



Thermo Scientific

TruDefender FT TruDefender FTi

User Guide

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Preface

The Thermo Scientific TruDefender FT instrument is an FTIR spectrometer designed for use by first responders, homeland security, military, law enforcement, and forensic chemistry personnel. Compact and lightweight, this instrument is intended for rapid field identification of unknown solid and liquid samples.

This guide describes how to perform a scan with the TruDefender® FT instrument, interpret scan results, save and export results, and maintain the instrument. If you own a TruDefender FTi model, you can also wirelessly send a scan as an email or an SMS message.

Contacting Us

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Safety Notices

The TruDefender FT instrument is specifically designed to be used in an everyday environment in the field and is therefore considerably more rugged than a laboratory instrument.

However, the user should recognize that this is a precision scientific instrument that should be treated with care. Abuse and mistreatment may lead to a degradation of performance or premature failure.



CAUTION

Do not use the TruDefender FT instrument unless you have been trained in its use.



CAUTION

There are no user-adjustable components inside the instrument. The TruDefender FT battery compartment door may be opened, but do not open the device or modify the electronics within. All service operations must be performed by Thermo Fisher Scientific or an authorized service agent of Thermo Fisher Scientific. Any attempt by the user to open the instrument will render the warranty null and void.



CAUTION

Use of controls, adjustments or performance of procedures other than those specified herein or those specified by Thermo Fisher Scientific personnel may result in a hazardous condition.



CAUTION

Follow your organization's procedure and regulations for the handling of unknown substances.



CAUTION

The TruDefender FT instrument is not certified to be intrinsically safe, and the user should take the necessary precautions when using the unit.



CAUTION

When wireless transmission is enabled, maintain a distance of 7.9 inches (20 cm) between the instrument and your head and body.



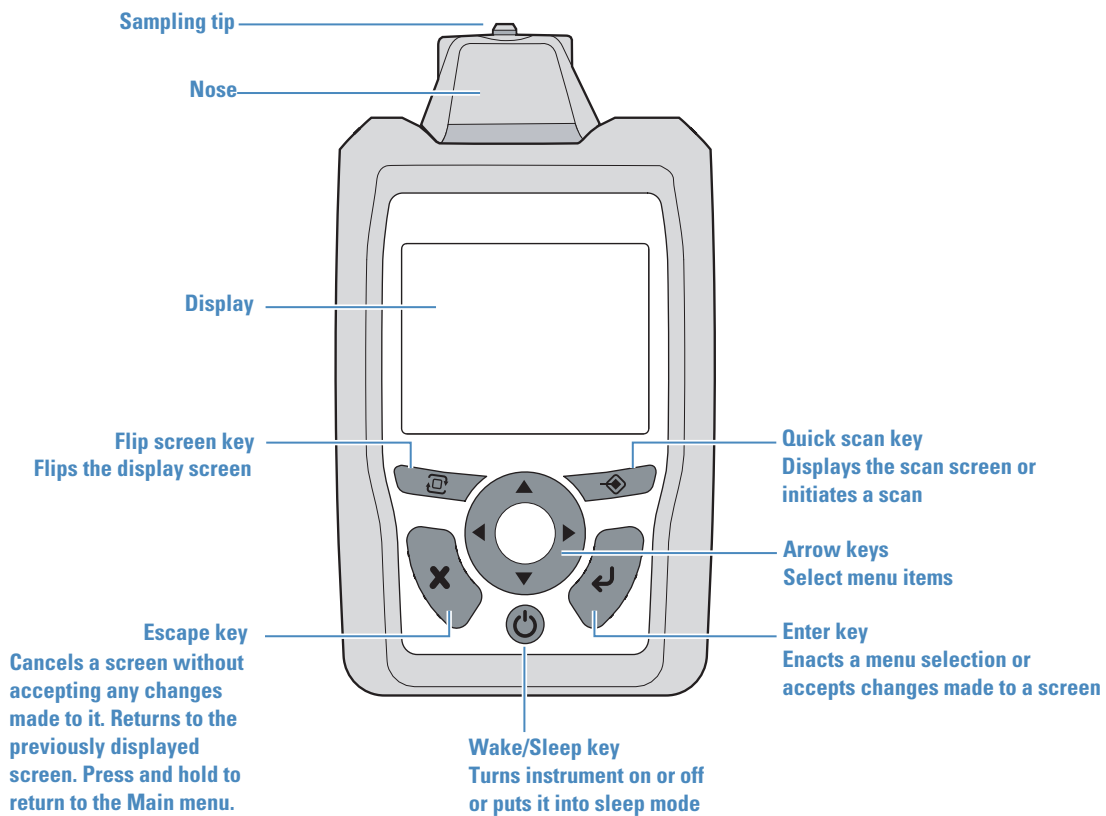
CAUTION

If there is a possibility that you may be sending messages wirelessly with the instrument, do not attach the instrument to your belt clip or hang it on a shoulder strap.

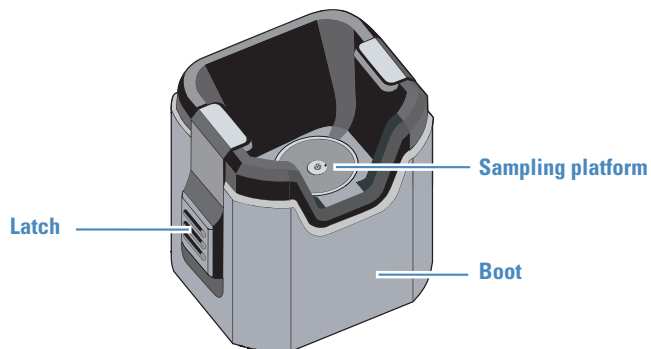
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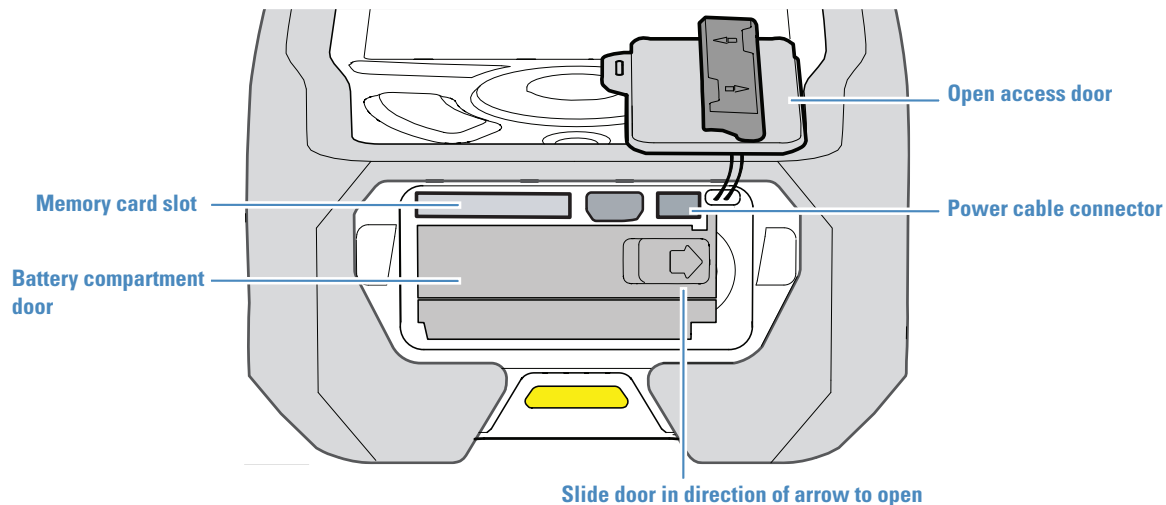
Instrument Front Diagram



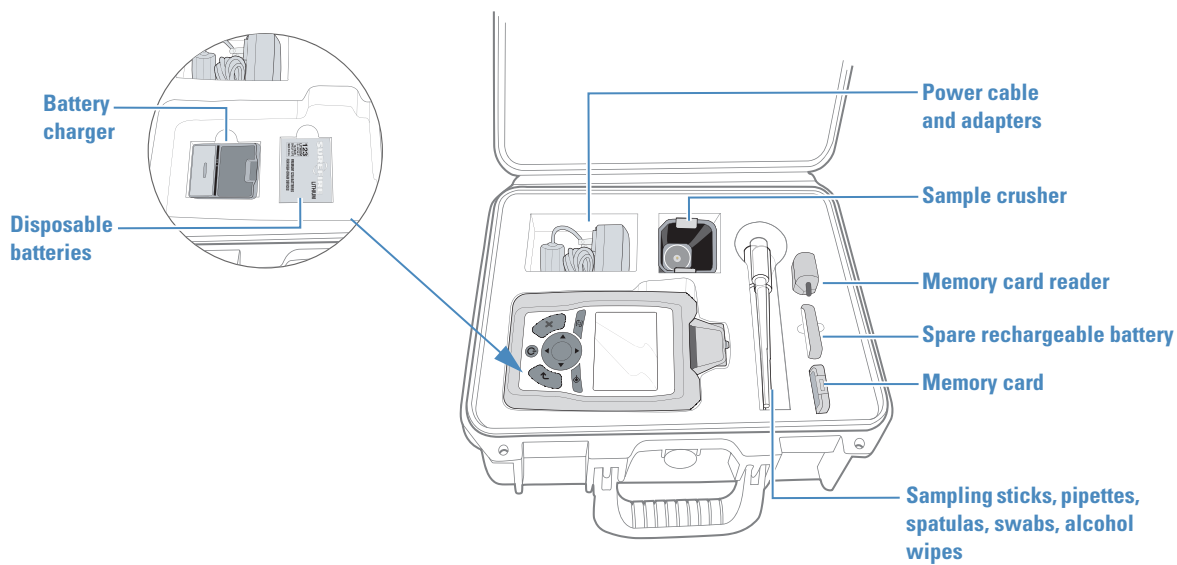
Sample Crusher Diagram



Instrument Bottom Diagram



Carrying Case Contents



Powering the Instrument

The TruDefender FT instrument can be powered by:

- A rechargeable battery (provides about 4 hours in normal use)
- Connection to an electrical outlet (plug the AC power cable into the power cable connector, which is behind the access door)
- Three disposable SureFire® batteries (provide about 5 hours in normal use)

When the display illuminates, the instrument is fully powered and ready for operation.

The instrument has three power states: On, off, and a power-saving mode (“sleep mode”).



The instrument enters sleep mode if it remains idle for several minutes while on battery power.

NOTE



Use the SureFire disposable batteries when operating below 32°F (0°C).

NOTE

❖ To turn on the instrument

Press and hold the Wake/Sleep key until the display backlight turns on, then release the key.

❖ To put the instrument into sleep mode

Briefly press the Wake/Sleep key.

❖ To turn off the instrument

Press the Wake/Sleep key for several seconds.

Opening and Closing the Access Door

The access door is designed to securely seal the battery compartment, to protect it from contaminants.



CAUTION

When the access door on the bottom of the instrument is open, the environmental seal is broken, and the system is no longer water- and dust-resistant.

❖ To open the access door

Place your thumbs on each side of the door bar and push in the direction of the arrows on the bar. The tabs on both ends of the bar will disengage from the slots on either side of the door.

❖ To close the access door

Press the door into the opening to completely seat the door gasket into the bottom of the instrument. Push the door bar into the horizontal position. Make sure that both of the bar tabs are seated in their slots.

Changing the Rechargeable Battery

Be sure to turn the instrument off before removing the rechargeable battery or the disposable batteries.



CAUTION

If you remove the rechargeable battery or the disposable batteries when the instrument is turned on, the instrument software is very likely to be damaged. This damage can cause the instrument to behave unpredictably or even to fail to turn on. If the software is damaged, you will need to return the instrument for servicing.

- 1 Turn off the instrument by pressing and holding the Wake/Sleep key for several seconds.
- 2 Open the access door.
- 3 Slide the battery compartment door to the right. The door will spring open, and the battery will slightly eject.
- 4 Remove the battery and insert a charged one. Make sure that “This side up” is on top and the arrow on the battery label is pointing toward the instrument.
- 5 Close the battery compartment door and slide it to the left to latch it in place.
- 6 Close the access door.

Inserting the Disposable Batteries

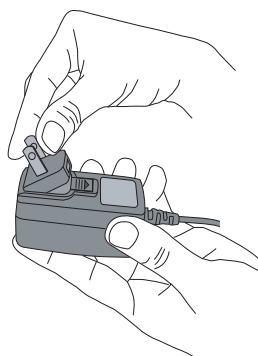
Be sure to turn the instrument off before removing any batteries. See the caution notice above.

Follow the procedure for changing the rechargeable battery, but remove the rechargeable battery and insert three disposable batteries.

Orient the battery poles in this order: positive, negative, positive. See the figure inside of the battery compartment door, which shows the correct orientation.

Using the Wall Plug Adapters

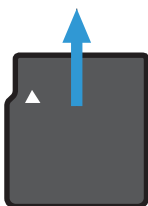
Your instrument comes with a set of international wall plug adapters. To install an adapter, press it into the recess in the power cord until the adapter clicks into place. To remove an adapter, slide the release latch down and pull the adapter out.



1 Getting Started

Using the Memory Card

When you export data, the instrument stores the data on a memory card, which may be placed in a memory card reader and connected to a computer.



TIP

When not in use, keep the memory card in the carrying case.

❖ To insert the memory card

Hold the card with the arrow pointing toward the instrument and the notched edge at the left (see the figure at the left) and insert it into the memory card slot. Press the card in until it catches in place.

❖ To remove the memory card

Push the card in, then release. The card will eject slightly from the slot. Remove the card, using the fingernail groove on the top edge of the card to catch the card's edge.

Changing System Date or Time

You can change system date and time to synchronize with your local time.

By default, your instrument uses the mm/dd/yyyy date format. You can switch to the dd/mm/yyyy format.

- 1 In the Main menu, select **Tools** > press the Enter key.
- 2 Select **Date/Time** > press the Enter key.
- 3 Select **Month, Day, Year, Hour, Minutes, Zone,** or **Format**, then press the right or left arrow key until the value that you want to set appears. (Zone is the time zone, in hours before or after Greenwich Mean Time, GMT.)
- 4 Press the Escape key.

Changing the System Language

You can change the system language at any time.



NOTE

To change to a translated library, you must install the translated version of the software.

- 1 In the Main menu, select **Tools** > press the Enter key.
- 2 Select **Language** > press the Enter key.
- 3 Select a language > press the Enter key.

Scanning

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Follow Safe Scanning Practices

**CAUTION**

If you own a TruDefender FTi model, keep the instrument at least 7.9 inches (20 cm) from your head and body when the wireless radio is enabled. For information on how to determine if the radio is enabled, see [page 30](#).

**CAUTION**

Use caution when scanning shock- or friction-sensitive materials.

Shock- or friction-sensitive materials can pose a hazard of explosion if mishandled during the scanning process. Examples of materials known to be shock- and friction-sensitive include (but are not limited to) TATP, gunpowder, nitroglycerine, and match tips.

Follow these safety precautions when performing a scan of a material that may be shock- or friction-sensitive:

- 1 Scan the smallest possible amount of material (<300 μ L, 1 drop, or less than 300 mg).
- 2 Wear all necessary personal protective gear.

The Keys to Getting a Good Scan

The FTIR light beam emerges from the center of the sampling tip. Because the beam can only penetrate a few microns into a sample, to get a good scan you must ensure that sample materials are in very close contact with the sampling tip.

The keys to getting a good scan are:

- 1 When scanning powders or solids, use the sample crusher or **firmly** press the instrument into the material.
- 2 Center the sample material on the sampling tip. The Best Practices table (see [page 11](#)) shows proper positioning for the most common scanning situations.
- 3 When possible, grind powders to a fine and even consistency.

Cleaning the Sampling Tip

Before every background check, clean the sampling tip thoroughly.

To clean the tip, scrub it with an alcohol wipe, then allow it to air dry, or wipe it with a clean paper towel or cloth. If the tip is visibly dirty, wipe off as much of the material as possible before scrubbing the tip with an alcohol wipe.

Whenever possible, use the sample crusher to scan powders. The sample crusher exerts the firm and constant pressure that is necessary to ensure good contact.

TruDefender FT generally displays results in less than 30 seconds. Scans may be prolonged or may not finish if:

- The sample material is not in close contact with the sampling tip.
- The sample material interacts little or not at all with infrared light (for example, pure elements).



TIP

Dilute solutions will return a positive match for water because water strongly interacts with infrared light.

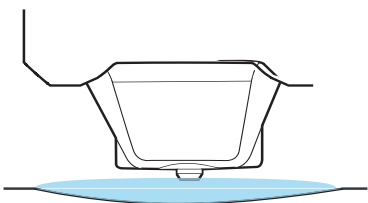
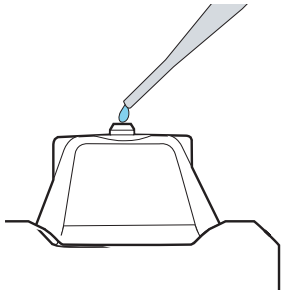
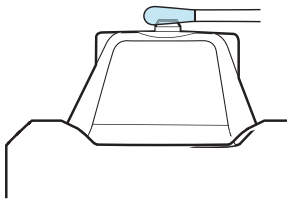
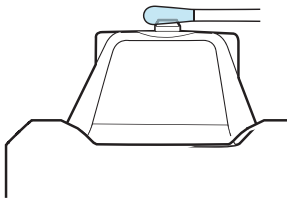
If the sampling tip is contaminated with an oily substance, scrub it with mineral spirits or paint thinner.



TIP

In very cold weather, liquid from the alcohol wipe may freeze on the sampling tip and cause inaccurate scan results. To prevent this, remove any frozen residue by scrubbing the sampling tip with a paper towel or cloth.

Best Practices for Scanning

For this situation	Do these things	
<p>Puddled liquid At least 1/4 inch (6 mm) deep</p>	<p>Immerse the sampling tip in the puddle. The instrument may touch the underlying surface.</p>	
<p>Non-volatile liquid in a container</p>	<p>Stand the instrument on its bottom. Place a drop of liquid on the sampling tip.</p>	
<p>Volatile liquid</p>	<p>See “Scanning a Volatile Liquid” on page 17.</p>	
<p>Thinly spread film or droplets of liquid</p>	<p>Saturate a swab with the liquid. Press the swab firmly on the center of the sampling tip.</p>	
<p>Thinly spread paste</p>	<p>Collect some of the paste on a swab. Press the swab firmly on the center of the sampling tip.</p>	

2 Scanning

For this situation

Powders

Do these things

If the powder is coarse, grind it to a fine and even texture.

For best results, use the sample crusher (see [page 16](#)).

If you cannot use the sample crusher, **firmly** press the sampling tip in contact with the powder.



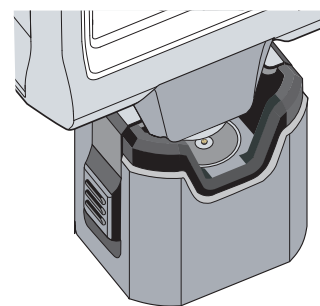
TIP

If possible, grind a powder until the granules are no larger than grains of table salt.

Solids

If the material can be ground, grind it to a fine powder and scan it with the sample crusher (see [page 16](#)).

If the material cannot be ground, press the sampling tip **firmly** into the material.



NOTE

To scan the inside of a coated tablet, scrape off the coating, finely grind the remaining material, and scan it with the sample crusher.

To scan the coating, scrape it off and scan separately.

Performing a Scan



NOTE

If you own a TruDefender FTi model, you can send scan results wirelessly via a cellular connection to an email or SMS address. For details, see [page 29](#).

Step 1

Choose a scanning technique (see the Best Practices table on [page 11](#)). See [page 16](#) for guidelines on using the sample crusher.

Press the Wake/Sleep key if the instrument is not powered up. The Main menu appears.



TIP

If you are using the sample crusher or holding the instrument upside down, press the Flip Screen key.

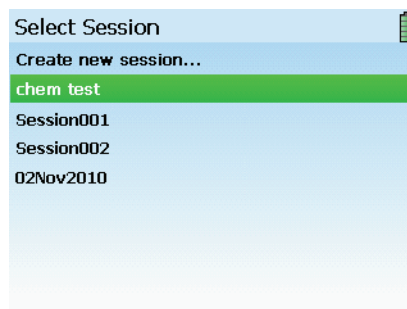
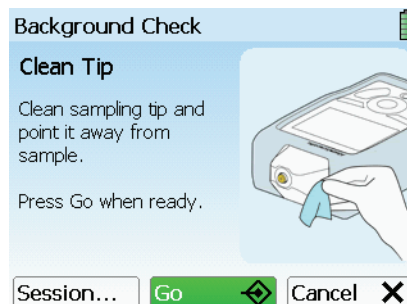
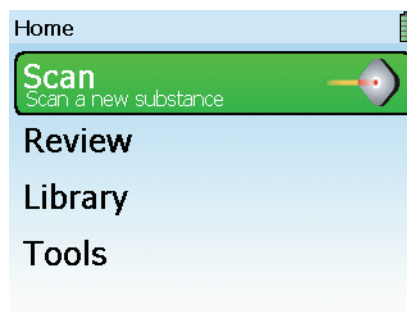
Step 2

Press the Quick Scan key. The Background Check screen appears. Clean the sampling tip now (see [page 10](#)).

Step 3

(Optional) Create a new session for the scan. Select **Session > Create new session** > press the Enter key. The New Session Name keyboard appears.

Enter a new name or accept the default name. (For help with the keyboard, see [page 17](#).)



2 Scanning

Step 4

Select **Go** > press the Enter key. The instrument performs a background check. If the background has changed since the last scan, the instrument automatically performs a new background scan.



NOTE

Do not put the instrument in the sample crusher for the background check. During a background scan, the sampling tip must not be in contact with any sample material.

Step 5

When the background check or the background scan finishes, the Position Unit screen appears.

Place the sampling tip in contact with the sample (see the Best Practices table on [page 11](#)). If you are using the sample crusher, place a small amount of the test substance on the sampling platform, then insert the instrument (see [page 16](#)).

Step 6

To start the scan, select **Scan** > press the Enter key. The Scan in progress screen appears. Hold the instrument steady during the scan.

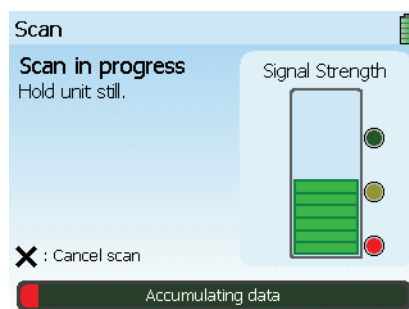
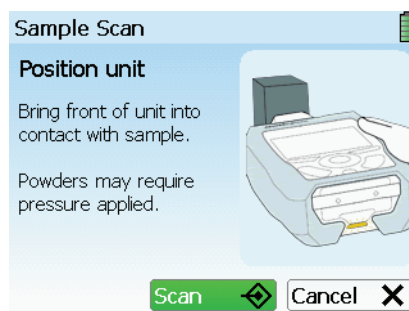
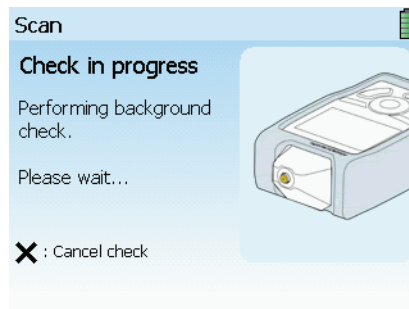
To monitor the progress of the scan, observe the progress bar on the bottom of the scan screen and the signal strength meter. The progress bar displays the estimated time to scan completion.

When the scan finishes, the instrument displays a result (see [page 19](#)).



TIP

If the scan time is lengthy and the signal strength meter shows only a few or no bars, the sampling tip may not be in good contact with the sample, or the sample may not be scannable by FTIR.



Reading the Activity Indicator Light

The activity indicator light on the bottom of the instrument also indicates scan status:

- **Blinking yellow:** The scan has just begun or the instrument is receiving adequate signal from the sample.
- **Blinking green:** The instrument is receiving strong signal from the sample.
- **Blinking red:** The instrument is not receiving any signal.
- **Solid green:** The scan has successfully completed.
- **Solid red:** The scan has stopped because of some error, or you pushed the Escape key to halt the scan.

Speeding Scan Time by Restricting the Library Search

During the analysis phase of a scan, the instrument normally searches the entire library to find the best match for the scan data.

You can constrain this search to only factory-added library items or only user-added library items.

Constraining the library search reduces scan time and is most useful when you are only interested in detecting the presence of particular user-added items.

For information on creating user-added library items, see [page 35](#).

- 1 In the Main menu, select **Tools** > press the Enter key.
- 2 Select **Libraries** > press the Enter key.
- 3 Select a display option > press the Enter key.

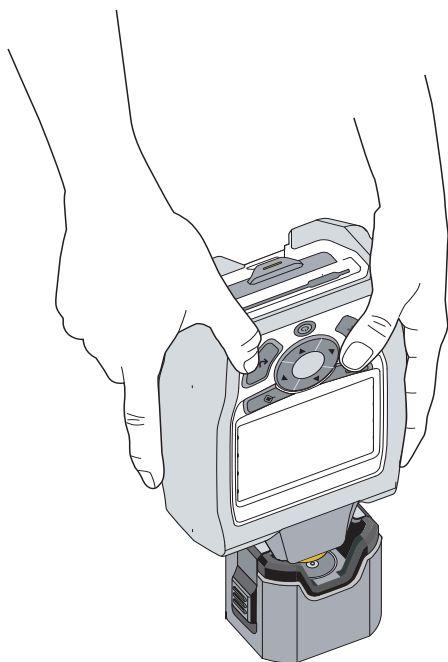
Using the Sample Crusher



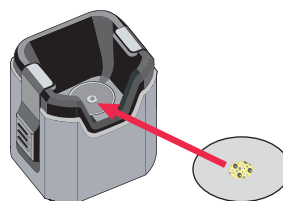
DO NOT scan pressure-sensitive materials with the sample crusher (see page 9).

CAUTION

Whenever possible, use the sample crusher to scan powders, because it is difficult to manually apply enough pressure to get a good scan. The sample crusher holds a powdered sample in firm and close contact with the sampling tip during the scan.



- 1 Place the sample crusher on a level surface.
- 2 Clean the sampling platform with an alcohol wipe.
- 3 Place a small amount of sample material in the center of the sample platform. **Use only enough material to completely cover the center of the platform.**



- 4 Perform steps 1 through 5 of the scanning procedure (see page 13). **Do not put the instrument into the sample crusher until the instrument has finished the background scan.**
- 5 Press the instrument into the sample crusher (see the figure at the left) until the side latches snap into place. If you have trouble inserting the instrument, you may need to clean the sample crusher (see page 42).



TIP

To minimize the risk of dislodging the sample during insertion, hold the instrument at a slight angle on the front-to-back axis and insert the nose into the crusher, then straighten the instrument and push it down to complete the insertion.

- 6 Initiate the scan (see step 6 on page 14).
- 7 When finished, press the latches to release them, and remove the instrument.

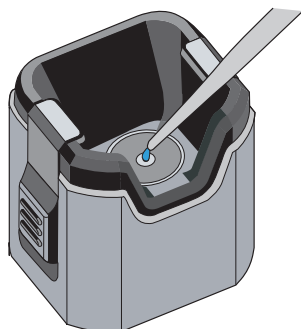


NOTE

If the scan progresses slowly, remove the instrument and reinsert it into the sample crusher. If scan time does not improve, stop the scan, remove the instrument, and make sure that the sample is centered on the sample platform.

Scanning a Volatile Liquid

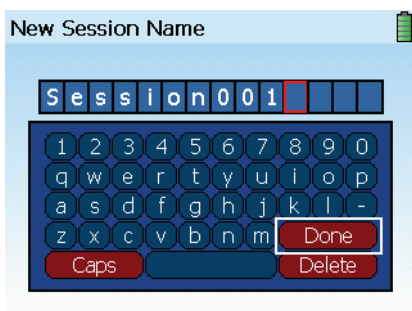
Use the sample crusher to scan a volatile liquid. This will help prevent the liquid from evaporating before the scan is complete.



- 1 Clean the sampling platform with an alcohol wipe, and place the sample crusher on a flat surface.
- 2 Perform steps 1 through 4 of the procedure for performing a scan (see [page 13](#)).
- 3 When the Position Unit screen appears, use a pipette to place drops of the liquid on the center of the sample platform. The liquid must completely cover the crystal tip in the center of the sample platform.
- 4 Immediately place the instrument into the sample crusher (see [page 16](#)). It is not necessary to latch the sample crusher into place.
- 5 Complete the scan (see step 6 on [page 14](#)).
- 6 Remove the instrument from the sample crusher.

Using the Keyboard

The instrument displays a keyboard when you need to enter data into the system, such as a session name.



❖ To enter data into the keyboard

- Enter data one character at a time. When finished, select **Done** > press the Enter key.
- To enter a character, use the arrow keys to select the character > press the Enter key.
- To enter a space, select the space bar > press the Enter key.
- To backspace delete characters, select **Delete** > press the Enter key.
- To enter a capital letter or a symbol, select **Caps** > press the Enter key, then select the character > press the Enter key.

2 Scanning

Understanding Results

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- 23 Overlaying a Spectrum

Reading a Result Screen

All result screens except the No Match result include the information shown in the figure below.

The NFPA (National Fire Protection Association) diamond identifies the type and level of risks that this library item poses for emergency personnel, according to specifications set forth in NFPA standard 704.

The screenshot shows a result screen for "2-Propanol" with the following information:

- Session001 : Scan014
- 2-Propanol**
- ITF-40, NIOSH, Pharmaceuticals, UN
- CAS: 67-63-0
- NFPA diamond: 1 (Flammability), 3 (Health Hazard), 0 (Reactivity), 0 (Unique Hazard Codes)
- 1 match found

Library categories to which the identified item is assigned — points to the text: ITF-40, NIOSH, Pharmaceuticals, UN

CAS (Chemical Abstracts Service) number, an international chemical naming and categorization reference for the library item — points to the text: CAS: 67-63-0

NFPA diamond — points to the diamond symbol

Color codes for the diamond:

- Red: Flammability
- Blue: Level of health hazard
- Yellow: Chemical reactivity
- White: Unique hazard codes


Number scale: 0 (no hazard) to 4 (severe risk)

3 Understanding Results

Interpreting a Scan Result

Session001 : Scan014

2-Propanol
ITF-40, NIOSH, Pharmaceuticals, UN
CAS: 67-63-0



1 match found


Single Positive Match

The data matches only one library item.

Session003 : Scan004

Hexane
Energetics, Household/Commercial, Indust...
CAS: 110-54-3

Heptane




2 matches found

Multiple Positive Match

The data matches two or more library items, meaning that the sample could be any one of them.

Session002 : Scan005

Name	Weight
2-Propanol ITF-40, NIOSH, Pharmaceuticals, UN CAS: 67-63-0	88%
Methanol	9%



Potential mixture identified, 96% explained

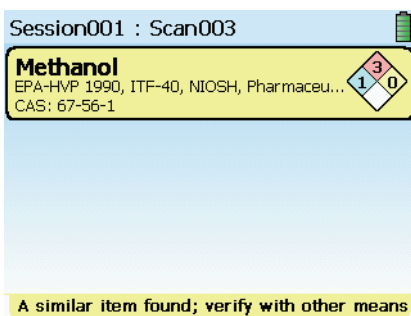
Mixture Match

The data matches a mixture of library items.

The percentages indicate the proportion of the data that matches the individual items. **The percentages are not concentrations.**

The percentages will not add up to 100 if any of the data cannot be matched.

Mixture identification is a complex analysis. It is more susceptible to false positives than the Single Positive or Multiple Positive results.



Similar Item Match

The data is similar to one or more library items.

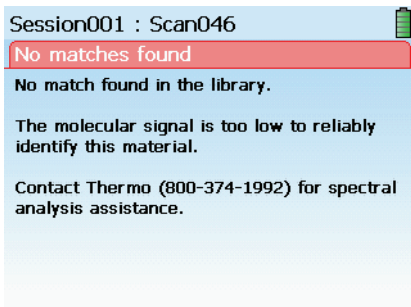
Be careful when interpreting this type of result! This screen does not mean that the listed substances are present, only that the data resembles them in some respects.

Possible reasons for a Similar Item match include the following:

- The sample is chemically interacting.
- The substance does not produce detectable levels of signal or is not scannable.
- Your scanning technique was improper for the situation, so the instrument could not collect enough data.

Consult the Best Practices table ([page 11](#)) and repeat the scan.

If this result persists, contact Thermo Fisher Scientific Customer Support.



No Match

The data did not match anything in the library, including mixtures of library items.

The text on the No Match screen contains important information. Read it carefully.

Possible reasons for a No Match result include the following:

- The substance does not produce detectable levels of signal or is not scannable.
- Your scanning technique was improper for the situation, so the instrument could not collect enough data.

Consult the Best Practices table ([page 11](#)) and repeat the scan.

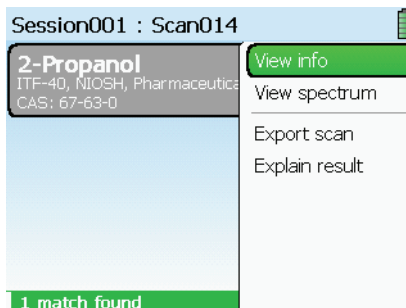
If this result persists, contact Customer Support.

3 Understanding Results

Viewing Library Information for a Scan Result

For Single Positive results, press the Enter key > select **View Info**. Detailed library information for the identified substance will appear in the display.

For result screens that identify more than one substance (Multiple Positive, Mixture, and some Similar Match results), use the down arrow key to select one of the identified substances > press the Enter key > select **View Info**.



Viewing the Spectrum for a Scan Result

When a scan result is inconclusive or confusing, viewing the spectrum for the result can help you make a positive identification.

The instrument superimposes the spectrum of the identified substance on the spectrum of the library item that matches the scan data.

The scan spectrum is colored black, and the library spectrum is colored red. In the case of a Mixture result, the instrument also displays a blue-colored spectrum for the mixture itself.

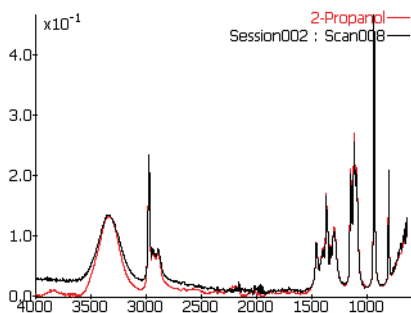
- 1 With the result displayed, press the Enter key.
- 2 Select **View spectrum** > press the Enter key. The spectrum appears.
- 3 If you are viewing a Multiple Positive, Mixture, or Similar Match result, press the down arrow to scroll to the spectrum that you want to view.



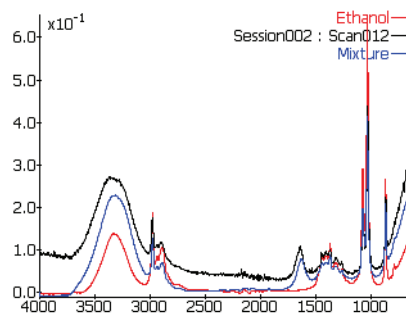
TIP

For result screens that identify more than one substance (Multiple Positive, Mixture, and some Similar Match results), press the down arrow to sequentially display the spectrum for each substance.

Spectrum for Single Positive Match result



Spectrum for Mixture result



Zooming and Rescaling a Spectrum

You can zoom a spectrum to improve the visibility of crowded regions. Zooming shortens and widens the peaks in a spectrum.

To make zoomed peaks more prominent, you can rescale the spectrum. Rescaling increases the vertical height of the spectrum peaks.

Use the arrow keys to pan to regions of interest in a zoomed spectrum.

- 1 With the spectrum displayed, press the Enter key.
- 2 Select **Zoom In** or **Zoom Out** > press the Enter key until the spectrum is magnified as you wish.
- 3 To rescale the zoomed spectrum, press the Enter key > select **Autoscale Y** > press the Enter key. The peak heights will increase.
- 4 Press the Escape key to close the menu.

Overlaying a Spectrum

To visually compare the patterns of the peaks in two spectra, you can lay one spectrum on top of another. The overlaid spectrum is colored light purple.



NOTE

An overlaid spectrum will appear on all spectra that you display, until you clear the overlay.

❖ To overlay a spectrum

- 1 With a spectrum displayed (see [page 22](#)), press the Enter key > select **Overlay** > press the Enter key.
- 2 Select one of the overlay options. The spectrum for the option that you select appears on top of the previously displayed spectrum.
 - **Previous scan:** The Review screen appears. Select a stored scan > press the Enter key.
 - **Library item:** The library appears. Manually scroll to an item > press the Enter key. See [page 35](#) for information on finding library items.
 - **Search library:** The Library Search screen appears. See [page 36](#) for information on searching the library.

❖ To clear an overlay

With the spectrum and its overlay displayed, press the Enter key > select **Clear overlay**.

3 Understanding Results

Reviewing Stored Scans and Sending Messages

- 26 Viewing a Stored Scan
- 26 Renaming a Scan or a Session
- 27 Exporting Scans or Sessions
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- 33 Editing or Deleting a Contact Via the Contact List Web Page
- 33 Synchronizing the Contact Lists
- 33 Specifying the Files That Are Attached to Emailed Scans
- 34 Manually Enabling and Disabling the Wireless Radio

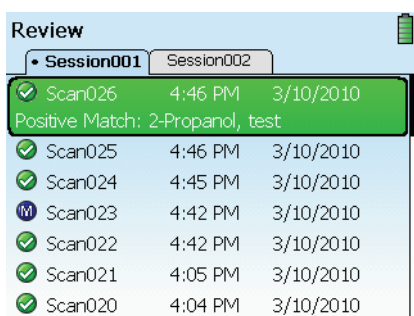
4 Reviewing Stored Scans and Sending Messages

Viewing a Stored Scan

Scans are stored in the session folder that is specified in the Select Session screen (see [page 13](#)). If you never create a new session, scans are stored in the default session folder.

Use the left and right arrow keys to scroll through the session folders. Use the up and down arrow keys to scroll through stored scans.

- 1 In the Main menu, select **Review** > press the Enter key.
- 2 Select a scan > press the Enter key.
- 3 Select **Open scan** > press the Enter key. The scan result appears.



Renaming a Scan or a Session

You can rename any single scan or session.

- 1 In the Main menu, select **Review** > press the Enter key.
- 2 Select the scan or session > press the Enter key.
- 3 Select **Rename scan** or **Rename session** > press the Enter key.
- 4 Enter a new name. For help with the keyboard, see [page 17](#).

Exporting Scans or Sessions

You can export scans to the memory card and transfer them to a computer for analysis, printing, or emailing. If you own a TruDefender FTi model, you can also export a single scan wirelessly as an email or SMS text message (see [page 30](#)).

The TruDefender FT instrument provides these export formats:

- **Report file (.jpg):** A printable file that summarizes information about a scan (for an example, see [page 28](#)).
- **Reachback file (.arb):** A file that encodes scan data, instrument calibration data, and the system log. Thermo Fisher Scientific Customer Support uses Reachback files to diagnose problems.
- **Text file (.txt):** A plain text file.
- **SPC file (.spc):** A special format that can be read by data analysis packages.



NOTE

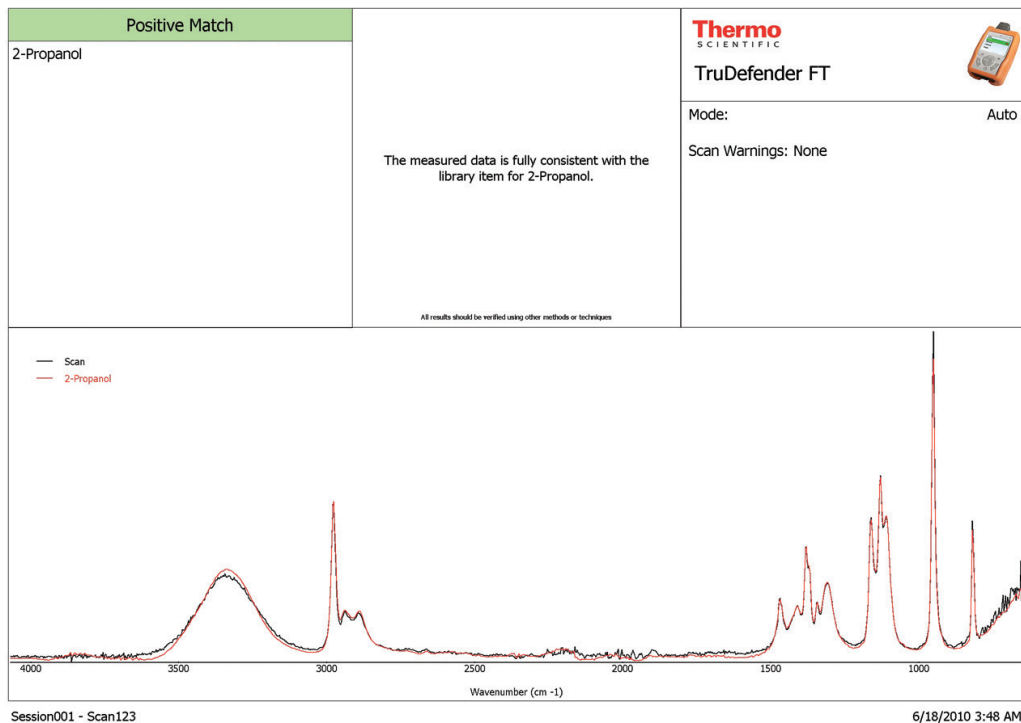
You can also export a single scan directly from a result screen. Press the Enter key, then select **Export scan**.

- 1 Open the access door and insert the card into the memory card slot. Be sure to orient the card correctly: Arrow pointing toward the instrument and notched edge at the left (see [page 8](#)).
- 2 In the Main menu, select **Review** > press the Enter key.
- 3 Select either a session or an individual scan > press the Enter key.
- 4 Select **Export Scan** or **Export Session** > press the Enter key.
- 5 Select an export format > press the Enter key. The instrument exports the selected scan or all scans in the selected session to the memory card.
- 6 Remove the memory card and place it in the card reader, then attach the card reader to a USB port on a computer.

4 Reviewing Stored Scans and Sending Messages

Printing a Report File

Export the scan as a JPEG file (see [page 27](#)) and print the file from your computer. Here is a sample report file for 2-propanol.



Viewing Exported SPC Files

To view SPC files on your computer, you must have software that can read them. Thermo Fisher Scientific recommends GRAMS[®] software, an integrated suite of spectroscopic software tools that is available from

Thermo Fisher Scientific (see <http://www.thermo.com/grams>). You can also use a freeware program called SpekWin32, available at http://www.ffmpeg2.de/spekwin/index_en.html.

Deleting Scans and Sessions

When you delete all scans at once, the instrument deletes all scans and all sessions except for the default session. When finished, the instrument has one empty session with the default session name.



NOTE

Deleted scans and sessions cannot be recovered.

❖ To delete a single scan or session

- 1 In the Main menu, select **Review** > press the Enter key.
- 2 Select the scan or session > press the Enter key.
- 3 Select **Delete scan** or **Delete session** > press the Enter key > select **Yes** > press the Enter key.

❖ To delete all scans

- 1 In the Main menu, select **Tools** > press the Enter key.
- 2 Select **Clear sessions** > press the Enter key > select **Yes** > press the Enter key.

About Sending Email and SMS Messages

If you own a TruDefender FTi model, you can wirelessly send scans to:

- An email address
- An SMS number
- The Thermo Fisher Scientific Reachback team

(An SMS transmission is a text message. SMS stands for “Short Message Service.”)

Wireless transmissions are sent over mobile phone networks. Reception is governed by cell phone coverage in your area. The instrument displays signal strength bars to help you gauge reception.



NOTE

The instrument can only send messages. It cannot receive incoming messages.

About the Wireless Radio Power States

The wireless radio is enabled when you turn on the instrument after a complete power-down. If, though, you wake the instrument from a sleep, the radio is not enabled. (See “[Powering the Instrument](#)” on [page 6](#) for an explanation of the power states.)

When you initiate a scan, the instrument disables the radio. The radio remains disabled until you send a scan, which automatically enables the radio.

You can also enable and disable the radio manually (see [page 34](#)).



NOTE

When the radio is disabled, a red X appears on top of the signal strength bars:






Reading the Wireless Service Icons

When the radio is enabled, signal strength bars and service icons appear at the top right of every screen. The instrument uses different services for email and SMS transmissions.

Just like a mobile phone, the signal strength bars roughly indicate radio signal strength, not transmission speed.

The service icons include:

-  Reachback (an email service)
-  Email
-  SMS

Wirelessly Sending a Scan

You can send a scan to a contact immediately after the result appears, or you can send a stored scan.



NOTE

By default, when you email a scan the instrument attaches the scan report file to the email. You can change this default to send other types of files (see [page 33](#)).



TIP

You can add a new contact and immediately send a scan to it (see [page 31](#)).

❖ To send immediately after a scan finishes

- 1 When the result appears, press the Enter key > select **Export Scan** > press the Enter key.
- 2 Select **Wireless** > press the Enter key.
The instrument enables the radio, and the contact list appears. (The instrument disabled the radio during the scan.)
- 3 Select a contact > press the Enter key.

❖ To send a stored scan

- 1 In the Main menu, select **Review** > press the Enter key.
- 2 Select a scan to send > press the Enter key.
- 3 Select **Export Scan** > press the Enter key.
- 4 Select **Wireless** > press the Enter key.
If necessary, the instrument re-enables the wireless radio.
- 5 Select a contact > press the Enter key.

Managing Contacts

Your instrument can hold up to 25 contacts. A contact consists of an email address or SMS number and an optional contact name.

You can add one contact immediately before sending a scan (see below) or multiple contacts at any time via the Wireless Tools menu (see [page 32](#)).



NOTE

If your list is full and you enter another contact, the **least frequently used** contact is dropped from the list (excluding the Reachback contact).

You can also add one or more contacts by entering them into a contact list on a special Customer Support web page and then synchronizing your instrument contact list with this web page (see [page 32](#)). The synchronization process performs a two-way update, resulting in an identical set of contacts on the instrument and the web page.

Adding a Contact When You Send a Scan

To place the new contact on the Customer Support contact list web page, synchronize the lists (see [page 33](#)).



TIP

Use the arrow keys to scroll through the instrument contact list.

- 1 With the scan result displayed, press the Enter key > select **Export Scan** > press the Enter key.
- 2 Select **Wireless** > press the Enter key.
- 3 Select **New E-mail Address** or **New Phone Number** > press the Enter key.
- 4 Enter the email address or the telephone number > select **Done**. For help with the keyboard, see [page 17](#).
- 5 (Optional) Enter a contact name.
- 6 Select **Send** > press the Enter key.

Adding Contacts Via the Wireless Tools

To place the new contact on the Customer Support contact list web page, synchronize the lists (see [page 33](#)).

- 1 In the Main menu, select **Tools** > **Wireless Tools** > press the Enter key.
- 2 Select **Add Contact** > press the Enter key > select **Contact Type** > press the Enter key.
- 3 Select **E-Mail** or **Phone number** > press the Enter key.
- 4 Select **Address** in the Add Contact screen > press the Enter key > enter the address or telephone number (for help with the keyboard, see [page 17](#)).
- 5 Select **Done** > press the Enter key.
- 6 (Optional) Select **Name** in the Add Contact screen > press the Enter key > enter a contact name > select **Done** > press the Enter key.
- 7 Select **Add Contact** > press the Enter key.

Adding a Contact Via the Contact List Web Page

The contact list web page provides a decentralized way to add contacts to an instrument in the field.

Sample Contact List Web Page

Contact Information
Fields marked with * are required.

#	Lastname	Firstname	Title	E-Mail/SMS *	Alias	Delete?
1	Jones	Ellen		e.jones@emergOffic	Ellen	<input type="checkbox"/>
2	Masters	Phillip	Capt	phillipmasters@state	PMasters	<input type="checkbox"/>
3	Doe	James		james.doe@fbi.state	JD	<input type="checkbox"/>

Add New Contact

#	Lastname	Firstname	Title	E-Mail/SMS *	Alias
4					

[Save Settings](#)

❖ To view the web page

- 1 Navigate to the Customer Support website: www.thermoscientific.com/chemID-support > click **TruDefender FT**.
- 2 Enter the serial number and support code for your instrument > click **Log On**. The TruDefender FT Customer Support page appears.
- 3 Click **Edit your customer and contact information**.

❖ To add a contact via the web page

- 1 In the Add New Contact row, enter an email address or SMS number for the contact.
- 2 (Optional) Enter first and last name and an alias.
- 3 Click **Save Settings**. The website adds the new contact to the list.
- 4 Synchronize the contact lists (see [page 33](#)).

Editing or Deleting a Contact Via the Contact List Web Page

To edit or delete a contact that is on your instrument, you must make the change on the contact list web page and then synchronize the two lists (see below). You cannot edit or delete a contact directly on the instrument.

- 1 View the web site contact list (see [page 32](#)).
- 2 To edit a contact, revise the displayed information. To delete a contact, select its Delete check box.
- 3 Click **Save Settings**.
- 4 Synchronize the contact lists (see below).

Synchronizing the Contact Lists

When you synchronize the contact lists, the instrument and the contact list web page exchange data, so that each shows the same set of contacts.

In addition, if you have deleted or edited a contact on the web page, synchronization makes those changes on the instrument contact list.

- 1 In the Main menu, select **Tools > Wireless Options** > press the Enter key.
- 2 Select **Synchronize Contacts** > press the Enter key.

Specifying the Files That Are Attached to Emailed Scans

You can attach any combination of the following types of files to emailed scans:

- Report file (.jpg format)
- SPC file (.spc format)
- Reachback file (.arb format)

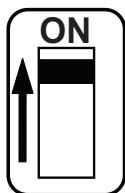
For an explanation of these file formats, see [page 27](#).

- 1 In the Main menu, select **Tools > Wireless Options** > press the Enter key.
- 2 Select **Choose E-mail Attachments** > press the Enter key.
- 3 Select the file types that you want to attach > press the Enter key. You can select more than one type.

Manually Enabling and Disabling the Wireless Radio

The radio consumes energy when it is enabled. To avoid running down your battery, you may choose to disable the radio. You can do this two ways:

- Via the instrument software
- Via a lockout switch inside the battery compartment



Switch in ON position

❖ To enable or disable the radio via the Wireless Tools

- 1 In the Main menu, select **Tools** > **Wireless Tools** > press the Enter key.
- 2 Select **Wireless Power** > press the Enter key > select **Disable** or **Enable** > press the Enter key.

❖ To enable or disable the radio via the lockout switch

- 1 Open the battery compartment door and remove the battery if present (see [page 7](#)).
- 2 Locate the small white switch at the side of the battery compartment.
- 3 Using the tip of a ballpoint pen or the end of a wooden swab, move the switch:
 - Toward the instrument nose to enable.
 - Toward the end of the instrument to disable.

Using the Library

- 35 Using the Library
- 36 Searching for Library Items
- 36 Changing the Organization of the Library Tabs
- 36 Exporting Library Items
- 37 Adding a Library Item
- 37 Deleting a Library Item

Using the Library

The library contains detailed information about all the chemicals that your instrument can detect.

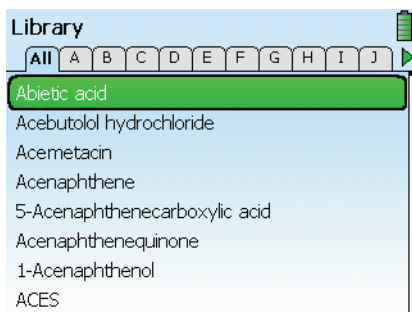
To help you locate items, the library is organized into tabs. You can choose to view either alphabetical tabs or category tabs (see [page 36](#)).

You can add custom items to the library (termed “user-added items”), which appear in their own tab in category view (see [page 37](#)).

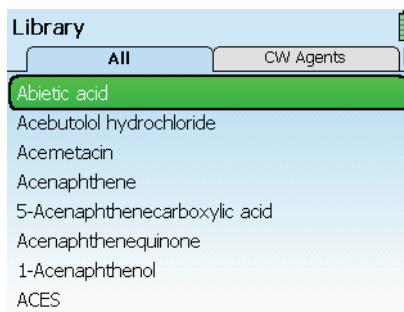
❖ To manually locate library items

- 1 In the Main menu, select **Library** > press the Enter key.
- 2 Use the arrow keys to scroll to an item > press the Enter key > select **View Info**.

Alphabetical tabs



Category tabs



5 Using the Library

Searching for Library Items

You can search for items by any part of their name. For example, “ace” finds “acetone” and “acetate.”



TIP

To skip to the end of a long list of library items, select the first item and press the up arrow. To skip to the top, select the last item and press the down arrow.

- 1 In the library, press the Enter key > select **Search Items** > press the Enter key.
- 2 Enter a search term > select **Done**. For help with the keyboard, see [page 17](#).
- 3 Select a search result > press the Enter key > select **View Info**.

Changing the Organization of the Library Tabs

You can choose to view alphabetical library tabs or category library tabs.

- 1 In the library, press the Enter key > select **View** > press the Enter key.
- 2 Press the Enter key > select an option:
 - **Name:** Displays alphabetical tabs.
 - **Type:** Displays category tabs.
- 3 Press the Enter key. The library tabs change according to the setting.

Exporting Library Items

You can export user-added library items to a different instrument by using the memory card to transfer the data.

To easily find user-added items, switch the library to show category tabs (see the preceding section).



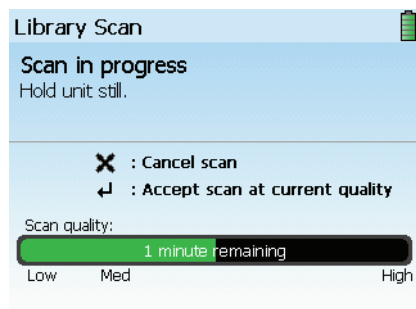
NOTE

Don't forget to remove the memory card from the target instrument when you are done.

- 1 Insert the memory card into the instrument (see [page 8](#)). In the Main menu, select **Library** > press the Enter key.
- 2 Switch the library to show category tabs (see above) > navigate to the User Items tab > select a user-added item > press the Enter key.
- 3 Select **Export item** > press the Enter key.
- 4 Remove the memory card and place it in the target instrument. On the target instrument, select **Library** in the main menu > press the Enter key.
- 5 Select **Import Item(s)** > press the Enter key. The instrument loads all the library items that are on the card.

Adding a Library Item

Adding a custom library item involves performing a library scan. A library scan is just like a regular scan except that it collects more data and so requires more time to complete.



The scale below the scan progress bar indicates the quality level that the scan has reached at a given point in time.

For the highest quality data, let the scan run until the green bar reaches the High marker.

If a scan is taking a very long time to run, you may press the Enter key to halt the scan at a lower level of scan quality.



NOTE

Your scan will only be as good as your sample. Crush solids or powders in a mortar, to a fine and even consistency. Prepare the sample in a clean area, and guard against contamination.

Deleting a Library Item

You can delete a user-added library item, but not a factory-installed item.



NOTE

Always use the sample crusher to perform a library scan of a powder or a solid.

- 1 Clean the sampling tip thoroughly (see [page 10](#)).
- 2 In the Main menu, select **Tools** > press the Enter key.
- 3 Select **Library Scan** > press the Enter key.
- 4 Select **Background Scan** > press the Enter key. The instrument runs a full background scan.
- 5 When the background scan finishes, position the sample as required for the scan: Either place a drop of liquid on the tip (see [page 11](#)) or put powdered sample into the sample crusher (see [page 16](#)).
- 6 Select **Sample Scan** > press the Enter key.
- 7 Either allow the scan to complete, or press the Enter key when the progress bar reaches the desired quality level. A summary of scan data appears on the screen.
- 8 Press the Enter key > select **Add Scan to Library**. The keyboard screen appears. Name the new item. For help with the keyboard, see [page 17](#).

- 1 In the library, press the Enter key > select a user-added item > press the Enter key.
- 2 Select **Delete Item** > press the Enter key.
- 3 In the confirmation screen, select **Yes** > press the Enter key.

5 Using the Library

Maintenance and Getting Help

- 39 Getting Help and Reachback Support
- 40 Sending a Reachback File Wirelessly
- 41 Performing a Self Test
- 42 Cleaning the Instrument
- 42 Cleaning the Sample Crusher
- 43 Decontaminating the Instrument and the Sample Crusher
- 43 Rebooting the Instrument
- 43 Recharging the Battery
- 44 About the System Card
- 44 Troubleshooting Wireless Transmissions
- 44 Testing the Wireless Service
- 45 Obtaining New Software
- 45 Returning the Instrument for Service

Getting Help and Reachback Support

Thermo Fisher Scientific Customer Support is available by telephone or email 24/7, 365 days a year.

- United States: 1-800-374-1992
- International: +1-978-642-1100
- support@chemid.thermofisher.com
For general non-emergency support questions.
- reachback@chemid.thermofisher.com
For help with interpreting scan results or with persistent No Match or Similar Match results.

**NOTE**

If you own a TruDefender FTi model, you can wirelessly email a Reachback file (see [page 40](#)).

Please contact Customer Support by telephone before emailing a Reachback file. Your call will immediately be escalated to a senior Customer Support specialist, who will explain the Reachback process and help you to email your scan results to us in Reachback file format. (For information about the Reachback file format, see [page 27](#).) We will notify you by telephone that we have received the Reachback file.

Our chemists begin analyzing your Reachback file as soon as they receive it. In most cases, you will receive a preliminary report of their findings within 1 hour. Within 1 business day, Customer Support will send you a final written report.

Sending a Reachback File Wirelessly

If you own a TruDefender FTi model, you can wirelessly send scan results to Customer Support in the Reachback file format.

The process involves supplying a contact telephone number, which the instrument sends to Customer Support along with the Reachback file.

Customer Support will telephone this number as soon as they receive the file, to discuss the results and collect additional information as needed.

❖ To send a Reachback file and select an existing contact

- 1 In the Main menu, select **Review** > press the Enter key.
- 2 Select the scan that you want to send to Reachback > press the Enter key.
- 3 Select **Export Scan** > press the Enter key.
- 4 Select **Wireless** > press the Enter key.
- 5 Select **Reachback Support** > press the Enter key.
- 6 Select **Continue** > press the Enter key.
- 7 Select a contact number > press the Enter key.
- 8 Select **Send** > press the Enter key.

❖ To send a Reachback file and add a new contact

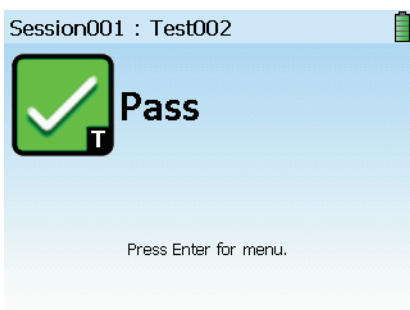
- 1 Follow steps 1 to 6 of the procedure above.
- 2 Select **New Phone Number** > press the Enter key.
- 3 Enter a new contact number > select **Done** > press the Enter key. (For help with the keyboard, see [page 17](#).)
- 4 (Optional) Enter a contact name.
- 5 Select **Send** > press the Enter key.

Performing a Self Test

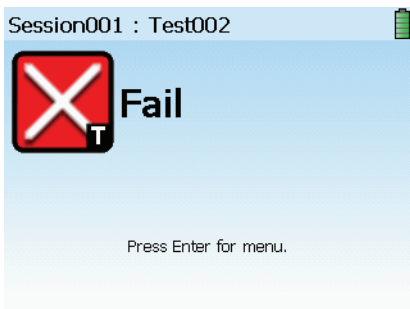
Perform a self test at least daily to verify that the instrument is operating properly. During the self test, you will scan the silicone boot on the sample crusher.

The self test has two possible results:

- A Pass result means that the instrument correctly identified the chemical properties of the silicone boot. This result indicates that the instrument is functioning properly and meets factory specifications.



- A Fail result indicates a problem.



- 1 Thoroughly clean one side of the silicone boot on the sample crusher with an alcohol wipe and allow the alcohol to completely dry.
- 2 In the Main menu, select **Tools** > press the Enter key.
- 3 Select **Self Test** > press the Enter key. The Background Check screen appears.
- 4 Clean the sampling tip (see [page 10](#)), then press the Enter key. The instrument performs a background scan and then displays the Position Unit screen.
- 5 Firmly press the sampling tip on the cleaned side of the sample crusher boot, then press the Enter key to start the self test. The Scan in progress screen appears, followed by a result screen after a few seconds.
- 6 If you get a Pass result, press the Escape key to return to the Main menu. If you get a Fail result, repeat the self test. If you obtain another Fail result, contact Customer Support.

Cleaning the Instrument

To remove nonhazardous contaminants from the outside of the instrument and the sample crusher, wipe them with a soft cloth moistened with water or isopropyl alcohol.

Cleaning the Sample Crusher

Clean the sample crusher regularly, or whenever it becomes difficult to insert the instrument.

Contaminants enter the sample crusher at its moving parts (the spring-loaded sampling platform and the latches) and eventually make it difficult to insert the instrument.

A buildup of hardened accumulations in the recesses of the top of the sample crusher can also prevent instrument insertion.

To clean the sample crusher, disassemble it and clean its parts with alcohol wipes, or with mineral spirits for oily contaminants.



NOTE

Soaking the sample crusher without disassembling it will not adequately clean its internal parts.

If the instrument is contaminated with potentially hazardous substances, follow the instructions in “Decontaminating the Instrument and the Sample Crusher” on page 43.

❖ To disassemble the sample crusher

- 1 Remove the sample crusher boot.
- 2 Unscrew and remove the large nut in the bottom of the sample crusher and remove the spring.
- 3 Push the sampling platform out.
- 4 To remove the latches, insert a small tool in the holes on the back side of the crusher and push out the pins inside.

❖ To clean the sample crusher

- 1 Scrub the sample platform top and rim, especially the crevices at the top and bottom of the black O-ring.
- 2 Scrub the top of the sample crusher, especially the corner recesses.
- 3 Scrub the hole that houses the spring.
- 4 Wipe all other parts.
- 5 Apply a small amount of a light lubricant to the O-ring.
- 6 Reassemble the sample crusher.

Decontaminating the Instrument and the Sample Crusher

You may immerse the instrument and the disassembled sample crusher for up to 1 hour in either water or a solution of 1 part household bleach (5% sodium hypochlorite) and 10 parts water.



NOTE

Be sure to follow your organization's decontamination guidelines.



NOTE

If you need to perform a self test after decontaminating the sample crusher, make sure that the crusher is completely dry first.

Before decontaminating the instrument, be sure to:

- Press the Wake/Sleep key to put the instrument to sleep.
- Close the battery compartment door and the access door, making sure that the access door gasket is fully seated and the door is locked in place (see [page 6](#)).
- Disassemble the sample crusher (see [page 42](#)).

You may want to remove the instrument boot before decontamination. Although the boot fits tightly, contaminants may enter along its edges. To remove the boot, place your thumbs on either side of the boot at the bottom end of the instrument and push the boot off, then peel it away from the instrument.

Rebooting the Instrument

If the instrument becomes unresponsive, reboot it by turning it off, then on again.

If the instrument still fails to reboot, contact Customer Support.



NOTE

If you are rebooting because you are experiencing problems with wireless transmission, see [page 44](#).

Recharging the Battery

You can recharge the battery in two ways:

- Connect the power cable to the instrument and plug it into an electrical outlet. The battery will automatically charge, even if the instrument is powered down.
- Insert the battery into the battery charger and plug the charger into an electrical outlet. The battery charger light changes from red to green when the battery is fully recharged.



TIP

Charge time for a depleted battery is less than 4 hours.

About the System Card

The system memory card resides in a slot at the back of the battery compartment. The card holds the instrument software, chemical library, user-added library items, and stored scans.

The system memory card does not hold any user-modifiable software or data. Do not remove the card unless instructed to do so by Customer Support.

Troubleshooting Wireless Transmissions

If you are having trouble sending wireless transmissions, try the following troubleshooting procedures:

- Make sure that the radio power switch is on (see [page 34](#)).
 - Use the Wireless Options to manually disable and re-enable the radio (see [page 34](#)).
 - If there are only a few or no reception bars, try moving to a different location.
 - Determine whether the instrument can find the carrier: Select **Tools > Wireless Options > Cell Info**. If the Network field says “Unknown,” the instrument cannot find the carrier. Reboot the instrument.
- Test your instrument’s connection to the TruDefender FTi servers (see below).
 - Try sending a different type of message.
 - Try sending a scan to a different contact.
 - Reboot the instrument.
 - Contact Customer Support if none of these suggestions fix the problem.

Testing the Wireless Service

If you are having difficulty sending messages, Customer Support may ask you to test your connection to the TruDefender FTi servers.

- 1 In the Main menu, select **Tools > Wireless Options** > press the Enter key.
- 2 Select **Wireless Test** > press the Enter key. The instrument will display a message indicating success or failure.

Obtaining New Software

Customer Support will notify you when a software upgrade is available on the Customer Support website.

To log into this website, you must enter the support code and serial number for your instrument.

The support code is listed in the About screen (select **Tools > About**).

The serial number is printed on a label on the back of the instrument and is also displayed in the About screen.



NOTE

The support code changes on a daily basis. To obtain a valid support code, the time, date, and GMT zone fields must be set correctly on your instrument (see [page 8](#)).

- 1 Open the Customer Support website (www.thermoscientific.com/chemID-support) and click the picture that matches your instrument.
- 2 Enter the serial number and support code for your instrument.
- 3 Follow the directions provided on the website.

Returning the Instrument for Service

Before returning the instrument, contact Customer Support or your local distributor and request a return material authorization (RMA) number.



NOTE

Packages that are not identified with an RMA number will be returned to the shipper unopened.

- 1 Clean the instrument and decontaminate it if necessary. Both safety and common carrier requirements require all returned instruments to be clean and decontaminated.
- 2 Package the instrument securely and write your RMA number on the outside of the package.
- 3 Mail the package to Customer Support or to your local distributor.

6 Maintenance and Getting Help

Labels and Regulatory Statements

Export Regulation Statements



The technical information contained with this document is subject to the Export Administration Regulations. Export of this technical information to foreign persons or foreign companies, within or outside the United States, may require prior written authorization by the U.S. Department of Commerce, Bureau of Industry and Security. Contact Thermo Fisher Scientific, Inc., prior to such a transfer.

WEEE Compliance

This product is required to comply with the European Union's Waste Electrical & Electronic Equipment (WEEE) Directive 2002/96/EC. It is marked with the following symbol:



Thermo Fisher Scientific has contracted with one or more recycling or disposal companies in each European Union (EU) Member State, and these companies should dispose of or recycle this product. For further information, contact Thermo Fisher Scientific or your local representative.

WEEE Konformität

Dieses Produkt muss die EU Waste Electrical & Electronic Equipment (WEEE) Richtlinie 2002/96/EC erfüllen. Das Produkt ist durch folgendes Symbol gekennzeichnet:



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Limited Warranty

Seller warrants that the Products will operate or perform substantially in conformance with Seller's published specifications and be free from defects in material and workmanship, when subjected to normal, proper and intended usage by properly trained personnel, for the period of time set forth in the product documentation, published specifications or package inserts. If a period of time is not specified in Seller's product documentation, published specifications or package inserts, the warranty period shall be one (1) year from the date of shipment to Buyer for equipment and ninety (90) days for all other products (the "Warranty Period"). Seller agrees during the Warranty Period, to repair or replace, at Seller's option, defective Products so as to cause the same to operate in substantial conformance with said published specifications; provided that Buyer shall (a) promptly notify Seller in writing upon the discovery of any defect, which notice shall include the product model and serial number (if applicable) and details of the warranty claim; and (b) after Seller's review, Seller will provide Buyer with service data and/or a Return Material Authorization ("RMA"), which may include biohazard decontamination procedures and other product-specific handling instructions, then, if applicable, Buyer may return the defective Products to Seller with all costs prepaid by Buyer. Replacement parts may be new or refurbished, at the election of Seller. All replaced parts shall become the property of Seller. Shipment to Buyer of repaired or replacement Products shall be made in accordance with the Delivery provisions of the Seller's Terms and Conditions of Sale. Consumables are expressly excluded from this warranty.

Notwithstanding the foregoing, Products supplied by Seller that are obtained by Seller from an original manufacturer or third party supplier are not warranted by Seller, but Seller agrees to assign to Buyer any warranty rights in such Product that Seller may have from the original manufacturer or third party supplier, to the extent such assignment is allowed by such original manufacturer or third party supplier.

In no event shall Seller have any obligation to make repairs, replacements or corrections required, in whole or in part, as the result of (i) normal wear and tear, (ii) accident, disaster or event of force majeure, (iii) misuse, fault or negligence of or by Buyer, (iv) use of the Products in a manner for which they were not designed, (v) causes external to the Products such as, but not limited to, power failure or electrical power surges, (vi) improper storage and handling of the Products or (vii) use of the Products in combination with equipment or software not supplied by Seller. If Seller determines that Products for which Buyer has requested warranty services are not covered by the warranty hereunder, Buyer shall pay or reimburse Seller for all costs of investigating and responding to such request at Seller's then prevailing time and materials rates. If Seller provides repair services or replacement parts that are not covered by this warranty, Buyer shall pay Seller therefor at Seller's then prevailing time and materials rates. ANY INSTALLATION, MAINTENANCE, REPAIR, SERVICE, RELOCATION OR ALTERATION TO OR OF, OR OTHER TAMPERING WITH, THE PRODUCTS PERFORMED BY ANY PERSON OR ENTITY OTHER THAN SELLER WITHOUT SELLER'S PRIOR WRITTEN APPROVAL, OR ANY USE OF

B Limited Warranty

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FCC Statement:

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions:

- 1 This device may not cause harmful interference, and
- 2 This device must accept any interference received, including interference that may cause undesired operation.

Any change or modification to the product not expressly approved by Thermo Fisher Scientific could void the user's authority to operate the device.

This equipment complies with FCC radiation exposure limits set forth in an uncontrolled environment.

This equipment should be installed and operated with minimum distance 20cm between the equipment and the user's body.

IC Statement

This device complies with Industry Canada license-exempt RSS standard(s). Operation is subject to the following two conditions:

- 1 this device may not cause interference, and
- 2 this device must accept any interference, including interference that may cause undesired operation of the device.

Le présent appareil est conforme aux CNR d'Industrie Canada applicables aux appareils radio exempts de licence.

L'exploitation est autorisée aux deux conditions suivantes:

- 1 *l'appareil ne doit pas produire de brouillage, et*
- 2 *l'utilisateur de l'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.*

This device has been designed to comply with safety requirements for exposure to radio waves (SAR) in accordance with RSS-102.

This device should be installed and operated with minimum distance 20cm between the equipment and your body.

Cet artifice a été conçu pour se plier à la sécurité des exigences pour l'exposition aux ondes radioélectriques (SAR) dans conformité avec RSS-102.

Cet artifice devrait être installé et fait marcher avec la distance minimale 20 centimètres entre l'équipement et votre corps.

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