From Eye to Insight

Leica
MICROSYSTEMS

STELLARIS 5
STELLARIS 8

User Manual

Copyright

Made in Germany.

Published by:

Leica Microsystems CMS GmbH

Am Friedensplatz 3

D-68165 Mannheim (Germany)

https://www.leica-microsystems.com

Responsible for contents: Leica Microsystems CMS GmbH

Table of Contents

1 About this User Manual

Prior to commissioning the system, carefully read through this User Manual and be absolutely certain to follow the safety notes contained in it. So that you can operate the system safely and react quickly and correctly in the event of an emergency, you must familiarize yourself with the safety devices before using it for the first time. Keep this User Manual and the included manuals for the microscope and other components in a safe place easily accessible for all users.

This User Manual gives you important information about safe handling of the system. All information is intended for the safety of users and trouble-free operation of the system. Unless the information pertains specifically to certain system variants, the instructions always apply to the basic system described here.

Figures are for illustration purposes. The system you purchased can deviate from the illustrations without Leica Microsystems CMS GmbH explicitly specifying such. Depending on the system configuration, the components mentioned in this User Manual can vary significantly.

This User Manual provides you with important information for using the system, the necessary ambient conditions and the usable lasers. It explains system startup. The system is assembled and disassembled by Leica Field Service engineers that have been authorized by Leica Microsystems CMS GmbH. This is why unpacking, assembly and installation of the system are not described in this User Manual You can find an overview of the system and specifications in chapter 7. For information about special configurations, such as optional lasers or specific objectives, refer to the respective included manual.

This User Manual does not contain any information about basic optical principles or the operating principle of microscopes, confocal systems and the like. If you are interested in these topics or certain applications from the area of optics and confocal microscopy, you can read more about them at the Leica Microsystems CMS GmbH knowledge portal: *https://www.leica-microsystems.com/science-lab*

The system is delivered with the latest version of the licensed LAS X software. In order to keep information up-to-date, a description of software functions has been intentionally omitted from this User Manual. You can find up-to-date explanations and instructions for corresponding software functions in the LAS X Online Help. Read chapter 14 in this User Manual in order to familiarize yourself with the design and basic operation of the software. Additional information about specific functions can be found in the online help.

The instructions contained in this documentation reflect state-of-the-art technology and knowledge standards at the time of publication. Leica Microsystems CMS GmbH reserves the right to revise this documentation and/or to further develop and improve the products described in this document at any time without prior notice or any other obligation. If you have any suggestions for or criticism of this User Manual, please get in touch with your contact person or with the Leica branch office in your country, see chapter 27.

2 Intended Use

This system is intended for use in a lab. The system was designed for confocal acquisition (laser scanning images) of fluorescence-labeled living and fixed specimens as well as for quantitative measurements in the area of life science.

Applications of in-vitro diagnostics in accordance with the European guideline 98/79/EC are excluded from proper intended use.

This system must not be used together with life-support systems such as those found in intensive-care wards. The owner/operator and user of this product are responsible for proper and safe operation and safe maintenance of the system and for following all applicable safety regulations. The owner/operator and user are fully liable for all consequences resulting from the use of the system for any purposes other than those listed in the User Manual or the online help.

The manufacturer assumes no liability for damage caused by, or any risks arising from, use of the microscopes for purposes other than those for which they are intended, or not using the microscopes within the specifications of Leica Microsystems CMS GmbH. In such cases, the Declaration of Conformity shall be invalid.

3 Liability and Warranty

Leica Microsystems CMS GmbH shall not be liable for damages resulting from failure to observe the information in this User Manual. The information here does not in any way modify the warranty and liability clauses contained in the general terms and conditions of Leica Microsystems CMS GmbH.

Repairs and servicing may be performed only by Leica Field Service engineers authorized by Leica Microsystems CMS GmbH. Opening or working on the system in any way shall void any and all warranty claims.

The manufacturer assumes no liability for damage caused by, or any risks arising from, use of the microscopes for purposes other than those for which they are intended, or not using the microscopes within the specifications of Leica Microsystems CMS GmbH. In such cases, the Declaration of Conformity shall be invalid.

Leica Microsystems CMS GmbH shall not be liable for any damage caused by incorrect storage, improper transport or an unsuitable installation location.

Figures are for illustration purposes. The system you purchased can deviate from the illustrations without Leica Microsystems CMS GmbH explicitly specifying such.

Leica Microsystems CMS GmbH shall not be liable for any injury or property damage caused by untrained or unauthorized persons.

3.1 Important Information for Operators and Users

- The owner/operator is required to designate a Laser Safety Officer or a Laser Protection Advisor according to the applicable legal requirements in each country.
- The owner/operator and user of this product are responsible for proper and safe operation and safe maintenance of the system and for following all applicable safety regulations.
- The owner/operator and user are fully liable for all consequences resulting from the use of the system for any purposes other than those listed in the User Manual or the online help.
- The owner/operator and user are obligated to perform and monitor suitable safety measures (according to national regulations).
- The owner/operator and user are responsible for observing the laser safety regulations according to applicable country-specific regulations.
- The owner/operator and user must ensure that this laser product is commissioned and operated only by persons who have been trained in the use of the system and the potential dangers of laser radiation.
- The owner/operator and user is obligated to carry out, adhere to and monitor suitable Internet and intranet safety measures together with the owner/operator's system administrator to protect the system from malware (viruses, worms, Trojan horses, etc.) and other attacks from the Internet and intranet.
- The owner/operator and user are fully liable for all consequences resulting from the use of the system if it is opened, improperly serviced or repaired by persons other than authorized Leica Field Service engineers.

4 Meaning of the Warning Messages in the Manual

WARNING **Electric shock**

This warns you of hazardous electrical voltage. Following the instructions is mandatory, since otherwise there is a risk of severe or fatal injury.

WARNING **Severe injuries from ...**

This note warns you of hazards that can cause severe or fatal injuries.

WARNING **Permanent eye and skin damage from laser radiation**

This note warns you of eye and skin damage that can occur when using lasers if safety precautions are not taken.

WARNING **Injuries due to harmful or irritating substances**

This note warns you of substances that pose a health hazard.

WARNING **Risk of injuries due to biological substances**

This note warns you of biological substances that pose a health hazard.

WARNING **Risk of burns on hot surfaces**

This note warns you of hot surfaces that can cause burns.

WARNING **Risk of hand injury**

This note warns you of the risk of hand injuries.

CAUTION

Injuries from…

This note warns you of minor to moderate injuries that can be prevented by following instructions.

NOTICE

Risk of damage to the system

This note describes possible material damage that can occur in case of misuse.

NOTICE

Loss of data

This note warns you against loss of data.

Observe user manual

This mandatory sign indicates that an additional user manual must be followed.

Wear laser safety glasses

This mandatory sign indicates that laser safety glasses must be worn to prevent eye injuries.

Additional note

This note serves to emphasize important instructions for handling the product or contains additional instructions about a certain topic.

Disposal

This note indicates that the system, its accessory components and consumable materials must not be disposed of together with general household waste! With respect to this, national laws and regulations must be observed.

*

Optional components are marked by an asterisk "*" in this User Manual. The components depend on the system configuration.

5 General Safety Notes

You have to follow the instructions listed below to work with the system safely and without disturbance. Leica Microsystems CMS GmbH shall not be liable for personal injuries or property damage resulting from noncompliance.

Not every possible hazardous situation can be foreseen; therefore, perform all actions on the system carefully and while exercising common sense.

5.1 Instrument Setup and Use

- The system is delivered in secure transport packaging. Only Leica Field Service engineers or people authorized by Leica Microsystems CMS GmbH may open the transport packaging and unpack and assemble the system.
- Before beginning to handle the system, receive instruction on the dangers of laser radiation and on suitable laser safety precautions, such as wearing suitable laser safety glasses (laser safety officer). This applies to all persons present in the room where the system is set up and operated.
- Read the manuals included carefully and follow the instructions they contain.
- Do not introduce any reflective objects or mirrors into the laser beam path or specimen area when working using a laser.
- Do not introduce any flammable objects into the beam path or specimen area when working using a laser.
- Do not place any flammable or combustible objects on or near the system and do not put it near hot surfaces.
- Keep your hands away from the specimen area during startup and operation. Otherwise, there is a risk of crushing/injury from rotating objectives and the motorized specimen stage.
- If the specimen carrier breaks, there is a risk of cutting injury and, depending on the kind of specimen, risk of contamination. Take suitable actions to remove fragments and prevent cutting injuries.
- Set up the workplace (for example, chair and monitor) on the system according to your requirements. Observe the national regulations for occupational safety.
- Clean the system thoroughly first before a Leica Field Service engineer carries out maintenance or before each time the system is moved. If necessary, the surfaces must be disinfected appropriately to eliminate potential contamination and, therefore, prevent hazardous substances and infectious agents from carrying over. The same also applies to the removal of components. This applies in particular to systems that are located in biomedical research labs.
- Do not deviate from the operating and maintenance instructions provided herein.
- Do not rearrange the components. If you have any further questions regarding the placement and arrangement of components, get in touch with your contact person or with the Leica branch office in your country.
- Ensure that the equipment for cooling components (including ventilation slots, apertures or fans) is not adjusted or covered because this can cause the components to overheat and get destroyed.

5.2 Electrical Safety

- Only operate the system with and connect it to grounded sockets. Operation without grounded sockets is not allowed. Otherwise, risks such as electrical shocks or property damage can result.
- Make sure that the supply voltage at the system remains in an approved tolerance range (100 V~ - 240 V~ ±10 %).

- Only connect the system to a power supply with a ground protection conductor and do not use extension cords without ground protection conductors. Using extension cords without ground protection conductors is not allowed.
- Do not interrupt the ground protection conductor within or outside of the system and do not disconnect it. Otherwise, risks such as electric shocks can result.
- Under no circumstances may you open housing parts since the components below them are energized and can harm you.
- Before any cleaning or servicing, de-energize the entire system. To do so, use the power switches of all components and disconnect all power cables from the power supply.
- Only use the power cables included or provided by your local Leica Field Service engineer for connecting individual peripheral devices to the power supply.
- Fuses inside the system may be replaced only by authorized Leica Field Service engineers. If you have further questions, get in touch with your contact person or the Leica branch office in your country.

5.3 Safety Devices and Safety Labels

- Carefully read chapter 11Safety Features of this User Manual before initial use to familiarize yourself with the safety devices. This is the only way to be able to operate the system safely and react correctly and quickly in emergencies.
- Keep all safety and laser protection equipment in a ready-to-operate condition.
- Never remove, change, deactivate or damage the safety and laser protection equipment on the system. Otherwise, serious injuries or damage to property may result.
- Do not remove any safety labels on the system.
- Attach missing or damaged safety labels immediately and at the described location. Observe chapter 12 "Safety Labels on the System".

5.4 Laser Safety

- The system is a Class 3B/IIIb (VIS and UV lasers) or a Class 4/IV (IR lasers) laser product.
- Adhere to all necessary safety measures applicable for each laser class.
- Do not switch on the system if you detect damage to the fiber optic cables. Laser radiation can escape and lead to irreparable eye and skin injuries.
- Do not introduce any reflective objects or mirrors into the laser beam path or specimen area when working using a laser.
- Never expose your eyes or skin to direct or indirect laser radiation (reflections). The radiation can cause irreparable eye and skin injuries.
- Do not look into the eyepieces during scanning or when switching the beam path in the microscope.
- During the scanning operation, the laser radiation is accessible in the microscope's specimen area without obstruction after coming out of the objective. Always maintain a nominal ocular hazard distance of at least 20 cm (8") between your eyes and the opening of the objective.

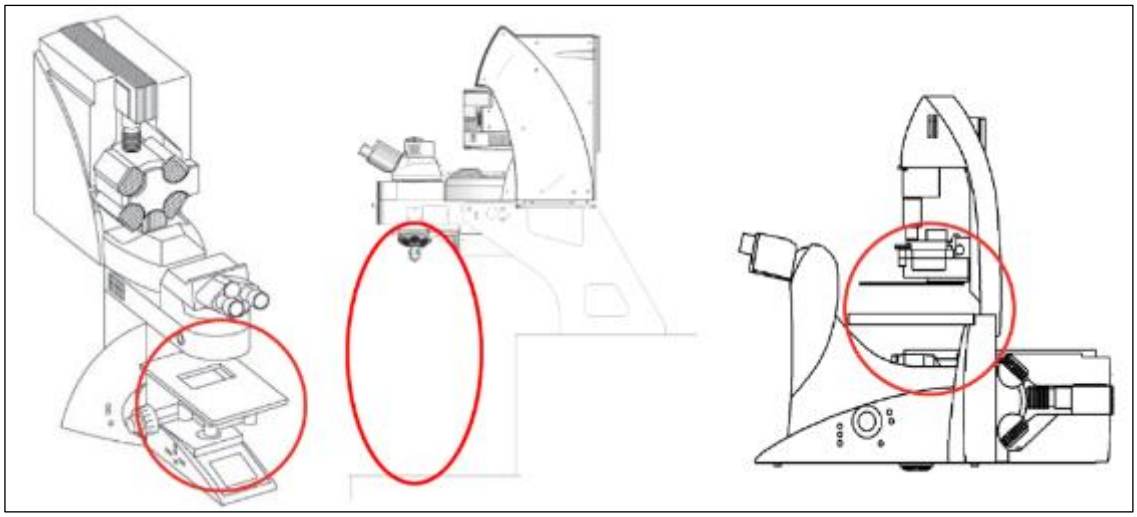


Figure 1: Specimen area of upright and inverted microscope

- Only use Leica microscope condensers and observe the two following points concerning this:
  - Do not use an S70 microscope condenser. Its large working distance and lower numerical aperture could pose a hazard due to laser radiation.
  - You must not use the S1 microscope condenser in combination with the z-Piezo specimen stage due to the risk of collision.
- Never change any specimens, objectives, filter cubes, beam splitters, condensers or other components during a scanning operation.
- If there is no lamp housing or mirror housing connected to the microscope, attach the corresponding cover to the replacement flange.
- Close all unoccupied positions in the objective nosepiece using the supplied caps.

5.4.1 Special Precautions for MP Systems

- When using a MP system, you must wear suitable laser safety glasses. Appropriate laser safety glasses for IR laser radiation are provided with the system when delivered. These laser safety glasses do not provide any protection against visible laser radiation (visible spectrum)! During the scanning operation, all persons present in the room must wear such laser safety glasses. If you need additional safety glasses, please contact the Leica branch office in your country directly.
- Do not use any dry objectives with a numerical aperture (NA) greater than 0.85. This does not apply to immersion objectives (oil, water).

5.5 Contact with Liquids

- Do not expose the system to rain or humidity. Otherwise, risks such as electrical shocks or fire hazards can result.
- Make sure that no liquid enters the system housing or comes into contact with any electrical components.
- Avoid condensation.
- The system must be completely dry before connecting it to the power supply or turning it on.
- Do not operate the system if coolant is leaking or has leaked.

5.6 Modifications to the System

- The system is installed by Leica Field Service engineers. Do not change the position of the system components.
- Always set up and operate the supply unit in an upright position.
- Under no circumstances may you open housing parts since the components below them are energized and can harm you.
- Never disconnect a fiber optic cable.
- Make sure that the cables, fiber optic cables and cooling liquid hoses are not stretched, pinched or rolled up tightly or damaged in any other way.
- Do not connect any external equipment or other components. If you have further questions, get in touch with your contact person or the Leica branch office in your country.

5.7 Malfunction of the System

You must immediately disconnect the system from the power supply if any of the following occur:

- The emission warning indicator is not lit after being switched on using the key switch.
- The emission warning indicator is re-lit after being switched off using the key switch.
- Scanning of the specimen is not activated after the system is switched on properly (laser radiation in the specimen area).

If any of these occur, immediately notify your local contact person or the Leica branch office in your country.

6 Additional Notes on Handling the System

Follow these instructions to ensure that you handle the system without interference to avoid damage to the instrument and loss of data.

6.1 Location

- You need sufficient space for temporary storage and for unpacking the delivered components. Always protect the transport crates and their contents from moisture and condensation and store them facing upwards (see the indication on the crate).
- Upon receiving the crates, make sure they are intact. If you find that the crates or seals have been damaged, have the supplier confirm this; inform your contact person at Leica Microsystems about this immediately.
- Keep the packaging material in case you need to return a defective component.
- Be absolutely certain to observe the ambient conditions applicable for this system.
- You may use the system indoors only.
- The room must be free of dust, oil and chemical vapors.
- After installing the system, you may carry out interior finish work on the room only if the system is stored in a dust-free location while this work is underway.
- Avoid direct sunlight and vibrations, since these can distort measurements and micrographic scans.
- We also recommend using a room that can be completely darkened.
- Do not expose the system to drafts.
- If the system has to be relocated or moved for any other reason, get in touch with your local contact person or the Leica branch office in your country.

6.2 Using the Software

- Before carrying out operating steps with the system, first read the corresponding description of the function in the LAS X online help, see chapter 14 "LAS X and Online help". For an overview of the individual functions, refer to the table of contents of the online help.
- Back up your data regularly to a suitable data carrier.
- Do not switch the workstation off after a software crash, but restart the LAS X software after 15 seconds. No image data are lost in case of a software crash. If the LAS X software is restarted without restarting the workstation, the data is automatically restored. If the software crash is caused by a workstation crash, the image data might be lost.
- Do not install any hardware or software on the workstation, as otherwise serious damage to the system or loss of data can result.

6.3 Protecting the System

- Observe the maintenance instructions and intervals prescribed in chapter 24Maintenance.
- During the update of the firmware, a continuous warning signal sounds. The audible warning signal stops after the updated component is automatically restarted. During the automatic update and the automatic restart of the component, you may not switch off or restart the system, since otherwise this can lead to damage to the system.
- Protect the system from dust and grease.
- Make sure to use only one small drop of immersion fluid. The immersion fluid may not contaminate or enter the microscope.
- Make sure that the specimen carrier is not against the objective and cannot be damaged by it or cause broken glass.
- Be absolutely certain to prevent the optics and mechanical parts from coming into direct contact with acids, bases and other aggressive chemicals.
- Never use abrasive products to clean the system and its components. Abrasives can scratch the surface and thus have a negative effect on the protection of the parts.
- Protect the microscope from excessive temperature fluctuations. Such fluctuations can lead to the accumulation of condensation, which can damage the electrical and optical components.
- Allow the entire system to cool down to room temperature before covering the system with a dust cover. This prevents condensation from forming below it, which can enter the system and damage it.
- Certain detectors, such as avalanche* or hybrid* detectors, have a safety shutoff that is activated if too much light has an effect. Positive effects on the lifetime of the specified detectors can be gained by adapting the laser power such that the safety shutoff is not activated in the first place.
- In normal use, the HyD reflected light detectors* are sufficiently protected from destruction due to overexposure by measures in LAS X and by an electronic protective circuit. An audible signal (beep) warns the user if the detector is being operated near the maximum permitted signal level. If the maximum permitted signal level is exceeded, the detector automatically switches off and the red status LED on the detector module lights up.
- If you have further questions, get in touch with your contact person or the Leica branch office in your country (see chapter 27).

6.3.1 Objectives

- Only use immersion fluids that are intended for the objective. Unsuitable immersion fluid can contaminate or destroy the objective.
- When changing over from an oil or water objective to a dry objective, you have to remove the immersion medium from the specimen slide in order not to damage the dry objective.
- Never open the objectives for cleaning.
- If there is a z-Piezo specimen stage installed on your system with an upright microscope, be absolutely certain to observe the corresponding notes in chapter 21, page 104.

6.4 Digital LightSheet (DLS)[1]

If there is a DLS transmitted light arm installed on your system, pay careful attention to the following notes:

- Only lasers up to Class 3 are permitted for LightSheet experiments. If you would like to use a multi-photon laser (Class 4), it is only activated if the specimen area is protected by a laser safety chamber.
- Before you switch on the system and start the LAS X software, tilt the DLS transmitted light arm back. Failure to do so may cause specimens and objectives to be damaged or destroyed by initialization of the specimen stage upon system and software startup.
- When moving the specimen stage (with the SmartMove, for example) ensure that the specimen and the specimen stage do not collide with the mirror cap. This collision can damage the specimen, the specimen stage, the mirror cap and the objective.
- When rotating the objective turret manually, ensure that the objectives do not collide with the specimen or the specimen stage, which could damage the specimen or specimen stage.
- Do not remove the transmitted light arm once the LightSheet module has been adjusted as part of service activities. Opening or working on the transmitted light arm would necessitate further adjustment by a Leica Field Service engineer.
- Do not make any changes to the TwinFlect mirror cap! Opening or working on the mirror cap in any way or loosening the screws causes damage to the mirror and the mirror cap (see chapter 18.5, page 89).

[1] Optional

7 System Overview and Properties

Figures are for illustration purposes. The system you have acquired may deviate from the illustrations. For additional system illustrations, refer to chapter 8.

7.1 System with Inverted Microscope

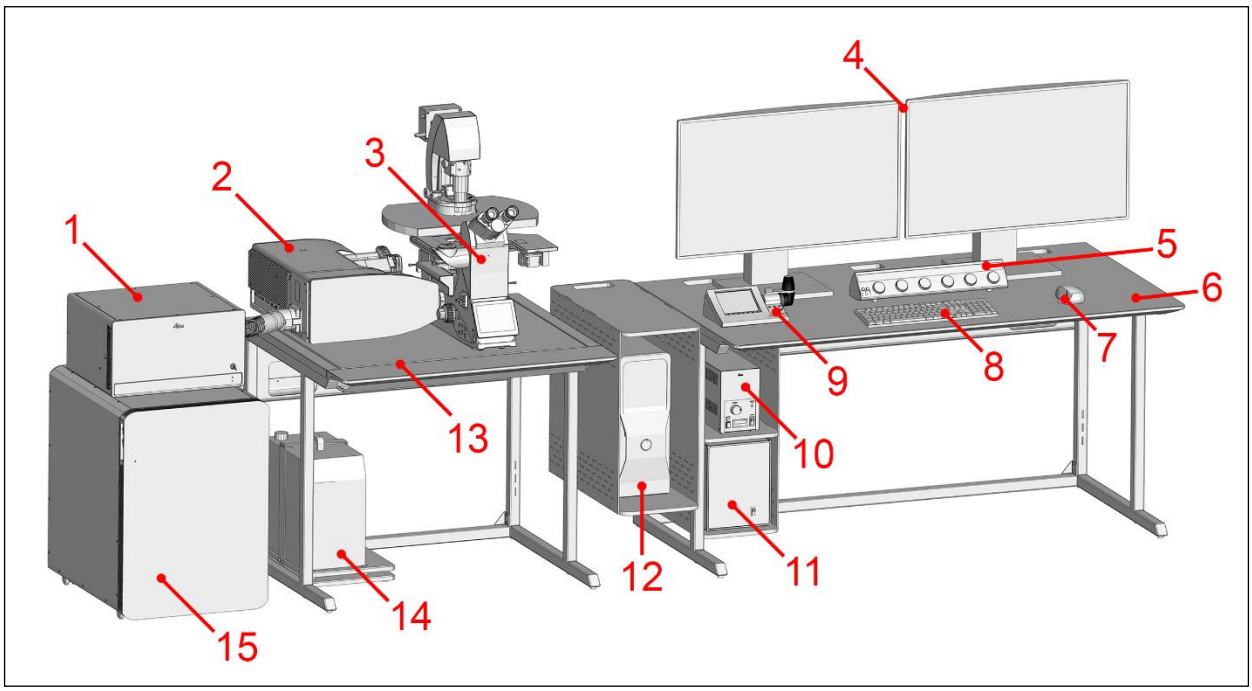


Figure 2: System with Inverted Microscope

1	White Light Laser (WLL)[2]	9	SmartTouch or SmartMove
2	Scan head	10	External light source
3	Microscope	11	Microscope control box
4	Monitor(s)	12	Workstation
5	Control panel	13	Microscope table
6	Work table	14	External cooling (chiller)
7	Mouse	15	Supply unit
8	Keyboard		

[2] Only for STELLARIS 8.

7.2 System with Upright Microscope

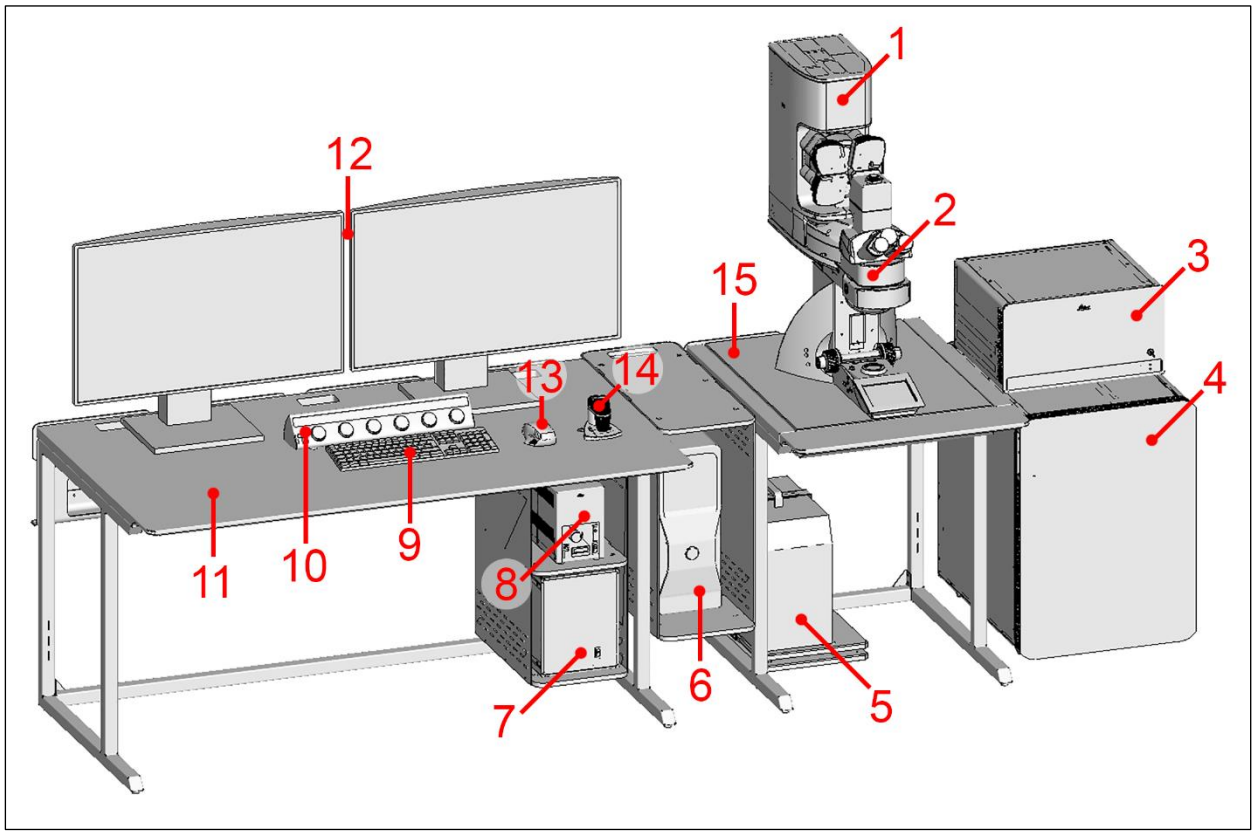
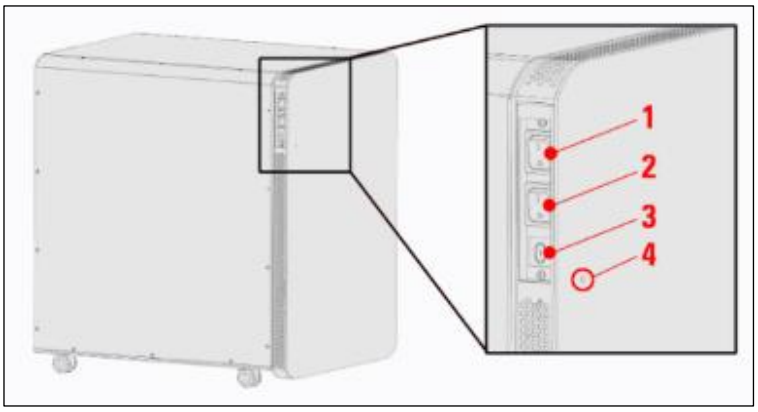


Figure 3: System with Upright Microscope

1	Scan head	9	Keyboard
2	Microscope	10	Control panel
3	White Light Laser (WLL)[3]	11	Work table
4	Supply unit	12	Monitors
5	External chiller (cooling)	13	Mouse
6	Workstation	14	SmartMove
7	Microscope control box	15	Microscope table
8	External light source		

[3] Only for STELLARIS 8.

7.3 Controls and emission warning indicator on the supply unit



1 On/off switch

2 Laser switch

3 Master key switch

4 Emission warning indicator

Figure 4: Controls and emission warning indicator on the supply unit

8 Technical Data

Figures are for illustration purposes. The system you have acquired may deviate from the illustrations.

8.1 STELLARIS 5 – Dimensions of the System and Space Requirements

For more information about the requirements for the location and the room dimensions, refer to Chapter 9, page 32.

8.1.1 STELLARIS 5 with Inverted Microscope

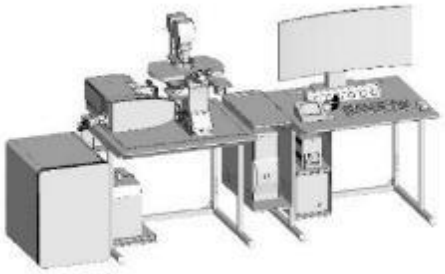
	**Dimensions of the system (length x depth x height)** 276 cm x 100 cm x 175 cm (9' 1'' x 3' 3'' x 5' 9'') **Space requirements including free room around the system** 356 cm x 250 cm (11' 8'' x 8' 2'')

Figure 5: System with inverted microscope, with small work table (90 cm) and the supply unit to the left of the microscope table

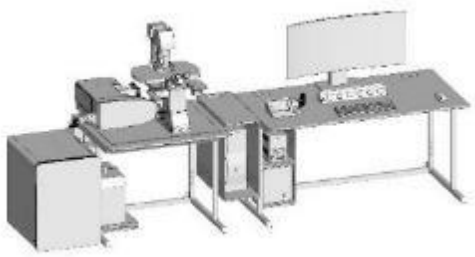
	**Dimensions of the system (length x depth x height)** 335 cm x 100 cm x 175 cm (11' x 3' 3" x 5' 9'') **Space requirements including free room around the system** 415 cm x 250 cm (13' 7'' x 8' 2'')

Figure 6: System with inverted microscope, with large work table (150 cm) and the supply unit to the left of the microscope table

8.1.2 STELLARIS 5 with Upright Microscope

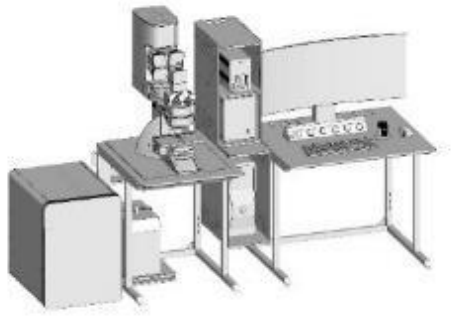
	Dimensions of the system (length x depth x height) 240 cm x 100 cm x 175 cm (7' 10" x 3' 3" x 5' 9") Space requirements including free room around the system 320 cm x 250 cm (10' 6" x 8' 2")

Figure 7: System with upright microscope, with small work table (90 cm) and the supply unit to the left of the microscope table

8.2 STELLARIS 8 – Dimensions of the System and Space Requirements

For more information about the requirements for the location and the room dimensions, refer to Chapter 9, page 32.

8.2.1 STELLARIS 8 with Inverted Microscope

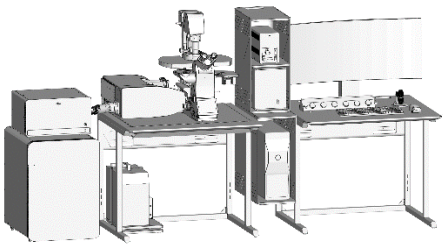
	Dimensions of the system (length x depth x height) 276 cm x 100 cm x 175 cm (9' 1" x 3' 3" x 5' 9") Space requirements including free room around the system 356 cm x 250 cm (11' 8" x 8' 2")

Figure 8: System with inverted microscope, small work table (90 cm) and the supply unit to the left of the microscope table

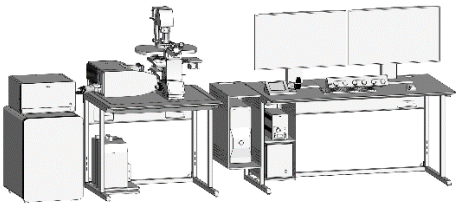
	Dimensions of the system (length x depth x height) 335 cm x 100 cm x 175 cm (11' x 3' 3" x 5' 9") Space requirements including free room around the system 415 cm x 250 cm (13' 7" x 8' 2")

Figure 9: System with inverted microscope, large work table (150 cm) and the supply unit to the left of the microscope table

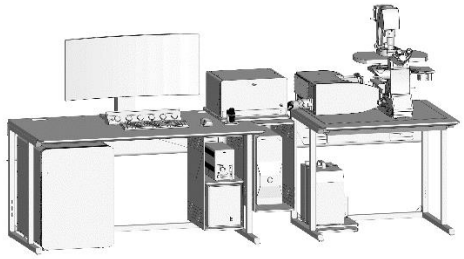
	**Dimensions of the system (length x depth x height)** 280 cm x 100 cm x 175 cm (9' 2" x 3' 3" x 5' 9") **Space requirements including free room around the system** 360 cm x 250 cm (11' 10" x 8' 2")

Figure 10: System with inverted microscope, large work table (150 cm) and the supply unit below the work table

8.2.2 STELLARIS 8 with Upright Microscope

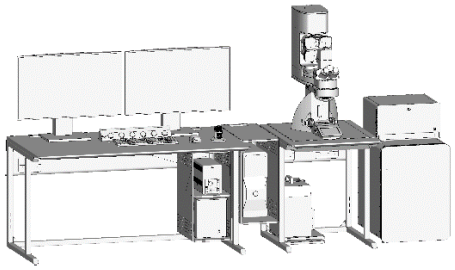
	**Dimensions of the system (length x depth x height)**[4] 295 cm x 100 cm x 175 cm (9' 8" x 3' 3" x 5' 9") **Space requirements including free room around the system**[5] 375 cm x 250 cm (12' 4" x 8' 2")

Figure 11: System with upright microscope, with large work table (150 cm) and the supply unit to the right of the microscope table

[4] Only for STELLARIS 5.
[5] Only for STELLARIS 5.

8.3 STELLARIS 8 CRS – Dimensions of the System and Space Requirements

For more information about the requirements for the location and the room dimensions, refer to Chapter 9, page 32.

Optical table	Minimum size of the room[6]
150 x 180 cm (4' 11" x 5' 11'')	420 x 330 cm (13' 9" x 10' 10'')

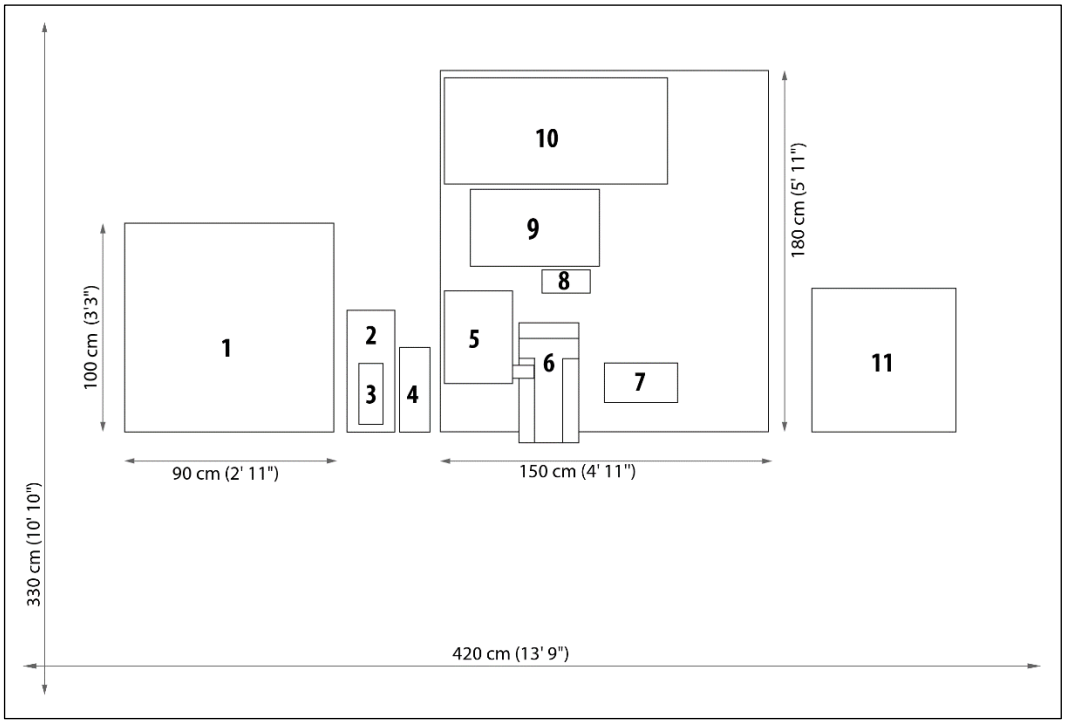


Figure 12: Example of a STELLARIS 8 CRS configuration

1 Work table and supply unit
2 Workstation
3 NDD detection unit
4 Microscope control box
5 Scan head
6 Microscope
7 Panel PC
8 AOTF driver
9 Beam coupling unit
10 CARS laser
11 CARS laser supply unit and cooling

[6] Width of the room with small work table (90 cm | 2' 11"). With a large work table (150 cm | 4' 11"), you need a room that is 60 cm (2') wider.

8.4 STELLARIS 8 DIVE – Dimensions of the System and Space Requirements

Depending on the configuration, the STELLARIS 8 DIVE is equipped with different optical tables and different infrared lasers. The number of the IR lasers on the optical table may vary.

For more information about the requirements for the location and the room dimensions, refer to Chapter 9, page 32.

8.4.1 STELLARIS 8 DIVE with Inverted Microscope

Optical table	Minimum size of the room[7]
180 x 120 cm (5' 11" x 3' 11'')	450 x 300 (14' 9" x 9' 10")
180 x 150 cm (5' 11" x 4' 11'')	450 x 330 cm (14' 9'' x 10' 10")
210 x 150 cm (6' 11" x 4' 11'')	480 x 330 cm (15' 9' x 10' 10")

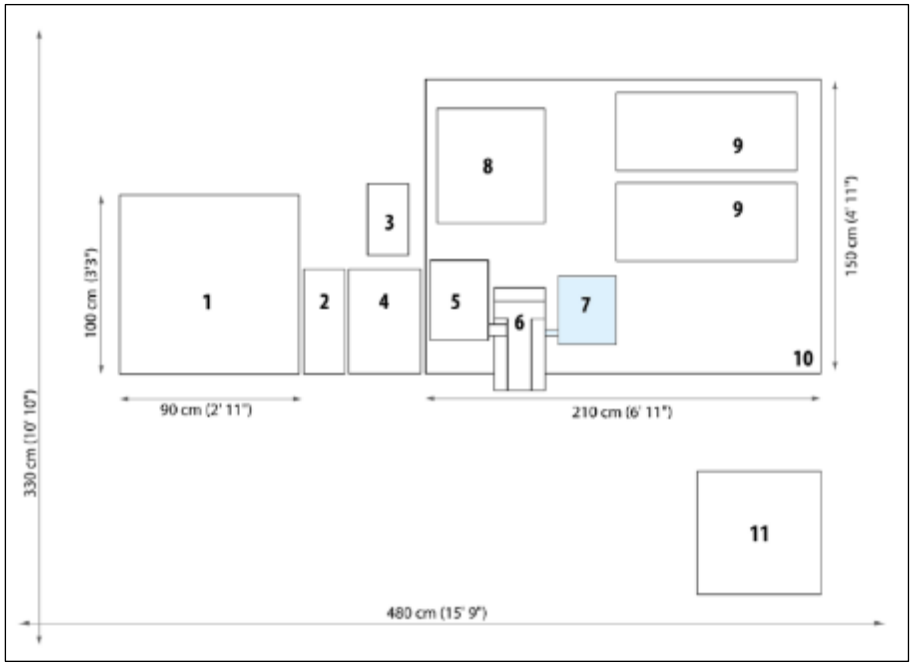


Figure 13: Example of a STELLARIS 8 DIVE configuration with inverted microscope

1 Work table and supply unit
2 Workstation
3 Cooling of the 4Tune
4 DIVE control unit
5 Scan head
6 Inverted microscope
7 4Tune (Spectral NDD)
8 Beam coupling unit
9 IR laser
10 Optical table
11 Power supply and cooling of the IR laser

[7] Width of the room with small work table (90 cm | 2' 11"). With a large work table (150 cm | 4' 11"), you need a room that is 60 cm (2') wider.

8.4.2 STELLARIS 8 DIVE with Upright Microscope

Optical table	Minimum size of the room[8]
120 x 150 cm (3' 11" x 4' 11")	390 x 330 (12' 10" x 10' 10")
120 x 180 cm (3' 11" x 5' 11")	390 x 350 cm (12' 10" x 11' 6")
130 x 150 cm (4' 3" x 4' 11")	420 x 350 cm (13' 9" x 11' 6")
150 x 180 cm (4' 11" x 5' 11")	420 x 350 cm (13' 9" x 11' 6")
180 x 150 cm (5' 11" x 4' 11")	450 x 330 cm (14' 9" x 10' 10")

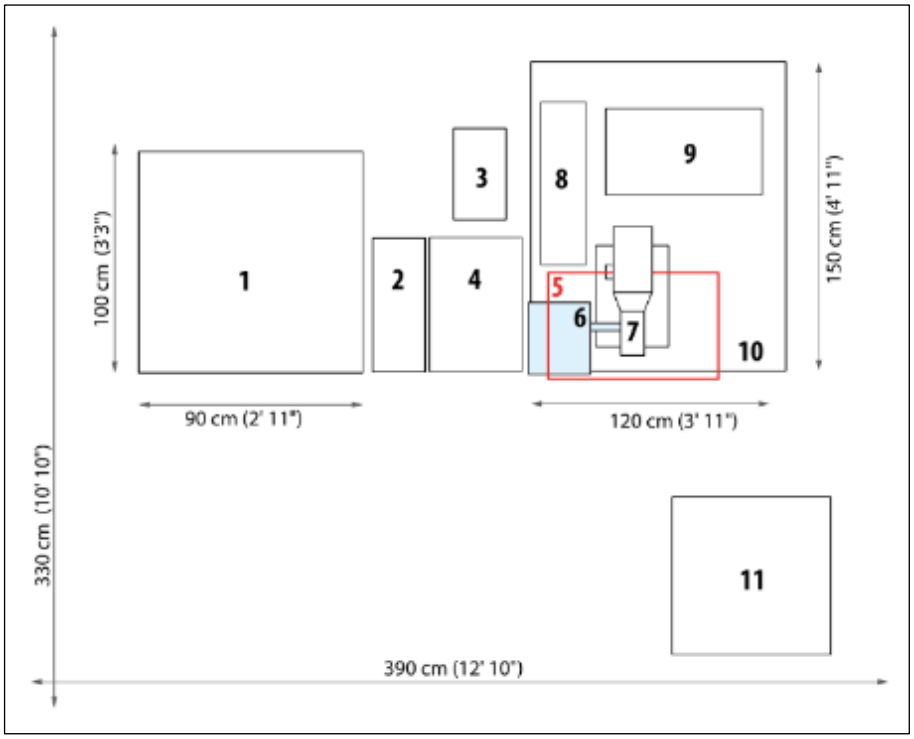


Figure 14: Example of a STELLARIS 8 DIVE configuration with upright microscope

1 Work table and supply unit
2 Workstation
3 Cooling of the 4Tune
4 DIVE control unit
5 Laser safety chamber
6 4Tune (Spectral NDD)
7 Upright microscope
8 Beam coupling unit
9 IR laser
10 Optical table
11 Power supply and cooling of the IR laser

[8] Width of the room with small work table (90 cm | 2' 11"). With a large work table (150 cm | 4' 11"), you need a room that is 60 cm (2') wider.

Optical table	Minimum size of the room[9]
130 x 150 cm (4' 3'' x 4' 11'')	420 x 350 cm (13' 9'' x 11' 6")

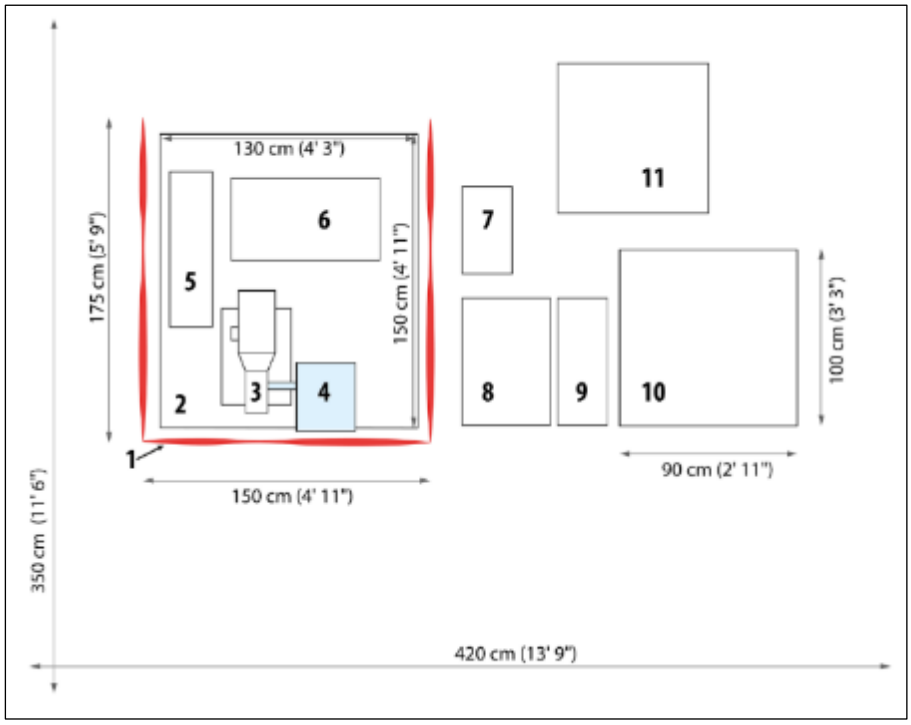


Figure 15: Example of a STELLARIS 8 DIVE configuration with upright microscope and laser safety curtain

1 Laser safety curtain
2 Optical table
3 Upright microscope (e.g. Leica DM8 CS)
4 4Tune (Spectral NDD)
5 Beam coupling unit
6 IR laser
7 Cooling of the 4Tune
8 DIVE control unit
9 Workstation
10 Work table with supply unit
11 Power supply and cooling of the IR laser

[9] Width of the room with small work table (90 cm | 2' 11"). With a large work table (150 cm | 4' 11"), you need a room that is 60 cm (2') wider.

8.5 Weight

8.5.1 STELLARIS 5 and STELLARIS 8

Weight of the system:	up to 350 kg (772 lbs)
Static floor load:	200 kg/m² (0.28 lbf/in²)

8.5.2 STELLARIS 8 CRS

Weight of the system:	up to 850 kg (1874 lbs)
Static floor load:	250 kg/m² (0.36 lbf/in²)

8.5.3 STELLARIS 8 DIVE

Weight of the system:	up to 1300 kg (2866 lbs)
Static floor load:	500 kg/m² (0.71 lbf/in²)

8.6 Electrical Specifications

For more information, refer to chapter 9.4 "Electrical Connection Requirements" and 9.5 "Waste heat".

Observe the user manuals provided

Always observe all of the user manuals provided for the individual components and peripheral devices.

8.7 Electromagnetic Compatibility

In regard to emitted interference, this is a class A system (CISPR 11). This system is suitable for use in buildings that do not include domestic premises and buildings not directly connected to a low-voltage power supply network that supplies buildings used for domestic purposes.

The system can cause radio interference in a household environment. In these cases, the operator may have to take measures to eliminate the interference.

When using internal and external HyDs, it is recommended that the system only be operated in a controlled electromagnetic environment. This is because the use of cell phones or other radio transmitting devices such as DECT phones can cause picture interference if used in the immediate vicinity of the system.

8.8 Serial Number

Depending on the system configuration, you can find the serial number of your system in the following location:

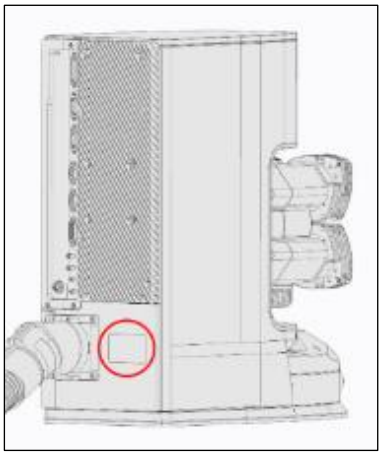


Figure 16: Nameplate with serial number on the rear side of the scan head

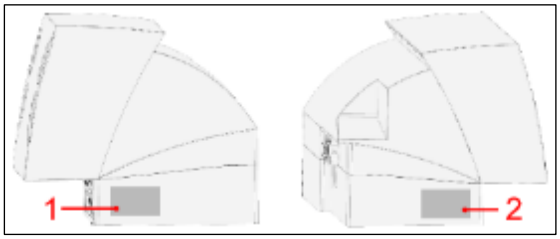


Figure 17: Nameplate with serial number on the front side of the 4Tune, (1) at the inverse system, (2) at the upright system

9 Ambient Conditions

Here you can find a summary of the information regarding the size and design of the room and the general requirements regarding ambient conditions. Be absolutely sure to comply with the ambient conditions.

9.1 General Requirements Regarding Ambient Conditions

- You may use the system only in indoor areas that are dust-free. The room must be free of dust, oil and chemical vapors.
- Avoid direct sunlight and vibrations, since these can distort measurements and micrographic scans. We also recommend using a room that can be completely darkened.
- The room must meet national safety regulations for laser safety areas.
- Never expose the system to rain, fluids, or humidity. Do not set up the system under water pipes, air-conditioning systems, or other piping. Otherwise, this could cause fire and electrical shocks to the system and the electrical components.
- The room should be equipped with a telephone connection to contact Leica Microsystems CMS GmbH for phone support. For Leica RemoteCare, an Internet connection is also needed, see chapter 9.1.1.
- The system should be set up in a separate room in order to be able to provide a constant temperature and appropriate ambient lighting without having to address needs of other systems, instruments, and room users.

	STELLARIS 5 STELLARIS 8 STELLARIS 8 DIVE	STELLARIS 8 CRS
Temperature range for operation:	18 to 25 °C (64 to 77 °F)	19 to 25 °C (66 to 77 °F)
Optimum optical behavior:	22 °C ± 1 °C (72 °F ± 1.8 °F)	23 °C ± 1 °C (73 °F ± 1.8 °F)
Pollution degree:	2 (protect system against dust)	
Permitted relative humidity:	20 to 60 % (non-condensing)	
Maximum location elevation:	2000 m above sea level	

- HyD-RLDs[10] are cooled. To ensure optimal performance from the detectors, the humidity of the surrounding air must not exceed 60 % at 25 °C. To prevent potential damage due to condensation, the cooling shuts off automatically if its value is exceeded.

[10] optional

9.1.1 Compressed air supply of the optical tables

If you are using an optical table, you will need a corresponding compressed air supply for the level control of the tabletop that is dependent on the model of the optical table:

- Air pressure reducer with ¼" connection
- Integrated air filter with water trap
- Compressed air or nitrogen (operating pressure 5-7 bar)

9.1.2 Internet and Phone Connection

The room should be equipped from the outset with a telephone and Internet connection in case you need to contact Leica for remote support or RemoteCare.

If the system is connected to the Internet, you have the ability to download software updates, obtain remote support and connect to Leica RemoteCare. For this purpose, ensure that your local IT technician is available during the system installation to establish an Internet connection.

The workstation can be connected to the Internet using the *RJ45* network connection or using the *Leica WiFi adapter*. Only use the WiFi adapter recommended by Leica.

If you have further questions about Leica RemoteCare, email:
remotecare.support@leica-microsystems.com

9.2 Vibrations

Vibrations must be reduced to a minimum; for that reason, do not set up the system near any of the following sources of vibration: shakers, ultracentrifuges, pumps, compressors, refrigerators, vending machines, elevators.

9.2.1 STELLARIS 5 and STELLARIS 8

Maximum tolerable vibrations:

Frequency range [5 Hz – 30 Hz]:	less than 30 µm/s root mean square
Frequency range [> 30 Hz]:	less than 60 µm/s root mean square

9.2.2 STELLARIS 8 CRS

Maximum tolerable vibrations:

Frequency range [5 Hz – 30 Hz]:	less than 12.5 µm/s root mean square
Frequency range [> 30 Hz]:	less than 12.5 µm/s root mean square

9.2.3 STELLARIS 8 DIVE

Maximum tolerable vibrations:

Frequency range [5 Hz – 30 Hz]:	less than 30 µm/s root mean square
Frequency range [> 30 Hz]:	less than 60 µm/s root mean square

9.3 Room Dimensions

WARNING **Fire or overheating of the system possible**

Electrical peripheral devices must be placed at least 10 cm (4") away from the wall and from flammable substances to prevent overheating or fire of the system.

The specified dimensions for the room size are minimum space requirements. The room dimensions for the respective system are provided in chapter 8, from page 23.

Passage width	at least 100 cm (3' 3")
Free room to the right, left, and behind the system	at least 40 cm (1' 4")
Free room in front of the system	at least 110 cm (3' 7")
Height and width of obstacles such as steps and door thresholds	< 6 cm (< 2.4")

- Make sure that doors and passages are at least 100 cm (3' 3'') wide to allow safe transport of the system.
- The room should be as large as possible so that multiple users can find room in front of the system. The free room to the right, left and rear of the system should be 40 cm (1' 4"). In front of the system there must be 110 cm (3' 7") of clearance so that the service technicians can access the system as necessary.
- Obstacles, steps and door thresholds must be no higher than 6 cm (2.4") or wider than 6 cm (2.4"). If they are larger, you must hire a moving company to transport the supply unit, which weighs up to 130 kg (287 lbs), properly past the obstacles.
- If a move between floors is necessary, a suitable elevator is required.

9.4 Electrical Connection Requirements

WARNING **Electric shock is possible when using ungrounded sockets**

This system is designed for connection to grounded outlets. The grounding plug performs an important safety function. To avoid the risk of electrical shock or damage to the instrument, do not disable this feature. Operation without grounded sockets is not permitted.

Observe the user manuals provided

Always observe all of the user manuals provided for the individual components and peripheral devices.

9.4.1 STELLARIS 5 and STELLARIS 8

	STELLARIS 5	STELLARIS 8
Supply voltage	100 V~ to 240 V~ ± 10 %, grounded	
Frequency:	50/60 Hz	
Power supply connection:	Two separate electrical circuits (16 A) for the two multiple socket outlets. Depending on the system configuration, further electrical circuits may be required.	Three separate electrical circuits (16 A). Two of these are intended for the two multiple socket outlets. The third electrical circuit is required for the external WLL* or STED* with WLL. Depending on the system configuration, further electrical circuits may be required.
Power supply connection for USA:	Two terminals of type NEMA 5-20.	Three terminals of type NEMA 5-20.
Permitted power consumption of the multiple socket outlets:	max. 2 x 3200 VA	max. 2 x 3200 VA + 1000 VA for the external WLL* or STED* with WLL
Fuse:	T8A H 250 V	
Protection class:	I	
Protection class:	Covered design	
Overvoltage category:	II	

* optional component(s) depending on the system configuration.

9.4.2 STELLARIS 8 CRS

	STELLARIS 8 CRS
Supply voltage	100 V~ to 240 V~ ± 10 %, grounded
Frequency:	50/60 Hz
Power supply connection:	At least three separate electrical circuits (16 A), depending on the number of lasers. Depending on the system configuration, further electrical circuits may be required.
Power supply connection for USA:	Terminals of type NEMA 5-20.
Permitted power consumption of the multiple socket outlets:	max. 2 x 3200 VA
Fuse:	T8A H 250 V
Protection class:	I
Protection class:	Covered design
Overvoltage category:	II

9.4.3 STELLARIS 8 DIVE

	STELLARIS 8 DIVE
Supply voltage	100 V~ to 240 V~ ± 10 %, grounded
Frequency:	50/60 Hz
Power supply connection:	At least four separate electrical circuits 16 A), depending on the number of lasers. Depending on the system configuration, further electrical circuits may be required.
Power supply connection for USA:	Terminals of type NEMA 5-20.
Permitted power consumption of the multiple socket outlets:	max. 2 x 3200 VA
Fuse:	T8A H 250 V
Protection class:	I
Protection class:	Covered design
Overvoltage category:	II

9.4.4 Multiple Socket Outlets

Load capacity of the multiple socket outlet: maximum 3200 VA per electrical circuit.

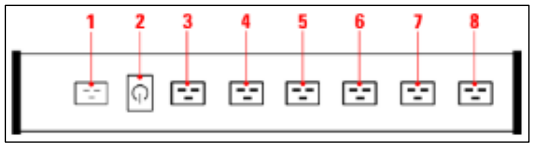


Figure 18: Multiple socket outlet

1	Socket for the country-specific IEC cable	5	Monitor*
2	On/off switch	6	RAID system*
3	Workstation	7	Environmental chamber*
4	Monitor	8	---

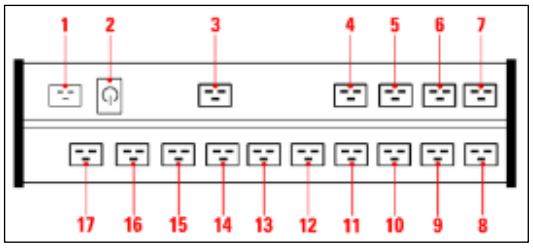


Figure 19: Multiple socket outlet

1	Socket for the country-specific IEC cable	10	RLD supply unit*
2	On/off switch	11	SmartTouch* / SmartMove*
3	Supply unit	12	APD detection unit*
4	External cooling (chiller)	13	External laser PicoQuant*
5	Microscope control box	14	z-Piezo specimen stage*
6	External light source	15	Camera*
7	Environmental chamber*	16	DIVE supply unit*
8	External 355 / 405 laser*	17	---
9	XY stage (scanning stage)		

* optional component(s) depending on the system configuration

9.5 Waste heat

NOTICE **Risk of damage to instruments**

Never install the system close to air conditioners or other ventilation systems. Air from air-conditioning systems or other ventilation equipment should not blow directly on the microscope.

Use a high-performance air-conditioning system

We recommend a high-performance air-conditioning system for operating the system to prevent large temperature fluctuations in the room.

Waste heat of STELLARIS 5	up to 3 kW
Waste heat of STELLARIS 8	up to 4 kW
Waste heat of STELLARIS 8	up to 4.4 kW
Waste heat of STELLARIS 8 DIVE	with 1 laser up to 5.4 kW with 2 lasers up to 7.9 kW

10 Lasers

It is mandatory to observe the laser safety measures for laser class 3B/IIIb (VIS and UV lasers) or for laser class 4/IV (MP systems) in accordance with applicable national and federal regulations.

You may only use the laser listed here, as the laser safety devices are only designed for the laser variants listed here.

Note that the usable lasers depend on the system type and not all lasers are compatible with each other. If your lasers should not be listed, get in touch with your contact person or the Leica branch office in your country.

10.1 Laser Classes

Laser class	Usable lasers	Wavelength range
3B/IIIb	VIS	400 - 790 nm (visible laser radiation)
	UV	350 - 400 nm (invisible laser radiation)
3B/IIIb and 4/IV	VIS	400 - 790 nm (visible laser radiation)
	UV	350 - 400 nm (invisible laser radiation)
	IR	680 - 1600 nm (invisible laser radiation)

10.2 Overview of Usable Lasers

The system features a combination of the lasers listed, see chapter 10.2.1"Lasers of Laser Class 3B/IIIb":

10.2.1 Lasers of Laser Class 3B/IIIb

Note that the usable lasers depend on the system type and not all lasers are compatible with each other. If your lasers should not be listed, get in touch with your contact person or the Leica branch office in your country.

Wavelength (nm)	Pulse duration
355	Continuous wave (cw)
405	Continuous wave (cw)
440 – 790	Pulsed
448	Continuous wave (cw)
485 – 685	Pulsed
488	Continuous wave (cw)
514	Continuous wave (cw)
561,3	Continuous wave (cw)
639	Continuous wave (cw)
730	Continuous wave (cw)

10.2.2 Lasers of Laser Class 4 / IV

Note that the usable lasers depend on the system type and not all lasers are compatible with each other. If your lasers should not be listed, get in touch with your contact person or the Leica branch office in your country.

Wavelength (nm)	Pulse duration
592	Continuous wave (cw)
660	Continuous wave (cw)
775	Pulsed
700 - 1950	Pulsed

10.2.2.1 MP laser

Wavelength (nm)	Pulse duration
680 – 1080	Pulsed
680 – 1300	Pulsed
690 – 1040	Pulsed
690 – 1050	Pulsed

11 Safety Features

11.1 Disconnecting the Power Supply

For de-energizing, switch off the multiple socket outlets at the "on/off switch" (see position 2 in Figure 18 and Figure 19) and disconnect all plugs from the electrical circuits.

11.2 Key Switches

11.2.1 Master Key Switch on the Supply Unit

There is a master key switch on the supply unit for protection against unauthorized use of the laser products. This master key switch is integrated in the interlock circuit. If the master key switch is in the "off" position, all laser beam paths are interrupted. Then no radiation from lasers integrated in the supply unit or the external lasers can reach the specimen area, even if the key switches of the external lasers are in the "on" position.

The master key switch is located on the left side of the supply unit (see Figure 20, position 3).

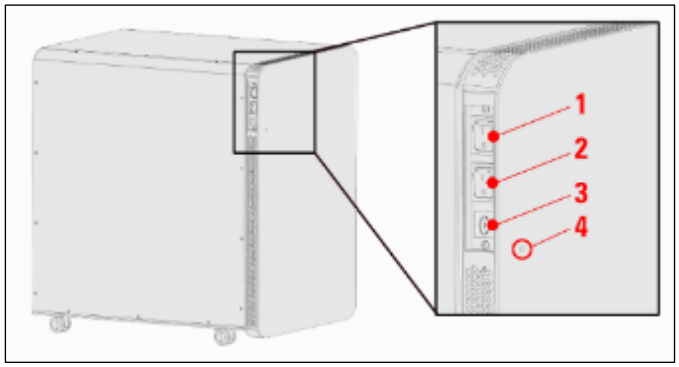


Figure 20: Master key switch on the supply unit (position 3)

11.2.2 Key Switch for the External White Light Laser

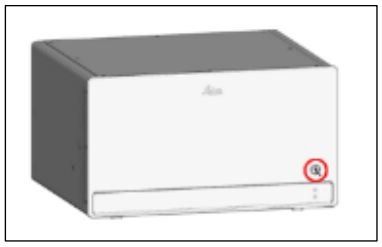


Figure 21: Key Switch for the External White Light Laser

11.2.3 Key Switch for CRS Laser

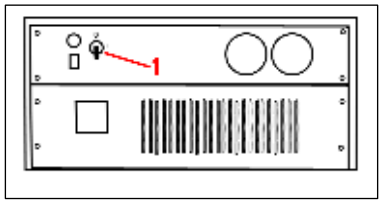


Figure 22: Key switch at the power supply of the CRS laser (1)

11.2.4 Key Switches for Other External Lasers

Observe the user manuals for external lasers

Please refer to the information from the documents provided by the laser manufacturer for the external lasers. Pay particular attention to the laser manufacturer's notes.

11.3 Emission Warning Indicators

The operational readiness of lasers is signaled by an emission warning indicator.

WARNING

Possible risk of permanent eye and skin damage from laser radiation in the specimen plane

As soon as the emission warning indicator of the lasers is lit, it is possible from a functional standpoint that laser radiation is present in the specimen area.

The emission warning indicator on the supply unit is connected to the master key switch. If this is illuminated, there is the possibility of laser radiation in the specimen plane. If the master key switch is in the "off" position, the emission warning indicator on the supply unit goes out.

The emission warning indicator is located on the front of the supply unit and lights up in white, see Figure 23, position 4.

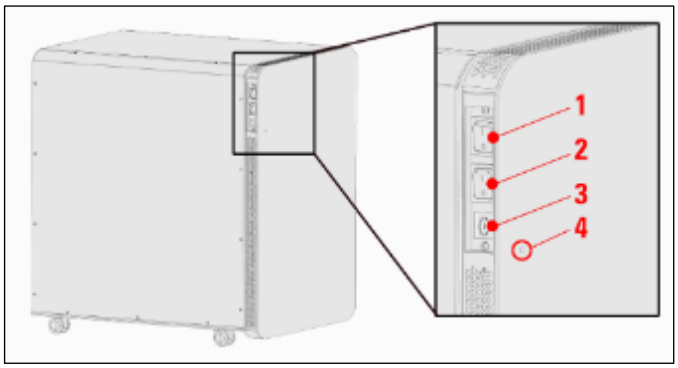


Figure 23. Emission warning indicator on the supply unit (position 4)

11.3.1 Emission Warning Indicator on the External White Light Laser

The emission warning indicator of the external white light laser is located on the front of the white light laser (see Figure 24) and lights up in red.

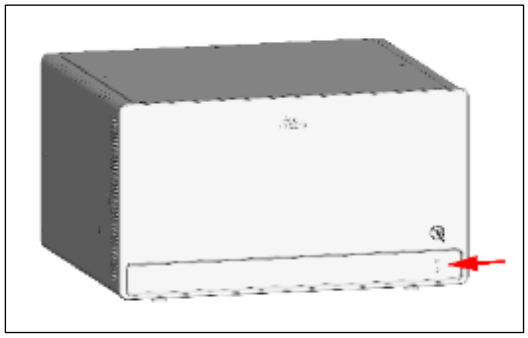


Figure 24: Emission Warning Indicator on the External White Light Laser

11.3.2 Emission Warning Indicator on the CRS Laser (picoEMERALD™)

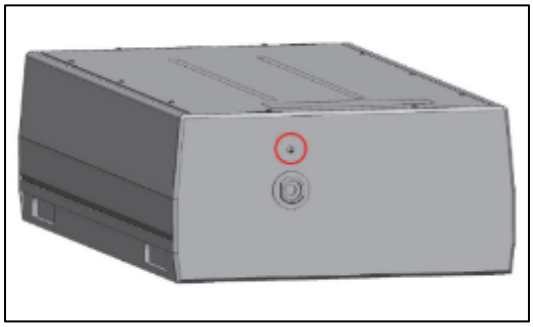


Figure 25: Emission Warning Indicator on the CRS Laser (picoEMERALD™)

11.3.3 Emission Warning Indicator on the Supply Unit of the CRS Laser

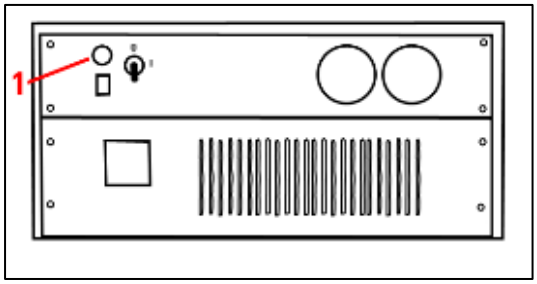


Figure 26: Emission warning indicator on the supply unit of the CRS laser (1)

11.3.4 Emission Warning Indicator on Other External Lasers

Observe the user manuals for external lasers

Please refer to the information from the documents provided by the laser manufacturer for the external lasers. Pay particular attention to the laser manufacturer's notes.

11.3.5 Malfunction of Emission Warning Indicator

WARNING

Malfunction of Emission Warning Indicator

You must immediately disconnect the system from the power supply if any of the following occur:

- The emission warning indicator is not lit after being switched on using the detachable-key switch.
- The indicator continues to be lit after being switched off using the key switch.
- Scanning of the specimen is not activated after the system is switched on properly (laser radiation in the specimen area).

If any of these occur, immediately notify your local contact person or the Leica branch office in your country.

11.4 Interlock Connectors

11.4.1 Interlock Connector on the Supply Unit

Figure 27: Interlock Connector on the Supply Unit

The interlock connector (plug connection for the remote-controlled safety interlock), operating voltage 12 V DC, is located on the rear side of the supply unit.

The interlock connector on the supply unit has a shorting plug in its factory condition. The shorting plug is removable in order to connect a remote-controlled safety interlock (cable and safety switch). The laser beam path is interrupted if the contact is open. The safety interlock can, for example. be connected to a door contact. When the door is opened, the laser beam is then interrupted automatically.

The total length of the cable must not exceed 10 m. If a large amount of electromagnetic interference (EMC) is expected in the environment, use a shielded cable with a shielded plug.

Remote Interlocks Possible

Remote interlock devices such as those connected to the room, the door or other onsite safety interlock systems can also be connected to the remote interlock connector. The laser beam path is interrupted if the contact is open.

11.4.2 Interlock Connector on the CRS Laser

Observe the user manuals for external lasers

Please refer to the information from the documents provided by the laser manufacturer for the external lasers. Pay particular attention to the laser manufacturer's notes.

11.4.3 Interlock Connector on Other External Lasers

Observe the user manuals for external lasers

Please refer to the information from the documents provided by the laser manufacturer for the external lasers. Pay particular attention to the laser manufacturer's notes.

11.4.4 Interlock Connector on the Scan Head

The interlock connector is located on the rear side of the scan head (operating voltage: 12 V DC, see Figure 28).

For laser safety reasons, the inverted microscope must be connected to this connector or, if an upright microscope is used, the mirror housing. This ensures that the microscope safety switch is integrated in the interlock circuit.

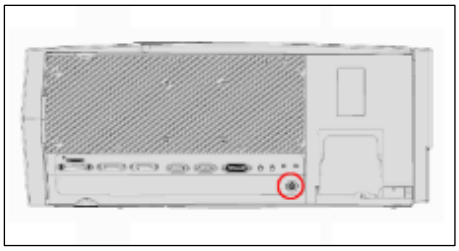


Figure 28: Interlock connector on the scan head

11.5 Safety Switches on the Microscope

When the safety switches are triggered, the light path of the laser beam is interrupted.

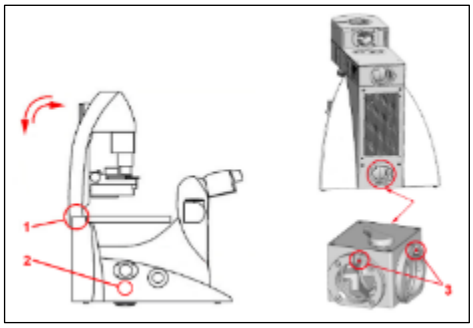


Figure 29: Safety switches (1) and (2) on the inverted microscope (left);
Safety switches (3) on the mirror housing for the upright microscope (right)

Position of the safety switch	Is triggered by …	Is triggered if …	Function
1	Transmitted-light illuminator arm	The illuminator arm is tilted (e.g. for working on the specimen)	Prevents laser light while working on the specimen
2	Motorized changeover from eyepiece mode to scan mode	The path-folding mirror for the scan head is swung out by motor	Prevents stray light in the eyepiece if the user switches from eyepiece observation to confocal observation
3	Pushbutton in the port apertures of the mirror housing	One of the two apertures on the mirror housing is free (no external detector, no halogen lamps, no cover)	Prevents the escape of laser light if the user removes components from the mirror housing.

11.6 Warning Messages

Message/Signal	Cause	Remedy
Warning message in LAS X on the monitor	Defective or not properly functioning shutter	For safety reasons, the shutters remain closed. No further use of the laser is possible. In this situation, the system must not be operated. Contact the Leica branch office in your country or your contact person.
Audible warning signal at a 1 second interval	Defective part in the safety circuit of the shutter	For safety reasons, the shutters remain closed. No further use of the laser is possible. In this situation, the system must not be operated. Contact the Leica branch office in your country or your contact person.
Audible warning signal at a 2 second interval	Defective relay contact for the door warning lamp terminal	Notify the Leica branch office in your country or your contact person immediately. The system may not be operated if a door warning lamp is connected to the door warning lamp terminal and the relay contact is defective.
Continuous audible warning signal	While automatically updating the firmware	The continuous audible warning signal stops after the updated component is automatically restarted. During the automatic update and the automatic restart of the component, you may not switch off or restart the system, since otherwise this can lead to damage to the system.

11.7 Special Laser Safety Equipment

11.7.1 Laser Protection Tube and Laser Protection Shield

The laser protection tube and the laser protection shield are used in inverted microscopes for protection from laser radiation (see Figure 30).

WARNING

Risk of permanent eye and skin damage from laser radiation

Never remove the laser protection shield, laser protection tube or other laser protection equipment on the system. Otherwise, serious injuries or damage to property may result.

If you must remove laser protection equipment to replace a component, you must reinstall the laser protection equipment completely and so that it is fully functional before you start up the system! Otherwise, serious injuries or damage to property may result.

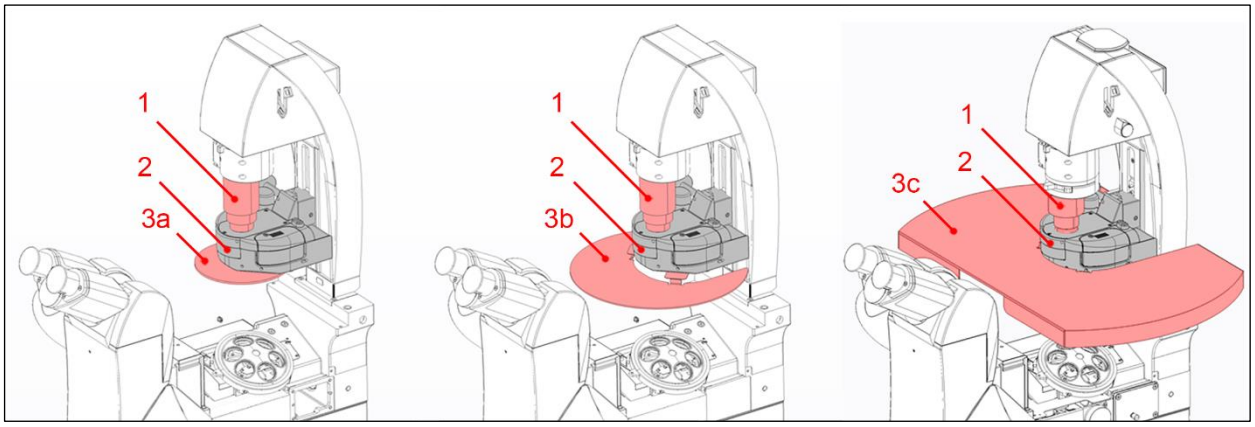


Figure 30: Laser protection tube and laser protection shield on the inverted microscope

1	Laser protection tube
2	Condenser base
3a	Laser protection shield (for VIS/UV lasers)
3b	Laser protection shield (for STED lasers up to laser class 3b)
3c	Laser protection shield (for MP lasers and STED lasers of laser class 4)

Reordering a Condenser Base:

When reordering a condenser base (see Figure 30, position 2), be sure to note that the condenser base is supplied without a laser protection shield (see Figure 30).

The existing laser protection shield (see Figure 30) must always be reinstalled. Please consult the microscope's provided user manual.

Condenser Base with Filter Holder:

When using a condenser base with filter holder, always make sure that unused filter holders are swung out of the beam path, and that the laser protection tube covers the beam path.

When equipping multiple filter holders with filters, do so from bottom to top so that the laser protection tube can cover the beam path to the greatest possible extent. Do not swing in the filters during the scanning operation.

11.7.2 Laser safety curtain

The laser safety curtain (Figure 31, position 1) is used in the STELLARIS 8 DIVE system in combination with the upright microscope DM8 CS.

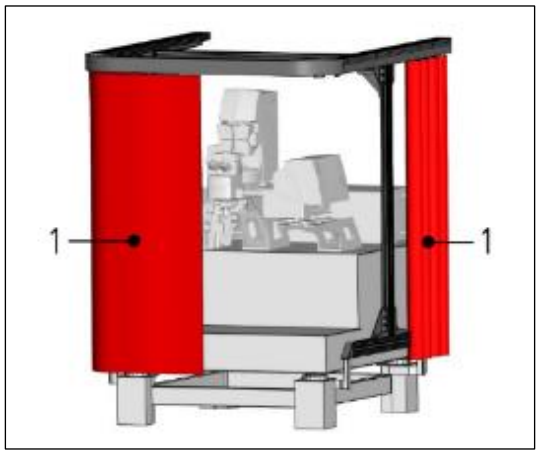


Figure 31: Laser safety curtain

The laser safety curtain is integrated in the interlock circuit. If the laser safety curtain is open, the shutters are closed. If the laser safety curtain is properly closed, the shutters open, and you can use the lasers and the system.

Tampering with or bypassing the interlock circuit is prohibited. Opening or working on the interlock circuit or the system's safety features in any way shall void any and all warranty claims.

11.7.3 Safety Beam Guide

The light of all VIS lasers and UV lasers being used is guided by a fiber optic cable and, thus, is completely shielded until it exits the microscope objective and hits the specimen in the specimen area.

For systems with infrared laser (wavelength range > 700 nm), the beam is routed through a safety beam routing and, if necessary, also through a fiber optic cable (see Figure 32). This completely shields the laser beam until it leaves the microscope objective and reaches the specimen.

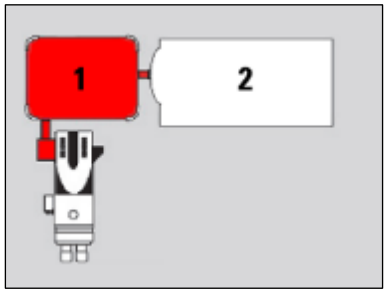


Figure 32: Safety beam guide (1) and IR laser (2)

12 Safety Labels on the System

The corresponding safety labels are selected dependent on the laser configuration (VIS, UV, MP) and attached in the following locations.

Figures are for illustration purposes. The system you have acquired may deviate from the illustrations.

WARNING **Permanent eye and skin damage from failure to observe the safety labels on the system**

Make sure that the safety labels shown in the User Manual are attached to the system.

Safety labels may not be removed.

Missing or damaged safety labels must be attached immediately and at the described location. Operation without the safety labels shown is not permitted. If you have any further questions, contact your laser safety officer or the Leica branch office in your country immediately.

WARNING **Risk of hand injury**

This note warns you of the risk of hand injuries.

12.1 Safety Labels on the Laser Safety Chamber

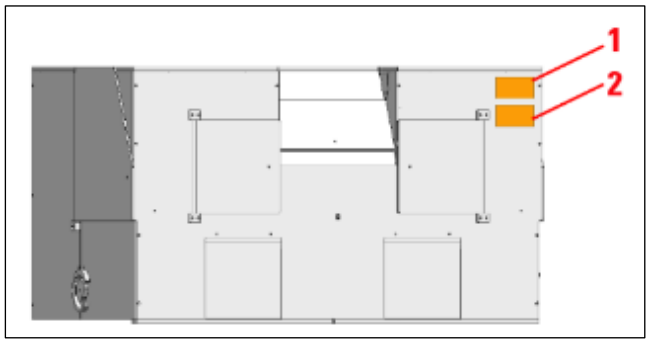


Figure 33: Safety Labels on the Laser Safety Chamber

Position	Safety labels in English and German
1	MP DANGER VISIBLE AND INVISIBLE LASER RADIATION CLASS 4 WHEN OPEN AVOID EYE OR SKIN EXPOSURE TO DIRECT OR SCATTERED RADIATION GEFAHR SICHTBARE UND UNSICHTBARE LASERSTRAHLUNG KLASSE 4- WENN GEÖFFNET BESTRAHLUNG VON AUGE ODER HAUT DURCH DIREKTE ODER STREUSTRAHLUNG VERMEIDEN
2	RISK OF COLLISION STAGE AND CONDENSER KOLLISIONSGEFAHR TISCH UND KONDENSOR

12.2 Inverted microscope

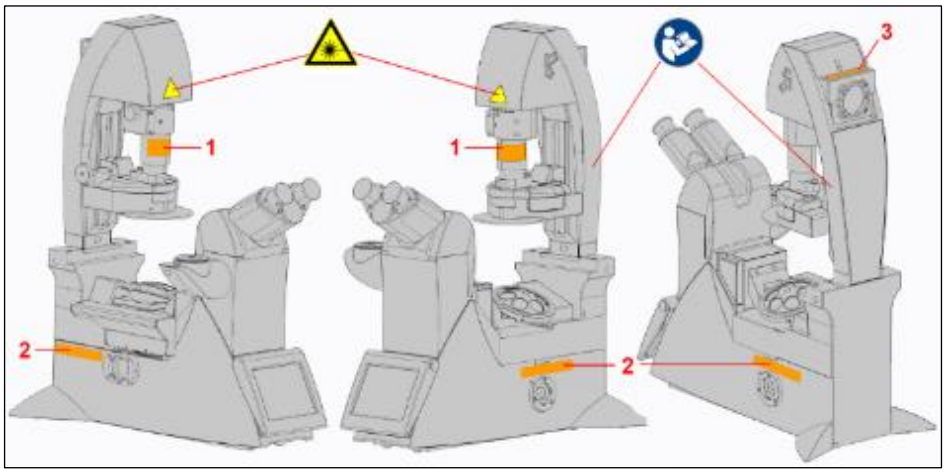


Figure 34: Safety labels for the inverted microscope

Position	Safety labels in English and German
1	VISIBLE AND INVISIBLE LASER RADIATION IS EMITTED FROM THIS APERTURE AVOID EXPOSURE AUSTRITT VON SICHTBARER UND UNSICHTBARER LASERSTRAHLUNG BESTRAHLUNG VERMEIDEN
2 and 3	VIS / UV WARNING VISIBLE AND INVISIBLE LASER RADIATION CLASS 3B WHEN OPEN AVOID EXPOSURE TO BEAM WARNUNG SICHTBARE UND UNSICHTBARE LASERSTRAHLUNG KLASSE 3B WENN GEÖFFNET NICHT DEM STRAHL AUSSETZEN
2 and 3	MP DANGER VISIBLE AND INVISIBLE LASER RADIATION CLASS 4 WHEN OPEN AVOID EYE OR SKIN EXPOSURE TO DIRECT OR SCATTERED RADIATION GEFAHR SICHTBARE UND UNSICHTBARE LASERSTRAHLUNG KLASSE 4- WENN GEÖFFNET BESTRAHLUNG VON AUGE ODER HAUT DURCH DIREKTE ODER STREUSTRAHLUNG VERMEIDEN

12.3 Upright microscope

12.3.1 Rear View of Upright Microscope

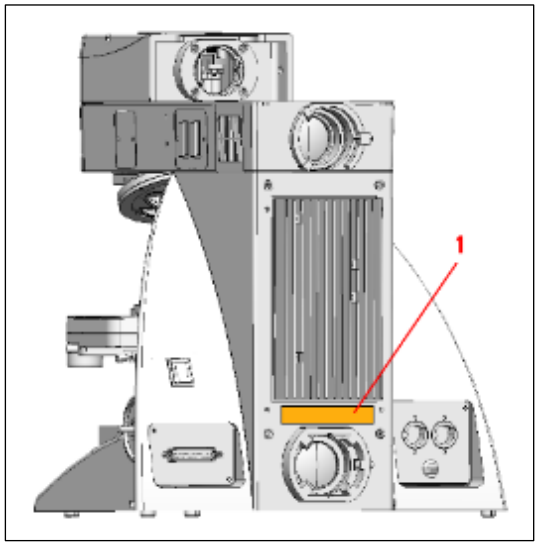


Figure 35: Safety labels for the upright microscope

Position	Safety labels in English and German
1	VIS / UV WARNING VISIBLE AND INVISIBLE LASER RADIATION CLASS 3B WHEN OPEN AVOID EXPOSURE TO BEAM WARNUNG SICHTBARE UND UNSICHTBARE LASERSTRAHLUNG KLASSE 3B WENN GEÖFFNET NICHT DEM STRAHL AUSSETZEN
1	MP DANGER VISIBLE AND INVISIBLE LASER RADIATION CLASS 4 WHEN OPEN AVOID EYE OR SKIN EXPOSURE TO DIRECT OR SCATTERED RADIATION GEFAHR SICHTBARE UND UNSICHTBARE LASERSTRAHLUNG KLASSE 4- WENN GEÖFFNET BESTRAHLUNG VON AUGE ODER HAUT DURCH DIREKTE ODER STREUSTRAHLUNG VERMEIDEN

12.3.2 Front View of the Upright Microscopes

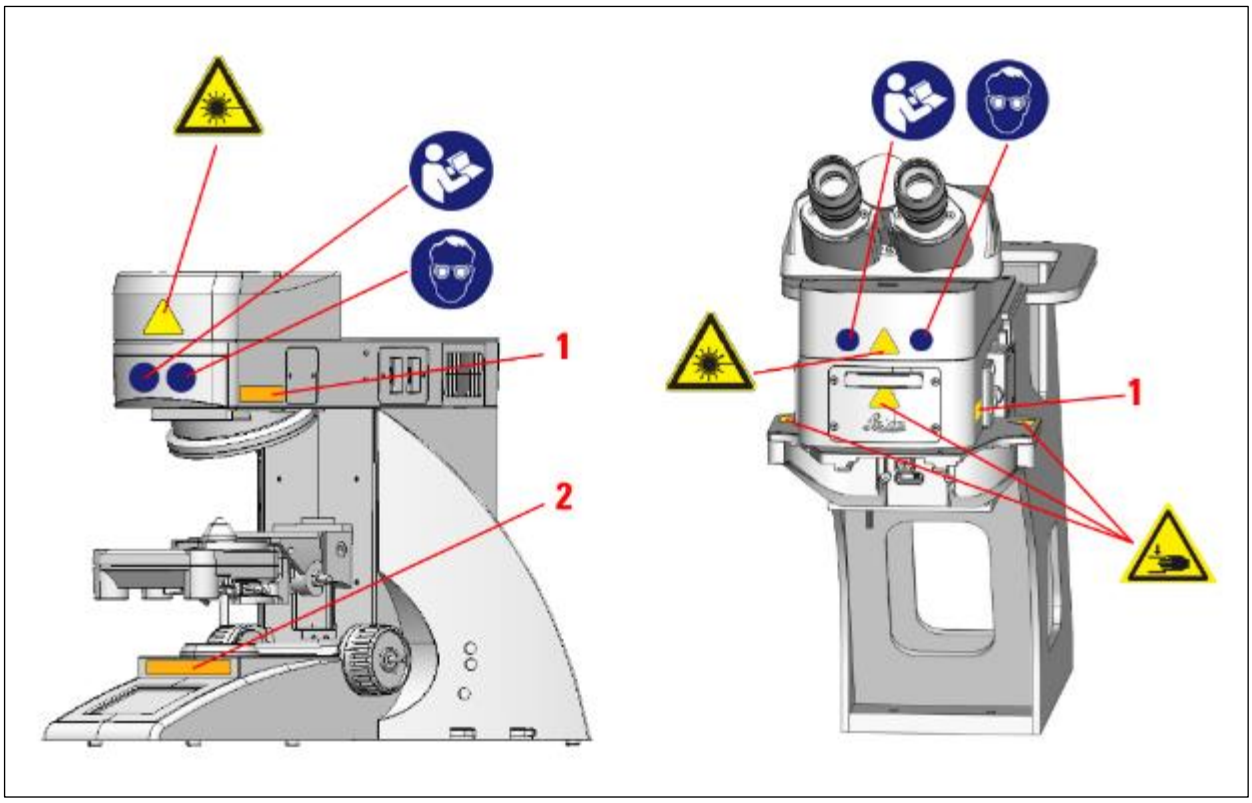


Figure 36: Safety label for upright microscopes

Position	Safety labels in English and German
1 and 2	VISIBLE AND INVISIBLE LASER RADIATION IS EMITTED FROM THIS APERTURE AVOID EXPOSURE AUSTRITT VON SICHTBARER UND UNSICHTBARER LASERSTRAHLUNG BESTRAHLUNG VERMEIDEN

12.4 Scan head

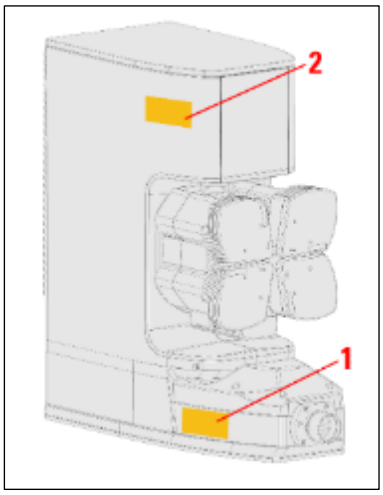


Figure 37: Safety labels on the scan head

Position	Safety labels in English and German
1	VIS / UV LASER RADIATION - VISIBLE AND INVISIBLE- CLASS 3B - AVOID DIRECT EXPOSURE TO BEAM P < 500 mW 350- 790 nm IEC 60825-1: 2014 LASERSTRAHLUNG SICHTBAR UND UNSICHTBAR KLASSE 3B NICHT DEM STRAHL AUSSETZEN P < 500 mW 350- 790 nm IEC 60825-1: 2014
1	MP LASER RADIATION VISIBLE AND INVISIBLE CLASS 4 – AVOID EYE OR SKIN EXPOSURE TO DIRECT OR SCATTERED RADIATION P< 4W 350-1600nm >80fs IEC 60825-1:2007 LASERSTRAHLUNG SICHTBAR UND UNSICHTBAR KLASSE 4 BESTRAHLUNG VON AUGE ODER HAUT DURCH DIREKTE ODER STREUSTRAHLUNG VERMEIDEN P< 4W 350-1600nm >80fs IEC 60825-1:2007
2	VIS / UV WARNING VISIBLE AND INVISIBLE LASER RADIATION CLASS 3B WHEN OPEN AVOID EXPOSURE TO BEAM WARNUNG SICHTBARE UND UNSICHTBARE LASERSTRAHLUNG KLASSE 3B WENN GEÖFFNET NICHT DEM STRAHL AUSSETZEN
2	MP DANGER VISIBLE AND INVISIBLE LASER RADIATION CLASS 4 WHEN OPEN AVOID EYE OR SKIN EXPOSURE TO DIRECT OR SCATTERED RADIATION GEFAHR SICHTBARE UND UNSICHTBARE LASERSTRAHLUNG KLASSE 4- WENN GEÖFFNET BESTRAHLUNG VON AUGE ODER HAUT DURCH DIREKTE ODER STREUSTRAHLUNG VERMEIDEN

12.5 Supply unit

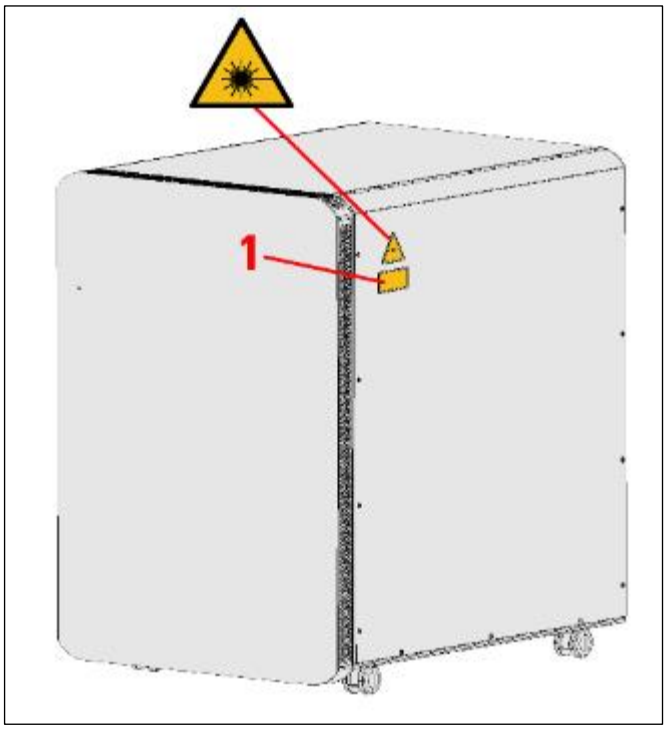


Figure 38: Safety label on the supply unit

Position	Safety labels in English and German
1	WARNING VISIBLE AND INVISIBLE LASER RADIATION CLASS 3B WHEN OPEN AVOID EXPOSURE TO BEAM WARNUNG SICHTBARE UND UNSICHTBARE LASERSTRAHLUNG KLASSE 3B WENN GEÖFFNET NICHT DEM STRAHL AUSSETZEN

12.6 Beam coupling unit

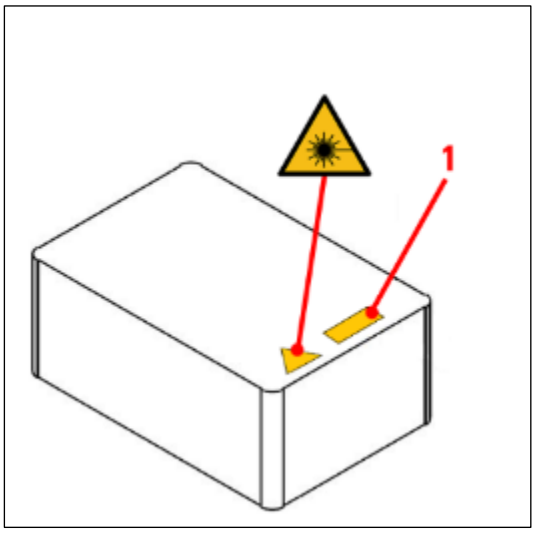


Figure 39: Safety label for the beam coupling unit

Position	Safety labels in English and German
1	DANGER VISIBLE AND INVISIBLE LASER RADIATION CLASS 4 WHEN OPEN AVOID EYE OR SKIN EXPOSURE TO DIRECT OR SCATTERED RADIATION GEFAHR SICHTBARE UND UNSICHTBARE LASERSTRAHLUNG KLASSE 4- WENN GEÖFFNET BESTRAHLUNG VON AUGE ODER HAUT DURCH DIREKTE ODER STREUSTRAHLUNG VERMEIDEN

12.7 4Tune

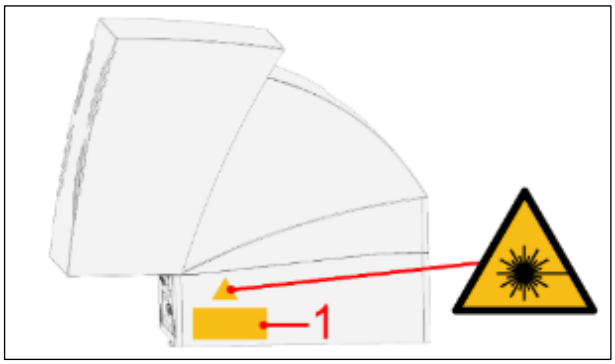


Figure 40: Safety label for the 4Tune at the upright system

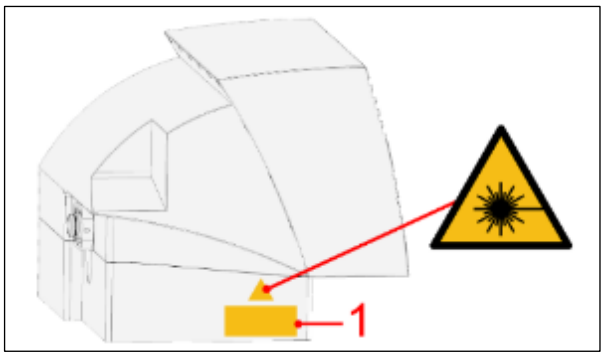


Figure 41: Safety label for the 4Tune at the inverted system

Position	Safety labels in English and German
1	DANGER VISIBLE AND INVISIBLE LASER RADIATION CLASS 4 WHEN OPEN AVOID EYE OR SKIN EXPOSURE TO DIRECT OR SCATTERED RADIATION GEFAHR SICHTBARE UND UNSICHTBARE LASERSTRAHLUNG KLASSE 4- WENN GEÖFFNET BESTRAHLUNG VON AUGE ODER HAUT DURCH DIREKTE ODER STREUSTRAHLUNG VERMEIDEN

12.8 DIVE control unit

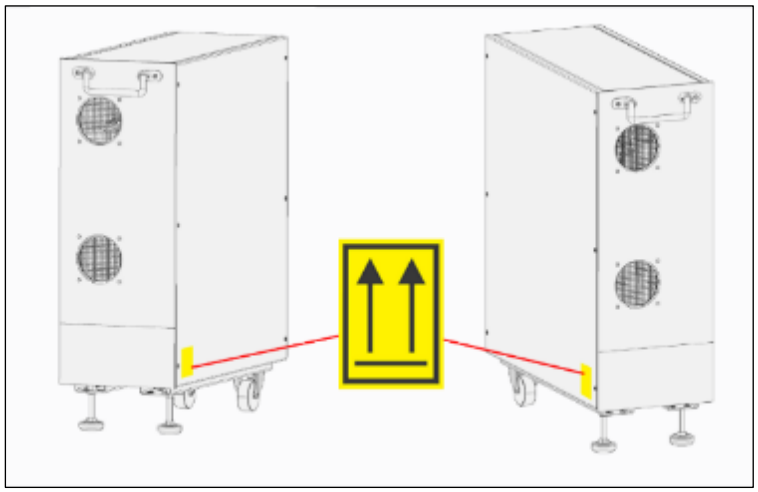


Figure 42: Safety label on the DIVE control unit

12.9 Cover for Replacement Flange

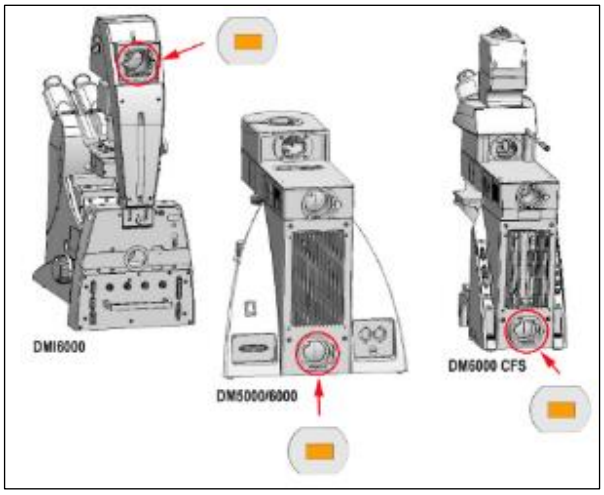


Figure 43: Cover for replacement flange at different microscopes

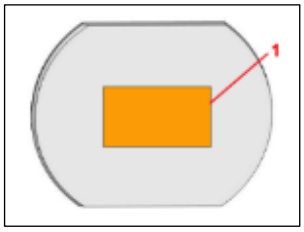


Figure 44: Safety labels on the cover

Position	Safety labels in English and German
1	VIS / UV WARNING VISIBLE AND INVISIBLE LASER RADIATION CLASS 3B WHEN OPEN AVOID EXPOSURE TO BEAM WARNUNG SICHTBARE UND UNSICHTBARE LASERSTRAHLUNG KLASSE 3B WENN GEÖFFNET NICHT DEM STRAHL AUSSETZEN
1	MP DANGER VISIBLE AND INVISIBLE LASER RADIATION CLASS 4 WHEN OPEN AVOID EYE OR SKIN EXPOSURE TO DIRECT OR SCATTERED RADIATION GEFAHR SICHTBARE UND UNSICHTBARE LASERSTRAHLUNG KLASSE 4- WENN GEÖFFNET BESTRAHLUNG VON AUGE ODER HAUT DURCH DIREKTE ODER STREUSTRAHLUNG VERMEIDEN

If the replacement flange for transmitted light is not equipped with a functional module, such as a lamp housing, a cover must be placed over the opening for laser safety reasons.

12.10 Path-folding mirror

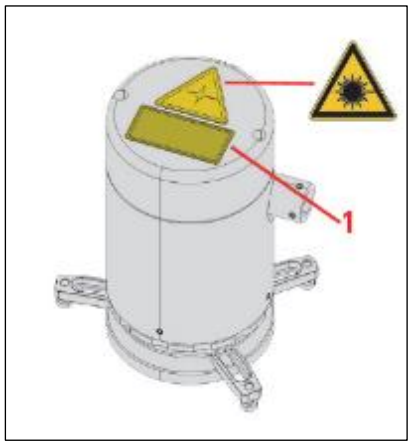


Figure 45: Safety labels on the path-folding mirrors

Position	Safety labels in English and German
1	DANGER VISIBLE AND INVISIBLE LASER RADIATION CLASS 4 WHEN OPEN AVOID EYE OR SKIN EXPOSURE TO DIRECT OR SCATTERED RADIATION GEFAHR SICHTBARE UND UNSICHTBARE LASERSTRAHLUNG KLASSE 4- WENN GEÖFFNET BESTRAHLUNG VON AUGE ODER HAUT DURCH DIREKTE ODER STREUSTRAHLUNG VERMEIDEN

12.11 Mirror Housing

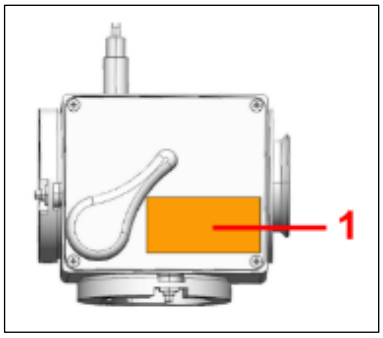


Figure 46: Safety label on the mirror housing (top)

Position	Safety labels in English and German
1	VIS / UV WARNING VISIBLE AND INVISIBLE LASER RADIATION CLASS 3B WHEN OPEN AVOID EXPOSURE TO BEAM WARNUNG SICHTBARE UND UNSICHTBARE LASERSTRAHLUNG KLASSE 3B WENN GEÖFFNET NICHT DEM STRAHL AUSSETZEN
1	MP DANGER VISIBLE AND INVISIBLE LASER RADIATION CLASS 4 WHEN OPEN AVOID EYE OR SKIN EXPOSURE TO DIRECT OR SCATTERED RADIATION GEFAHR SICHTBARE UND UNSICHTBARE LASERSTRAHLUNG KLASSE 4- WENN GEÖFFNET BESTRAHLUNG VON AUGE ODER HAUT DURCH DIREKTE ODER STREUSTRAHLUNG VERMEIDEN

12.12 HyD-RLD

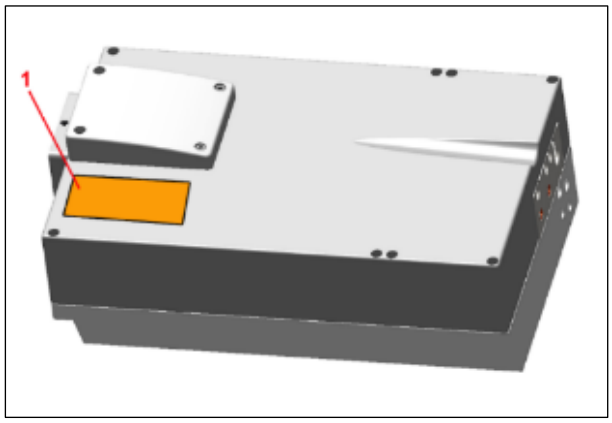


Figure 47: Safety label on the HyD RLD

Position	Safety labels in English and German
1	WARNING VISIBLE AND INVISIBLE LASER RADIATION CLASS 3B WHEN OPEN AVOID EXPOSURE TO BEAM WARNUNG SICHTBARE UND UNSICHTBARE LASERSTRAHLUNG KLASSE 3B WENN GEÖFFNET NICHT DEM STRAHL AUSSETZEN

12.13 CRS Laser (picoEMERALD™)

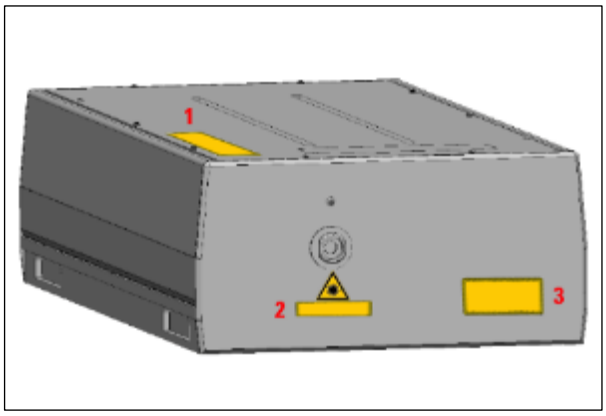


Figure 48: Safety labels on the CRS laser (picoEMERALD™)

Position	Safety labels in English and German
1	DANGER VISIBLE AND INVISIBLE LASER RADIATION CLASS 4 WHEN OPEN AVOID EYE OR SKIN EXPOSURE TO DIRECT OR SCATTERED RADIATION GEFAHR SICHTBARE UND UNSICHTBARE LASERSTRAHLUNG KLASSE 4- WENN GEÖFFNET BESTRAHLUNG VON AUGE ODER HAUT DURCH DIREKTE ODER STREUSTRAHLUNG VERMEIDEN
2	AVOID EXPOSURE LASER RADIATION IS EMITTED FROM THIS POINT BESTRAHLUNG VERMEIDEN AUSTRITT VON LASERSTRAHLUNG
3	DANGER VISIBLE AND INVISIBLE LASER RADIATION CLASS 4 WHEN OPEN AVOID EYE OR SKIN EXPOSURE TO DIRECT OR SCATTERED RADIATION GEFAHR SICHTBARE UND UNSICHTBARE LASERSTRAHLUNG KLASSE 4- WENN GEÖFFNET BESTRAHLUNG VON AUGE ODER HAUT DURCH DIREKTE ODER STREUSTRAHLUNG VERMEIDEN

12.14 White Light Laser

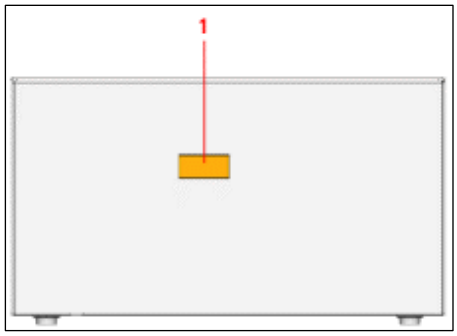


Figure 49: Safety label on the rear side of the white light laser

Position	Safety labels in English and German
1	DANGER VISIBLE AND INVISIBLE LASER RADIATION CLASS 4 WHEN OPEN AVOID EYE OR SKIN EXPOSURE TO DIRECT OR SCATTERED RADIATION GEFAHR SICHTBARE UND UNSICHTBARE LASERSTRAHLUNG KLASSE 4- WENN GEÖFFNET BESTRAHLUNG VON AUGE ODER HAUT DURCH DIREKTE ODER STREUSTRAHLUNG VERMEIDEN

13 Switching the System On/Off

Observing the switch-on/off sequences is important for protecting the instrument from damage. System components could even be irreparably destroyed if you do not observe the switch on/off sequences.

NOTICE	**Damage is possible when contacting the specimen stage** When using an inverted microscope, the illuminator arm must be swung back before the system start and LAS X start because the stage can damage the condenser, the objective or the specimen during initialization.

NOTICE	**Objective damage is possible when contacting the specimen stage** When using an upright microscope, the specimen stage must be moved down before the system start and LAS X start because it could come into contact with the objective during initialization and damage the objective.

13.1 Switch-on Sequence

NOTICE	**Damage to the instrument may result when not adhering to the switch-on sequence** The switch-on sequence must be followed! When not adhering to the switch-on sequence listed below, system components can be damaged or even irreparably destroyed.

	**Observe the user manuals for external lasers** Please refer to the information from the documents provided by the laser manufacturer for the external lasers. Pay particular attention to the laser manufacturer's notes.

NOTICE	**Damage is possible when contacting the specimen stage** When using an inverted microscope, the illuminator arm must be swung back before the system start and LAS X start because the stage can damage the condenser, the objective or the specimen during initialization.

NOTICE	**Objective damage is possible when contacting the specimen stage** When using an upright microscope, the specimen stage must be moved down before the system start and LAS X start because it could come into contact with the objective during initialization and damage the objective.

1. Switch on the workstation (refer to Figure 2, position 12).
2. Switch on the supply unit (Figure 50, position 1). The power supplies and cooling of the system have now been started.

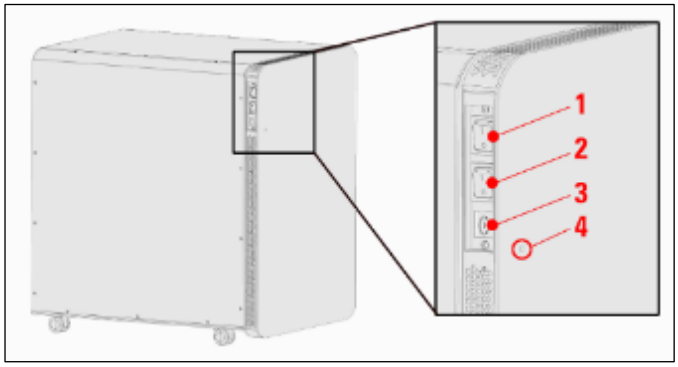


Figure 50: Supply unit

3. Switch on the power supply of the lasers (Figure 50, position 2).

WARNING **Risk of permanent eye and skin damage from laser radiation**

From this time on, laser radiation may be present in the specimen area of the laser scanning microscope. Make sure to follow the safety notes for operation of the system.

Use suitable laser safety glasses for MP systems.

When using a MP system, you must wear suitable laser safety glasses. During the scanning operation, all persons present in the room must wear such laser safety glasses. These laser safety glasses do not provide any protection against visible laser radiation (visible spectrum)!

4. To switch on the lasers in the supply unit, activate the detachable-key switch (see Figure 50, position 3). The emission warning indicator (Figure 50, position 4) is illuminated in white.
5. After the workstation has started, log on to the operating system. To log into the operating system, use your personal user ID if one has been set up. This ensures that user-specific settings are saved and maintained for this user only. If you are logging on as "LASX-User" for the first time, leave the password field and assign a new password in the "New Password" field. If you do not want a new password, leave the "New Password" field blank also. If you do not assign a new password, you will not need to enter a password when logging in as "LASX-User" in the future.
6. If you are using HyD RLDs, you must switch them on before LAS X starts (refer to chapter 13.1.3, page 69). Otherwise, the LAS X software cannot initialize the detectors.
7. If you have a STELLARIS 8 CRS system, continue with item 8, otherwise with item 11.
8. Set the key switch for the supply unit/cooling of the CRS laser to I (ON).
9. Switch on the supply unit and cooling of the CRS laser.
10. Switch on the panel PC.

Warm-up time of the CRS laser

After each time the CRS laser is switched on, a warm-up time of 1 hour is recommended. Do not start a CRS experiment until after the recommended warm-up time.

11. Wait before starting the LAS X software. The display on the scan head (refer to Figure 51) must light up in green before you start the LAS X software.

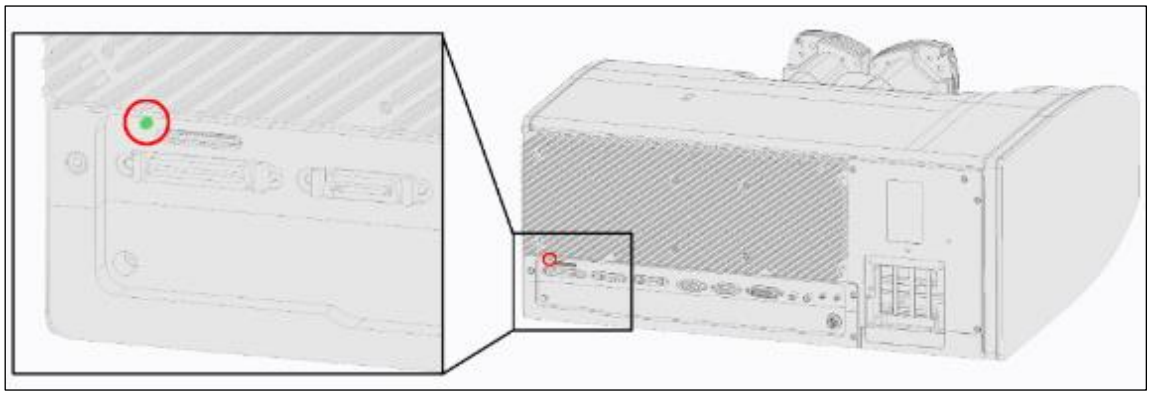


Figure 51: Readiness indicator on the scan head

12. As soon as the display on the scan head is illuminated in green (see Figure 51), all components are ready to use. Double-click the LAS X icon on the desktop to start the LAS X software. For additional information about the LAS X software and the online help, refer to the chapter 14.

The system is now ready to use.

13.1.1 Switching on the CRS Laser from Standby Mode

If you have already switched on the supply unit and cooling of the CRS laser at an earlier time and switched the CRS laser to standby mode, you can switch it on from standby mode by switching on the CRS laser using the LAS X control software (see description in online help).

13.1.2 Selecting SRS or CARS Detector

Depending on the system configuration, you can select between SRS* or CARS* detection using the slider (Figure 52, position 3).

- For **SRS detection**, slide the slider to the far left, to the SRS detector (position 1).
- For **CARS detection**, slide the slider to the far left, to the CARS detector (position 2).

* optional component(s) depending on the system configuration.

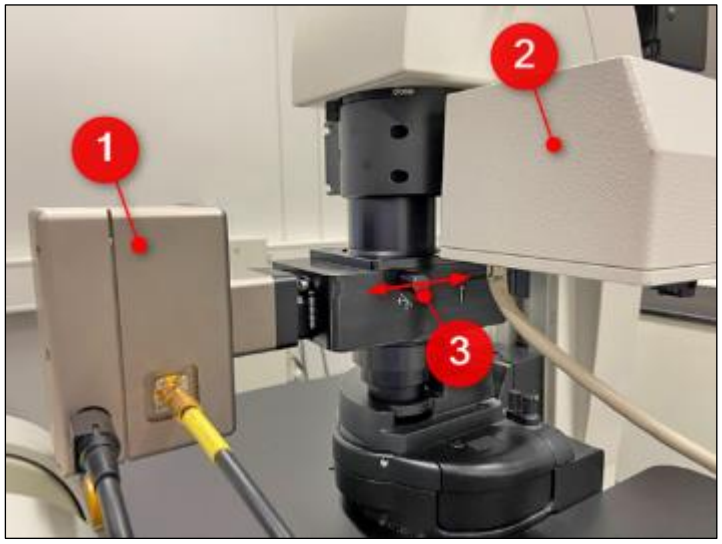


Figure 52: Manual selection of the SRS detector (1) or of the CARS detector (2) using the slider (3)

13.1.3 HyD reflected light detectors (HyD RLDs)[11]

If you are using HyD RLDs you must switch them on before LAS X starts. Otherwise, the LAS X software cannot initialize the detectors. The HyD RLDs consist of a supply unit (see Figure 53) and a detector module (see Figure 54).

- The power switch for switching on and off the power supply and the cooling for the detector module is located on the front side of the supply unit (see Figure 53).

Figure 53: HyD RLD supply unit

[11] Optional

For image acquisition, activate the detectors in LAS X. The yellow status LED (see Figure 54, position 2) flashes if photons are being detected.

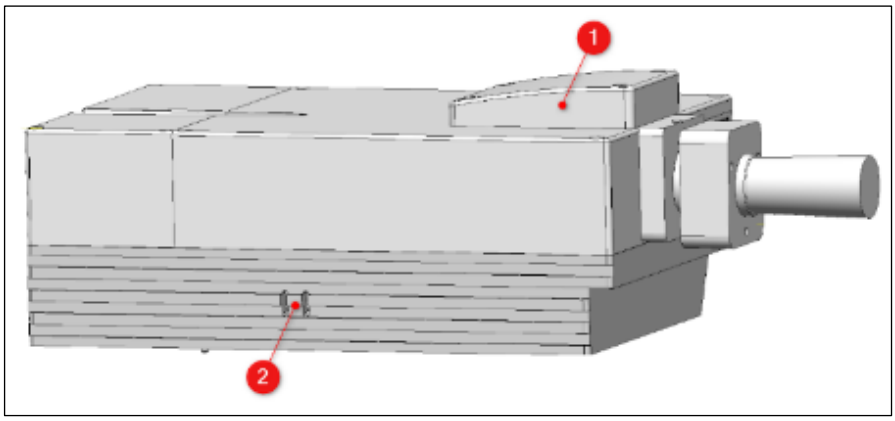


Figure 54: HyD reflected light detectors (HyD RLDs)

Status LED color (See Figure 54, position 2)	Meaning
Green	Operational readiness
Red	The maximum permitted signal level has been exceeded. The detector has been shut off.
Yellow	Flashes if photons are being detected.
Blue	Cooling is active.

- The filter cube cover (see Figure 54, position 1) ensures the housing's EMC stability and prevents light from entering or exiting.
- Never change or remove the filter cube or short pass filter during operation.

Replacement of the short pass filter is only allowed starting from LAS X Version 2.7 or later.

13.2 Switch-off Sequence

NOTICE **Damage to the instrument when not adhering to the switch-off sequence**

The switch-off sequence must be followed! When not adhering to the switch-off sequence listed below, system components can be damaged or even irreparably destroyed.

Observe the user manuals for external lasers

Please refer to the information from the documents provided by the laser manufacturer for the external lasers. Pay particular attention to the laser manufacturer's notes.

Standby time of the CRS laser

If you want to resume working with the system soon, you can simply switch the CRS laser into standby mode (see description in online help). The supply unit and the cooling of the CRS laser remain switched on and the warm-up time of the CRS laser is much shorter the next time it is switched on.

If you have a STELLARIS 8 CRS system and want to switch it off for a longer period, continue with item 1. If you have a different system, save the image data, close the LAS X software and continue with item 7.

1. Save the image data.
2. Switch off the CRS laser in LAS X.
3. Close the LAS X software.
4. The Laser Standby dialog appears on the panel computer. Click Standby. All CRS components shut down. Switch off the panel PC.
5. Switch off the supply unit and cooling of the CRS laser.
6. Set the key switch to O (OFF).
7. Switch off the operating system and wait until the workstation is switched off.
8. To switch off the lasers in the supply unit, activate the detachable-key switch (see Figure 55, position 3). The emission warning indicator (Figure 55, position 4) goes out.
9. Switch off the power supply of the lasers (Figure 55, position 2).
10. Switch off the supply unit (Figure 55, position 1). The power supplies and cooling of the system have now been switched off. The external cooling (chiller) keeps running for a while and switches off automatically.

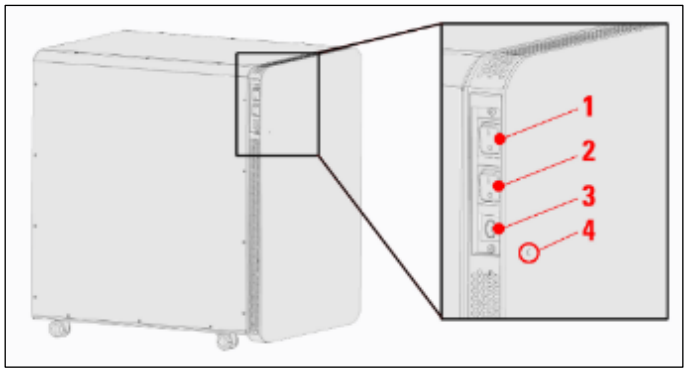


Figure 55: Supply unit

Observe the user manuals provided

Always observe all of the user manuals provided for the individual components and peripheral devices.

14 LAS X and Online help

The LAS X software is used to control all system functions and acts as the link to the individual hardware components. Image acquisition, image analysis and image processing are carried out using LAS X.

14.1 Starting LAS X

NOTICE	**Damage is possible when contacting the specimen stage** When using an inverted microscope, the illuminator arm must be swung back before the system start and LAS X start because the stage can damage the condenser, the objective or the specimen during initialization.

NOTICE	**Objective damage is possible when contacting the specimen stage** When using an upright microscope, the specimen stage must be moved down before the system start and LAS X start because it could come into contact with the objective during initialization and damage the objective.

Figure 56: LAS X Start menu

1. After you have started the LAS X software, select the desired configuration (refer to Figure 56).
2. Now start LAS X by clicking the OK button (refer to Figure 56).

You are now in the main LAS X view (refer to chapter 14.2, page 74).

14.2 Structure of the LAS X graphical user interface

The structure of the LAS X user interface is described below. The software maps the various steps for configuration, image acquisition, image processing, image evaluation and image analysis. The user interface takes on a different form depending on whatever step you are in. It is usually divided into the following three areas:

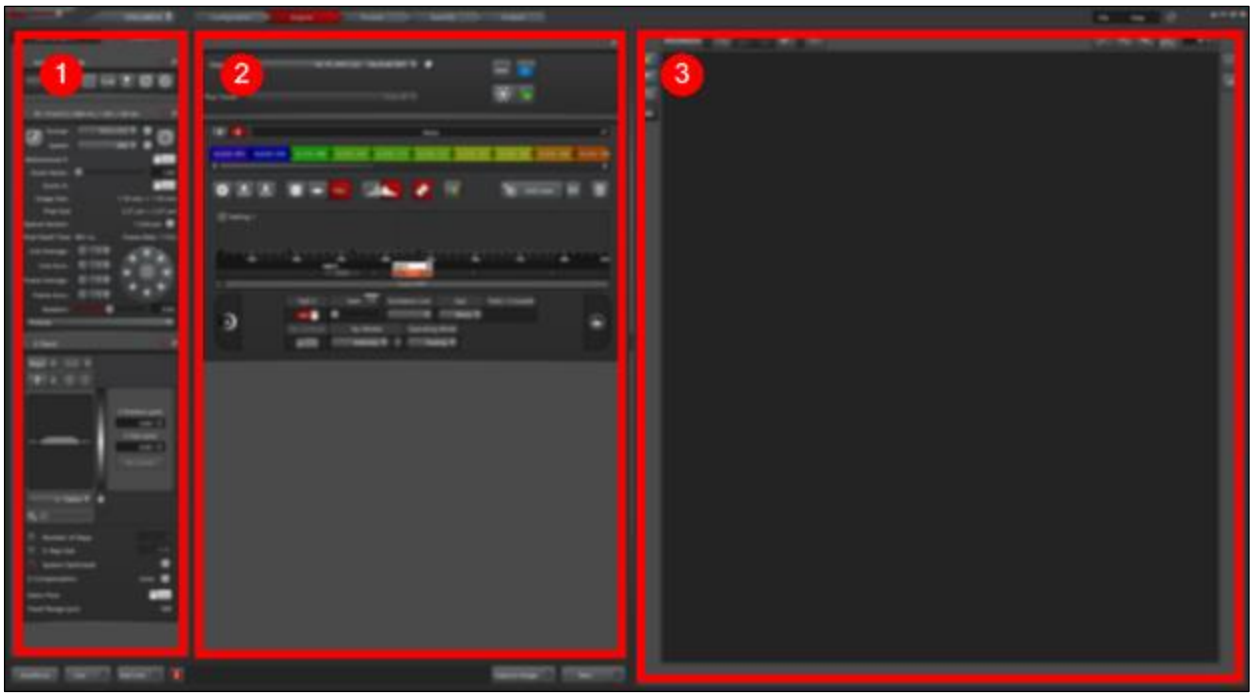


Figure 57: Structure of the LAS X graphical user interface

1. Configuration area.
2. This area is used for displaying various things, such as the results (preview, evaluations).
3. The display window is shown here.

The user interfaces of the various wizards have layouts that are customized for the respective workflow. These are described in the respective wizard chapters in the online help.

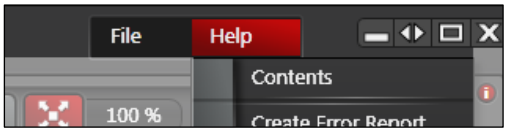
For additional information about the LAS X software, how to adapt the layout and the Remote Care Service, refer to the online help. For information on how to access the online help, refer to chapter 14.3.

14.3 Online Help

You can call up LAS X online help in two different ways: Using the Help menu (refer to chapter 14.3.1) and in the respective context-sensitive dialog (refer to chapter 14.3.2).

14.3.1 … using the Help Menu

Click on the **Help** → **Contents** menu in the LAS X menu bar.



The online help opens in your default web browser.

14.3.2 … via Context Sensitive Retrieval

Click on the help symbol located in the top right corner of every LAS X dialog:

The online help opens in your default web browser. An overview of the dialog topic is displayed, where you will find links to all relevant topics.

14.3.3 Showing the Online Help in Internet Explorer

For the online help to work and be displayed correctly in Internet Explorer, ActiveX/JavaScript must be allowed to run on the workstation. This can take place either generally or on a case-by-case basis. Clarify with your system administrator whether or not ActiveX/JavaScript is to be generally permitted on the workstation.

NOTICE	**Potential hazard to the system from malware**
	Enabling and running ActiveX control elements on your workstation presents a potential safety hazard. Therefore, general enabling of ActiveX/JavaScript is done at the risk of the owner/operator and user. Clarify with your system administrator whether or not ActiveX/JavaScript is to be generally permitted on the workstation. Leica Microsystems CMS GmbH shall under no circumstances accept any warranty or liability for direct, indirect, coincidental or consequential damages to the system caused by enabling and/or by running ActiveX controls, web browser add-ons and scripts of any kind (occurrence of security vulnerabilities, infections by malicious software of any kind such as viruses, worms or Trojan horses, unwanted actions such as remote control, theft of data or deleting files, impairment of system performance, damage to hardware and/or software, loss of data, interruption of work, damages caused by lost profits, other material or immaterial damage, losses and failures).

The actions described below are relevant only if the online help is not displayed directly and running ActiveX/JavaScript is not yet generally permitted on your workstation. For questions please contact your system administrator.

If ActiveX/JavaScript is generally not allowed to run, information from Internet Explorer appears at the bottom of each page of the online help in order to warn of a potential security risk:

In this case, click the **Allow blocked Content** button in order to allow ActiveX/JavaScript to run on the specific individual page:

15 Changing the Specimen

WARNING **Risk of permanent eye damage from laser radiation**

Never change specimens during the scanning operation because laser radiation can escape uncontrolled from the specimen area.

15.1 Changing the Specimen on an Upright Microscope

To change specimens on an upright microscope, proceed as follows:

1. Finish the scanning operation.
2. Ensure that no laser radiation is present in the specimen area anymore.
3. Replace the specimen. Insert the specimen correctly into the specimen holder.

15.2 Changing the Specimen on an Inverted Microscope

To change specimens on an inverted microscope, proceed as follows:

1. Finish the scanning operation.
2. Ensure that no laser radiation is present in the specimen area anymore.
3. Tilt the transmitted light arm back.
4. Replace the specimen. Insert the specimen correctly into the specimen holder.
5. Tilt the transmitted light arm back into the working position.

16 Changing the Objective

WARNING **Permanent eye and skin damage from laser radiation**

Never change objectives during the scanning operation because laser radiation can escape uncontrolled from the specimen area.

WARNING **Permanent eye and skin damage from laser radiation**

For MP systems, dry objectives (air objectives) may not be used with a numerical aperture (NA) larger than 0.85. This does not apply to immersion objectives (oil, water).

To change objectives, proceed as follows:

1. Finish the scanning operation.
2. Switch off the internal lasers using the detachable-key switch.
3. If any external lasers are present, switch them off with their detachable-key switch or as described in the laser manufacturer's user manual.
4. Rotate the objective nosepiece so that the objective to be changed is swiveled out of the beam path and points outward.
5. Replace the objective.
6. Close all unoccupied positions in the objective nosepiece using the supplied caps. System operation with unlocked positions in the objective nosepiece is not allowed.

WARNING **Permanent eye and skin damage from laser radiation**

All unoccupied positions in the objective nosepiece must be closed with the included caps to prevent the uncontrolled escape of laser radiation in the specimen area.

17 Changing the Filter Cube on an Inverted Microscope

WARNING **Risk of permanent eye damage from laser radiation**

Never change a filter cube during a scanning operation because laser radiation could uncontrollably escape from the specimen area.

For changing the filter cube, the laser safety chamber must be removed beforehand. Switch off all lasers before disassembling the laser safety chamber.

Reassemble the laser safety chamber before starting up the system and switching on the lasers.

- If the inverted microscope is not equipped with autofocus, continue with chapter 17.1.
- If the inverted microscope is equipped with autofocus, continue with chapter 17.2.
- If the system is equipped with 4Tune and autofocus, continue with chapter 17.3.

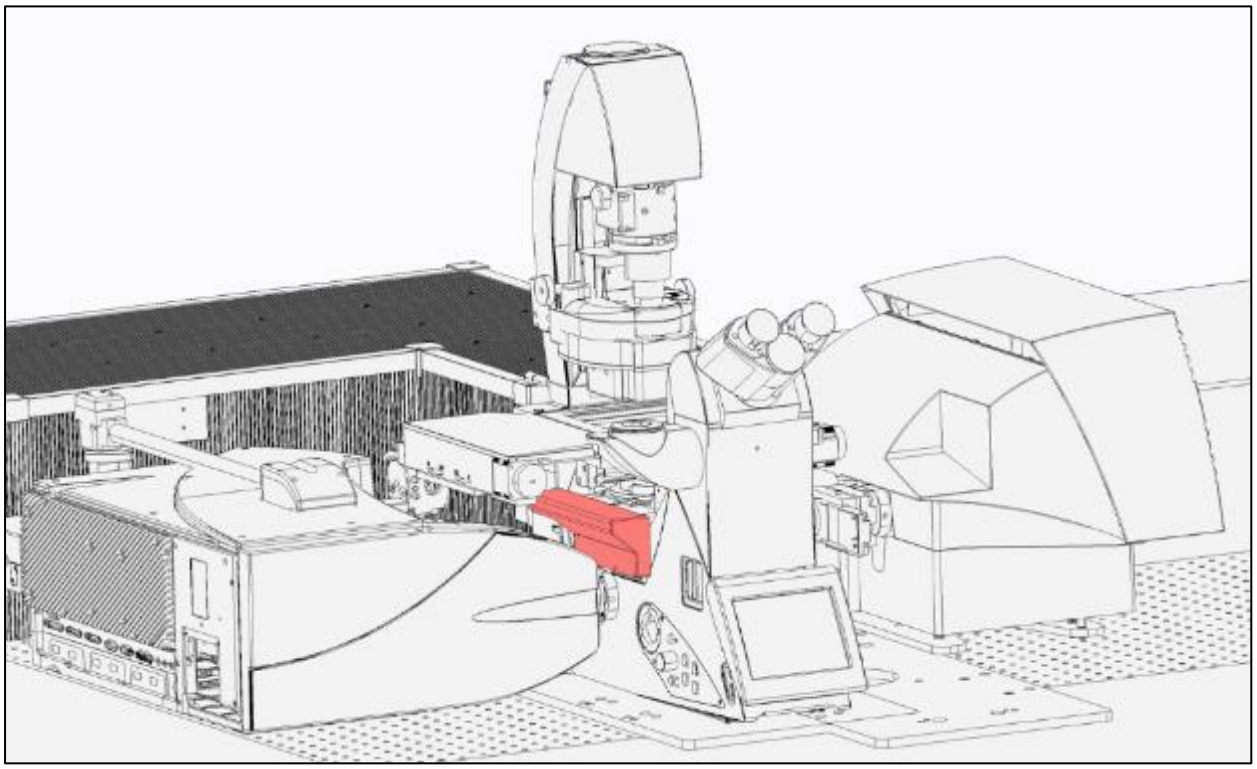


Figure 58: Autofocus unit on the inverted microscope

17.1 ... without Autofocus

Observe the User Manual of the microscope

Please be absolutely certain to consult the microscope's User Manual provided.

If the inverted microscope has no autofocus, you can change the filter cube from the left side of the microscope. To do so, follow these steps:

1. Unscrew the two screws (Figure 59, position 1).
2. Remove the filter cube cover (Figure 59, position 2). Now you have access to the filter cube turret.

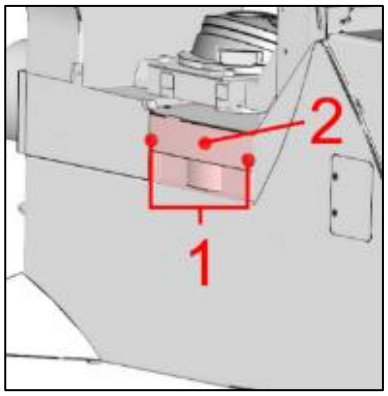


Figure 59: Filter cube cover on the microscope, left

3. For changing the filter cube, pull out the filter cube and slide the new filter cube straight into the holder.
4. You must screw the filter cube cover tightly to the microscope again before starting up the system. To do so, follow the above steps in reverse order.

17.2 ... with Autofocus

Observe the User Manual of the microscope

Please be absolutely certain to consult the microscope's User Manual provided.

If the inverted microscope is equipped with autofocus (see Figure 58), you must replace the filter cube from the right side of the microscope. To do so, proceed as described in chapter 17.1, only this time from the right side of the microscope.

If the system is equipped with 4Tune, you must first disassemble the 4Tune module before you can change the filter cube. Read in chapter 17.3 how to disassemble the 4Tune module.

17.3 Disassembling the 4Tune Module

For disassembling the 4Tune module, you need the following tools:

Figure 60: Provided tools

Position inFigure 60	Designation	Color of the hexagon socket wrench
1	Wrench extension	-
2	Hexagon socket wrench, 2.5 mm	Blue
3	Hexagon socket wrench, 3.0 mm	Yellow
4	Hexagon socket wrench, 5.0 mm	Orange
5	Hexagon socket wrench, 2.5 mm	Red
6	Two protective caps	-

To remove the 4Tune module from the microscope, follow these steps:

1. Switch the entire system and all lasers off.
2. You need the 5.0 mm hexagon socket wrench (orange). Unfasten the two clamps on the 4Tune by loosening the two screws (Figure 61, position 1).
3. Pull the two clamps away from the 4Tune module in the direction of the arrow (Figure 61, position 2).
4. You need the 3.0 mm hexagon socket wrench (yellow). Unscrew the screw (Figure 61, position 3) at the 4Tune coupling but do not unscrew too far. Unscrew until you feel a slight resistance.
5. The 4Tune module rests on aligned guide rails. Do not apply much force during the following step and do not lift the 4Tune module. Do not touch the optics as it gets exposed. Now you can remove the 4Tune module by carefully pulling it approx. 3 mm backwards and then to the right (Figure 61, position 4).

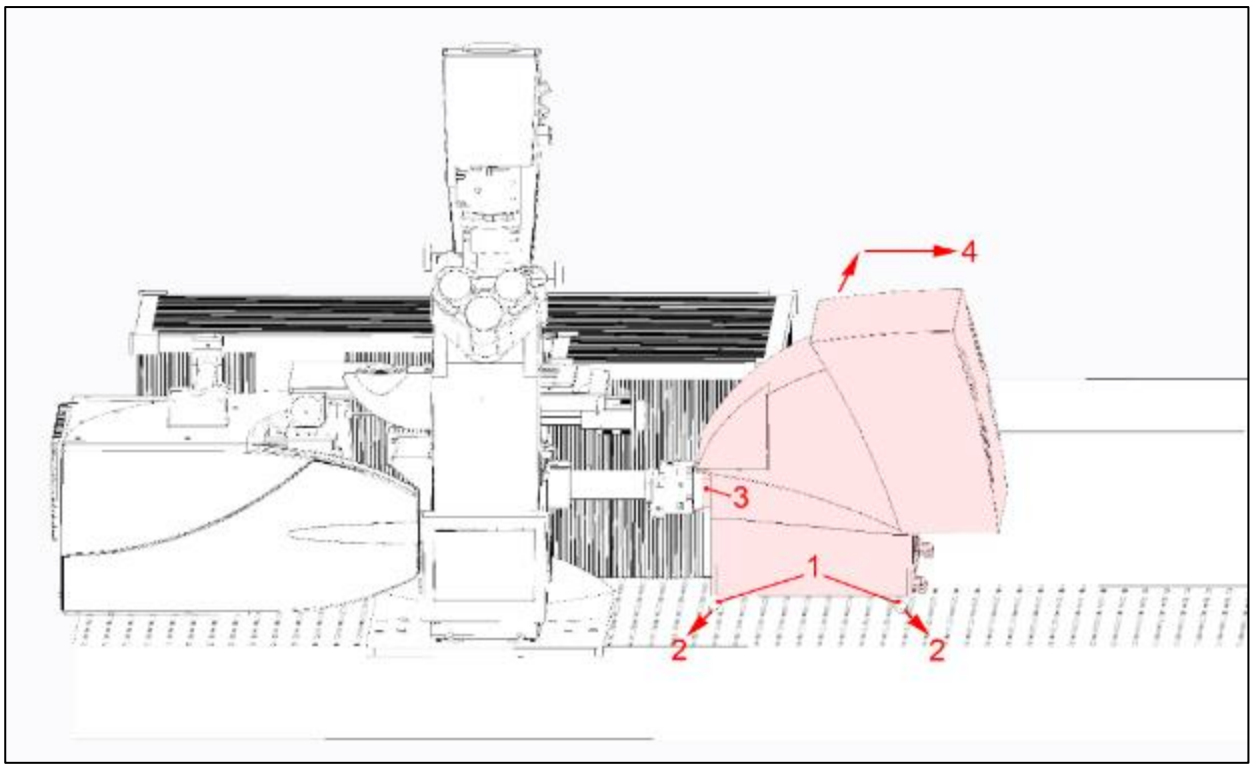


Figure 61: Removing 4Tune

6. To protect the optics from contamination, attach the two protective caps.

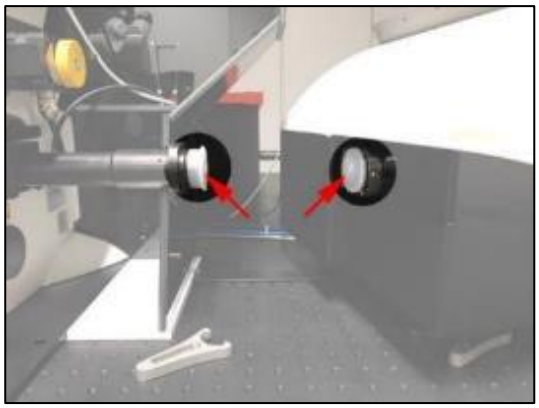


Figure 62: Protective caps

7. Pull out the analyzer laterally at the microscope.

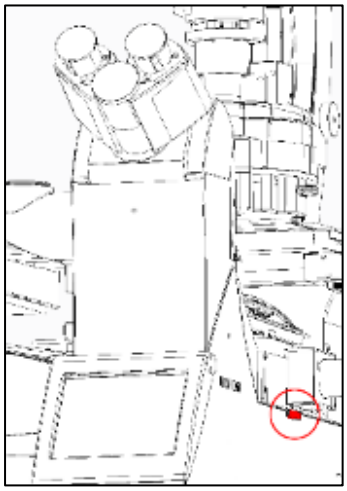
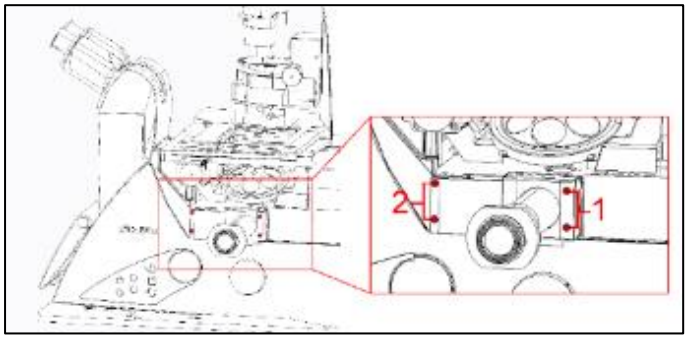


Figure 63: Analyzer

8. Make sure that the screws do not fall into the holes of the table during the following steps. Place a mat or a towel below so that the screws have a place to fall onto if necessary.
9. You will need the two 2.5 mm hexagon socket wrenches (blue and red). To remove the bumper plate, loosen the two screws to the right (64, position 1) and then the two screws to the left (64, position 2) using the blue hexagon socket wrench. You can then unscrew the loosened screws more easily using the red hexagon socket wrench.



64Filter cube cover

10. Now carefully pull off the bumper plate together with the tube. Now, you have access to the filter cube changer.

Now, you have access to the filter cube changer.

Observe the User Manual of the microscope

Please be absolutely certain to consult the microscope's User Manual provided.

11. For changing the filter cube, pull out the filter cube and slide the new filter cube straight into the holder.
12. You must reattach and screw tight the bumper plate and the 4Tune module before switching the microscope and the laser on. To do so, follow the above steps in reverse order.

18 Digital LightSheet (DLS)[12]

If there is a DLS transmitted light arm5[13] installed on your system, pay careful attention to the following notes:

- Only lasers up to Class 3 are permitted for LightSheet experiments. If you would like to use a multi-photon laser (Class 4), it is only activated if the specimen area is protected by a laser safety chamber.
- Before you switch on the system and start the LAS X software, tilt the DLS transmitted light arm back. Failure to do so may cause specimens and objectives to be damaged or destroyed by initialization of the specimen stage upon system and software startup.
- When moving the specimen stage (with the SmartMove, for example) ensure that the specimen and the specimen stage do not collide with the mirror cap. This collision can damage the specimen, the specimen stage, the mirror cap and the objective.
- When rotating the objective turret manually, ensure that the objectives do not collide with the specimen or the specimen stage, which could damage the specimen or specimen stage.
- Do not remove the transmitted light arm once the LightSheet module has been adjusted by the Leica Field Service engineer. Opening or working on the transmitted light arm would necessitate further adjustment by a Leica Field Service engineer.
- Do not make any changes to the TwinFlect mirror cap! Opening or working on the mirror cap in any way or loosening the screws causes damage to the mirror and the mirror cap (see chapter 18.5).

18.1 Requirements for a DLS Experiment

Before carrying out a DLS experiment, you must:

- Prepare a specimen (e.g. a standard specimen for verifying the system properties, chapter 18.2)
- Install the objective holder on the transmitted light arm (chapter 18.6).
- Screw the TwinFlect mirror cap onto the objective (chapter 18.5).
- Screw the objective with mirror cap into the objective holder.
- Switch on the laser and activate it in the software.
- Adjust the DLS components (chapter 18.6.3)

18.2 Creating the Standard Specimen for DLS

You can verify the system properties using the standard specimen. The standard specimen is delivered in the DLS case (Figure 65, position 11) or you can create the standard specimen yourself.

To create the standard specimen, the following must be prepared:

- Create agarose (chapter 18.2.1)
- Create a parent solution (chapter 18.2.2)

[12] Optional
[13] Optional

18.2.1 Creating Agarose

To create agarose, you need:

- 1 g of agarose
- 100 ml of aqua dest.
- A microwave oven

Dissolve 1 g of agarose in 100 ml of aqua dest. in the microwave oven.

18.2.2 Creating a Parent Solution (µ-beads Solution)

To create the standard specimen, you need:

- FEP hose (I.D. 1.65mm, A.D. 1.95 mm, W.D. 0.15 mm, Saint-Gobain Performance Plastics Isofluor GmbH)
- Pipette (Eppendorf 10 µl – 100 µl)
- Parent solution (µ-beads solution), see chapter 17.2.2
- Cell culture dish with glass bottom (No. 627861, Greiner BioOne)
- Picodent Twinsil 22 (No. 13001000, Picodent)
- Parafilm

Creation:

1. Cut 32 mm-long pieces from the FEP hose.
2. Use the pipette to inject the parent solution into the hose.
3. Position the filled pieces in the center of the cell culture dish.
4. Seal the ends with Picodent Twinsil 22.
5. Place the cover on top of the cell culture dish and seal it with the Parafilm.
6. Store the standard specimen in the dark.

18.3 DLS Case

You will find an overview of the DLS case in Figure 65.

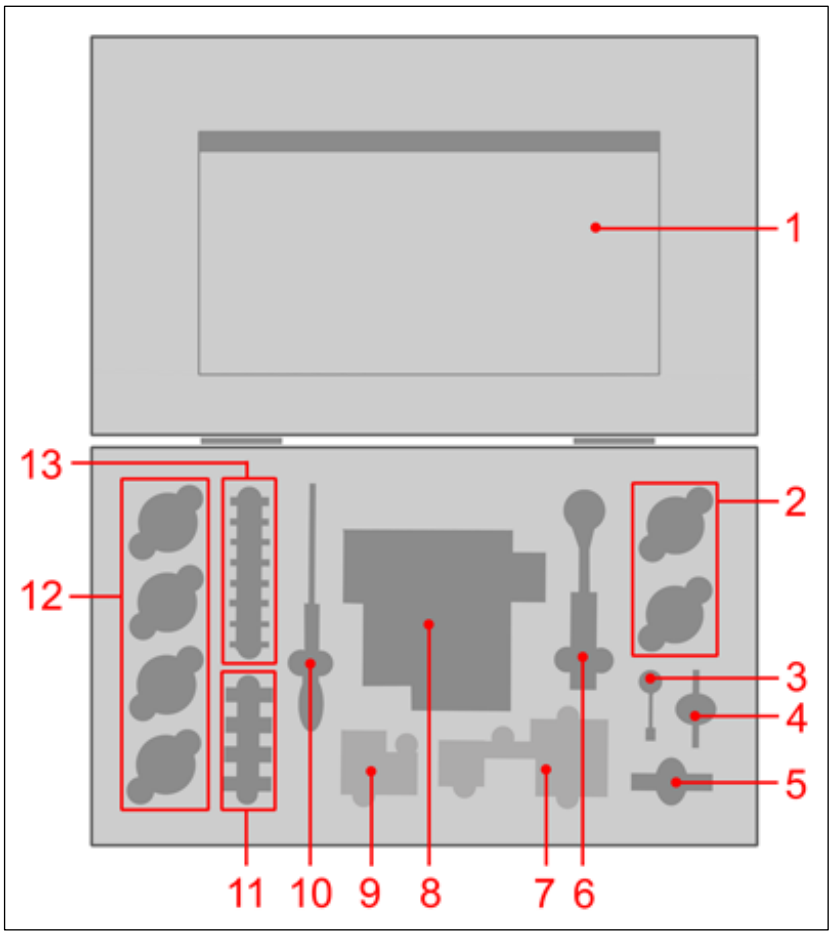


Figure 65: Neutral position of the dummy plugs (1) and (2). Slot (3)

1 User Manual
2 Container for mirror caps
3 Hex screwdriver (2 mm) for filters
4 Lens cover
5 Cover for TLD module
6 Filter holder
7 Dummy plugs for the condenser slot
8 Slot for condenser or objective holder
9 Dummy plugs for the objective holder slot
10 Hex screwdriver (3 mm) for the objective holder
11 Standard specimens
12 Container for objectives
13 DLS filter

18.3.1 Slot in DLS Case for the Condenser or Objective Holder

Depending on whether you are using the condenser or the objective holder on the microscope, the non-used part must be securely stowed in the DLS case (Figure 66, position 3). Note that only the condenser with the laser protection shield for VIS/UV lasers can be stowed in the slot of the DLS case. A condenser with a laser protection shield for STED or MP lasers cannot be stowed in the slot. Note that the laser protection shield must not be removed from the condenser.

Switch the positions of the dummy plugs accordingly so that either the condenser with laser protection shield for VIS/UV lasers or the objective holder is securely held in place in the slot. When the dummy plugs are in the neutral position, the slot does not provide a secure hold, see Figure 66.

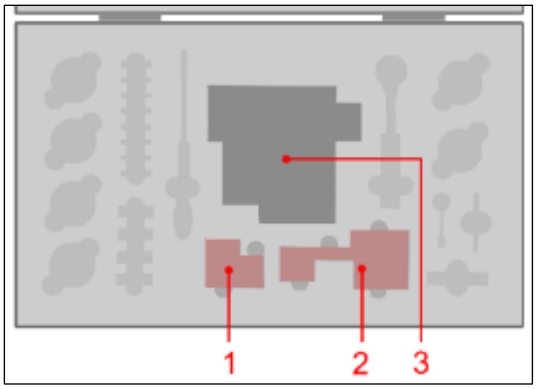


Figure 66: Neutral position of the dummy plugs (1) and (2). Slot (3)

18.3.1.1 Switching the Location of the Dummy Plugs

To stow the objective holder securely in the DLS case, switch the location of the corresponding dummy plugs. Follow the instructions in reverse order to stow the condenser with laser protection shield for VIS/UV lasers securely in the DLS case:

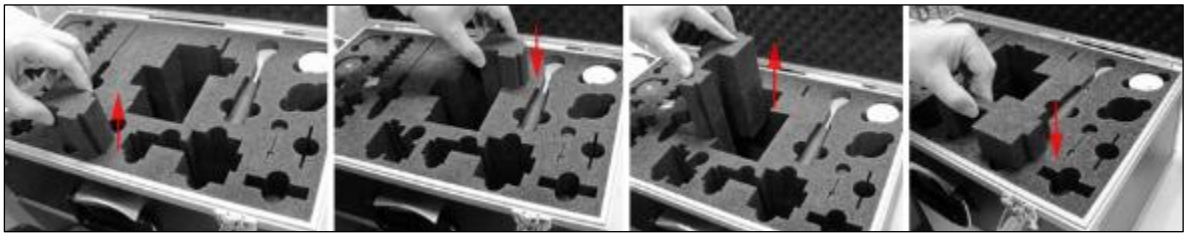


Figure 67: Switching the Location of the Dummy Plugs

Position of the dummy plugs with the objective holder in the slot:

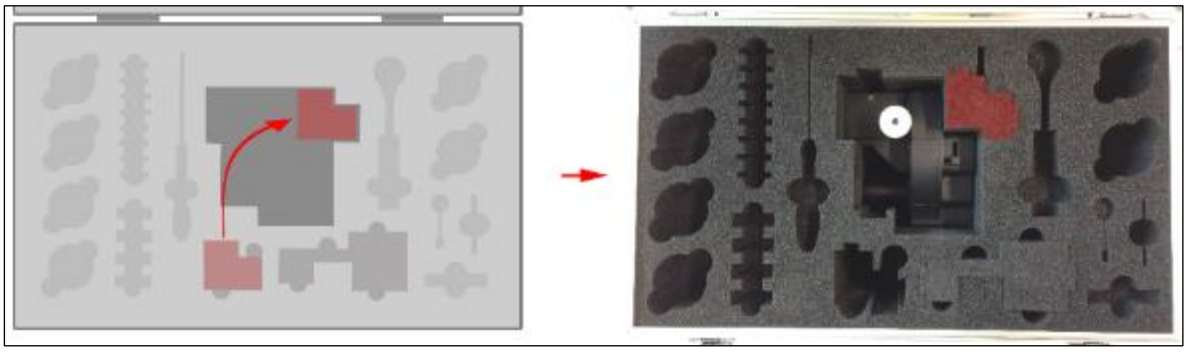


Figure 68: Dummy plugs and objective holders

Position of the dummy plugs with the condenser in the slot:

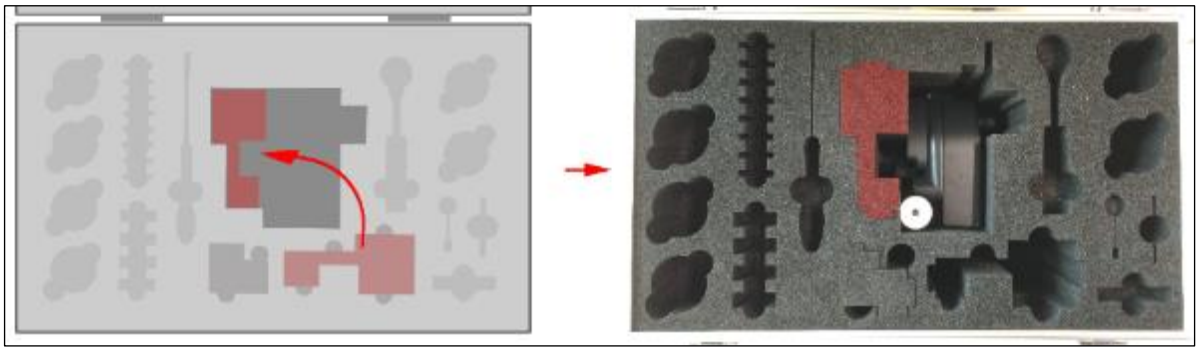


Figure 69: Dummy plugs and condenser

18.4 System Components for LightSheet Calibration

The figure shows the most important system components for lightsheet calibration.

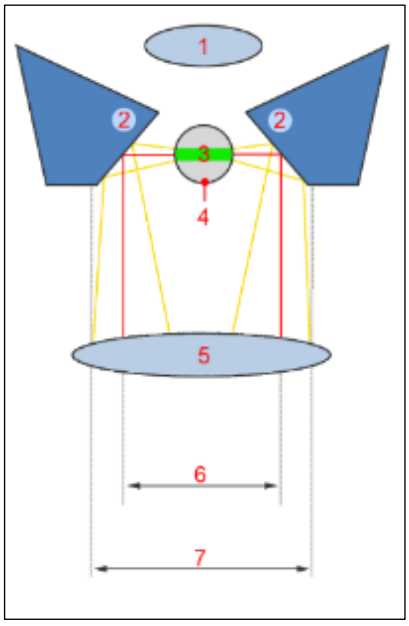


Figure 70: LightSheet calibration

1	Detection objective	5	Illumination objective
2	Mirror	6	Mirror offset for the LightSheet
3	LightSheet (green)	7	Maximum scan region
4	Specimen		

18.5 TwinFlect Mirror Cap on the Objective

The mirror cap (Figure 65, position 2) and the detection objective (Figure 65, position 12) are stored in separate containers in the DLS case. For a DLS experiment, the mirror cap with the detection objective must be screwed into place.

Ensure it is screwed in straight.

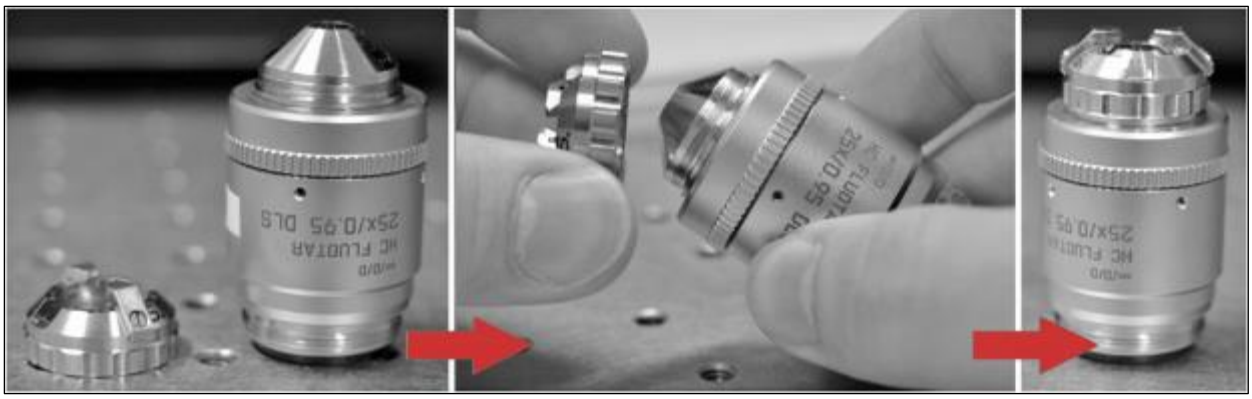


Figure 71: TwinFlect mirror cap and associated objective

Do not make any changes to the mirror cap! Opening or working on the mirror cap in any way or loosening the screws causes damage to the mirror and the mirror cap.

Keep the mirror cap with reflecting surfaces clean and free of scratches. This has a significant effect on the quality of the LightSheet. For additional notes on cleaning and care, see chapter 22.4.

Always store the cleaned mirror cap in the mirror cap container (Figure 72). To do so, screw the clean, dry mirror cap into the container and close the container. You can securely store the container with the mirror cap in the DLS case (Figure 65, position 2).

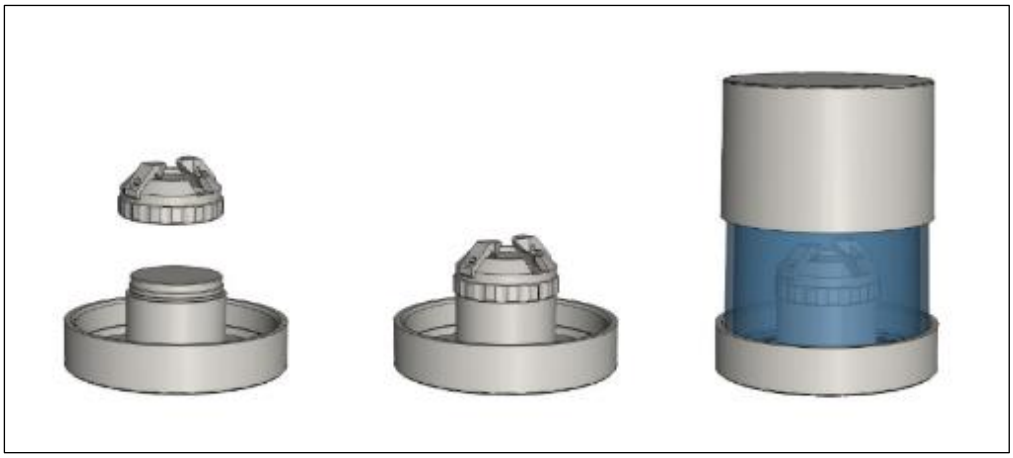


Figure 72: Mirror cap in the container

18.6 Installing the Objective Holder on the Transmitted Light Arm

To carry out LightSheet experiments, the objective holder must be attached to the transmitted light arm in place of the condenser.

The removed, unused condenser must be stored in the provided DLS case (see chapter 18.3.1) so that it is protected from dirt and damage.

18.6.1 Replacing the Condenser with the Objective Holder on the Transmitted Light Arm

Note that only the condenser with the laser protection shield for VIS/UV lasers can be stowed in the slot of the DLS case. A condenser with a laser protection shield for STED or MP lasers cannot be stowed in the slot.

Note that the laser protection shield must not be removed from the condenser.

When replacing the condenser, LAS X and the microscope must be switched off.

1. Close LAS X.
2. Switch off the microscope at the electronics box.

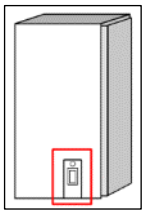


Figure 73: Microscope electronics box

3. Carefully tilt the transmitted light arm back.
4. Hold the condenser securely with one hand.
5. With your other hand, use the hex screwdriver (3 mm) to loosen the side screw on the condenser (see Figure 74) until the condenser is completely loosened.

Figure 74: Side screw on the condenser

6. Place the hex screwdriver (3 mm) to the side and push the laser protection tube upward (see Figure 75) so that you can move the condenser to the front to pull it out.

Figure 75: Laser protection tube

7. Carefully pull the condenser out the front.
8. Remove the objective holder from the DLS case.
9. Switch the location of the dummy plugs so that the condenser fits (see Figure 69).
10. Carefully place the condenser into the slot of the DLS case.

Figure 76: Condenser in the DLS case

This securely stows the condenser in the DLS case.

11. When attaching the objective holder, note the DLS mark on the transmitted light arm (see Figure 77, position 1).
12. Push the laser protection tube upward so that you can attach the objective holder to the transmitted light arm (see Figure 77, position 2-4).

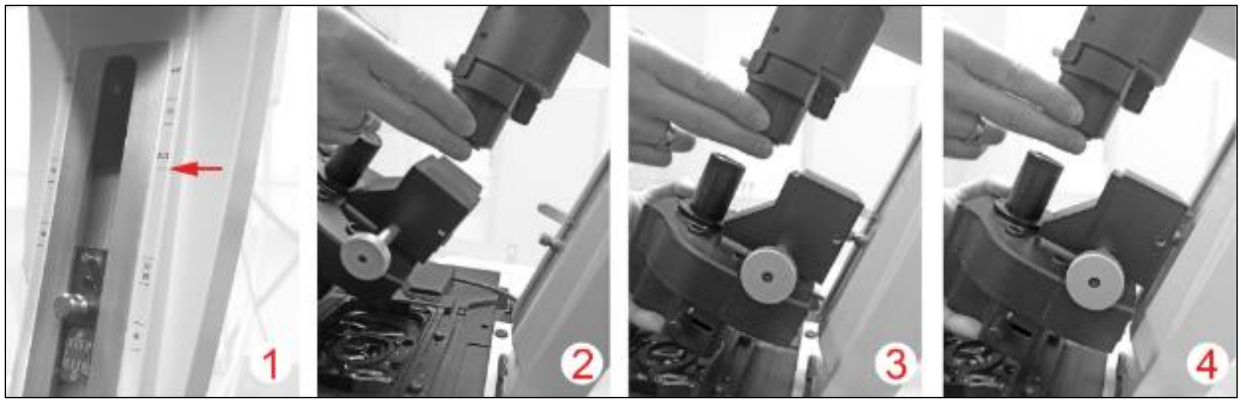


Figure 77: Attaching the objective holder

13. The upper edge of the objective holder closes so that it is flush with the DLS mark on the transmitted light arm:

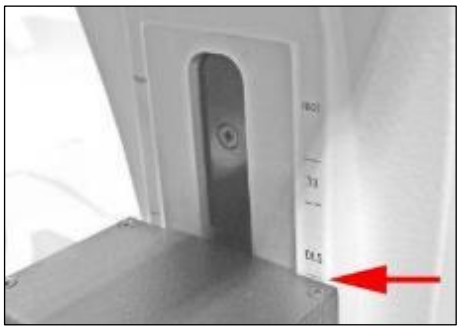


Figure 78: DLS mark on the transmitted light arm

14. Carefully tighten the side screw on the objective holder using the hex screwdriver (3 mm).

Figure 79: Side screw on the objective holder

With that, the objective holder is now installed on the transmitted light arm.

15. Screw the desired objective into the objective holder. Note that you must teach the objective into the software. For a description of how to teach objectives into the software, please see Online Help.
16. If you do not want to insert or replace any DLS filters, skip to item 25.
17. If you want to insert or replace DLS filters, you must unscrew and remove the cover on the objective holder. To do so, use the hex screwdriver (3 mm) to remove the two screws:

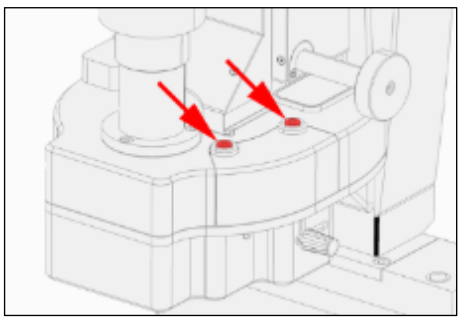


Figure 80: Unscrew and remove the screws

18. Remove the cover:

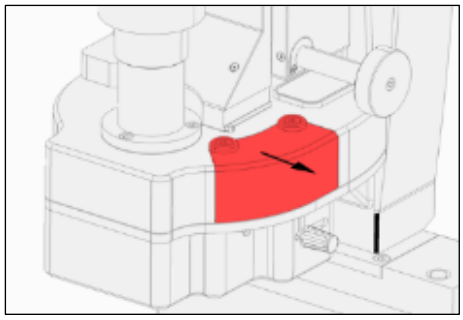


Figure 81: Removing the cover

19. Remove the filter holder from the DLS case (see Figure 65, item 6) and use it to insert the desired DLS filters into the corresponding filter position (filter positions 1 to 4). The DLS filters are carried on the filter holder using magnets and can be inserted into the corresponding filter position in the filter wheel in this manner.

Figure 82: Inserting DLS filters using the filter holder

20. You can close filter positions that are not needed using a dummy plate (included in the DLS case). Note that you must teach the DLS filters into the software. For a description of how to teach DLS filters into the software, please see Online Help.
21. The instrument is shipped from the factory with filter positions 5 and 7 closed. The instrument is shipped from the factory with filter position 6 open. Do not tamper with or change filter positions 5, 6 or 7 in the filter wheel.
22. To fasten the inserted DLS filter in the filter holder, carefully tighten the two corresponding screws in the filter wheel using the hex screwdriver (2 mm):

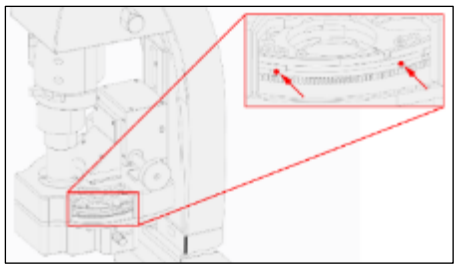


Figure 83: Screws for the DLS filters in the filter wheel

23. Attach the cover to the top of the objective holder.

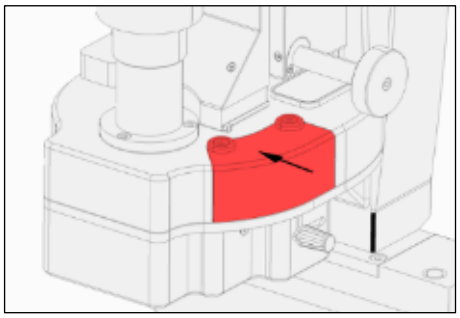


Figure 84: Attaching the cover

24. Carefully tighten the two screws:

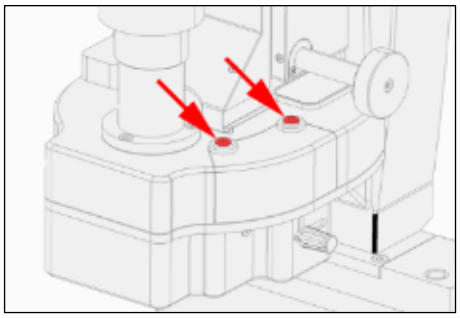


Figure 85: Tightening the screws

25. Keep the transmitted light arm tilted back.
26. Switch on the microscope at the electronics box.

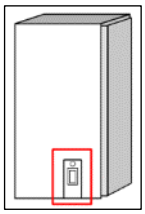


Figure 86: Microscope electronics box

27. Start LAS X.
28. Continue with the adjustment of the DLS components (see chapter 18.6.3).

18.6.2 Using LightSheet Components

The calibration process includes the adjustment of the DLS components and subsequent calibration in the software (LightSheet wizard, see Online Help).

During calibration, the system components for creating the lightsheet are matched so that the lightsheet is generated at the focus of the detection objective, creating a sharp image on the camera.

18.6.3 Adjusting DLS Components

In this step, place the objective holder and the examination specimen into the correct position and align the mirrors of the detection objective. The specimen must be positioned within the working distance of the detection objective between the two mirrors. You can use the standard specimen to verify the system properties.

The workflow with the standard specimen is described below:

1. Carefully tilt the transmitted light arm back.
2. Place the objective holder at a safe height to prevent a collision with the standard specimen or the specimen holder when it is lowered.
3. Fasten the standard specimen on the specimen stage.
4. Switch on the fluorescence lamp.
5. Swing out the BF lens (brightfield) (Figure 87, position 1).

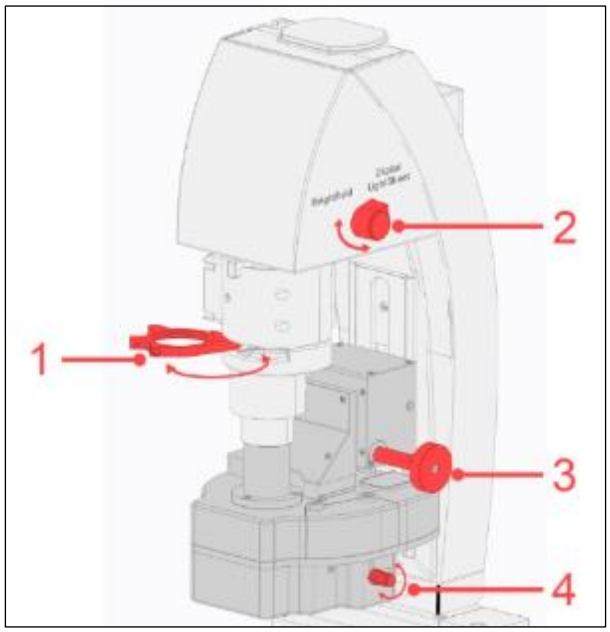


Figure 87: Adjusting DLS components

6. Cover the swung out BF lens with the lens cover (Figure 88, position 1). The lens cover is located in the DLS case (Figure 65, position 4).

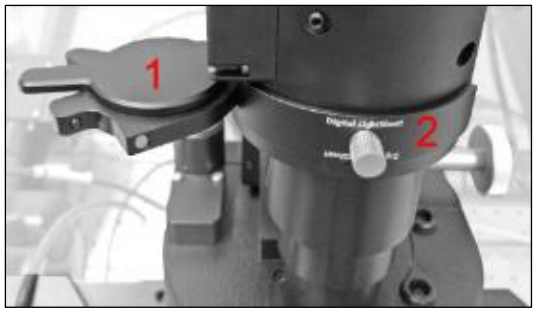


Figure 88: Lens cover (1). Cover for the TLD module (2).

7. Use the cover for the TLD module to close the opening created by the swinging out movement of the BF lens (Figure 88, position 2). The cover is located in the DLS case (Figure 65, position 5).
8. Turn the knob to the Digital LightSheet position (Figure 87, position 2).

9. Carefully pull the transmitted light arm back into the front position. Ensure that the specimen and specimen stage do not collide with the TwinFlect mirror cap.
10. Switch the microscope to fluorescence illumination.
11. Carefully rotate the objective holder down using the setscrew (Figure 87, position 3) until the desired height is reached. This is the case if the mirrors dip into the mountant surrounding the specimen.
12. Look through the eyepieces and move the illumination objective using the z-wide actuator until the specimen is between the two mirrors.

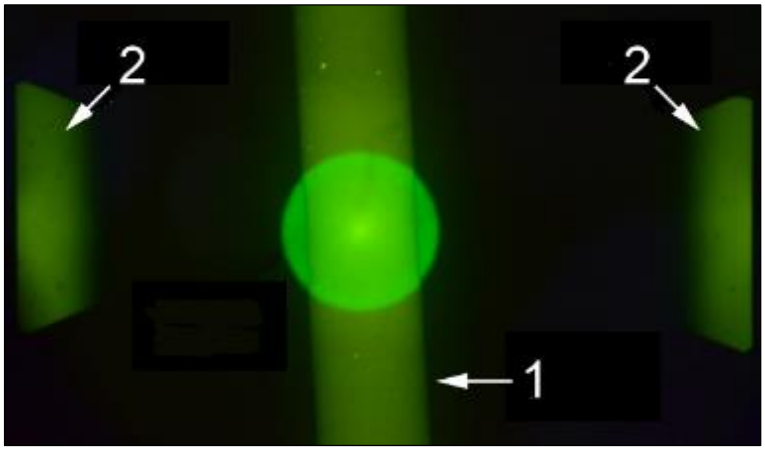


Figure 89: Specimen (1) between the two mirrors (2)

Once the specimen is visible as a reflection in the center of both mirrors (left and right) and can be seen in focus either directly or in the mirrors by moving the z-wide actuator, the position of the objective holder is approximately correct.

13. Center the standard specimen.
14. Use the setscrew (Figure 87, position 4) to turn the detection objective until both mirrors are horizontal at the same height.

Now the standard specimen and the objective holder are in the correct position for you to begin the calibration in the LAS X LightSheet wizard. For additional steps in the software and the calibration in the LightSheet wizard, please see Online Help.

18.7 Installing the Condenser on the Transmitted Light Arm

To carry out brightfield experiments, the condenser must be attached to the transmitted light arm in place of the objective holder.

The removed, unused condenser must be stored in the provided DLS case (see chapter 18.3.1) so that it is protected from dirt and damage.

18.7.1 Replacing the Objective Holder with the Condenser on the Transmitted Light Arm

When replacing the objective holder, LAS X and the microscope must be switched off.

1. Close LAS X.
2. Switch off the microscope at the electronics box.

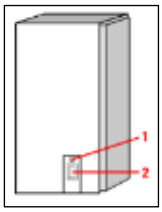


Figure 90: Microscope electronics box

3. Carefully tilt the transmitted light arm back.
4. Unscrew the objective with TwinFlect mirror cap from the objective holder and stow the two components separately in the provided containers in the DLS case (Figure 65, position 2 and position 12).
5. Hold the objective holder securely with one hand.
6. With your other hand, use the hex screwdriver (3 mm) to loosen the side screw on the objective holder until the objective holder is completely loosened.

Figure 91: Side screw on the objective holder

7. Place the hex screwdriver (3 mm) to the side and push the laser protection tube upward so that you can move the objective holder to the front to unplug it.
8. Pull the objective holder carefully to the front to unplug it.
9. Remove the condenser from the DLS case.
10. Switch the location of the dummy plugs so that the objective holder fits (see Figure 68).

11. Carefully place the objective holder into the slot of the DLS case.

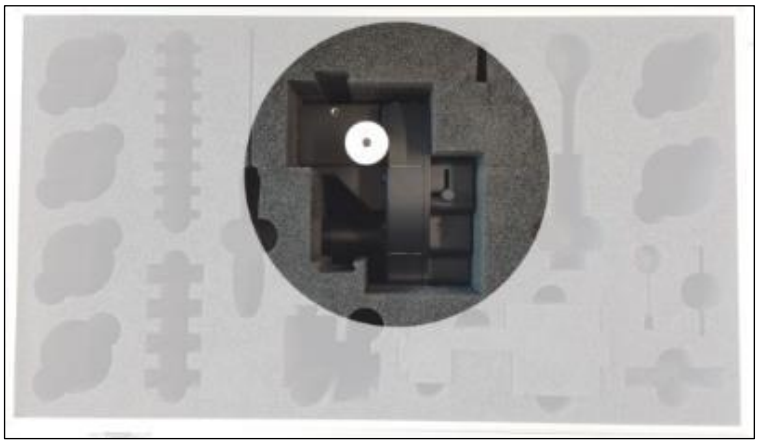


Figure 92: Objective holder in the DLS case

With that, the objective holder is stored securely in the DLS case.

12. Push the laser protection tube upward so that you can attach the condenser to the transmitted light arm.
13. When attaching the condenser, note the "28" mark on the transmitted light arm (see Figure 93).

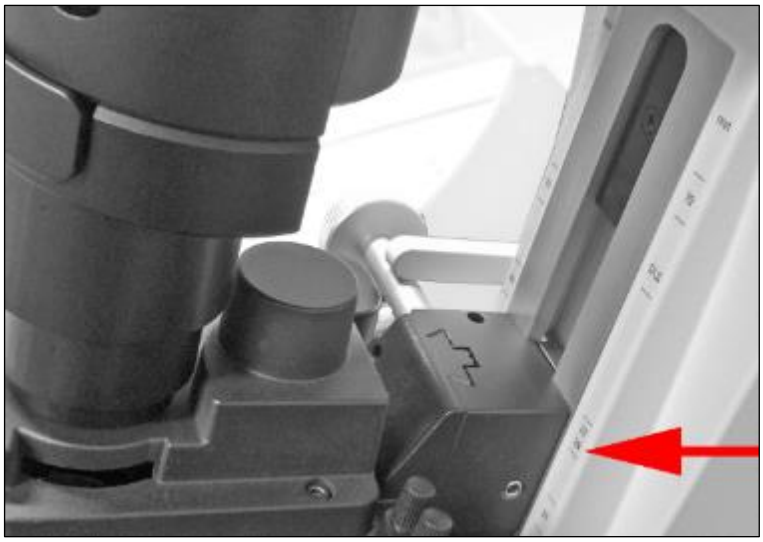


Figure 93: Mark for the condenser on the transmitted light arm

14. Carefully tighten the side screw on the condenser using the hex screwdriver (3 mm).

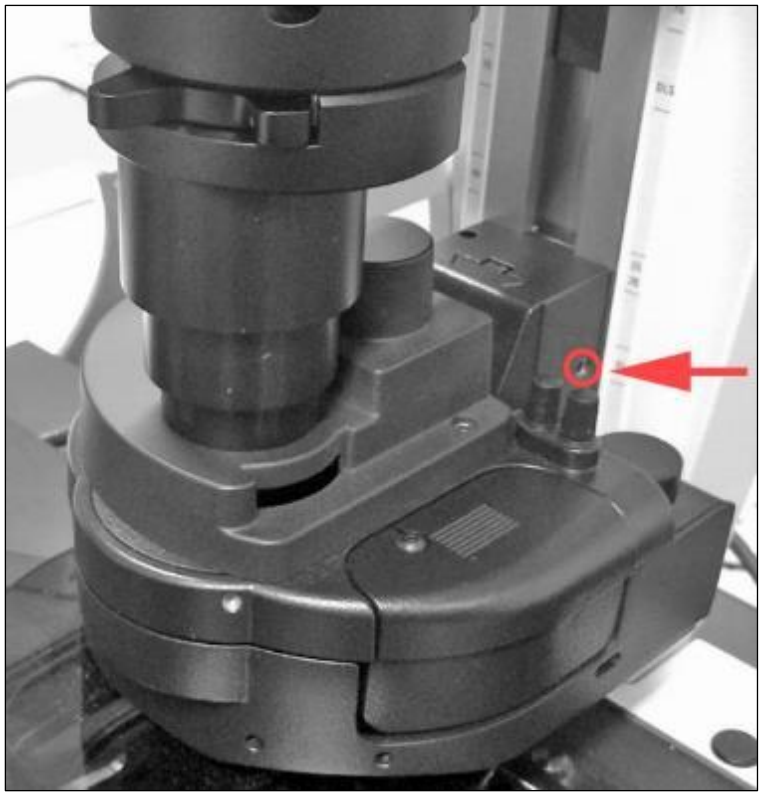


Figure 94: Side screw on the condenser

With that, the condenser is now installed on the transmitted light arm.

15. Switch on the microscope at the electronics box.

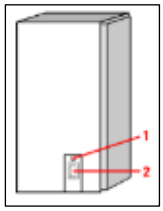


Figure 95: Microscope electronics box

16. Start LAS X.
17. Continue with the adjustment of the brightfield components (see chapter 17.7.2).

18.7.2 Adjusting the BF Components

1. Bring the condenser to a safe height to avoid a collision with the specimen holder.
2. Fasten the specimen on the specimen stage.
3. Remove the cover for the TLD module (Figure 96, position 2) and stow the cover in the DLS case (Figure 65, position 5).

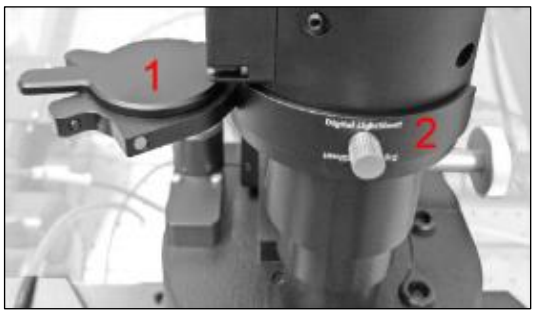


Figure 96: Lens cover (1). Cover for the TLD module (2).

4. Remove the lens cover from the BF lens (Figure 96, position 1) and stow the lens cover in the DLS case (Figure 65, position 4).
5. Swing in the BF lens (Figure 97, position 1).
6. Turn the knob to the brightfield position (Figure 97, position 2).

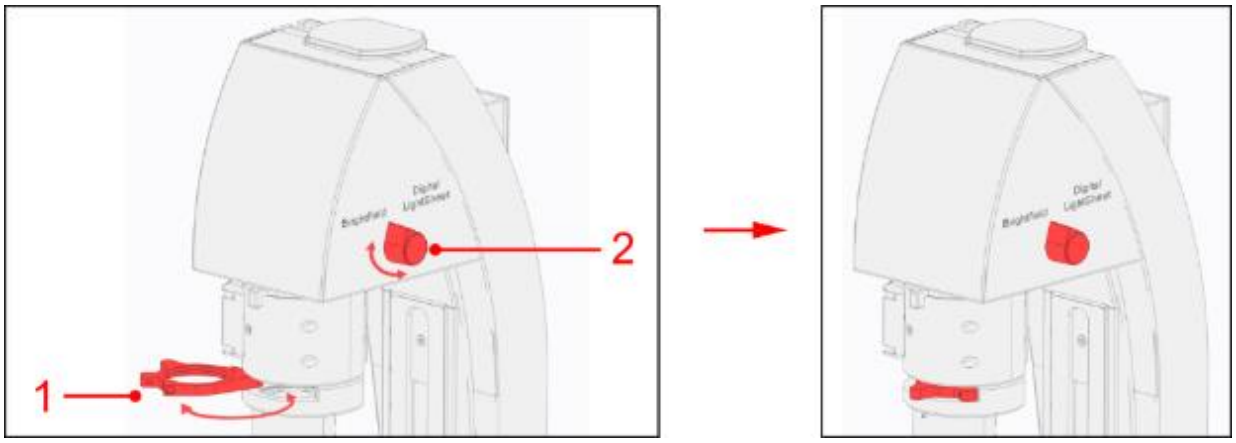


Figure 97: Adjusting BF components

For additional steps to achieve the correct illumination setting, refer to the microscope instructions.

19 Piezo Focus

NOTICE **Damage is possible when contacting the specimen stage**

When using an inverted microscope, the z-drive and/or objective nosepiece must be swung downwards before the system start and the illuminator arm must be swung back before the system start and/or the LAS X start, because the stage can damage the condenser, the objective or the specimen during initialization.

NOTICE **Objective damage is possible when contacting the specimen stage**

When using an upright microscope, the specimen stage must be moved down before the system start and LAS X start because it could come into contact with the objective during initialization and damage the objective.

Observe the user manuals provided

Always observe all of the user manuals provided for the individual components and peripheral devices.

If there is a piezo focus installed on your system (see Figure 98, position 2) pay careful attention to the following notes:

- Before you switch on the system and start the LAS X software, you must remove the specimen carrier from the specimen stage. If this is not observed, specimens and objectives can be damaged or destroyed upon system/software startup by the initialization of the piezo focus.
- Make sure that the specimen carrier is not against the objective and cannot be damaged by it or cause broken glass. The objective could likewise be damaged.
- Do not carry out the objective change automatically. The automatic motion may damage the cable of the piezo focus.
- Do not make any adjustments to the piezo focus controller (see Figure 99), as it has already been optimally set up by the Leica Field Service engineer.
- When replacing the objective on the piezo focus, you must perform a teach-in for the new objective in LAS. Please see the instructions on this topic in the microscope user manual.
- Please note that the focus position of an objective with piezo focus is 13 or 14.5 mm lower than those without piezo focus. A spacer (Figure 98, position 1) is installed on all other objectives to ensure the same focal plane. If you have further questions, get in touch with your contact person or the Leica branch office in your country.

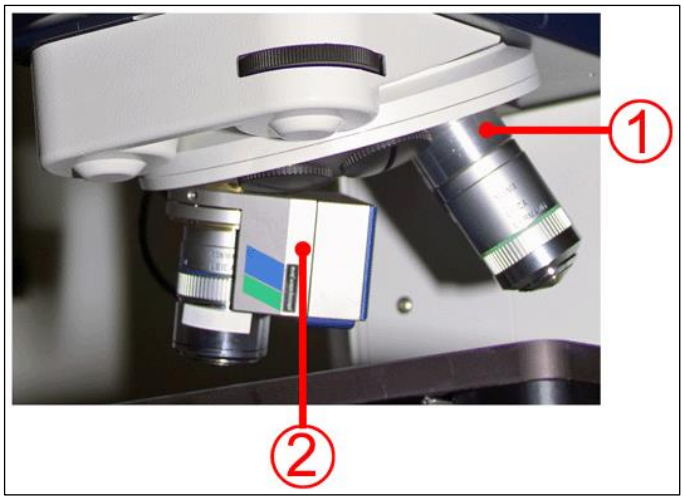


Figure 98: Spacer (1) and piezo focus (2)

The objective can be moved by 150 µm in either direction. The total travel is 300 µm.

Piezo focus controller display:

- Highest position: 350 µm
- Middle position: 200 µm
- Lowest position: 50 µm
- xz scan range: 250 µm

Figure 99: Piezo focus controller

20 SCANplus Specimen Stage

Observe the provided user manual of the microscope

Observe the notes on the assembly of specimen stages in the provided user manual of the microscope.

Overload of the SCANplus specimen stage

In case of overload, the SCANplus specimen stage automatically switches to manual mode, see chapter 20.1, page 103.

20.1 Control Mode

The SCANplus specimen stage can be controlled in two modes. The illuminated or flashing display (Figure 100, position 1) indicates the current mode of the specimen stage. You can toggle between the modes by pressing the button (Figure 100, position 2).

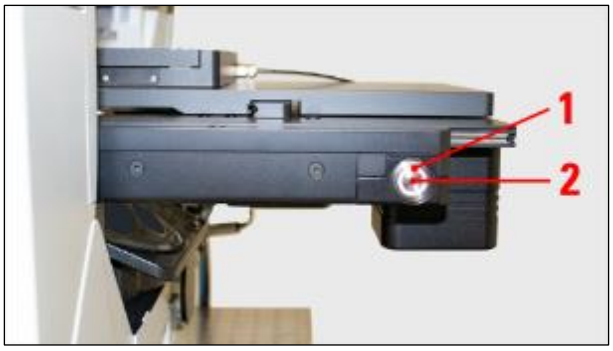


Figure 100: Display and button on the specimen stage

Control Mode	Display (figure 38, position 1)
STANDARD, via the workstation: • using the 2-axis joystick • in the LAS X Navigator	continuously illuminated
MANUAL The software control is deactivated. You can move the specimen stage manually.	flashing

21 z-Piezo Specimen Stage

Observe the provided user manual of the microscope

Observe the notes on the assembly of specimen stages in the provided user manual of the microscope.

- The z-Piezo specimen stage may exclusively be used in combination with the SCANplus.
- Tightening torque for screwing on the inserts: 2 kg / 60 Nm.
- The z-Piezo specimen stage must not be used in combination with the following components:
    - S1 Leica microscope condenser
    - Piezo focus objective

21.1 Installing the z-Piezo Specimen Stage

Replacing the z-Galvo with the z-Piezo specimen stage

Chapter 21.1 is relevant only if the microscope is equipped with a z-Galvo specimen stage and you want to replace the z-Galvo specimen stage with a z-Piezo specimen stage.

1. For better access to the specimen stage, remove the environmental chamber if present.
2. Remove the z-Galvo specimen stage from the SCANplus platform. To do so, unscrew the three screws:

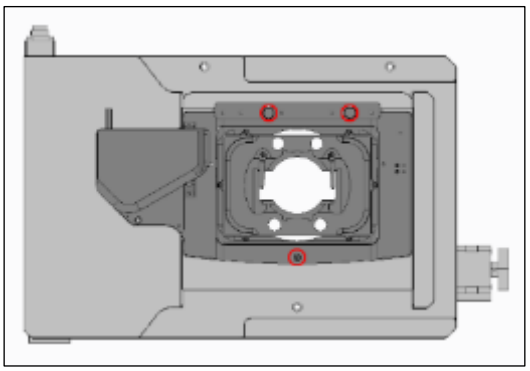


Figure 101: Screws on the z-Galvo specimen stage

3. Disconnect the z-Galvo cable connection from the scan head (connection on the scan head: **z-stage**).
4. Safely store the z-Galvo specimen stage in its original packaging.
5. Remove the z-Piezo specimen stage from its packaging.

6. Fasten the z-Piezo specimen stage to the SCANplus platform using the four screws and the provided Allen key (2.5 mm).

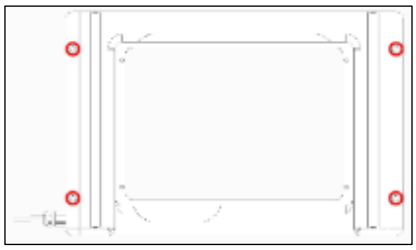


Figure 102: Screws on the z-Piezo specimen stage

7. Connect the components as shown in the figure below:

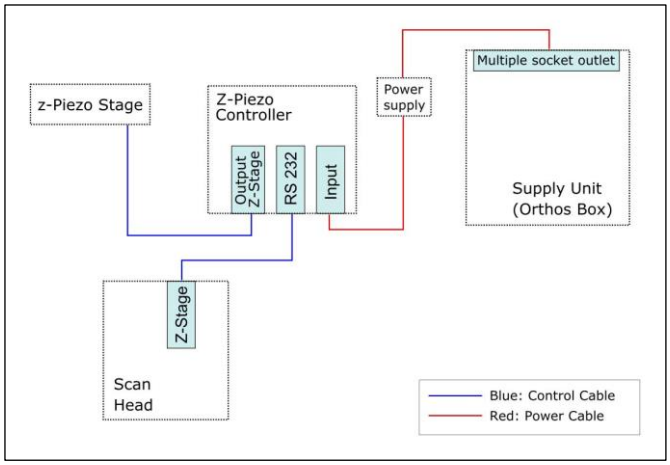


Figure 103: Connection of the components

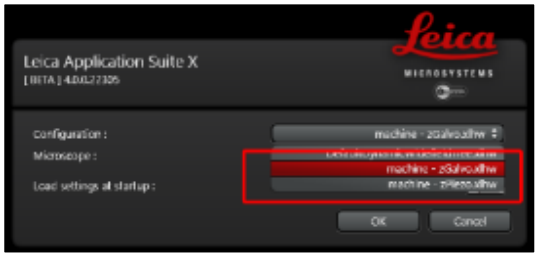
8. Set up the z-Piezo controller in a suitable location and pay attention to the cable length. The cable must not be tensioned. The piezo controller does not cause any vibrations because it has no active ventilation.
9. Switch on the z-Piezo controller.

Leave the power switch of the z-Piezo controller switched on.

The power switch of the control should always be set to "on" so that the z-Piezo controller and the z-Piezo specimen stage with the scan head are switched on.

The z-Piezo stage is activated once the scan head is switched on.

10. When starting the LAS X, select the specimen stage installed on the microscope in the Start menu under Configuration:



22 Care and Cleaning

Observe the user manuals provided

Always observe all of the user manuals provided for the individual components and peripheral devices.

WARNING **Electric shock**

Before cleaning, disconnect the entire system from the power supply. To do so, use the power switches of all components and disconnect all power cables from the power supply.

Ensure that no fluids enter the individual components or peripheral devices during cleaning!

WARNING **Contamination with hazardous substances**

Before each visit by a Leica Field Service engineer, the system has to be cleaned/disinfected thoroughly to avoid contamination with hazardous substances. When returning system parts, it must be ensured that they are free of hazardous substances - otherwise they must not be sent.

22.1 Cleaning Surfaces

- Never use abrasives. Abrasives can scratch the surface and thus have a negative effect on the protection of the parts.
- Clean uncoated or plastic surfaces only using a dry cotton cloth or one moistened with a little water. Other cleaning agents can attack and tarnish the surface and cause it to become porous.
- Never use acetone, xylene or nitro thinners as they attack the varnish.
- Remove dust and loose dirt particles using a soft brush or lint-free cotton cloth.
- Carefully remove clinging dirt on coated surfaces using a clean cloth slightly moistened with water.

22.2 Cleaning Optical Components

These cleaning recommendations refer to accessible optical components such as the front lens of objectives.

Microscope-internal optical components and filter cubes must only be cleaned by Leica Field Service engineers authorized by Leica Microsystems CMS GmbH. If damage appears on inner surfaces, the optical components must be sent to your Leica subsidiary for repair.

- Never open the objectives for cleaning.
- Only use the recommended solvents for cleaning objectives. Certain solvents may dissolve the glue which holds the objective lens in place.
- Remove dust with a fine, dry brush made from hair or with a clean, lint-free cloth moistened with distilled water.
- Remove persistent dirt from glass surfaces using suitable solvents.

- Prevent the optics and mechanical parts from coming into direct contact with acids, bases and other aggressive chemicals.

22.2.1 Cleaning the Front Lens of Immersion Objectives

The immersion oil should be removed from the front lens of immersion objectives immediately after using them:

1. First, remove the immersion oil using a clean cloth.
2. Once most of the oil has been removed with a clean tissue, a piece of lens tissue should be placed over the front lens of the objective.
3. Apply a drop of the recommended solvent. Gently wipe the tissue across the lens surface in circular movements.
4. Repeat this procedure until the front lens is completely clean. Use a clean piece of lens tissue each time.

Caution when objective lens is contaminated

If an objective lens is contaminated by unsuitable immersion oil or by the specimen, please contact your local Leica branch office.

22.3 Care

- Always keep the optical components of the microscope clean.
- Never touch the optical components with your fingers or anything which may bear dust or grease.
- Always place dust caps over the objective nosepiece positions when no objective is in place in the nosepiece.
- When not in use, cover the system with a plastic cover or a clean piece of cotton cloth.

Avoid condensation

Allow the entire system to cool down to room temperature before covering the system with a dust cover. This prevents condensation from forming below it, which can enter the system and damage it.

22.4 Cleaning Digital LightSheet Components[14]

The TwinFlect mirror cap (chapter 18.5) is manufactured from high-quality stainless steel. This material makes the mirror cap very rugged. When using physiological solutions, which are typical for live imaging, the mirror cap remains free of corrosion.

- After use, always keep the mirror cap and the reflecting surfaces in a clean, dry state.
- Remove liquids with a towel that is soft enough to use on lenses.
- Use ethanol and DI water to clean the mirror cap and the reflecting surfaces (as needed or before storing the mirror cap in the container). Do not use any cleaning agents because cleaning substances age the reflecting surfaces. This can result in contamination of the specimen or affect the quality of the LightSheet.
- If there is persistent dirt, we recommend a 2-minute cleaning with distilled water in the ultrasonic cleaner.
- If sterilization is necessary, you can treat the mirror cap with ethanol. It is also possible to carry out sterilization with steam or hot air.

[14] Optional

23 Repairs and Service Work

WARNING **Contamination with hazardous substances**

Before each visit by a Leica Field Service engineer, the system has to be cleaned/disinfected thoroughly to avoid contamination with hazardous substances. When returning system parts, it must be ensured that they are free of hazardous substances - otherwise they must not be sent.

- Repairs and servicing may be performed only by Leica Field Service Engineers authorized by Leica Microsystems CMS GmbH. Opening or working on the system in any way shall void any and all warranty claims.
- If housing parts have to be opened for repairs or service work, only Leica Field Service engineers may be present in the room where the system is installed.
- Be sure to back up your data before any service or repair work is performed. Leica Microsystems CMS GmbH shall not be liable for any loss of data.
- Inside the system there are installed components that can cause potentially fatal injury if handled improperly. Opening these components will result in danger to people and the system. Therefore, only authorized Leica Field Service engineers may open or work on the supply unit and the scan head.
- Obstacles, steps and door thresholds must be no higher than 6 cm (2.37") or wider than 6 cm (2.37"). If they are larger, you must hire a moving company to transport the supply unit, which weighs up to 130 kg (287 lbs), properly past the obstacles.
- For more information about Leica RemoteCare, refer to chapter 9.1.1, page 33.

24 Maintenance

NOTICE	**Damage to the instrument from not paying attention to the maintenance instructions** Absolutely adhere to the prescribed maintenance intervals, as otherwise there can be serious damage to the instrument.

24.1 External Cooling of the System

Observe the user manuals provided

Always observe all of the user manuals provided for the individual components and peripheral devices.

NOTICE	**A low coolant level and aspirated air may damage the instrument** The coolant level must not drop too low. If the coolant level is low, air can be sucked into the cooling circuit. Aspirated air can disrupt the cooling circuit, which causes severe damage to the instrument. If air is sucked into the circuit, keep the system switched off and contact the Leica branch office in your country or your contact person.

NOTICE	**Damage to the instruments due to incorrect coolant** Only use the permitted coolant, since otherwise the cooling circuit, the peripheral device and the entire system could be destroyed. If in doubt, contact the Leica branch office in your country or your contact person.

You can find the safety data sheet for the coolant in chapter 28.1, " Safety Data Sheets from Third-party Manufacturers", page 114.

24.1.1 Refilling the Coolant in the External Cooling System

- The coolant in the external cooling system (Figure 2, position 14 or Figure 3, position 5) must be refilled depending on the intensity of operation.
- Check the coolant level at regular intervals and observe the provided User Manual of the external cooling system.
- When refilling the coolant, wear suitable safety glasses and gloves and observe the safety data sheet in chapter 28.1, page 114.

24.2 Cooling Systems on External Lasers and Other Peripheral Devices

Observe the user manuals provided

Always observe all of the user manuals provided for the individual components and peripheral devices.

Some external lasers and other peripheral devices can have a cooling circuit independent from the system and may use different coolants. These cooling circuits must be maintained according to the notes in the provided User Manual.

NOTICE **Damage to the instruments due to incorrect coolant**

Only use the permitted coolants, since otherwise the cooling circuit, the peripheral device and the entire system could be destroyed. If in doubt, contact the Leica branch office in your country or your contact person.

25 Disassembly and Transport

Do not disassemble system components or housing parts yourself. Opening or working on the system in any way shall void any and all warranty claims.

Contact the Leica branch office in your country or your contact person if you need to move or transport the system or need to ship parts of it.

WARNING **Contamination with hazardous substances**

Before each visit by a Leica Field Service engineer, the system has to be cleaned/disinfected thoroughly to avoid contamination with hazardous substances. When returning system parts, it must be ensured that they are free of hazardous substances - otherwise they must not be sent.

Observe the instructions in 23 "Repairs and Service Work", page 109.

26 Disposal

At the end of the product service life, please contact the Leica branch office in your country with regard to disposal.

Disposal

The system, its accessory components and consumable materials must not be disposed of together with general household waste! Be sure to follow the national laws and regulations.

27 Contact

If you have further questions or need technical support, get in touch with your contact person or the Leica branch office in your country. The appropriate contacts can be found on the Internet at: https://www.leica-microsystems.com/contact

If you have further questions about Leica RemoteCare, email:
remotecare.support@leica-microsystems.com

27.1 Your Feedback

Your opinion matters to us. We would be happy to hear any suggestions and constructive criticism you may have about this document. Note that the email address specified below and the online form are to be used exclusively for your feedback about this specific document. We are unable to respond to any inquiries sent via the email address below or the online form.

27.1.1 … by email

Email address: docu-feedback@leica-microsystems.com

If you have further questions or need technical support, refer to the information in chapter 27.

27.1.2 … by online form

Link to online form: https://forms.office.com/r/sfrqCmMu7c

If you have further questions or need technical support, refer to the information in chapter 27.

28 Appendix

28.1 Safety Data Sheets from Third-party Manufacturers

The scan head is liquid-cooled. Following are the safety data sheets from the manufacturer "Innovatek" for the coolant used.

innovatek

SAFETY DATA SHEET

according to Regulation 1907/2006/EC [REACH]

Revised 25.03.2019 Page 01 of 06

SECTION 1. Identification of the Substance / Mixture and of the Company

Product identifier: **innovatek Protect IP - Application Mixture 25%**

Relevant identified uses of the substance or mixture and uses advised against

Relevant identified uses: Antifreeze and anti-corrosion fluid for thermotechnical systems.

Details of the supplier of the safety data sheet

Identification of the company: innovatek OS GmbH, Stadtweg 9, 85134 Stammham
Phone: +49 (0) 8405 9259-0 / Fax: +49 (0) 8405 9259-21

Information about the product: E-mail (competent person): info@innovatek.de

Emergency information: Phone: +49 (0)8405 -9259-0 (weekdays 8 a.m. - 5 p.m.)

SECTION 2. Hazards Identification

Classification of the substance or mixture

According to Regulation (EC) No. 1272/2008 [CLP]

Acute Tox. 4 (oral), STOT RE (Kidney) 2.

According to Directive 67/548/EEC or 1999/45/EC

Possible hazards: Harmful if swallowed. Harmful: danger of serious damage to health by prolonged exposure if swallowed.

For the classifications not written out in full in this section the full text can be found in section 16.

Label elements

According to Regulation (EC) No. 1272/2008 [CLP] / Globally Harmonized System, EU (GHS)

Signal Word: Warning.

Hazard Statements

H302 Harmful if swallowed.
H373 May cause damage to organs (Kidney) through prolonged or repeated exposure.

Precautionary Statements (Prevention)

P260 Do not breathe dust/gas/mist/vapours.
P270 Do not eat, drink or smoke when using this product.
P264 Wash with plenty of water and soap thorougly after handling.

Precautionary Statements (Response)

P311 Call a POISON CENTER or doctor/physician.
P301+P330 IF SWALLOWED: rinse mouth.

Precautionary Statements (Disposal)

P501 Dispose of contents/container to hazardous or special waste collection point.

Hazard determining component for labelling: ETHANE-1,2-DIOL/ETHYLENEGLYCOL

Other hazards

According to Regulation (EC) No. 1272/2008 [CLP]

High risk of slipping due to leakage/spillage of product.

SECTION 3. Composition / Information on Ingredients

Chemical nature: Ethanediol (ethylene glycol). Inhibitors.
This product contains no vPvB substance (very persistent, very bioaccumulative) and does not fall under Annex XIII of the Regulation (EG) 1907/2006 (<0,1%).
This product contains no PBT substance (persistent, bioaccumulative, toxic) and does not fall under Annex XIII of the Regulation (EG) 1907/2006 (<0,1%).

Hazardous ingredients according to Regulation 1272/2008/EC and Directive 1999/45/EC

Substance	Reg. 1272/2008/EC [CLP/GHS]
Ethanediol (ethylene glycol)	
Content (w/w): > 25% +-5%	Acute Tox. 4 (oral)
CAS number: 107-21-1	STOT RE (Kidney 2)
EC number: 203-473-3	H302, H373
INDEX number: 603-027-00-1	
REACH registration number: 01-2119456816-28	
2-ethylhexanoic acid, sodium salt	
Content (w/w): > 0,5 % - < 0,75%	Repr. 2 (unborn child)
CAS number: 19766-89-3	H361d
EC number: 243-283-8	
Disodium tetraborate pentahydrate / borax pentahydrate	
Content (w/w): ≥ 0.05 % ≤ 0,1 %	Eye Dam./Irrit. 1
CAS number: 12179-04-3	Repr. 1B (fertility)
EC number: 215-540-4	Repr. 1B (unborn child)
INDEX number: 005-011-02-9	H318, H360FD
REACH registration number: 01-2119490790-32	

For the classifications not written out in full in this section, including the indication of danger, the hazard symbols, the R-phrases, and the hazard statements, the full text is listed in section 16.

SECTION 4. First-Aid Measures

Description of first aid measures

General advice: Remove contaminated clothing.

If inhaled: If difficulties occur after vapour/aerosol has been inhaled, remove to fresh air and seek medical attention.

On skin contact: Wash thoroughly with soap and water.

On contact with eyes: Wash affected eyes for at least 15 minutes under running water with eyelids held open.

On ingestion: Rinse mouth immediately and then drink plenty of water, seek medical attention. Administer 50 ml of pure ethanol in a drinkable concentration.

Most important symptoms and effects, both acute and delayed

Symptoms: The most important known symptoms and effects are described in the labelling of the product (see section 2) and/or in section 11. Further important symptoms and effects are so far not known.

Indication of any immediate medical attention and special treatment needed

Treatment: Symptomatic treatment (decontamination, vital functions).

SECTION 5. Fire-Fighting Measures

Extinguishing media

Suitable extinguishing media: water spray, dry powder, alcohol-resistant foam.

Special hazards arising from the substance or mixture

Harmful vapours. Evolution of fumes/fog. The substances/groups of substances mentioned can be released in case of fire.

Advice for fire-fighters

Special protective equipment: Wear a self-contained breathing apparatus.

Further information

The degree of risk is governed by the burning substance and the fire conditions. Contaminated extinguishing water must be disposed of in accordance with official regulations.

SECTION 6. Accidental Release Measures

High risk of slipping due to leakage/spillage of product.

Personal precautions, protective equipment and emergency procedures

Use personal protective clothing.

Environmental precautions

Contain contaminated water/firefighting water. Do not discharge into drains/surface waters/groundwater.

Methods and material for containment and cleaning up

For large amounts: Pump off product. For residues: Pick up with suitable absorbent material. Dispose of absorbed material in accordance with regulations.

Reference to other sections

Information regarding exposure controls/personal protection and disposal considerations can be found in section 8 and 13.

SECTION 7. Handling and Storage

Precautions for safe handling

Advice on safe handling:	Ensure thorough ventilation of stores and work areas. Shut containers immediately after taking product because product takes up the humidity of air.
Advice on protection against fire/explosion:	No special precautions necessary.

Conditions for safe storage, including any incompatibilities

Further information on storage conditions:	Containers should be stored tightly sealed in a dry place. Storage in galvanized containers is not recommended.

Specific end uses

For the relevant identified uses listed in section 1 the advice mentioned in this section 7 is to be observed.

SECTION 8. Exposure Control / Personal Protection

Control parameters

Components with occupational exposure limits

107-21-1: Ethanediol (ethylene glycol)

TWA value 52 mg/m^3; 20 ppm (OEL (EU)) indicative. STEL value 104 mg/m^3; 40 ppm (OEL (EU)) indicative. Skin Designation (OEL (EU)). The substance can be absorbed through the skin.

12179-04-3: Disodium tetraborate pentahydrate / borax pentahydrate

Exposure controls

Personal protective equipment

Respiratory protection:	Suitable respiratory protection for higher concentrations or long-term effect. Combination filter for gases/vapours of organic compounds and solid and liquid particles (e.g. EN 14387 type A-P2).
Hand protection:	Chemical resistant protective gloves (EN 374). Suitable materials also with prolonged, direct contact (Recommended: Protective index 6, corresponding >480 minutes of permeation time according to EN 374): nitrile rubber (NBR) - 0.4 mm coating thickness. Manufacturer's directions for use should be observed because of great diversity of types.
Eye protection:	Safety glasses with side-shields (frame goggles) (e.g. EN 166).
General safety and hygiene measures:	Do not inhale gases/vapours/aerosols. Handle in accordance with good industrial hygiene and safety practice. Wearing of closed work clothing is recommended.

SECTION 9. Physical and Chemical Properties

Information on basic physical and chemical properties

Form:	liquid.
Colour:	colourless.

SECTION 9. Physical and Chemical Properties - Continuation

	Odour:	product specific.
|	**Odour threshold:**	no applicable information available.
	pH value (20 °C):	7-9 (ASTM D 1287)
	Solidification temperature:	≤ -10°C (DIN/ISO 3016)
	Boiling point:	≥ 107°C (ASTM D 1120)
	Flash point:	120°C (DIN EN 22719, ISO 2719)
|	**Evaporation rate:**	Value can be approximated from Henry's Law Constant or vapour pressure.
	Flammability:	not flammable.
|	**Lower explosion limit (20 °C):**	3.0 Vol.-% (Air)
|	**Upper explosion limit (20 °C):**	15 % vol. (Air)
	Ignition temperature:	>200°C (DIN 51794)
	Vapour pressure (20 °C):	0.2 hPa.
	Density (20 °C):	1.06 g/cm^3 (DIN 51757)
	Solubility (qualitative) solvents:	polar solvents: soluble.
	Partitioning coefficient n-octanol/water (log Kow):	Study scientifically not justified.
	Self ignition:	not self igniting.
	Viscosity (kinematic, 20 °C):	4-6 mm^2/s. (DIN 51562)
	Explosion hazard:	not explosive.
	Fire promoting properties:	not fire-propagating.
	Other Information	
	Miscibility with water:	miscible in all proportions.
	Hygroscopy:	hygroscopic.

SECTION 10. Stability and Reactivity

Reactivity:	No hazardous reactions if stored and handled as prescribed/indicated. Corrosion to metals: No corrosive effect on metals.
Chemical stability:	The product is stable if stored and handled as prescribed/indicated.
Possibility of hazardous reactions:	No hazardous reactions when stored and handled according to instructions.
Conditions to avoid:	No conditions to avoid anticipated.
Incompatible materials:	Substances to avoid: strong oxidising agents.
Hazardous decomposition products:	No hazardous decomposition products if stored and handled as prescribed/indicated.

SECTION 11. Toxicological Information

Information on toxicological effects

|	**Acute toxicity:**	Assessment of acute toxiciy: Of moderate toxicity after single ingestion. Of low toxicity after short-term skin contact. Experimental/calculated data: LD50 human (oral): approx. 1600 mg/kg. LD50 rabbit (dermal): >2000 mg/kg. Literature data.
	Irritation:	Experimental/calculated data: Skin corrosion/irritation rabbit: non-irritant. Serious eye damage/irritation rabbit: non-irritant.
|	**Respiratory / Skin sensitization:**	Assessment of sensitization: Skin sensitizing effects were not observed in animal studies. Human data do not fully exclude a skin sensitizing potential.
|	**Carcinogenicity:**	Assessment of carcinogenicity: The whole of the information assessable provides no indication of a carcinogenic effect.
|	**Developmental toxicity:**	Information on: ethanediol (ethylene glycol) Assessment of teratogenicity: In animal studies the substance caused malformations when given at high doses.
|	**Repeated dose toxicity and Specific target organ toxicity (repeated exposure):**	Information on: ethanediol (ethylene glycol). Assessment of repeated dose toxicity: The substance may cause damage to the kidney after repeated ingestion. The substance may cause damage to the kidney after repeated skin contact with high doses.
|	**Other relevant toxicity information:**	The product has not been tested. The statements on toxicology have been derived from the properties of the individual components.

SECTION 12. Ecological Information

Toxicity: Toxicity to fish: LC50 (96 h): >100 mg/l, Leuciscus idus.
Aquatic invertebrates: EC50 (48 h): >100 mg/l, Daphnia magna.
Aquatic plants: EC50 (72 h): >100 mg/l, algae.
Microorganisms/effect on activated sludge: Inhibition of degradation activity in activated sludge is not to be anticipated during correct introduction of low concentrations.

Persistence and degradability: Elimination information: >70 % DOC reduction (28d) (OECD 301 A, new version). Evaluation: Readily biodegradable.

Bioaccumulative potential: Bioaccumulative potential: Accumulation in organisms is not to be expected.

Mobility in soil: Assessment transport between environmental compartments: The substance will not evaporate into the atmosphere from the water surface. Adsorption to solid soil phase is not expected.

Results of PBT and vPvB assessment: According to Annex XIII of Regulation (EC) No.1907/2006 concerning the Registration, Evaluation, Authorisation and Restriction of Chemicals (REACH): The product does not contain a substance fulfilling the PBT (persistent/bioaccumulative/toxic) criteria or the vPvB (very persistent/very bioaccumulative) criteria.

Other adverse effects: The product does not contain substances that are listed in Annex I of Regulation (EC) 2037/2000 on substances that deplete the ozone layer.

Additional information: Other ecotoxicological advice: Do not release untreated into natural waters. The product has not been tested. The statements on ecotoxicology have been derived from the properties of the individual components.

SECTION 13. Disposal Considerations

Waste treatment methods

Recommendations for the product: The product must be disposed of or incinerated in accordance with local regulations.
Waste key: 16 01 14 - antifreeze fluids containing dangerous substances. The waste codes are manufacturer's recommendations based on the designated use of the product. Other use and special waste disposal treatment on customer's location may require different waste-code assigments.

Recommendations for the packaging: Uncontaminated packs can be re-used. Packaging that cannot be cleaned should be disposed of in the same manner as the product.

SECTION 14. Transport Information

Land transport - ADR/RID: Not classified as a dangerous good under transport regulations.
Inland waterway transp. - ADN: Not classified as a dangerous good under transport regulations.
Sea transport - IMDG: Not classified as a dangerous good under transport regulations.
Air transport - ICAO/IATA: Not classified as a dangerous good under transport regulations.
Transport in bulk according to Annex II of MARPOL73/78 and the IBC Code: Not evaluated.

SECTION 15. Regulatory Information

Safety, health and environmental regulations/legislation specific for the substance/mixture

Chemical Safety Assessment

Chemical Safety Assessment not yet performed due to registration timelines.

SECTION 16. Other Information

Assessment of the hazard classes according to UN GHS criteria (most recent version)

Acute Tox. 4 (oral)
STOT RE (Kidney) 2

SECTION 16. Other Information - Continuation

Full text of the classifications, including the indication of danger, the hazard symbols, the R-phrases, and the hazard statements, if mentioned in section 2 or 3:

Xn	Harmful.
T	Toxic.
R22	Harmful if swallowed.
R48/22	Harmful: danger of serious damage to health by prolonged exposure if swallowed.
R63	Possible risk of harm to the unborn child.
R41	Risk of serious damage to eyes.
R60	May impair fertility.
R61	May cause harm to the unborn child.
Acute Tox.	Acute toxicity.
STOT RE	Specific target organ toxiciy - repeated exposure.
Repr.	Reproductive toxicity.
Eye Dam./Irrit.	Serious eye damage/eye irritation.
Repr. Cat. 2	Reprotoxic substances (fertility or development) Category 2: Substances which should be regarded as if they cause developmental toxicity to humans or substances which should be regarded as if they impair fertility in humans.
H302	Harmful if swallowed.
H373	May cause damage to organs (Kidney) through prolonged or repeated exposure.
H361d	Suspected of damaging the unborn child.
H318	Causes serious eye damage.
H360FD	May damage fertility. May damage the unborn child.

Acronyms used in this document in alphabetical order

ADN	European agreement concerning the international carriage of dangerous goods by inland waterways (Accord européen relatif au transport international des marchandises dangereuses par voies de navigation intérieures).
ADR	European agreement concerning the international carriage of dangerous goods by road (Accord européen relatif au transport des marchandises dangereuses par route).
ASTM	American Society for Testing and Materials.
CAS	Chemical Abstract Service.
CLP	Classification, Labelling and Packaging.
DIN	German Standards Institute / German industrial norm (Deutsches Institut für Normung/ Deutsche Industrienorm).
DOC	Dissolved organic carbon.
EC50	Effective Concentration 50 %.
GHS	Globally Harmonised System of Classification, Labelling and Packaging of Chemicals.
IATA	International Air Transport Association.
IBC	Intermediate Bulk Container.
ICAO	International Civil Aviation Organization.
IMDG	International Maritime Dangerous Goods Code.
INDEX	Annex VI of Regulation No. (EC) 1272/2008 [CLP/GHS].
LC50	Lethal Concentration 50 %.
LD50	Lethal Dose 50 %.
MARPOL	International Convention for the Prevention of Marine Pollution from Ships.
OECD	Organization for Economic Cooperation and Development.
OEL	Occupational Exposure Limit.
REACH	Registration, Evaluation and Authorization of Chemicals.
RID	Regulations concerning the international carriage of dangerous goods by rail (Règlement concernant le transport International ferroviaire de marchandises Dangereuses).
STEL	Short-term Exposure Limit.
TWA	Time Weighted Average.

Vertical lines in the left hand margin indicate an amendment from the previous version.

This safety data sheet is intended to provide information and recommendations as to: 1. how to handle chemical substances and preparations in accordance with the essential requirements of safety precautions and physical, toxicological, and ecological data. 2. how to handle, store, use, and transport them safely.

No liability for damage occurred in connection with the use of this information or with the use, application, adaption, or processing of the products here described will be accepted. No liability will be accepted for damage indirectly incured.

We provide this information and data according to our present level of knowledge and experience. No assurances concerning the characteristics of our product are hereby furnished.

28.2 Conformity

This system has been tested and meets the requirements of the following standards:

IEC/EN 61010-1	"Safety requirements for electrical equipment for measurement, control and laboratory use - Part 1: General requirements"
IEC/EN 60825-1	"Safety of laser products - Part 1: Equipment classifications and requirements"
IEC/EN 61326-1	"Electrical equipment for measurement, control and laboratory use - EMC requirements - Part 1: General Requirements (Class A)" This is a Class A instrument for use in buildings that do not include domestic premises and buildings not directly connected to a low-voltage power supply network that supplies buildings used for domestic purposes.

You can find the Declaration of Conformity for the system on the next page of this User Manual.

For use in the USA:

CDRH 21 CFR 1040.10:	Laser Products U.S. Food and Drug Administration (FDA) "Complies with FDA performance standards for laser products except for conformance with IEC 60825-1 Ed. 3., as described in Laser Notice No. 56, dated May 8, 2019".

For the USA (area of validity of the CDRH/FDA), the designations of the laser class are to be changed in the text from 3B to IIIb and Class 4 to IV.

28.2.1 Declaration of Conformity

EU Declaration of Conformity
EU Konformitätserklärung

Leica Microsystems CMS GmbH
Am Friedensplatz 3
68165 Mannheim, Germany

We hereby declare that the device described below, both in its basic design and construction and in the version marked by us, conforms to the relevant safety- and healthrelated requirements of the appropriate EU directives.
For the microscope models DM and DMI the respective EC Declaration of Conformity with its corresponding EC Directives is valid.
This declaration shall cease to be valid if modifications are made to the device without our approval.

Hiermit erklären wir, dass nachfolgend bezeichnetes Gerät aufgrund seiner Konzipierung und Bauart sowie in der von uns in Verkehr gebrachten Ausführung, den einschlägigen grundlegenden Sicherheits- und Gesundheitsanforderungen der EU Richtlinien entspricht.
Für die Mikroskopmodelle DM und DMI gilt die entsprechende CE Konformitätserklärung mit den korrespondierenden EU Richtlinien.
Bei einer nicht mit uns abgestimmten Änderung des Gerätes, verliert diese Erklärung ihre Gültigkeit.

Product / Bezeichnung:	***Konfokales Lasermikroskopsystem***
Model / Gerätetyp:	***STELLARIS 5*** ***STELLARIS 8*** ***Product family and accessories***
EU directives / EU Richtlinien:	Low Voltage / Niederspannungsrichtlinie: 2014/35/EU Electromagnetic compatibility / Elektromagnetische Verträglichkeit: 2014/30/EU RoHS - Restriction of the use of certain hazardous substances in electrical and electronic equipment / RoHS - zur Beschränkung der Verwendung bestimmter gefährlicher Stoffe in Elektro- und Elektronikgeräten (2011/65/EU) ecodesign requirements for energy-related products / Ökodesign – Richtlinie: 2009/125/EC + VO EU 1194/2012
Harmonised standards applied / Angewandte harmonisierte Normen :	EN 61010-1:2010 EN 61326-1:2013 EN 60825-1:2014 EN 62471:2008
Registration No. / Registriernummer	CE 140-01

.....
i.V. Steffen Laabs
Director RA/QA Life Science and Applied

Mannheim, 20.04.2020

28.3 People's Republic of China

- Administrative Measures on the Control of Pollution Caused by Electronic Information Products -

有害物质标记表

Hazardous Substance Marking Table

部件名称 Part Name	有害物质 Hazardous Substances					
	铅 (Pb)	汞 (Hg)	镉 (Cd)	六价铬 (Cr(VI))	多溴联苯 （PBB）	多溴二苯醚 （PBDE）
印刷电路板 Printed circuit boards	×	○	○	○	○	○
电子元器件 Electronic components	×	○	○	○	○	○
机械部件 Mechanical parts	×	○	○	○	○	○
电缆和电缆配件 Cables and cable accessories	×	○	○	○	○	○
显示屏 Displays	×	○	○	○	○	○
光源 Light sources	×	×	○	○	○	○
光学 Optics	×	○	○	○	○	○

这些表是按照 SJ/T 11364 的规定编制。
This table is prepared in accordance with the provisions of SJ/T 11364.

○：表示该有害物质在该部件所有均质材料中的含量均在 GB/T 26572 规定的限量要求以下。
Indicates that said hazardous substance contained in all of the homogeneous materials for this part is below the limit requirement of GB/T 26572.
×：表示该有害物质至少在该部件的某一均值材料中的含量超出 GB/T 26572 规定的限量要求。
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

有害物质标记表涵盖了这里列出的产品。

The “Hazardous Substance Marking Table” covers the here listed products.

显微镜	控制	光源	光学和照相机	电源和服务模块
Microscopes	Controls	Light Sources	Optics and Cameras	Power Supply and Service Modules

Note: The actual product may or may not include all the part types listed above.

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https://www.leica-microsystems.com

User Manual STELLARIS 5, STELLARIS 8
Article number: 158200002| V: 02 | 17. September 2021