

thermo scientific

# Nicolet Apex

FTIR Spectrometer



## USER GUIDE

269-361501

Revision A

March 2024

**ThermoFisher**  
SCIENTIFIC

[This page intentionally left blank]

# Chapter 1

© 2024 Thermo Fisher Scientific Inc. All rights reserved.

Microsoft, Windows and Excel are either trademarks or registered trademarks of Microsoft Corporation in the United States and/or other countries. All other trademarks are the property of Thermo Fisher Scientific Inc. and its subsidiaries.

For technical support, please contact: [www.thermofisher.com](http://www.thermofisher.com)

Thermo Fisher Scientific Inc. provides this document to its customers with a product purchase to use in the product operation. This document is copyright protected and any reproduction of the whole or any part of this document is strictly prohibited, except with the written authorization of Thermo Fisher Scientific Inc.

The contents of this document are subject to change without notice. All technical information in this document is for reference purposes only. System configurations and specifications in this document supersede all previous information received by the purchaser.

**Thermo Fisher Scientific Inc. makes no representations that this document is complete, accurate, or error-free, and assumes no responsibility and will not be liable for any errors, omissions, damage, or loss that might result from any use of this document, even if the information in the document is followed properly.**

This document is not part of any sales contract between Thermo Fisher Scientific Inc. and a purchaser. This document shall in no way govern or modify any Terms and Conditions of Sale, which Terms and Conditions of Sale shall govern all conflicting information between the two documents.

**For Research Use Only. This instrument or accessory is not a medical device and is not intended to be used for the prevention, diagnosis, treatment, or cure of disease.**

## WARNING



**Avoid an explosion or fire hazard.**

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

[This page intentionally left blank]

---

# Table of contents

---

<b>Table of contents</b> .....	<b>5</b>
<b>Conventions used</b> .....	<b>7</b>
<b>Questions, concerns, and ordering parts</b> .....	<b>8</b>
<b>Spectrometer safety labels</b> .....	<b>9</b>
<b>Contacting us</b> .....	<b>10</b>
<b>Operation</b> .....	<b>11</b>
ZnSe configuration (optional) .....	11
Indicators and buttons .....	12
Installing a Smart Accessory .....	13
Measuring data with the instrument .....	14
Measuring data with the module .....	14
Setting the purge gas controls .....	14
Aligning your spectrometer .....	16
Verifying the laser frequency .....	17
Cooling a detector .....	17
<b>Installing or replacing hardware</b> .....	<b>21</b>
Installing a purge kit .....	21

Installing a sample compartment extension kit .....	24
Installing baseplate-mounted accessories .....	26
Installing slide-mounted accessories .....	26
Installing other accessories .....	27
Replacing the power supply .....	28
Changing the source .....	29
Installing sidewall adapters .....	32
<b>Maintaining your instrument .....</b>	<b>33</b>
Cleaning your instrument .....	33
Static electricity precautions .....	34
Maintaining detector dewar .....	34
Checking the humidity indicator .....	35
Replacing the humidity indicator .....	36
Replacing the desiccant .....	37
Regenerating the desiccant .....	39
Checking and changing the purge gas filter .....	41
<b>Troubleshooting .....</b>	<b>45</b>
Instrument problems .....	46
Error messages .....	49

---

# 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.

**Tip** Provides information that can make a task easier.

# Questions, concerns, and ordering parts

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 visit our website at [www.thermofisher.com](http://www.thermofisher.com).

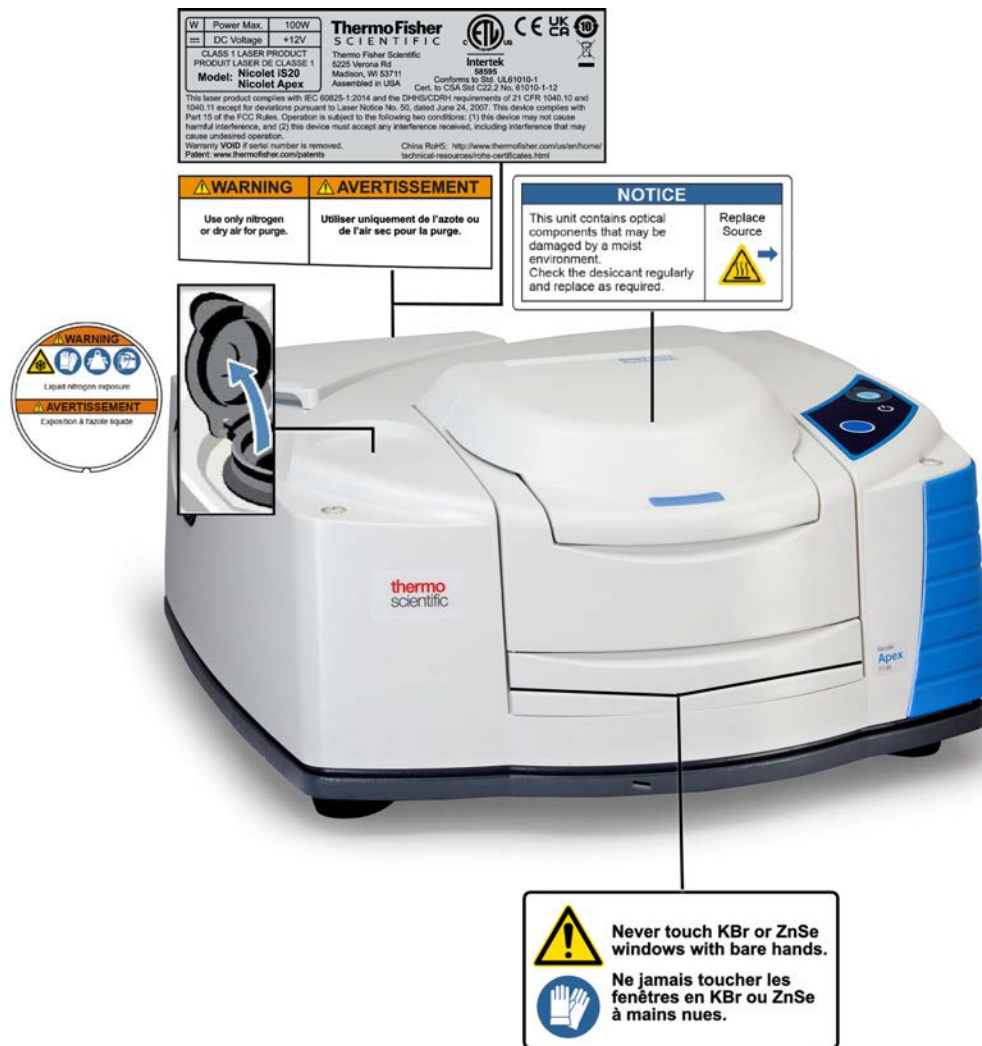
To order parts, [contact us](#).



# Spectrometer safety labels

Your instrument comes with multiple safety labels.

Heed the verbiage on the label to avoid hazard, damage, or injury to yourself or your instrument.



# Contacting us

For Technical Support, please [contact us](#).

If you have problems with your system, refer to the [Troubleshooting](#) information for help, or call Technical Support.

Thermo Fisher Scientific  
168 Third Avenue  
Waltham, MA USA 02451

Website: <https://www.thermofisher.com>

Phone: 781-622-1000

## Ordering parts

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.

---

# Operation

The Thermo Scientific™ Nicolet™ Apex spectrometer has integrated validation features, a powerful software suite, and many other features that make it easy for you to measure data. It was designed to allow you to install optional hardware and perform several service and maintenance procedures yourself. This document contains detailed information about performing such procedures.

## ZnSe configuration (optional)

### NOTICE

The information in this section is only pertinent if you purchased the Nicolet Apex spectrometer in the zinc selenide (ZnSe) configuration. If you purchased the more standard potassium bromide (KBr) configuration, skip ahead to the next section.

The non-hygroscopic ZnSe configuration for your instrument replaces the KBr sample compartment windows, beamsplitter, and detector window with ZnSe counterparts.

The ZnSe configuration comes at a 600  $\text{cm}^{-1}$  cutoff compared to a 350  $\text{cm}^{-1}$  cutoff with the KBr configuration, with the benefit of additional protection against high ambient humidity damage.

### WARNING



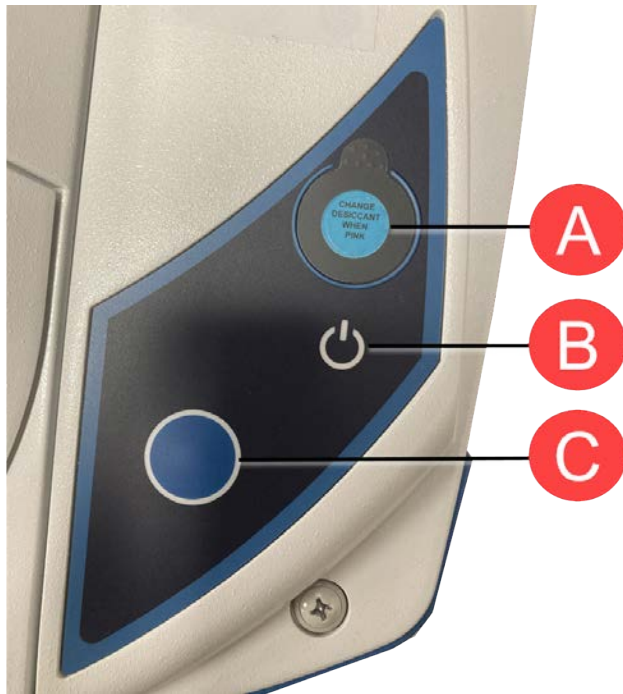
**Avoid toxic inhalation and ingestion.** Zinc selenide is toxic. Refer to the [Manufacturer's Safety Data Sheet](#) for handling and exposure controls.

Wear protective gloves when replacing the ZnSe sample compartment windows.

# Indicators and buttons

The status indicators for the instrument are located on the touch panel, which is on the main cover of the instrument. This panel also has buttons that allow you to operate the instrument.

Figure 2-1: Integrated touch panel



**A** Humidity indicator

**B** Power indicator

**C** Blue Touch Point button

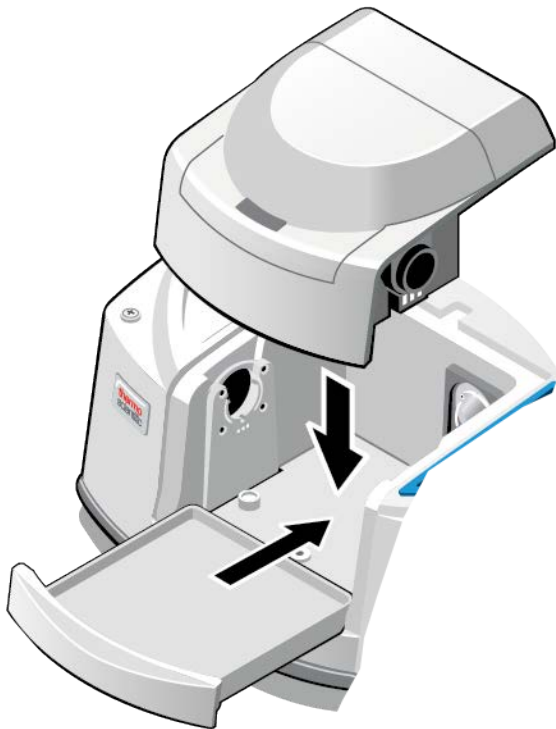
- **Humidity indicator.** The humidity indicator changes color when the humidity inside the instrument exceeds 60% RH. For precise and accurate humidity levels, refer to the System Status table in OMNIC Paradigm software.
- **Power indicator.** Indicates if the instrument is off or on.

- **Blue Touch Point button.** Used to confirm actions and answer prompts instead of doing so manually in OMNIC Paradigm software, such as acquiring a background spectrum or measuring the current sample installed in the sample compartment.

## Installing a Smart Accessory

To install a Smart Accessory™ in the sample compartment, lower the accessory into the sample compartment and press gently downward until the accessory locks in place, then rotate the accessory lock on the top of the instrument at the back edge of the sample compartment so that it holds down the accessory.

Figure 2-1: Install transmission accessory



**Note** If you want to remove a Smart Accessory, simply reverse the steps in this procedure. When you are not using an accessory, store it in a dust-free environment like a box or cabinet. For information about installing other kinds of accessories, see [Installing other accessories](#).

## Measuring data with the instrument

For information about measuring data with your instrument, please see the **Nicolet Apex Getting Started** guide.

## Measuring data with the module

You must use Thermo Scientific™ OMNIC Paradigm software™ to measure data. OMNIC Paradigm software can be started by using the OMNIC Paradigm shortcut on your system desktop. For additional information, please consult the associated documentation or our knowledge base at <https://knowledge1.thermofisher.com/>.

## Setting the purge gas controls

You must connect a source of purge gas (dry air or nitrogen) to purge your instrument of moisture and other environmental contaminants. For best results, the purge gas should be dried to a dew point of -70 °C (-94 °F) or below. Use the following instructions to set the purge gas controls.

### NOTICE

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 under the warranty. If you have questions about this requirement, please contact us.

### CAUTION

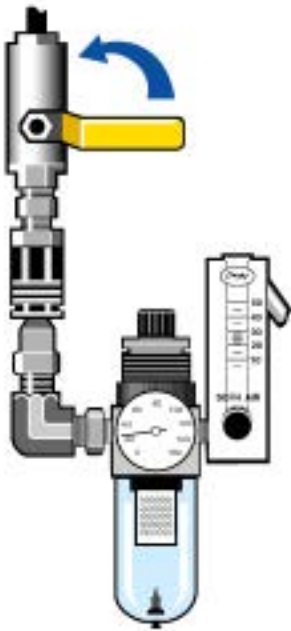


Avoid hazard. Never use a flammable gas to purge your instrument. The purge gas must be free of moisture, oil, carbon dioxide, and other reactive or infrared-absorbing materials. To prevent beamsplitter or detector damage, use only dry air or nitrogen to purge your instrument.

## Operation

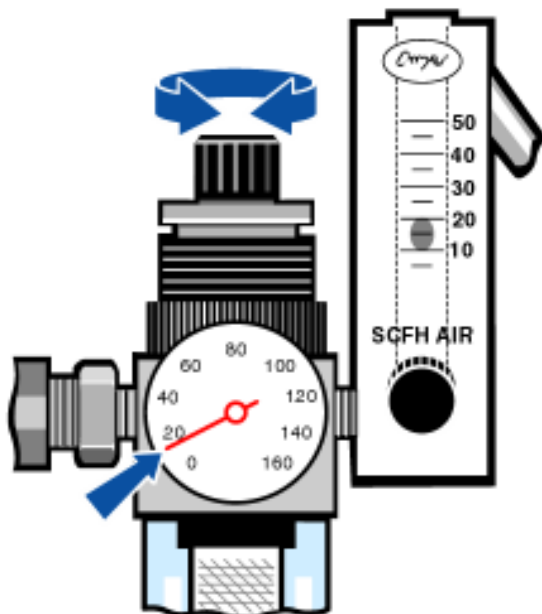
1. Open the shutoff valve.

Figure 2-1: Open purge valve



2. Adjust the pressure regulator until the gauge indicates that the pressure is between 0.7 and 1.4 bar (70 to 140 kPa, or 10 to 20 psig).

Figure 2-2: Adjust purge pressure

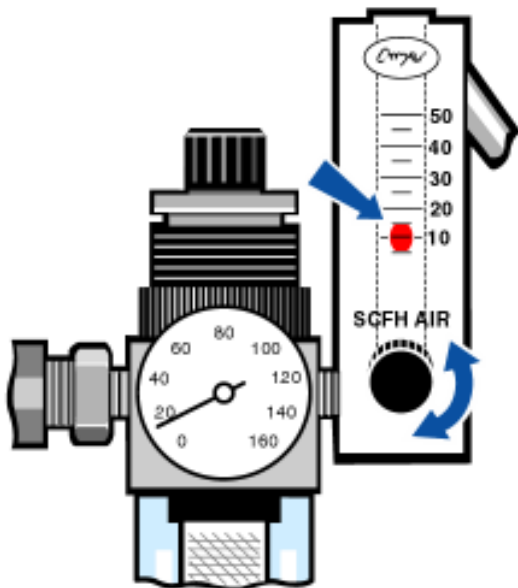


**NOTICE**

Flow rates greater than 10 scfh can cause vibration that can affect data quality. We recommend keeping the flow rate at approximately 10 scfh.

3. Set the flowmeter to 10 scfh.

Figure 2-3: Set purge flowmeter



## Aligning your spectrometer

Your instrument can be aligned automatically using OMNIC Paradigm software. Alignment optimizes the energy throughput to the detector. Alignment can change slightly over time, particularly in locations that have large temperature swings or excessive vibration.

**Note** The instrument is aligned automatically each time you run a performance verification (PV) test. We recommend running a PV test at least once a month.

Remove any installed accessories before aligning your spectrometer. To align it, go to **Acquire Data >Diagnostics > Align Spectrometer** in OMNIC Paradigm software.



## Verifying the laser frequency

For optimum system performance, verify the laser frequency according to the following schedule:

Spectrometer environment	Spectrometer state	Recommended schedule
Stable	Always powered on	Every 3 months
Unstable (e.g., temperature or humidity constantly changing)	Powered on and off frequently	Every day or once a week

**Note** The laser is verified automatically each time you run a PV test. We recommend running a PV test at least once a month.

### ❖ To verify the laser frequency and calibrate the laser

1. In OMNIC Paradigm software, go to **Acquire Data > Diagnostics > Laser Calibration**.
2. In the Laser Calibration dialog box, select **Start** to calibrate the laser.

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

## Cooling a detector

If you have a liquid nitrogen-cooled MCT detector, you must cool it with liquid nitrogen before you can measure data.

**Time needed:** 40 minutes or less.

### **Tools needed:**

- Protective clothing and eye wear
- A small plastic laboratory funnel

- A one-liter, metal vacuum bottle
- Liquid nitrogen

**Note** A detector dewar should maintain its insulating vacuum for several years. If the vacuum leaks, the insulation will lose effectiveness.

## WARNING

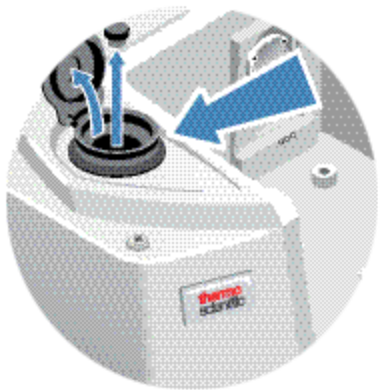


**Avoid freeze burn hazard.** Liquid nitrogen is extremely cold and potentially hazardous. Make sure you pour the liquid nitrogen slowly when you fill the vacuum bottle or the detector dewar. Pouring too quickly can cause liquid nitrogen to spray out.

To prevent injury, always follow standard laboratory safety practices and wear protective clothing and eyewear when you use liquid nitrogen. Avoid letting liquid nitrogen come into contact with your skin.

1. Open the detector dewar cover and remove the plastic stopper from the dewar.

Figure 2-1: Open detector dewar



2. Fill the metal vacuum bottle with liquid nitrogen.

## NOTICE

Do not spill liquid nitrogen on or near the detector window. If the window's o-ring seal cools very rapidly, the dewar may lose its vacuum and expose the detector element to damaging atmospheric pressure.

3. Insert the funnel into the detector dewar and pour the liquid nitrogen slowly into the funnel. A small amount of liquid nitrogen typically spills out of the funnel. This will not harm your instrument.

## Operation

4. Fill the funnel and let it drain completely two or three times. Wait until the vapor plume disappears and then repeat until the dewar is filled.

Figure 2-2: Filling detector dewar



5. Remove the funnel.
6. Wait until the vapor plume disappears, and then replace the plastic stopper and close the dewar cover.
7. Wait 20 minutes, and then repeat the preceding steps to make sure the dewar is completely filled.

[This page intentionally left blank]

---

# Installing or replacing hardware

**Note** For safety concerns, refer to the user documentation specific to any applicable accessory.

## Installing a purge kit

Purging your instrument protects the internal components from moisture and other environmental contaminants by maintaining an internal atmosphere of dry air or nitrogen.

If your instrument is not already equipped to purge, you must install a purge kit.

### NOTICE

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 under the warranty. If you have questions about this requirement, please contact us.

**Time needed:** 30 minutes or less

**Tools needed:**

- A 3/4 inch open-ended wrench
- An 11/16 inch open-ended wrench
- A shutoff valve with a 1/4 inch male or 3/8 inch female fitting
- Pipe tape

**Note** 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 order parts, contact us.

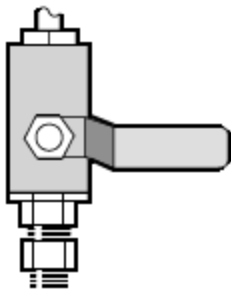
**WARNING**



**Avoid hazard.** Never use flammable gas to purge your instrument. The purge gas must be free of moisture, oil, carbon dioxide, or infrared-absorbing materials. To prevent laser damage, use only dry air or nitrogen to purge your instrument.

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

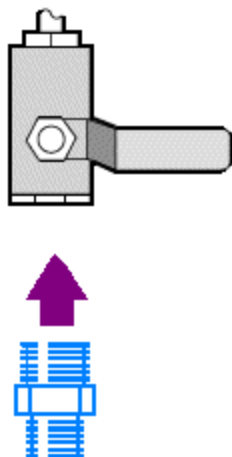
Figure 3-1: Purge shutoff valve



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

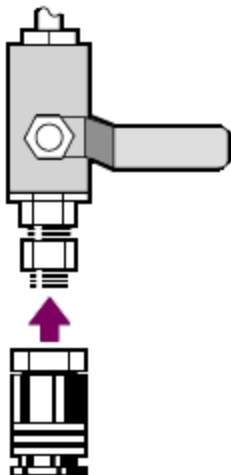
If you used a 3/8 inch female fitting on the purge gas source, install the 3/8 inch to 1/4 inch reducing nipple that was included with your purge kit. Wrap the reducing nipple with Teflon pipe tape before you install it, and use an 11/16 inch open-ended wrench to tighten the connection.

Figure 3-2: Purge-reducing nipple



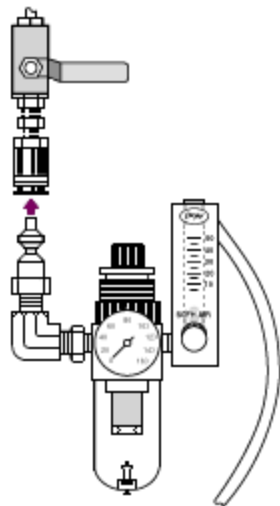
3. Wrap the reducing nipple or the 1/4 inch male fitting with Teflon pipe tape, then install the pressure coupling. Use a 3/4-inch, open-ended wrench to tighten the connection.

Figure 3-3: Connect pressure coupler



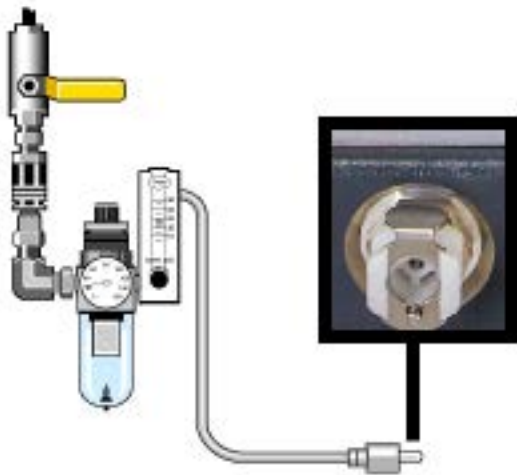
4. Install the purge filter, pressure regulator and flow meter, and snap the assembly into the pressure coupling.

Figure 3-4: Connect purge



5. Connect the purge kit to your instrument, set the purge gas controls, and snap the flow coupler into the back of the instrument.

Figure 3-5: Purge connector



## Installing a sample compartment extension kit

**Time needed:** 10 minutes or less

**Tools needed:**

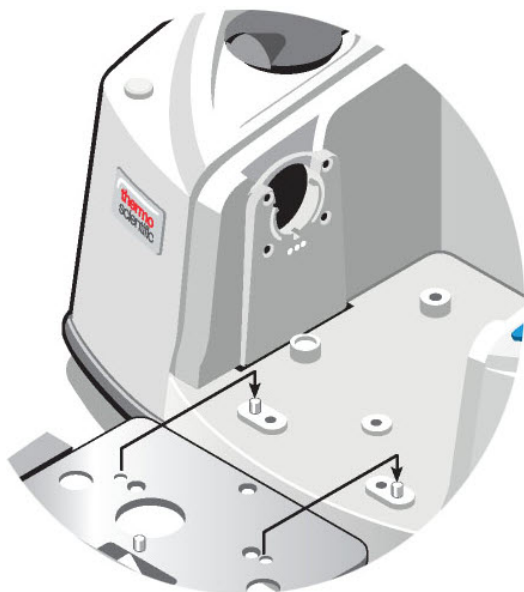
- 4-in-1 tool (included with your instrument)
  - 5/32 inch hex wrench
1. Remove any Smart Accessory, then disconnect any cables that are connected at the back of the sample compartment.
  2. Remove the stabilizer arm located on the top of the instrument at the back edge of the sample compartment.

Remove the cap on top of the stabilizer arm, then use the 4-in-1 tool with a Phillips bit installed to remove the stabilizer arm screw. Lift the stabilizer arm off the instrument and save it (with its cap and screw) in a safe place for if you want to reinstall it later.



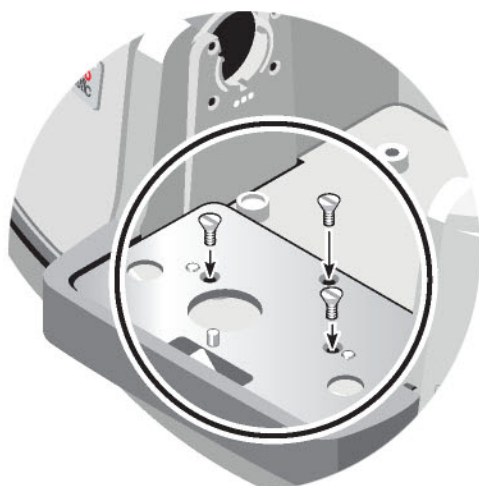
3. Place the sample compartment extension on the front of the sample compartment. Make sure the pins in the same compartment base fit into the holes in the sample compartment extension.

Figure 3-1: Sample compartment extension kit pins



4. Place the screws that came with the sample compartment extension kit into the holes in the sample compartment extension, then use the 4-in-1 tool with a Phillips bit installed to tighten the screws. The screws should be just finger-tight.

Figure 3-2: Sample compartment extension kit screw installation



5. Install the sample compartment cover.

You are now ready to install baseplate-mounted accessories.

## Installing baseplate-mounted accessories

To install the standard sample compartment baseplate (or an accessory mounted on that baseplate) make sure the sample compartment extension kit is installed, then orient the baseplate with the finger hole toward the front and lower the baseplate into the sample compartment. The baseplate fits over several alignment pins, which hold it in place. The sample compartment's position is mounted with two alignment pins and held in place with magnets and four screws.

Figure 3-1: Align the baseplate



## Installing slide-mounted accessories

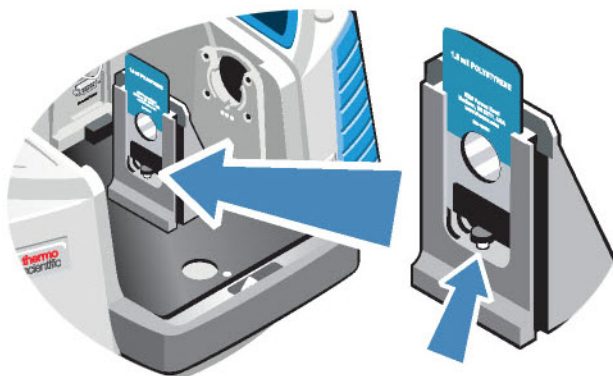
The standard sample holder can accommodate slide-mounting accessories (such as a variable angle ATR) as well as thin film samples and optical filters. To install a slide-mounting sample or accessory, slide the sample or accessory into one pair of slots in the standard sample holder. Alternatively, if you have the Smart OMNI-Transmission accessory, it can be used to measure slide-mounting samples and install most slide-mounting accessories.

Figure 3-1: Standard baseplate sample holder



Use the adjustment screw to position the sample vertically so that it is roughly centered in the infrared beam.

Figure 3-2: Adjust sample height



## Installing other accessories

**Note** The following procedure explains how to install accessories that are not Smart accessories. This procedure applies only if a sample compartment extension kit has been installed.

## NOTICE

Your accessory must be mounted on one of our baseplates. If it is not, you can remove an accessory from one of our baseplates and install your accessory on that baseplate. If you need assistance, [contact us](#).

1. Remove any Smart Accessory, or if a Smart Accessory is not installed, remove the baseplate. Disconnect any cables that are connected at the back of the sample compartment.
2. If the accessory is purged through the windows in the side of the sample compartment, install sidewall adapters.
3. Install the accessory.

Use the instructions that came with the accessory to make any adjustments or perform any alignment procedures that are necessary.

# Replacing the power supply

**Time needed:** 5 minutes or less

**Tools needed:**  
None

## NOTICE

Use only Thermo Fisher certified replacement parts. To order, [contact us](#).

## WARNING



**Avoid shock hazard.** Do not attempt to remove the cover of the power supply. Before you replace the power supply, always make sure you have turned off your instrument and disconnected the power supply from the wall outlet or power strip.

1. Turn off the instrument.
2. Disconnect the old power supply (simply pull out the power connector).
3. Connect the new power supply and turn on the instrument.

If your instrument does not function normally, turn off the power and check the cable connections between the power supply, the instrument, and the wall outlet or power strip. If the connectors are seated properly and the instrument still does not function normally, contact us for assistance.

## Changing the source

Both mid-IR and near-IR sources are available for your spectrometer. This procedure explains how to switch from one kind of source to the other.

### NOTICE

When changing infrared sources, you must adjust the voltage DAC setting to get consistent power. A Thermo Fisher service representative can do this for you.

**Time needed:** 25 minutes or less

**Tools needed:**

- 4-in-1 tool (included with your instrument)
- Finger cots, gloves, or laboratory tissue
- Alternate or duplicate source

### NOTICE

Use only Thermo Scientific-certified replacement parts. 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.

**Note** A spare source, or an alternate source, can be stored in a holder in the same compartment as the 4-in-1 tool above the desiccant compartment.

### CAUTION

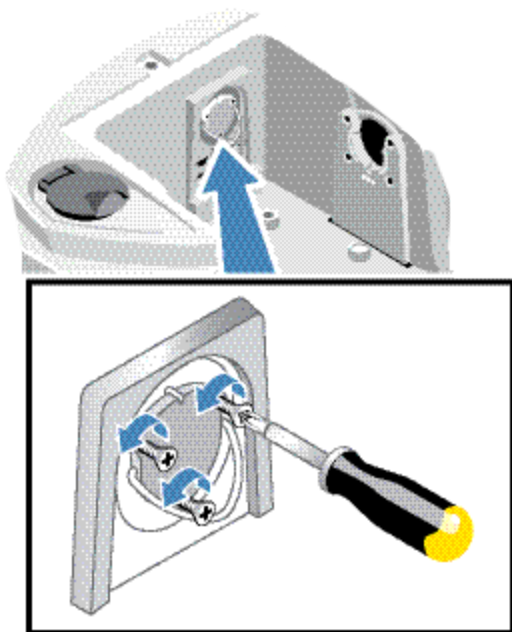


**Avoid hot surface hazard.** The source becomes extremely hot when the instrument is powered on. Always allow the source to cool for at least 15 minutes after the instrument is powered off before you work with it.

## Installing or replacing hardware

1. Turn off your instrument, wait 15 minutes for the source to cool, and then remove the Smart Accessory or open the sample compartment cover.
2. Use the 4-in-1 tool, with the small Phillips bit installed, to loosen the screws that hold the source in place. The screws are captive, so you only need to loosen them until they spin freely.

Figure 3-1: Loosen screws



**Note** Do not twist the source as you remove it and do not touch the electrical contacts or the source element.

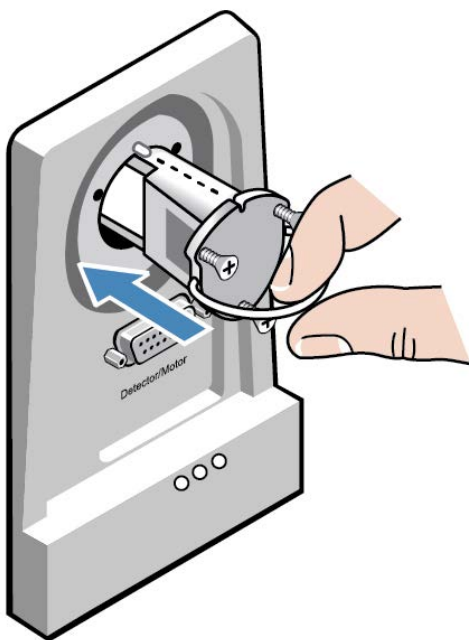
3. Remove the current source.

Figure 3-2: Remove source



4. Insert the new source.

Figure 3-3: Replace source

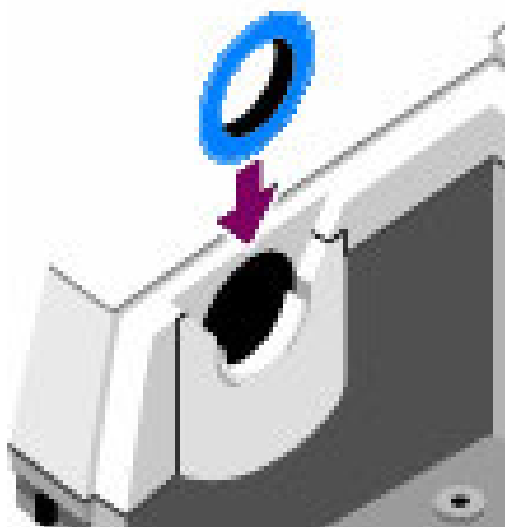


5. Use the 4-in-1 tool, with the small Phillips bit installed, to tighten the screws that hold the source in place. Do not overtighten the screws.
6. Turn on your instrument and start OMNIC Paradigm software.
7. Make sure the system has been on for at least 15 minutes (one hour for best results), then align the instrument.

## Installing sidewall adapters

Sidewall adapters are used to provide a tight purge seal for gas cells and other purged accessories. To install sidewall adapters, press the adapter ring toward the sidewall to compress the purge gasket, and then slide the adapter down into the clips on the side of the sample compartment.

Figure 3-1: Installing a sidewall adapter



**Note** To remove a sidewall adapter, press the adapter ring toward the sidewall to compress the purge gasket, then slide the adapter up out of the clips on the side of the sample compartment.



---

# Maintaining your instrument

## Cleaning your instrument

If the outside of your instrument needs cleaning, turn off the instrument and disconnect the power supply. When this is done, you can use a soft, damp (not wet) cloth and a mild soap to clean the outside of the instrument.

### WARNING



**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, such as those that may be in the sample compartment.

Mirror surfaces and 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 instrument performance 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.

## Static electricity precautions

Critical components in your instrument can be permanently damaged by static electricity. To help prevent such damage, follow these recommendations:

### NOTICE

Before you disconnect power supply, always discharge any static electricity that you may have accumulated by touching the metal base of your instrument.

Do not touch any printed circuit board in the instrument, such as the circuit board on the detector.

Do not remove replacement components from their protective packaging until you are ready to install that component in the instrument.

## Maintaining detector dewar

If your instrument has a cooled detector, it will include a detector dewar. With proper care, a detector dewar should maintain its insulating vacuum for many years. If the vacuum leaks, the insulation will lose effectiveness and the following symptoms may occur:

- Liquid nitrogen boils off much faster than usual.
- The outside of the dewar stays cold more than 30 minutes after filling and may feel damp or become frosted.
- Water and atmospheric contaminants condensing on the detector window show up in spectra as unwanted peaks.

### NOTICE

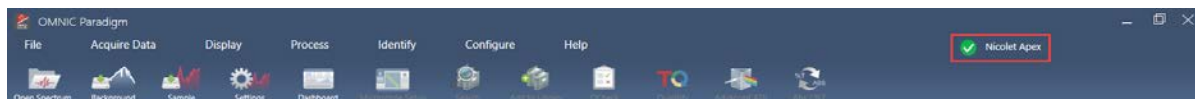
If your instrument shows any of these symptoms, the detector dewar may have a vacuum leak. Contact us immediately for assistance. Leaving internal detector elements exposed to atmospheric pressure can permanently damage them.

# Checking the humidity indicator

The humidity indicator changes color when the humidity level inside your instrument exceeds 60% RH. This can occur only when ambient humidity outside the instrument is above 60% RH. The indicator provides no information on the lifespan of the desiccant and is provided as a means to monitor internal conditions when the instrument is stored without power. If the indicator turns pink or white, you must replace the desiccant and store the instrument in a lower humidity environment.

To monitor humidity inside your instrument, use the System Status table in OMNIC Paradigm software. To reach the table, simply click the instrument name in the upper right corner of the screen.

Figure 4-1: System Status table location



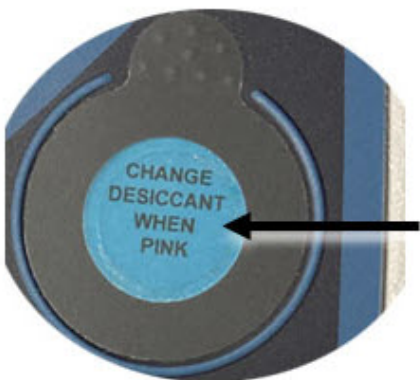
We recommend that the desiccant be replaced when OMNIC Paradigm software reports humidity levels above 40% RH. The humidity indicator should also be changed if it has turned white.

## NOTICE

Check the humidity indicator every time you use your instrument. If use the instrument infrequently, make sure you check the indicator at least once a month.

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 under the warranty. If you have questions about this requirement, please contact us.

Figure 4-2: Humidity indicator



# Replacing the humidity indicator

The humidity indicator must be proactively replaced before it turns white (when it is pink). If it does turn white, both the desiccant and the indicator must be replaced.

**Time needed:** less than 1 minute

**Tools needed:**

- Gloves, finger cots, or laboratory tissue
- Replacement humidity indicator

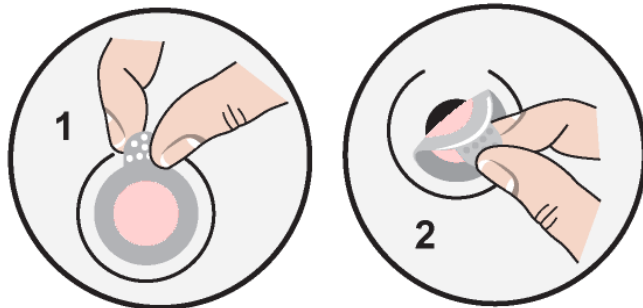
## NOTICE

Use only Thermo Scientific certified replacement parts. To order parts, contact us.

1. Remove the old humidity indicator.

Save the old indicator for reference when you install the new indicator.

Figure 4-1: Removing the old humidity indicator



## NOTICE

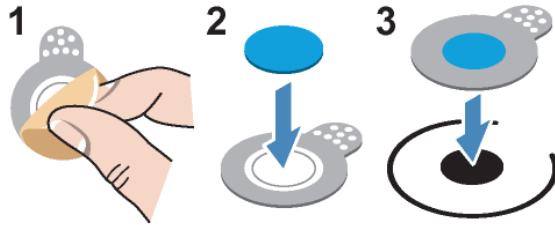
Always wear lab gloves or finger cots, or use laboratory tissue, when handling the humidity indicator. Oil or moisture from skin can discolor the indicator.

**Note** When installing the new humidity indicator, make sure the indicator is centered in the holder and that there are no gaps.

2. Peel the backing off of the indicator holder, and then, as shown below, press the round, blue indicator onto the adhesive on the holder.

3. Place the new indicator and holder over the indicator opening, and press down gently to make sure it is sealed.

Figure 4-2: Installing a new humidity indicator



## Replacing the desiccant

Follow the instructions in this section to replace the desiccant cartridges.

### NOTICE

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 under the warranty. If you have questions about this requirement, please contact us.

**Time needed:** 3 minutes or less

**Tools needed:**

- 4-in1 tool (included with your instrument)
- 2 replacement (or regenerated) desiccant canisters

### NOTICE

Use only Thermo Scientific certified replacement parts. To order parts, contact us. Make sure nothing falls into the instrument while the desiccant cover is removed.

1. Open the tool compartment, and use the 4-in-1 tool, with the large Phillips bit installed, to loosen the captive screw in the desiccant cover.

Lift off the desiccant compartment cover and put it in a safe place.

Figure 4-1: Removing desiccant plate

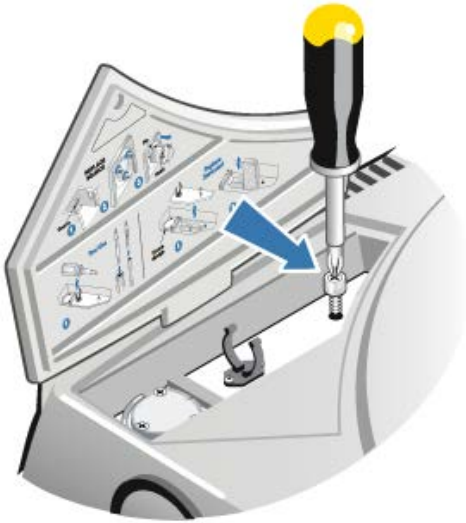
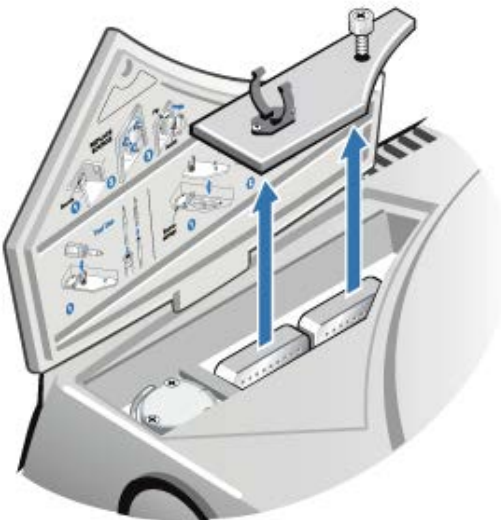


Figure 4-2: Removing desiccant cover.



**CAUTION**



**Avoid hazard.** The contents of the desiccant canisters can be harmful if ingested. If you discard the saturated desiccant canisters, make sure they are properly disposed of.

2. Lift the saturated desiccant canisters out of your instrument and install the new desiccant canisters.

Figure 4-3: Lifting the desiccant cover



3. Use the 4-in-1 tool to install the desiccant cover, and then replace the 4-in-1 tool in its compartment and close the tool compartment door.

#### NOTICE

If the humidity indicator has turned white or does not return to blue after the desiccant has been replaced, you must replace the humidity indicator.

## Regenerating the desiccant

When the desiccant canisters must be replaced, you can contact us to order new desiccant canisters, or you can dry and reuse the saturated canisters according to the following instructions.

**Time needed:** 3 hours

**Tools needed:**

- Vented oven
- Insulated cloth or hot pad

**Note** If you need to replace the humidity indicator, you must order new desiccant canisters. A new humidity indicator is included with the new desiccant canisters.

## NOTICE

- If you are going to dry and reuse saturated desiccant canisters, make sure you have fresh desiccant canisters that you can place in the instrument while the saturated canisters dry.
- Do not leave canisters in the oven for more than three hours and do not exceed a temperature of 150 °C (about 300 °F).
- Make sure the insulated cloth or hot pad you use to handle the regenerated desiccant canisters is not contaminated with substances that could be absorbed by the desiccant and subsequently released into your instrument.

1. Place the saturated desiccant canisters in a vented oven at 150 °C (about 300 °F) for three hours.

## CAUTION



**Avoid burn hazard.** Use an insulated cloth or hot pad to handle the heated desiccant canisters and always wait until the canisters have cooled to room temperature before you reinstall them in the instrument.

2. Use an insulated cloth or hot pad to remove the desiccant canisters from the oven.

Allow the canisters to cool on the hot pad or cloth. Do not attempt to handle or install them until they have reached room temperature.

When the canisters reach room temperature, you must either install them in the instrument or seal them in an airtight container or bag. Otherwise, they will absorb moisture from the air in the room and quickly become saturated again.

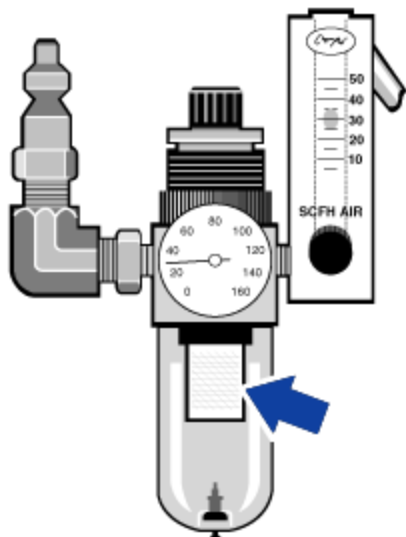
**Note** The desiccant material within the canister is molecular sieve 4A. When new, this material can absorb water up to 20% of its mass. The regeneration temperature and time specifies here is limited due to the packing materials, which results in a lower absorption capacity than a new desiccant canister.



# Checking and changing the purge gas filter

Check the purge filter occasionally to make sure it is clean and dry.

Figure 4-1: Changing the purge gas filter



If the filter is green, it does not need to be replaced. If it is yellow or otherwise discolored, replace it according to the following procedure.

## NOTICE

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 under the warranty. If you have questions about this requirement, contact us.

**Time needed:** 5 minutes or less

**Tools needed:**

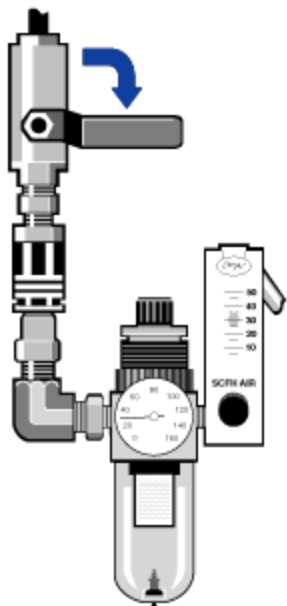
- Purge gas filter replacement kit

## NOTICE

Use only Thermo Scientific certified replacement parts. To order parts, contact us.

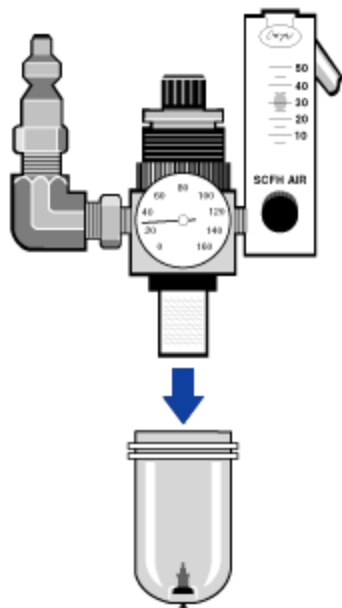
1. Turn off the purge gas at the main valve. Do not turn down the flow meter or the pressure regulator.

Figure 4-2: Shutting purge valve



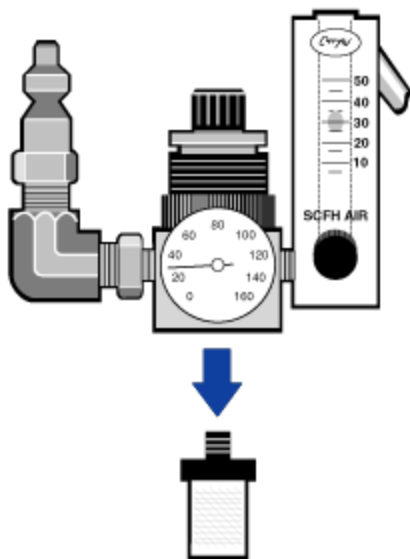
2. Remove the plastic bowl that houses the filter. You can unscrew the bowl by hand.

Figure 4-3: Purge filter cover removal



3. Remove the filter. You can unscrew the filter by hand.

Figure 4-4: Purge filter cover removal



4. Install the new filter and replace the plastic bowl.
5. Turn on the purge flow to the instrument.

**Note** You may notice increased levels of water and carbon dioxide in spectra collected immediately after you have had the purge gas turned off. If this interferes with your data, wait 15 to 60 minutes until the purge is completely reestablished.

[This page intentionally left blank]

---

# Troubleshooting

The System Status icon in OMNIC Paradigm software provides information as to the status of your instrument.

## Using the Troubleshooting topics

This section includes a variety of topics about troubleshooting and solving problems with your instrument. These topics are divided into the following two sections:

- [Instrument problems](#) addresses specific problems you may encounter with the instrument.
- [Error messages](#) deals with error messages you may see.

Each topic lists steps that you can take to try to resolve the problem.

**Note** If you are having a problem with applications or software, see the associated documentation.

### CAUTION





**Avoid hazard.** When performing any of the procedures in the troubleshooting topics, always follow the safety precautions noted in the documentation.

# Instrument problems

## The status icon in OMNIC Paradigm software is yellow

When monitoring is enabled in OMNIC Paradigm software, the System Status indicator in the upper right corner of the OMNIC Paradigm software home page reflects the results of system diagnostic tests and system errors.

- If the System Status indicator has a green checkmark  , the instrument is operating properly.
- If the System Status indicator is yellow  , an instrument test has failed or is overdue.

For more information, click the icon to open the **System Status Overview** box.



### Additional troubleshooting steps:

1. If you are using performance verification (PV), check whether one of these items has failed, or if a scheduled maintenance procedure is overdue.
2. Check whether the MCT detector, if used, has been properly cooled before use. See [Cooling a detector](#) for details.

If none of these issues is causing the problem, contact us for assistance.

## The status icon in OMNIC Paradigm software is red

When monitoring is enabled in OMNIC Paradigm software, the System Status indicator in the upper right corner of the OMNIC Paradigm software home page reflects the results of system diagnostic tests and system errors.

- If the System Status indicator has a green check mark  , the instrument is operating properly.
- If the System Status indicator is red  , the instrument requires attention.

For more information, click the icon to open the **System Status Overview** box.

### Additional troubleshooting steps:

1. If you are using performance verification (PV), check whether one of these items has failed, or if a scheduled maintenance procedure is overdue.

2. If the source is not working, replace it. Contact us for assistance.
3. If the laser is out of calibration, calibrate the laser on your spectrometer (see [Verifying the laser frequency](#)).

If the laser is still not working, contact us for assistance.

4. Make sure the system has been on for at least 15 minutes (one hour for best results), then align the instrument.
5. Make sure any accessories are installed according to the instructions that came with them.

If none of these issues is causing the problem, contact us for assistance.

## The system scans normally but the signal intensity is very low

1. Align the spectrometer.
2. In OMNIC Paradigm software, set the **Optical Velocity** setting to a lower velocity.
3. Check the **Aperture** setting. For an MCT detector, set Aperture to **Small (10)**. For a TEC DTGS detector, set Aperture to **Large (80)**.
4. Make sure any accessories you are using are installed and aligned correctly. For more information, see the instructions that came with the accessory.
5. Check the sample compartment windows. If they are fogged, contact us to have the windows replaced.

If the problem persists, contact us for assistance.

## The baseline is not stable

1. Lower the purge flow rate to minimize the acoustic noise inside the instrument until the baseline is stable.
2. Align the instrument.
3. Make sure the environmental conditions meet the requirements given in the Site and Safety guide.
4. Check the humidity indicator and replace the desiccant and indicator if needed.

## NOTICE

If you are using purge and the instrument cover was recently opened, allow the instrument to purge for 10 to 15 minutes after the cover is closed.

5. If the instrument power was recently turned on, allow at least 1 hour for the temperature to stabilize.
6. If the instrument has a cooled detector and the detector dewar was recently filled, allow the detector at least 15 minutes to cool.

If the problem persists, contact us for assistance.

## The alignment fails

1. Remove any sample or sampling accessory from the instrument sample compartment.
2. Check the humidity indicator on the instrument touch panel. If the indicator is pink or white, change the desiccant and the indicator.
3. Check all of the instrument indicators.
4. Make sure the system has been on for at least 15 minutes (one hour for best results), then align the instrument.
5. Make sure any accessories are installed according to the instructions.

If the problem persists, contact us for assistance.

## There is a problem selecting an external detector in a microscope

1. Check the accessory connector on the back of the instrument, or on the back wall of the sample compartment. Check the detector cable connection. If it is loose, tighten it.
2. If the problem persists, contact us for assistance.



## Data cannot be measured (or other software problems)

1. Close OMNIC Paradigm software and turn off the instrument power. Wait 90 seconds, then turn on the instrument power. Allow the start-up sequence to finish and then restart OMNIC Paradigm software.
2. Turn off the computer and turn off the instrument power switch. Check the data cable. If it is damaged, replace it. If the cable is loose or disconnected, reconnect it. Turn on the instrument power and wait until the start-up sequence finishes. Then turn on the computer and restart OMNIC Paradigm software.

If the problem persists, contact us for assistance.

## Error messages

### The computer cannot communicate with the instrument

1. Close OMNIC Paradigm software, and then turn off the instrument power. Wait 90 seconds, and then turn on the instrument power.

Allow the start-up sequence to finish and then restart OMNIC Paradigm software.

2. Make sure the power supply is connected to the instrument and to a wall outlet or power strip.
3. Turn off the computer and then turn off the instrument power. Check the USB data cable. If the cable is damaged, replace it. If the cable is loose or disconnected, reconnect it.
4. Turn on the instrument power. Wait until the start-up sequence finishes and then turn on the computer and restart OMNIC Paradigm software.
5. Remove any USB computer accessories that may be interfering with communications.
6. Close any applications that might interfere with OMNIC Paradigm software.

If the problem persists, contact us for assistance.

### The instrument temperature is out of specification

1. Make sure nothing is placed on top of the instrument and that air can flow freely around it.
2. Make sure the power supply vents are not blocked.

3. The ambient temperature of the room may be too high. The ambient temperature should be between 15 °C and 30 °C (59 °F and 86 °F). If the room temperature cannot be adequately controlled, move the instrument to a location that is maintained in the recommended temperature range.

If the problem persists, contact us for assistance.

## **OMNIC Paradigm software cannot communicate with the detector**

If OMNIC Paradigm software cannot communicate with the instrument, contact us for assistance.

### **The MCT detector is warm**

1. Cool the detector with liquid nitrogen.
2. Check the detector dewar for signs of leaks. If necessary, contact us to restore the dewar vacuum.

If the problem persists, contact us for assistance.

### **The laser voltage is out of specification**

The ambient temperature of the room may be too high.

The ambient temperature should be between 15 °C and 30 °C (59 °F and 86 °F). If the room temperature cannot be adequately controlled, move the instrument to a location that is maintained in the recommended temperature range.

If the room temperature is within the recommended range, remove any accessories or samples from the sample compartment, and then align the instrument.

If the problem persists, contact us for assistance.

### **The source voltage is out of specification**

Check to see if the source is properly seated in its holder.

Replace the source. Contact us for assistance.

## **The power supply voltages are out of tolerance**

Replace the power supply. Contact us for assistance.

[This page intentionally left blank]