete. When calibration is finished, the display shows "Measurement complete" and indicates any change in laser frequency.

The instrument takes up to 12 hours to come to thermal equilibrium. For best results, re-run alignment and calibration after the first 12 hours of operation.

- c. Run the **Nicolet FTIR - Factory Qualification** workflow. Performance verification and qualification workflows use a polystyrene reference material inside the spectrometer to run a series of standard tests to verify your instrument operation and to ensure the accuracy of your data.
  - i. Return to the Dashboard.
  - ii. Scroll to the Workflows pane and select **Nicolet FTIR - Factory Qualification**.
  - iii. Right click the workflow and select **Run** to start the workflow.

# Replace the Source

The IR source is easily accessible from the bottom of the spectrometer and can be replaced without having to remove the spectrometer's cover.

## TOOLS AND MATERIALS NEEDED

- A #1 Phillips head screwdriver
- Source Replacement Kit

### CAUTION



Before replacing the source, turn off the instrument. Replace the source only with replacement parts supplied by us.

### ❖ To replace the source

1. Turn off and disconnect the spectrometer.
  - a. Turn off the instrument and unplug the power cord.
  - b. Disconnect any cables from the instrument, such as the Ethernet cable or USB devices.
  - c. If the spectrometer or an installed accessory is purged, disconnect the purge lines from the spectrometer and the accessory (quick connect fittings stop the flow automatically). See ["Install and Maintain a Purge Kit"](#) for more information.
  - d. Remove any installed accessories from the instrument.

### CAUTION

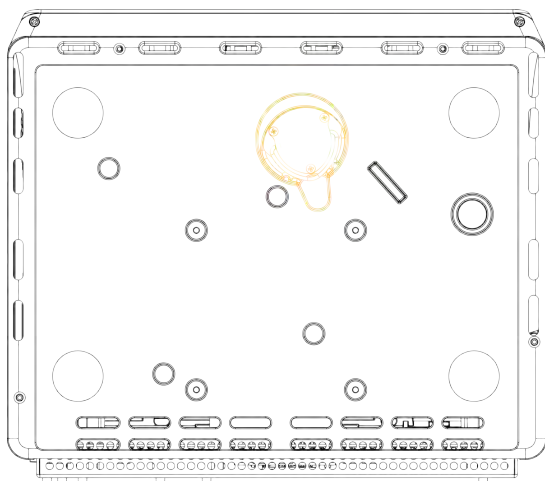


**Avoid burn hazard.**

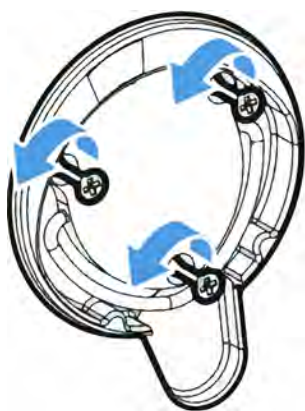
The source becomes extremely hot while you are using the instrument. Wait at least 10 minutes after turning the instrument off before you perform the next step.

## Maintenance

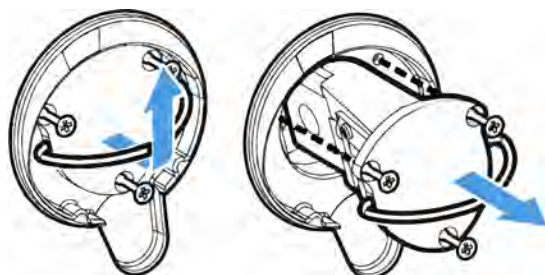
2. Remove the source.
  - a. Carefully tip the instrument back until it rests on the electronics enclosure.



- b. Use a #1 Phillips head screwdriver to fully loosen the three captive screws that hold the source in place.



- c. Swing the bale out. Steady the instrument with one hand and pull firmly on the bale to pull the source straight out of the instrument.



### NOTICE

Never touch a source element with your bare fingers. Skin oils or other deposits on the element will shorten its life. Always use clean finger cots, gloves, or clean laboratory tissue when handling a source element.

3. Insert the new source.
  - a. Make sure the three captive screws are straight and then slowly insert the source into the cavity until the source mount is flush with the instrument.
  - b. Tighten the screws to secure the source and snap the bale into its storage position.
4. Reconnect and power on the spectrometer.
  - a. Carefully return the instrument to its upright position and reconnect any cables you removed.
  - b. Replace the desiccant. See ["Replace the Desiccant"](#) for instructions.

Because the internal optics are exposed to the atmosphere when removing the source, the desiccant should always be replaced after replacing the source.

### WARNING



#### Avoid shock hazard.

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

- c. Plug in the power cord to the instrument and press the power button to turn on the spectrometer.

**Note** Do not install any sampling accessing until after you have aligned the spectrometer and verified its performance

5. Verify the spectrometer's performance.

Before taking the following steps, make sure there is not a sampling accessory in the sampling compartment.

## Maintenance

- a. Align the spectrometer optics.
  - i. From the dashboard of OMNIC Paradigm software, go to **Acquire Data > Diagnostics > Align Spectrometer**.
  - ii. Select **Start** to begin alignment. The screen says "Align complete" when alignment has finished successfully.
- b. Calibrate the laser.
  - i. Go to **Acquire Data > Diagnostics > Laser Calibration**.
  - ii. Select **Start** to begin calibration.

Laser calibration may take several minutes to complete. When calibration is finished, the display shows "Measurement complete" and indicates any change in laser frequency.

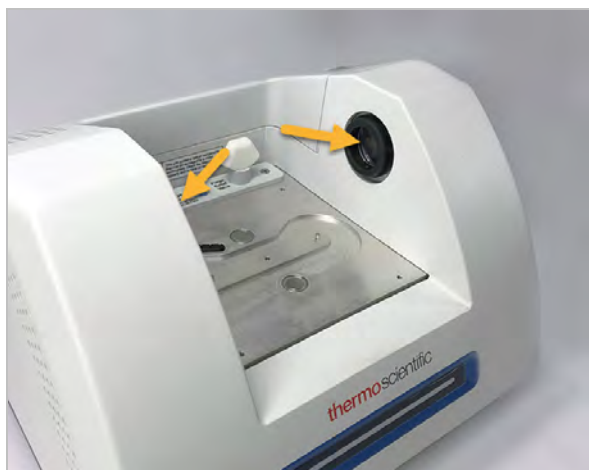
The instrument takes up to 12 hours to come to thermal equilibrium. For best results, re-run alignment and calibration after the first 12 hours of operation.

- c. Run the **Nicolet FTIR - Factory Qualification** workflow. Performance verification and qualification workflows use a polystyrene reference material inside the spectrometer to run a series of standard tests to verify your instrument operation and to ensure the accuracy of your data.
    - i. Return to the Dashboard.
    - ii. Scroll to the Workflows pane and select **Nicolet FTIR - Factory Qualification**.
    - iii. Right click the workflow and select **Run** to start the workflow.
6. Replace any accessories that you removed earlier.



# Replace the Sample Compartment Windows

The Thermo Scientific Nicolet Summit LITE FTIR Spectrometer has windows on both sides of the sample compartment that seal the instrument from moisture and other contaminants but allow the infrared beam to enter and exit the sample compartment. The windows should always be installed, even if your system is purged with dry air or nitrogen.



## WARNING



**Avoid fire and explosion hazard.**

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

We install potassium bromide (KBr) windows at the factory and run all of our operating and performance tests with the windows installed. The KBr windows are hygroscopic but have a protective coating. On this spectrometer, they provide a working spectral range between 8,000 and 350  $\text{cm}^{-1}$  with no significant optical absorptions lines.

For optimal spectrometer performance, the sample compartment windows must be clear (not cloudy) and clean (no dust or fingerprints). If your windows become contaminated, the spectrometer may fail performance and qualification tests. You can order new windows from us and install them yourself using the instructions below.

### NOTICE

- Replace sample compartment windows only with replacement parts supplied by us.
- Do not allow liquids to come into contact with the windows.
- Windows can be scratched and ruined very easily. Do not touch or attempt to clean them. Dust will not affect the signal, but fingerprints can degrade the performance of the instrument and permanently damage mirrors or windows. If you wish to remove dust from a mirror or window, blow it off with a gentle stream of clean, dry air or nitrogen. (Do not use compressed air from a can; contaminants may cause damage.)
- Leave new windows in their protective packaging until you are ready to insert them in the spectrometer.
- If you remove working KBr or ZnSe windows from the spectrometer, immediately place them in the provided protective packaging (includes desiccant) and seal the package securely.
- KBr windows are clear; ZnSe windows are yellow.

Tools needed:

Nicolet Summit ZnSe (or KBr) replacement windows kit

The kit includes the following items:

- ZnSe (or KBr) replacement windows (2)
- Window replacement tool
- Protective packaging (includes desiccant) for storing unused windows
- Nitrile gloves



### ❖ To replace sample compartment windows

1. Turn off the spectrometer.

**Note** If your instrument is purged, leave the purge on while you replace the windows to prevent ambient air from entering the spectrometer.

2. Remove any sampling accessory from the spectrometer.
3. Remove the first installed window.
  - a. Line up the three ribs on the window replacement tool's inside rim with the notches in the outside rim of the first installed window.



**Note** The window fittings are tight. Use one hand to stabilize the instrument and the other to remove the window.

- b. Press firmly on the tool and turn it counterclockwise to loosen the window.

Continue loosening the window until it is free. If you tip the tool upward, it will support the window so you don't have to handle it directly.



### NOTICE

Use nitrile gloves to handle the window and handle it by the rims only. (Avoid touching the window surfaces even when wearing gloves.)

- c. If the window is still usable, grasp it by the plastic ring and carefully place it in the provided package (with desiccant). Store the package someplace that is clean and dry.
4. Install the new window.
  - a. Grasp the new window by the plastic ring and carefully place it in the window replacement tool with the window threads facing up.
  - b. Rotate the window until the three notches in its outside rim line up with the ribs on the tool's inside rim.
  - c. Reversing the removal procedure above, tip the tool and window just enough to place the window over the opening in the spectrometer.
  - d. While maintaining light pressure against the spectrometer wall, slowly turn the tool clockwise to ensure the window's threads are engaged properly.

### NOTICE

The window should turn easily at the start; if it doesn't, reverse the direction of rotation and restart the insertion to avoid stripping the threads.

- e. Continue rotating the tool clockwise until you feel the O-ring compress, plus 1/8 turn more.
5. Repeat steps 3 through 4 above to replace the second window.
6. Turn on the instrument power, connect to your computer, and start OMNIC Paradigm software.
7. Verify the spectrometer's performance.

Before taking the following steps, make sure there is not a sampling accessory in the sampling compartment.

- a. Align the spectrometer optics.
  - i. From the dashboard of OMNIC Paradigm software, go to **Acquire Data > Diagnostics > Align Spectrometer**.
  - ii. Select **Start** to begin alignment. The screen says "Align complete" when alignment has finished successfully.
- b. Calibrate the laser.
  - i. Go to **Acquire Data > Diagnostics > Laser Calibration**.
  - ii. Select **Start** to begin calibration.

Laser calibration may take several minutes to complete. When calibration is finished, the display shows "Measurement complete" and indicates any change in laser frequency.

The instrument takes up to 12 hours to come to thermal equilibrium. For best results, re-run alignment and calibration after the first 12 hours of operation.

- c. Run the **Nicolet FTIR - Factory Qualification** workflow. Performance verification and qualification workflows use a polystyrene reference material inside the spectrometer to run a series of standard tests to verify your instrument operation and to ensure the accuracy of your data.
  - i. Return to the Dashboard.
  - ii. Scroll to the Workflows pane and select **Nicolet FTIR - Factory Qualification**.
  - iii. Right click the workflow and select **Run** to start the workflow.
8. If you use operational qualification (OQ) tests to track instrument performance, we recommend that you rerun your chosen OQ test after the sample compartment windows have been replaced (especially if you changed the window type). See the article titled "Qualify the Summit Spectrometer" in the online help for more information.
9. Replace any accessories you removed earlier on the spectrometer.