



Leica DMS1000 User Manual

Contents

General Notes

General Notes	5
Important Safety Notes	6
Symbols Used	7
Safety Instructions	8

Introduction

Congratulations!	11
Standard Delivery and Optional Accessories	12
System Overview	13
Overview of the Instrument	14
Effective Displayed Section	15

Assembly

Leica DMS1000 with Incident Light Base	17
Incident Light Base and Focusing Column	17
Microscope Carrier and Leica DMS1000	18
Leica DMS1000 with Transmitted Light Base	19
Transmitted Light Base and Focusing Column	19
Microscope Carrier and Leica DMS1000	20
Leica DMS1000 with Swing-arm Stand	21
Baseplate and Vertical Column	21
Safety Ring and Horizontal Arm	22
Microscope Carrier and Leica DMS1000	23

Objective and Illumination	24
Standard Objective	24
Objective with Telecentric Optics	25
Illumination: Leica LED3000 RL	27
Illumination: Leica LED3000 NVI™	29
Illumination: Leica LED5000 SLI, Leica LED3000 SLI	30

Installation

HD Mode (Standalone)	33
Cables and Terminals, Activating HD Mode (Standalone)	33
PC Mode	34
Connecting a Computer, Installing Software, Activating PC Mode	34
Limitations in PC Mode	35

Startup Procedure

Leica DMS1000	37
Switching on the Leica DMS1000	37
Switching on the Illumination	38
Focusing, Adjusting the Resistance of the Focus Drive	39
Changing Magnification, Click-stop Feature	40
Remote control	41
"Pairing" the Leica DMS1000 with a Remote Control	43
Configuring the Front Button or Footswitch	44

Contents (Continued)

Operation

Operation in HD Mode (Standalone)	47
Checking Cables and Terminals	47
Switching on the Leica DMS1000	48
Information about SD Memory Cards	49
Capturing Images without a Computer	50
Displaying Images and Videos without a Computer	51
White Balance	52
PC Mode	53
Checking Cables, Terminals and Software	53
Switching on the Leica DMS1000	54
Additional Use of an HD Monitor in PC Mode	55

User Menu

Calling up the User Menu	57
Automatic white balance	58
Manual white balance	59
Exposure	60
Resolution	61
Camera Settings	63
User-defined Settings	65
Setting the overlay (SETUP OVERLAY)	67
Scalable Display	69
Configuring Predefined Illumination Scenarios	70

Service

Care, Maintenance, Contact Persons	72
Spare parts	75

Specifications

Technical Data	77
Optical Data - Field of View	81
Optical Data - Magnification and Depth of Field	82
Dimensional Drawings	84
Leica DMS1000	84
Leica DMS1000 with Incident Light Base	85
Leica DMS1000 with Incident Light Base	86
Leica DMS1000 with Transmitted Light Base	87
Leica DMS1000 with Swing-arm Stand	88

General Notes

General Notes

Safety concept

Before using your Leica microscope for the first time, please read the "Safety Concept" brochure included with your instrument. It contains additional information on handling and care.



Use in clean rooms

The Leica DMS1000 digital microscope system can be used in clean rooms without any problems.

Cleaning

- Do not use any unsuitable cleaning agents, chemicals or techniques for cleaning.
- Never use chemicals to clean colored surfaces or accessories with rubberized parts. This could damage the surfaces, and specimens could be contaminated by abraded particles.
- In most cases, we can provide special solutions on request. Some products can be modified, and we can offer other accessories for use in clean rooms.

Servicing

- Repairs may only be carried out by Leica Microsystems-trained service technicians. Only original Leica Microsystems spare parts may be used.

Responsibilities of person in charge of instrument

- Ensure that the Leica microscope is operated, maintained and repaired by authorized and trained personnel only.

Important Safety Notes

User Manual

The Leica DMS1000 can be configured in a variety of ways in the Leica product range. You can find information on individual system components on the interactive CD-ROM together with all relevant user manuals in additional languages. Keep this CD-ROM in a safe place, where it is available to the user. User manuals and updates are also available for you to download and print from our website www.leica-microsystems.com

This operating manual describes the special functions of the Leica DMS1000 digital microscope system and contains important instructions for its operational safety, maintenance, and accessories.

The "Safety Concept" booklet contains additional safety information regarding the service work, requirements and the handling of the microscope, accessories and electrical accessories as well as general safety instructions.

You can combine individual system articles with articles from external suppliers (e.g. cold light sources, etc.). Please read the User Manual and the safety instructions from the supplier.

Before installing, operating or using the instruments, read the user manuals listed above. In particular, please follow all safety instructions.

To maintain the unit in its original condition and to ensure safe operation, the user must follow the instructions and warnings contained in these user manuals.

Symbols Used

Warning! Safety hazard!



This symbol indicates especially important information that is mandatory to read and observe.

Failure to comply can cause the following:

- Hazards to personnel
- Functional disturbances or damaged instruments

Warning of hazardous electrical voltage



This symbol indicates information that must be read and observed.

Failure to comply can cause the following:

- Hazards to personnel
- Functional disturbances or damaged instruments

Danger due to hot surface.



This symbol warns against touching hot surfaces, e.g. those of light bulbs.

Important information



This symbol indicates additional information or explanations that are intended to provide clarity.

Safety Instructions

Description

- The individual modules fulfill the highest requirements for observation and documentation with the Leica DMS1000 digital microscope system.

Intended Use

- Refer to "Safety Concept" booklet

Non-intended use

- Refer to "Safety Concept" booklet

Never use the Leica DMS1000 or its components for surgical procedures (such as eye surgery) since it is not intended for such use.

The instruments and accessories described in this User Manual have been tested for safety and potential hazards. The responsible Leica affiliate must be consulted whenever the instrument is

altered, modified or used in conjunction with non-Leica components that are outside of the scope of this manual!

Unauthorized alterations to the instrument or noncompliant use shall void all rights to any warranty claims.

Place of use

- Refer to "Safety Concept" booklet
- Electrical components must be placed at least 10 cm away from the wall and from flammable substances.
- Avoid large temperature fluctuations, direct sunlight and vibrations. These conditions can distort measurements and micro-graphic images.

- In warm and warm-damp climatic zones, the individual components require special care in order to prevent the build-up of fungus.

Responsibilities of person in charge of instrument

- Refer to "Safety Concept" booklet

Ensure that:

- The Leica DMS1000 digital microscope system and accessories are operated, maintained and repaired by authorized and trained personnel only.
- All operators have read, understood and observe this User Manual, and particularly the safety regulations.

Safety Instructions (continued)

Repairs, service work

- Refer to "Safety Concept" booklet
- Only original Leica Microsystems spare parts may be used.
- Before opening the instruments, switch off the power and unplug the power cable.
- Avoid contact with powered electrical circuits, which can lead to injury.

Transport

- Use the original packaging for shipping or transporting the individual modules of the Leica DMS1000 digital microscope system and the accessory components.
- In order to prevent damage from vibrations, disassemble all moving parts that (according to the user manual) can be assembled and disassembled by the customer and pack them separately.

Integration in third-party products

- Refer to "Safety Concept" booklet

Disposal

- Refer to "Safety Concept" booklet

Legal regulations

- Refer to "Safety Concept" booklet

EC Declaration of Conformity

- Refer to "Safety Concept" booklet

Health risks

Workplaces with microscopes facilitate and improve the viewing task, but they also impose high demands on the eyes and holding muscles of the user. Depending on the duration of uninterrupted work, asthenopia and musculoskeletal problems may occur. For this reason, appropriate measures for reduction of the workload must be taken:

- Optimal arrangement of workplace, work assignments and work flow (changing tasks frequently).
- Thorough training of the personnel, giving consideration to ergonomic and organizational aspects.

The ergonomic optics concept and the design of the Leica DMS1000 digital microscope system aim to limit the strain on the user to the lowest possible level.



Introduction

Congratulations!

Congratulations on purchasing the Leica DMS1000 digital microscope system by Leica Microsystems. The special design of the Leica DMS1000 makes it a universal, highly versatile tool for viewing microscopic specimens and capturing still images or even video.

Real Full HD display

The integrated HDMI output allows the microscope image to be output to a high-definition (HD-capable) monitor, where the following resolutions are possible:

- 1920×1080 (Full HD). This resolution provides the best possible imaging performance on a Full HD-capable monitor.
- 1280×720 (HD ready). This resolution is suitable for display on monitors labeled "HD ready" or on smaller screens with a 10" or 12" diagonal.

Leica Application Suite

Your Leica DMS1000 digital microscope system includes the "Leica Application Suite" (LAS) software. It allows additional scenarios to be implemented in which an HD monitor and computer monitor can even be used together. This means you will be perfectly equipped for any situation, including: Working on a computer, during presentations, training sessions, trade show appearances, during materials testing and more.

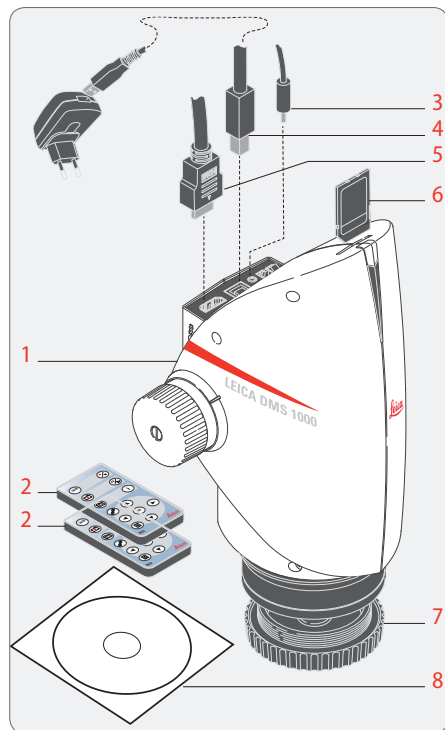
There are countless (optionally available) LAS modules to choose from if you want to perform demanding image analyses.

User-friendly even in the smallest detail

Like every digital camera, the Leica DMS1000's integrated camera reacts differently to different light sources. However, the white balance is matched to LED illuminators from Leica at the factory. This means that if you use a Leica LED illuminator, you automatically obtain the best results!

Standard Delivery and Optional Accessories

Standard delivery



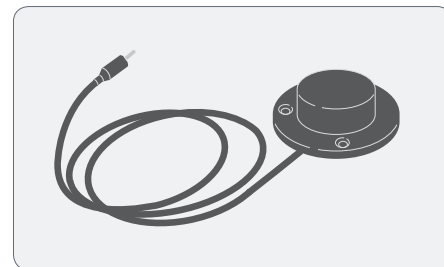
The Leica DMS1000 digital microscope system's standard delivery includes:

- 1 *Leica DMS1000 digital microscope system, without objective*
- 2 *2 remote control units, with battery*
- 3 *Connection for optional footswitch*
- 4 *USB cable, for connecting to a computer or to a power supply unit for supplying power*
- 5 *HDMI cable, for connecting to an HD monitor*
- 6 *SD memory card*
- 7 *Protective cover*
- 8 *"Leica Application Suite (LAS)" software DVD*



Additional information about working on the computer and with Leica Application Suite is provided in the software's online help.

Optional accessories: Handswitch/footswitch



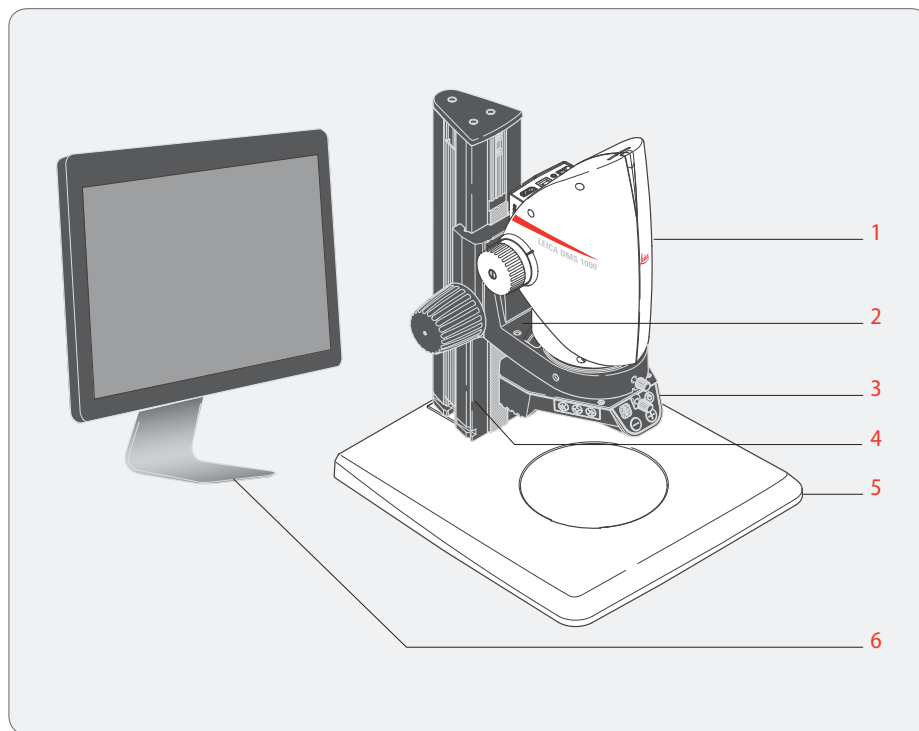
Various functions can be assigned to the optional handswitch/footswitch (12 730 229) (such as taking individual pictures, white balance).

For information on additional accessories, such as objectives and adapters, illumination or the dust cover for the microscope, please contact your Leica Microsystems authorized dealer.



You can find detailed descriptions of different accessories in their corresponding user manual.

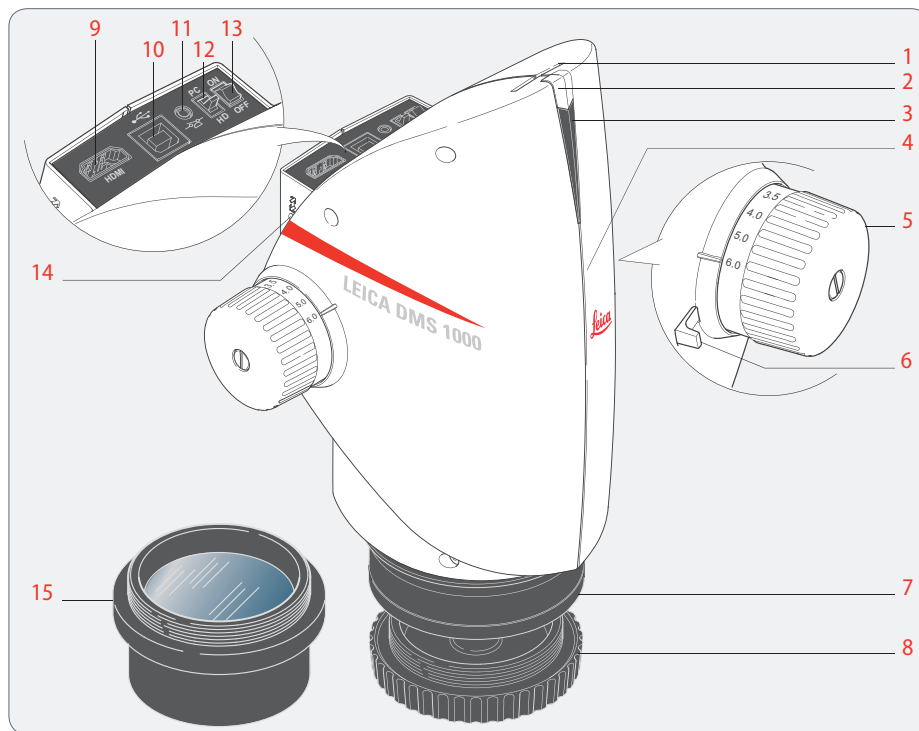
System Overview



This overview shows the Leica DMS1000 in an example application with additional components.

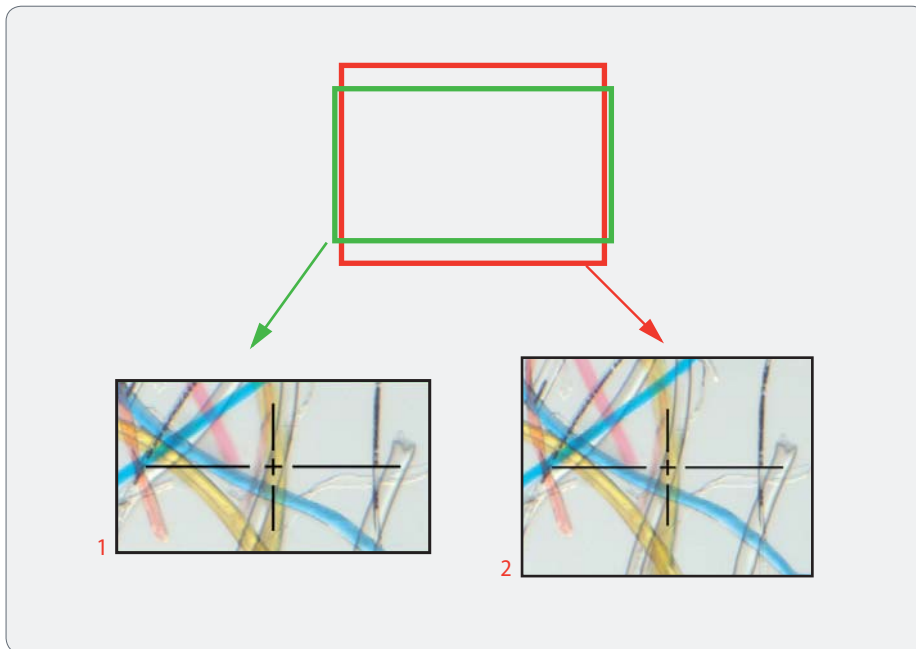
- 1 *Leica DMS1000*
- 2 *Microscope carrier*
- 3 *Illumination*
- 4 *Focusing column*
- 5 *Baseplate*
- 6 *HD monitor or computer with LAS software*

Overview of the Instrument



- 1 Card holder for SD card
- 2 Programmable front button
- 3 Status light
- 4 IR receiver, for remote control
- 5 Zoom knob
- 6 Click-stop slider
- 7 Leica DMS1000 mounting fixture in the microscope carrier
- 8 Protective cover
- 9 HDMI connection
- 10 USB connection
- 11 Connection for footswitch
- 12 Mode switch, for PC or HD mode
- 13 On/off switch
- 14 Reset button
- 15 Objective (not included in the delivery package)

Effective Displayed Section



The live image on the HD screen and the final captured image may not show the same section depending on the sensor size in the microscope.

- 1 Live image in 16:9 format, displayed on the HD monitor
- 2 Captured image in 4:3 format, displayed on the computer or saved to an SD card.

Assembly

Leica DMS1000 with Incident Light Base

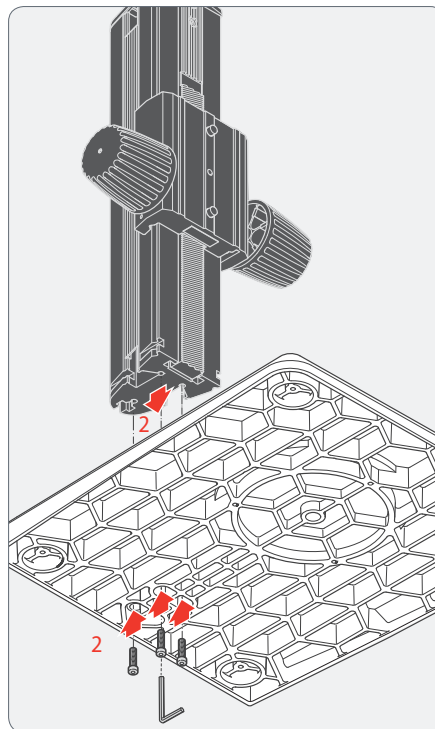
Incident Light Base and Focusing Column

General Notes



This chapter shows an example of assembly of the Leica DMS1000 on an incident light base. Images and descriptions may vary when using another incident light base.

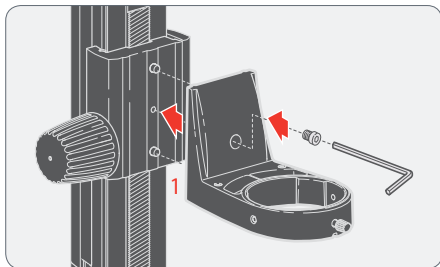
Assembling the column



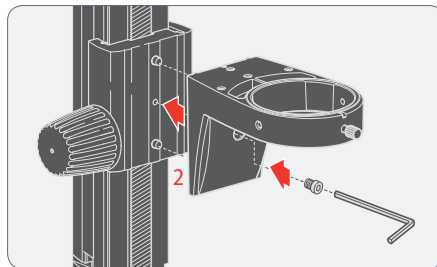
1. Take the three provided screws out of the packaging.
2. Install the incident light base on the column using the three screws.

Microscope Carrier and Leica DMS1000

Assembling the microscope carrier

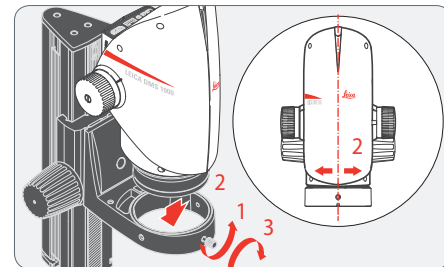


1. Fasten the microscope carrier to the column using the provided Allen key and the provided screw (recommended variant for objectives with a small working distance).



2. Alternatively, the microscope carrier can also be installed upside-down (recommended variant for objectives with a large working distance).

Assembling the Leica DMS1000



1. Unscrew the clamping screw.
2. Place the Leica DMS1000 in the microscope carrier so that the notch in the microscope housing and the lower clamping screw overlap.
3. Fasten the microscope in place using the clamping screw.

Leica DMS1000 with Transmitted Light Base

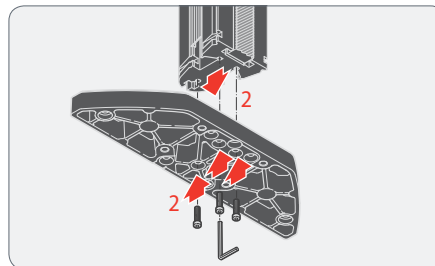
Transmitted Light Base and Focusing Column

General Notes



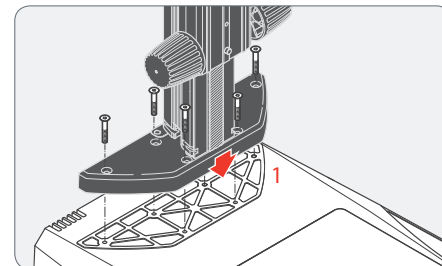
This chapter shows an example of assembly of the Leica DMS1000 on a transmitted light base. Images and descriptions may vary when using another transmitted light base.

Installing the column adapter



1. Take the three provided screws out of the packaging.
2. Install the column adapter on the column using the three screws.

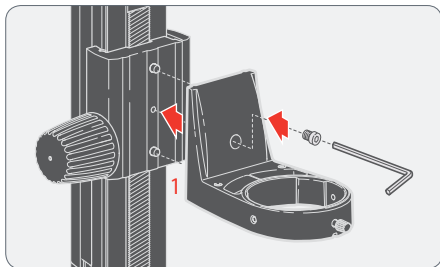
Assembling the column



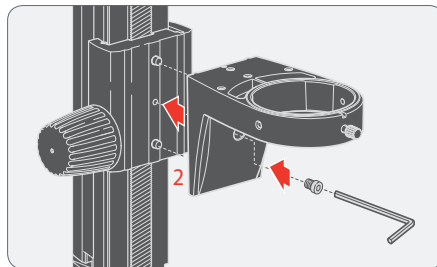
1. Install the column adapter and column to the transmitted light base using the six screws provided.

Microscope Carrier and Leica DMS1000

Assembling the microscope carrier

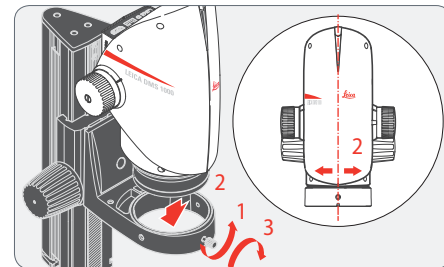


1. Fasten the microscope carrier to the column using the provided Allen key and the screw provided (recommended variant for objectives with a short working distance).



2. Alternatively, the microscope carrier can also be installed upside-down (recommended variant for objectives with a large working distance).

Assembling the Leica DMS1000



1. Unscrew the clamping screw.
2. Place the Leica DMS1000 in the microscope carrier so that the notch in the microscope housing and the lower clamping screw overlap.
3. Fasten the microscope in place using the clamping screw.

Leica DMS1000 with Swing-arm Stand

Baseplate and Vertical Column

Instructions for safe assembly



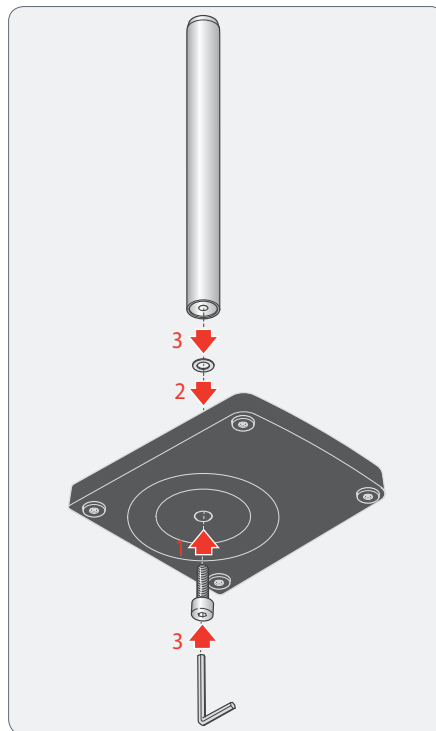
Due to the heavy weight of the baseplate, improper use can cause injuries or damage to the surrounding area. For safety reasons, use two people for this part of the setup.

General Notes



This chapter shows an example of assembly of the Leica DMS1000 on a swing-arm stand. Images and descriptions may vary when using another swing-arm stand.

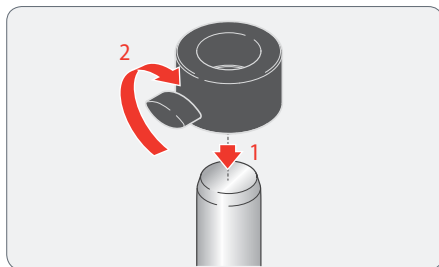
Assembling the column




1. Push the tapping screw through the baseplate from below.
2. Fit the serrated lock washer onto the screw.
3. Install the vertical column on the base plate using the screw.

Safety Ring and Horizontal Arm

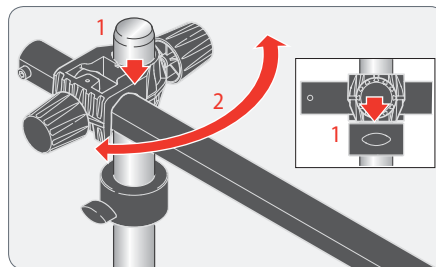
Installing the safety ring




1. Push the safety ring over the column.
2. Securely tighten the clamping screw.

 The safety ring is the most important safety element of the entire configuration. It protects the horizontal arm against falling down accidentally.

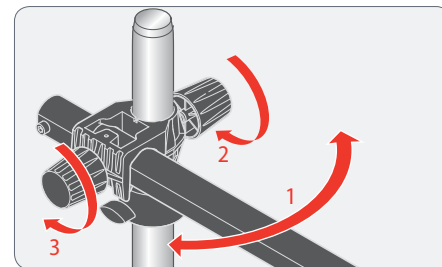
Mounting the horizontal arm



1. Push the cross-member with the horizontal arm over the column so that the cross-member lies securely on the safety ring.
2. You can now rotate the horizontal arm in any direction desired.

 The swing-arm stand is designed so that the Leica DMS1000 can be moved as desired. However, it may also be logical in some instances to fasten the microscope in place.

Fastening the horizontal arm



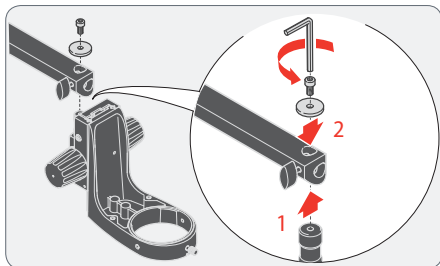
1. Rotate the horizontal arm into a secure position.
2. Carefully tighten the clamping screw on the cross-member to prevent the joint on the column from rotating.
3. Tighten the clamping screw to prevent the arm from extending.



For safety reasons, you should fasten the horizontal arm in place when you leave your workstation.

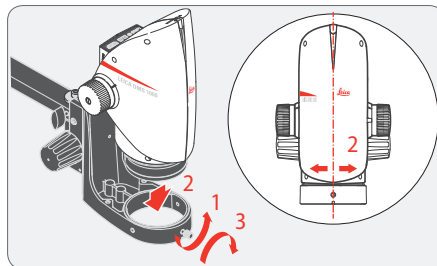
Microscope Carrier and Leica DMS1000

Assembling the microscope carrier



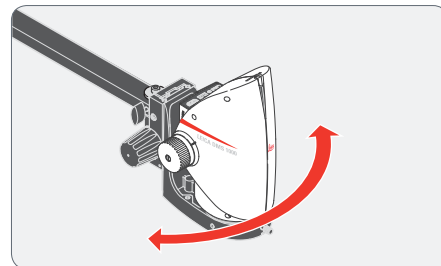
1. Insert the connecting pin from below into the bore of the horizontal arm.
2. Fasten the microscope carrier in place using the washer and safety screw.

Assembling the Leica DMS1000



1. Unscrew the clamping screw.
2. Place the Leica DMS1000 in the microscope carrier so that the notch in the microscope housing and the lower clamping screw overlap.
3. Fasten the microscope in place using the clamping screw.

Free movement of the microscope



The microscope can be rotated freely together with the microscope carrier.

Objective and Illumination

Standard Objective

Instructions for safe assembly

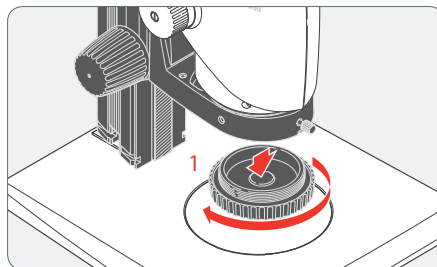


Hold the objective firmly during assembly and disassembly so that it does not fall onto the stage plate. Remove all specimens from the stage plate first.

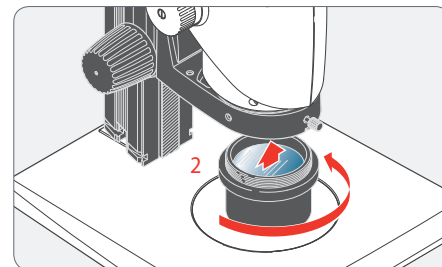


The objective is not part of the standard delivery of the Leica DMS1000.

Assembly



1. Remove the protective cap on the optics carrier by turning it.



2. Screw the objective into the optics carrier.

Objective with Telecentric Optics

Instructions for safe assembly



Hold the objective firmly during assembly and disassembly so that it does not fall onto the stage plate. Remove all specimens from the stage plate first.



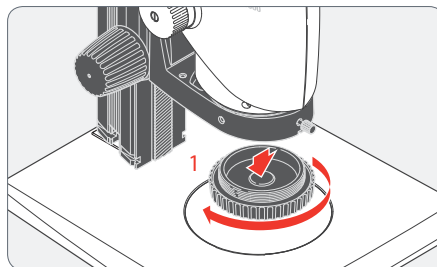
The objective is not part of the standard delivery of the Leica DMS1000.

Notes on telecentric optics

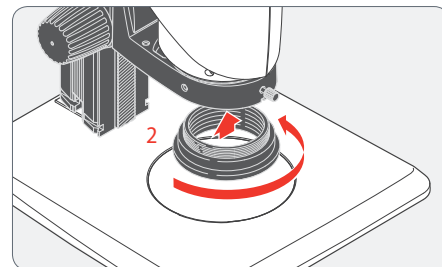


The Leica DMS1000 can be used for special measuring requirements when using an objective with telecentric optics. This is made possible by using a special objective and compatible adapter combination.

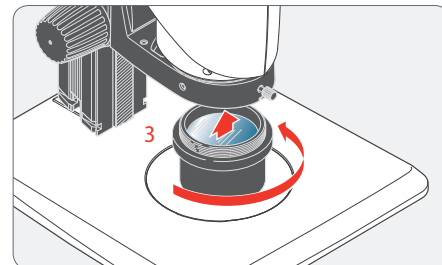
Assembly



1. Remove the protective cap on the optics carrier by turning it.



2. Screw the compatible adapter onto the optics carrier.



3. Screw the objective onto the adapter.

Objective with Telecentric Optics (continued)

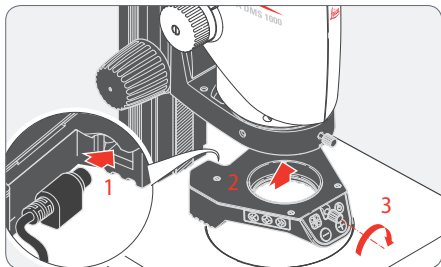
Overview of objectives and adapters

The following table shows which combinations of objective and compatible adapter are provided by telecentric optics.

Objective	Leica article number	Compatible adapter
0.5× planapochromatic Z-series	10 447 177	10 450 650
0.8× planapochromatic Z-series	10 446 360	10 450 651
1.0× planapochromatic Z-series	10 447 176	10 450 651

Illumination: Leica LED3000 RL

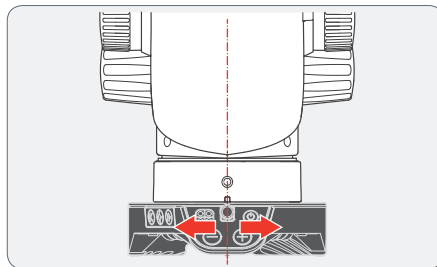
Installing the Leica LED3000 RL




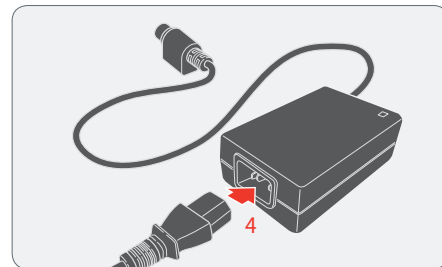
1. Connect the external power supply unit (10 450 266) to the Leica LED3000 RL.
2. Attach the Leica LED3000 RL to the objective from below.
3. Tighten the locking screw.



The supported working distance is between 60 mm and 150 mm.



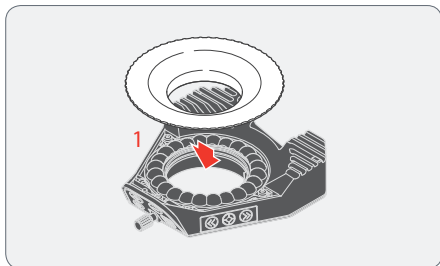
 Ensure that the locking screw of the illuminator and the locking screw of the optics carrier are on a straight line.



4. Connect the power supply to the power cable.

Illumination: Leica LED3000 RL (continued)

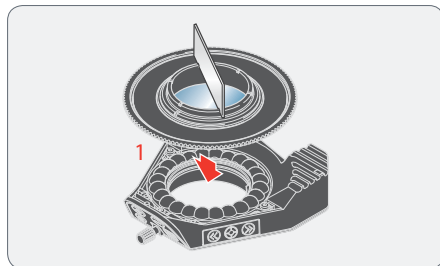
Installing optional accessories



1. The optional diffuser is attached and screwed in below the ring illuminator.



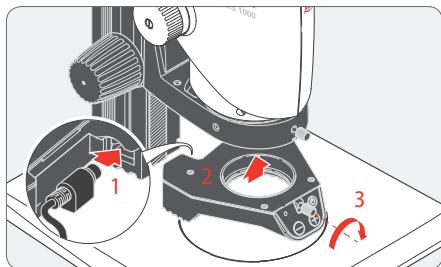
We recommend assembling the accessories on the Leica LED3000 RL on a table in reverse and then mounting them on the objective together.



1. The optional polarization set (polarizer and analyzer) is attached and screwed in below the ring illuminator. The provided small metal plate is used as a fastening aid in the process.

Illumination: Leica LED3000 NVI™

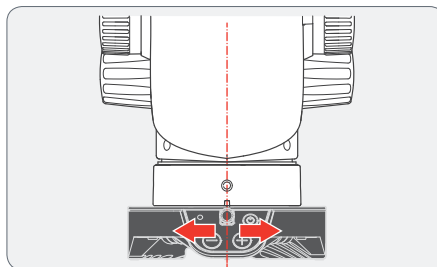
Installing the Leica LED3000 NVI™



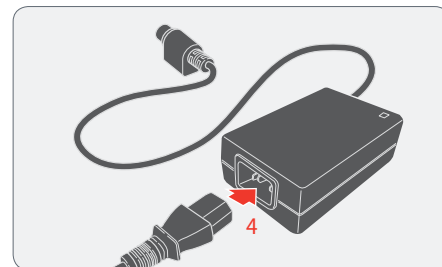
1. Connect the external power supply unit (10 450 266) to the Leica LED3000 NVI™.
2. Attach the Leica LED3000 NVI™ to the objective from below.
3. Tighten the locking screw.



The supported working distance is between 60 mm and 150 mm.



Ensure that the locking screw of the illuminator and the locking screw of the optics carrier are on a straight line, as otherwise image shading may occur.



4. Connect the power supply to the power cable.

Illumination: Leica LED5000 SLI, Leica LED3000 SLI

Assembly

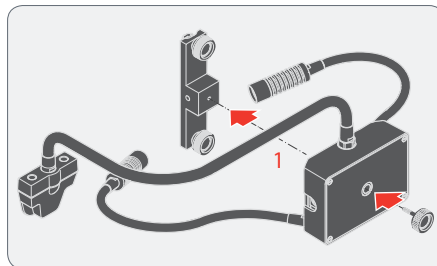


The spot illuminator is installed on the focusing column using an adapter.

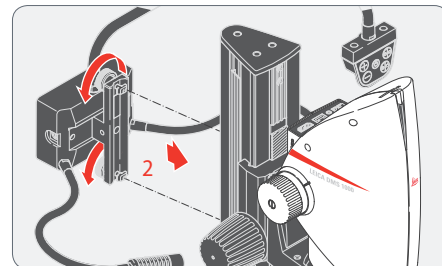


The Leica LED5000 SLI and its longer goosenecks should be avoided for installation on a large incident light base (10 450 049) or a transmitted light base. Leica Microsystems recommends the LED3000 SLI for installation on a small or medium incident light base (10 446 340 / 10 447 342).

Installation on routine focusing columns



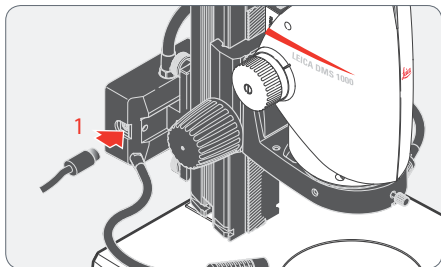
1. Screw the spot illuminator to the adapter 10 450 570.



2. Install the adapter to the rear side of the focusing column. In doing so, the height can be adapted to your requirements.

Illumination: Leica LED5000 SLI, Leica LED3000 SLI (continued)

Power supply via external power supply unit



1. Connect the external power supply unit (10 450 266) to the Leica LED5000 SLI or LED3000 SLI. The right and left side of the spot illuminator both have a socket.

Second CTL2 socket



An additional Leica LED illuminator (RL or NVI) can be connected to the spot illuminator's second CTL2 socket.

Installation

HD Mode (Standalone)

Cables and Terminals, Activating HD Mode (Standalone)

General Notes

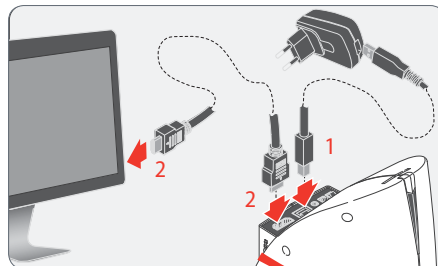


The Leica DMS1000 is designed for the use of HD-capable (high definition) monitors. We highly recommend connecting the HD monitor using an HDMI connector and not using a DVI adapter, as otherwise proper function can no longer be guaranteed!



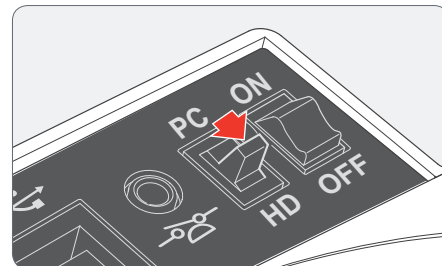
Please only connect the provided 5V power supply unit. Using an incorrect voltage can substantially damage the Leica DMS1000.

Power supply and HD monitor



1. Connect the Leica DMS1000 to a suitable power socket using the USB cable and power supply.
2. Connect the Leica DMS1000 to the HD monitor using the HDMI cable.

Activating HD mode (standalone)



1. Set the mode switch to "HD" in order to set the Leica DMS1000 to HD mode (standalone).



An SD card with sufficient free memory must be inserted into the Leica DMS1000 in order to save images in HD mode (standalone).




In order to avoid instrument malfunctions, do not connect the Leica DMS1000 to a computer while in HD mode (standalone).

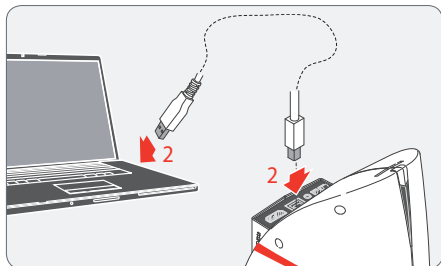
PC Mode

Connecting a Computer, Installing Software, Activating PC Mode


Installation and connection

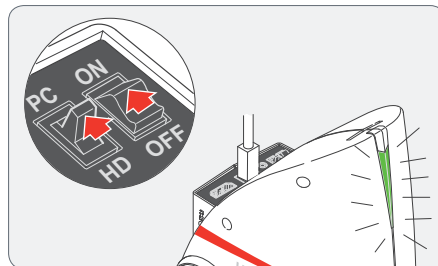
 For instructions on installing and using the software for PC mode, refer to the DVD provided with the Leica DMS1000.

1. Place the DVD provided into the computer's disk drive and follow the instructions for installing the software.



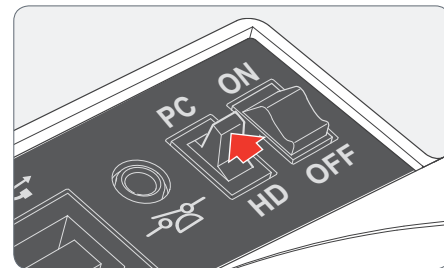
2. Connect the Leica DMS1000 to the computer using the USB cable.

 The Leica DMS1000 is powered by the computer via the USB cable. This changes the color of the status light. The status light is red when switching on the Leica DMS1000; as soon as it is green, you can open the software and view, record or manage images.




3. Follow the instructions in the software for adjusting and recording an image.

Activating PC mode

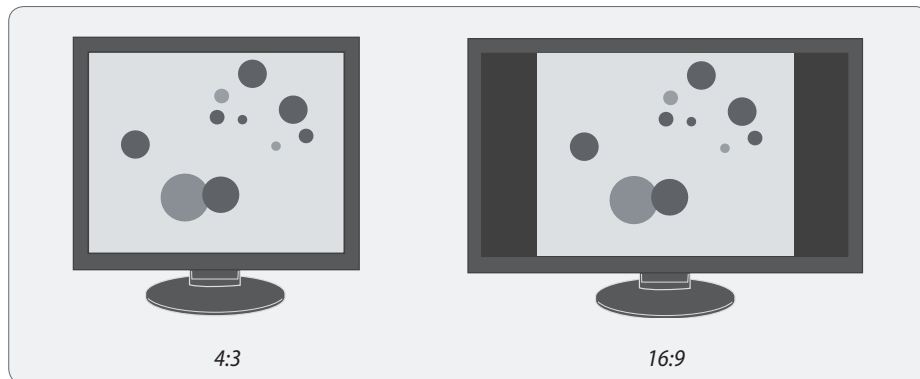



1. Set the mode switch to "PC" in order to set the Leica DMS1000 to PC mode.

 Leica Application Suite has to be installed on the computer in order to use the Leica DMS1000 in PC mode. The computer also has to have sufficient free hard drive space.



Limitations in PC Mode


Aspect ratio



 Images are always output in a 4:3 aspect ratio when the Leica DMS1000 is connected to a computer – even if a 16:9 monitor is connected via HDMI. However, the image is displayed correctly on these kinds of devices, just with black screen edges.

Operation

 The Leica DMS1000 is controlled entirely via the computer in PC mode. The front button, the remote control and the footswitch do not work. The menus for the camera are also not displayed on the HD monitor. Status information can be retrieved at any time despite this by using  on the remote control.

 Images cannot be saved onto the SD card in PC mode.

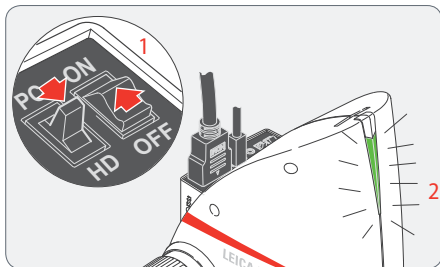



Startup Procedure

Leica DMS1000

Switching on the Leica DMS1000

HD Mode (Standalone)



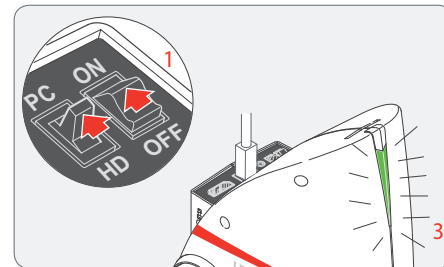
 Ensure that the optional objective is screwed onto the microscope, the mode switch is set to "HD" and the HD monitor is switched on.


1. Set the on/off switch to "ON" to switch on the Leica DMS1000.
2. The status light's LED switches from red to green, a signal tone sounds and the live image is displayed on the HD monitor - the Leica DMS1000 is ready to use.

 If the Leica DMS1000 is connected to a computer in HD mode (standalone):

- The remote control does not respond.
- A live image with a 4:3 aspect ratio is displayed on the HD monitor (with black bars on the right and left).
- The menu does not appear.
- The message "No camera" appears when starting the LAS software.

PC Mode



 Ensure that the optional objective is screwed onto the microscope, the mode switch is set to "PC" and the computer monitor is switched on.

1. Set the on/off switch to "ON" to switch on the Leica DMS1000.
2. Start Leica Application Suite.
3. The status light's LED switches from red to green, a signal tone sounds and the live image is displayed on the computer - the Leica DMS1000 is ready to use.

Switching on the Illumination

General Notes



The light from the Leica LED illuminator can be very bright. Avoid looking directly into the LEDs.

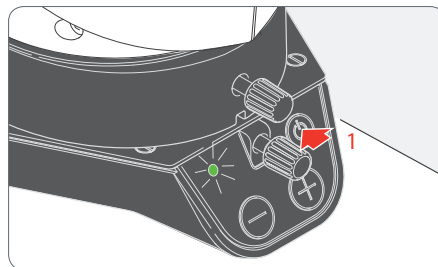



The intensity of the illuminator can be adjusted in 10 increments.

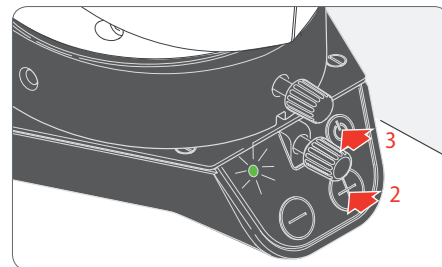





When pressing the buttons, hold the keypad between your thumb and index finger. Avoid tapping the keypad with just one finger if possible.

Use



1. Switch on the illuminator by briefly pressing the  (ON/OFF) button. The green LED on the upper left corner now lights up.



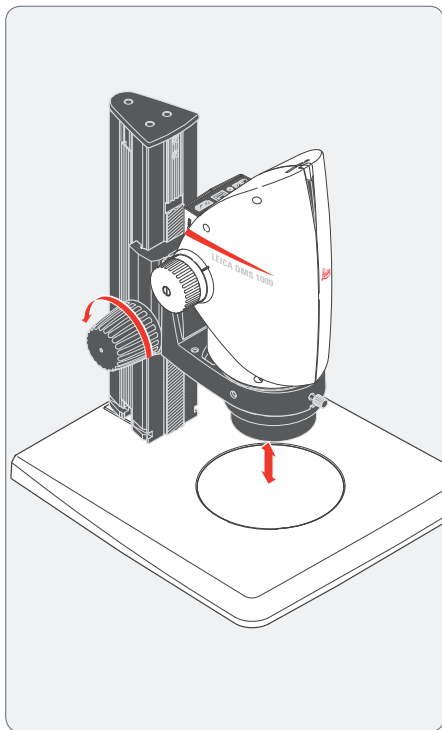
2. Adjust the brightness by briefly pressing the  or  buttons.
3. Switch off the illuminator by briefly pressing the  button.



The Leica LED3000 RL, LED3000 NVI™, LED5000 SLI and LED3000 SLI are operated very similarly.

Focusing, Adjusting the Resistance of the Focus Drive

Focusing

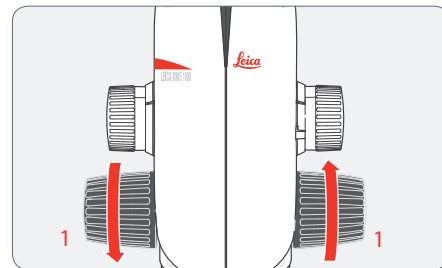


Focusing raises or lowers the microscope using the focusing drive. The specimen detail is brought into sharp focus as soon as it is in the focal point of the objective.

- The focusing drive can be operated either left- or right-handed.

Adjusting the resistance

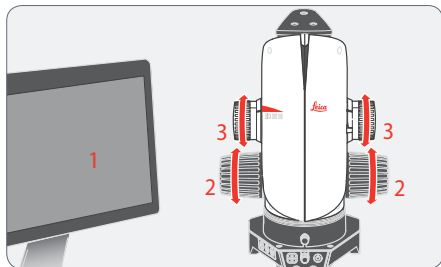
Is the focusing drive too loose or too tight? Does the equipment tend to slide downwards? The resistance can be adjusted individually depending on the equipment weight and personal preferences as follows:




1. Grip the drive knobs with both hands and turn them towards each other until the desired resistance is reached during focusing. On focusing columns with separate coarse and fine adjustment, the outer drive knobs have to be twisted in opposite directions relative to each other.


Changing Magnification, Click-stop Feature


Changing the magnification (zoom)



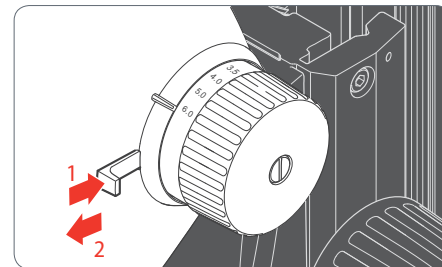
1. Look at the HD monitor.
2. Focus on the specimen.
3. Rotate the magnification changer until the desired magnification is configured or it has to be refocused.

 The rotary knob for the zoom can be used either left or right-handed.

 The magnification changer can optionally be operated either with or without click stops enabled. Continuous zoom is possible when the click stops are disabled, which many users find convenient. On the other hand, when the click stops are enabled, photographs, measurement results etc. can be reproduced more accurately.

 Parfocality: The Leica DMS1000 is parfocally matched. If the specimen is in focus at the highest magnification level, this remains true across the entire magnification range.

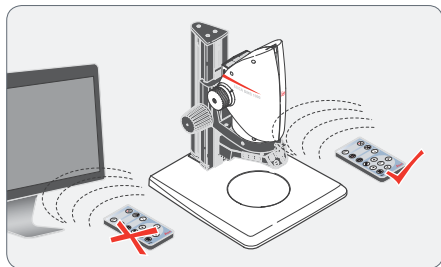
Enabling and disabling click stops



1. Push the button towards the knob to enable the click stops.
2. Push the button away from the knob to disable the click stops.

Remote control

General Notes



Always keep the remote control for controlling the Leica DMS1000 pointed towards the microscope's IR receiver.

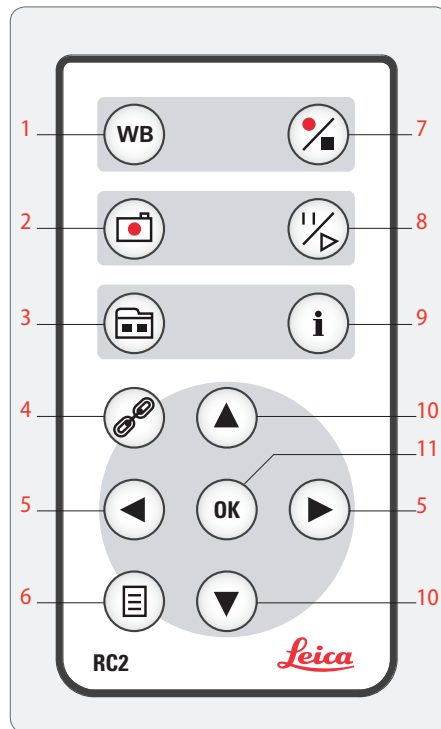


The remote control does not respond if the microscope is connected to a computer.



Instead of the remote control, the front button or the optional footswitch (depending on the configuration) can be used to trigger the Leica DMS1000.

Description

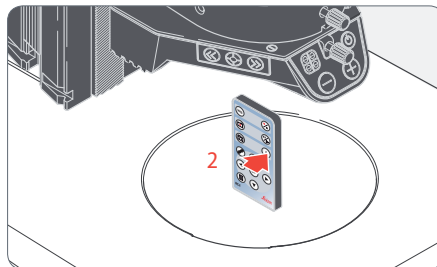


1. Perform automatic white balance
2. Save still image to SD card
3. Show/hide gallery, retrieve data from SD card
4. Pairing (microscope - remote control)
5. Left/right button, select illumination mode
6. Show/hide user menu
7. Start/stop video recording
8. Stop/continue live image
9. Show/hide information box
10. Up/down button, select overlay
11. OK/confirm

Remote Control (continued)

Checking the battery

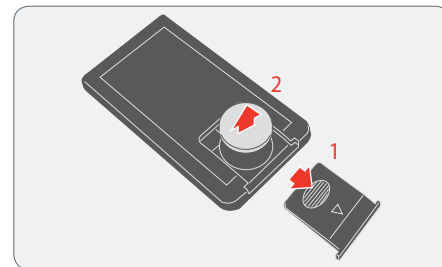
1. Switch on the microscope and HD monitor so that you see the live image on the HD monitor.



2. Hold the remote control in the beam path so that it faces upwards and press any key.

Because the microscope's chip also responds to the infrared range, you can see how the LED on top of the remote control lights up on the HD monitor. If this is not the case, the battery needs to be changed.

Changing the Battery



1. Remove the battery cover on the rear side of the remote control.
2. Replace the battery and close the battery cover.




For the replacement, you need a button battery of type CR2025.

"Pairing" the Leica DMS1000 with a Remote Control

Pairing



The Leica DMS1000 and the remote control can be paired and then only respond to each other. This can be helpful when using multiple microscopes and remote controls.


1. Press the  button to start or end the process.





In order to achieve successful pairing and avoid pairing by mistake, the 3rd step must be performed within four seconds.



If a "timeout" is displayed after 4 seconds, press the "Pair" button again to start the process.

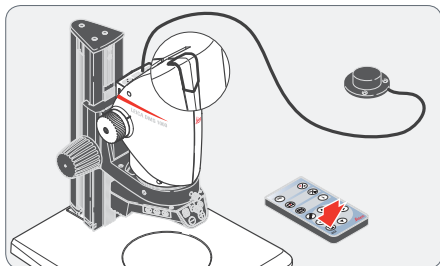
2. Select a button on the remote control that you want to define as the pair button. Only the  button cannot be used for this.
3. Press and hold your pair button until a corresponding confirmation is displayed on the HD monitor.
4. The microscope only responds to the remote control commands from this remote control.

Resetting to factory setting

1. Press the  button to start the process.
2. Press the  button until a corresponding confirmation is displayed on the HD monitor.

Configuring the Front Button or Footswitch

General Notes



Both the Leica DMS1000's front button and optional footswitch can be configured with the remote control as defined by the user.




The default setting is "CAPTURE" for capturing an image.



The Leica DMS1000's front button and optional footswitch do not work in PC mode.

Configuring

1. Point the remote control towards the Leica DMS1000.
2. Press the  button to show the user menu on the computer monitor.
3. Select "SETUP USER" in the main menu:



4. Select "FRONT BUTTON" for the front button or "FOOT SWITCH" for the footswitch:



Configuring the Front Button or Footswitch (continued)

5. The following configurations are possible by selecting the corresponding option:
 - NONE: No Function
 - CAPTURE: Capture an image and save it to the SD card.
 - SHOW LAST: Show a preview of the most recently acquired image.
 - MOVIE: Start video recording or stop a video recording that is in progress. Saved to the SD card as an MP4 file.
 - OVERLAY: Show crosshair or overlay. Pressing this button multiple times scrolls through the list of crosshairs or overlays.
 - WHITE BAL: Run white balance for color correcting the camera. For additional information on white balance, refer to page 52

Operation

Operation in HD Mode (Standalone)

Checking Cables and Terminals

General Notes

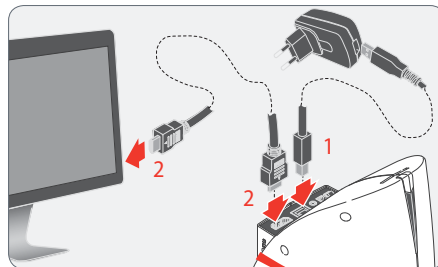


The Leica DMS1000 is designed for the use of HD-capable (high definition) monitors. We highly recommend connecting the HD monitor using an HDMI connector and not using a DVI adapter, as otherwise proper function can no longer be guaranteed!



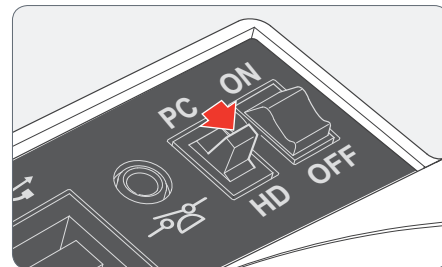
Please only connect the provided 5V power supply unit. Using an incorrect voltage can substantially damage the Leica DMS1000.

Power supply and HD monitor



1. Check that the Leica DMS1000 is properly supplied with power via the USB power supply.
2. Check whether the Leica DMS1000 is connected to the HD monitor properly via the HDMI cable.

HD Mode (Standalone)



1. Check whether the mode switch is set to "HD" (standalone).



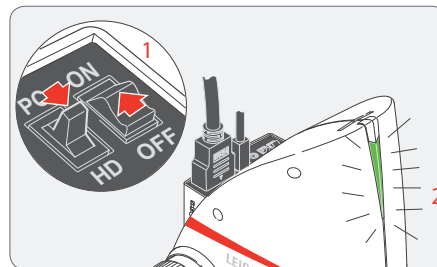
An SD card with sufficient free memory must be inserted into the Leica DMS1000 in order to be able to save images in HD mode (standalone).

Switching on the Leica DMS1000

Switching on the Leica DMS1000 (standalone)



Ensure that the optional objective is screwed onto the microscope, the mode switch is set to "HD" and the HD monitor is switched on.



1. Set the on/off switch to "ON" to switch on the Leica DMS1000.
2. The status light's LED switches from red to green, a signal tone sounds and the live image is displayed on the HD monitor - the Leica DMS1000 is ready to use.

Information about SD Memory Cards

General Notes



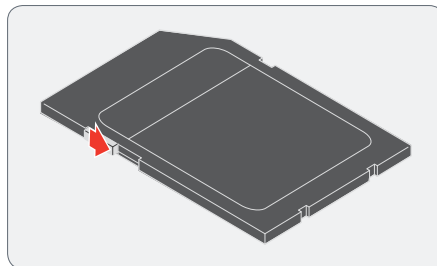
Be absolutely certain to read the following instructions about formatting and handling the memory card provided in order to prevent malfunctions during image acquisition.

File system and formatting

The FAT file system has to be used so that the SD card works correctly and is detected by the Leica DMS1000. Most memory cards are factory-formatted with FAT so that they can be used immediately.

An SD card cannot be formatted in the Leica DMS1000. If it is necessary to format the card, use a computer to do so. You can also delete the files on the card in any digital camera that works with SD cards. During the deletion, the FAT file system is installed automatically.

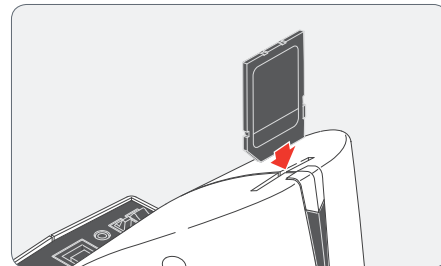
Write protection



Some SD memory cards are equipped with a slide for write protection. If the slide is pressed down, no new images can be saved. In addition, existing images are protected from being deleted.

If you cannot save any more images to the SD card, check to make certain that the write protection is disabled.

Orientation



Make sure that the memory card is oriented correctly before inserting it into the Leica DMS1000. Accidentally inserting the card the wrong way around could damage the microscope.

Capacity

Class 4 and 6 SD cards can be used with the Leica DMS1000. SDHC (high capacity) cards up to 32 GB are also supported.

Capturing Images without a Computer

General Notes



Before capturing the image, ensure that enough memory is available on the SD card and that write protection has not been activated. If the SD memory card is full or protected, the Leica DMS1000's status light stays red, and you cannot acquire any more images.



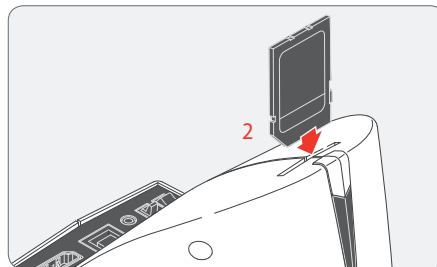
In order to avoid instrument malfunctions, do not connect the Leica DMS1000 to a computer while in HD mode (standalone).



In the highest resolution, a single image takes up approx. 1.3 megabytes of storage space on the SD card. This means that per gigabyte of capacity, you can save over 700 images.

Recording

1. Focus on the specimen.

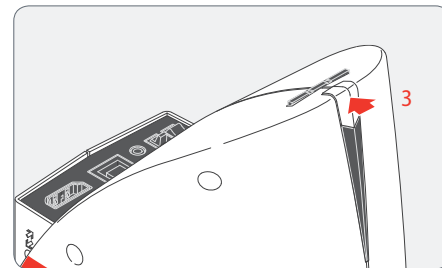


2. Push the SD memory card into the slot on top of the Leica DMS1000 until it clicks into place.

The Leica DMS1000's status light is illuminated in green. The microscope is now ready to save images to the SD memory card.



Depending on the configuration, the front button can be used for capturing an image. For additional information, refer to page 44



3. Briefly press the Leica DMS1000's front button to capture an image.

You hear a signal tone as confirmation. While the image is being acquired, the status light flashes green and the word "Capture..." flashes on the HD monitor.














4. In order to remove the SD card from the camera, press on the SD memory card in the memory slot so that it pops out.

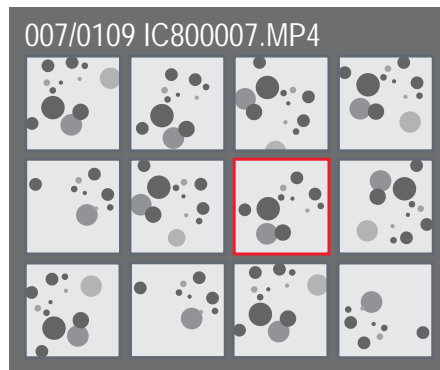
You can now transfer the images to your computer using an SD memory card reader.

Displaying Images and Videos without a Computer

 The Leica DMS1000 can display images and video clips directly on an HD monitor.

Control via remote control:

1.  : Show/hide thumbnail view.
2.   : Select thumbnail image (JPG or MP4).
3. For a JPG image:
 -  : Display image in full size and zoomed in 1x, 2x, 3x (when pressing repeatedly).
 -   : Next/previous image.
3. For an MP4 video clip:
 -  : Play video.
 -  : Stop/play video.
 -   : Rewind/fast forward video.
4. In order to return to the live image, press the , , or  button - if you are in a zoomed-in image, you may need to do this more than once.



Thumbnail view



Reproduction / full screen

White Balance

General Notes



The white balance ensures that the specimen is shown in neutral colors. We recommend carrying out a new white balance adjustment whenever you change the illumination type or color temperature. This is particularly necessary if you are working with halogen light that can be switched from yellow (low intensity) to blue (high intensity).



Configure the white balance via the user menu using the remote control. Depending on the configuration, automatic white balance can also be carried out using the front button or the footswitch.

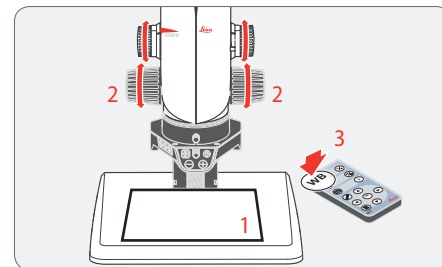



The white balance of the microscope is factory set to automatically provide optimum results when used in conjunction with a Leica LED illuminator.

Manual white balance

- Manual white balance is described on [page 59](#).

Automatic white balance




- Position a gray chart or a gray, neutral object under the microscope so that the entire image field is filled in.
- Adjust the illumination as desired.
- Press the  button on the remote control or - if configured accordingly - press and hold the front button or footswitch for 5 seconds. The microscope now carries out an automatic white balance adjustment.

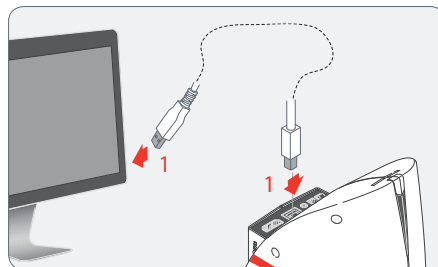
PC Mode

Checking Cables, Terminals and Software


Software

 Leica Application Suite has to be installed on the computer in order to use the Leica DMS1000 in PC mode. The computer also has to have sufficient free hard drive space.

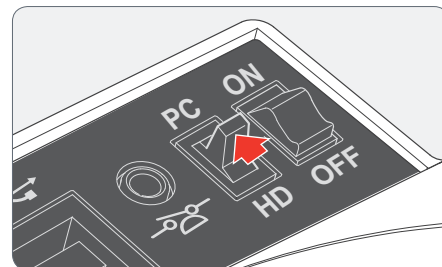
Leica DMS1000 and computer connection




1. Check whether the Leica DMS1000 and the computer have been connected properly via the USB cable provided.



 The Leica DMS1000 is powered by the computer over the USB cable.

PC Mode



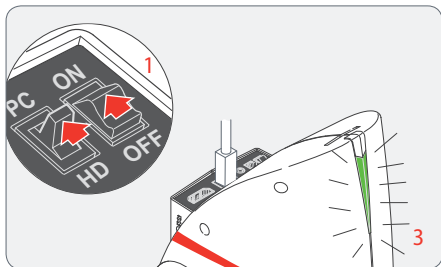
1. Check whether the mode switch is set to "PC".

 For possible limitations in PC mode, refer to page 35.

 The Leica DMS1000 is controlled entirely via the computer in PC mode. The front button, the remote control and the footswitch do not work. Status information can be retrieved at any time despite this by using  on the remote control.

Switching on the Leica DMS1000

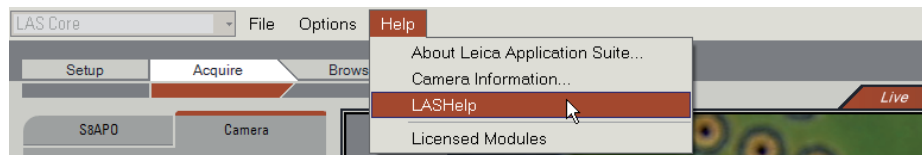
Switching on the Leica DMS1000 (PC mode)



1. Set the on/off switch to "ON" to switch on the Leica DMS1000.
2. Start Leica Application Suite.
- 3 The status light's LED switches from red to green, a signal tone sounds and the live image is displayed on the computer - the Leica DMS1000 is ready to use.
4. Follow the instructions in the software for adjusting and acquiring an image.





For additional information on Leica Application Suite, please refer to "LAS Help".



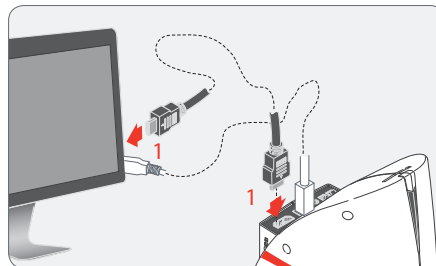
Additional Use of an HD Monitor in PC Mode

General Notes

 In PC mode, the microscope image is always shown in the preview window of Leica Application Suite. In addition, another HD monitor can be connected via the HDMI interface.

 The resolution on the connected HD monitor is limited by the live image resolution of the LAS software. Due to technical limitations, it is not possible to display an HD ready or Full HD live image on the connected HD monitor. In order to do this, you have to switch the Leica DMS1000 to HD mode (standalone) (see page 47).

Connecting the HD monitor





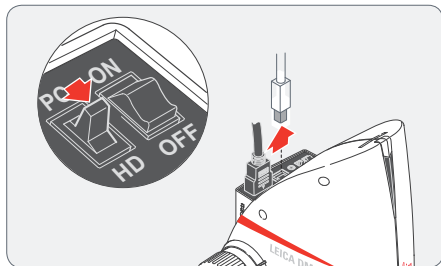
1. Connect the Leica DMS1000 to the HD monitor using the HDMI cable.

User Menu

Calling up the User Menu








General Notes

 The Leica DMS1000 is controlled entirely via the computer in PC mode. The front button, the remote control and the footswitch do not work. The menus for the camera are also not displayed on the HD monitor. Status information can be retrieved at any time despite this by using  on the remote control.



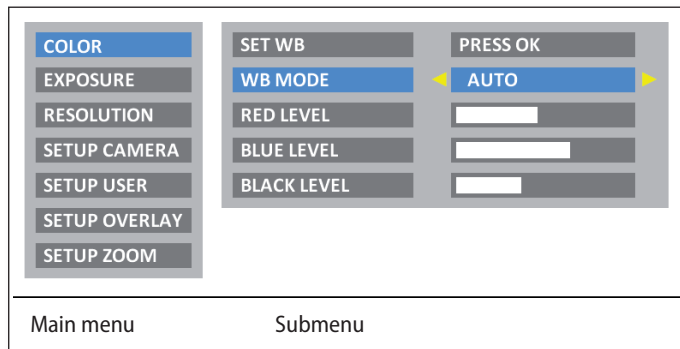
In this case, unplug the USB cable from the microscope and set the mode switch to "HD". The message "STARTING HD MODE" appears on the HD monitor.

Calling up and closing the user menu



1. Point the remote control towards the Leica DMS1000.
2. Press the  button to show the user menu on the computer monitor.
3. Press the   /   buttons to select a menu item.
4. Press the  button to confirm a menu item.
5. Press the  button again to hide the user menu.



Automatic white balance



Activating automatic white balance.

1. Press the  button on the remote control.
2. Call up the "COLOR" entry.
3. Set the value for "WB MODE" to "AUTO".
4. Press the  button to leave the menu.



The values for "RED LEVEL", "BLUE LEVEL" and "BLACK LEVEL" cannot be adjusted if the "WB MODE" setting is set to "AUTO".



The "COLOR" function makes it possible to adapt the camera chip to the ambient light so that color-neutral images can be acquired.

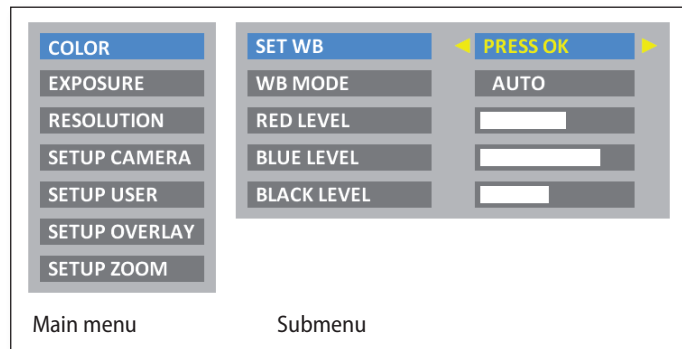



Whenever possible, always use a neutral gray chart or another color-neutral object to attain optimum results.




For transmitted light specimens, configuring the white balance to the pure transmitted light at moderate brightness is recommended (without the specimen).


Manual white balance





 The "COLOR" function makes it possible to adapt the camera chip to the ambient light so that color-neutral images can be acquired.


 Whenever possible, always use a neutral gray chart to attain optimum results.


Adjusting the white balance manually (recommended)

1. Place the gray chart under the microscope so that the entire field of view is filled in.
2. Press the  button on the remote control. The white balance is calibrated and saved to the camera.

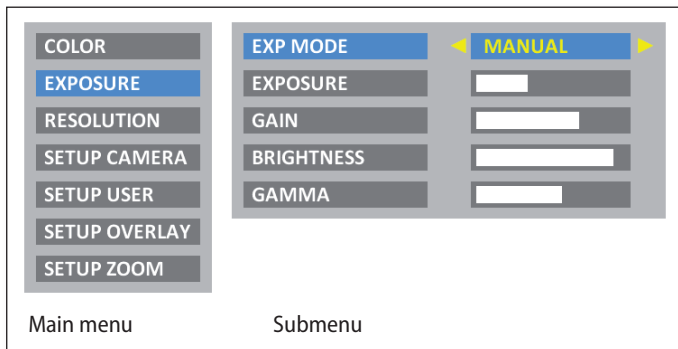
Alternatively, you can also calibrate the white balance using the user menu.

1. Press the  button on the remote control.
2. Call up the "COLOR" entry.
3. Select the "SET WB" menu item.
4. Press the  button.


 If you do not have a neutral gray area in the image or if the illumination has a very strong color cast, you can manually set the values for "RED LEVEL", "BLUE LEVEL" and "BLACK LEVEL" until the image displays a harmonious gray.

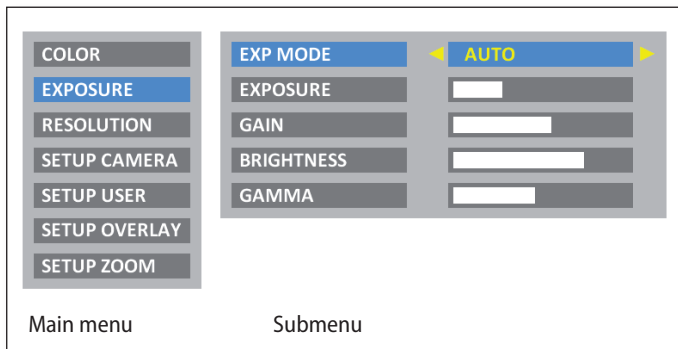
 The white balance mode is always set to "MANUAL" after manually adjusting the white balance, even if it was set to "AUTO" previously.

Exposure




Manual exposure

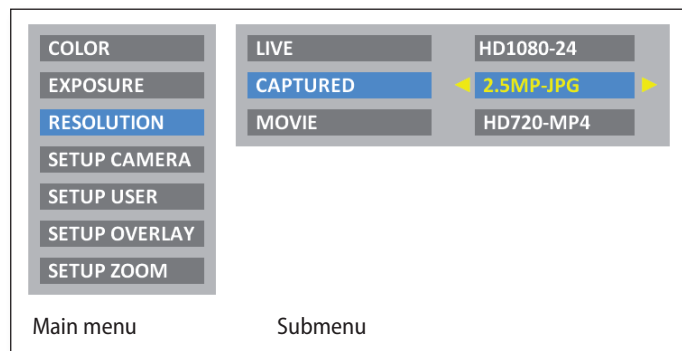
1. Press the  button on the remote control.
2. Call up the "EXPOSURE" entry.
3. Set the value for "EXP MODE" to "MANUAL" for manual exposure.
4. Correct the values for "EXPOSURE", "GAIN" and "GAMMA" until you obtain the desired results for the image.




Automatic exposure

1. Press the  button on the remote control.
2. Call up the "EXPOSURE" entry.
3. Set the value for "EXP MODE" to "AUTO" for automatic exposure.
4. Correct the values for "BRIGHTNESS" and "GAMMA" until you obtain the desired results for the image.

Resolution



 The "RESOLUTION" menu lets you define the resolution individually for the live image on the computer, capturing individual images and capturing video. This provides optimum results in every situation.

Resolution of the live image (LIVE)

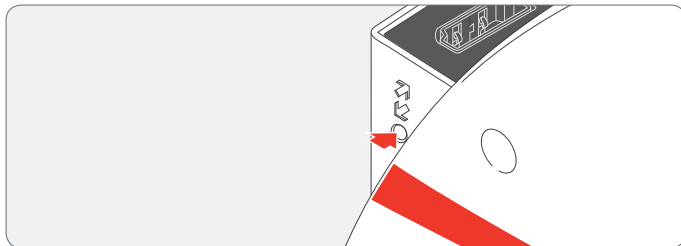
Defines the resolution of the live image. The following resolutions are available:

- HD720-50 and HD720-60: 1280×720 pixels, at 50 Hz or 60 Hz image refresh rate.
- HD1080-24 and HD1080-30: 1920×1080 pixels, at 24 Hz or 30 Hz image refresh rate, progressive.
- HD1080-50 and HD1080-60: 1920×1080 pixels, at 50 Hz or 60 Hz image refresh rate, interlaced.

Select a resolution that can be displayed on the HD monitor correctly without flickering and without an error message.

Resolution (continued)

If a resolution cannot be displayed and the HD monitor remains black, you can do the following to display a live image again in the HD monitor:



Use the tip of a ball-point pen (or a bent paperclip) to press the hidden reset button:

- Pressing the reset button for the first time displays the current live image resolution on the HD monitor.
- Pressing it a second time switches to the next live image resolution.
- Repeat the last step until a live image is displayed. The camera can activate 6 different resolutions in sequence.



A double signal tone is output when activating the recommended default resolution of HD1080-50.

Resolution of the captured image (CAPTURED)

Defines the resolution of the captured image saved directly to the SD card. The following resolutions are available:

- 1.1 MP - JPG: 1216×912 pixels
- 2.5 MP - JPG: 1824×1368 pixels
- 5.0 MP - JPG: 2592×1944 pixels

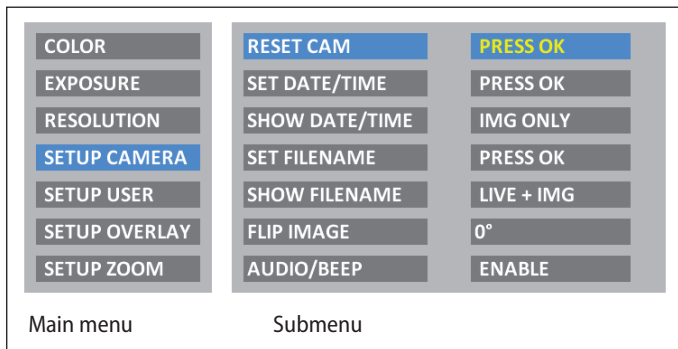
Resolution of videos (MOVIE)


Defines the resolution of video captures saved directly to the SD card. The following resolutions are available:

- HD720-MP4: 1280×720 pixels
- HD1080-MP4: 1920×1080 pixels

About 50 MB of data are produced per minute with HD720 and 100 MB with HD1080 (slightly dependent on the contents and compression applied). A new file is created each time a file size of 1 GB is reached; capturing continues without interruption. Video capturing is discontinued if the SD card runs out of memory.


Camera Settings



 The "SETUP CAMERA" menu lets you configure various internal parameters, such as the date and time, the file name for images on the SD card or whether a signal tone should sound each time an image is captured.

Reset camera (RESET CAM)

Resets the microscope to the factory default settings. All user information (such as white balance, resolution, etc.) is reset. Select this function if you are getting the impression the microscope is not responding normally or a setting has not been made correctly.

 Alternative method for resetting the camera: Use the tip of a ball-point pen (or a bent paperclip) to press hidden reset button: Hold the reset button down for at least 5 seconds until a signal tone sounds.

Set the date and time (SET DATE/TIME)

This command sets the date and time as well as the format for displaying them. The following formatting options are available for selection: YYYY.MM.DD – DD.MM.YYYY – MM/DD/YYYY

Display the date and time (SHOW DATE/TIME)

Depending on the setting, this does not display the date and time at all, just displays it in the live image, just in image captures or in both the live image and image captures. The date and time are displayed or written into the top right corner of the image.

Set the filename (SET FILENAME)

Lets you freely select the first four characters of the filename for both single exposures and video recordings. By default, either MC12 or MC17 are used for the first four characters. These characters are followed by sequential numbering, followed by either JPG for individual images or MP4 for video recordings.

Camera Settings (continued)

Display the filename (SHOW FILENAME)

Depending on the setting, this does not display the filename at all, just displays it in the live image, just in image captures or in both the live image and image captures. The filename is also shown or written into the top right corner of the image.



If you save the file name or the date and time into images, they cannot be deleted later, even if you rename the files or change the date.

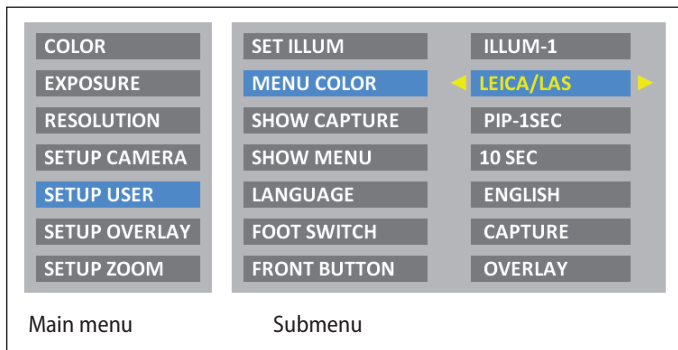
Rotate image (FLIP IMAGE)


Rotates the image by 180°.

Signal tone (AUDIO/BEEP)

Depending on the setting, you can have a brief signal tone sound after capturing an image. This can be helpful when working with a footswitch if you want to capture images without taking your eyes off the microscope.

User-defined Settings




 The "SETUP USER" menu lets you change or switch certain user-specific settings to make working with the microscope a more enjoyable experience.

Set the illumination mode (SET ILLUM)

These settings allow you to define up to three different illumination modes, such as one for transmitted light or one for polarized light. This can save the current camera settings for recurring acquisition situations and retrieval again at any time.

Press ◀ ▶ to select illumination mode 1, 2 or 3. Press OK to save the current camera settings under the displayed illumination mode.

 In order to select a pre-defined or newly defined illumination mode quickly without calling up the user menu, press ◀ ▶ in the live image.

Set menu color (MENU COLOR)

Currently, two color schemes are available for the menu guidance. Additional colors may be provided in the future via a firmware update.

User-defined Settings (continued)

Show the capture (SHOW CAPTURE)

Lets you set whether or not a recently saved image is to be displayed in full screen or as picture-in-picture (PIP) on the screen after capturing an image. You can also select whether the created capture is to be displayed for one second, three seconds or permanently (INFINITE).

Display the menu (SHOW MENU)

Defines how long the menu is displayed on the screen. You can stop the menu from being displayed at any time by pressing the menu button again or selecting a menu entry.

Set the language (LANGUAGE)

Lets you set the language for menu guidance. Select the fifth entry in the main menu if you have (unintentionally) selected an Asian language that uses logograms and want to return to a menu display that is alphanumeric. The menu entry for selecting the language is always added in English as well.

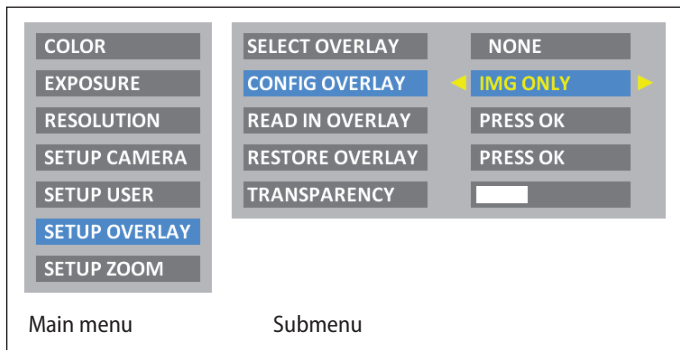
Configure the footswitch (FOOT SWITCH)


Lets the footswitch be configured with another function. By default, pressing the footswitch triggers image acquisition. However, you can choose if this should perform a white balance adjustment, record a video or display the last capture instead.

Configure the front button (FRONT BUTTON)


Lets you configure another function for the front button. By default, pressing the front button triggers image acquisition. However, you can choose if this should perform a white balance adjustment, record a video or display the last capture instead.


Setting the overlay (SETUP OVERLAY)



 The Leica DMS1000 lets you superimpose predefined or user-specific images in the live image and in captured images. These superimposed images (called overlays) can contain anything, but usually just contain a few elements such as a crosshair or company logo. Up to 10 overlays can be defined, of which the first overlay (01) is reserved for displaying a small histogram in the bottom left corner. Overlays 02 through 10 can contain either predefined or user-specific content and let you configure your microscope for special tasks.

Select an overlay (SELECT OVERLAY)

Press ◀ ▶ to select another overlay. Press  to activate the selected overlay and leave the menu.

 If you want to quickly display other overlays, press ▼ ▲ when the live image is displayed to show the next or previous respective overlay.

Configure an overlay (CONFIG OVERLAY)

Depending on the setting, this does not show an overlay, only shows the overlay in the live image or shows it in both the live image and the image capture.

Import an overlay (READ IN OVERLAY)

Imports up to 10 user-specific overlays from the SD card from the "Overlay" directory. The overlays need to be saved as a JPG with 4:2:2 compression and must have both the appropriate resolution and a specifically defined filename. Various overlays are available for download on the Leica Microsystems website, as well as a manual for how to create your own overlays. Follow those instructions to create new overlays.

Setting the Overlay (continued)

Restore an overlay (RESTORE OVERLAY)

Resets the overlays to the factory setting: A histogram, a Leica logo, a cross-hair over the entire live image and a small crosshair in the middle of the live image.

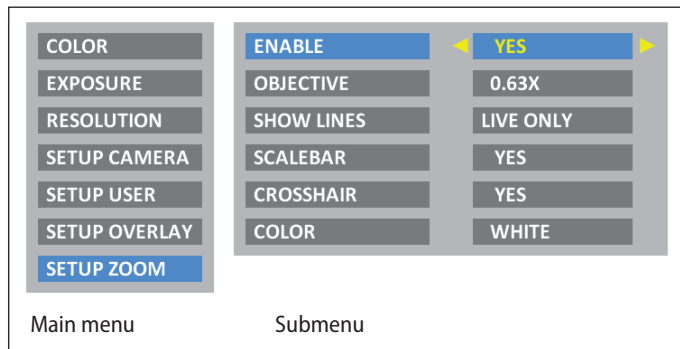
Set transparency (TRANSPARENCY)


The overlay's edges are more or less prominent depending on the selected setting.



This setting does not change the transparency of the overlay.

Scalable Display





 The Leica DMS1000 has a "scalable display". This means that the zoom scale and crosshair are also magnified at the corresponding setting based on the selected magnification.

Enable zoom scale (ENABLE)

The display of the coding can be enabled or disabled using this setting.

"YES" enables the zoom scale, "NO" disables it.

Select the objective (OBJECTIVE)

Press   to select an objective. This information is necessary for correctly calculating scaling.

Set the display of lines (SHOW LINES)

If the zoom scale is enabled, this can be used to select where it is to be displayed. There are options for displaying them in the live image (LIVE ONLY), or in the live image and the saved image (LIVE + IMG).

Enable the scale bar (SCALEBAR)

Select "YES" or "NO" to enable or disable the scale bar.

Enable the crosshair (CROSSHAIR)


Select "YES" or "NO" to enable or disable the crosshair.

Select the color of the line (COLOR)


Select the color for the scale bar and crosshair. "WHITE", "BLACK" or "YELLOW" are available.

Configuring Predefined Illumination Scenarios

Changing the illumination mode

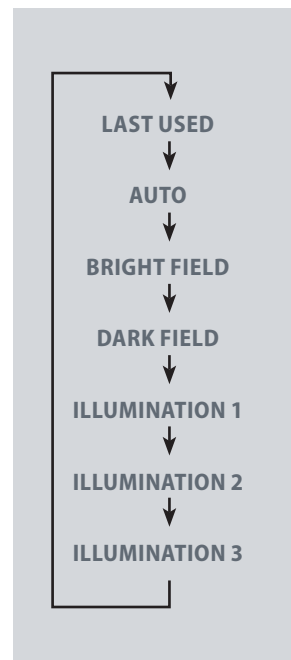
 The Leica DMS1000 is supplied with various illumination modes that cover a wide spectrum of possible situations.

1. Press ◀ ▶ on the remote control to display the current illumination mode on the HD monitor.
2. Press ◀ ▶ again to switch to the next illumination mode. The microscope immediately switches the illumination mode and sets the stored parameters.
3. Wait until the displayed illumination mode disappears from the screen. This means that illumination mode is now active.

 To return to the last selected mode, press ◀ ▶ until the "LAST USED" setting appears.

 If you do not press ◀ ▶ for 5 seconds, the selected illumination mode is applied.

Sequence



Service

Care, Maintenance, Contact Persons

General

We hope you enjoy using your high-performance microscope. Leica microscopes are renowned for their robustness and long service life. Observing the following care and cleaning tips will ensure that even after years and decades, your Leica microscope will continue to work as well as it did on the very first day.

Warranty benefits

The guarantee covers all faults in materials and manufacture. It does not, however, cover damage resulting from careless or improper handling.

Contact address

If your instrument no longer works perfectly, contact your Leica Microsystems representative. You can find information on worldwide Leica representatives on the Leica Microsystems website: www.leica-microsystems.com

Care, Maintenance, Contact Persons (continued)

Care

- Keeping all optical components clean is important for maintaining good optical performance.
- If any optical surface becomes badly coated with dust or dirt, flush the surface using a syringe or by brushing it off with a camel hair brush before attempting to wipe it clean.
- Optical surfaces should be cleaned using a lint-free cloth, lens cloth or cotton swab soaked in ethanol or a commercially available glass cleaner. Do not use alcohol.
- Avoid excessive use of solvents. The lint-free cloth, lens cloth or cotton swab should be soaked with solvent, but not so wet that solvent runs over the lens.
- Protect your microscope from moisture, fumes and acids and from alkaline, caustic and corrosive materials and keep chemicals away from the instruments.
- Plugs, optical systems and mechanical parts must not be disassembled or replaced, unless doing so is specifically permitted and described in this manual.
- Protect your microscope from oil and grease.
- Do not grease guide surfaces or mechanical parts.

Protection from dirt

Dust and dirt will affect the quality of your results.

- Put an optionally available dust cover over the microscope when it will not be used for a long time.
- Keep accessories in a dust-free place when not in use.

Care, Maintenance, Contact Persons (continued)

Cleaning polymer components

Some components are made of polymer or are polymer-coated. They are, therefore, pleasant and convenient to handle. The use of unsuitable cleaning agents and techniques can damage polymers.

Permitted measures

- Clean the microscope (or parts of it) using warm soapy water, then wipe using distilled water.
- For stubborn dirt, you can also use ethanol (industrial alcohol). When doing so, follow the corresponding safety regulations.
- Remove dust with a bellows and a soft paintbrush.
- Clean the objectives with special optics cleaning cloths and pure alcohol.

Servicing

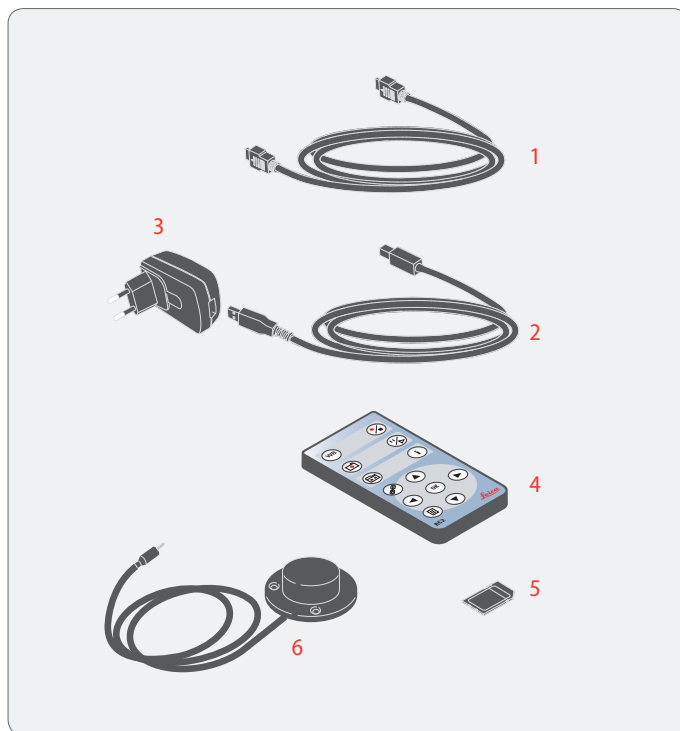
- Repairs may only be carried out by Leica Microsystems-trained service technicians. Only original Leica Microsystems spare parts may be used.

Danger of electric shock



Risk of electric shock. Removing the cover of the Leica DMS1000 exposes electrically live parts, which, if touched, can cause potentially fatal injuries. Have technical service carried out by a Leica Microsystems authorized dealer.

Spare parts



Item	Leica article number	Designation
1	19 004 872	HDMI cable (2 m)
2	19 004 871	USB cable (1.8 m)
3	13 302 708 946 915	5 W USB adapter with interchangeable connector
4	19 004 873	RC2 remote control
5	19 004 870	SD card (4 GB)
6	12 730 229	Footswitch

Specifications

Technical Data

Live image (Full HD): Objectives

Optical data	Leica DMS1000
Max. resolution	337 lp/mm
Max. FoVx	82 mm
Max. FoVy	46 mm
Max. DoF	34 mm
Working distance	303 – 27 mm
Max@22"-monitor	6 – 299

Live image (Full HD): 1.0 achromatic objective

Optical data	Leica DMS1000 @ highest head pos.	Leica DMS1000 @ lowest head pos.
Resolution	169 lp/mm	21 lp/mm
FoVx	3.2 mm	25.9 mm
FoVy	1.8 mm	14.6 mm
DoF	0.05 mm	3.5 mm
Max@22"-monitor	150x	18x

Additional working distances

Optical data	Leica DMS1000
Working distances	303 mm (achromatic 0.32×)
	188.5 mm (achromatic 0.5×)
	148 mm (achromatic 0.63×)
	114 mm (achromatic 0.8×)
	89.6 mm (achromatic 1×)
	65.5 mm (achromatic 1.25×)
	46 mm (achromatic 1.6×)
	27.4 mm (achromatic 2.0×)

Technical Data (continued)

Objective

Optics carrier	
Design engineering	Multi-layered tempered optics system with beam path and main objective, lead-free
Coding	Fully coded zoom
Specific surface resistivity (housing)	$2 \times 10^{11} \Omega/\text{mm}^2$ Discharge time <2 seconds from 1000 V to 100 V
Click-stop feature	Eight switchable positions, for repetitive tasks
Standard objective	Achromatic 1.0×
Additional objectives	Achromat: 0.32×, 0.5×, 0.63×, 0.8×, 1×, 1.25×, 1.6×, 2×
Additional objectives (with adapter)	Z-series planapochromat: 0.5×, 0.8×, 1×

Accessories	
Adapter for telecentric lens	For Z-series planachromat: 0.5×, 0.8×, 1×
Footswitch	For hands-free operation (e.g. image acquisition and other tasks)

Technical Data (continued)

Leica DMS1000 - digital camera

Optics carrier	
Live image resolution	HD ready: 1280×720 - 50 Hz/60 Hz - 30 fps Full HD: 1920×1080 - 50 Hz/60 Hz/25 Hz/30 Hz - 30 fps PC: 1600×1200 - 10fps / 1024×768 - 24 fps
Image resolution (capture)	5 megapixels (2592×1944) 2.5 megapixels (1824×1368) 1.1 megapixels (1216×912)
Video resolution	HD1080 (1090×1920) HD720 (1280×720)
Pixel size	2.35 µm × 2.35 µm 3.34 µm × 3.34 µm
Sensor grade	Aptina 1/2.3" CMOS
Sensor size	6.1 mm × 4.6 mm
Exposure time	0.5 msec - 500 msec
Gain	1× - 12×
Color depth	3×8 bit = 24 bit
File formats	Image: JPEG Video: MP4

Accessories	
Supported operating systems	Windows XP, Windows 7, Mac OS X
Leica Software	PC: Leica LAS & LAS EZ software Mac: Leica Acquire Software
Computer system (recommended)	PC or Mac, Intel Core 2 Duo, >2.4 GHz, 4 GB RAM, 24-bit graphics, 1248 × 1024

Technical Data (continued)

Electronic interfaces

Accessories	
Computer	USB 2.0, standard USB plug type B
High-definition connector	HDMI 1.3, standard HDMI connector type A
On/Off switch	Available
PC/HD switch	Available
Reset button	Display for the current resolution, change to next resolution, reset, firmware upload
Remote control	RC2 infrared remote control, with button battery type CR2025
Remote trigger (optional: 12730229)	Hand and foot trigger, with 1.5 m cable
SD card (Secure Digital)	SD HC compatible, 128 MB – 32 GB
Status LED	3 colors: green – power on, yellow – busy, red – error
Power supply	Via USB cable to computer or to external 5 V USB power supply unit
Power requirement	5 W

Miscellaneous

Operating temperature range	+10 °C - 40 °C
Rel. humidity	10 - 90 %
Weight	1.3 kg
CE Declaration of Conformity	Available
Tested standards	EMI/RFI: EN 55011 EN 61010-1 EMC: EN 61326-1

Optical Data - Field of View

Objective	Achr. 0.32×		Achr. 0.5×		Achr. 0.63×		Achr. 0.8×		Achr. 1.0×		Achr. 1.25×		Achr. 1.6×		Achr. 2.0×	
Working distance	303 mm		188.5 mm		148.2 mm		114 mm		89.6 mm		65.5 mm		46 mm		27.4 mm	
Field of view (zoom setting)	FOVx	FOVy	FOVx	FOVy	FOVx	FOVy	FOVx	FOVy	FOVx	FOVy	FOVx	FOVy	FOVx	FOVy	FOVx	FOVy
0.75	81.99	46.12	52.01	29.25	41.19	23.17	32.46	18.26	25.99	14.62	20.82	11.71	16.25	9.14	13.00	7.31
1.0	61.52	34.61	39.03	21.95	30.91	17.39	24.36	13.70	19.50	10.97	15.62	8.79	12.20	6.86	9.76	5.49
1.25	49.22	27.69	31.22	17.56	24.73	13.91	19.48	10.96	15.60	8.77	12.50	7.03	9.76	5.49	7.81	4.39
1.6	38.45	21.63	24.39	13.72	19.32	10.87	15.22	8.56	12.19	6.86	9.77	5.49	7.62	4.29	6.10	3.43
2.0	30.76	17.30	19.51	10.98	15.46	8.69	12.18	6.85	9.75	5.48	7.81	4.39	6.10	3.43	4.88	2.74
2.5	24.61	13.84	15.61	8.78	12.36	6.95	9.74	5.48	7.80	4.39	6.25	3.52	4.88	2.74	3.90	2.20
3.2	19.23	10.81	12.20	6.86	9.66	5.43	7.61	4.28	6.09	3.43	4.88	2.75	3.81	2.14	3.05	1.72
4.0	15.38	8.65	9.76	5.49	7.73	4.35	6.09	3.42	4.87	2.74	3.91	2.20	3.05	1.72	2.44	1.37
5.0	12.30	6.92	7.81	4.39	6.18	3.48	4.87	2.74	3.90	2.19	3.12	1.76	2.44	1.37	1.95	1.10
6.0	10.25	5.77	6.50	3.66	5.15	2.90	4.06	2.28	3.25	1.83	2.60	1.46	2.03	1.14	1.63	0.91

Optical Data - Magnification and Depth of Field

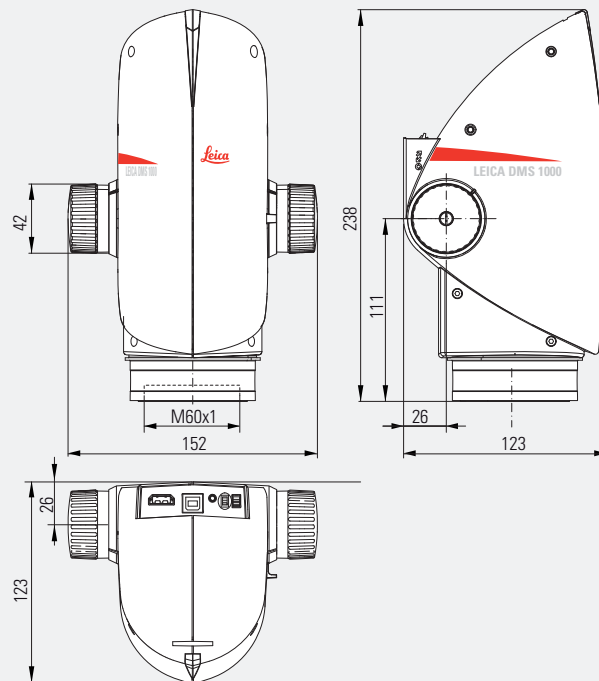
Objective		Achr. 0.32×		Achr. 0.5×		Achr. 0.63×		Achr. 0.8×		Achr. 1.0×		Achr. 1.25×		Achr. 1.6×		Achr. 2.0×	
Monitor	Zoom setting	Total mag.	DOF	Total mag.	DOF	Total mag.	DOF	Total mag.	DOF	Total mag.	DOF	Total mag.	DOF	Total mag.	DOF	Total mag.	DOF
10"	0.75	2.7	34.76	4.3	13.99	5.4	8.77	6.8	5.45	8.5	3.49	10.6	2.24	13.6	1.37	17.0	0.87
	1.0	3.6	19.56	5.7	7.87	7.2	4.94	9.1	3.07	11.3	1.96	14.2	1.26	18.1	0.77	22.7	0.49
	1.25	4.5	12.52	7.1	5.04	8.9	3.16	11.4	1.96	14.2	1.26	17.7	0.81	22.7	0.49	28.3	0.31
	1.6	5.8	7.64	9.1	3.07	11.5	1.93	14.5	1.20	18.2	0.77	22.7	0.49	29.0	0.30	36.3	0.19
	2.0	7.2	4.89	11.3	1.97	14.3	1.23	18.2	0.77	22.7	0.49	28.3	0.32	36.3	0.19	45.3	0.12
	2.5	9.0	3.13	14.2	1.26	17.9	0.79	22.7	0.49	28.4	0.31	35.4	0.20	45.4	0.12	56.7	0.08
	3.2	11.5	1.91	18.1	0.77	22.9	0.48	29.1	0.30	36.3	0.19	45.3	0.12	58.1	0.08	72.6	0.05
	4.0	14.4	1.22	22.7	0.49	28.6	0.31	36.3	0.19	45.4	0.12	56.6	0.08	72.6	0.05	90.7	0.03
	5.0	18.0	0.78	28.3	0.31	35.8	0.20	45.4	0.12	56.7	0.08	70.8	0.05	90.7	0.03	113.4	0.02
	6.0	21.6	0.54	34.0	0.22	42.9	0.14	54.5	0.09	68.1	0.05	85.0	0.04	108.8	0.02	136.0	0.01
19"	0.75	5.1	34.76	8.1	13.99	10.2	8.77	13.0	5.45	16.2	3.49	20.2	2.24	25.9	1.37	32.4	0.87
	1.0	6.8	19.56	10.8	7.87	13.6	4.94	17.3	3.07	21.6	1.96	26.9	1.26	34.5	0.77	43.1	0.49
	1.25	8.5	12.52	13.5	5.04	17.0	3.16	21.6	1.96	27.0	1.26	33.7	0.81	43.1	0.49	53.9	0.31
	1.6	10.9	7.64	17.2	3.07	21.8	1.93	27.6	1.20	34.5	0.77	43.1	0.49	55.2	0.30	69.0	0.19
	2.0	13.7	4.89	21.6	1.97	27.2	1.23	34.5	0.77	43.1	0.49	53.8	0.32	69.0	0.19	86.2	0.12
	2.5	17.1	3.13	26.9	1.26	34.0	0.79	43.2	0.49	53.9	0.31	67.3	0.20	86.2	0.12	107.8	0.08
	3.2	21.9	1.91	34.5	0.77	43.6	0.48	55.3	0.30	69.0	0.19	86.2	0.12	110.4	0.08	138.0	0.05
	4.0	27.4	1.22	43.1	0.49	54.4	0.31	69.1	0.19	86.3	0.12	107.7	0.08	138.0	0.05	172.5	0.03
	5.0	34.2	0.78	53.9	0.31	68.0	0.20	86.4	0.12	107.9	0.08	134.6	0.05	172.5	0.03	215.6	0.02
	6.0	41.0	0.54	64.7	0.22	81.7	0.14	103.6	0.09	129.4	0.05	161.5	0.04	207.0	0.02	258.7	0.01

Optical Data - Magnification and Depth of Field (continued)

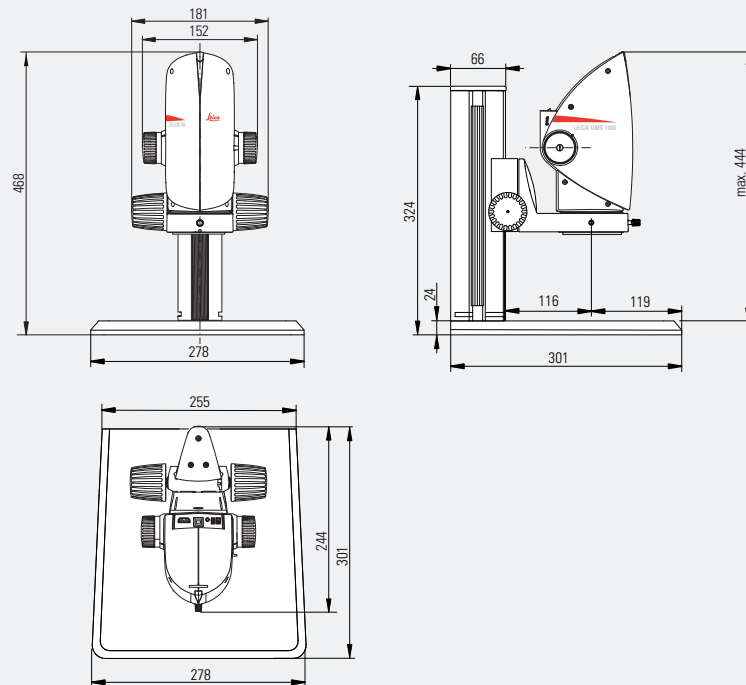
Objective		Achr. 0.32×		Achr. 0.5×		Achr. 0.63×		Achr. 0.8×		Achr. 1.0×		Achr. 1.25×		Achr. 1.6×		Achr. 2.0×	
Monitor	Zoom setting	Total mag.	DOF	Total mag.	DOF	Total mag.	DOF	Total mag.	DOF	Total mag.	DOF	Total mag.	DOF	Total mag.	DOF	Total mag.	DOF
22"	0.75	5.9	34.76	9.4	13.99	11.8	8.77	15.0	5.45	18.7	3.49	23.4	2.24	29.9	1.37	37.4	0.87
	1.0	7.9	19.56	12.5	7.87	15.7	4.94	20.0	3.07	25.0	1.96	31.2	1.26	39.9	0.77	49.9	0.49
	1.25	9.9	12.52	15.6	5.04	19.7	3.16	25.0	1.96	31.2	1.26	38.9	0.81	49.9	0.49	62.4	0.31
	1.6	12.7	7.64	20.0	3.07	25.2	1.93	32.0	1.20	39.9	0.77	49.8	0.49	63.9	0.30	79.8	0.19
	2.0	15.8	4.89	24.9	1.97	31.5	1.23	40.0	0.77	49.9	0.49	62.3	0.32	79.8	0.19	99.8	0.12
	2.5	19.8	3.13	31.2	1.26	39.4	0.79	50.0	0.49	62.4	0.31	77.9	0.20	99.8	0.12	124.7	0.08
	3.2	25.3	1.91	39.9	0.77	50.4	0.48	64.0	0.30	79.9	0.19	99.7	0.12	127.7	0.08	159.6	0.05
	4.0	31.6	1.22	49.9	0.49	63.0	0.31	79.9	0.19	99.8	0.12	124.6	0.08	159.6	0.05	199.5	0.03
	5.0	39.6	0.78	62.4	0.31	78.7	0.20	99.9	0.12	124.8	0.08	155.8	0.05	199.6	0.03	249.4	0.02
	6.0	47.5	0.54	74.8	0.22	94.5	0.14	119.9	0.09	149.8	0.05	186.9	0.04	239.5	0.02	299.3	0.01
24"	0.75	6.5	34.76	10.2	13.99	12.9	8.77	16.4	5.45	20.4	3.49	25.5	2.24	32.7	1.37	40.8	0.87
	1.0	8.6	19.56	13.6	7.87	17.2	4.94	21.8	3.07	27.2	1.96	34.0	1.26	43.5	0.77	54.4	0.49
	1.25	10.8	12.52	17.0	5.04	21.5	3.16	27.3	1.96	34.0	1.26	42.5	0.81	54.4	0.49	68.0	0.31
	1.6	13.8	7.64	21.8	3.07	27.5	1.93	34.9	1.20	43.6	0.77	54.4	0.49	69.7	0.30	87.1	0.19
	2.0	17.3	4.89	27.2	1.97	34.4	1.23	43.6	0.77	54.5	0.49	68.0	0.32	87.1	0.19	108.8	0.12
	2.5	21.6	3.13	34.0	1.26	42.9	0.79	54.5	0.49	68.1	0.31	85.0	0.20	108.8	0.12	136.0	0.08
	3.2	27.6	1.91	43.5	0.77	55.0	0.48	69.8	0.30	87.1	0.19	108.7	0.12	139.3	0.08	174.1	0.05
	4.0	34.5	1.22	54.4	0.49	68.7	0.31	87.2	0.19	108.9	0.12	135.9	0.08	174.2	0.05	217.7	0.03
	5.0	43.2	0.78	68.0	0.31	85.9	0.20	109.0	0.12	136.2	0.08	169.9	0.05	217.7	0.03	272.1	0.02
	6.0	51.8	0.54	81.6	0.22	103.1	0.14	130.8	0.09	163.4	0.05	203.9	0.04	261.2	0.02	326.5	0.01

Dimensional Drawings

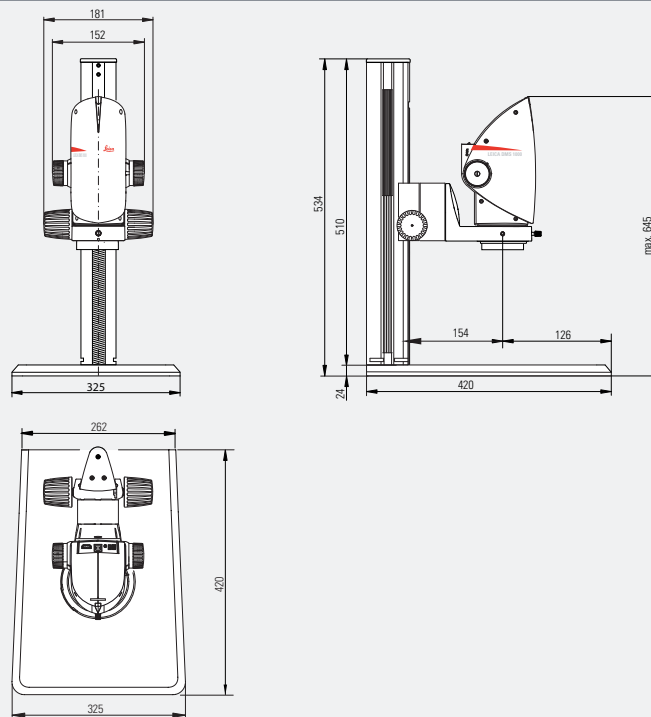
Leica DMS1000



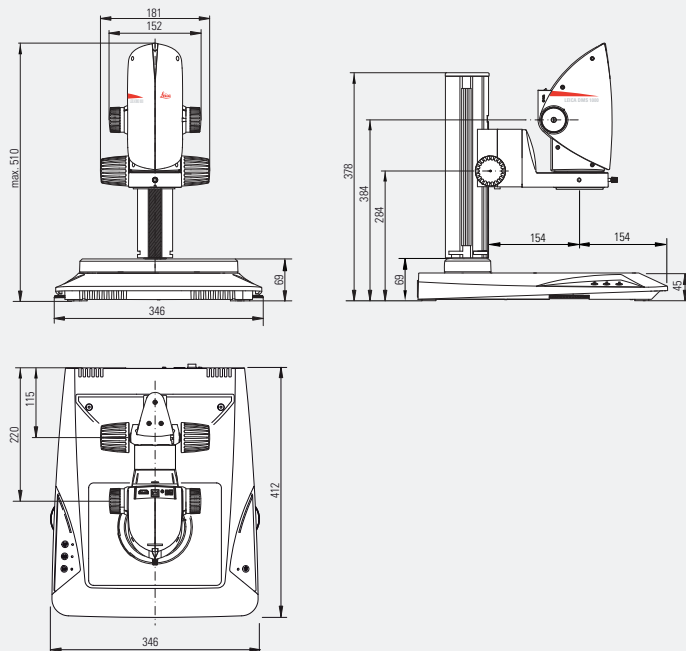
Leica DMS1000 with Incident Light Base



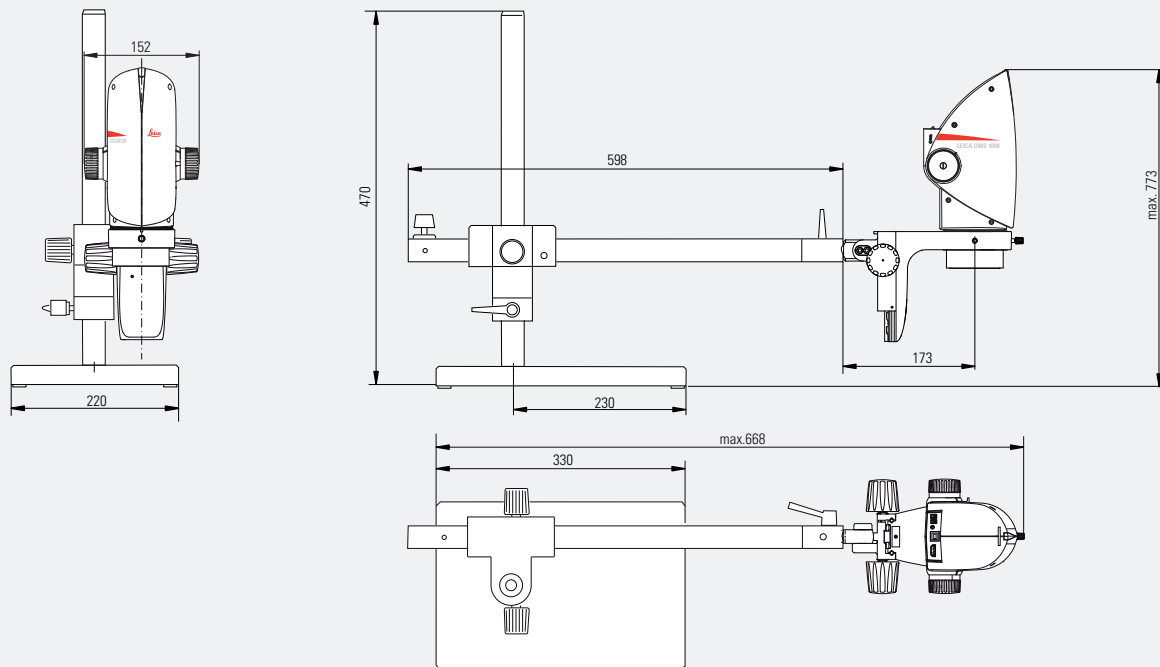
Leica DMS1000 with Incident Light Base



Leica DMS1000 with Transmitted Light Base



Leica DMS1000 with Swing-arm Stand



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