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Multiskan™ Ease Absorbance Microplate Reader

USER GUIDE

Catalog Numbers ME001000C and ME002000C

Publication Number MAN1001753

Revision A



For Research Use Only. Not for use in diagnostic procedures.

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Thermo Fisher Scientific (Guangzhou) Biotechnology Company, Ltd. | Block B3 1-5F, Block B4 1-4F | No.77 Kang Zhao 2nd Road | Huangpu District, Guangzhou, China

For descriptions of symbols on product labels or product documents, go to thermofisher.com/symbols-definition.

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The information in this guide is subject to change without notice.

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Preface

This manual is for the following instruments:

- Multiskan™ Ease Absorbance Microplate Reader – Cat. No. **ME001000C**
- Multiskan™ Ease Absorbance Microplate Reader without touchscreen – Cat. No. **ME002000C**

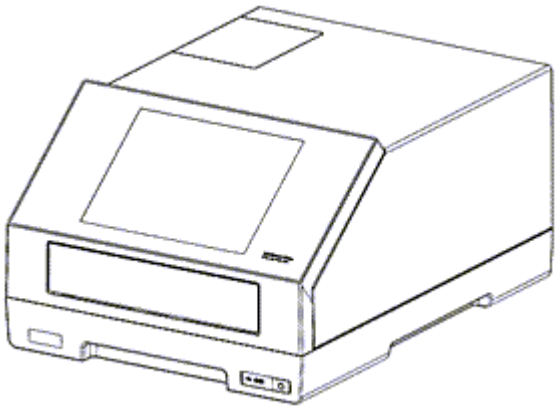


Figure 1 (a). ME001000C



Figure 1 (b). ME002000C

Figure 1 Multiskan™ Ease Absorbance Microplate Reader

Use Multiskan™ Ease as standalone (**ME001000C**) or with Thermo Scientific™ SkanIt™ Software. Multiskan™ Ease 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™ Ease.
- Navigate in the Multiskan™ Ease User Interface.
- Install and use SkanIt™ Software.

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.

1 Product information

Product description

The Thermo Scientific™ Multiskan™ Ease Absorbance Microplate Reader is a high-quality filter-based microplate photometer. It is used to measure absorbance from appropriate 96- or 384-well plate formats in the wavelength range of 400–760 nm. The instrument also has incubating and shaking capabilities and can be integrated into automation environments.

This instrument has two modes, and the differences between these two modes are as follows:

Description	ME001000C	ME002000C
Plate support	96 and 384 wells, w and w/o lid	96 wells, w and w/o lid
Absorbance, turbidimetric measurement	√	√
Linear shaking	√	√
SkanIt Software supported	√	√
Incubator	√	–
Touchscreen	√	–
USB host	√	–
Ethernet	√	–
Microsoft™ One Drive™	√	–

Note: The pictures in the manual are based on the **ME001000C** model. The content related to touchscreen UI and incubator is not applicable to the **ME002000C** model.

Instrument overview

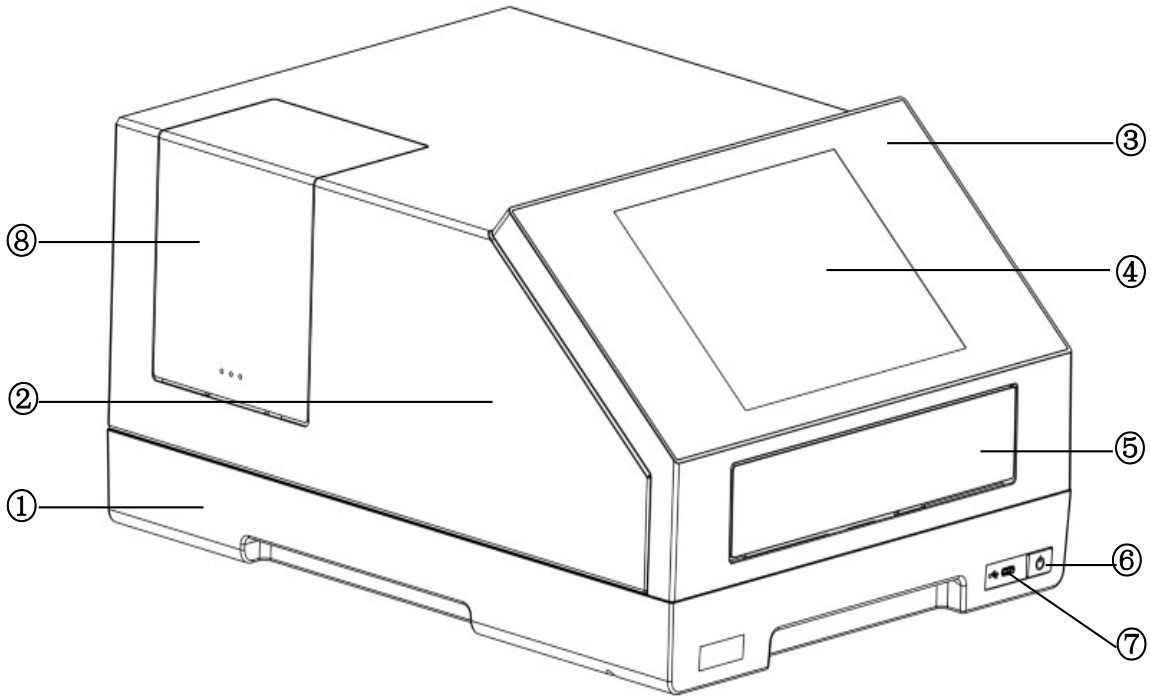


Figure 2 Front view of the Multiskan™ Ease Absorbance Microplate Reader

① Base
② Housing
③ Front panel
④ Touchscreen (**ME001000C** only)
⑤ Measurement chamber door
⑥ Power switch
⑦ USB-C connector (**ME001000C** only)
⑧ Filter wheel chamber door

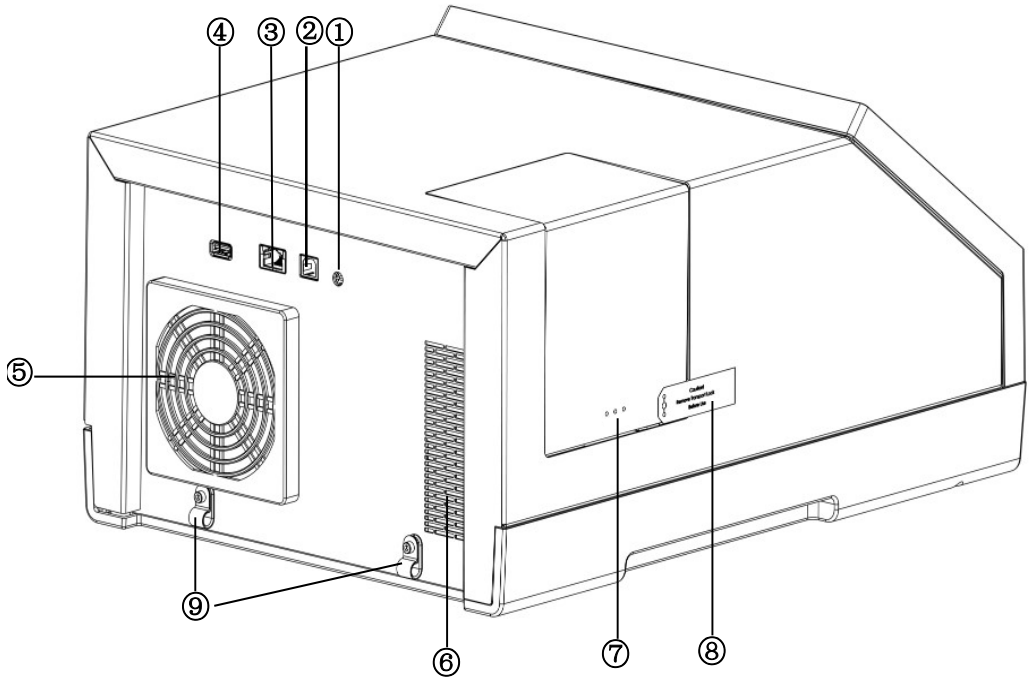


Figure 3 Rear view of the Multiskan™ Ease Absorbance Microplate Reader

① Power supply connector
② USB-B connector
③ Ethernet connector (**ME001000C** only)
④ USB-A connector (**ME001000C** only)
⑤ Cooling fan outlets
⑥ LED cooling fan outlet
⑦ Filter wheel chamber door
⑧ Label of the transport lock
⑨ Locking piece of the transport lock

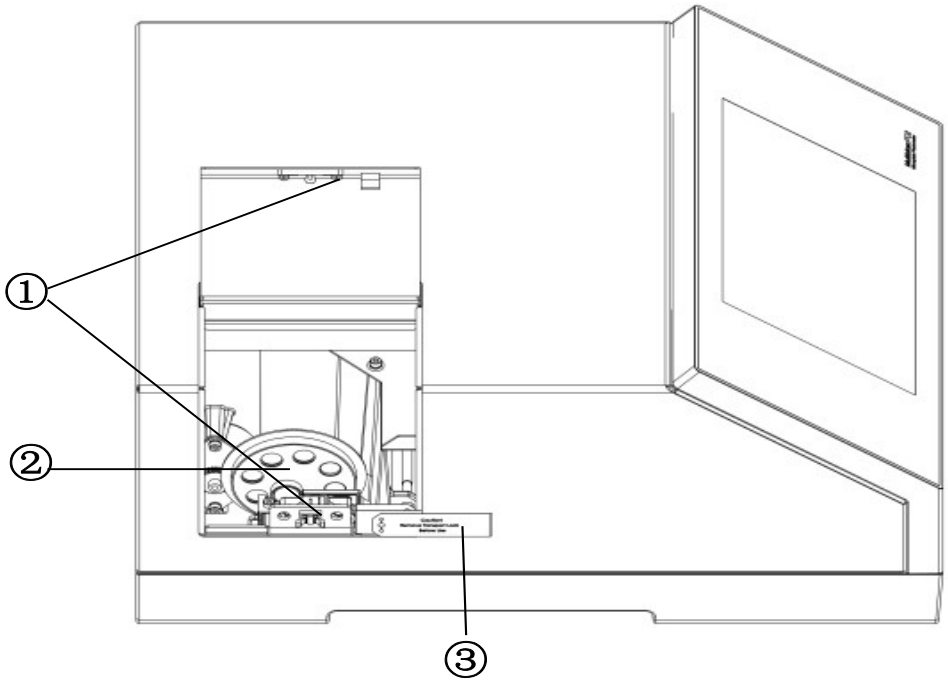


Figure 4 Internal view of the Multiskan™ Ease Absorbance Microplate Reader

1. Filter wheel chamber door lock
2. Filter wheel
3. Label of the transport lock

Principle of operation

The principle of the Multiskan™ Ease Absorbance Microplate Reader optical measurement is shown in below Figure 5. The instrument reads from bottom to top. The exact wavelength of the white LED used by the instrument is selected using interference filters in the rotating filter wheel. The light is guided to the microplate optics through an optical fiber. The measurements are conducted through the well.

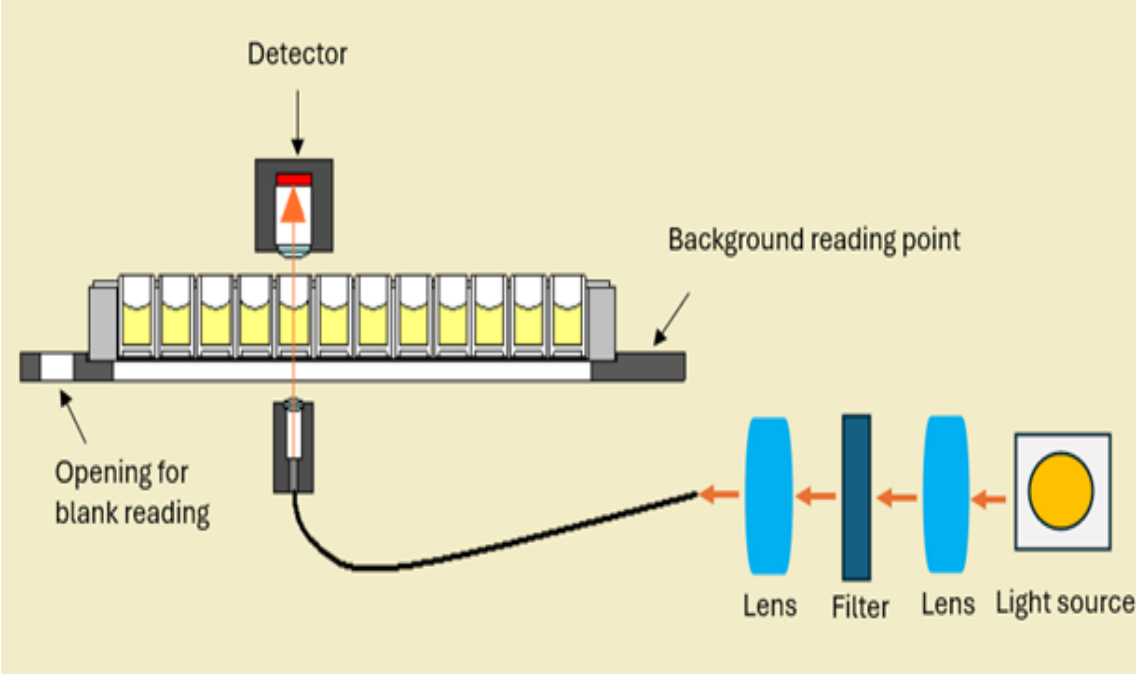
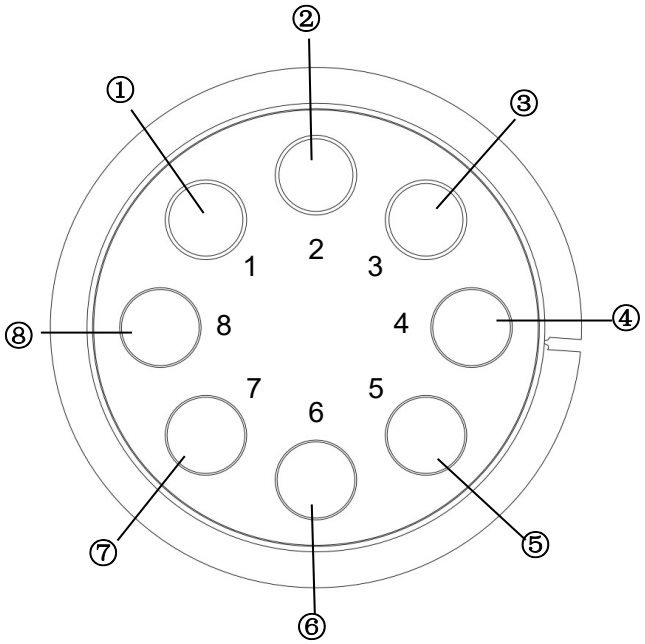


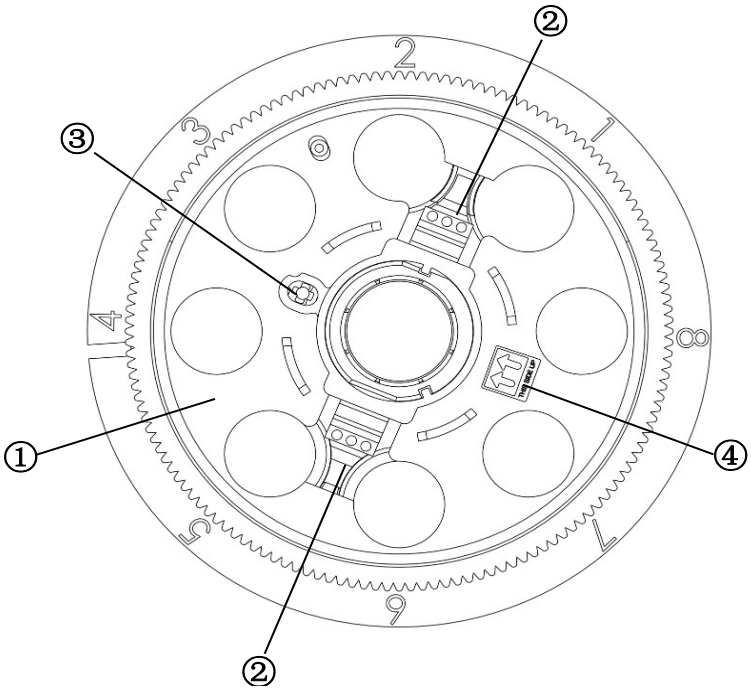
Figure 5 Principle of operation

In microplate measurement, the track moves to select the well row, and the measurement head moves to select the well column. Blank (air) and dark level measurements are required to calculate absorbances. These measurements are performed once for each measured row. The instrument moves the microplate aside to measure the blank and dark automatically.



① Default filter slot (center wavelength: 405nm)
② Default filter slot (center wavelength: 450nm)
③ Default filter slot (center wavelength: 620nm)
④ User defined filter slot
⑤ User defined filter slot
⑥ User defined filter slot
⑦ User defined filter slot
⑧ User defined filter slot

Figure 6 Front of the filter wheel



① Filter wheel cover used to fix filters
② Filter wheel cover lock
③ Filter wheel cover positioning hole
④ A mark used to indicate that this side is up

Figure 7 Back of the filter wheel

2 Set up the instrument

The following installation steps must be performed before the instrument is operated.

- Remove the transport lock.
- Connect the mains supply cable.
- You can operate the instrument by internal touchscreen UI.
- To operate the instrument by SkanIt™ Software, connect the instrument to a computer and install the SkanIt™ Software for Microplate Readers to the computer connected to the instrument.

Remove the transport lock

1. Remove the tape from the filter wheel chamber door on the left side of the instrument and from the plate carrier door on the front side of the instrument.
2. Open the filter wheel chamber door by clicking three dots ①.

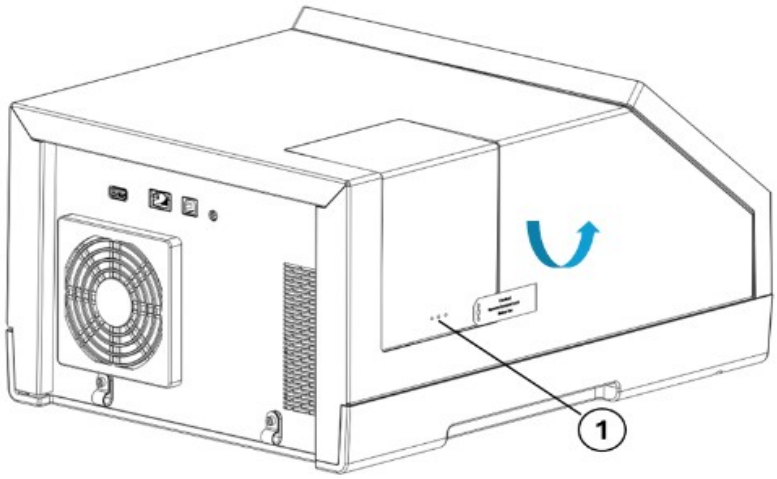


Figure 8 Three dots

The transport lock ② will be found on the right side of the filter wheel.

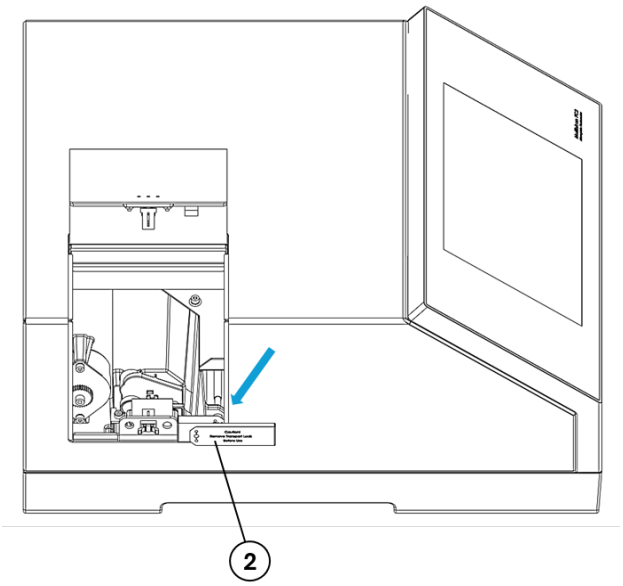


Figure 9 Transport lock

3. Loosen the fixing screws and remove the transport lock ③ from the filter wheel chamber, then insert the end of the transport lock into the hole at the end of the warning tag, securing the tag onto the transport lock.

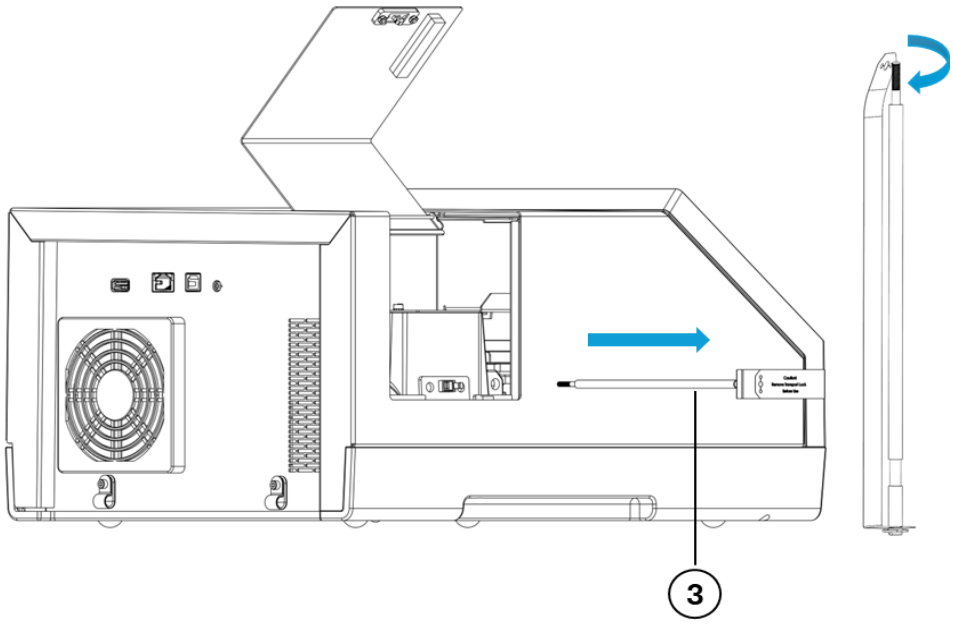


Figure 10 Transport lock

4. Loosen the fixing screws of the right transport lock holder ring ④, then insert one end of the transport lock into the left holder ring and place the other end into the opened right holder ring.

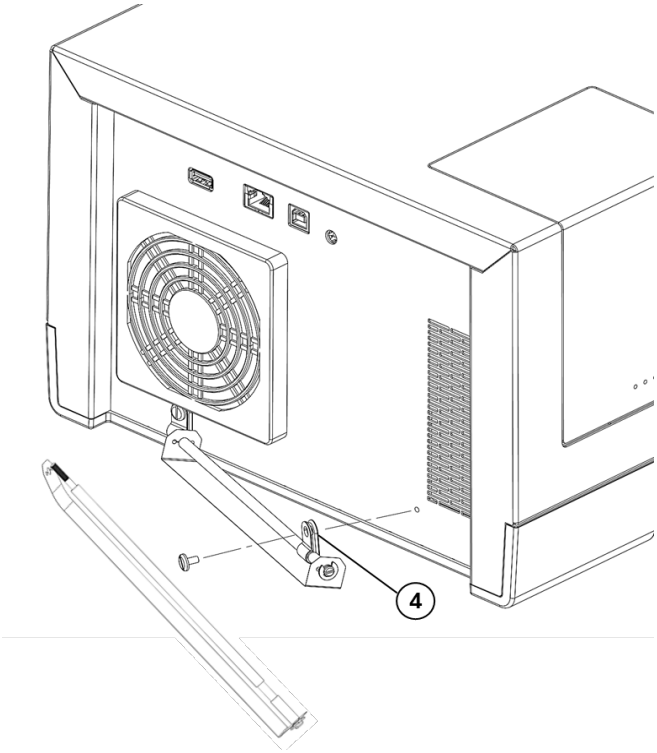


Figure 11 Transport lock holder ring

5. Tighten the screws of the transport lock holder ring and secure the transport lock on the back of the instrument for future use.

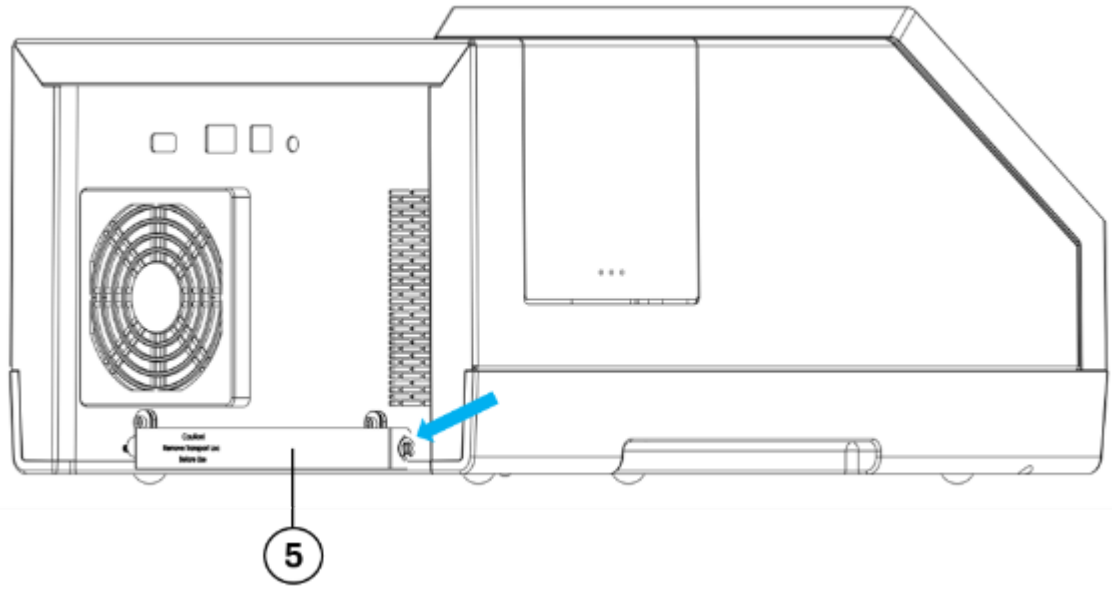


Figure 12 Attach the transport lock

Connect the mains supply cable

1. Connect the power supply cable to the AC-to-DC power adaptor, then plug the output of the AC-to-DC power adaptor into the power supply connector on the back panel. The input range is 100-240 Vac, 50/60 Hz, nominal.

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

CAUTION! Do not connect the power supply to a power outlet line before plug the output of the AC-to-DC power adaptor in the power supply connector on the back panel.

2. Connect the power supply to a correctly installed line power outlet with a grounded conductor.

CAUTION! Do not operate the instrument from a power outlet that has no ground connection.

3 Instrument operation

The instrument can be operated through the internal touchscreen UI and the Thermo Scientific™ SkanIt™ Software.

To operate the instrument using SkanIt™ Software, you should first install the software (see “Install the SkanIt™ Software” on page 18).

IMPORTANT! Do not operate the instrument when it is disassembled.

Guidelines for operating the instrument

CAUTION! Do not operate the instrument from a power outlet that has no ground connection.

CAUTION!

- Do not smoke, eat, or drink while using the instrument.
- Wash your hands thoroughly after handling test fluids.
- Observe standard laboratory procedures when handling potentially hazardous samples.
- Wear proper protective clothing and disposable gloves.
- Ensure that the working area is well-ventilated.
- Do not spill fluids in or on the equipment.

IMPORTANT! Operate the instrument only with software and hardware specifically designed for it. Thermo Fisher Scientific assumes no liability for the use of third-party software applications.

IMPORTANT! When the instrument is connected to SkanIt™ Software, the software automatically updates the date and time of the instrument according to the computer clock.

IMPORTANT! It is recommended to include internal quality control samples in the assay to verify operation.

Switch on the instrument

IMPORTANT! Before switching on the instrument, ensure that all the cables are properly connected and fitted according to the installation instructions.

The power switch is located on the front cover of the instrument. Press the switch to power on the instrument.

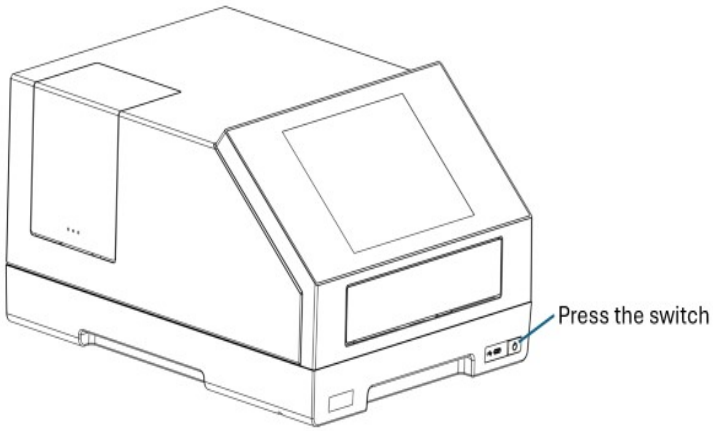


Figure 13 Power switch

Start up the instrument

When you switch on the instrument, it automatically performs a self-diagnostic check. It performs a set of initialization tests and adjustments.

The instrument also carries out mechanical, electrical, and optical checks, such as:

- File system check
- Plate startup check
- Head startup check
- Filter wheel startup check
- PD startup check
- Optical signal check
- LED intensity calibration for all filters and check
- Head offset calibration and check
- Track offset calibration and check
- Heating sensors check(**ME001000C** only)

When the instrument starts up successfully, the plate extends to indicate that the instrument is ready for use.

Note: It is further recommended to perform an empty 96-well plate run to verify proper instrument operation.

IMPORTANT! Do not switch off the instrument during start up and self-diagnostics.

Control switching

While power-on, the touchscreen UI automatically attempts to get control. After the touchscreen UI successfully gets control, you can switch control between the touchscreen UI and SkanIt™ Software.

If the instrument is idle and controlled by the touchscreen UI, opening the SkanIt™ Software automatically transfers control to the software.

If the instrument is idle and controlled by SkanIt™ Software, the touchscreen UI automatically displays a **Take Control** button. Pressing this button transfers control of the instrument to the touchscreen UI.

Note: Control can only be switched when the instrument is in an idle state. If the instrument is busy, control cannot be switched.

Operation by touchscreen UI

The instrument (only Cat. No. **ME001000C**) can be operated independently using the internal touchscreen UI.

For more information to operate the instrument, see Chapter 4, “Internal touchscreen UI”.

Operation by SkanIt™ Software

Install the SkanIt™ Software

Install the SkanIt™ Software for Microplate Readers on the computer.

For installation instructions, see the SkanIt™ Software for Microplate Readers Quick Reference.

For more information about the software, see the SkanIt™ Software for Microplate Readers User Guide.

Optical filter management

The Multiskan™ Ease Absorbance Microplate Reader has 3 factory-installed filters for photometric measurements, and 5 open filter positions are available in the filter wheels for accessory filters. Accessory filters should be installed according to your specific applications.

Several accessory filters are available for purchase; see **Ordering Information**.

Table 1 Factory installed filter pair specifications

Filter name	Wavelength	Usage
Abs405	405 nm	• Alkaline phosphatase (AP) detection • Enzyme activity detection • Turbidimetric method for endotoxin detection

Table 1 Factory installed filter pair specifications *(continued)*

Filter name	Wavelength	Usage
Abs450	450 nm	• Most ELISA kits detection (using Horse Radish Peroxidase (HRP) - Tetramethylbenzidine (TMB) reaction) • XTT cell viability assay • BCA protein quantification
Abs620	620 nm	• Bacterial growth curve measurement • Background correction in dual-wavelength detection (ELISA and endotoxin detection)

Add filters into filter wheel

1. Open the filter wheel chamber door, then remove the filter wheel.
   The filter wheel is fixed by magnetic suction and can be removed with a little force.

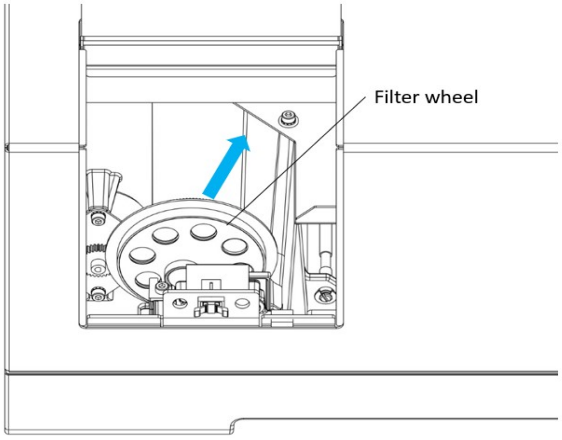


Figure 14 Filter wheel

2. Filter wheel cover is on the back of the filter wheel. Press the filter wheel cover lock inward to open the filter wheel cover.

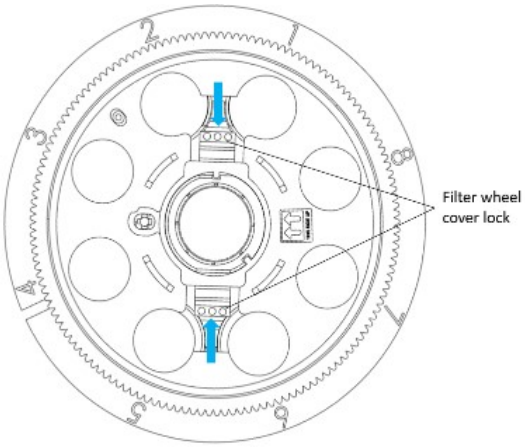


Figure 15 Open the filter wheel cover

3. Default filters are installed in slots 1,2,3, and accessory filters can be installed in slots 4–8.

   It is recommended to attach filters in the order of slot positions. For example, add accessory filter 1 into slot 4, and add accessory filter 2 into slot 5. The arrow on the filter ring is in the same direction as the arrow on the filter wheel.

4. Once all the necessary filters are installed, close the cover of the filter wheel, then press the filter wheel cover lock outward to fix the filter wheel cover.

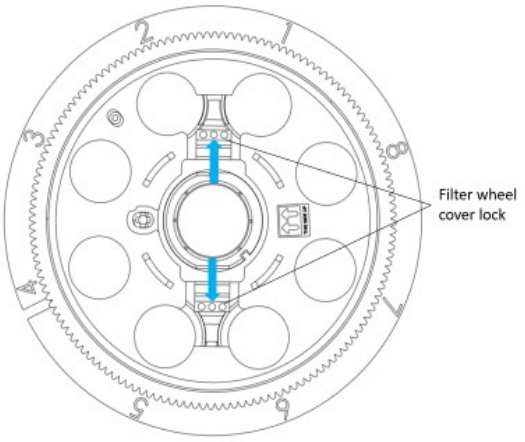


Figure 16 Close the filter wheel cover lock

Note: Do not touch the filter surfaces with your bare hands.

Add filters via touchscreen UI

Note: Before adding filters via touchscreen UI, ensure that the filters are already installed in the filter wheel.

For adding filters by touchscreen UI, see “Change filter settings” on page 30.

Add filters via SkanIt™ Software

Note: Before adding filters via SkanIt™ Software, ensure that the filters are already installed in the filter wheel.

1. Open the SkanIt™ Software, then the software automatically identifies the connected instrument if it is idle.
2. Select **Menu** to open the **Application** menu, then select **Settings** to open the **Edit application settings** window.

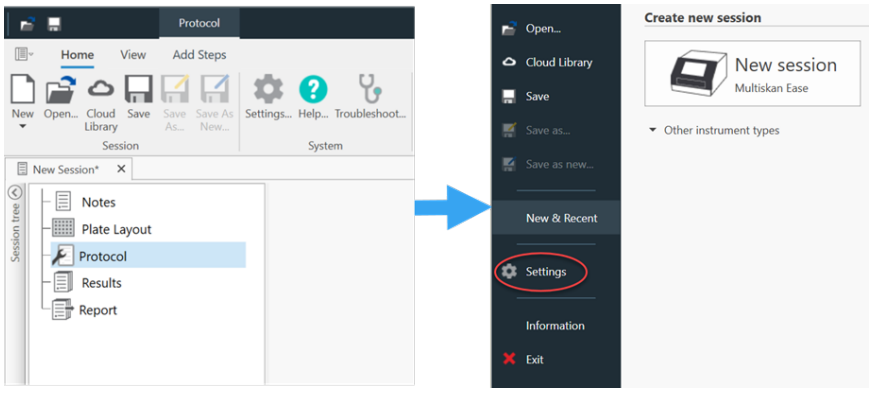


Figure 17 Menu ▸ Application ▸ Settings

3. Select **Instruments** to open the **Edit application setting** window.
   Currently connected instruments are shown in the **Instruments** list.

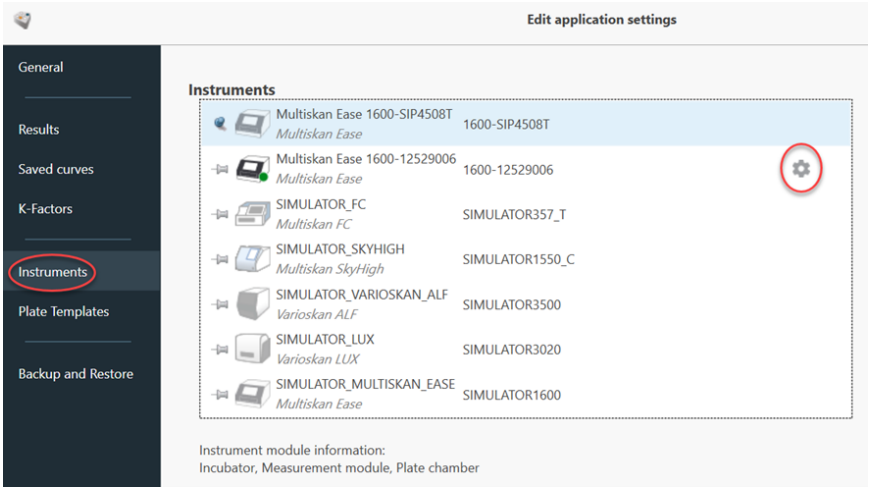


Figure 18 Edit application setting

4. Select **Settings** to open the **Edit instrument parameters** window.

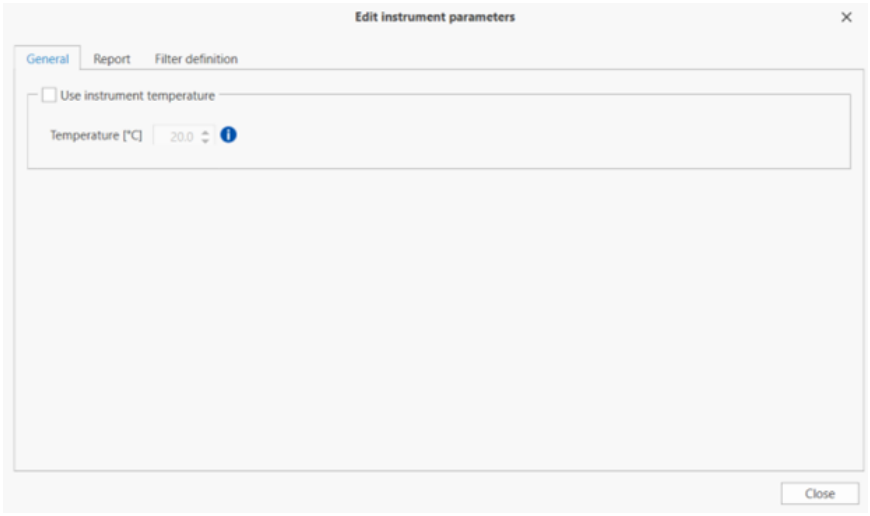


Figure 19 Edit instrument parameters

5. Select the **Filter definition** tab of **Edit instrument parameters** window to add accessory filters.

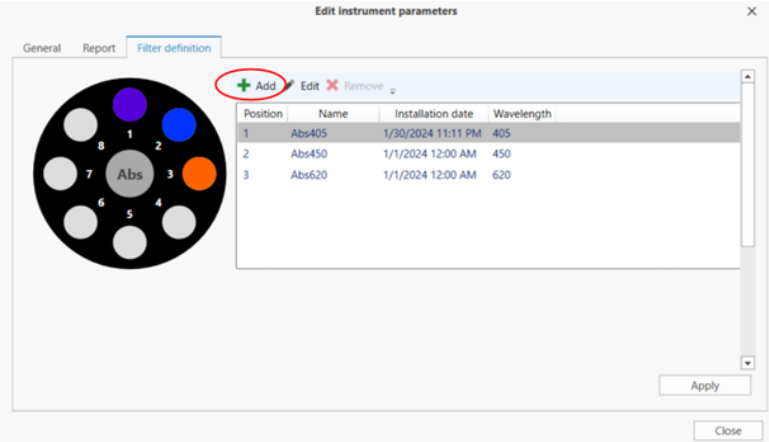


Figure 20 Filter definition

6. Click **Add** to add filters. **Add new filter** message box is displayed. Enter **Position**, **Name**, and **Wavelength** of the filter, then click **OK**.

   This new filter will be displayed in the filter list. Add the remaining filters one by one using this method until all required filters have been added.

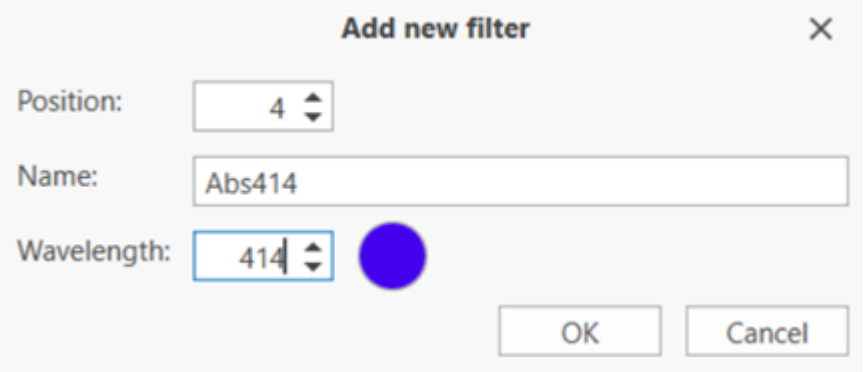


Figure 21 Add new filter

7. Click the **Apply** tab, then the instrument automatically completes the initial configuration for the newly added filters.

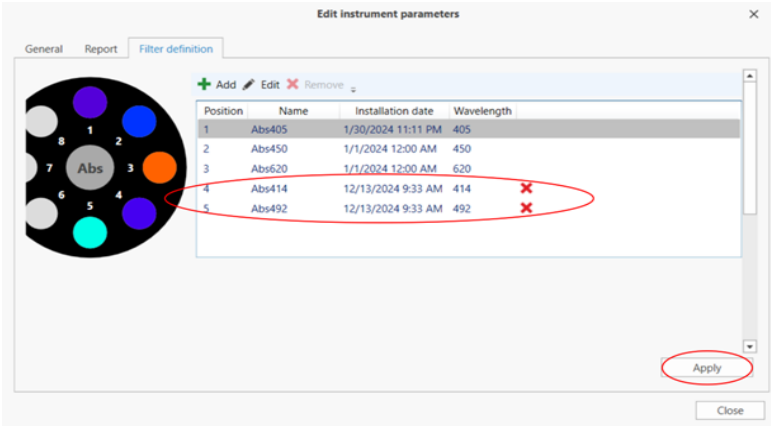


Figure 22 Edit instrument parameters

All these newly added filters are shown in the wavelength list, and now all new added filters are available for use.

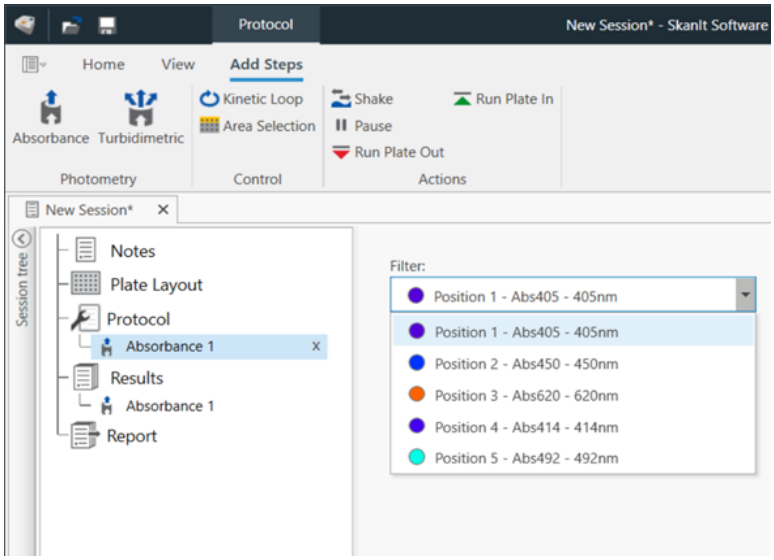


Figure 23 Filter list

Instrument temperature

For setting the instrument temperature from touchscreen UI, see “Incubator control” on page 31.

You also can set the instrument temperature from the SkanIt™ Software.

1. When a measurement session is open, click the temperature icon above the **Start** button.
2. Check the **Temperature** box and set the required temperature.
3. Click **OK**.

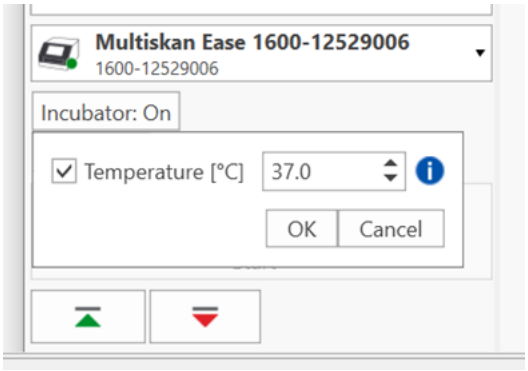


Figure 24 Set temperature

Note: The software shows both the current and target temperatures until the target temperature is reached.

Switch off the instrument

IMPORTANT! Power off the instrument after daily use.

1. Run the plate tray from SkanIt™ Software or from the touchscreen UI.
2. Press and hold the power switch on the front panel of the device for 5 seconds to power off the instrument.
3. To switch off **ME001000C**, tap **Main** menu ▸ **Power OFF** on the touchscreen UI.

4 Internal touchscreen UI

Initial setup steps

Upon initial power-on, the user interface guides the user through the following four setup steps:

1. **Language**: Select the system language from the list.

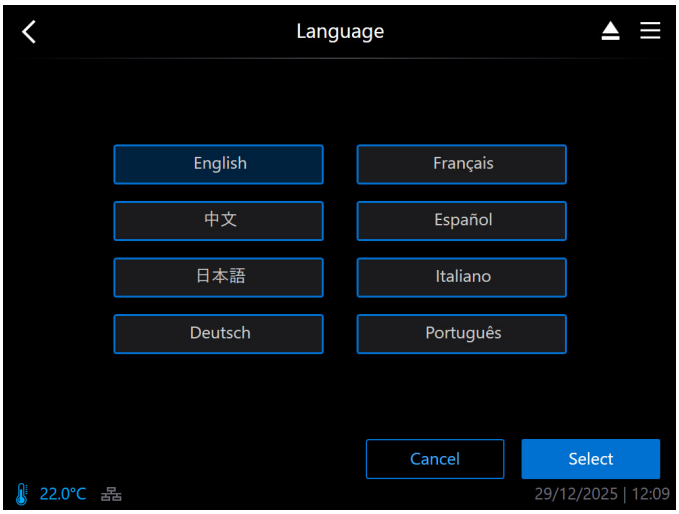


Figure 25 Language

2. **End User License Agreement**: Read and accept the End User License Agreement (EULA).

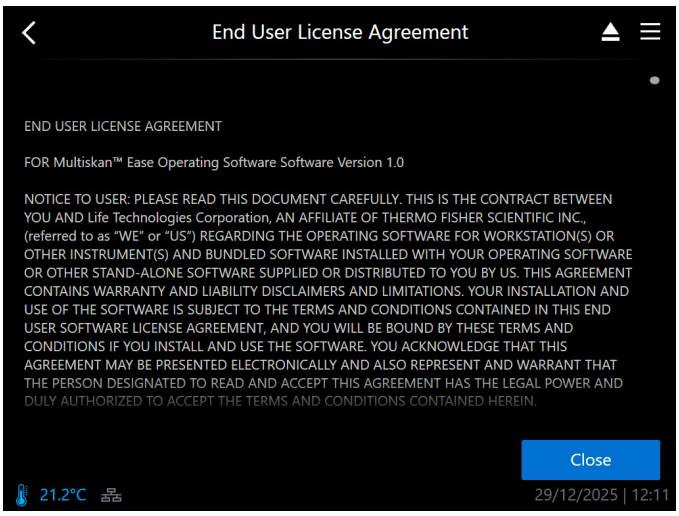


Figure 26 End User License Agreement

3. **Network Configuration** *(optional)*: Connect the instrument to a local network or map a network drive through the server configuration.

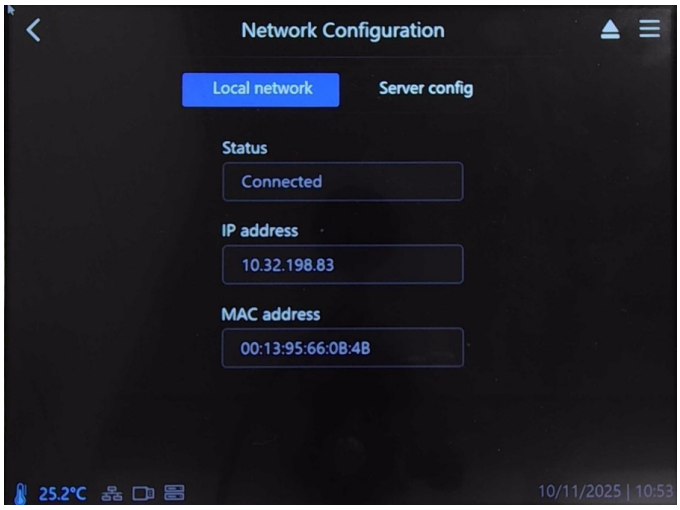


Figure 27 Local network

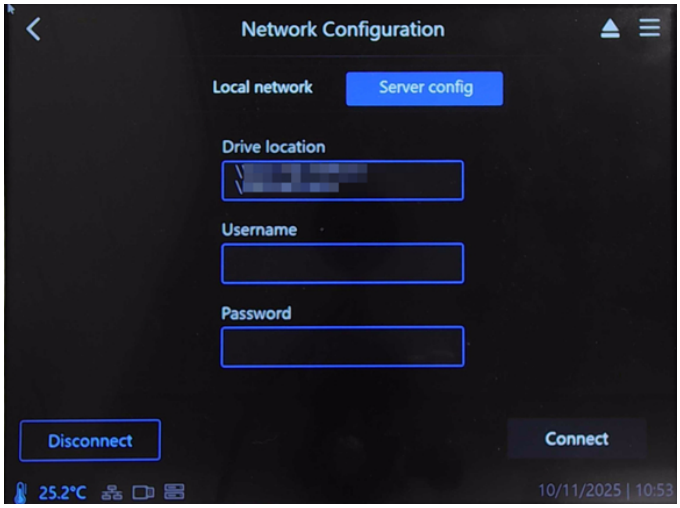


Figure 28 Server configuration

4. **Time Zone, Date and Time**: Adjust and set the time zone, date and time as well as their display formats.

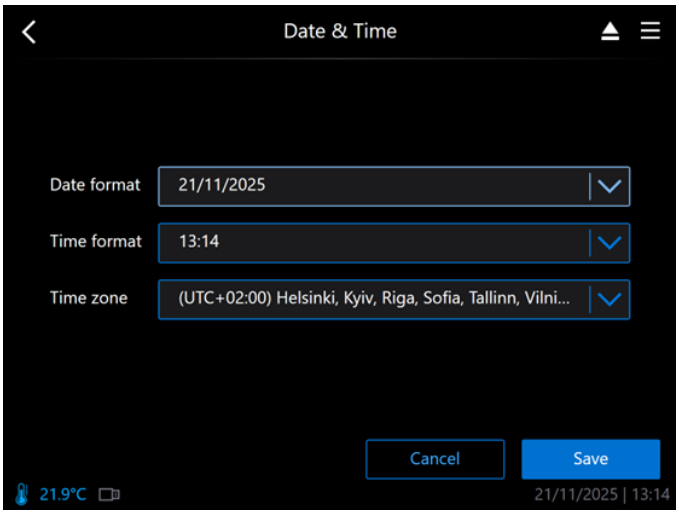


Figure 29 Time Zone, Date and Time

The user interface will indicate when the setup is complete, then the instrument will be ready for use.

Note: The operational system running the user interface does not allow the date and time setting to be set for a long period of time backwards. In such case, date and time setting will be restored at the next start-up.

Main view

The GUI of the system consists of the **Main view** with tray eject and main **Menu** in the top right corner, three quick controls in the middle, and several instrument status indicators in the bottom.

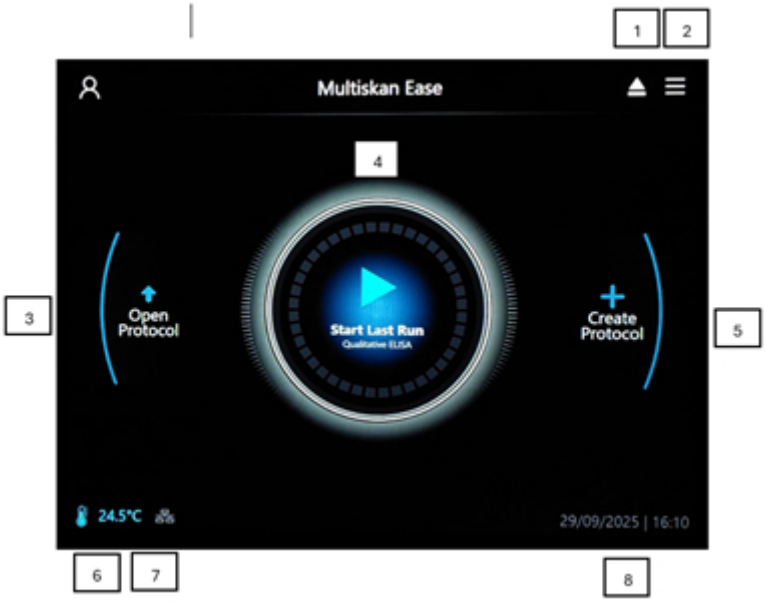


Figure 30 Main view

① Plate in/out
② Main menu
③ Quick access existing protocols
④ Quick run the last executed protocol
⑤ Quick create a new protocol
⑥ Instrument temperature
⑦ Network connection status
⑧ Date and time

General settings

To change internal software settings, open **Settings** in the main **Menu** at the top right corner of the main view:

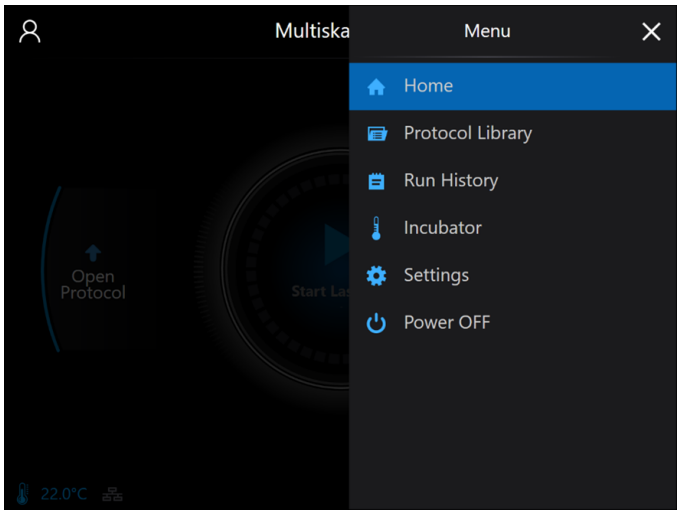


Figure 31 Settings

In the **Settings** menu, the user can modify the **Date & Time**, **Language**, **Network configuration**, and **Filter setup**. Instrument information can be exported using **Instrument Export** and viewed by tapping **About Instrument**. For more details about settings, see the Multiskan™ Ease Absorbance Microplate Reader Technical Guide.

Change filter settings

The instrument is shipped with 3 factory-installed filters for photometric measurements, and 5 open filter positions are available in filter wheels for accessory filters. Accessory filters should be installed according to your specific applications. Several accessory filters are available for purchase (see Ordering Information). Default filters are installed in slots 1–3, and accessory filters can be installed in slots 4–8.

1. Tap **Menu** ▸ **Settings**, then click **Filter setup**.
2. Tap on any element on filter wheel to change filter **Name**.
3. Tap **Wavelength (nm)** to save accessory filter wavelength.

   Note: Factory installed filter wavelengths cannot be changed.

   Note: Only one filter with the same wavelength can be installed in the instrument.
4. Select a filter, then click **Remove** to remove the filter.

   Note: Factory installed filters cannot be removed.

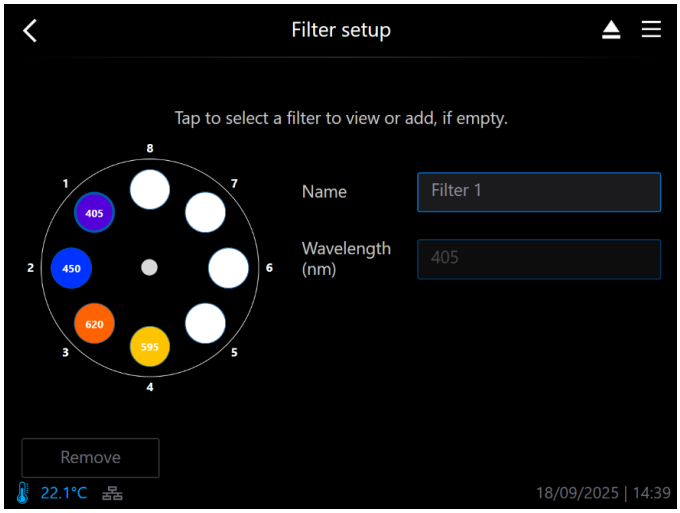


Figure 32 Filter setup

Incubator control

To access the incubator control, tap **Menu ▸ Incubator** or tap the temperature displayed in the lower left corner of the main view.

1. Click **Menu ▸ Incubator** to power on the incubator.

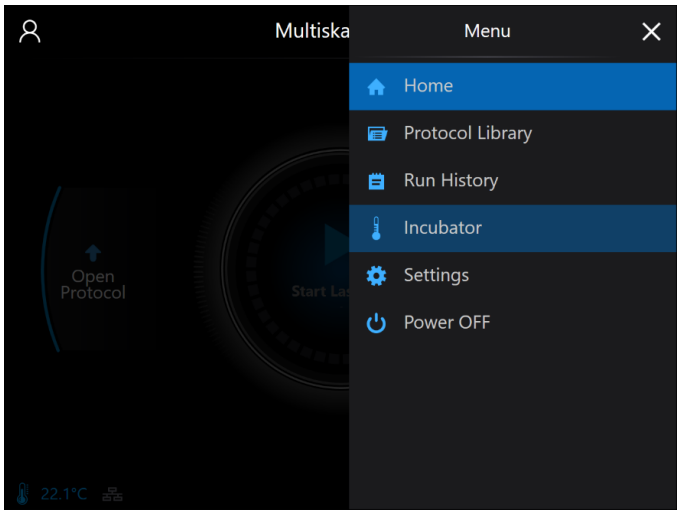


Figure 33 Menu ▸ Incubator

2. Alternatively, tap the temperature displayed in the lower left corner of the main view to access the incubator controls.



Figure 34 Main view

3. Switch **On** from **Off** to enable the incubator, then set the **Target temperature** (°C).

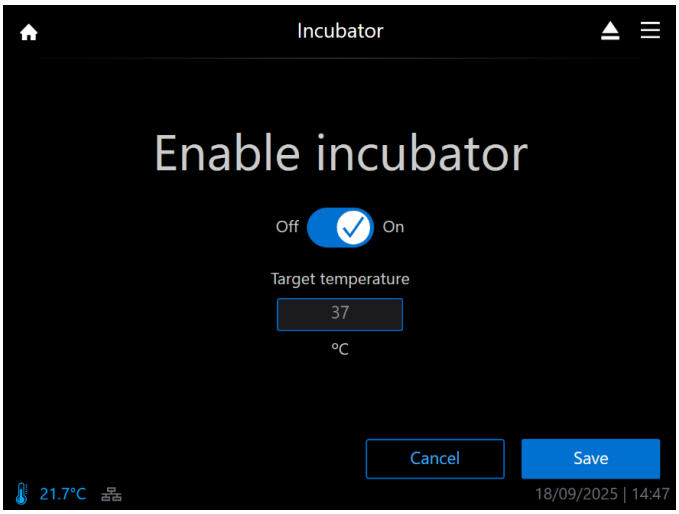


Figure 35 Target temperature

4. Tap **Save**.

Create and save a protocol

1. Create new protocols using one of the following options:
   a. Select **Create Protocol** in the main view.



Figure 36 Main view

   b. Go to **Menu** ▸ **Protocol library**, then click **Create new**.

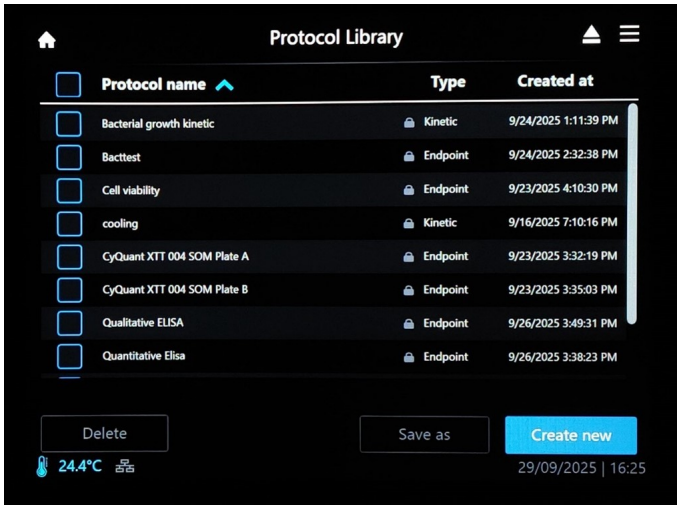


Figure 37 Protocol library

2. To create a protocol, first choose between **Endpoint** and **Kinetic** measurement.

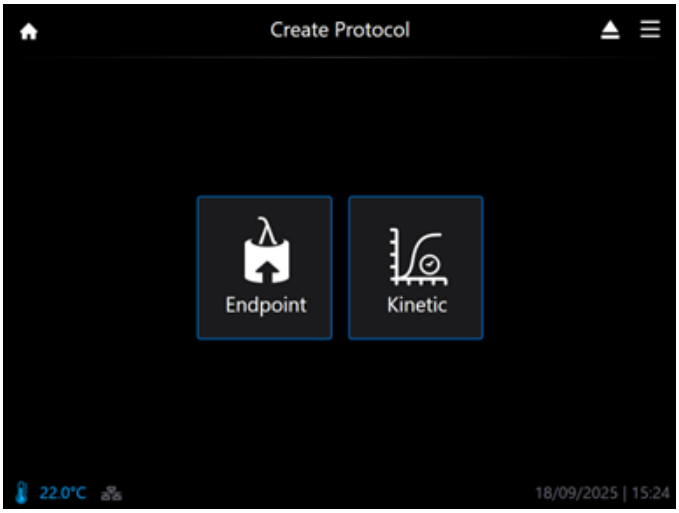


Figure 38 Create Protocol

Endpoint measurement protocol

To create an **Endpoint** measurement protocol, there are three tabs with different measurement related options: **Parameters**, **Plate layout**, and **Calculation**.

Parameters

In the **Parameters** tab, user can configure the **Protocol name**, select the desired **Filter** (from the installed filters) and the **Reference** filter *(optional)*, enable or disable **Shaking**, and specify the **Shaking time**.

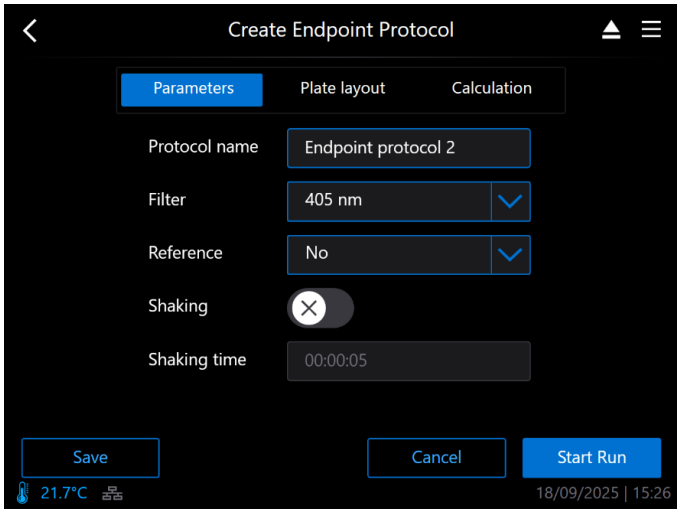


Figure 39 Parameters

Note: Shaking time minimum is 5 seconds and maximum is 4 hours, 59 minutes, 59 seconds.

Plate layout

In the **Plate layout** tab, user can configure the location of the following sample types: **Blank**, **Control**, **Standard**, and **Unknown**.

- **Blank**: Blank is the sample that represents the background absorbance level, typically contains assay buffer and reagents without the analyte. User can define unlimited number of replicates for the blank.

  Select sample type blank, then tap the first blank well, then hold and drag to add blank replicates. User can add blank wells also in various locations by tapping each blank well separately.

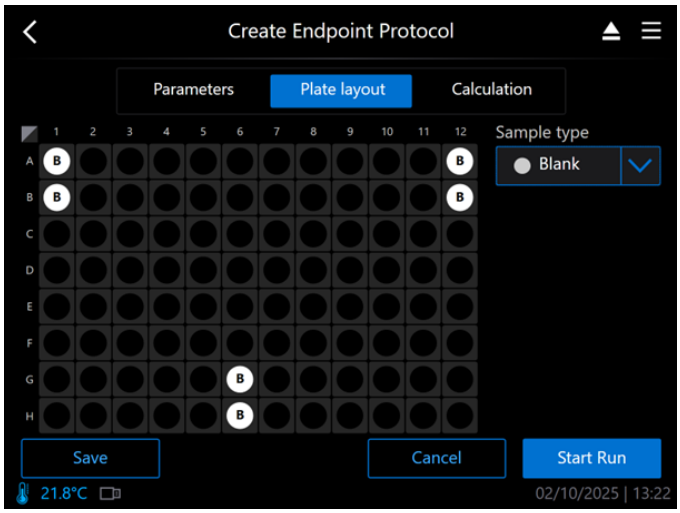


Figure 40 Blank

- **Control**: Control is a known sample that is typically used for quality control or classification purpose. Each control sample can have 1–3 replicates aligned either horizontally or vertically.

  Select sample type control then tap the first control well. Replicates of the control is placed according to the selection. Either drag down or to the right, or tap on different well to add more control samples.

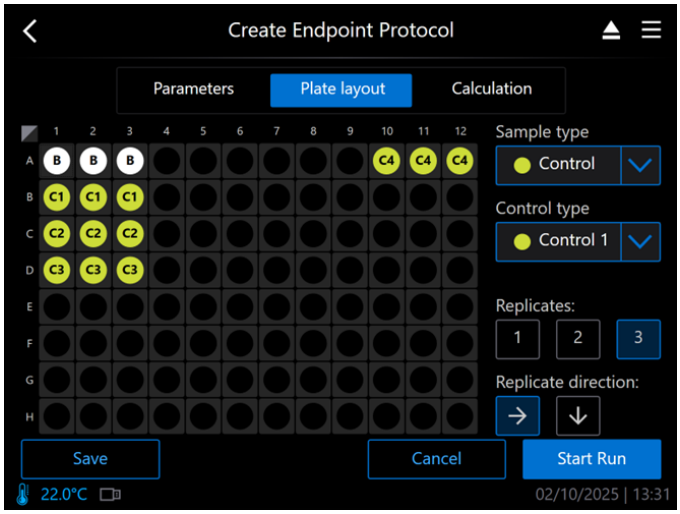


Figure 41 Control

- **Standard**: Standard is a sample with known analyte concentration and is used to create a calibration curve.

  User can define up to 8 different standard concentrations and their numeric value can be between 0.0001–99999.

  First, add or edit sample concentrations and the unit for the standard, then click **Save** to save the standard concentration.

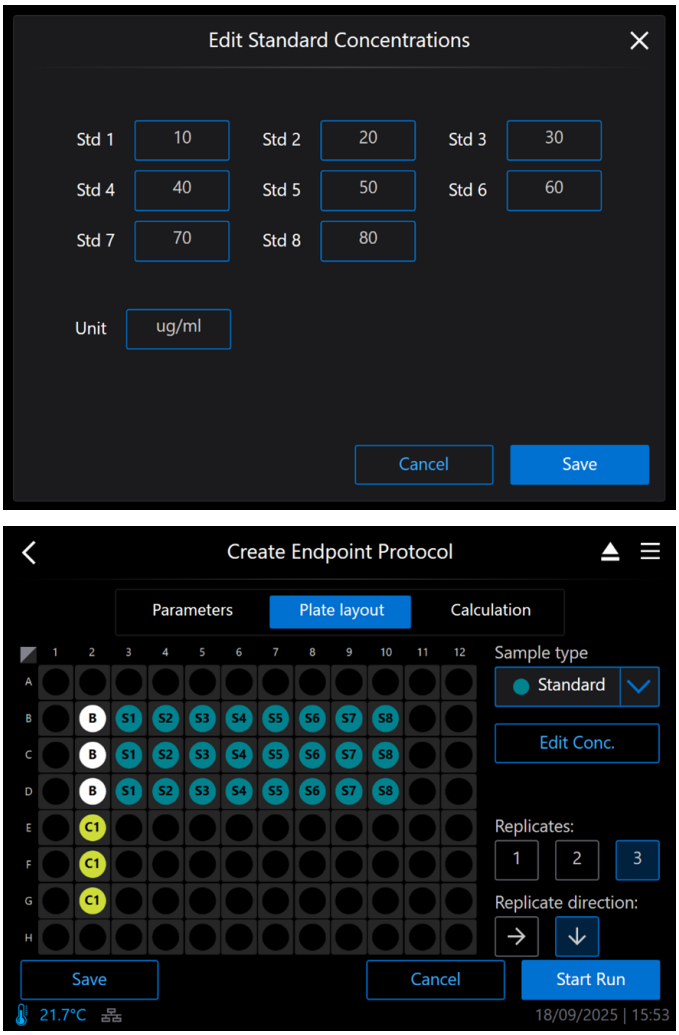


Figure 42 Standard

.

- **Unknown**: Unknowns are samples to be investigated. User can define the location, dilution factor, number of replicates (1–3), and the alignment of the unknowns. Dilution factor is automatically included in the Standard curve calculation of unknown sample concentrations.

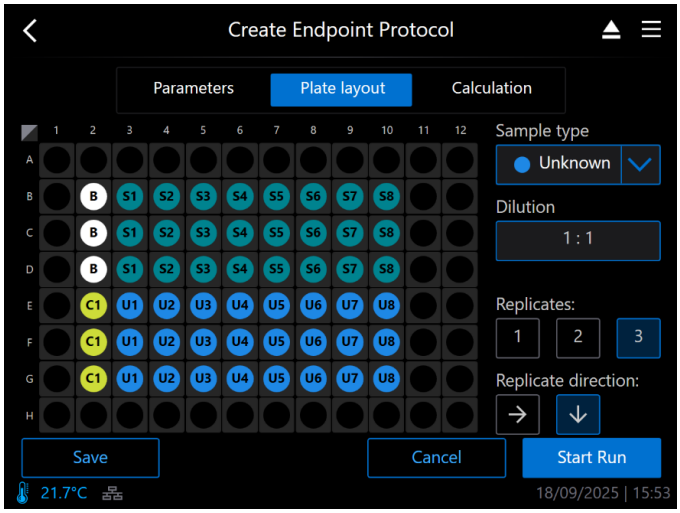


Figure 43 Unknown

Calculation

In the **Calculation** tab, user can perform calculations based on **Raw** or **Blanked** (for example, blank subtracted) data type. Data type can be selected from the **Pre-calculation** dropdown list.

User can enable calculations to generate standard curve based on the standard sample measurements, and/or perform threshold-based classification and rules-based quality control. All calculations are done using mean measurement values.

For more information about adding calculations, see the Multiskan™ Ease Absorbance Microplate Reader Technical Guide.

Kinetic measurement protocol

To create a new kinetic measurement protocol, there are two tabs with different measurement related options: **Parameters** and **Plate layout**.

Parameters

In the **Parameters** tab, user can define the **Protocol name**, set the **Number of cycles** and cycle **Intervals** for the kinetic run. User can also select the **Filter** (from installed default and accessory filters) and enable or disable **Shaking**.

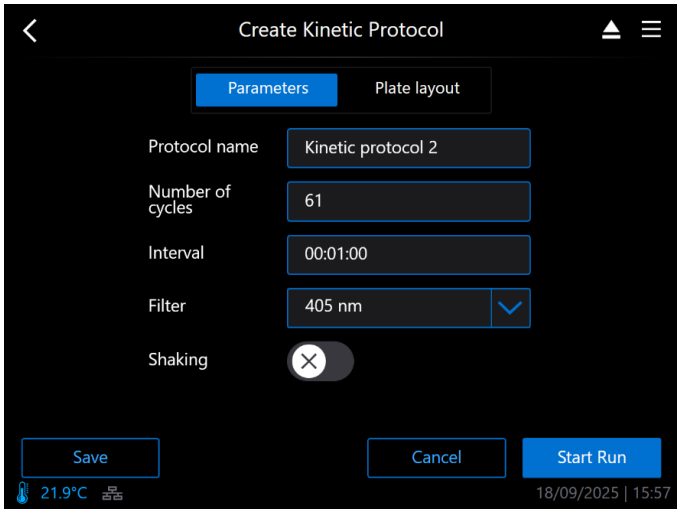


Figure 44 Parameters

Users can define the number of cycles ranging from **2 to 500** and set the kinetic interval between **20 seconds** and **one hour**.

Shaking in kinetic protocol has only **ON** or **OFF** options. When shaking is on, it is always fixed to continuous linear shaking using 3 mm amplitude at 11 Hz frequency.

Plate layout

In the **Plate layout** tab, user can define the location of the following sample types: **Blank**, **Control**, **Standard**, and **Unknown**.

See “Plate layout” on page 35 in “Endpoint measurement protocol” on page 34 for details.

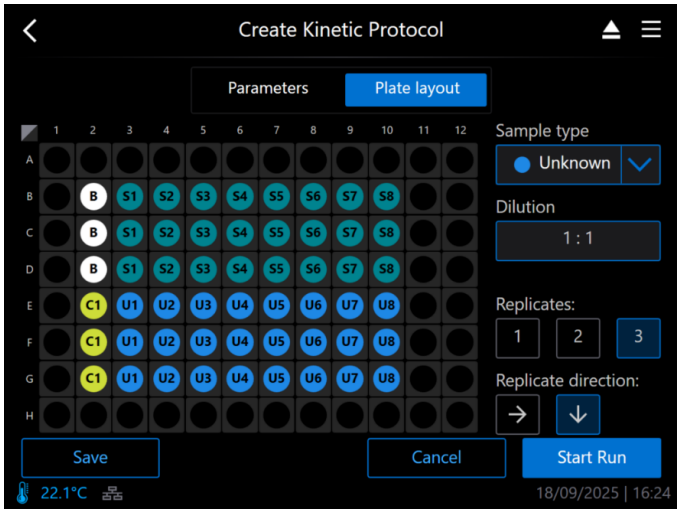


Figure 45 Plate layout

Run protocol

Protocols created by user can be found in the **Protocol library** which is accessible from the **Main view** or from the main **Menu**. Protocols can be started either by clicking **Start run** in **Open Protocol/Create Protocol** or by starting the last active protocol (**Start Last Run** in the **Main view**).



Figure 46 Run protocol

When running a kinetic protocol, the user interface displays the progress with an estimated remaining run time.

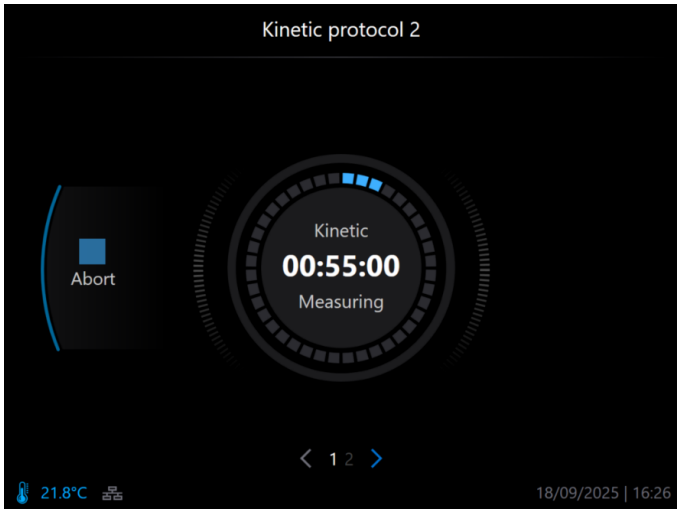


Figure 47 Kinetic protocol 2

During a kinetic run, the user can view the real-time results as a plate map overview or monitor readings from an individual well can be opened by tapping any well position in overview window.

Access, view, and export runs

All past runs can be accessed from **Menu** ▸ **Run History** :

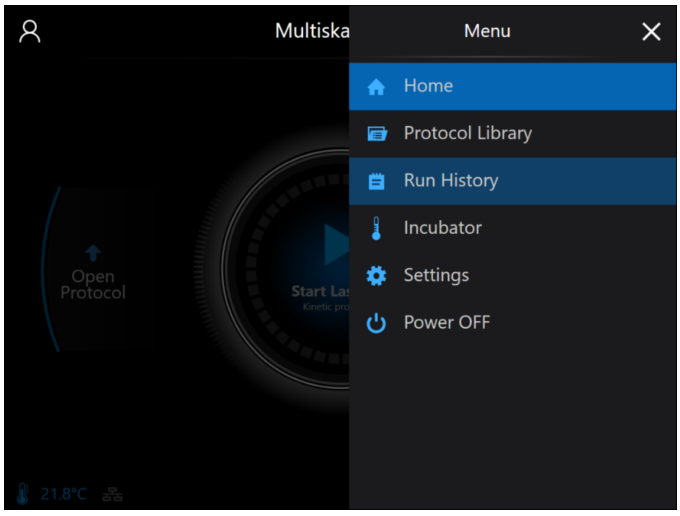


Figure 48 Menu

Run History lists all runs executed with the instrument. The list displays **Run name**, **Status**, **Type** (Endpoint or Kinetic), and execution date and time (**Ran at**) for each run. User can open runs by tapping the name bar.

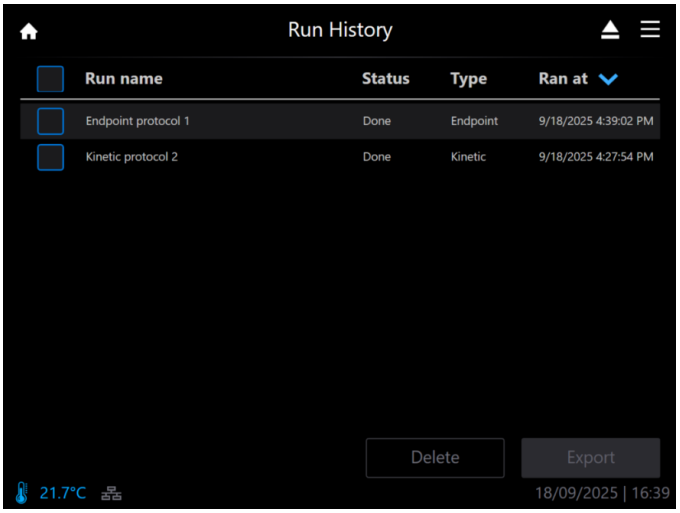


Figure 49 Run History

Endpoint run results

When opening an **Endpoint** run, four tabs become available: **Data**, **Standard curve**, **Classification**, and **Quality control**. These tabs help the user to interpret the run results. All presentation parameters can be modified without altering the raw data.

For more information about presenting run results, see the Multiskan™ Ease Absorbance Microplate Reader Technical Guide.

Data export

To export run data any time, select the **Export** button in the lower right corner of the screen. The user interface then prompts you to select data export destination and data format.



Figure 50 Export

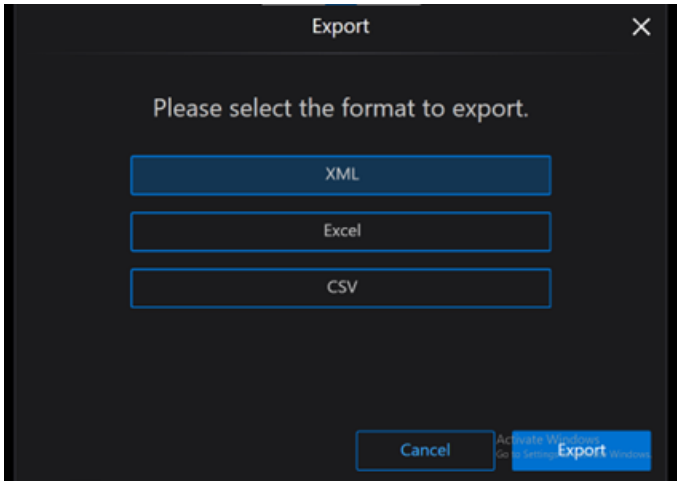


Figure 51 Data format to export

Note: When exporting data to USB drive, do not connect multiple USB drives to the instrument simultaneously. This will possibly cause illogical behavior of the export process.

Kinetic run results

- When opening the **Kinetic** run, you can see a plate overview displaying all kinetic measurements.
- Tap any well position to open the results from an individual well.
- Click **Export** button in the plate overview screen to export results to a USB drive or any preconfigured Network drive.

Power control

Click main **Menu**, then **Power OFF** to switch off the instrument.

Alternatively, press physical power off button in front of the instrument.

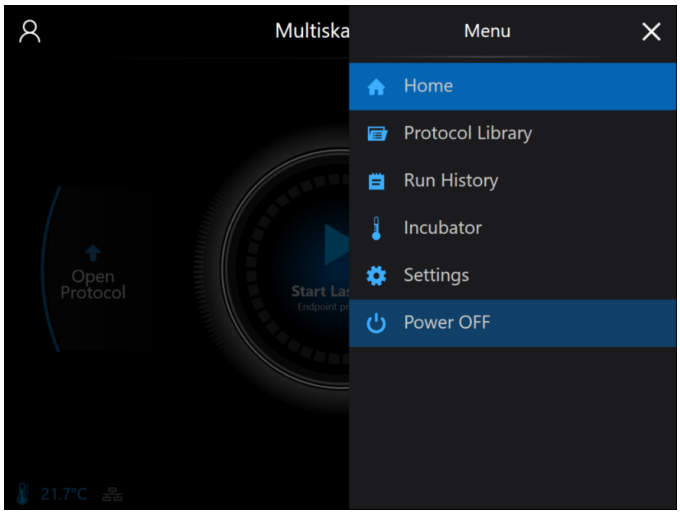


Figure 52 Menu ▸ Power OFF

In both ways, power off performs controlled shut down where the operational system, the touchscreen interface and the instrument firmware are shut down following controlled and timed shutdown process. This controlled shutdown takes about 15 seconds.

5 Maintenance

This chapter describes how to maintain and service the instrument.

Note: Follow normal laboratory safety procedures about biohazardous, infectious, radiologic or toxic materials when maintaining the instrument.

Regular and preventive maintenance

Guidelines for maintaining the instrument

Contact local authorized technical service or your local Thermo Fisher Scientific representative for assistance, if necessary.

Maintenance checklist

Users must perform routine and service procedures to avoid unnecessary wear and potential safety hazards.

The procedures and their recommended frequencies are described below.

Table 2 Maintenance checklist

Maintenance	Daily	Weekly	Yearly	If required
Ensure proper shutdown.				•[1]
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.		•		
Perform verification with Thermo Scientific™ Multiskan™ Verification Plate.			•	

Table 2 Maintenance checklist *(continued)*

Maintenance	Daily	Weekly	Yearly	If required
Decontaminate the instrument when relocating the instrument or sending it for service.[2]				•
Service the instrument regularly.			•	

[1] To save energy, it is recommended to shut down the instrument for the weekends and other longer periods when the instrument is not in use.

[2] For detailed decontamination instructions, see "Cleaning and decontamination" on page 55.

Instrument care

WARNING! If any surfaces have been contaminated with biohazardous material, use a mild sterilizing solution.

WARNING! Do not use acetone or any other strong solvents as they damage the covers.

WARNING! Do not autoclave any part of this instrument.

Ensure that the electricity supply in the laboratory conforms to that specified on the power adaptor type label.

To guarantee the continuous reliability and accuracy of Multiskan™ Ease, avoid disturbing any of the optical system components.

IMPORTANT! A misalignment of the light path affects measurements.

- Prevent any liquid from entering the instrument.
- Keep the instrument free of dust and other foreign matters.
- Clean the touchscreen display with a mild laboratory detergent.
- Clean the plastic covers and surfaces with a mild laboratory detergent or alcohol.
- Avoid using abrasive cleaning agents, as they can damage the paint finish.

It is recommended that you clean the case of the instrument periodically to maintain its good appearance.

For more information, see "Clean the instrument" on page 46.

If any damage occurs, contact your local Thermo Fisher Scientific representative for service.

Guidelines for cleaning the instrument

Clean the instrument

Clean the instrument regularly as stated below.

1. Switch the instrument off.
2. Unplug the instrument.
3. Clean the outside of the instrument with a soft cloth dampened with water or mild detergent.
4. If you have spilt infectious agents on the instrument, decontaminate the instrument.

For more information, see “Cleaning and decontamination” on page 55.

CAUTION! Immediately wipe away spilled saline solutions, solvents, acids, or alkaline solutions from outer surfaces to prevent damage and wipe with deionized distilled water.

CAUTION! Painted surfaces can be cleaned with most laboratory detergents. Dilute the cleaning agent as recommended by the manufacturer.

CAUTION! Do not use any solutions containing oxidative chemicals, such as hypochlorite and peroxides or strong bases, on any of the anodized aluminum surfaces (plate carrier). These substances can cause permanent damage to the surface finish.

CAUTION! Wear disposable gloves when cleaning the instrument.

Clean the plate carrier

WARNING!

- Ensure that the bottom of each microplate is dry.
- Fluid on the bottom of a microplate may present a contamination hazard.
- Use good laboratory practices when handling any hazardous materials.

CAUTION!

- Keep the instrument plate carrier clean to avoid dust and dirt from entering the measurement chamber.
- Clean the plate carrier surface at least once a week using a soft cloth or tissue paper soaked in a mild detergent solution, soap solution or 70% ethanol.
- Wipe up spills immediately.
- Do not use formaldehyde or strong alkaline.

1. Click the **Run plate out** icon in SkanIt™ software or press the **Plate Out** button in the touchscreen to run the plate out.
2. Clean the plate carrier with a soft cloth dampened with water or mild detergent.
3. If you have spilt infectious agents on the plate carrier, decontaminate the instrument.

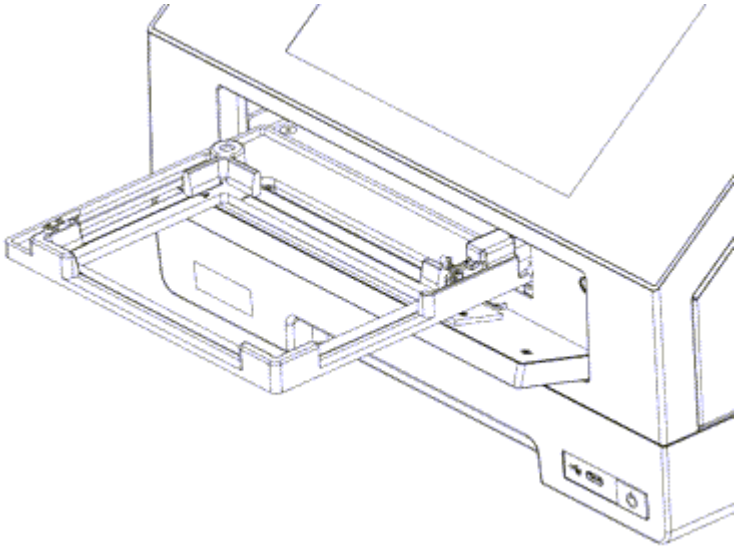


Figure 53 Plate carrier

For more information, see “Cleaning and decontamination” on page 55.

A Specifications

Thermo Fisher Scientific reserves the right to change any specifications without prior notice as part of our continuous product development program.

General specifications

Specifications	ME001000C	ME002000C
Model	1600-1	1600-3
Overall dimensions	295 mm (W) × 400 mm (D) × 215 mm (H)	295 mm (W) × 400 mm (D) × 215 mm (H)
Weight	10 kg	8.5 kg
Operating conditions	• 10–40°C. • Maximum relative humidity 80% for temperatures up to 31°C. • Decreasing linearly to 50% relative humidity at 40 C. **Note:** Indoor use only!	• 10–40°C. • Maximum relative humidity 80% for temperatures up to 31°C. • Decreasing linearly to 50% relative humidity at 40°C. **Note:** Indoor use only!
Performance specification conditions	All performance specifications are fulfilled within an ambient temperature (20–25°C) in humidity range of 10–80%.	All performance specifications are fulfilled within an ambient temperature (20–25°C) in humidity range of 10–80%.
Transportation conditions	–40°C to +70°C, packed in transport packaging	–40°C to +70°C, packed in transport packaging
Storage conditions	–25°C to +50°C, packed in transport packaging	–25°C to +50°C, packed in transport packaging
Mains power supply	100–240 Vac, 50/60 Hz, nominal	100–240 Vac, 50/60 Hz, nominal
Power consumption	• Idle: 17 W • Typical (without heating): 35 W • Maximum (with heating): 90 W	• Idle: 9 W • Typical: 27 W
Noise	<50 dB (at a distance of 500 mm)	<50 dB (at a distance of 500 mm)
User interface	Standalone use: 8-inch touchscreen display	—

(continued)

Specifications	ME001000C	ME002000C
PC control	SkanIt™ Software (Research Edition included)	SkanIt™ Software (Research Edition included)
Connection	• 1 USB type A port, USB 2.0 • 1 USB type B port, USB 2.0 • 1 USB type C port, USB 2.0 • Ethernet port	1 USB type B port, USB 2.0
Incubator	Incubator included (heating only)	—
Shaker	Linear	Linear
Plate type	96-well and 384-well microplates, with or without lid, maximum total height 18 mm.	96-well microplates, with or without lid, maximum total height 18 mm.

Performance specifications

Specifications	ME001000C	ME002000C
Photometry		
Light source	White LED	White LED
Wavelength range	400–760 nm	400–760 nm
Wavelength selection	Filter wheels with 3 factory filters and 5 optional filter positions	Filter wheels with 3 factory filters and 5 optional filter positions
Factory filters[1]	405 nm, 450 nm, and 620 nm	405 nm, 450 nm, and 620 nm
Bandwidth (FWHM)	3–8 nm	3–8 nm
Wavelength accuracy	±2 nm	±2 nm
Linearity (Absorbance), at 450 nm	0–3 Abs, 2.0%	0–3 Abs, 2.0%
Accuracy (Absorbance), at 450 nm	±(1.0% + 0.003 Abs) (0 – 3 Abs)	±(1.0% + 0.003 Abs) (0 – 3 Abs)
Precision (Absorbance), at 450 nm	SD <0.005 Abs or CV <0.5%, whichever is greater	SD <0.005 Abs or CV <0.5%, whichever is greater
Turbidimetric sensitivity	<5 FTU (formazine turbidimetric units)	<5 FTU (formazine turbidimetric units)
Measurement speed[2]	96-well microplates	96-well microplates

(continued)

Specifications	ME001000C	ME002000C
	• Fast mode: ≤10 seconds • Precision mode: ≤20 seconds	• Fast mode: ≤10 seconds • Precision mode: ≤20 seconds
Incubator		
Temperature range	Ambient + 4°C to 45°C (room temperature 25°C)	—
Liquid warm-up time	<40 minutes from 25–37°C, 96-well microplate, 200 µL water/well	—
Mean temperature of wells at 37°C	±0.5°C	—
Plate temperature uniformity at 37°C	<1.0°C	—
Shaker		
Shaking modes	Linear	Linear
Shaking speeds	• Low (5 Hz, amplitude 15 mm) • Medium (11 Hz, amplitude 3 mm) • High (18 Hz, amplitude 1 mm)	• Low (5 Hz, amplitude 15 mm) • Medium (11 Hz, amplitude 3 mm) • High (18 Hz, amplitude 1 mm)
Shaking type	Continuous or pulsed	Continuous or pulsed

[1] Hard coated filters with unlimited lifetime.
[2] Minimum kinetic interval time from A1 back to A1.

B

Safety

WARNING! GENERAL SAFETY. Using this product in a manner not specified in the user documentation may result in personal injury or damage to the instrument or device. Ensure that anyone using this product has received instructions in general safety practices for laboratories and the safety information provided in this document.

- Before using an instrument or device, read and understand the safety information provided in the user documentation provided by the manufacturer of the instrument or device.
- Before handling chemicals, read and understand all applicable Safety Data Sheets (SDSs) and use appropriate personal protective equipment (gloves, gowns, eye protection, and so on). To obtain SDSs, visit **thermofisher.com/support**.

Symbols on the instrument

Symbols may be found on the instrument to warn against potential hazards or convey important safety information. In this document, the hazard symbol is used along with one of the following user attention words:

CAUTION! Indicates a potentially hazardous situation that, if not avoided, may result in minor or moderate injury. It may also be used to alert against unsafe practices.

WARNING! Indicates a potentially hazardous situation that, if not avoided, could result in death or serious injury.

DANGER! Indicates an imminently hazardous situation that, if not avoided, will result in death or serious injury.

Symbol	English
	See User Guide for details.
	Environmental protection symbol of the China RoHS directive. The "e" in the symbol indicates the product does not have any hazardous substances in excess of the concentration limits.

(continued)

Symbol	English
	The CE mark symbolizes that the product conforms to all applicable European Community provisions for which this marking is required. Operation of the instrument is subject to the conditions described in this manual. The protection provided by the device may be impaired if the instrument is used in a manner not specified by the manufacturer.
	Regulatory Compliance Mark indicates conformity with Australian standards for electromagnetic compatibility.
	This product conforms to UL 61010-1, CAN/CSA C22.2 No.61010-1 “Safety Requirements for Electrical Equipment for Measurement, Control, and Laboratory Use, Part I: General Requirements.” Instruments bearing the TUV symbol are certified by TUV Product Services to be in conformance with the applicable safety standard for the US and Canada.
	Caution, risk of danger. Consult the manual for further safety information.
	**WARNING!** Risk of electric shock.
	WARNING Biohazard risk.
	Protective conductor terminal (main ground)
	Do not dispose of this product in unsorted municipal waste. **CAUTION!** To minimize negative environmental impact from disposal of electronic waste, do not dispose of electronic waste in unsorted municipal waste. Follow local municipal waste ordinances for proper disposal provision and contact customer service for information about responsible disposal options.

Instrument safety

General instrument safety

- The instrument is for laboratory research use only.
- Observe proper laboratory safety precautions; wear protective clothing and follow approved laboratory safety procedures.
- Follow Good Laboratory Practice (GLP) to guarantee reliable analyses.
- Follow the preventive maintenance instructions to keep the instrument in the best condition, see “Maintenance checklist” on page 44.
- Observe all safety symbols and markings on the instrument.
- Do not open any covers except the filter wheel chamber door or measurement chamber door when the instrument is plugged in a power source.
- Do not open the measurement chamber door manually when the instrument is in operation.
- Do not push the plate carrier in manually unless the instrument is switched off.
- Do not force a microplate into the instrument.



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 (for example 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.



WARNING! 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! Do not disturb the instrument and let it sit for at least three hours before installing and switching it on to prevent condensation causing a short circuit.

Operating conditions

The safety specifications are also met under the following environmental conditions in addition to or in excess of those stated in the operating conditions:

Parameter	Description
Altitude	Up to 2,000 m
Humidity	Maximum relative humidity 80% for temperatures up to 31°C decreasing linearly to 50% relative humidity at 40°C
Temperature	10–40°C
Mains supply fluctuations	±10% from nominal
Installation category (Overvoltage category)	II (IEC 60664-1)[1]
Pollution degree	2 (IEC 60664-1)[2]

[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.

[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.

Electrical safety

WARNING! Ensure appropriate electrical supply. For safe operation of the instrument:

- Plug the system into a properly grounded receptacle with adequate current capacity.
- Ensure the electrical supply is of suitable voltage.
- Never operate the instrument with the ground disconnected. Grounding continuity is required for safe operation of the instrument.

WARNING! Power Supply Line Cords. Use properly configured and approved line cords for the power supply in your facility. If the line cord is damaged, contact technical support.

WARNING! Disconnecting Power. To fully disconnect power either detach or unplug the power cord, positioning the instrument such that the power cord is accessible.

Cleaning and decontamination

CAUTION! Cleaning and Decontamination. Use only the cleaning and decontamination methods that are specified in the manufacturer user documentation. It is the responsibility of the operator (or other responsible person) to ensure that the following requirements are met:

- No decontamination or cleaning agents are used that can react with parts of the equipment or with material that is contained in the equipment. Use of such agents could cause a HAZARD condition.
- The instrument is properly decontaminated a) if hazardous material is spilled onto or into the equipment, and/or b) before the instrument is serviced at your facility or is sent for repair, maintenance, trade-in, disposal, or termination of a loan. Request decontamination forms from customer service.
- Before using any cleaning or decontamination methods (except methods that are recommended by the manufacturer), confirm with the manufacturer that the proposed method will not damage the equipment.

Safety and electromagnetic compatibility (EMC) standards

The instrument design and manufacture complies with the following standards and requirements for safety and electromagnetic compatibility.

Safety

Reference	Description
CE-LVD (2014/35/EU)	European Union “Low Voltage Directive”
IEC 61010-1 GB 4793.1 EN 61010-1 UL 61010-1 CSA C22.2 No.61010-1-12	*Safety requirements for electrical equipment for measurement, control, and laboratory use – Part 1: General requirements*
IEC 61010-2-010 GB 4793.6 EN 61010-2-010 UL 61010-2-010 CSA C22.2 No.61010-2-010	*Safety requirements for electrical equipment for measurement, control and laboratory use – Part 2-010: Particular requirements for laboratory equipment for the heating of materials*

EMC

Reference	Description
CE-EMC (2014/30/EU)	European Union “EMC Directive”
EN IEC 61326-1 GB/T 18268.1	*Electrical Equipment for Measurement, Control and Laboratory Use – EMC Requirements – Part 1: General Requirements*

Environmental design standards

Reference	Description
Directive 2012/19/EU	European Union “WEEE Directive”—Waste electrical and electronic equipment
Directive 2011/65/EU	European Union “RoHS Directive”—Restriction of hazardous substances in electrical and electronic equipment
SJ/T 11364-2024	“China RoHS” Standard—Marking for the Restricted Use of Hazardous Substances in Electronic and Electrical Products For instrument specific certificates, visit our customer resource page at **www.thermofisher.com/us/en/home/technical-resources/rohs-certificates.html**.

Chemical safety

WARNING! GENERAL CHEMICAL HANDLING. To minimize hazards, ensure laboratory personnel read and practice the general safety guidelines for chemical usage, storage, and waste provided below. Consult the relevant SDS for specific precautions and instructions:

- Read and understand the Safety Data Sheets (SDSs) provided by the chemical manufacturer before you store, handle, or work with any chemicals or hazardous materials. To obtain SDSs, see the "Documentation and Support" section in this document.
- Minimize contact with chemicals. Wear appropriate personal protective equipment when handling chemicals (for example, safety glasses, gloves, or protective clothing).
- Minimize the inhalation of chemicals. Do not leave chemical containers open. Use only with sufficient ventilation (for example, fume hood).
- Check regularly for chemical leaks or spills. If a leak or spill occurs, follow the manufacturer cleanup procedures as recommended in the SDS.
- Handle chemical wastes in a fume hood.
- Ensure use of primary and secondary waste containers. (A primary waste container holds the immediate waste. A secondary container contains spills or leaks from the primary container. Both containers must be compatible with the waste material and meet federal, state, and local requirements for container storage.)
- After emptying a waste container, seal it with the cap provided.
- Characterize (by analysis if needed) the waste generated by the particular applications, reagents, and substrates used in your laboratory.
- Ensure that the waste is stored, transferred, transported, and disposed of according to all local, state/provincial, and/or national regulations.
- **IMPORTANT!** Radioactive or biohazardous materials may require special handling, and disposal limitations may apply.

WARNING! HAZARDOUS WASTE (from instruments). Waste produced by the instrument is potentially hazardous. Follow the guidelines noted in the preceding General Chemical Handling warning.

WARNING! 4L Reagent and Waste Bottle Safety. Four-liter reagent and waste bottles can crack and leak. Each 4-liter bottle should be secured in a low-density polyethylene safety container with the cover fastened and the handles locked in the upright position.

Biological hazard safety



WARNING! Potential Biohazard. Depending on the samples used on this instrument, the surface may be considered a biohazard. Use appropriate decontamination methods when working with biohazards.



WARNING! BIOHAZARD. Biological samples such as tissues, body fluids, infectious agents, and blood of humans and other animals have the potential to transmit infectious diseases. Conduct all work in properly equipped facilities with the appropriate safety equipment (for example, physical containment devices). Safety equipment can also include items for personal protection, such as gloves, coats, gowns, shoe covers, boots, respirators, face shields, safety glasses, or goggles. Individuals should be trained according to applicable regulatory and company/ institution requirements before working with potentially biohazardous materials. Follow all applicable local, state/provincial, and/or national regulations. The following references provide general guidelines when handling biological samples in laboratory environment.

- U.S. Department of Health and Human Services, *Biosafety in Microbiological and Biomedical Laboratories (BMBL)*, 6th Edition, HHS Publication No. (CDC) 300859, Revised June 2020
  cdc.gov/labs/bmbl
- Laboratory biosafety manual, fourth edition. Geneva: World Health Organization; 2020 (Laboratory biosafety manual, fourth edition and associated monographs)
  who.int/publications/i/item/9789240011311

C Documentation and support

Customer and technical support

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  Note: For SDSs for reagents and chemicals from other manufacturers, contact the manufacturer.

Limited product warranty

Life Technologies Corporation and its affiliates warrant their products as set forth in the Life Technologies' General Terms and Conditions of Sale at **www.thermofisher.com/us/en/home/global/terms-and-conditions.html**. If you have questions, contact Life Technologies at **www.thermofisher.com/support**.