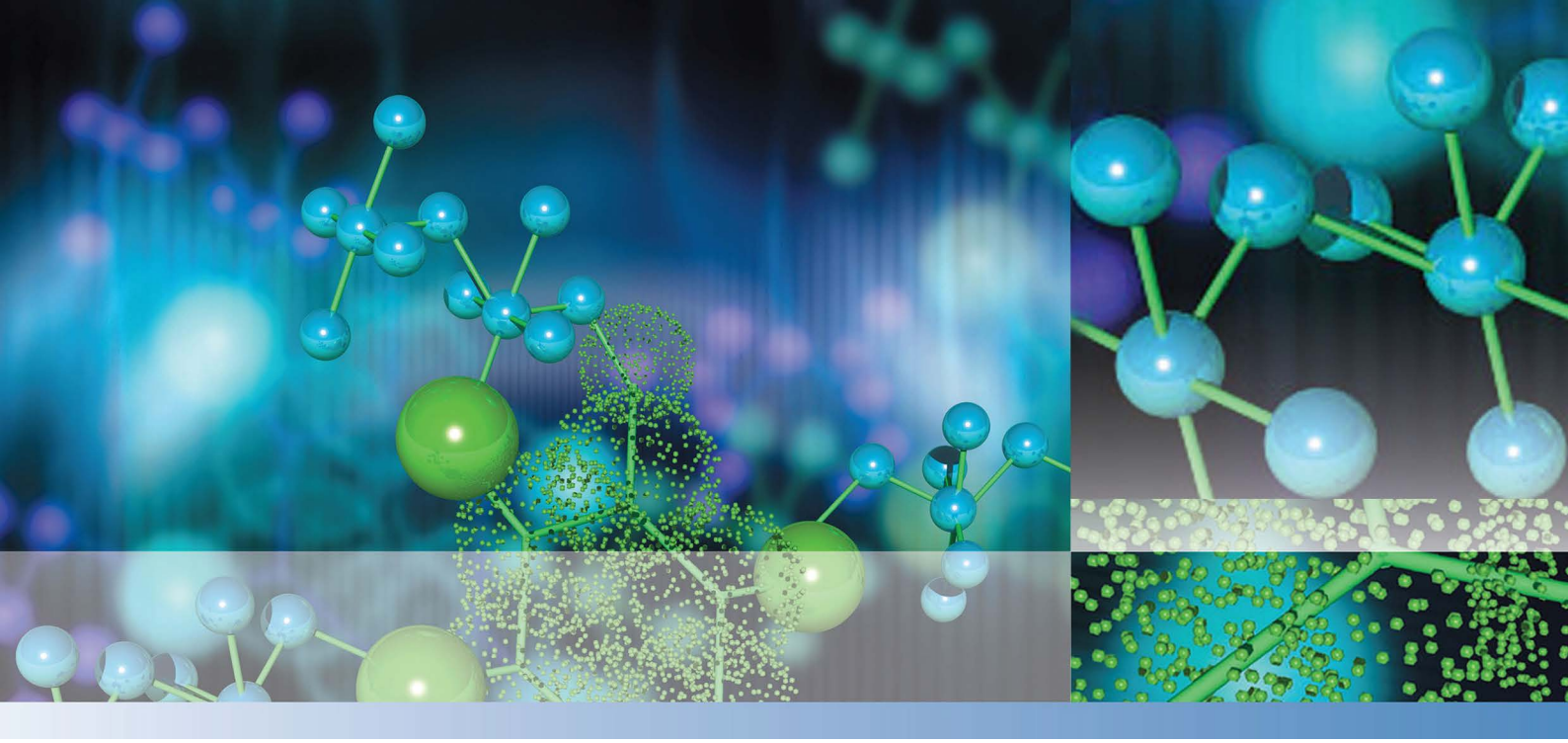

Thermo Scientific

Varioskan™ LUX

User Manual

Cat. No. N16044 Rev 1.4 2023

thermo scientific

Manufacturer

Life Technologies Holdings Pte. Ltd.

(a part of Thermo Fisher Scientific Inc.)

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Release history:

For general laboratory use.

WEEE Compliance

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Preface

About This Guide

Thermo Scientific™ Varioskan™ LUX is a modular multi-technology microplate reader and it is controlled by Thermo Scientific SkanIt® Software for Microplate readers. This guide gives an overview of the instrument and software installation procedures, and describes the main operations and routine maintenance.

Related Documentation

In addition to this guide, Thermo Fisher Scientific provides the following electronic documents for Varioskan LUX and SkanIt Software:

- *Thermo Scientific™ Varioskan™ LUX Technical Manual* (Cat. No. N16045)
- *Thermo Scientific™ SkanIt™ Software for Microplate Readers Technical Manual* (Cat. No. N16046)
- *Thermo Scientific™ SkanIt™ Software for Microplate Readers User Manual* (Cat. No. N16243, available in multiple languages)

The software also has a Help.

Safety and Special Notices

Make sure you follow the precautionary statements presented in this guide. 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 an appropriate CAUTION symbol.

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.

Contacting Us

For the latest information on products and services, visit our website at:

www.thermofisher.com/platereaders

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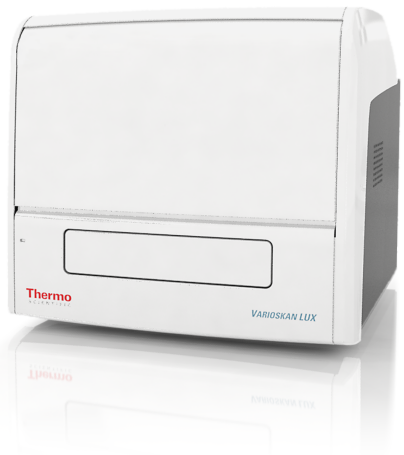
1

Introduction to Varioskan LUX

Thermo Scientific™ Varioskan™ LUX is a modular multi-technology microplate reader. Varioskan LUX is controlled by Thermo Scientific™ SkanIt™ Software for Microplate Readers.

End point, kinetic, spectral and multipoint measurements can be carried out in the UV/Vis/NIR range from appropriate microplate formats. In fluorescence intensity, time-resolved fluorescence, luminescence and AlphaScreen™ measurements 6- to 1536-well plates can be used, and correspondingly 6- to 384-well plates in absorbance measurements.

Figure 1. Thermo Scientific™ Varioskan™ LUX



The instrument is always equipped with the following detection technologies:

- Absorbance
- Fluorescence intensity (FI)

Depending on the instrument model, the following optional detection technologies (LAT module) may be included:

- Luminescence
- AlphaScreen
- Time-resolved fluorescence (TRF)

The instrument selects the measurement wavelength either by using filters or monochromators depending on the measurement technology.

- Monochromators are used in absorbance and fluorescence intensity measurements.
- Filters are used in AlphaScreen and TRF measurements.
- Most luminescence measurements do not require any wavelength selection. But if required, filters can be used.

The LAT module has built-in excitation filters for TRF and AlphaScreen. The TRF and AlphaScreen (and luminescence) emission filters you need to install yourself.

Note All measurement technologies, except AlphaScreen, allow spectral scanning measurements with monochromators.

The instrument has an incubator for temperature control up to 45°C and a plate shaking capability with orbital shaking mode.

The instrument can also be equipped with:

- Dispensers (up to two) for automatic reagent addition.
- Integrated gas module for controlling the gas atmosphere (CO_2 & O_2) inside the instrument.

The optical system of the instrument allows you to perform:

- Fluorescence intensity measurements from the top or bottom of the well.
- Luminescence, TRF and Alpha technology measurements from the top of the well.
- Absorbance measurements through the well.

Note Fluorescence measurements from the bottom of the well require an instrument model supporting bottom reading.

Note Your instrument may not have all of the features presented in this guide. As the instrument is modular, you can upgrade it later. See the *Thermo Scientific Varioskan LUX Technical Manual* for more information.

Intended Use

The Varioskan LUX modular multimode reader is used to measure fluorescence intensity (FI), time-resolved fluorescence (TRF), absorbance, luminescence, and AlphaScreen from samples in appropriate microplates. The instrument also has incubating, atmospheric control, shaking and reagent dispensing capabilities.

It is used with an external computer control software. The reader is intended for use in research laboratories by professional personnel. The multimode reader is not intended for diagnostic use.

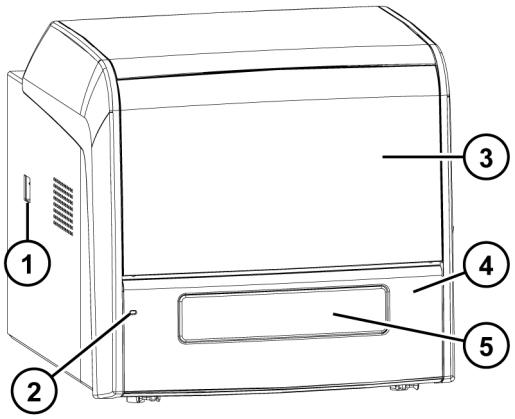
Use for self-testing is excluded.

For validation of the entire system, it is recommended that Good Laboratory Practice (GLP) is followed to guarantee reliable analyses.

Instrument Layout

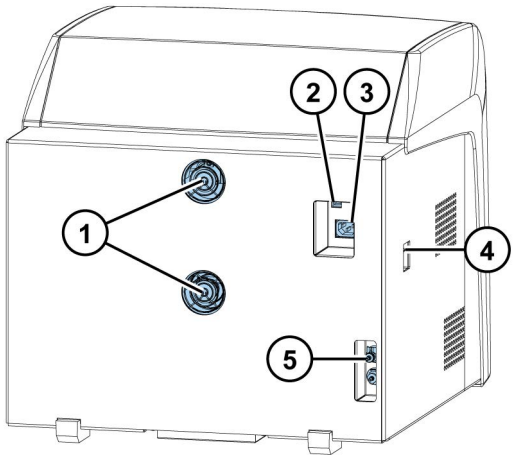
The front view of the instrument.

Figure 2. The power switch (1), LED indicator (2), dispenser sliding cover (3), front cover (4), and measurement chamber door (5).



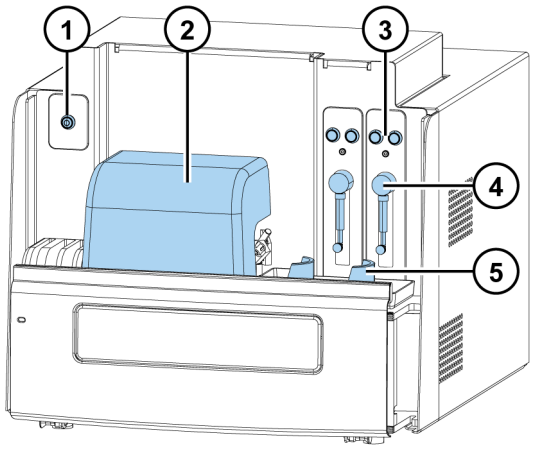
The back view of the instrument.

Figure 3. The cooling fan outlets (1), USB connector (2), mains power supply connector (3), power switch (4), and gas connectors (5).



The instrument with the dispenser sliding cover open.

Figure 4. Plate In/Out button (1), LAT module (2), Prime and Empty buttons (3), dispensers 1 and 2 (4), reagent bottle holder (5).



Install Varioskan LUX

This chapter describes how to install the instrument.

IMPORTANT The instrument weighs 53 - 60 kg (117 - 131 lbs.) and needs two persons to lift.

Take into account the weight, safety and instrument requirements when deciding where to place the instrument.

Installation

For detailed environmental requirements, see the *Thermo Scientific™ Varioskan™ LUX Technical Manual*.

IMPORTANT Do not touch or loosen any screws or parts other than those specified in the instructions.

Place the instrument on a sturdy laboratory bench that can take the weight of the instrument.

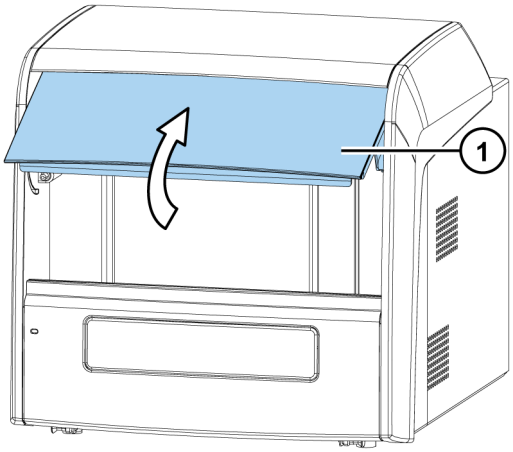
Installation order:

1. Release the tray holder transport lock.
2. Install the tray and adapter.
3. Set up the dispensers.
4. Connect the power supply cable and the USB cable.
5. Install SkanIt Software.

Installation Steps

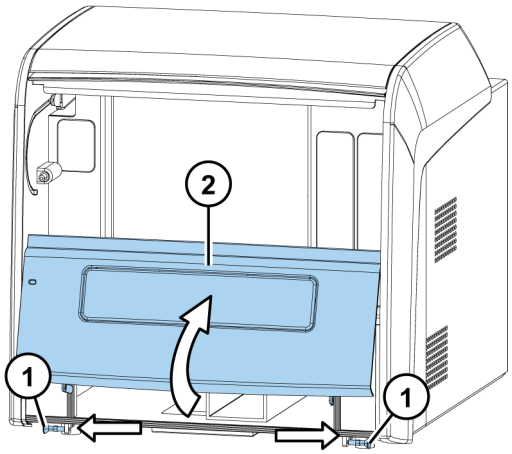
1. **Release the tray holder transport lock.**
   a. Lift up the dispenser sliding cover.

Figure 5. Dispenser sliding cover (1).



b. Remove the front panel by pulling the two bolts, one on each side at the bottom, sideways, then by turning the bottom of the cover 30°, and lifting it off.

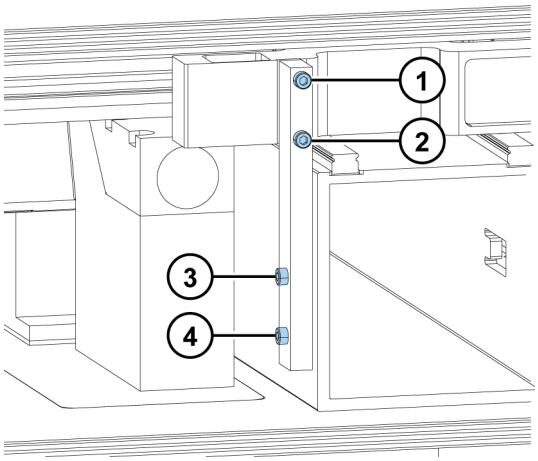
Figure 6. Side bolts (1), front panel (2).



The metallic transport lock support is fastened with four screws. Two screws (1 and 2) are fastened to the tray holder, and two screws (3 and 4) are fastened to the track mechanism bar.

c. Remove the tray holder screws (1 and 2), and the transport lock tag. Store the lock tag for future use.

Figure 7. Tray holder screws (1 and 2) and track mechanism bar screws (3 and 4) on the transport lock.



d. Gently push the track mechanism (where screws 1 and 2 were fastened) into the instrument.

e. Remove screw 3 and loosen screw 4.

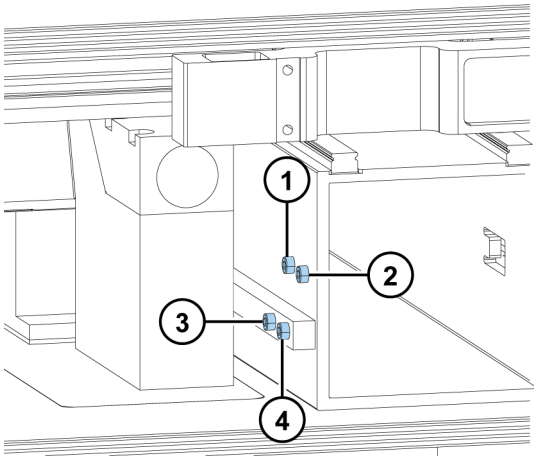
f. Turn the transport lock into its horizontal storage position.

g. Tighten screw 4. Fasten screw 3 back into the same hole from which it was unfastened.

h. Fasten screws 1 and 2 onto the track mechanism bar.

The transport lock is now in its storage position.

Figure 8. Screws 1, 2, 3, and 4, and the released transport lock.

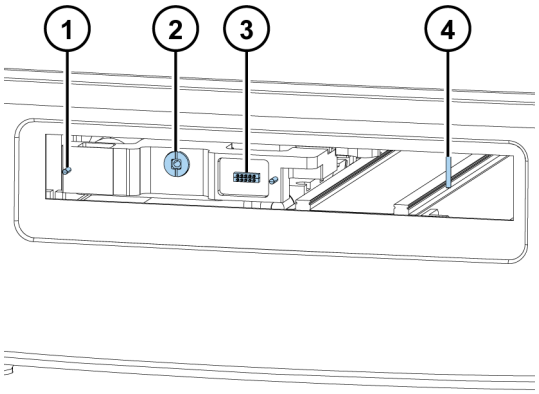


2. Install the plate tray and adapter.

First install the tray, then the adapter. The tray /adapter combinations are individually coded for automatic identification.

a. Gently pull the tray holder out and slide it to the left.

Figure 9. Close-up of the tray holder. Guide pins (1), screw fix hole (2), contact pins (3), lever opening bar (4).



b. Install the tray into the tray holder. Make sure you first push the positioning lever to the left of the lever opening bar. Make sure the two guide pins located on both sides of the tray holder are inserted into the tray.

Note Install the universal tray without the adapter.

c. Fasten the tray to the tray holder by the screw fix by turning the key clockwise.

Figure 10. Tray and tray holder.

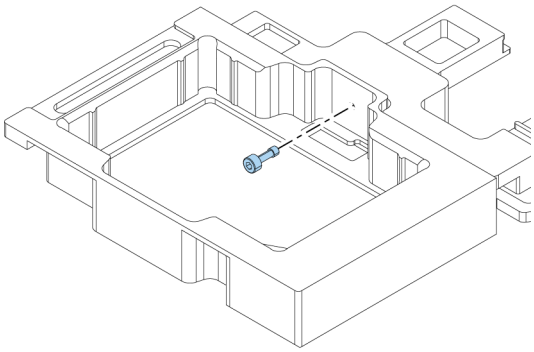
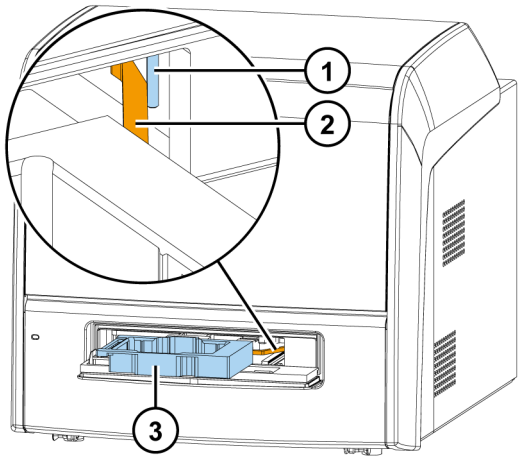


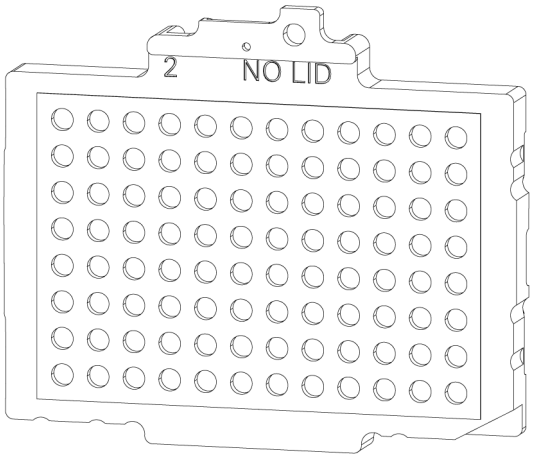
Figure 11. Close-up of the lever opening bar (1) and positioning lever (2) behind the plate tray (3).



d. Take a strip from the strip plate delivered with the instrument. Use it as a tip priming vessel and put it to the hole on the left edge of the tray.

e. Choose the detachable adapter according to the plate type you are using.

Figure 12. Detachable adapter for a 96-well plate.



f. Place the adapter at the very bottom of the tray and make sure it is level. It may be a tight fit. A click sound indicates a successful installation

Note The adapter will not go to the bottom of the tray if the positioning lever is in the way.

g. Push the plate tray into the instrument.

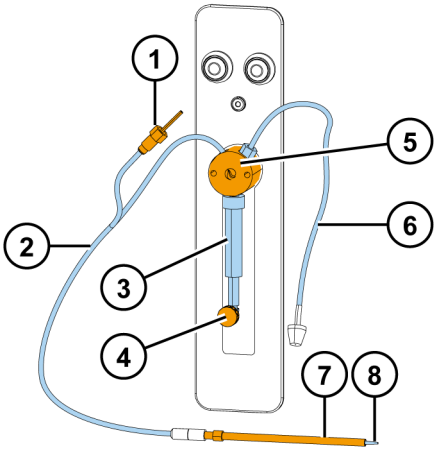
h. Replace the front cover by inserting the two top door latches into place while turning the cover 30° and then snapping it shut.

3. Set up the dispensers

a. Fit the complete dispensing tube assembly into the left hole of the valve and tighten it finger tight. The dispensing tube is used to dispense reagent from the syringe into a microplate.

Connect the male connector of the dispensing head position sensor to the corresponding female connector above the valve.

Figure 13. Dispenser. Male connector of the dispensing head position sensor (1), dispensing tube assembly (2), dispenser syringe and plunger (3), plunger lock screw (4), valve (5), aspirate tube assembly (6), dispensing head (7), dispensing tip (8).

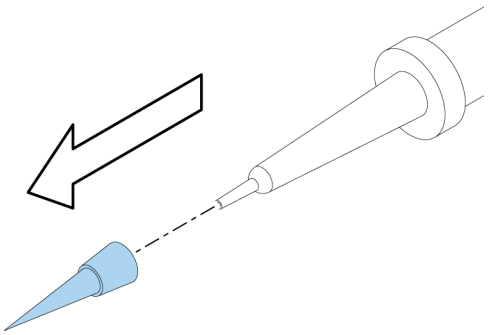


b. Fit the aspirate tube assembly to the right hole of the valve and tighten it finger tight. The aspirate tubing is used to fill the syringe with reagent.

c. Insert the dispensing heads into their respective head holder slots on the left-hand side of the dispenser.

d. Remove the protective cap from the dispensing tip.

Figure 14. Cap and dispensing tip.



4. Set up the integrated gas module

The optional integrated gas module is integrated in the instrument. You just need to attach the supplied tubes (see Figure 13 on page 10) between the instrument and a gas supply system.

The gases required for the module (CO_2 and / or N_2) are supplied to the device from a separate gas supply system, either from gas cylinders or from a central pressurized gas container.

When feeding gas inside Varioskan LUX, there is always some gas emission from the instrument to the surrounding atmosphere. Therefore ensure that the working area is well ventilated.

CAUTION Ensure that the working area is well ventilated. In order to control the gas atmosphere, CO_2 and O_2 sensors must be present on the wall of the room where the Varioskan LUX with a Integrated gas module is installed. Follow the instructions of the sensor manufacturer.

Table 1. Ventilation efficiency

Room size (m^2/ft^2)	Ventilation efficiency (l/m^2/s or cfm/ft^2)
>30/320	0.9/0.18
12-30/130-320	2.0/0.4
6-12/65-130	4.0/0.8

Do not use gas control module in a room smaller than $6m^2$ (65 ft^2).

The above requirements for ventilation efficiency are calculated based on the limits defined by US Department of Labour / Occupational Safety & Health Administration (OSHA).

OSHA has determined the limit values for the safe working environment as follows:

- CO_2 concentration must not raise above 0.1% (OSHA Technical Manual TED 01-00-015, Section 3, Chapter 2)
- O_2 concentration must not drop below 19.5% (OSHA Respiratory Protection Standard 29 CFR 1910.134, paragraph (d)(2)(iii))

Note The national regulations may differ from the OHSA regulations. Check the regulations of your area before use. According to our current understanding the OSHA limits are the most conservative.

CAUTION If ventilation is not sufficient to keep the gas concentrations within recommended levels, working in the room may cause headache, nausea or in extreme situations even death.

The CO_2 and O_2 concentrations in the room can also be affected by other instruments that are connected to the gas cylinders. Human respiration also produces CO_2 to the surrounding environment.

The person installing the gas supply system to Varioskan LUX must be a professional.

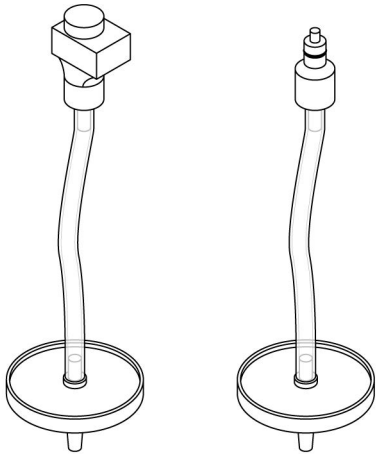
For security the gas cylinders must be properly fastened to a wall. Make sure the tubes between the instrument and the gas supply system are connected tightly.

The layout of the gas supply system must ensure that the operating pressure of the gas supply lines can be set to a range between 0.8 bar (min.) to 1 bar (max.) and that the pressure cannot be changed.

To install the integrated gas module:

a. Attach the gas supply system to the filters using silicon tubing (or similar) with 4 mm internal diameter.

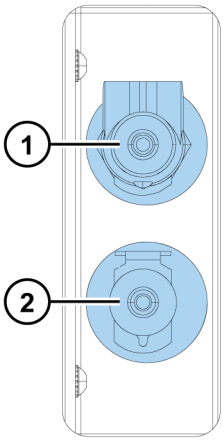
Figure 15. Supplied tubes for O_2 (left) and CO_2 (right).



b. Attach the connectors at the other ends of the tubes to the gas connectors on the back panel of the instrument (see Figure 13 on page 10).

Attach CO_2 gas line to the connector 1 and N_2 gas line to the connector 2.

Figure 16. Connector for CO_2 gas line (1) and connector for N_2 gas line (2).



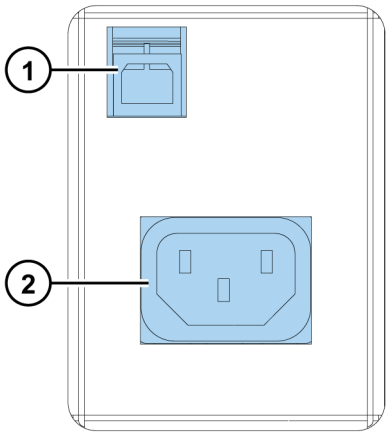
5. Connect the power supply cable and the USB cable.

CAUTION Make sure the power switch is in the 'off' position. Do not operate your instrument from a power outlet that has no ground connection.

a. Connect the mains supply cable to the mains power supply connector on the back panel. If you need to use a different type of mains supply cable other than the one supplied, use only cables certified by the local authorities.

b. Connect the instrument mains supply cable to a correctly installed line power outlet that has a protective conductor that is grounded.

Figure 17. USB connector (1) and mains power supply connector (2).



c. Connect the instrument to the PC using a USB cable.

6. Install SkanIt Software.

For installation instructions, refer to the *Thermo Scientific™ SkanIt™ Software for Microplate Readers User Manual* (available in multiple languages).

Operations

This chapter describes the instrument preparation steps you can take before you start a measurement.

After you have installed the instrument, switch it on and start SkanIt Software. The software finds the instrument automatically. Refer to the *Thermo Scientific™ SkanIt™ Software for Microplate Readers User Manual* for instructions.

Do not operate the instrument when it is disassembled.

Switch the Instrument On

The power switch is on the left side panel of the instrument. Switch it to the 'on' position.

The LED indicator on the front cover of the instrument indicates three states:

- green = on and ready for operation
- orange = in operation
- red = error

If there is no light, the power switch is off, or the power cable is not plugged in.

Instrument Startup

The instrument performs a set of initialization tests and adjustments. It also performs mechanical, electrical and optical checks. The LED light is orange during this check.

When the instrument is ready for measurements, the LED light turns green, and the plate tray is run out.

If anything fails in the initialization tests or adjustments, the LED light turns red. Turn the power switch off, then on. If this does not help, contact the authorized technical service.

Switch the Instrument Off

Switch the instrument off after daily use.

1. Rinse the dispenser tubing thoroughly with deionized, distilled water after each use. Leave the fluid pathway filled for storage.
2. Run the plate tray in from the software or from the instrument.

3. Switch the instrument off from the on/off switch on the left side panel of the instrument.

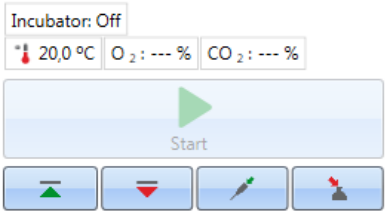
Run the Plate In / Out

You can run the plate tray in or out from the software or instrument.

From the Software

Click on the **Run plate in** or **Run plate out** icon below the **Start** button.

Figure 18. From left to right under Start: Run plate in, Run plate out, Prime dispenser(s), Empty dispenser(s).



From the Instrument

Press the Plate In/Out button in the instrument (left side) to run the plate in or out.

Figure 19. The Plate In / Out button icon.

Set the Instrument Temperature

You can set the instrument temperature up to 45°C from the software.

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

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

Tip You can also set the temperature from application menu -> **Settings** -> **Instruments**-> **General** -> **Use instrument temperature**.

Note The instrument has no cooling system.

Dispense

You can use two dispensers in the instrument for automatic reagent addition to a microplate.

Varioskan LUX uses dispensing tips that have 0.40 mm tip diameter for all dispensing volumes.

Dispensing Positions F and L

The instrument has two dispensing positions, F (fluorescence) and L (luminescence). Both positions can be used either with dispenser 1 or 2. The instrument recognizes which dispensing position a dispenser head is inserted into.

Figure 20. Dispensers 1 and 2, dispensing positions F and L.

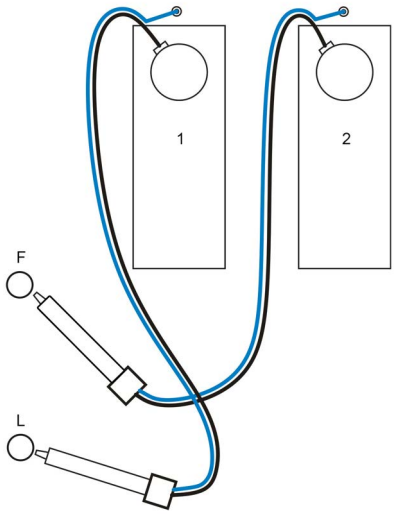


Table 2. Dispensing positions and the measurement positions they point at.

Position F	Position L
Fluorescence (top of the well)	Luminescence
Absorbance	Fluorescence (bottom of the well)
Spectral TRF	TRF
Spectral luminescence	AlphaScreen

To start a measurement at the same time as dispensing, place the dispensing head into the dispensing position (F or L) that points at the correct measurement position (see Table 1 above). This way there is no delay time between dispensing and measurement, which is important in fast kinetic reactions.

If you use a dispensing position that does not point at the correct measurement position, the instrument makes an extra plate movement before the measurement step. This may cause minor time delays between dispensing and measurement.

Prime the Dispensers

Before you use dispensers in a measurement session, you must prime them. Priming dispensers means filling the tubing with the dispensing liquid. The aspirate tube is the input tube, which is between the reagent container and syringe. The dispense tube is the output tube.

Figure 21. Prime button icon.

You can start the priming from the software or instrument.

1. Insert an empty plate of the same height as the assay plate into the plate tray.
2. Place the head of the aspirate tube into the reagent container.
3. Hold the dispense head in a waste container.

   IMPORTANT Do not insert the dispensing head into the dispensing position F or L during priming.

4. Start the priming.
   a. from the instrument:

      Press the **Prime** button until the liquid flows out.

   b. from the software:

      i. Click the **Prime dispenser(s)** icon to open the **Prime** window.

      ii. Select the dispenser.

      iii. Select the volume and speed.

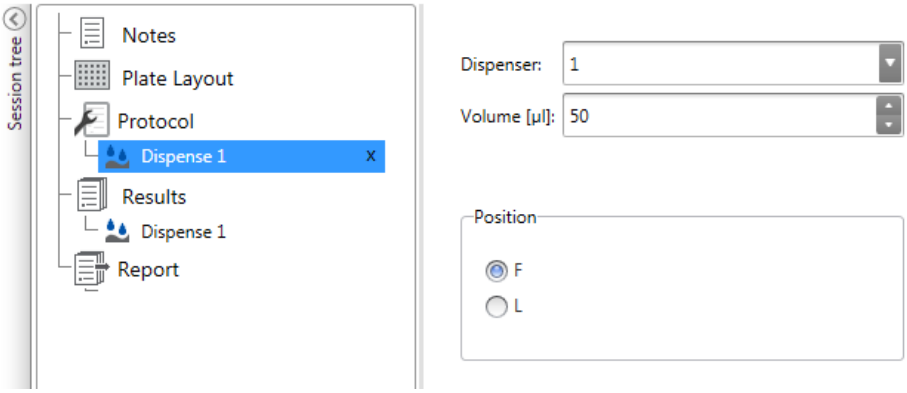
      iv. Click **Prime**.
5. Insert the dispensing head in position F or L.

Dispensing Step in a Measurement Session

After priming the dispensers, you can run a session which includes dispensing. Make sure the dispensing parameters are correct.

Select the same dispenser (1 or 2) and position (F or L) for both the software and instrument. The instrument automatically checks that the same positions are selected.

Figure 22. Select the same dispenser (1 or 2) and position (F or L) in the software as you selected in the instrument.



Empty the Dispensers

You can use the instrument or software to empty the liquid from the tubes back into the reagent container.

Figure 23. Dispense button icon.

a. From the instrument:

   Press the **Empty** button until the liquid flows back.

b. From the software:

   i. Click the **Empty dispenser(s)** icon to open the **Empty** window.

   ii. Select the dispenser.

   iii. Select the volume and speed.

   iv. Click **Empty**.

Plate Trays and Plate Adapters

Plate Trays

There are two types of plate trays: universal and robotic.

The universal plate tray is for basic use. It is compatible with all plate formats (6 to 1536 well plates). Always use a plate adapter with a universal tray.

A robotic plate tray is for automation use with robots. It is compatible with 96 to 1536 well plate formats. Use the special robotic plate adapter when using a plate without a lid. Remove the plate adapter when using a plate with a lid on a robotic tray.

Note The universal plate tray is also compatible for robotic use with most of the robotic systems when gripping from the long sides of the plate is used.

When you have installed the plate tray, insert a tip priming vessel to the hole on the left edge of the tray. Strips of a 96-well strip plate can be used as a priming vessel. One strip plate is delivered with the instrument accessories.

Figure 24. Assembly illustration of a universal plate tray: tray / adapter combination identification (1), tip priming vessel (2), screw fix (3), position calibration hole (4), tip priming vessel holder (5), plate adapter (6), positioning lever (7), plate tray (8).

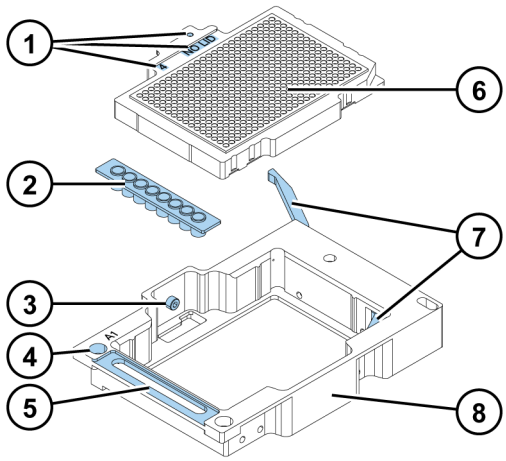


Plate Adapters

Plate adapters are used for adapting plates that are of different heights. Adapters lift the plates to the optimum height for measuring and dispensing.

Before you run a measurement, check that the correct plate adapter is in the plate tray. Choose the adapter based on the plate format you have (96, 384,...) and if you are using a lid or not.

Table 3. Available plate adapters.

Adapter no.	Cat. no.	Plate adapter	Supports dispensing
2	N02692	96-well adapter for plate without lid*	•
3	N02693	96-well adapter for plate with lid	
4	N02690	384-well adapter for plate without lid*	•
5	N02691	384-well adapter for plate with lid	
6	N03395	96-well adapter for PCR plate without lid To be used with 0.2 mL PCR plates	•
48	N02697	6-48-well adapter for plate with lid	

Table 3. Available plate adapters.

Adapter no.	Cat. no.	Plate adapter	Supports dispensing
65	N06210	1536-well adapter (10 mm) for plate without lid	
80	N02696	6-48-well adapter for plate without lid*	•
126	N03079	Robotic tray with adapter for plate without lid	•
127	N03079	Robotic tray without adapter for plate with lid	

*) Supplied with the instrument.

Plate Template and Adapter Association in the Software

You need to select the plate template you will use in the measurement:

1. Click on the **Plate template** drop-down list in the **Plate Layout** view.
2. Select a template that you will use in a measurement.

   The plate templates are automatically associated with the compatible plate adapters. When you start a measurement, the software checks that the selected plate template and the installed plate adapter are compatible.

Install LAT Module Filters

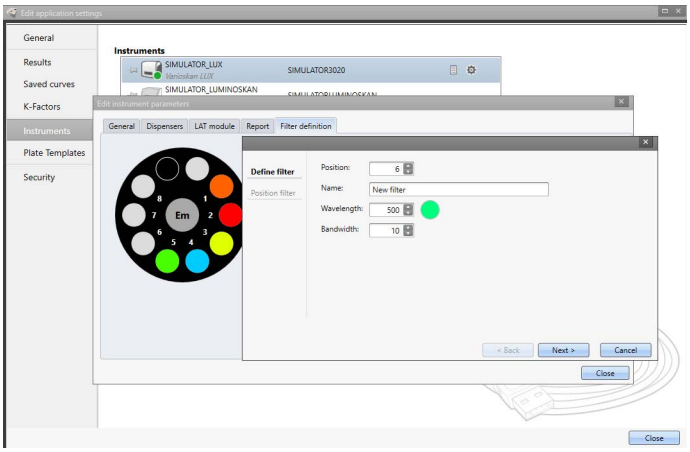
The LAT module has built-in AlphaScreen and TRF excitation filters. You need to install the AlphaScreen, TRF, and luminescence emission filters.

IMPORTANT Do not touch the surfaces of the filters with bare hands.

1. Turn on the instrument and open SkanIt Software.
2. Open the dispenser sliding cover and the LAT module cover.
3. Select the filter position in SkanIt Software:
   a. Click **Settings** on the application menu.
   b. Click **Instruments**.
   c. Click the icon (on the right side of the instrument name) to open the **Edit instrument parameters** window.
   d. Click the **Filter definition** tab.
   e. Click **Add**.
   f. Select a free filter position from the filter wheel and add the new filter information.
   g. Click **Next**.

      The filter wheel is now turned to the selected position.

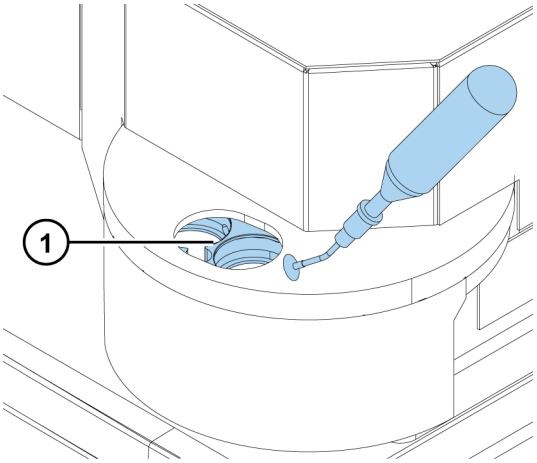
Figure 25. The Add new filter pop-up window.



4. Open the blue filter nest lid on the LAT module.
5. Loosen the filter wheel screw on the selected position.
6. Place the filter on a clean, dust free surface with the arrow on the side of the filter pointing upwards.
7. Use the filter pick-up tool to place the filter into the bottom of the filter nest.
8. Tighten the filter wheel screw.

Note It is critical that the filter wheel screw is tightened. If it is left open the screw will prevent the filter wheel from rotating and can lead to serious jamming of the filter system.

Figure 26. Filter nest (1) and pick-up tool.



9. Close and fasten the filter nest lid.
10. Click **Finish**.

Gas Control

The optional Integrated gas module allows you to control the CO_2 and / or O_2 concentration inside the instrument measurement chamber in cell-based assays.

- CO_2 concentration range 0.1 - 15%
- O_2 concentration range 1 - 21%

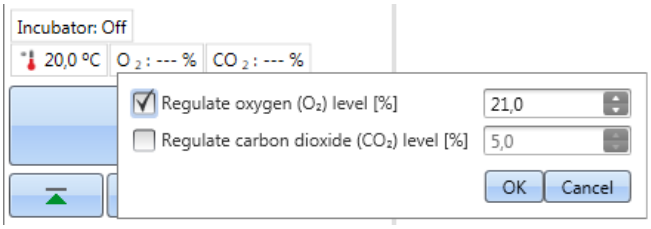
You need to connect gas bottles to the instrument. The O_2 concentration is adjusted by feeding nitrogen (N_2) into the instrument. See the *Thermo Scientific™ Varioskan™ LUX Technical Manual* (Cat. No. N16045) for details on how to connect the gas bottles and use gas control.

CAUTION Use a carbon dioxide and oxygen sensor in the room where the Integrated gas module is used.
CAUTION Follow safety procedures when working with gas bottles.

Set the Gas Atmosphere

1. Click the gas atmosphere icon above the **Start** button to open the pop-up window.

Figure 27. The gas atmosphere pop-up window.



2. Set the oxygen and carbon dioxide levels as needed and click **OK**.

   You can now see the current and target gas concentrations above the **Start** button.

Rules for Safe Use

CAUTION

1. Do not open optical covers to avoid ultraviolet radiation injury.
2. Do not operate the instrument when it is disassembled or exposed.
3. Do not use cell or tissue cultures in the device that are not in accordance with the regulations of safety levels L1, L2 and L3.
4. Use a carbon dioxide and oxygen sensor in the room where the Integrated gas module is used.
5. Follow safety procedures when working with gas bottles.

IMPORTANT

1. Do not open the chamber door during operation
2. Only authorized personnel can open optical covers.
3. Use blind plugs to close empty dispensing positions to avoid stray light.
4. Do not wash the electronic parts of the LAT base when you clean the instrument from below.
5. Make sure the dispense tubing is properly installed to avoid leakage.
6. Do not autoclave any part of the instrument.
7. Do not loosen or remove screws or parts other than those allowed in the instructions.
8. Do not touch filter or optical lens surfaces with bare hands.
9. Do not damage the optical system components.

Note

1. Decontaminate the instrument before removing from the laboratory and before servicing.
2. Check the installation and maintenance checklists.
3. Keep all of the holes in the plate adapter clean.
4. Do not use the instrument if it does not function properly.
5. Do not spill fluids in or on the equipment.
6. Take the chemical resistance of the dispensers and microplates into account.
7. Make sure the microplate or tip priming vessel is not too full.
8. Do not use any liquids that may cause precipitation or congealing or that contain mechanical particles with the automatic dispensers.
9. Do not let the dispensers run dry.

Tip

1. Empty the priming vessel after use.
2. Keep the bottom of the microplates dry to avoid contamination.
3. Change the 8 well plate strip (1x8 Thermo Scientific™Microtiter™ Solid Strip Assembly) priming vessel when needed.

Safety and Maintenance

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

General Safety Guidelines

- 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.

Instrument Safety

- Follow the preventative maintenance instructions to keep the instrument in the best condition. Go to Maintenance Checklist.
- Observe all safety symbols and markings on the instrument.
- Do not open any covers except the dispenser sliding cover 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 (LED indicator orange).
- Do not push the plate tray in manually unless the instrument is switched off.
- Do not force a microplate into the instrument.

Instrument Requirements

Check the instrument requirements before you install it.

Table 4. Instrument requirements

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, nominal
Power consumption	200 VA maximum

Safety Specifications

The safety specifications are also met under the environmental conditions listed in the table below in addition to or in excess of those stated in the operating conditions.

Table 5. Safety specifications

Altitude	< 2000m
Temperature	5°C to 40°C
Humidity	Maximum relative humidity 80% for temperatures up to 31°C, decreasing linearly to 50% relative humidity at 40%.
Mains supply fluctuations	±10% from nominal
Installation category (overvoltage category)	II according to IEC 60664-1*
Pollution degree	2 according to IEC 60664-1**

*) 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 overrvoltage is 2500 V for a 230 V supply and 1500 V for a 120 V supply.

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

Emergency Situations

In emergency situations:

1. Switch off the instrument.
2. Unplug the instrument form the power supply.
3. Carry out corrective measures.

Note Do not disassemble the instrument.

For more help, contact authorized technical service or your local Thermo Fisher Scientific representative.

Instrument Maintenance

Clean the instrument after each use.

1. Switch the instrument off with the tray out.
2. Wipe the surface of the tray with a soft cloth or tissue paper moistened with distilled water, mild detergent (SDS, sodium dodecyl sulfate) or a soap solution.
3. Disinfect any spilled infectious agents with 70% ethanol or another disinfectant.
4. Push the tray back into the instrument.
5. Check the dispensers for leaks and correct any problems.

Maintenance Checklist

Table 6. Maintenance checklist

Maintenance	Daily	Weekly	Monthly	Yearly	If required
Keep the instrument clean.	•				
Clean the instrument case and reagent basin.		•			
Clean the measurement chamber.			•		
Clean the tray.					•
Change the 8 well plate strip priming vessel after 250 tip primings if the priming is 10µl and after 2500 tip primings if the priming volume is 1µl.		•	•		
Clean the dispensing base.					•
Clean the fluorescence bottom reading optics.					•
Clean the absorbance optics.					•
Clean the LAT module.					•
Clean the LAT base.					•
Clean the dispensers.	•	•			
Replace the dispenser tubings.					•
Replace the dispensing tip.					•
Replace the dispenser syringe.					•
Ensure proper shutdown.	•	•			
Service the instrument.				•	