



MATEO TL Microscope User Manual



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Important Notes

This user manual is an essential part of the product. It must be read carefully before the product is assembled, put into operation or used, and must be kept for later reference.

Symbols Used

Symbol	Meaning
	This symbol is used to warn against touching hot surfaces, such as light bulbs.
	This symbol indicates additional information or explanations that are intended to provide clarity.
	This symbol indicates a hazard with a medium degree of risk that, if not avoided, can result in death or serious injury.
	This symbol indicates a hazard with a low degree of risk that, if not avoided, can result in minor or moderate injury.
	This symbol indicates especially important information that is mandatory to read and observe. Failure to comply may cause the following: • <i>Personal injury.</i> • <i>Product malfunctions and damage</i>
	Warning of hazardous electrical voltage! Risk of electrical shock! Failure to comply may cause the following: • <i>Personal injury.</i> • <i>Product malfunctions and damage.</i>

	Warning of electromagnetic field
	Connection to ground!
	Item not contained in all configurations.
	IVD manufacturing date, for example: 11/2011 for November 2011.
	Device for in vitro diagnostics (IVD).
	Manufacturer's address with manufacturing date
	China RoHS 50 years EFUP (Environmentally friendly use period)
	Catalogue number
	Serial number

Safety Notes

In order to maintain the microscope in its original condition and to ensure safe operation, you must follow the instructions and warnings contained in this manual.

Only operate the system in a technically perfect condition.

General Safety



The instrument and accessories described in this manual have been tested for safety and potential hazards. The responsible Leica affiliate or the main plant must be consulted whenever the device is altered, modified or used in conjunction with non-Leica components that are outside of the scope of this manual.



Unauthorized alterations to the device or noncompliant use shall void all rights to any warranty claims and product liability!



Prior to connecting power or to operation, check the components and accessories for damage.



Do not use damaged, non-functioning components or accessories. Instead, notify your Leica branch office or Leica dealer.



In order to ensure the product reliability and warranty services, the system must be exclusively operated with the original accessories and in particular the original power cord. The user bears the risk when using non-approved accessories.



Unauthorized alterations to the device or noncompliant use shall void all rights to any warranty claims and product liability!



This instrument is for indoor use only.



In case of safety-related malfunctions, switch off the system immediately, disconnect it from the power supply and take suitable measures to prevent further use.



In all cases of doubt regarding the safety of the system, switch off the system and prevent further use.



The internal battery has a durability of approx.5 years and can be replaced in the factory or by a certified service technician.



The product should be positioned to ease the plug and unplug of power cord by the operator.



Only insert or unplug data and control circuits when the instrument is switched off, otherwise the instrument may be damaged.



The external USB devices associated with the equipment should comply with IEC60950.



During the operation, necessary protective measures should be taken by the customer to prevent injury to operator by the solution.



IMPORTANT! Mateo TL should not be subjected to UV sterilization. UV degrades many materials, including plastic. Damage from UV exposure is not covered under the manufacturer's warranty.

Directives of European Community (EC-Directives)

The system fulfills the EU Directive 2014/35/ EU concerning the safety of electrical equipment and 2014/30/EU concerning electromagnetic.

System safety and EMC

Our system has been designed, produced and tested in compliance with



IEC 62368-1: Information technology equipment – Safety – Part one: general requirements



Radio interference suppression in compliance with EN 55011 class B



EN 61326-1, Electrical equipment for measurement, control and laboratory use –EMC requirements



This product of protection class 1 is built and inspected in accordance with IEC/EN61010-1 Safety requirements for electrical equipment for measurement, control and laboratory use and IEC/ EN 61010-2-101 Safety requirements for electrical equipment for measurement, control and laboratory use, Part2 Particular requirement- In vitro diagnostic (IVD) medical equipment.



It also meets the EMC-standards IEC/EN 61326-1 and IEC/ EN 61326-2-6 for electrical equipment for measurement, control and laboratory use and particular requirements for In vitro diagnostic (IVD) medical equipment.

The system meets the requirements of EU directives and carries the CE mark.



2014/35/EU Low voltage directive



2014/30/EU EMC directive



2011/65/EU RoHS directive



2009/125/EC + VO EU 2019/1782 Eco-design requirements for energy-related products

Electrical safety



Use only original power cables or alternative cables with a VDE / HAR logo, which at least fulfill the requirement of $3 \times 0.75 \text{ mm}^2$ and 10A/250V. Use the original power supply only (LPS-certified Power Supply with the same specifications).



Make sure that the power cord is approved for use in the country in which you intend to use it.



The cables shall be plugged or unplugged in the de-energized state! Before connecting the system, check that the supply voltage and frequency are correct at the installation site.



Always hold the plug of power supply when removing it from the socket outlet. Never unplug it by pulling the cable.



If the original power supply fails or is damaged, have it replaced by Leica service. Original power supplies are available from your Leica branch office or Leica dealer.



Do not repair the power supply.



Electrical work must only be carried out by Leica Service.



To avoid injury to the user and for cooling reasons and fire protection, never remove the covers of the components.



By definition, the main circuit breaker of this instrument is the connector between the power cable and device port. An unobstructed access to the main circuit breaker must be ensured at all times.



The power plug may only be plugged into an outlet equipped with a ground contact. Do not interfere with the grounding function by using an extension cord without a ground wire. Any interruption of the ground wire inside or outside of the device, or release of the ground wire connection, may cause the device to be hazardous. Intentional ground interruption is not permitted!



Do not use this instrument near sources of high electromagnetic radiation (for example, unshielded, intentionally operated ultra-high frequency sources); otherwise, the proper operation may be disrupted.

We recommend assessing the electromagnetic environment before operation of the components and then giving corresponding instructions.



Do not use the microscope in altitudes exceeding 2000 m ASL/

NL.



Transport and store in a temperature range of -20° – $+70^{\circ}\text{C}$ and at a humidity not exceeding 90%. If the system has been stored in a cold environment or at high humidity, wait until it is absolutely dry and has reached approximately room temperature before operating the system.



The microscope's electrical accessory components are not protected against water. Water may cause electric shock.



Do not immerse the components in water.



Ensure that no liquids or objects enter the interior of the components (during cleaning, etc.).



Protect the microscope from excessive temperature fluctuations. Such fluctuations may lead to the accumulation of condensate, and damage the electrical and optical components.

Notes on handling immersion oil



When the immersion oil is used, take care to avoid skin contact! Request a safety data sheet from the supplier!

Notes on handling acids and bases



Be absolutely certain to avoid direct contact with these chemicals.

Notes on disposal

After the end of the product life, please contact Leica Service or Leica Sales on how to dispose of it.



Please observe the national laws and ordinances which, for example, implement and ensure compliance with EU directive WEEE.



Like all electronic instruments, the microscope, its components and expendables may not be disposed of as general household waste!

Hazardous Substance Marking Table

Part Name	Hazardous Substances					
	Pb	Hg	Cd	Cr (VI)	PBB	PBDE
Printed circuit boards	x	o	o	o	o	o
Electronic components	x	o	o	o	o	o
Mechanical parts	x	o	o	o	o	o
Cables and cable accessories	x	o	o	o	o	o
Displays	x	o	o	o	o	o
Light sources	x	x	o	o	o	o
Optics	x	o	x	o	o	o

This table is prepared in accordance with the provisions of SJ/T 11364.

o: Indicates that said hazardous substance contained in all of the homogeneous materials for this part is below the limit requirement of GB/T 26572.

x: Indicates that said hazardous substance contained in at least one of the homogeneous materials used for this part is above the limit requirement of GB/T 26572.

Introduction

The Leica Mateo TL microscope is an inverted microscope and is intended for use as a general laboratory microscope for routine examinations of biological samples. It can be placed on a standard lab bench or inside the cell culture laminar flow hood of compatible dimension (refer to System Specification for Mateo TL dimension).

Intended Use

Intended use of Mateo TL RUO

Inspection, counting, classification, identification and monitoring of cell and tissue cultures, as well as examination of biological specimens, liquids and sediments. Not for use in diagnostic procedures.

Intended use of Mateo TL IVD global

Inspection, counting, classifying, identifying and controlling cell and tissue cultures, reviewing biological samples resulting in information regarding the physiological and/or pathological conditions inborn anomalies. The resulting actions are based on the interpretation by medical professionals.

System Specification

System type	Inverted microscope
Illumination	LED
Contrast methods	Transmitted light: Brightfield (BF) and Phase Contrast (PH)
Condenser	S40/0.45 condenser Working Distance: 50 mm
Phase turret	3-position turret: BF, PH0, PH1, encoded
Objective nosepiece	4-position nosepiece, encoded
Objectives	Preinstalled objectives: ● Obj. HI PLAN 4x /0.10 PH0 ● Obj. HI PLAN I 10x /0.22 PH1 Optional objectives: ● Obj.HI PLAN I 40x/0.50 PH1 ● Obj.HI PLAN I 20x/0.30 PH1
Camera	6 megapixel color camera (integrated)
Monitor	15.6 inch, 1920x1080
Stage	Fixed stage (L*W) 262 x 212 mm Optional object guide kit including one attachable object guide and two holding frames
Focusing	Coarse and fine focusing, travel range 7mm, min. adjustment 2μm

USB ports	1x USB 3.0 and 2x USB 2.0
Optional software module	Confluency module
Optional WIFI dongle	WIFI Dongle 2.4 GHZ
Optional transportation case	Transportation case for Mateo TL
Dimension (depth x width x height)	Monitor in display position: 310mm x 376mm x 530mm / 12.2in x 14.8in x 20.9in Monitor in folded position: 310mm x 376mm x 385mm / 12.2in x 14.8in x 15.2in
Weight	11kg (base configuration without optional accessories)
Operating temperature	4°C ~ 37°C
Storage temperature	-20°C ~ 70°C
Relative humidity	30% ~ 90%
Input power/Power supply	Rated Mains Power Supply Voltage: 100-240VAC Rated Mains frequency: 50-60Hz Max. Power: 60VA Power supply connection: Electrical circuits (10 A) for socket outlet Permitted power consumption of the multiple socket outlets: 2200 VA Protection class: I Overvoltage category: II Pollution degree: class II
Microscope	Voltage: 12VDC Max. Power: 60W
USB port	5V, 0.5A
Manufacturer	Leica Microsystems Ltd. Shanghai Floors 1, 2, 3A, 4A and 6, Building T20-1, Room 301, Building T20-5, No. 258, Jinzang Road, China (Shanghai) Pilot Free Trade Zone, Shanghai, People's Republic of China, 201206 021-58994990

System Overview

Front view



1. Display

Adjustable display to suit user viewing angle.

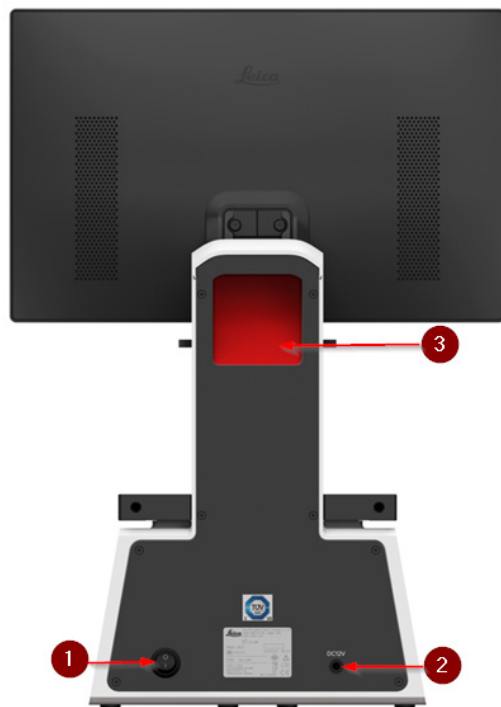
2. Object guide and holding frame

Supports precise movement of the sample vessel.

3. LED indicator

- Indicator light up: indicates the system is on.
- Indicator light out: indicates the system is off.

Rear view



1. Power switch

Press to power on/off the system.

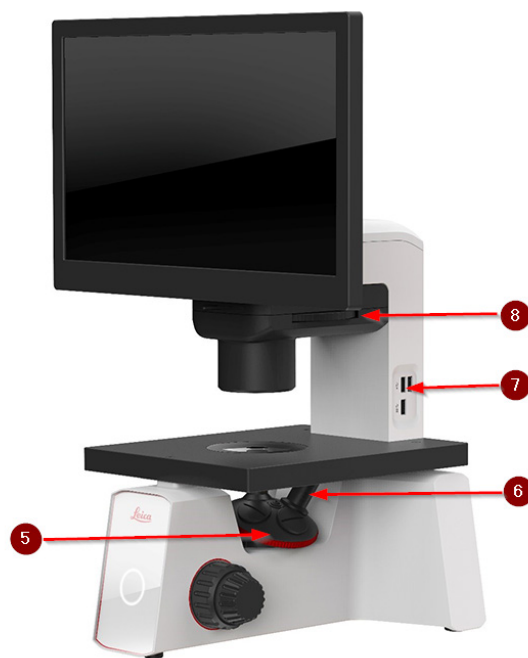
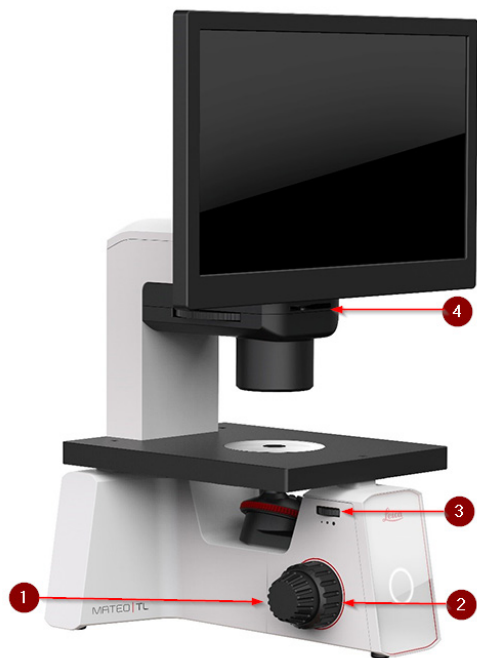
2. Power supply connection

For plugging in the power supply.

3. Supporting handle

Hold the handle to facilitate safe and steady transportation of the equipment.

Left and right view



1. Fine focus knob

For fine tuning the focus of the specimen.

2. Coarse focus knob

For quickly adjusting nosepiece vertical position to identify image focus.

3. Light intensity adjustment wheel

Rotating counterclockwise to increase light intensity. Rotating clockwise to reduce light intensity.

4. Aperture diaphragm adjustment lever

The aperture diaphragm defines the resolution, focus depth and contrast of the microscopic image. The best resolution is obtained when the apertures of the objective and the condenser are roughly the same.

5. Nosepiece

Nosepiece is the base where objectives are to be installed. Rotate nosepiece to move the objective of interest to the light path.

6. Objective

For magnifying the sample.

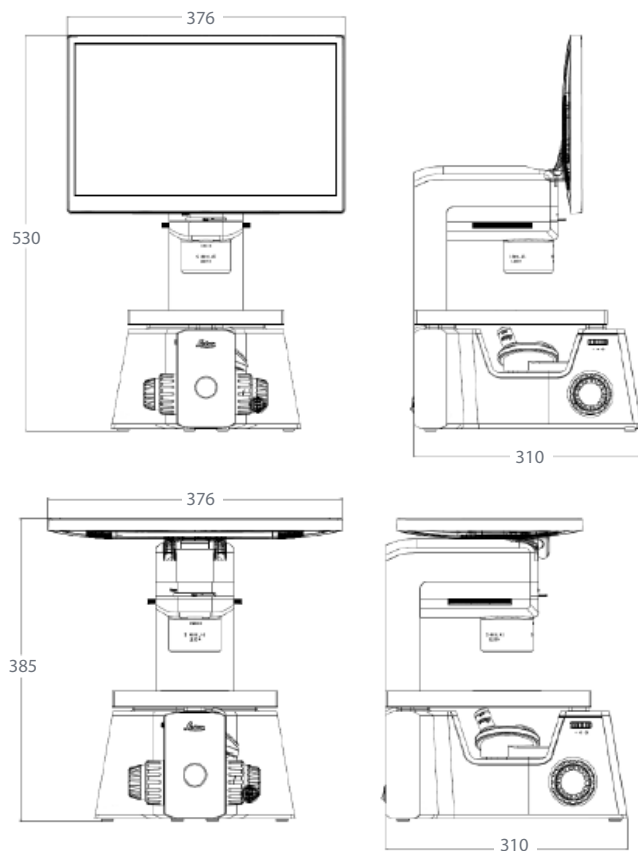
7. USB ports

- The upper two ports: USB 2.0.
- The lower port: USB 3.0.

8. Phase turret

Turn the wheel to switch contrasting methods among PH0, PH1 and BF.

Display in upright and folded position (dimension data in cm)



Unpacking

Before setting up Mateo TL, carefully remove all components from the transportation and packaging materials.



When the equipment is received by the customer, it should be checked that its appearance and screws are tightened. Then the installation and operations can be performed.



If possible, avoid touching the lens surfaces of the objectives. If fingerprints do appear on the glass surfaces, remove them with a soft leather or linen cloth. Even small traces of finger perspiration may damage the surfaces in a short time. Refer to ["Care and Maintenance" on page 58, for additional instructions.](#)

Mateo TL base configuration:

The following parts will be included in the delivery:

- Mateo TL stand with integrated camera and monitor
- Two preinstalled objectives:
 - Obj. HI PLAN 4x /0.10 PH0
 - Obj. HI PLAN I 10x /0.22 PH1
- Wireless mouse
- Mouse pad
- Power adaptor and power cord
- Dust cover
- User manual and Quick start guide

Optional accessories:

The following parts, if purchased, will be included in the delivery:

- Object guide kit (one object guide and two holding frames)
- Optional objectives:
 - Obj. HI PLAN I 40x/0.50 PH1
 - Obj. HI PLAN I 20x/0.30 PH1
- WIFI dongle
- Transportation case
- Paper containing the ticket number of confluency module

Preparation

Before performing any experiments, please set up your microscope according to the following instructions.

 Microscope should be used in a dust-free room, which is free of oil vapors or other chemical vapors, as well as extreme humidity. At the workplace, large temperature fluctuations, direct sunlight and vibrations should be avoided which may distort measurements and micrographic images.

 If you want to put the Mateo TL inside a laminar flow hood, you should check in advance whether there is a cable port inside the flow hood.

Connecting Power Supply

Prerequisites:

1. The power switch is on 'off' position.
2. The power indicator of Mateo TL is off.

Steps:

1. Connect the power cable and the power adaptor.
2. Connect the power adapter to the power port on the rear side of Mateo TL.
3. Connect the power cable to the power socket.

Turning on the System

1. Press the "On" end of the power switch at the lower rear side of the microscope to turn on the system.
2. Check the LED status at the lower front side of your microscope:
 - **Indicator light up:** indicates the system of Mateo TL is on.
 - **Indicator light out:** indicates the system of Mateo TL is off.

Installing Wireless Mouse

1. Plug the USB connector or USB dongle of your wireless mouse to one of the USB ports on the stand (USB 2.0 port is preferred).
2. Power on your mouse, and move it around to make sure the cursor moves along with your mouse accordingly.

Installing Keyboard

Mateo TL system comes with a built-in virtual keyboard. You can also connect a physical keyboard, wired or wireless, if needed. (USB 2.0 port is recommended for connection with the system).



The built-in virtual keyboard supports English and Chinese input.

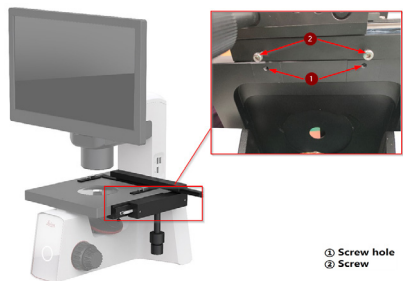
Installing Object Guide and Holding Frame



Object guide and holding frames are optional items

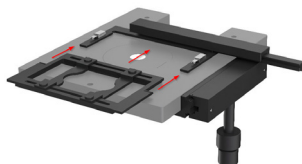
Installing Object Guide

1. Locate the two screw holes on the right side of the stage, as shown in the picture below.
2. Align the two hexagon screws of the object guide with the two screw holes on the stage, as shown in the picture below.
3. Turn the two screws clockwise manually until they are engaged with the holes.

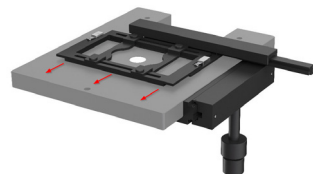


Installing Holding Frames

Align a holding frame with the installed object guide, push the holding frame until the fixing clip is locked with a click. See image below.



To uninstall/remove the holding frame, you can pull it outward until it is off from the object guide.



Installing Optional Objectives



For supported objectives, please refer to “Technical Data” on page 61.

Caution:

If necessary, first lower the focus to prevent damaging the objective front lenses.

1. Remove the screw caps on the nosepiece.



2. Turn the knurled ring of the nosepiece to make the target opening present at the right of the nosepiece.
3. Align the objective's lower end with thread to the target opening of the nosepiece, turn the objective clockwise until you cannot turn it anymore.



If possible, avoid touching the lens surfaces of the objectives. If fingerprints do appear on the glass surfaces, remove them with a soft leather or linen cloth. Even small traces of finger perspiration may damage the surfaces in a short time. Refer to “Care and Maintenance” on page 58 for additional instructions.



If any nosepiece opening is left unused, cover it with screw cap to protect the microscope optics against dust.

4. In the live view, click  to open the system “Settings” menu. Then, click “Objective setting” to set the parameters for the newly installed objective. (For details, please refer to “Objective Setting” on page 25).

Installing WIFI Dongle

Wi-Fi dongle is an optional item

With a Wi-Fi dongle, you can share images using your smart device. For installation and usage instructions, please refer to “Sharing Image(s) via Your Smart Device through Wi-Fi” on page 40.

Confluency module

Confluency module is an optional item, please purchase separately if needed.

For the activation and usage of confluency module, please refer to “Confluency Check” on page 42.

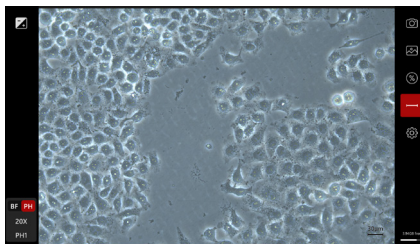
Transportation Case

All components of Mateo TL can be put into a transportation case for their safe transportation.

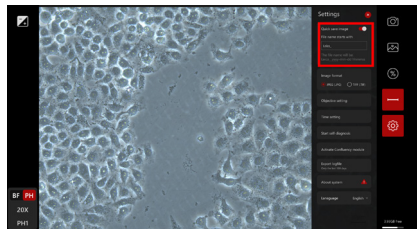
Getting Familiar with System Settings

In the live view, click  to open the system “Settings” menu where you can configure system settings per your preference.

To exit from system “Settings” menu, click the  on the top-right corner of the screen.



 All parameter values remain the same after system reboot, except the “image format” which goes back to default value “JPEG” after system reboot.



Quick Save Image

Options: Enabled or disabled.

Enabled:

If “Quick save image” is enabled, image can be automatically saved to gallery right after capturing an image, with the default naming rule below:

Prefix + timestamp + extension

Where:

- *Prefix: determined by “File name starts with” setting in system setting.*
- *Timestamp: in the format of “yyyy-mm-dd hhmmss”.*
- *Extension: JPEG or TIFF, determined by “Image format” setting in system setting, referring to “Image Format” on page 25.*

Example: Leica_2021-12-12 120000.jpg

Disabled:

If “Quick save image” is disabled, you need to name a captured image before saving it.

After taking an image, the system prompts a dialog window.

Enter the image name, and click “Confirm” to save the image. Then the system goes back to live view automatically.

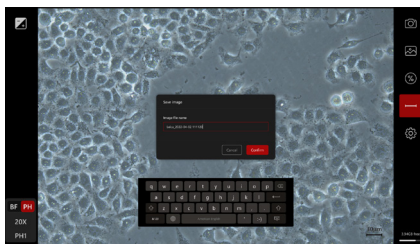
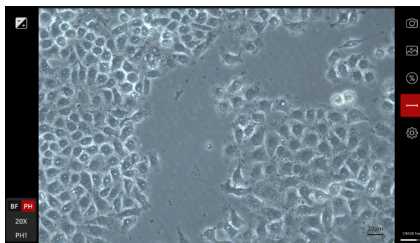


Image Format

Options: JPEG and TIFF



After system reboot, it goes back to the default value “JPEG”.

Objective Setting

Objective “Obj. HI PLAN 4x /0.10 PH0” and objective ‘Obj. HI PLAN I 10x /0.22 PH1” are pre-installed and pre-configured before delivery.

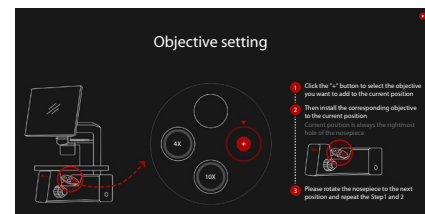
If an optional objective is installed, configuring that objective in the system is required.

Objective configuration procedure:

1. In the live view, click  to open the system “Settings” menu.
2. Turn the knurled ring of the nosepiece to make the target objective present at the right of the nosepiece.
3. Click “Objective setting”, a window appears, allowing you to configure the objective.

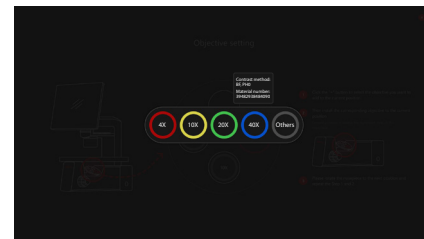


The objective you are configuring in the system is always the one at the right of the nosepiece.

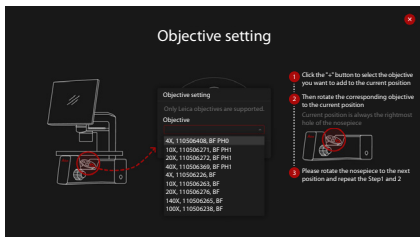
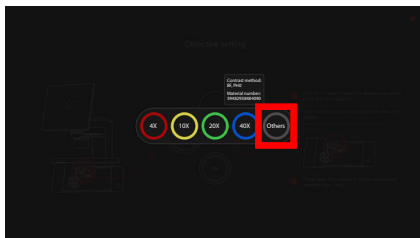


The system comes with the settings for each preinstalled objective and optional objective.

4. If the newly installed objective is one of the two optional objectives, click the corresponding icon of the objective to configure it.



- If you have other Leica objectives installed, click “Others” and select the correct objective in the list. Then, click “Confirm” to finish the configuration.



 After the completion of one objective. You can repeat the above steps to configure another objective. Please make sure the objective to be configured is positioned to the right of the nosepiece.

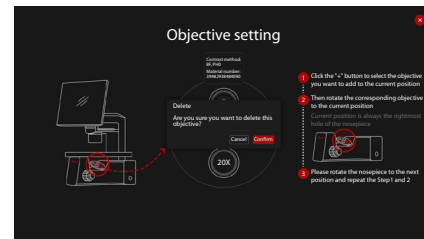
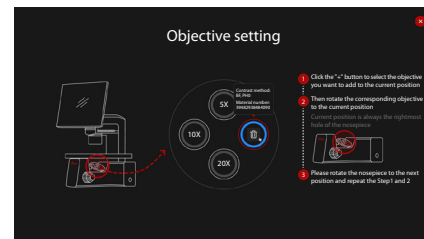
Delete the Objective Setting

If an objective is removed from the nosepiece, it is necessary to delete the corresponding objective setting.

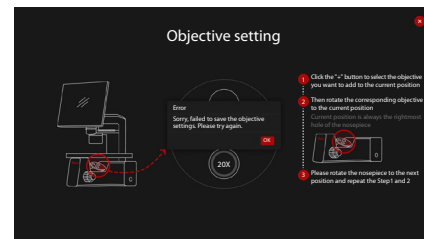
- Rotate the nosepiece to position the objective to be removed at the right of the nosepiece.

In the live view, click  to open the system “Settings” menu.

- Click “Objective setting”, and move your cursor to the icon of the objective to be removed until a trash bin icon  appears.
- Click , then click “Confirm” to remove the objective from the configuration.
- Remove the corresponding objective from the nosepiece.



- If removal fails, a dialog box is prompted, click “OK”. Then, you can repeat above steps to remove again, or close the window to abort removal.

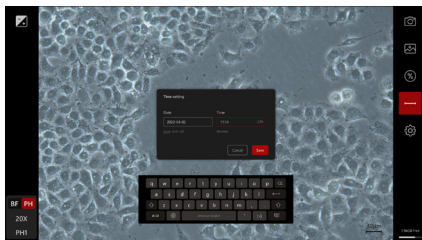


Time Setting

1. In the live view, click  to open the system “Settings” menu.
2. Click “Time setting” and enter date and time meeting the format requirements in the prompted window. Then, click “Save”.

Format requirement:

- Date: yyyy-mm-dd
- Time: hh:mm (24 hours)



If the format requirement for date or time is not met, a warning message appears to remind you the date and time you entered is invalid.



Start Self-diagnosis

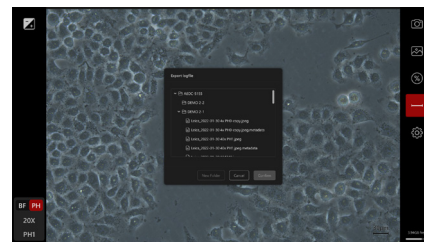
For details, please refer to “Self-diagnosis” on page 56.

Export Log file



The system stores log files for the last 180 days. Those files facilitate the diagnosing and troubleshooting if service is required.

1. Plug in your USB disk to one USB port on the stand. (USB3.0 port is preferred for fast data transmission)
2. Go to “System setting” menu and click “Export logfile”
3. Select a folder of the USB disk to save the log file, then click “Confirm” to export the file.
4. Provide the log file to Leica service for analysis



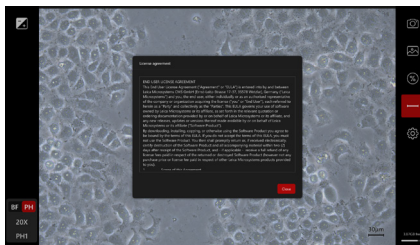
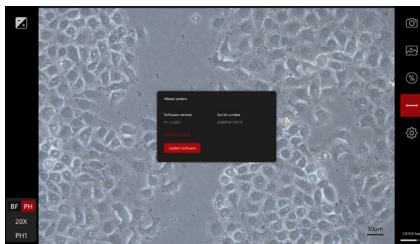
Activate Confluency

For the activation and usage, please refer to “Confluency Check” on page 42.

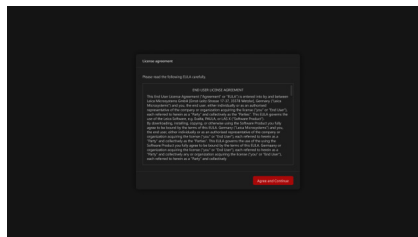
About System

From “About system”, you can check the system information.

1. In the system “Settings” menu, click “About system”, you can see the “Software version” and the “Serial number”.



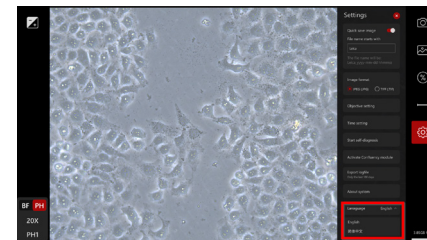
2. Click “License agreement”, you can see the content of the software license agreement. Then click “Close” to close the window.



3. By clicking “Update software” you can update system software. For details, please refer to “Updating Software” on page 49.

Language

Mateo TL supports English and Simplified Chinese. The default language is English. A system restart is required on each language switch.

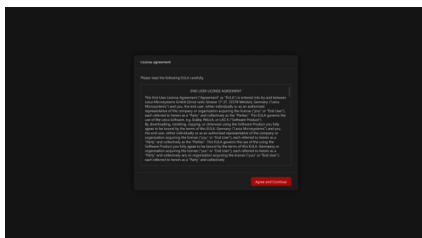


Operations

Turning on the Microscope

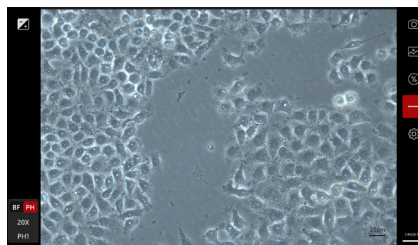
To turn on the system, please refer to “Turning on the System” on page 21.

Upon powering on your system for the first time a window is displayed to show you the content of the software license agreement. Please read it carefully, then click “Agree and Continue” to activate the software system. Otherwise, you cannot proceed.



Live view:

Upon turning on, the system goes to live mode and the live view is shown as below.



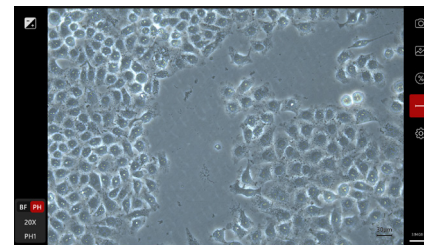
Setting up Contrast Mode

Before taking images, please select the appropriate contrast mode (BF or PH) according to need, and then use the appropriate objective and phase turret position.



When you select the phase contrast (PH) mode, it is necessary to confirm that the aperture diaphragm is fully open (Move the adjustment handle of the aperture diaphragm to the far left). When the brightfield (BF) mode is selected, please adjust the aperture diaphragm till the best imaging result has been obtained.

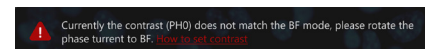
1. At the bottom left corner of the live view, click the target contrast mode (BF or PH) that suits your need.



2. After the contrast mode is selected, the system checks in the current optical path if the phase turret position matches with the objective. If it doesn't, a warning icon appears at the bottom left corner of screen, and warning messages appear at the top center of the screen. You need to make corrections according to the warning messages.



In BF mode, the system checks whether the phase turret is in the position of “BF”. If not, a warning message like below appears.



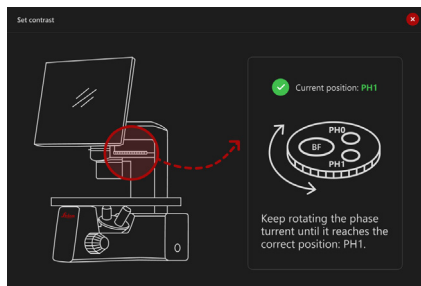
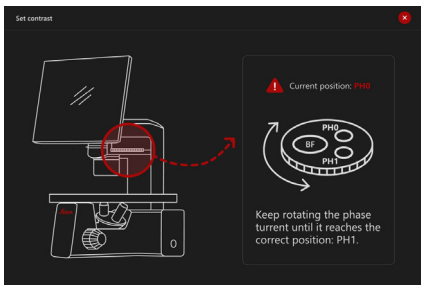


In PH mode, the system checks whether the objective and phase turret position match. If not, a warning message like below appears.

Currently the contrast (BF) does not match the PH mode, please rotate the phase turret.

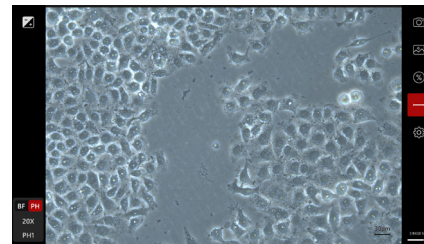
Currently the contrast (PH0) does not match the objective, please rotate the phase turret to PH1. [How to set contrast](#)

- Click “How to set contrast” to show the on-screen instructions, by following which you can correct the objective or the phase turret position until the warnings disappear and the error icon turns from red to green, as shown in the following screenshots.



Switching Objective

You can install up to 4 objectives on the Mateo TL, and switch to any one of them during experiment. The current objective in use and the phase turret position are shown at the bottom left corner of the screen. If the objective and the phase turret position don't match, the system prompts warning messages to remind you to make corrections. For details, please refer to “Setting up Contrast Mode” on page 30.



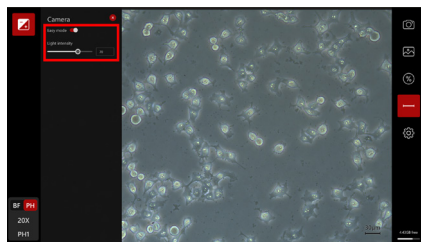
Managing Camera

After the objective and contrast mode is set and the aperture diaphragm is adjusted to the proper position (refer “Setting up Contrast Mode” on page 30), place the sample on the stage. Adjust the coarse focus knob and the fine focus knob to get a focused image of the sample. If the image quality does not reach your expectation, you can adjust the camera parameters for an optimum effect.

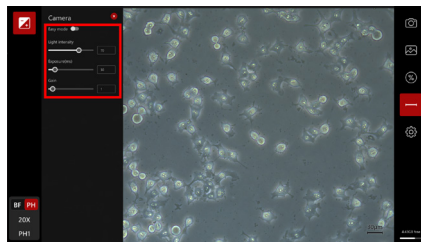
Adjusting Light Intensity, Exposure, or Gamma

In any contrast mode (BF or PH), click  at the top left corner of the screen to show the camera parameters.

By default, the camera is in “Easy mode”, in this mode you can adjust the brightness of the light source by moving the slider of “Light intensity”.



With “Easy mode” disabled, you can further adjust camera with additional parameters: Exposure and Gain.



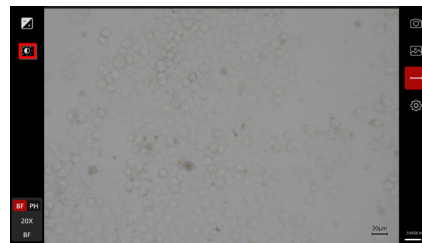
You can adjust each parameter through any way below:

- Enter value in the textbox.
- Move the slider by dragging and dropping it.
- Select the slider or input box, and adjust it by scrolling your mouse wheel.

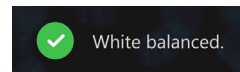
White balancing

In BF mode, you can also white balance the image.

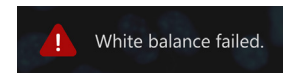
1. Move the white area of the sample to the optical path.



2. Click  at the top left corner of the screen, the system start white balancing the image. When it completes, the system prompts the result as below:

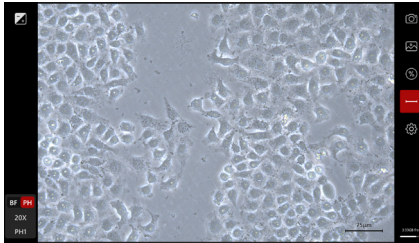


If the white balance fails, click  to repeat.

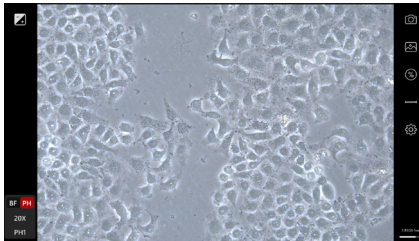


Adjusting Scale Bar

By default, the scale bar is enabled, and is displayed at the bottom right corner of the live view.

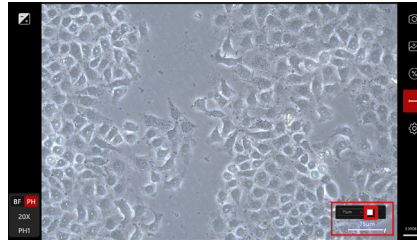
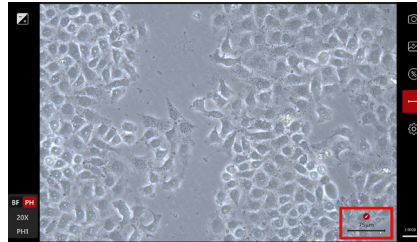


You can disable the scale bar by clicking  at the right side of the screen.

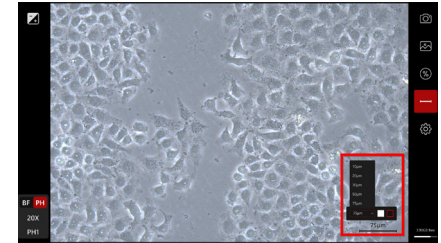


You can also change its color and length.

1. Click the scale bar at the bottom right corner of the screen, and select the color (white or black) from the prompted box to set the color of the scale bar.



2. Select one length value from the dropdown list to set the length of the scale bar.

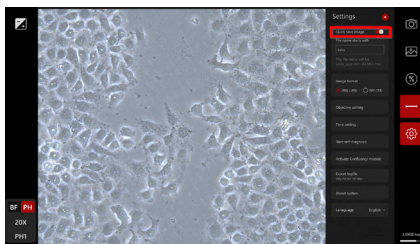


 The scale bar length changes according to the objective magnification chosen

Taking an Image

In the live view, click the camera  at the top right corner of the screen to take an image of the current sample view.

By default, the “quick save image” is enabled. The image just taken is stored to gallery automatically according to the image naming rule of the system. To save an image manually with a preferred name, you need to disable the “Quick save image” in the system setting (For details, please refer to “Quick Save Image” on page 24).



If the  grays out, hover your mouse over the storage icon at the bottom right corner to get further information. If it is due to shortage in storage space, please refer to “Clearing Storage/Gallery” on page 48.



If the name of a new captured image is identical with that of an existing image in the gallery, the new image will be renamed by adding a “-copy” suffix. (For example, new image whose intended name is identical with an existing image “Leica_2021-12-12:12:00: 00.jpeg” will be renamed as Leica_2021-12-12:12:00: 00-copy.jpeg.) Such situation occurs mostly when “Quick save image” is disabled and you are manually naming a newly captured image.



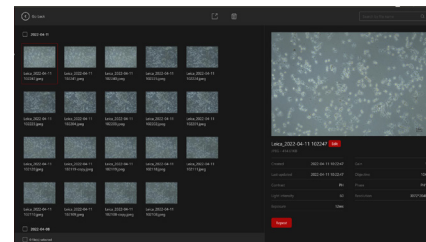
The images are stored chronologically to facilitate later reference and repeating experiment. (For details, please refer to “Repeating” on page 46).

Managing Images in Gallery

The images you captured during experiments are stored in gallery. In addition to viewing images and checking image parameters, you can also rename, delete, copy and share images there.

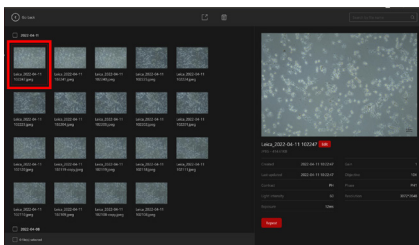
Checking Image Parameters

1. Click  in the live view, you can open the gallery where your experiment images are stored.
2. Click the image of interest, surrounding which red borders are visible. You can see the original image and all its parameters on the right side of the screen.



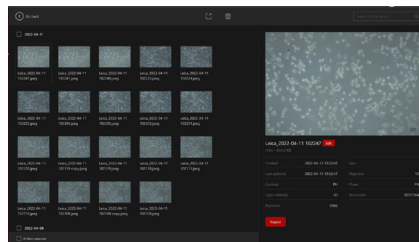


If multiple images are selected (For details, please refer to “Selecting Image(s)” on page 36), none of them would display on the right side of the screen, where only the image that was clicked (surrounded with red borders) and its parameters are presented.

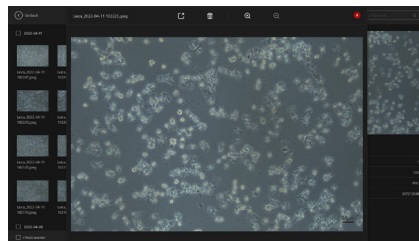


Zooming in/Zooming out

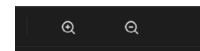
1. Click  in the live view, you can open the gallery where your experiment images are stored.



2. Double click the image of interest to open its original file.



3. Click the zoom in (+) /zoom out (-) on the middle top to locate and observe the fields of interest.



You can also roll your mouse wheel to zoom in/out.



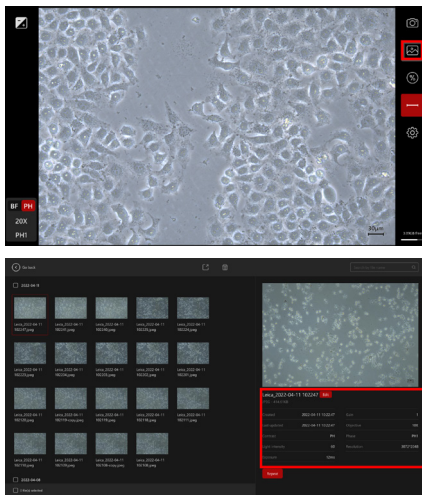
While zooming in, a window is prompted at the bottom right corner of the original image, which pinpoints the current field of interest in the original image.



4. Click  at the top right corner of the original image to close it.

Renaming Image

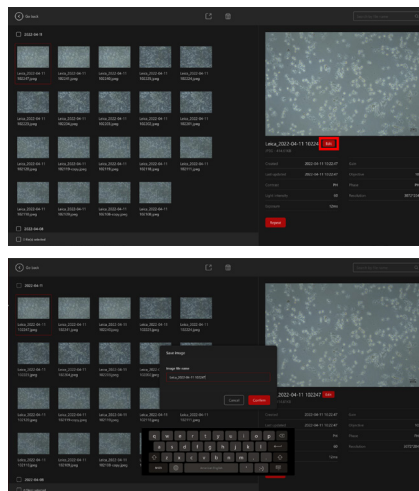
1. In the live view, click  to open gallery where your experiment images are stored.



2. Click the image of interest.

You can see all its parameters on the right side of the screen.

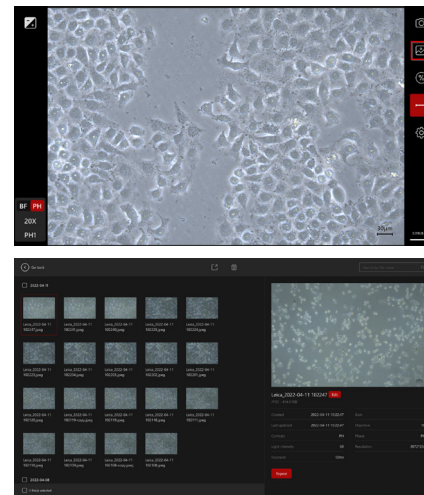
3. On the right side of the screen, click “Edit” beside the image name. It displays a dialog box as below.



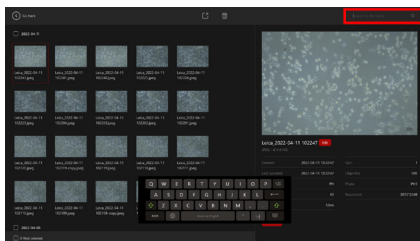
4. Enter the name (either through the virtual keyboard or your external physical keyboard) and click “Confirm” to finish renaming.

Selecting Image(s)

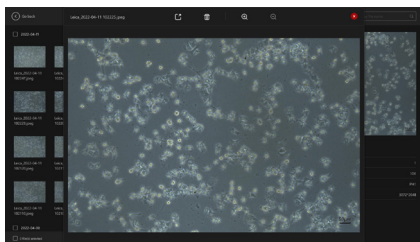
1. In the live view, click  to open gallery where your experiment images are stored.



- If needed, enter the keyword in the search bar at the top right corner to search images by name.



- Double click the image to open the original file. You can zoom in/out to check it in details. (Please refer to “Zooming in/ Zooming out” on page 35).

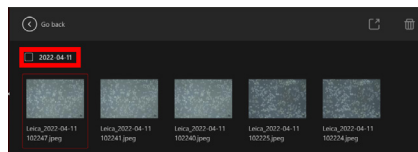


Click  at the top right corner of the original image to close it

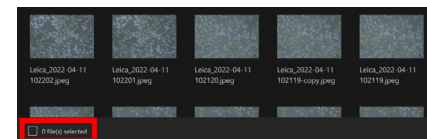
- You can select multiple images in any way below:
 - Click the checkbox on the top right of each image of interest.



- Click the checkbox on the left of the date label to select all images taken on that day.



- Click “Select all” at the bottom of the screen to select all images on the current page.



Deleting Selected Image(s)

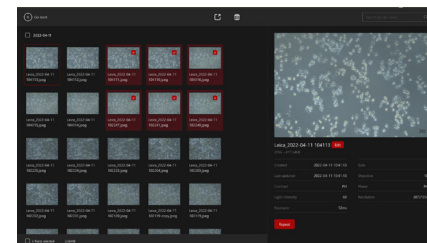
You can delete images with two methods, in thumbnail view or original file view.

Method 1:

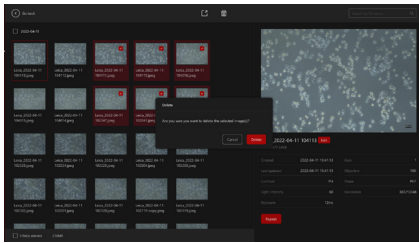
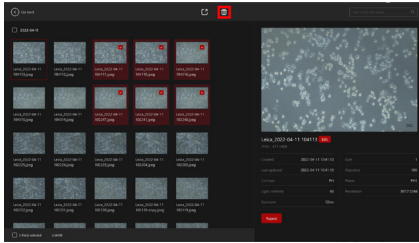
- Select one or more images to manage.



Refer to “Selecting Image(s)” on page 36.



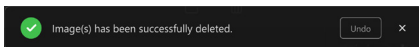
2. Click  on the middle top.



3. Click "Delete" to confirm your deletion.

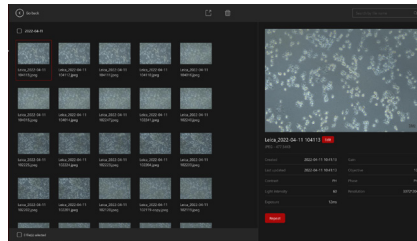
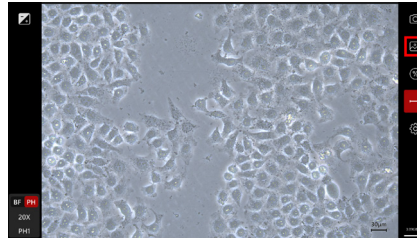


When deletion is completed, a message is prompted and stay for 10 seconds, saying "Image(s) has been successfully deleted". You can recover the image just deleted by clicking "Undo" besides the message within 10 seconds before it disappears.

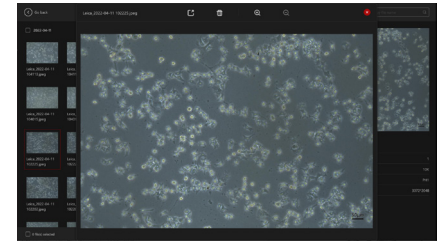


Method 2:

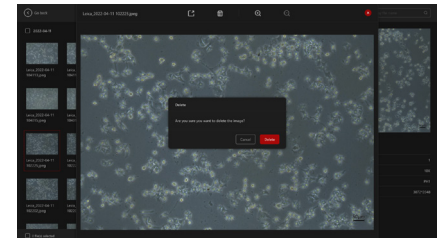
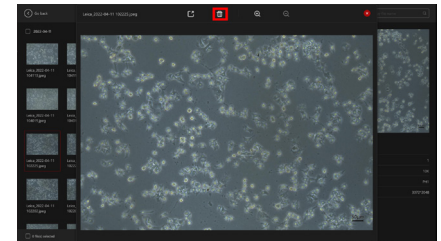
1. In the live view, click  to open gallery where your experiment images are stored.



2. Double click the target image to open its original file.



3. In the original file view, click  on the middle top. The click "Delete" to confirm the deletion.



Copying Image(s) to USB Disk



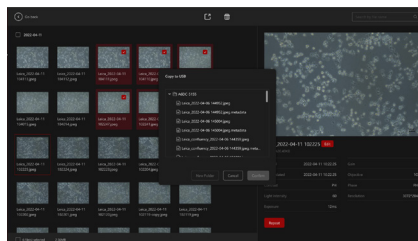
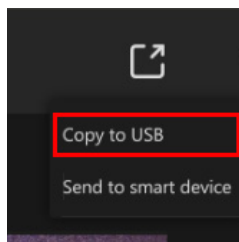
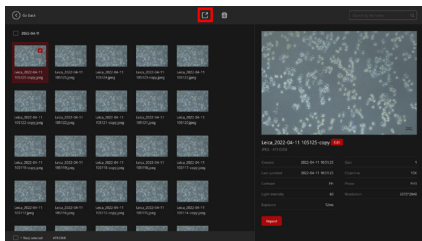
Clear your USB disk beforehand to ensure there is enough space to store your images.

1. Plug your USB disk into one USB port of the microscope. (Preferable USB3.0 port for faster transmission)
2. Select the image(s) to manage.

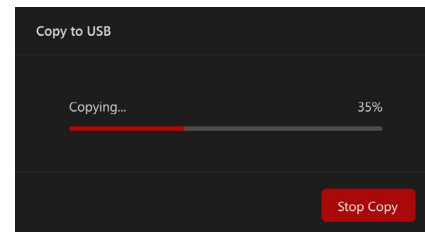


Refer to “Selecting Image(s)” on page 36

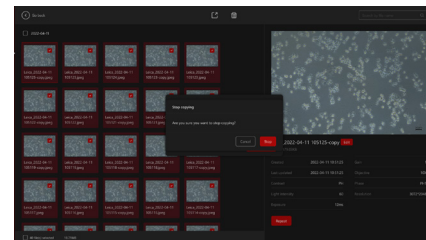
3. Click  on the middle top, then click “Copy to USB”.



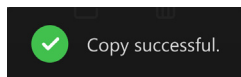
4. Select the target folder to save the images, then click “Confirm” to start copying. The progress bar is displayed.



If you need to cancel copying in the middle, click “Stop Copy” in the progress bar window, then click “Stop” in the confirmation window.



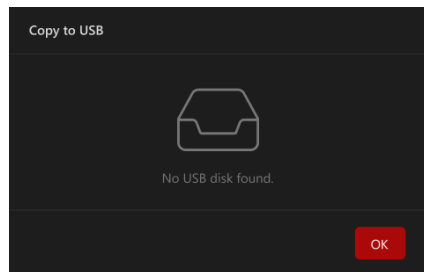
5. When the copy completes, a message saying “Copy successful”.



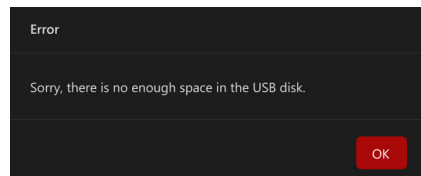
Possible exceptions:

When the following exceptions happen during image copy, you can stop copying, retry, or contact Leica service team.

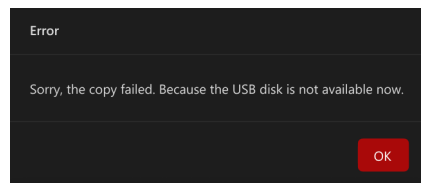
Exception 1: There is no USB disk plugged in, or the system cannot detect the USB disk.



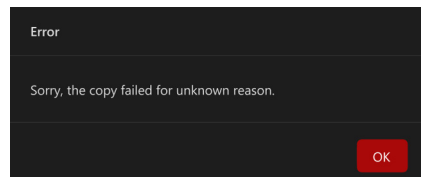
Exception 2: There is no enough space in the USB disk.



Exception 3: The copy aborts during the process due to unavailable USB disk.



Exception 4: The copy fails due to the USB disk is currently locked.



Sharing Image(s) via Your Smart Device through Wi-Fi

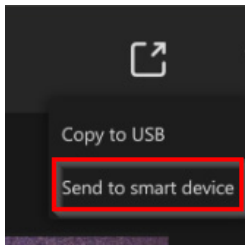
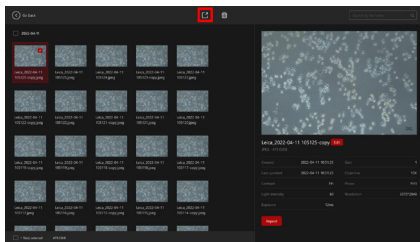
Before sharing, please make sure the optional Wi-Fi dongle is purchased.

1. Plug the Wi-Fi dongle to a USB port of your microscope, preferably USB 3.0 for faster transmission.
2. Select the image(s) to share.

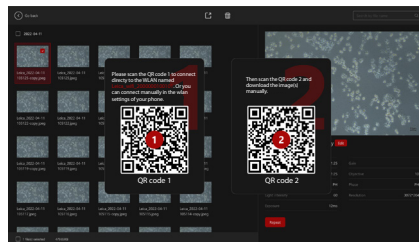


Refer to the “Selecting Image(s)” on page 36.

3. Click  on the top middle of the image, then click "Send to smart device".



4. Follow the instructions in the prompted window to share your image(s).



- 4.1. Using your smart device scan the QR code with label '1' to connect to wireless network "Leica Wi-Fi+serial number".



Please use your smart device's own built-in QR scanner. The scanning function of any APPs is not recommended to use due to compatibility issue.



After a successful connection between your Mateo TL and your smart device, you can directly select the wireless network "Leica Wi-Fi+serial number" device without having to scan the QR code '1' again.

- 4.2. Scan the QR code with label '2'; you are directed to a page where the selected image(s) are displayed. Click  on the top right corner of the image(s) to download to your smart device.



When the image is shared, the Wifi dongle can be unplugged from the equipment to avoid unauthorized connection to download images.

Confluency Check

The Confluency module can be used to estimate cell confluency, the percentage of the surface of a culture vessel that is covered by adherent cells. Many cell-based experiments require cell culture to reach a certain confluency. With Mateo TL microscope, you can use the onboard Confluency module to measure the confluency of your cell culture.

Checking Confluency Module Status

Before performing a confluency check, please make sure the Confluency module is purchased and its feature is activated.

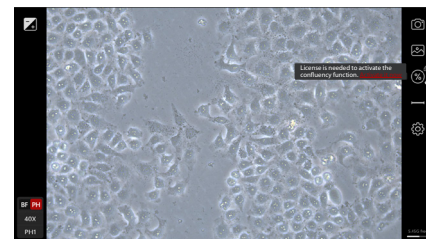
Inactivated: There is a lock sign that appears at the top right corner of Confluency module icon .

Hover your mouse over the lock, it shows “License is needed to activate the Confluency module function”.

You can click “Activate Confluency module” and follow the on-screen instructions to activate it.

You can also click “Activate Confluency module” in the system setting to activate it.

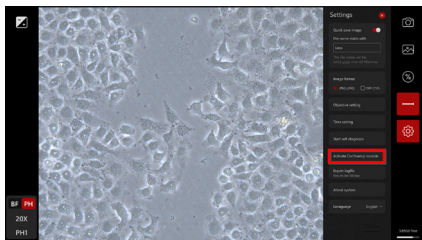
For details, please refer to “Activating Confluency Module” on page 43.



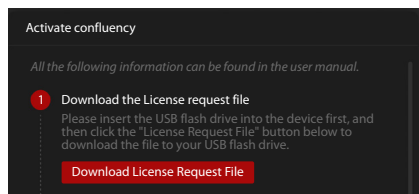
Activated: There is no lock icon on the top right corner of .

Activating Confluency Module

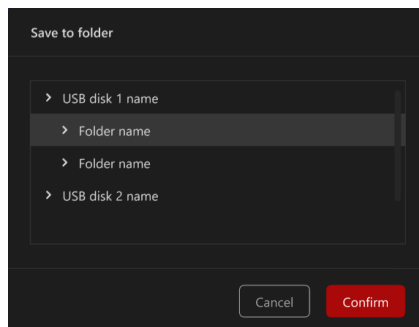
1. After purchasing the Confluency module, you will receive a paper document containing the **ticket number** required to activate the Confluency module.
2. In the system "Settings" menu, click "Activate Confluency module" to activate the module.



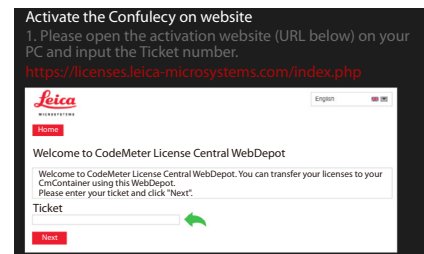
3. Download the "License Request File" to a USB disk.
 - 3.1 Plug in your USB disk to a USB port of the stand.
 - 3.2 Click "Download License Request File" in the "Activate Confluency module" window.



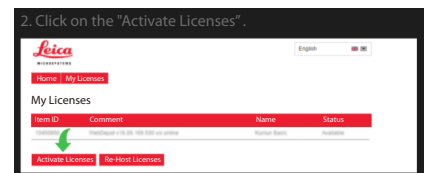
- 3.3 Select the target folder, then click "Confirm".



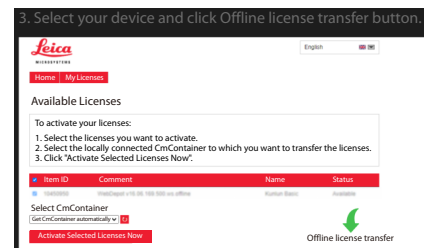
4. Generate the "License Update File" from Leica website.
 - 4.1 On your computer, open the webpage <https://licenses.leica-microsystems.com/index.php>. Enter the ticket number and click "Next".



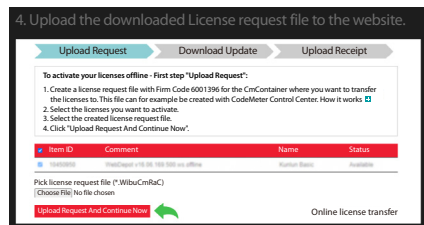
- 4.2 Click "Activate Licenses".



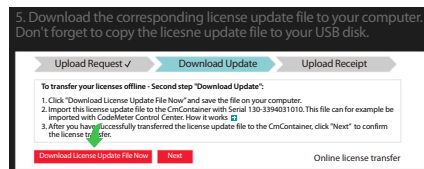
- 4.3 Click "Offline license transfer".



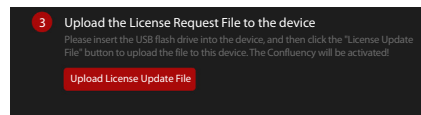
- 4.4 Plug in the USB disk that stores the “License Request File” that you got in Step 3.
- 4.5 Click “Choose File” and select the “License Request File” from your USB disk, then click “Upload Request and Continue Now”.



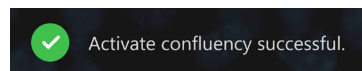
- 4.6 Click “Download License Update File Now” to download the license update file to the local drive of your computer.
- 4.7 Copy the downloaded “License Update File” to the USB disk.



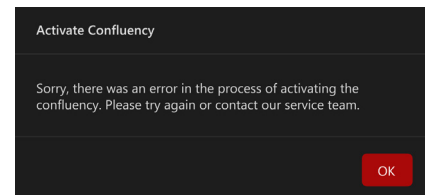
5. Upload the “License Update File” to your Mateo TL system.
- 5.1 Plug in the USB disk that stores the “License Update File” that you got in step 4.6.
- 5.2 Click “Upload the License Update File to the device”.



- 5.3 Select the “License Update File” from your USB disk, then click “Confirm” to start activating the license.
- 5.4 When the activation completes, you can see message as shown below.



 If something goes wrong during the activation, the system prompts warning information to remind you to retry or contact Leica service team.



Checking Cell Confluency

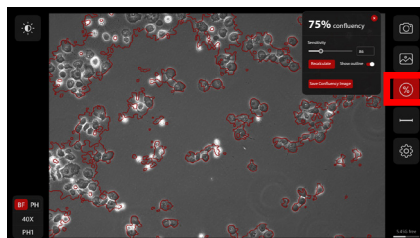
1. Place the sample on the stage.
2. Set the phase ring position to PH0 or PH1.
With the correct illumination method set, focus the cells to get a clear image.



The Confluency module can only be used in PH mode and is not available under BF mode.

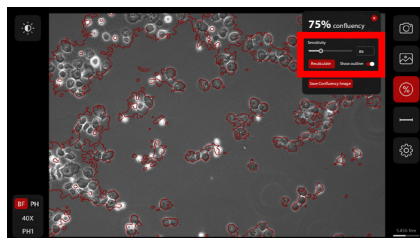
3. Click  in the live view. The system takes an image of the sample and calculates its confluency percentage automatically.

The confluency value is presented on the top right corner of the image. And the cells in the image are outlined in red.



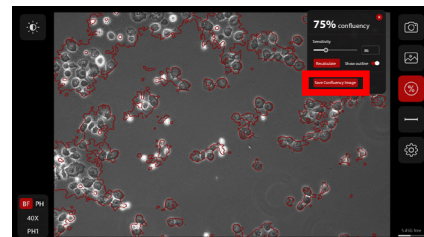
4. You can click “Show outline” toggle to make the red outlines invisible/visible. Doing so you can evaluate the result by comparing the original image and the image processed by Confluency module.

If the result fails to reach your expectation, you can change the “Sensitivity” and click “Recalculate” to repeat the process until your desired view is observed.



To set “Sensitivity”, you can move the slider or enter the value in the input box.

5. Click “Save Confluency Image”, then enter the image name in the prompted dialog box to save the current view to Gallery.

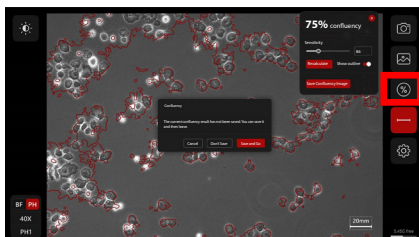


If “Quick save image” is enabled, the image is automatically named with a suffix “-Confluency”, following the naming rules of “Quick save image”.

After that, the system closes the Confluency module and goes back to live view automatically.



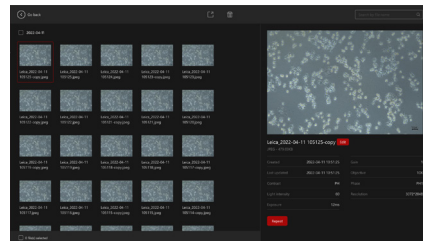
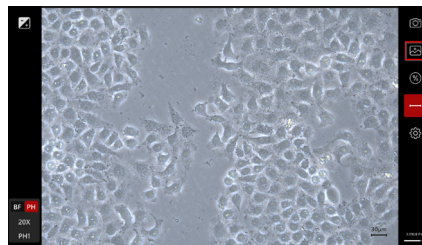
You can also close the Confluency module manually by clicking the  on the top right corner of the module. If the image is not saved yet, a message is prompted to remind you of that. You can click “Don’t Save” to exit without saving image or click “Save to save and exit.



Repeating

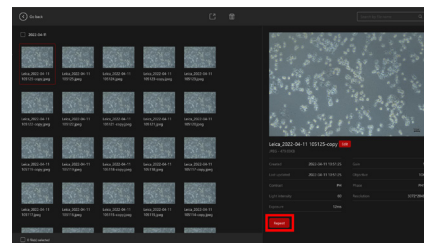
Many experiments are conducted repeatedly under the same conditions. With Mateo TL microscope, you can take one image from the gallery as a reference and reuse its parameters to repeat the imaging conditions of the reference.

1. In the live view, click  to open gallery where your experiment images are stored.

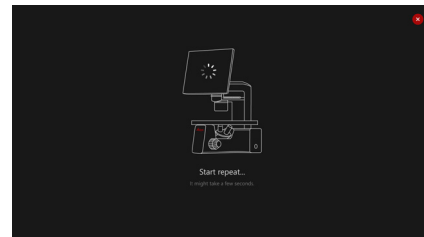


2. Click the image of interest.

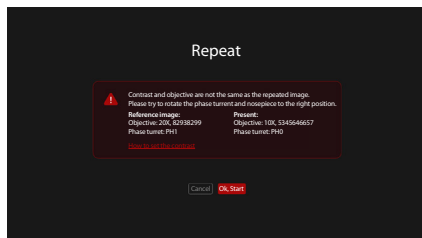
You can see all its parameters on the right side of the screen.



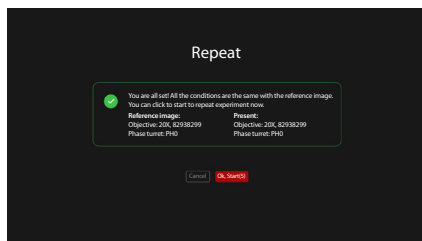
3. Click “Repeat”. The system starts verifying whether the current imaging parameters are identical with those of the reference image.



4. If there is any parameter discrepancy (for example phase turret position or objective position), a warning message displays as shown below. Follow the on-screen instructions to clear the discrepancy.



5. Click "OK, Start" to start repeating.



If "OK, Start" is not clicked, the "Repeat" starts automatically in 5 seconds.

Clearing Storage/Gallery

At the bottom right corner of the live view, there is an icon showing the current available storage space of the system storage. Hover your mouse over the icon to show more information. The colors of the icon have different meanings:

Icon color	Meaning	Impact	Action to take
White/Grey Example: 	Normal status, which means the available space is greater than 3G.	No functional impact.	No.
Yellow Example: 	The available space is less than 3G, and greater than 2G.	No functional impact.	Clearing space is recommended.
Red Example: 	The available space is less than 2G.	The  is grey out, which means you cannot take an image.	Clearing space must be done.



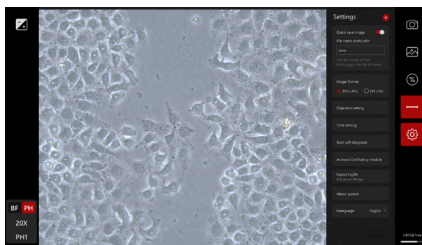
For the specific clearing method, please refer to “Deleting Selected Image(s)” on page 37.

Updating Software

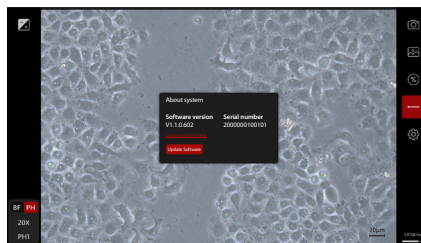
You should update the software regularly to make sure the system is using the latest software version and keep your Mateo TL running at an optimum performance level.

1. Download the latest software package from Leica official website, save it to a USB disk, then plug the USB disk into a USB port on the right side of the stand.

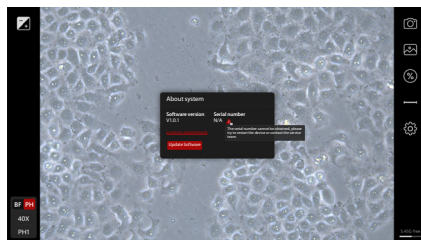
2. In the live view, click  to open system "Settings" menu.



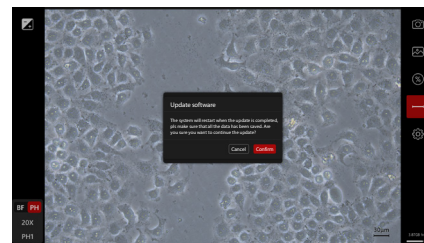
3. Click "About system", you can see the current version of software.



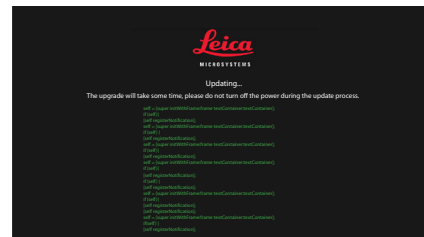
4. A  shows up if the system cannot obtain serial number. Hover the cursor over the icon, you can see the detailed reason for the presence of , and you are recommended to restart the system or contact Leica service.



5. Click "Update Software". The following window is prompted to remind you to save all your important data elsewhere before proceeding.



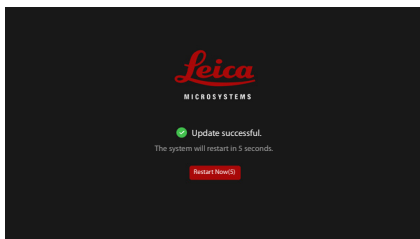
6. Click "Confirm" to proceed.
7. In the "Update software" window, select the software package from your USB disk. Then, click "Confirm" to start updating. It shows following information.



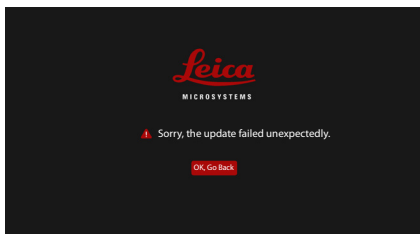
7. If update succeeds, it shows the successful result as shown below, which indicates the system will restart in 5 seconds.



You can also click “Restart Now” to restart the system immediately.



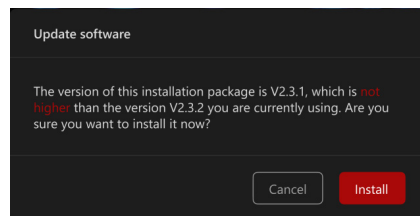
8. If the update fails, it shows the failed result. Click “OK, Go Back” to roll back to the previous version.



9. Go back to “About system” to verify whether the software is the target version.



It is also possible to downgrade the Mateo TL system to any previous version, if needed. To do so, you can download the package of your desired version and repeat the steps above. Note that after clicking “Update Software”, a window is prompted for your confirmation of the downgrade.



Troubleshooting

Problem	Possible Cause/Solution
The microscope does not start after pressing the On/Off button.	Possible cause: No power supply. Solution: 1. <i>Ensure that the power outlet has power.</i> 2. <i>Check cable connections between:</i> ● <i>microscope and power adapter</i> ● <i>power adaptor and power cord</i> ● <i>power cord and power outlet</i>
The live image is too dark	Possible cause: Wrong aperture position Solution: ● <i>In PH mode, adjust the aperture to the maximum.</i> ● <i>In BF mode, make the aperture larger.</i> For details, please refer to “Setting up Contrast Mode” on page 30. Possible cause: Too low light intensity Solution: Adjust light intensity to make the image brighter. For details, please refer to “Managing Camera” on page 32. Possible cause: Mismatch of the objective and phase turret position Solution: Change to the right phase turret position that matches the objective. For details, please refer to “Setting up Contrast Mode” on page 30.

Problem	Possible Cause/Solution
The image of samples on glass slide is blurry	Possible cause: The cover glass side of the slide is facing the objective. Solution: The glass slide must be positioned in a way that the cover glass side is facing the condenser.
The white balance button in BF mode is disabled. Or the scale bar button is disabled.	Possible cause: The camera is disconnected. Solution: Restart the system or Start self-diagnosis then connect the Leica service.
The capture button is disabled	Possible cause: The available space is below 2G. Solution: Remove images to make sure at least 2G available space is left. For details, please refer to “Clearing Storage/Gallery” on page 48. Possible cause: The camera is disconnected. Solution: Restart the system or Start self-diagnosis then connect the Leica service
The Confluency check button is locked.	Possible cause: Confluency module is not purchased or not activated. Solution: Purchase the additional confluency module from Leica and activate it in the system “Settings” menu.
There is no red reference line in the image processed by Confluency module.	Possible cause: “Show outline” is not enabled in the Confluency module. Solution: Go to Confluency module, enable “Show outline” to show the lines.
The system cannot detect the USB disk.	Possible cause: The USB disk is incompatible with the system. Solution: Use one of the recommended USB disks listed in Table 2 of “Technical Data” on page 61.

Problem	Possible Cause/Solution
There is no response on the smart device after scanning the QR code with label “1”.	Possible cause: The built-in QR scanner of your smart device is not used. Solution: Use your smart device’s own built-in scanner. Do not use the scanner function of any APPs installed in your smart device. For details, please refer to “Sharing Image(s) via Your Smart Device through Wi-Fi” on page 40. Possible cause: The smart device is incompatible with the system. Solution: Use one of the recommended smart devices listed in Table 3 of “Technical Data” on page 61.
The screen blacks out when a physical keyboard is used	Possible cause: The user used a built-in shortcut key function of the physical keyboard. (The shortcut key function is not supported in the Mateo TL system as the definitions of shortcut keys vary from manufacturer to manufacturer and they all cannot be verified.) Solution: Please reboot the system.
After power-on, the LED Indicator turns on, but the screen blacks out without response	Possible cause: Too short interval between power on and off (< 1 s) Solution: Reboot (power on after 10 s of power-off)

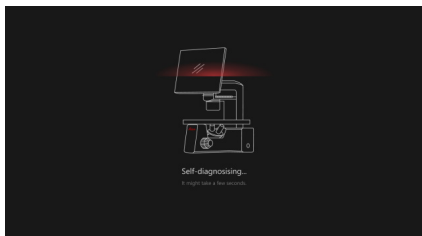
Self-diagnosis

Mateo TL features quick and easy self-diagnosis. With it, you can easily diagnose your system, get the needed technical information and quickly report the issue to Leica service via your smart device.



For instructions on log file export, please refer to “Export Log file” on page 27.

1. In the live view, click  to open system “Settings” menu. Then, click “Start self-diagnosis” to start self-diagnosing.



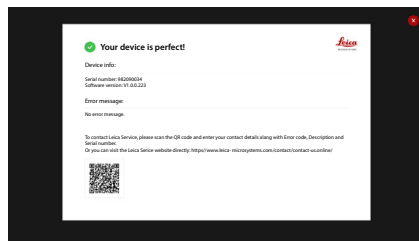
You cannot stop self-diagnosing in the middle, unless you power off the system, which is not recommended.



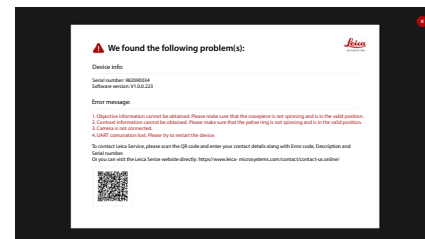
If the system is powered off during self-diagnosing, self-diagnosing won't be resumed after the system is powered on.

2. When the self-diagnosis completes, the result is shown with the following information presented.
 - *Device info (Serial number and Software version)*
 - *Error message*
 - *QR code (Login portal to Leica service website)*

Example result for normal system:



Example result for erroneous system:



3. If the result shows a system with error message, scan the QR code to visit Leica service website and enter required information (model, serial number etc.), then click "Submit Form" to send the information to Leica service.

Care and Maintenance

Contact address

If your system is no longer functioning properly, contact your local Leica representative. You can find information on on the Leica website: www.leica-microsystems.com.

Protection from dirt

Dust and dirt will affect the quality of your results.



Place a dust cover (optional) over the components when they are not in use for an extended period of time.



Keep accessories in a dust-free place when not in use.



Removing the covers of the components exposes hazardous voltages. Risk of electric shock and death.



Do not clean any interior parts yourself.



Please contact an authorized Leica dealer for technical service.



Unplug the power supply before cleaning and maintenance!

Protect electrical components from moisture!

Care and cleaning of the Mateo TL unit

Keeping all components clean is important for maintaining good optical performance.



Do not use any unsuitable cleaning agents, chemicals or techniques for cleaning. Clean the microscope surface using paper towels dampened with 70% ethanol.

Protect your components from moisture, fumes and acids and from alkaline, caustic and corrosive materials.

Glass surfaces, and particularly objectives, are always to be cleaned as described in the brochure "Cleaning of Microscope Optics". You can download the information from <http://www.leica-microsystems.com/products/light-microscopes/life-science-research/upright-microscopes>

Never use chemicals (e.g., thinners containing acetone, xylene or nitrogen) to clean the components, in particular-colored surfaces or accessories with rubberized parts. This could damage the surfaces, and specimens could be contaminated by abraded particles.

Test cleaning solutions of unknown composition on a less visible area of the components first. Ensure that coated or plastic surfaces do not become matted or etched. Protect your components from oil and grease.

Do not grease guide surfaces or mechanical parts.

You can also contact our Technical Service in case of any questions.

Cleaning polymer components

Some components are made of polymer or are polymer-coated. They are, therefore, pleasant and convenient to handle. The use of unsuitable cleaning agents and techniques can damage polymers. For examinations using acids or other aggressive chemicals, particular caution must be taken.

Handling acids and bases

For examinations using acids or other aggressive chemicals, take particular caution.

Never allow the optics and mechanical parts to come into direct contact with these chemicals.

Maintenance, repair work and servicing

Ensure that repairs are only carried out by Leica-trained service technicians.

Only use original Leica spare parts.

Technical Data

Table 1 Objectives

Objective	Objective Type	Working Distance(mm)	NA	Contrast method	
4X	HI PLAN	13.9	0.10	BF	PH0
10X	HI PLAN	7.8	0.22	BF	PH1
20X	HI PLAN	3	0.30	BF	PH1
40X	HI PLAN	2	0.50	BF	PH1

Table 2 Recommended external storage devices

Brand	Type	Storage format	Specification
Western Digital	Elements SE (WDBEPK0020BBK)	ext4/exFAT	2TB, USB3.0
Seagate	Basic (STJL2000400)	ext4/exFAT	2TB, USB3.0
TOSHIBA	HDTB420YK3AA	ext4/exFAT	2TB, USB3.0
Kingston	DT100G3/64G	exFAT	64G, USB3.0
Kingston	DT100G3/128G	exFAT	128G, USB3.0
aigo	U268	exFAT	64G, USB2.0
aigo	U385	exFAT	128G, USB2.0

Table 3 Recommended smart devices

Brand	Type	Storage Space	Specification
Apple	iPhone 12	- 128G	iOS
Apple	iPhone SE	- 256G	iOS
Apple	iPad 9	- 128G	iPad OS
Apple	iPad Mini	- 256G	iPad OS
SAMSUNG	SAMSUNG galaxy A52	- 128G	Android
SAMSUNG	SAMSUNG TAB S6 Lite	- 64G	Android



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