

Thermo Scientific

# Multiskan™ SkyHigh

## User Manual

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**thermo**  
scientific

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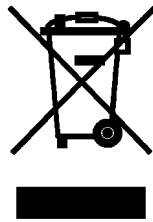
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Release history:

**For general laboratory use.**

## **WEEE Compliance**

This product is required to comply with the European Union's Waste Electrical & Electronic Equipment (WEEE) Directive 2012/19/EU. It is marked with the following symbol:



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# Preface

## About this guide

This manual is for the following instruments:

- Multiskan™ SkyHigh – Cat. No. A51119500C
- Multiskan™ SkyHigh with Touch Screen – Cat. No. A51119600C
- Multiskan™ SkyHigh with Cuvette and Touch Screen – Cat. No. A51119700C
- Multiskan™ SkyHigh with Touch Screen +  $\mu$ Drop Duo Plate – Cat. No. A51119600DPC
- Multiskan™ SkyHigh with Cuvette and Touch Screen +  $\mu$ Drop Duo Plate – Cat. No. A51119700DPC

Use Multiskan SkyHigh as standalone (the models with the touch screen) or with Thermo Scientific™ SkanIt™ Software. Multiskan SkyHigh is intended to be used in research laboratories by qualified personnel.

This document aims to give you the information you need to:

- Install and operate Multiskan SkyHigh.
- Navigate in the Multiskan SkyHigh user interface.
- Install and use SkanIt Software.

This manual also includes the maintenance checklist and specifications of Multiskan SkyHigh.

**Note** Screen shots appear with simulated data, the actual content may differ slightly.

Read the manual in its entirety before you start to operate the instrument.

Save this manual for future reference. This manual is an important part of the instrument and should be readily available.

## Related documentation

In addition to this manual and all its language versions, Thermo Fisher Scientific provides the following documents for Multiskan SkyHigh and SkanIt Software:

- *Thermo Scientific™ Multiskan™ SkyHigh Technical Manual* (Cat. No. N21872)
- *Thermo Scientific™ SkanIt™ Software for Microplate Readers Technical Manual* (Cat. No. N16046)

The instrument software also provides context sensitive help.

## Safety and special notices

Make sure you follow the precautionary statements presented in this guide or on the instrument. The safety and other special notices appear in boxes.

Safety and special notices include the following:



**CAUTION** Highlights hazards to humans, property, or the environment. Each CAUTION notice is accompanied by a CAUTION symbol.



**WARNING** Risk of injury to the user or users.



**WARNING** Risk of electric shock.

**IMPORTANT** Highlights information necessary to prevent damage to software, loss of data, or invalid test results; or may contain information that is critical for optimal performance of the system.

**Note** Highlights information of general interest.

**Tip** Highlights helpful information that can make a task easier.

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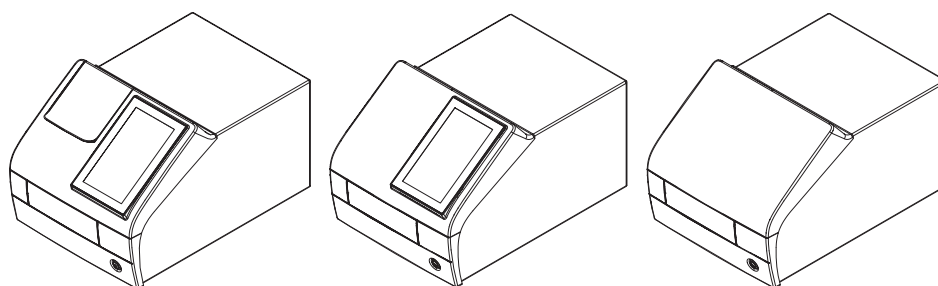
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## Introduction

Multiskan SkyHigh is a spectrophotometer that is used to measure photometric assays with defined 6–48-, 96- and 384-well microplates. Multiskan SkyHigh with the cuvette version can also measure photometric assays with cuvettes. Additionally, Multiskan SkyHigh is compatible with the Thermo Scientific™  $\mu$ Drop and  $\mu$ Drop Duo Plates.

**Figure 1.** Thermo Scientific Multiskan SkyHigh.



Multiskan SkyHigh with the touch screen can be connected to Thermo Fisher Connect cloud-based capabilities, Microsoft OneDrive, or the local area network. Multiskan SkyHigh is designed to be part of an analyzing system for the end user, who is responsible for validating the system to ensure reliable and safe results.

We recommend Good Laboratory Practice (GLP) during the analysis process.



**CAUTION** Follow the instructions provided by the manufacturer. Do not use the instrument in any other way.



**CAUTION** Do not expose the instrument to corrosive liquids or gases during use, storage or transport.



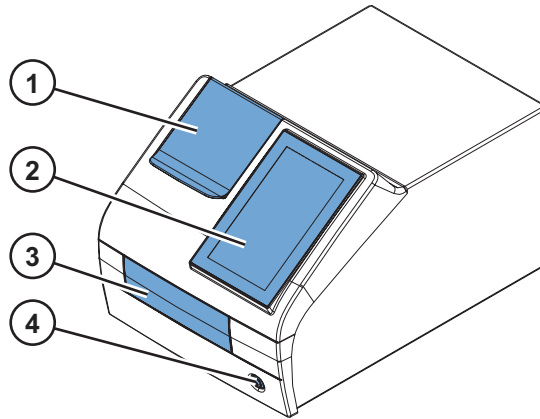
**CAUTION** Operate the instrument only with software and hardware that is specifically designed or selected for it. Thermo Fisher Scientific assumes no liability for the use of third-party software applications.

**Note** Your instrument may not have all of the features presented in this guide.

## Instrument layout

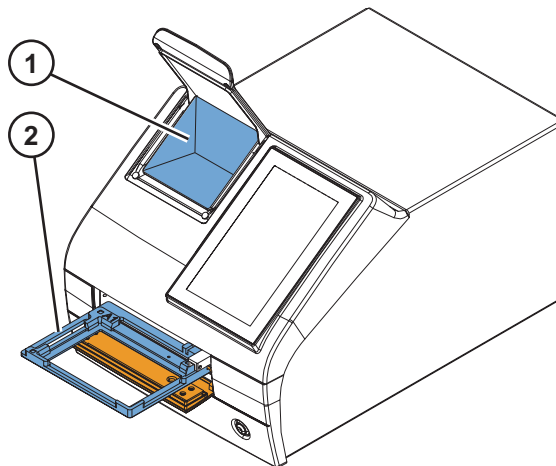
The front view of an instrument with the cuvette port:

**Figure 2.** Cuvette port (only in cuvette model) (1), touch screen display (only in the models with the display) (2), measurement chamber door (3), power button (4).



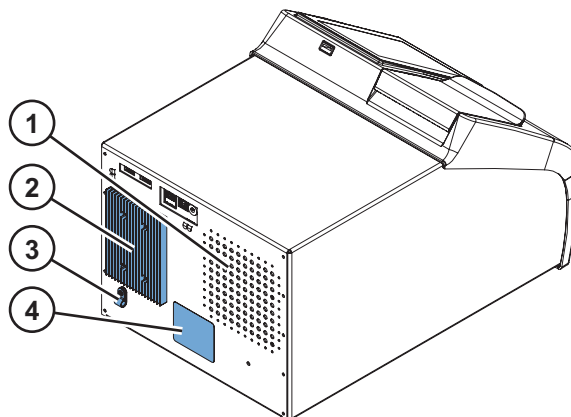
The instrument with the cuvette port and measurement chamber door open:

**Figure 3.** Cuvette port (1), plate carrier (2).



The back view of the instrument:

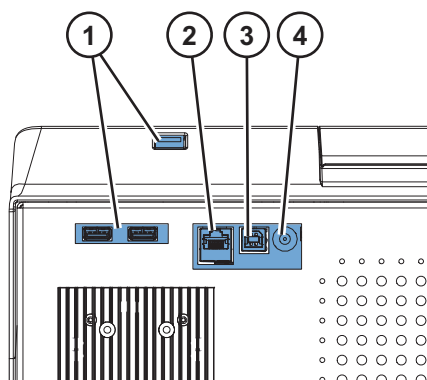
**Figure 4.** Air inlet (1), heat sink (2), transport lock storage position (3), type label (4).



**Note** Avoid damage to the heat sink. A dent in the heat sink could damage the internal electronics of the instrument.

The connectors on the instrument:

**Figure 5.** USB ports (for USB memory device or Wi-Fi dongle) (1), Ethernet (2), USB port (for PC) (3), mains power supply connector (4).



**Tip** You can connect a USB keyboard to one of the USB ports (1).

The USB ports (1) can accept an external memory device, or a Wi-Fi dongle compatible with Microsoft™ Windows™ 10.

**Note** The maximum length for a cable connected to the USB or Ethernet ports is 3 m.

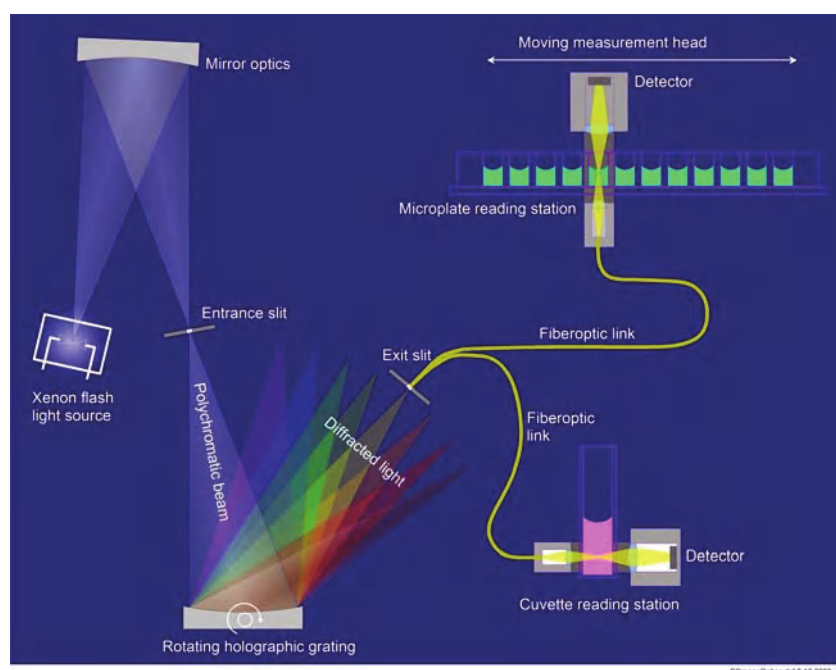
## Principle of operation

Multiskan SkyHigh is a monochromator-based microplate and cuvette photometer. The sample on the microplate is measured vertically from bottom to top, while the sample on the cuvette is measured horizontally.

The exact wavelength of the spectrum of the Xenon flash lamp is selected by using a monochromator. The light is guided to the microplate optics or the cuvette optics by the optical fiber. In both optics, part of the light is being guided through the sample and part to the reference detector. The light is sensed simultaneously by the reference detector and the measurement detector positioned after the sample to compensate any intensity fluctuations of the Xenon flash lamp.

In microplate measurement the measurement head moves to select the well column while the track moves to select the row.

**Figure 6.** Operating principle.



An air blank measurement is needed to calculate the absorbance values. In microplate measurement, Multiskan SkyHigh moves the microplate aside to measure the blank automatically.

## Install Multiskan SkyHigh

This chapter describes the necessary installation steps before you can operate the instrument.

Installation order:

1. Remove the transport lock.
2. Connect the mains supply cable.

If you want to connect the instrument to SkanIt Software:

1. Connect the instrument to a computer.
2. Install SkanIt Software.



**WARNING** Only authorized technical service personnel are allowed to open the instrument. Disconnect the instrument from all voltage sources by disconnecting the power supply cable before opening it.



**WARNING** Do not touch switches or electrical outlets with wet hands. Switch the instrument off before disconnecting it from the mains supply.



**WARNING** The electromagnetic environment should be evaluated prior to operation of the device. Do not use this device in close proximity to sources of strong electromagnetic radiation (e.g. unshielded intentional RF sources), as these can interfere with the proper operation.



**WARNING** Do not attempt to operate the instrument with the transport lock in place.



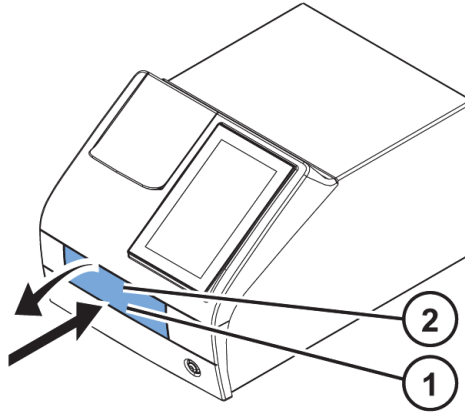
**CAUTION** Do not touch or loosen any screws or parts other than those specifically designated in the instructions. Doing so may cause misalignment and will void the instrument warranty.



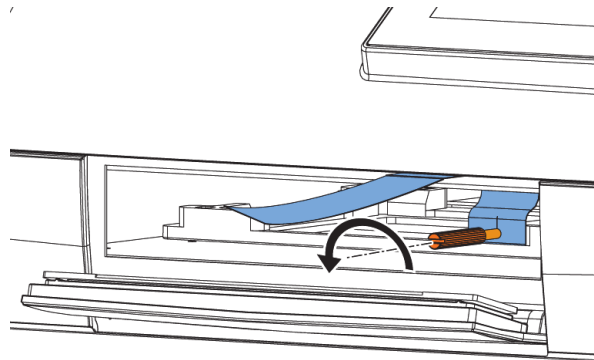
**CAUTION** Leave the instrument to sit for at least three hours before installing and switching it on to prevent condensation causing a short circuit.

## Remove the transport lock

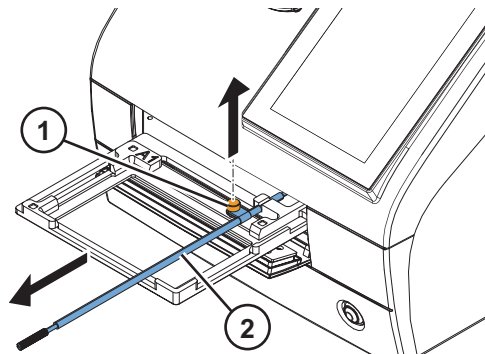
1. Open the measurement chamber door by pushing its bottom edge (1) and pulling the upper edge (2).



2. Unscrew the transport lock bar by turning it counterclockwise. Use a suitable flat head screwdriver if necessary.

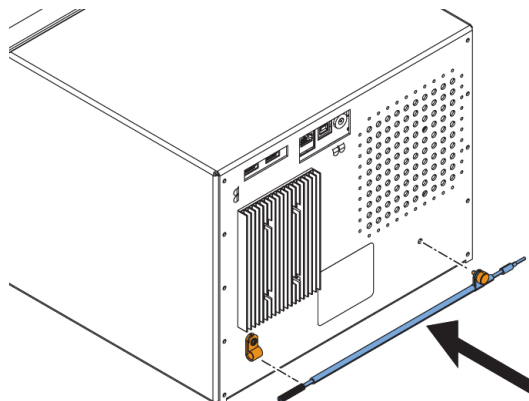


3. Pull the transport lock until the plate carrier is fully out of the instrument.
4. Unfasten the red fixing screw (1) and remove the transport lock (2) from the plate carrier.



5. Push the plate carrier back into the instrument and make sure that the measurement chamber door closes properly.

6. Attach the transport lock on the back of the instrument with the red fixing screw and the locking piece that is on the back of the instrument.



## Connect the mains supply cable



**CAUTION** Do not use other power supply cables than the power supply cable delivered with the instrument. Use the Thermo Scientific power supply cable designed for your region.



**CAUTION** Do not operate your instrument from a power outlet that has no ground connection.

1. Connect the power supply cable to the power supply connector and plug in the instrument.
2. Connect the power supply to a correctly installed line power outlet with a grounded conductor.

## Connect the instrument to a computer

If you are using a computer with the instrument, connect the communication cable to the USB port marked USB/PC.

**Note** Connecting the instrument to SkanIt Software automatically updates the instrument date and time according to the PC clock.

## Install SkanIt Software

For installation instructions, refer to “[Install SkanIt Software](#)” on [page 9](#).

When the instrument is connected to SkanIt Software, a **Take control** icon shows on the display. Tap the icon to disconnect the computer remote control.

## Operational check

When you switch the instrument on, the instrument proceeds to perform the self diagnostics. No error messages should appear on the display.

When the home screen opens, the instrument is ready for use.

If the instrument is switched on for the first time, the instrument prompts you to setup the device. In that case, proceed to [Initial settings](#).

## Initial settings

When you switch Multiskan SkyHigh with a touch screen on for the first time, the instrument prompts you to set some initial settings for the instrument.

To set up the instrument:

1. Select the Thermo Fisher Connect region: if you are in China, select **China**, otherwise, select **Global**.
2. Tap **Next**.
3. In the window that opens, check and update, if needed:

- date and time
- time zone
- language
- regional data format

4. Select whether you want to upload telemetry data to Thermo Fisher Connect.

For more information on telemetry data, refer to “[Thermo Fisher Connect cloud-based tools](#)” on [page 20](#).

5. Tap **Next**.
6. If you have a  $\mu$ Drop or  $\mu$ Drop Duo Plate, enter the  $\mu$ Drop/ $\mu$ Drop Duo Plate’s serial number and pathlength(s) indicated in the quality control measurement report delivered with the  $\mu$ Drop/ $\mu$ Drop Duo Plate.
7. Tap **Finish**.

If you do not want to set the settings now, you can skip this step and access the settings later by tapping the **Settings** tile on the **Home** screen.



## Install SkanIt Software

This chapter gives an overview of the software installation process and introduces the main elements in the user interface. For more information about the software, refer to the *Thermo Scientific™ SkanIt™ Software for Microplate Readers Technical Manual*.

The software automatically detects how Multiskan SkyHigh is configured and shows only those features that are available.

**Note** Your instrument may not have all of the features presented in this manual.

### SkaniT Software

With SkanIt Software you can:

- Control instrument actions.
- Create measurement sessions and start measurements.
- View measurement results and perform data analysis.
- Create comprehensive result reports.
- Print or export result reports in different file formats (for example, Microsoft™ Excel).

All measurement and calculation data is stored in a file system.

### Installation overview

To install SkanIt Software you need:

- Administrator rights to the PC.
- The installation software on a USB memory device (or access to Internet for installation from the company's website).
- To make sure your PC meets the recommended requirements.

**Table 1.** PC recommended requirements.

System	Recommended requirements
Supported operating systems	64-bit edition of Microsoft™ Windows™ 10 (Pro or Enterprise edition)
Disk space	14 GB free disk space
Processor	Quad-core (or dual-core with four logical processors), 2 GHz or faster
Memory	8 GB RAM
USB port available	1 (one)
Monitor	Full HD with 1920 x 1080 resolution

**Note** We strongly recommend using a computer that fulfills the recommended requirements, especially if you process sessions with more than total of 150,000 individual measurements or with complex calculations.

## Installation process

1. Insert the installation USB memory device into the USB port. (Optionally, go to the installation website.)
2. Follow the installation instructions.  
The installation ends with a 'Completed' message.
3. To open the software, click the SkanIt Software shortcut on the desktop.

For detailed installation steps, refer to the *Thermo Scientific™ SkanIt™ Software for Microplate Readers Technical Manual*.

## Connect the software to the instrument

Connect the software to the instrument by plugging the USB cable from the PC to the instrument. Switch the instrument on and start SkanIt Software. The software finds the instrument automatically.

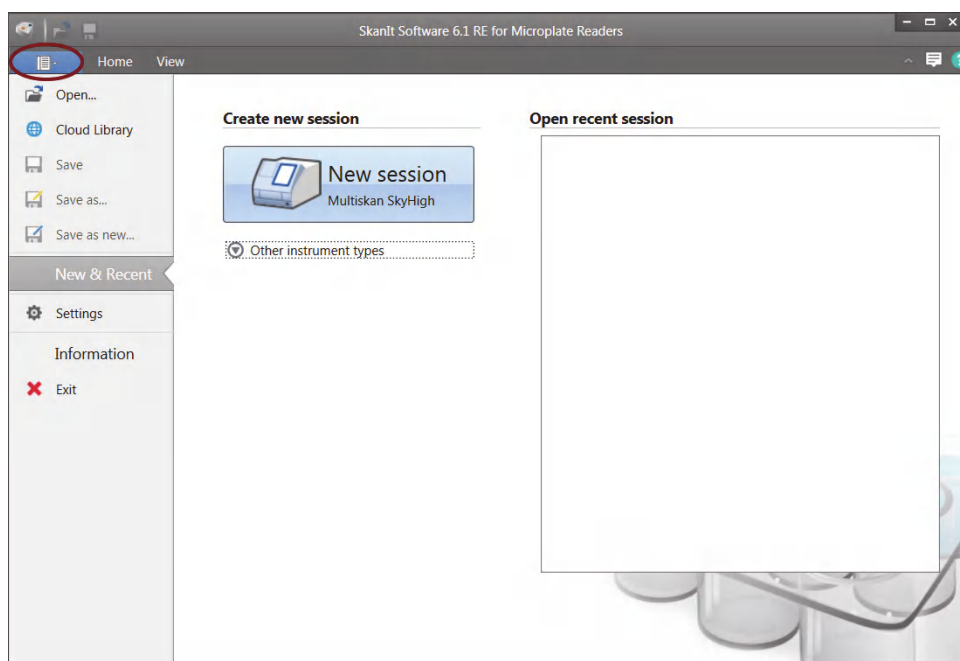
## Main elements

The main elements in the software are the application menu, the **Session tree** and the task ribbon. When you open the software, the application menu opens.

## Application menu

The application menu is for general tasks. This is where you create new sessions, open saved sessions, and access instrument settings. Click the menu icon to open the application menu.

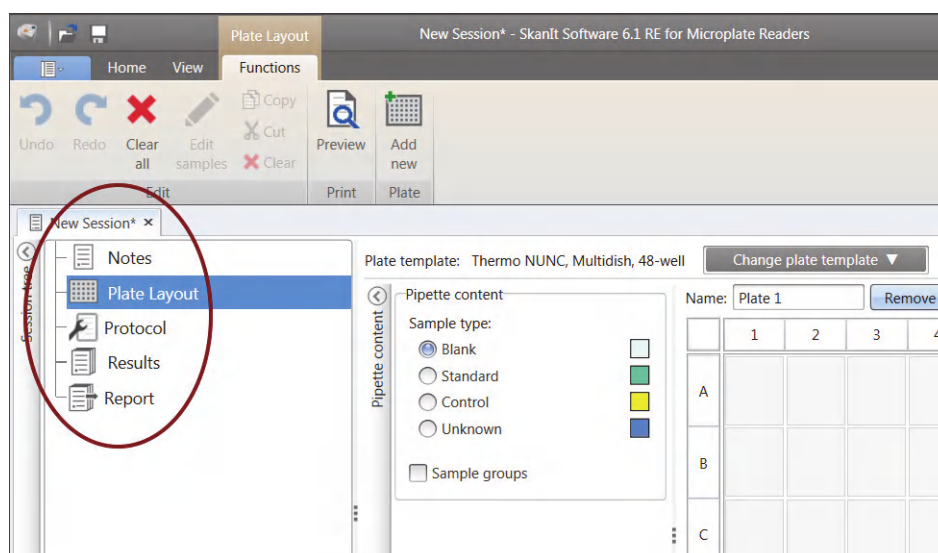
Figure 7. Application menu.



## Session tree

The **Session tree** is visible when you have created or opened a session. This is the main area where you navigate to define what wells to measure, to select the protocol, view the measurement results, perform calculations, and create a result report.

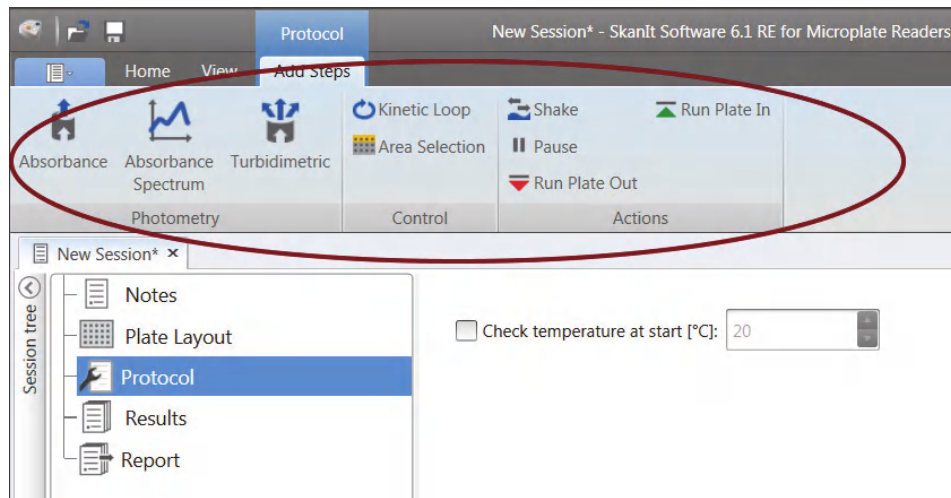
Figure 8. Session tree with Plate Layout selected.



## Task ribbon

The actions in the task ribbon are linked to the section you have selected in the **Session tree**. When you select **Plate Layout**, **Protocol**, **Results** or **Report** in the **Session tree**, the relevant task ribbon opens. The task ribbon shows the actions you can select.

**Figure 9.** Protocol task ribbon.



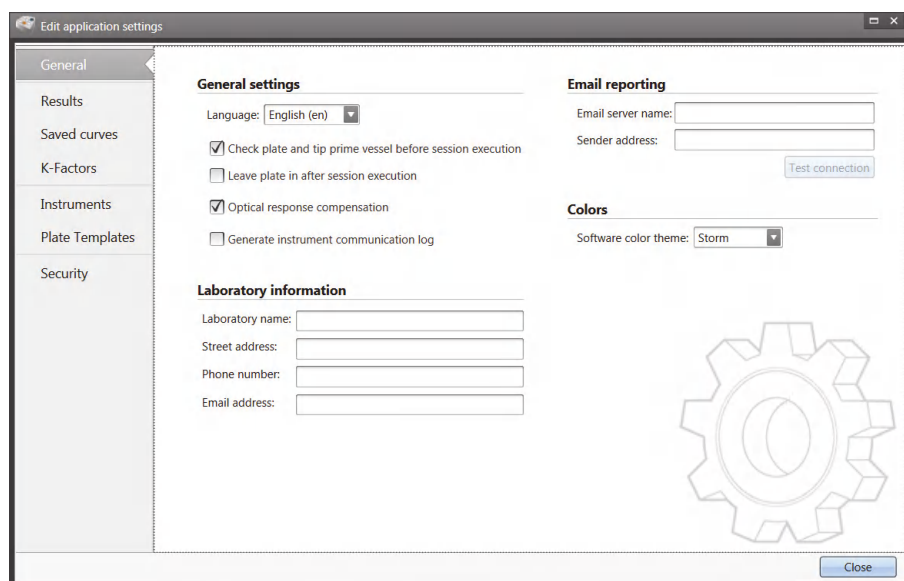
## Select the software language

The default language is English. You can change the language to French, German, Italian, Japanese, Portuguese, Russian, Simplified Chinese or Spanish.

To change the language:

1. Click **Settings** in the **Application menu**.  
The **Settings** window opens.
2. Select the language from the drop-down list under **General settings**.
3. Restart the software to set the new language.

**Figure 10.** Settings window.



## Instrument operations

### Switch the instrument on

Before you switch the instrument on, make sure that all the cables are properly fitted according to the installation instructions.

Switch the instrument on by pushing the power button. The instrument proceeds to perform the self diagnostics. The instrument is ready for use when the **Home** screen opens.

**Note** The cuvette port cover must be closed during the startup self diagnostics tests.

**Note** Do not switch the power off during startup, self diagnostics, or when data is transferred to a memory device.

### Touch screen display

Multiskan SkyHigh can be operated using the touch screen display of the instrument.



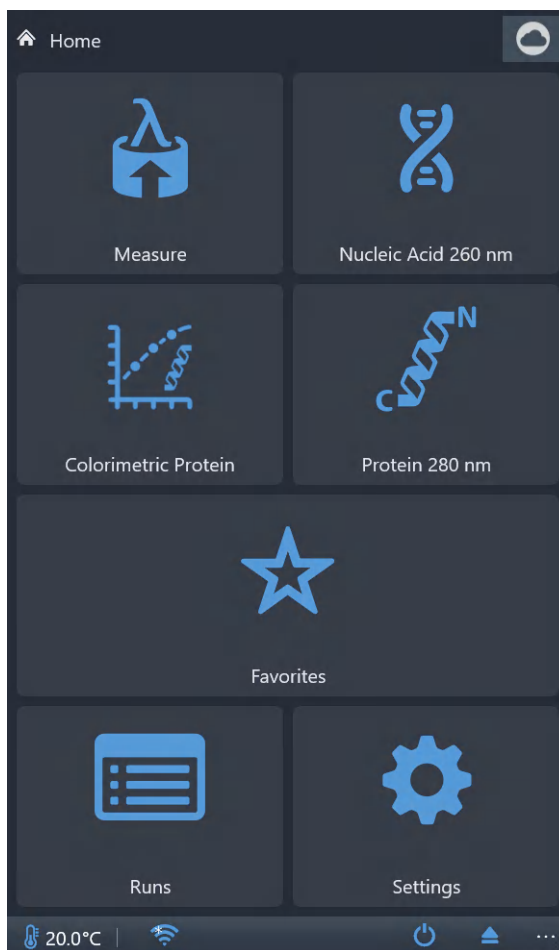
**CAUTION** The touch screen is a sensitive component. Use, for example, your finger to operate the instrument via the touch screen. Do not use a sharp object on the touch screen.



**WARNING** If the touch screen display is broken, do not touch it with bare hands.

**Note** You can operate the touch screen display while wearing disposable gloves.

The **Home** screen opens when you switch the instrument on.



The **Home** screen is divided into three parts:

- the navigation bar at the top,
- the function tiles in the middle, and
- the instrument-specific application bar at the bottom.

## Navigation bar

At the top of the display, there is the navigation bar. The navigation bar is always visible on the touch screen display.

The navigation bar operates with breadcrumb navigation, revealing the path to the present view. For example, from the result of an endpoint measurement started from **Favorites**, you can choose to return to either the **Home** screen, **Favorites**, or the endpoint measurement parameters under **Measure**:



**Tip** To return to the **Home** screen from any view, tap the **Home** icon.

## Function tiles

The instrument contains the following functions, displayed as tiles on the touch screen:

- **Measure:** absorbance and turbidity measurements in endpoint, kinetic and spectrum mode  
  
Select Absorbance when the assay is performed with light-absorbing molecules, which absorb light in direct correlation with their concentrations according to the Beer-Lambert's law. Some typical light-absorbing molecules are color dyes that are widely used, for instance, for the measurement of cellular viability and in ELISA assays.  
  
Select Turbidimetric when the assay is performed with light-scattering molecules, which absorb light energy but re-emit light in different directions with different intensity. Light scattering often occurs in solutions that contain suspended particles, for instance, in bacterial suspensions, when measuring bacterial growth.
- **Colorimetric Protein:** colorimetric quantification of protein concentration
- **Nucleic acid 260 nm:** direct DNA/RNA quantification by absorbance measurements at 260 nm
- **Protein 280 nm:** direct protein quantification by absorbance measurements at 280 nm
- **Favorites:** quick access to saved measurements
- **Runs:** results of previously run measurements
- **Settings:** instrument, network & USB, and  $\mu$ Drop and  $\mu$ Drop Duo Plate settings

Tap the tiles to access the functions.

For more information on the different functions, refer to the *Thermo Scientific™ Multiskan™ SkyHigh Technical Manual*.

## Application bar

The current instrument temperature, **Run plate in/out** and **Power off** icons are shown in the application bar at the bottom of the display. When the incubator is turned on, the info text bar shows also the target incubator temperature until the incubator reaches the target temperature.

**Tip** Tap the temperature in the application bar for a quick access to the incubator settings.

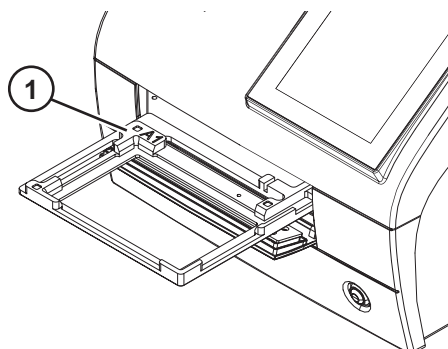
If Wi-Fi is available, or if a local area network cable or a USB memory device is connected to the instrument, a corresponding icon is displayed in the application bar.

## Measure a microplate

To measure a microplate:

1. Load the microplate.
  - a. If the plate carrier is in, push the power button to run it out.

- b. Place the microplate in the plate carrier and position the top-left corner of the microplate to the A1 corner (1) of the plate carrier.



- c. Push the power button to run the plate carrier in.



**CAUTION** Ensure that you select the correct microplate type. An unsuitable microplate can become jammed in the instrument. When you work in the UV range, use quartz or other UV-compatible microplates.

2. Access the measurement from the **Home** screen.

**Note** If you use Multiskan SkyHigh without the touch screen display, use SkanIt Software to define and start the measurements and to view the results. For instructions, refer to “Using SkanIt Software” on page 21.

3. Define the measurement parameters.
4. Tap **Start** to start the measurement.

**Note** Before measuring a  $\mu$ Drop or  $\mu$ Drop Duo Plate, make sure that the  $\mu$ Drop/ $\mu$ Drop Duo Plate’s serial number and pathlength have been defined in **Settings**.

**Note** Multiskan SkyHigh supports clear bottom 6–48-, 96- and 384-well microplates with and without lids, where the maximum height of the microplate or a combination of the microplate and lid is 19.5 mm.

5. View the results of the measurement.
6. Export the results if desired.

The measurement results are automatically stored in **Runs**.

## Measure a cuvette



**CAUTION** Do not spill any liquids inside the cuvette port.

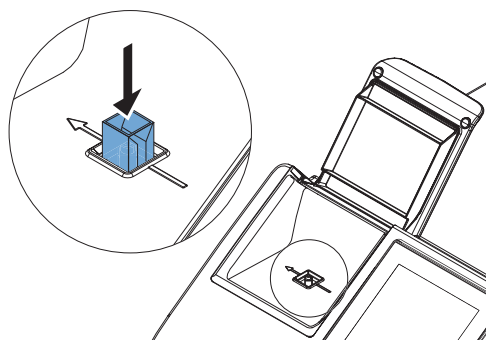
To measure a cuvette:



1. Access the measurement from the **Home** screen.

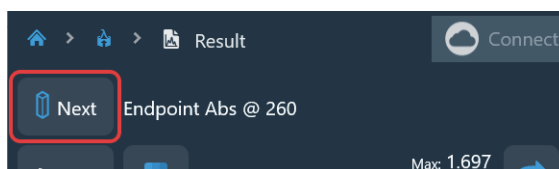
**Note** If you use Multiskan SkyHigh without the touch screen display, use SkanIt Software to define and start the measurements and to view the results. For instructions, refer to “Using SkanIt Software” on page 21.

2. Define the measurement parameters.
3. Insert the sample cuvette into the cuvette port with its measurement windows aligned with the measurement direction arrow on the cuvette port. Ensure that the cuvette is fully inserted and close the cuvette port cover.



**Note** Always keep the same cuvette orientation.

4. Tap **Start** to start the measurement.
5. View the results of the measurement.
6. Export the measurement data if desired.
7. To measure the next sample with the same measurement parameters, insert the next sample cuvette into the cuvette port and tap the **Next** icon.



**CAUTION** Ensure that you use a correct cuvette type with a measurement position height of 8.5 mm. When you work in the UV range, use quartz or other UV-compatible cuvettes.

The measurement results are automatically stored in **Runs**.

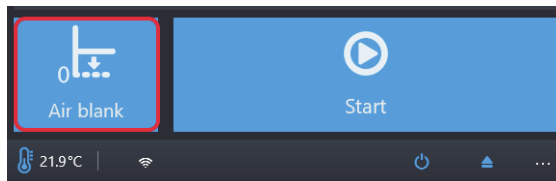
When you are not using the cuvette port, keep the cuvette port cover closed to protect it from dirt and dust.

## Air blanking for cuvettes

The instrument prompts you to perform air blanking if more than 24 hours have passed from the last performed air blanking. However, it is possible that the air blank changes slightly. Therefore, when performing very precise measurements, you can perform air blanking manually just before running the measurement.

To perform air blanking:

1. Make sure that the cuvette port is empty.
2. Set up the parameters for the cuvette measurement.
3. Tap the **Air blank** tile.



4. Tap **OK**.

The cuvette port is now set to zero absorbance level. All measured sample absorbances will be measured in comparison to this baseline level.

## Instrument incubator

The incubator temperature can be controlled from **Settings**.

To set the incubator on:

1. Go to **Settings > Instrument**.
2. In the **Incubator** settings, turn the **Enable incubator** selection ON.
3. Select the target incubation temperature either with the + and - icons, or by typing in the temperature with the numeric keypad that opens when you tap the temperature value.

When the incubator is turned on and the temperature is set, the temperature and an arrow (for example,  $21.6 \rightarrow 37.0$ ) shows in the application bar until the target temperature is reached.

**Tip** Tap the temperature in the application bar for a quick access to the incubator settings.

**Note** Multiskan SkyHigh has condensation control.

## Shaker

The linear shaker of the plate carrier shakes the microplate to mix the liquid in the wells. The shaker operates at different adjustable speeds. For more information, refer to the *Thermo Scientific™ Multiskan™ SkyHigh Technical Manual*.

The cuvette port and the  $\mu$ Drop and  $\mu$ Drop Duo Plates do not support shaking.

**Note** The shaker is optimized for water-based liquids with low viscosity. If you use other than water-based solutions, test the shaking function before running the measurement to ensure that the liquid is properly mixed, and that the liquid stays in the well.

**Note** The shaker is not meant for continuous use. If shaking periods of more than 24 hours are required, it is recommended to use a dedicated shaker.

## View results

The measurement results of a run open automatically after the run.

To view other results, go to the **Runs** view and tap the run you want to view.

## Export files

You can export measurement results to Thermo Fisher Connect, Microsoft OneDrive, the local area network, and a USB memory device:

- from a measurement result view
- from the **Runs** view
- by defining in **Settings** that the files are exported automatically.

**Note** Before you can export files to Thermo Fisher Connect, the instrument must be linked to the cloud and you must be signed in. For instructions, refer to the *Thermo Scientific™ Multiskan™ SkyHigh Technical Manual*.

**Note** Before you can export files to Microsoft OneDrive, you must be signed in.

**Note** Before exporting files to the local area network, define the network share location in **Settings** > **Network & USB**. You must have write permission to the network share.

## Power save feature

Multiskan SkyHigh has a power save feature which lowers power consumption when the instrument is idle.

Enable or disable the power save from **Settings**.

To reactivate the instrument, tap the **Power save** icon on the touch screen. SkanIt Software reactivates the instrument automatically. The user interface returns to the state where it was when the instrument entered the power saving mode.

## Shutdown

To shut down the instrument:

1. Remove any microplates or cuvettes from the instrument.
2. Push and hold the power button until the instrument switches off.

You can switch the instrument off also from the user interface.

# Thermo Fisher Connect cloud-based tools

The Multiskan SkyHigh models that have the touch screen display can be connected to Thermo Fisher Connect's cloud-based tools. To access the Thermo Fisher Connect services, register as a cloud user in the Thermo Fisher Connect website:

[www.thermofisher.com/connect](http://www.thermofisher.com/connect)

After registration, connect your Multiskan SkyHigh to Thermo Fisher Connect to access the cloud-based tools. For more information, refer to the *Thermo Scientific™ Multiskan™ SkyHigh Technical Manual*.

The instrument collects statistical data on the used measurement types and parameters. When you connect the instrument to Thermo Fisher Connect, it sends all the statistical data that has been collected until that time.

To prevent the sending of the statistical data to the Thermo Fisher Connect, go to **Settings > Network & USB > Thermo Fisher Connect** and set the **Upload telemetry data** to OFF.

## Using SkanIt Software

This chapter describes the session tree which is the main part of the software user interface. You will find information on how to create sessions, view and export measurement results, perform calculations, and create data reports.

The general outline for using the software is:

1. Create a new session or open an existing one.
2. Define the plate layout and protocol.
3. Start the session.
4. View the results and perform calculations.
5. Create result report and export data.

## Sessions

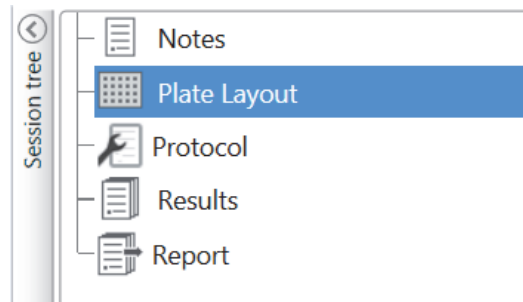
The information that is needed to define and run an assay is saved in a *session*. With SkanIt Software you can build sessions for your own assays and run or modify ready-made sessions.

## Session structure

The **Session tree** is the main use area in the software. The **Session tree** has five main sections:

1. **Notes** - write notes about a session.
2. **Plate Layout** - define which microplate format or type is used, and which wells of the microplate you want to measure.
3. **Protocol** - define what you want the instrument to do (for example, measure, shake).
4. **Results** - view the measurement results and choose your calculation methods.
5. **Report** - create a report of the measurement and calculation results.

Figure 11. Session tree.



## Create and save a session

1. Click the application menu tab.
2. Click the **New session** button under **New & Recent**.
3. Click **Save** in the **Home** ribbon.
4. In the **Save as session** window, select the folder where you want to save the session.
5. Give the session a name and click **Save**.

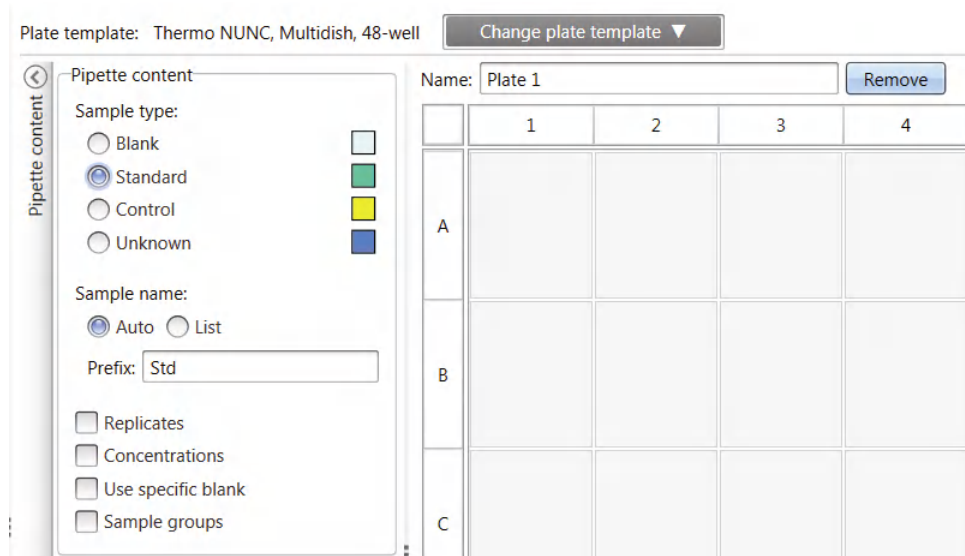
After the initial save, you can select **Save As** to save all protocols and measurement data with a new name. Select **Save As New** to save the protocols but not the measurement data.

## Plate layout

This is where you tell the software which wells to measure and what kind of samples you have in the microplate. The **Pipette content** section is where you define the sample properties. The virtual pipetting section is where you add the samples to the plate.

You can leave the plate layout empty. The instrument then measures the whole plate automatically.

Figure 12. Pipette content section (left.) and virtual pipetting section (right.) in the plate payout.



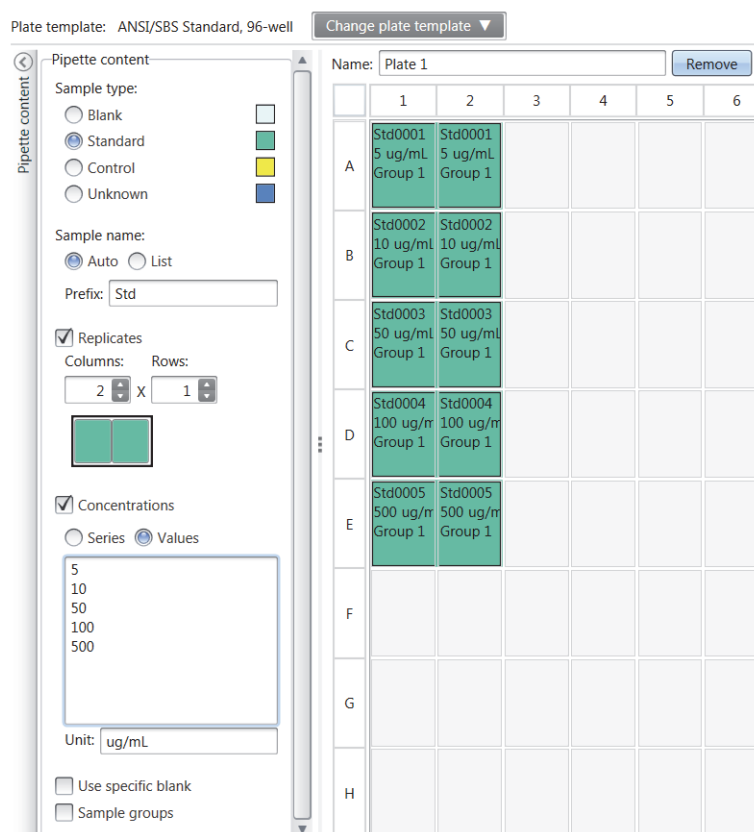
## Define the samples for the plate

1. Click **Plate Layout** in the **Session tree**.
2. Select the plate template from the drop-down list.
3. Select the **Sample type** and sample properties.
4. Click the plate wells with the virtual pipette (your cursor) to add the samples.

**Tip** You can add multiple samples at a time by dragging the pipette across the wells.

To clear or edit a well, right-click on the well.

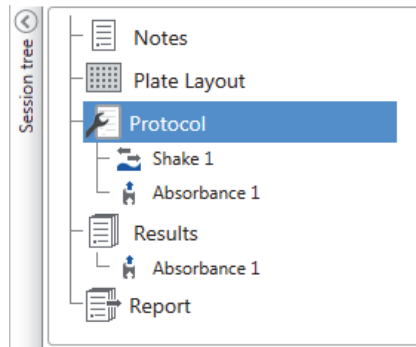
**Figure 13.** Example: To add a series of standard samples (concentrations 5, 10, 50, 100 and 500 µl/ml), with two replicates side by side, select the pipette content parameters as shown below, and add samples to the plate by painting the wells with the virtual pipette:



## Protocol

This is where you define which actions the instrument performs. The instrument runs the actions in the order as listed under the protocol.

**Figure 14.** In this example the instrument first shakes the plate, then measures the absorbance.

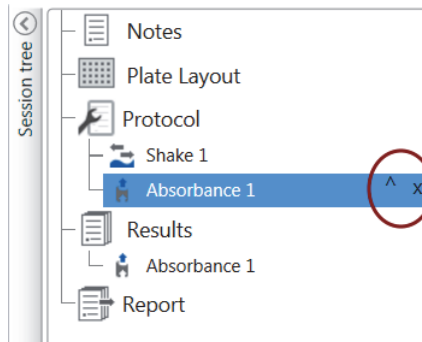


## Define a protocol

1. Click **Protocol** in the **Session tree**.
2. Select the action from the **Protocol** ribbon. The action appears in the **Session tree**.
3. Define the action parameters, such as the measurement wavelength.

To change the order of the actions, click the action you want to move, then click the small arrowhead to move it up or down.

**Figure 15.** To move the action up or down, click the arrowhead icon. To remove the action, click the x-mark.

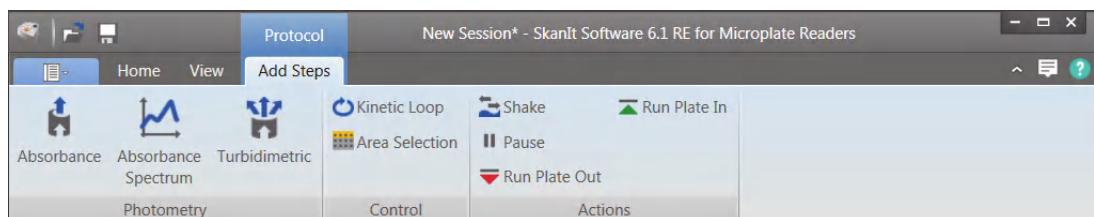


## Protocol actions

Select the protocol actions from the **Protocol** ribbon.

**Note** The software automatically detects the instrument configuration and shows only those actions that are available.

**Figure 16.** Protocol ribbon for adding actions.



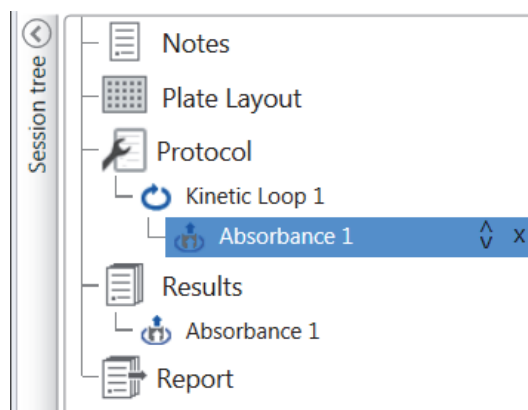


**Table 2.** Protocol actions and descriptions.

Action	Description
Absorbance	Measures the absorbance of light by the sample.
Absorbance Spectrum	Measures the absorbance spectrum for a wavelength range.
Turbidimetric	Measures the scattering of light by particles or other components on the sample.
Kinetic Loop	Executes sub-steps several times in defined time intervals in a kinetic measurement.
Area Selection	Executes sub-steps for only part of the defined wells in the plate layout. Area definition is not necessary when all of the defined wells in the plate layout are measured.
Shake	Shakes the microplate to mix the liquid in the wells.
Pause	Pauses the protocol.
Run Plate Out / In	Runs the plate in or out of the instrument.

**Tip** To perform a kinetic measurement, add the measurement step as a sub-step of the kinetic loop.

**Figure 17.** Example of a kinetic absorbance measurement.

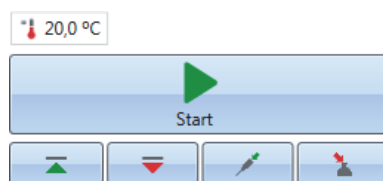


## Start a measurement

1. Click the **Start** button.

Click the temperature, if you want to set the incubation temperature.

**Figure 18.** The temperature and Start button.

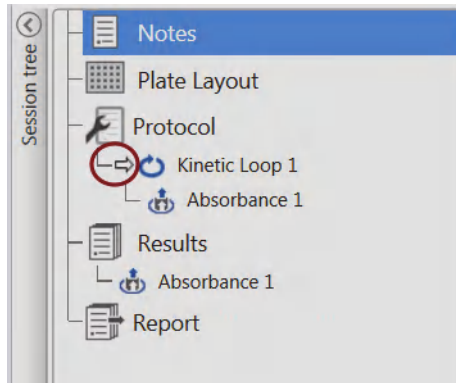


2. Write a name for the session in the **File Name** field.

This step is skipped if you have already saved the session from the **Home** ribbon.

3. Click **Save** to start the measurement. The software indicates the action it is running.

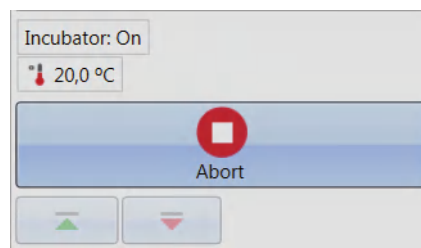
**Figure 19.** Ongoing measurement, the software indicates the action it is running.



4. Click the action under **Results** to watch the measurement results during the run.

If you need to stop the run, click **Abort**. The results measured up to that point are saved.

**Figure 20.** The Abort button.



**IMPORTANT** Do not open the measurement chamber door during a measurement.

## Results

This is where you can view the measurement results and perform calculations. You can also export measurement and calculation data to use outside SkanIt Software.

### View the results

1. Click the measurement step under **Results** in the **Session tree**.
2. Click the **Plate** or **List** tab to view the results.

**Figure 21.** Results of an absorbance measurement with the Plate view open.

		1	2
A	0,8682 Std0001	0,5482 Std0001	
B	0,4788 Std0002	0,4857 Std0002	

## Export results to Excel

1. In the **Results** view click on the **Export to Excel** tab.
2. Save the data.

**Tip** You can export the data of several steps into the same file by creating a report. You can create result reports in Excel, PDF, XML and TXT formats.

## Calculations

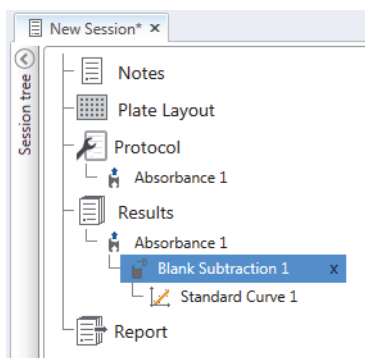
The software has built-in calculations that you can use to process data. You can add calculations either before or after a measurement. You can add several calculations to a measurement and also nest calculations.

The calculation uses the result data that is directly above it in the **Session tree**.

### Add a calculation

1. Select the results step in the **Session tree** that you want to use as the source data for the calculation.
2. Click the calculation action on the **Results** ribbon. The action appears in the **Session tree**.
3. Define the calculation parameters (if needed).
4. Click the **Plate** or **List** tab to view the calculation results.
5. Click **Save**.

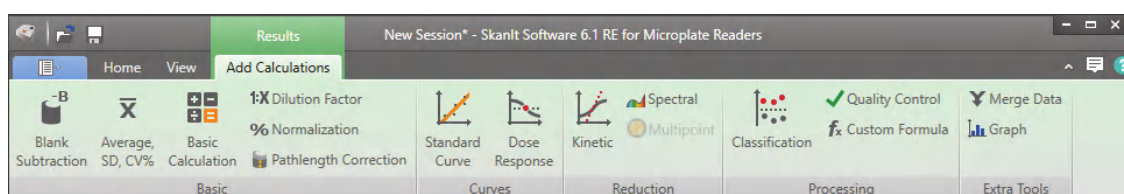
**Figure 22.** In this example the Absorbance measurement data is the source data for the Blank Subtraction calculation, and Blank Subtraction is the data source for Standard Curve.



## Calculation actions

Select the calculation actions from the **Results** ribbon.

**Figure 23.** Results ribbon for adding calculations.



**Note** Depending on the performed measurement, some of the actions in the results ribbon will be grayed out.

**Table 3.** Calculation actions and descriptions.

Action	Description
Blank Subtraction	Subtracts the average blank value from all of the samples.
Average, SD, CV%	Calculates the average, standard deviation (SD) and the coefficient of variation (CV%) of sample replicates.
Basic Calculation	Performs simple calculations, such as subtractions, multiplications and divisions.
Dilution Factor	Multiplies the results of the unknown samples by dilution factors defined in the plate layout.
Normalization	Normalizes the data of a sample group to a $B_0$ reference sample. The results are shown in percentages.
Pathlength Correction	Normalizes absorbance measurement data to correspond to a 10 mm pathlength (= standard cuvette).
Standard Curve	Calculates the concentrations of samples based on a standard curve generated from a standard sample series.
Dose Response	Calculates the concentration at which, e.g., 50% of a measured sample activity is achieved (= ED50).

**Table 3.** Calculation actions and descriptions.

Action	Description
Kinetic	Offers different kinds of calculations for kinetic data.
Spectral	Offers different kinds of calculations for spectral data.
Classification	Divides samples into separate categories based on user-defined limit values.
Quality Control	Checks the validity of the assay, e.g., against known control samples.
Custom Formula	Lets you create custom calculations.
Merge Data	Lets you merge several kinetic and/or endpoint measurements into a single kinetic data set.
Graph	Creates graphs from the result data.

## Report

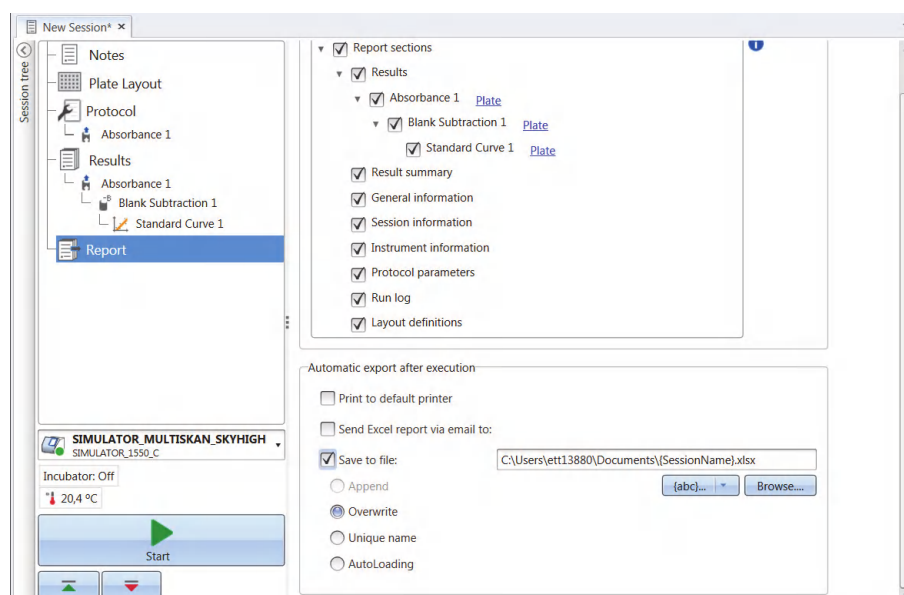
You can create a result report including both measurement and calculation data. You can export the result report to Excel, PDF, XML and TXT formats.

A summary table is automatically created under Report. The summary table shows only the measurement and calculation results of end-point measurements. Kinetic or spectral results are not included in the result summary.

You can export any data by selecting the individual result sections to the report.

### Create a data report

1. Click **Report** in the **Session tree**.
2. Check the sections you want to include in the report from the **Report sections** list.

**Figure 24.** Report pane open with Report sections checked.

## Export a result report manually

1. Click the PDF, Excel, XML, or TXT format on the **Results** ribbon to export the report.
2. Save the report.

The report automatically opens in the format you choose.

## Export a result report automatically

You can set the software to export the report automatically after the run to a specific destination.

Before you run a session, you need to select the report content and where to export the report.

1. Click **Report** in the **Session tree**.
2. Check the **Save to file** box in the **Automatic export after execution** pane.
3. Name the file and click **Browse** to select the destination folder and the file format.
4. Save the session.

The next time you start the session, a report is automatically saved in the destination folder you selected.

## Saved sessions

There are two different kinds of saved sessions:

- a. A session that is saved before you have run it.

A session that you have saved but have not run does not have measurement data. You can edit all of the content.

- b. A session that has been run.

A session that has been run is automatically saved. You cannot edit the protocol, but you can edit all other content. A green arrowhead icon next to a session name indicates a saved session with measurement data.

**Figure 25.** Session with measurement data (green icon) and without measurement data (no icon).



## Open an existing session

You can open a recent session, or an older session.

### Open a recent session

1. Click **New & Recent** on the application menu.
2. Select a recent session from the **Open recent session** list.

The session opens in the **Session tree**.

### Open an older session

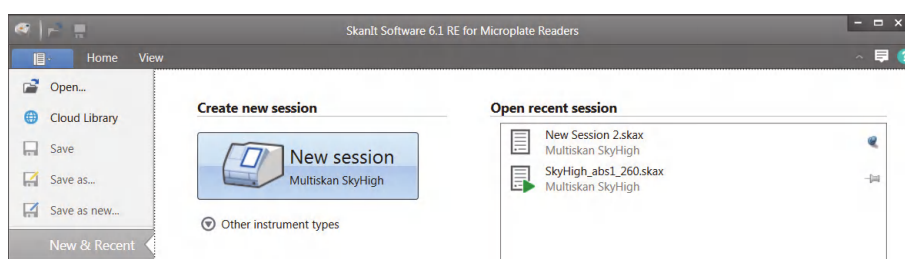
1. Click **Open** on the application menu.
2. Select the session from the pop-up window.

You can use **Search** to find a specific session quickly.

### Pin your favorite session

Click the recent session to pin it as a favorite session. The favorite session then stays on the recent session list.

**Figure 26.** In this example the first session under Open recent session is marked as favorite.



### Import a session

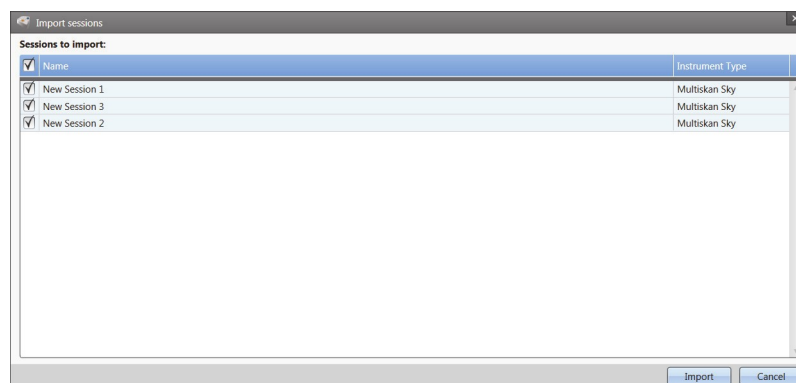
You can import a session, or multiple sessions, that have been created with older SkanIt Software. Files that can be imported have an \*.ska extension.

1. Click **Open** the application menu or **Home** tab.
2. Select the file type (.ska) from the drop-down list.
3. Select the session and click **Open**.

The **Import sessions** window opens.

4. Select the session(s) you want to import and click **Import**.

**Figure 27.** Session selection in the Import sessions window.



## 5 Using SkanIt Software

### Open an existing session

The software opens the imported session(s).

**Note** The \*.ska file can contain several sessions. Opening all the files at the same time could cause that the SkanIt Software goes in a non-responsive state.

5. Select **Save** to save the session(s) with a new name. Each session will be saved as a separate \*.skax file.

**Note** You can only save files in the \*.skax file format.



## Safety and Maintenance

This chapter includes the general and instrument safety guidelines and maintenance checklist.

### General specifications

**Table 4.** General specifications

Operating conditions	+10°C to +40°C; maximum relative humidity 80% for temperatures up to 31°C decreasing linearly to 50% relative humidity at 40°C Indoor use only.
Mains power supply	100–240 Vac, 50/60 Hz
Power consumption	Max. 110 W, typical operation < 27 W, Power Save < 10 W

### Safety specifications

**Table 5.** Safety specifications

Altitude	Up to 2,000 m
Temperature	+5°C – +40°C
Humidity	Maximum relative humidity 80% for temperatures up to 31°C decreasing linearly to 50% relative humidity at 40°C
Mains supply fluctuations	± 10% (if larger than specified above)
Installation category (overvoltage category)	II according to IEC 60664-1 (See Note 1)
Pollution degree	2 according to IEC 60664-1 (See Note 2)

**Note 1** The installation category (overvoltage category) defines the level of transient overvoltage which the instrument is designed to withstand safely. It depends on the nature of the electricity supply and its overvoltage protection means. For example, in CAT II which is the category used for instruments in installations supplied from a supply comparable to public mains, such as hospital and research laboratories and most industrial laboratories, the expected transient overvoltage is 2500 V for a 230 V supply and 1500 V for a 120 V supply.

**Note 2** The pollution degree describes the amount of conductive pollution present in the operating environment. Pollution degree 2 assumes that normally only nonconductive pollution, such as dust, occurs with the exception of occasional conductivity caused by condensation.

## Maintenance checklist

**Table 6.** Maintenance checklist

Maintenance	Daily	Weekly	Yearly	If required
Ensure proper shutdown.				•*
Keep the instrument free of dust.	•			
Wipe away spilled saline solutions, solvents, acids or alkaline solutions from outer surfaces immediately to prevent damage, and wipe with deionized distilled water.	•			
If any surfaces have been contaminated with biohazardous material, disinfect with a mild sterilizing solution.**	•			
Clean the case of the instrument periodically.		•		
Clean the plate carrier and cuvette port when necessary.		•		
Perform verification with the Spectrophotometric Verification Plate.			•	
Decontaminate the instrument when relocating the instrument or sending it for service.**			•	•
Service the instrument regularly.			•	

\*To save energy, it is recommended to shut down the instrument for the weekends. Thermo Fisher Scientific reserves the right to change any specifications without prior notice as part of our continuous product development program.

\*\*For detailed decontamination instructions, refer to the *Thermo Scientific™ Multiskan™ SkyHigh Technical Manual*.