

Living up to Life



MEDICAL DIVISION



Leica M320

User Manual

10 718 878 - Version 01

Thank you

for deciding in favor of a Leica surgical microscope system. For valuable information about Leica Microsystems products and services and the address of your nearest Leica representative, please visit our website:

www.leica-microsystems.com

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Product identification

The model code and serial number of your product are provided on the nameplate found on the underside of the control unit. Copy this information to the line below so that it is handy in case you have questions for our representatives or service locations.

Type:

Serial number:

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1.1 BASICS

Be sure to read the User Manual and the "Safety Notes" chapter carefully before assembling and operating the product.

Keep the manual close to the instrument.

1.2 INTENDED USE

The Leica surgical microscope is an optical instrument for magnifying and illuminating specimens. It can be applied for observation and documentation and for human and veterinary medical treatment.

The Leica surgical microscope may be used only in closed rooms and must be placed on a solid floor or attached to a strong wall or ceiling.

Not for use in eye operations!

The Leica M320 surgical microscope is subject to special precautionary measures for electromagnetic compatibility. It must be installed and commissioned in accordance with the guidelines and manufacturer's declarations and recommended safety distances (tables 1, 2, 4, 6 according to EN 60601-1: 2007).

Portable and mobile as well as stationary HF communications equipment can have a negative effect on the reliability of the Leica M320 surgical microscope.

1.3 SYMBOLS

1.3.1 IN THE MANUAL



Can cause death or severe injury.



Can cause minor injury.



Can cause property damage.



Information that is not safety-related, but is useful or important.

1.3.2 ON THE INSTRUMENT



Caution, follow the User Manual



Alternating current



European Conformity logo

1.4 REQUIRED TOOLS

Allen key:

- Size 2.5 for installing accessories (dovetail interface)
- Size 3 for optimizing the balance of the optics carrier
- Size 4 for handle holder
- Size 8 for balancing the swing arm

Provided brake knob

2.1 USER PROFILES

Responsible body

Person or company responsible for the use and maintenance of the surgical microscope (hospitals, physician's practices).

Users

Physicians and trained medical personnel with appropriate qualifications who have been instructed in the use of the instrument. Specific training is not required.

Authorized trained personnel

Authorized electricians or other technicians expressly authorized by Leica with corresponding training.

2.2 SAFETY NOTES

Information for the person responsible for the instrument/authorized trained personnel

- The surgical microscope may be used by qualified users only.
- Regularly check to make sure the users are complying with safety requirements.
- Provide comprehensive instructions and explain the warning messages.
- Assign and monitor responsibilities for commissioning, operating and maintenance.
- Use the surgical microscope in proper condition only.
- Do not place the drape too close to the instrument, as otherwise it can overheat and shut off.
- Inform your Leica representative or Leica Microsystems (Schweiz) AG immediately if you detect a product defect that could potentially cause injury or harm.
- Use original accessories or approved Leica accessories only.
- Use only high-quality HDMI cables with a maximum length of 15 m.
- Use only monitors approved for medical purposes or equipped with an isolating transformer.
- Modifications or repairs may be carried out by authorized trained personnel only.
- Use only original Leica parts in maintenance work.
- After maintenance or technical modifications, readjust the instrument in accordance with our technical specifications.
- If the instrument is modified by or maintenance has been performed by unauthorized personnel, if the equipment is improperly maintained or if the instrument has been operated improperly, Leica disclaims all liability.
- The owner or operator shall be held liable for the function of the system if the system has been assembled incorrectly by individuals who do not belong to Leica Microsystems (Schweiz) AG.
- The influence on other devices by the Leica M320 surgical microscope has been tested in accordance with EN 60601-1-2. The system passed the emissions and immunity test. The standard preventive measures and safety regulations pertaining to electromagnetic and other radiation have to be observed.

2.3 DIRECTIONS FOR THE OPERATOR OF THE INSTRUMENT

- Follow the User Manual.
- Follow the instructions given by your employer regarding the organization of work and safety at work.
- Do not modify the surgical microscope.
- Danger of tilting of the floor stand! When moving the floor stand, fold up the swing arm as described above and tighten the articulation brakes.
- Risk of injury from moving parts! Assemble and balance the accessories before the operation. Do not install it above the field of operation.
- Risk of injury from rolling of the floor stand! Always push the microscope to move it; never pull it. Do not roll it over anyone's feet. Do not roll over cables lying on the floor. Lock the foot brakes during the operation, and never move the device during operation.
- Do not shine lights in anyone's eyes.
- Do not cover up the ventilation slot of the optics carrier.
- Before an extended period of non-use, remove the battery from the remote control.

2.4 DISPOSAL

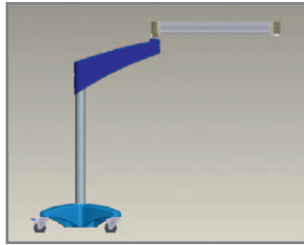


■ The respective applicable national laws must be observed for disposal of the products, with the involvement of corresponding disposal companies.
The unit packaging is to be recycled.

3.1 STANDS

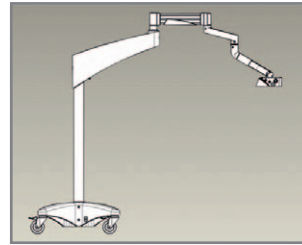
NOTE

To assemble the stand, note the installation instructions provided.

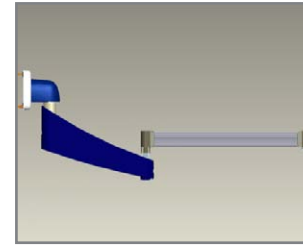


Rolling floor stand (F12),
long swing arm

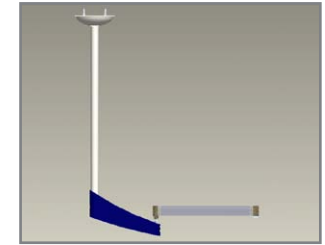
Standard for operating manual



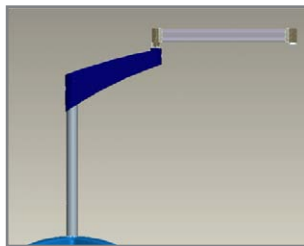
Rolling floor stand, short
swing arm



Wall stand (W12)



Ceiling mount (C12)



Floor stand/baseplate (FP12)

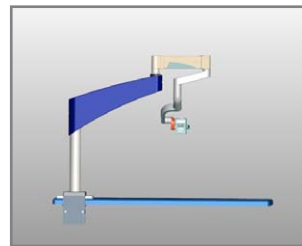
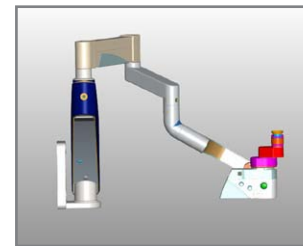


Table stand with terminal
(TC12)



Wall stand (LW12)

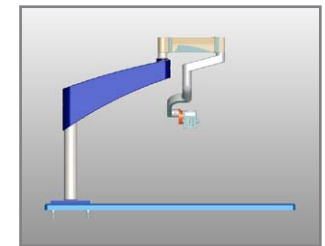
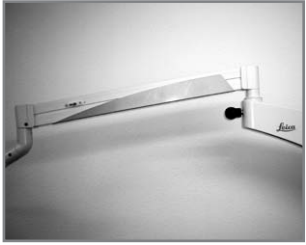


Table stand with plate (TP12)

3.2 SWING ARM AND HORIZONTAL ARM



Swing arm and horizontal arm

Integrated tilt switch

Move the swing arm upwards.
Light switches off automatically.

The integrated tilt switch is not available for models TC12, TP12 and LW12.

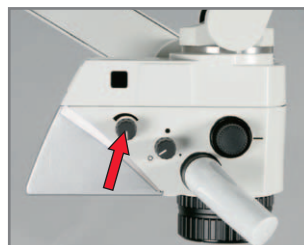
3.3 OPTICS CARRIER



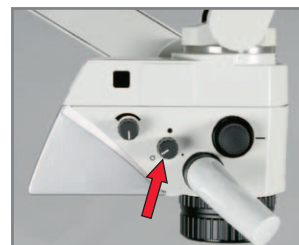
Caps for magnification changer are steam- or gas-sterilizable.



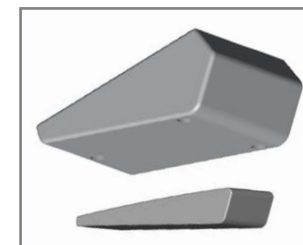
Magnification changer, both sides, increments: 6.4, 10, 16, 25, 40×



Illumination control for illumination intensity.



Filter and diaphragm controls for white light, orange filter and spot illumination.



Types of counterweight for balancing when many accessories are used.

3.4 MICROSCOPE CARRIER



Two different versions are available.



Inclined

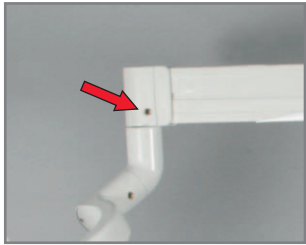


Upright

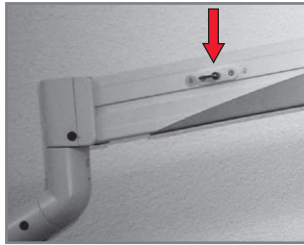


Upright installation is not possible for models TC12, TP12 and LW12.

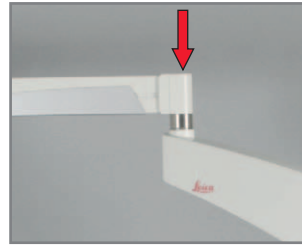
3.5 BRAKE KNOBS/ARTICULATION BRAKES



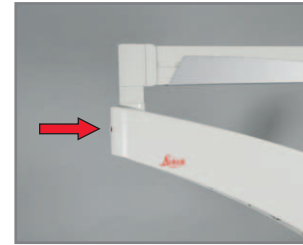
Articulation brake



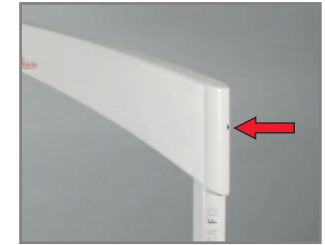
Lever for locking the vertical position



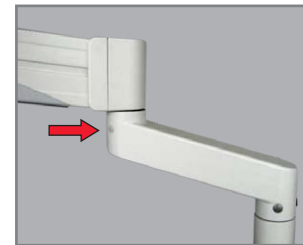
Joint for balancing



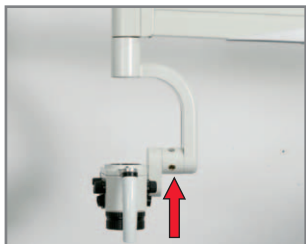
Articulation brake



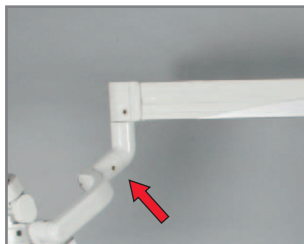
Articulation brake



Articulation brake
(LW12, TP12, TC12)



Tilt brake



Rotary brake
(inclined version)

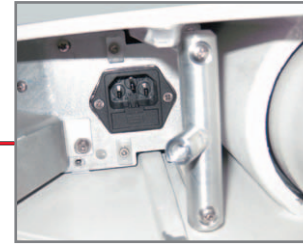
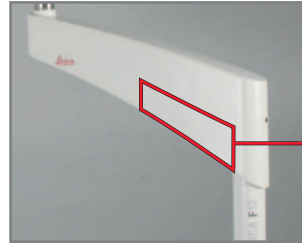
3.6 CONNECTIONS



Brake knob for setting the articulation brakes



Main switch



Power socket



Port for HDMI/USB cable

4.1 INSTALLING THE ACCESSORIES

CAUTION

Risk of injury from downward movement of the swing arm!
Before installing accessories, tighten the articulation brakes.
See "5.3 TRANSPORTING THE MICROSCOPE".

INFO

Installing the accessories, for example, ErgonOptic Dent.
Install any other accessories in a similar manner.



Unscrew the clamping screw.

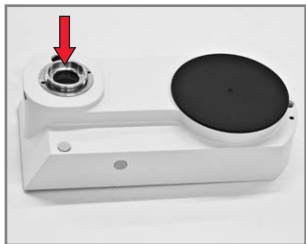


Push the accessory into the dovetail interface.



Tighten the clamping screw.

4.2 DOCUMENTATION OUTPUT



C-mount port for commercially available video camera

4.3 HANDLES

4.3.1 INSTALLING AND REMOVING THE FRONT HANDLE

NOTE

Installing the front handle before the rest of the accessories.

INFO

Gray handle sleeves are steam- or gas-sterilizable. White handle sleeves can be disinfected.



1
Screw on the handle sleeve holder.



2
Insert until the handle sleeve clicks into place.

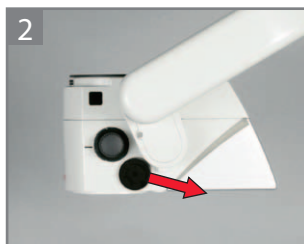


3
Push the knob and release the handle sleeve.

4.3.2 INSTALLING THE SIDE HANDLES



1
Screw the handle apart.



2
Remove cover with key.



3
Screw open the bottom holder for the handle. Handle tilt is individually adjustable.



4
Refit the handle sleeve holder.



5
Insert until the handle sleeve clicks into place.

4.4 ERGONOPTIC DENT



Improves ergonomics at certain working positions: Turning range 45° with 180° binocular tube.



ErgonOptic Dent: Optical extension for more comfortable work.

For installation, see "4.1 Installing the accessories".

4.5 ERGOWEDGE



The ErgoWedge gives a binocular with a fixed angle a variable viewing angle of 5° to 25°.



ErgoWedge



Ideal in combination with 45° inclined binocular tube.

For installation, see "4.1 Installing the accessories".

4.6 OBJECTIVES

i INFO

Fixed and fine objectives available in various focal lengths.



1 Remove the cover from the optics carrier.



2 Screw in the objective.



3 Turn the fine focusing objective for fine focus.

4.7 PROTECTIVE GLASS

i INFO

The protective glass is used to protect the objective. The glass is steam- or gas-sterilizable.



Fine focusing objective:
The nose points forward.



Fixed objective:
The nose points 90° towards
the left or right.

4.8 BINOCULAR TUBES



Binocular tube 5° - 25°



Inclined binocular tube



Binocular tube, 180° variable



Straight binocular tube

Binocular tube, variable
30° - 150°

4.9 EYEPIECES



Inclined binocular tube 45°

For installation, see "4.1
Installing the accessories".

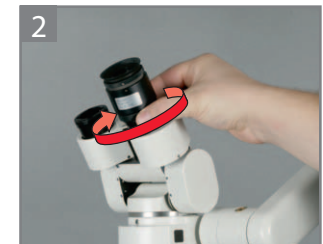
i INFO

Possible eyepieces:

- 10× eyepiece, standard (aside from with straight tube 12.5×)
- 10× eyepiece with crosshair graticule for easier image centering
- 12.5× eyepiece, shows image with similar magnification to that on the screen



Set the eyepiece in place.



Tighten the rotary ring.

4.10 ADAPTER

NOTE

The microscope is not balanced. To prevent it from tipping over, tighten the articulation brakes.



1 Install the stereo adapter.



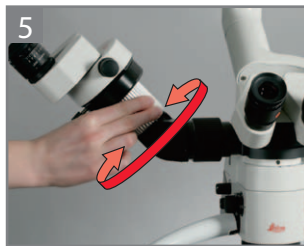
2 Fit the beam splitter.
For 50/50 % or
70/30 % observation.



3 Install the stereo attachment
for second observer on the
left side.



4 Fit the binocular tubes.



5 Turn the white ring to align
the cutout for the assistant.

NOTE

For installation, see "4.1
Installing the accessories".

4.11 MOUNTING STERILE COMPONENTS

CAUTION

Danger of infection!
Avoid touching the sterile
components. Allow sufficient
free space.

INFO

Do not install the sterile
components until shortly
before the operation.

Handle sleeves and caps for
the magnification changer
are steam and gas-sterilizable.

Sterilize the handle sleeves
and caps after use.



1 Insert until the handle sleeve
clicks into place.

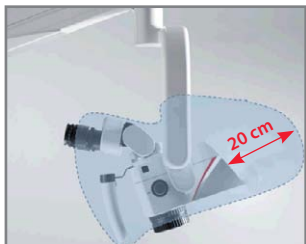


2 Attach the caps.



3 Attach protective glass on
objective. The noise points
forwards (fine focus
objectives) or 90° to the left/
right (fixed objectives).

4.12 INSTALLING THE DRAPE



Fit the drape.

CAUTION

Do not wrap the drape around
the microscope too tightly.
The distance between the
microscope and drape should
be 20 cm. Danger of
overheating!

4.13 EXTERNAL ORANGE FILTER

i INFO

Filters out the parts of the light spectrum that cause rapid curing of dental composite.



External orange filter:
additional accessory for
dentistry.

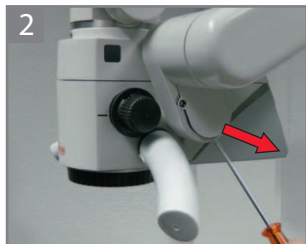
! NOTE

For installation, refer to the
separate Assembly
Instructions provided.

5.1 BALANCING THE SWING ARM



Remove the screw.



Remove the side cover.



Remove the screws.

Set the desired position.
Four different positions can be set.

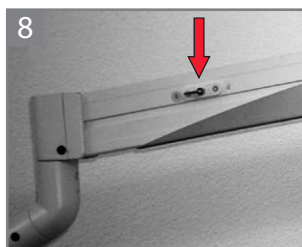
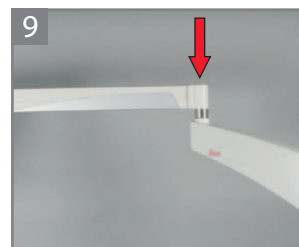
Fasten the screws.



Refit the side cover.



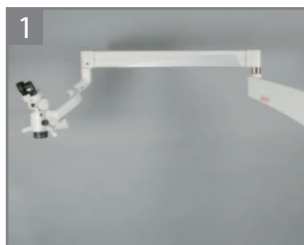
Fasten the screw.

Turn the lever for locking the
vertical position.Adjust the balancing joint to
the weight using an Allen key
(size 8).

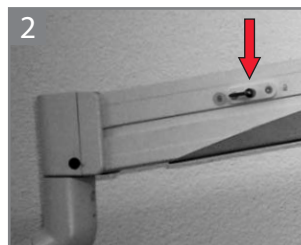
5.2 TRANSPORTING THE MICROSCOPE

CAUTION

Risk of injury from outward movement of swinging arm!
Transport the microscope in transport position.



1 Place swing arm in a horizontal position.



2 Turn the lever for locking the vertical position.



3 Turn the optics/microscope carrier towards the outside.



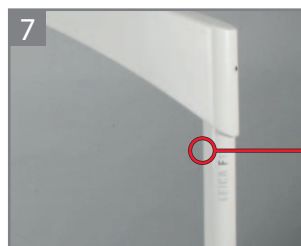
4 Tighten the articulation brake.



5 Open the articulation brake.



6 Fold the swing arm together.
Tighten the articulation brake.



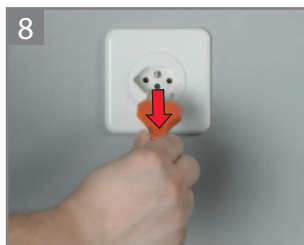
7 Compare the position of the swing arm with the attached sign.



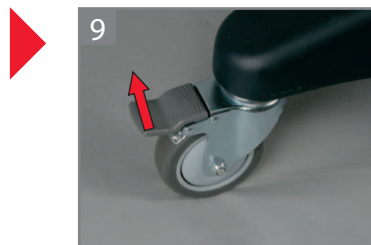
- Transportposition
- Transport position
- Position de transport
- Posizione di trasporto
- Posición de transporte
- Kuljetusasento
- Transportstand
- Transportstilling
- Transportstilling
- Transportläge
- Posição de transporte
- Θέση μεταφοράς
- Pozycja do transportu

NOTE

Possible damage of the cable!
Always pull the plug, never
the cable.



Unplug the power cable.



Release the foot brakes.

CAUTION

Risk of injury to feet!
Always push the instrument
to move it; never pull it.



Push the microscope to the
installation location and
position it.

CAUTION

Danger of microscope rolling
away on its own!
Tighten the foot brakes.



Tighten the foot brakes.

5.3 STARTING UP

⚠ WARNING

Risk of death from electrical shock!
Connect the microscope to a grounded socket only.

i INFO

The length of the HDMI cable must not exceed 15 m. Use only high-quality HDMI cables.

HDMI cables are available from Leica.

i INFO

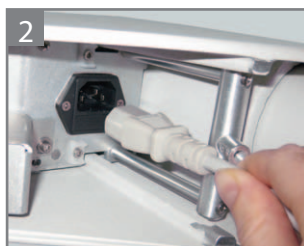
Image output: Resolution is always in HD format (720p/1080i/1080p). Check to ensure that the monitor is compatible with the HD standard.

i INFO

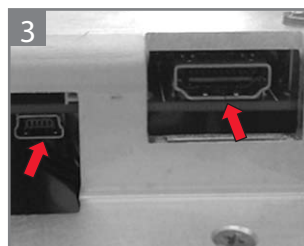
Use only monitors approved for medical purposes or equipped with an isolating transformer. Isolating transformers are available from Leica.



1 Remove cover of the horizontal arm.



2 Plug the power cable into the horizontal arm and fasten it using cable ties.



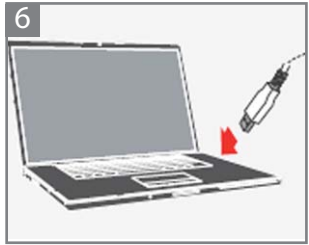
3 Plug the HDMI cable and USB cable (optional) into the horizontal arm and fasten it using cable ties.



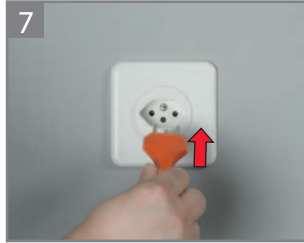
4 Screw in the cover of the horizontal arm and tighten it.



5 Connect the HDMI cable to a suitable monitor or screen.



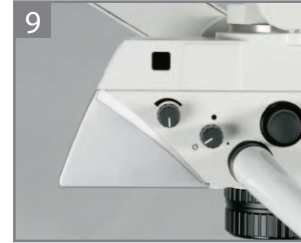
Connect the USB cable to the computer.



Connect the power cable.



Switch on the main switch.
Main switch lights up in green.



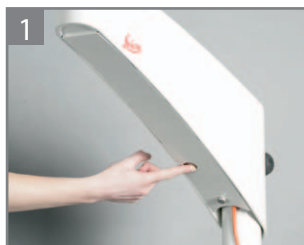
White LED illumination on the optics carrier lights up.

5.4 ADDITIONAL SETTINGS

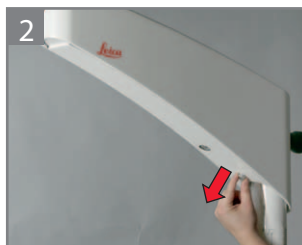
5.4.1 ADJUSTING THE DESIGN LED ILLUMINATOR



There are five different dimming levels.



1
Switch on the main switch.
Main switch lights up in green.



2
Remove cover of the
horizontal arm.

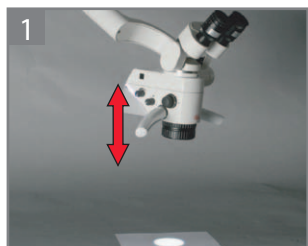


3
Using a ball-point pen or
similar object, press the
switch until the desired
dimming level is reached.



4
Screw in the cover of the
horizontal arm and tighten it.

5.4.2 ADJUSTING THE WORKING DISTANCE



1
Coarse focus by raising and
lowering the microscope.

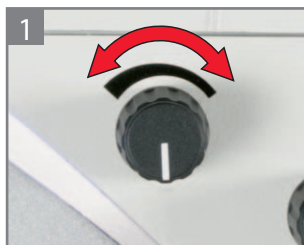


2
Fine focus via optional fine
focusing objective.

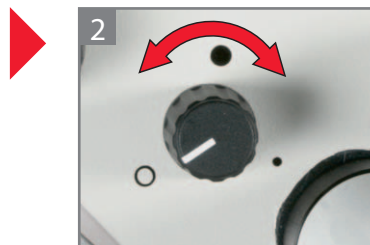
5.4.3 ADJUSTING THE ILLUMINATION

**WARNING**

Danger of retinal damage!
Do not shine lights in
anyone's eyes.



Set the desired illuminance.



Select the desired filter or
diaphragm function:

- White light
- Orange filter
- Spot illumination

5.4.4 ADJUSTING THE INTERPUPILLARY DISTANCE



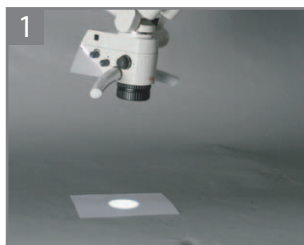
Look into the eyepieces.
Depending on the model,
move the tube manually or
using the drive knob until a
circular field is visible.

5.4.5 ADJUSTING THE PARFOCALITY WITH CAMERA AND MONITOR

i INFO

Parfocal means that the sharpness remains constant over the entire magnification range.

Adjust the diopter settings for both eyes separately and accurately.



Place a piece of paper with writing on it under the objective.



Maximum magnification (40 \times)

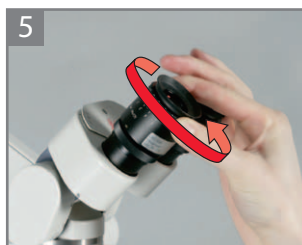


Bring the writing on the sheet of paper into sharp focus on the monitor.

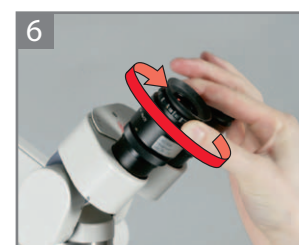
Adjusting the diopter settings



Without looking into the eyepieces, set the minimum magnification (6.4 \times). The image on the monitor must remain sharp!



Turn the dioptic correction on the eyepieces to "+5".

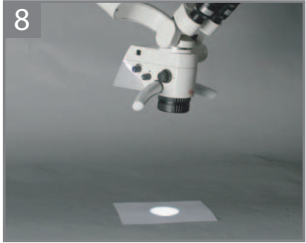


Look into the eyepieces. Rotate each eyepiece individually clockwise, in the "-5" direction, until each eye sees the writing in sharp focus.

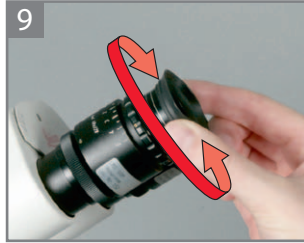


Set maximum magnification (40 \times).





Bring the writing on the sheet into focus.



Turn out the eyecups to the desired distance.

i INFO

The writing should now remain sharp when you change the magnification. If it does not, repeat the procedure.

5.4.6 ADJUSTING THE PARFOCALITY WITHOUT CAMERA AND MONITOR



Parfocal means that the sharpness remains constant over the entire magnification range.

Adjust the diopter settings for both eyes separately and accurately.

Personal diopter setting known:

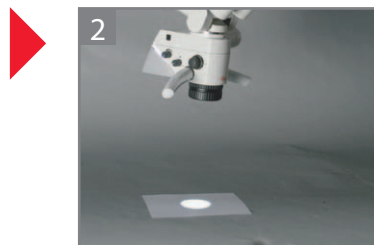


Set dioptic correction on eyepieces.

Personal diopter setting known:



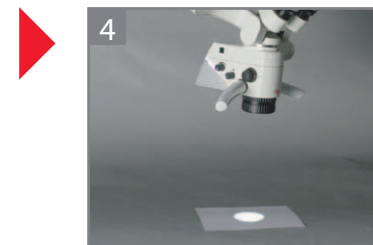
Adjust the dioptic setting at the eyepiece to 0.



Place a piece of paper with writing on it under the objective.



Set maximum magnification (40×)



Bring the writing on the sheet of paper into focus.





Without looking into the eyepieces, set the minimum magnification (6.4 \times).



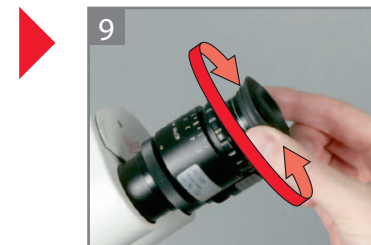
Turn the dioptic correction on the eyepieces to "+5".



Look into the eyepieces. Rotate each eyepiece individually clockwise, in the "-5" direction, until each eye sees the writing in sharp focus.



Set maximum magnification (40 \times).



Turn out the eyecups to the desired distance.

INFO

The writing should now remain sharp when you change the magnification. If it does not, repeat the procedure.

6.1 INFORMATION

6.1.1 STANDARD DELIVERY

- Remote control
- SD card (8 GB or similar)

Optional accessories:

- USB (A-B) cable, 1.8 m
- USB with Repeater cable, 10 m

6.1.2 REQUIREMENTS

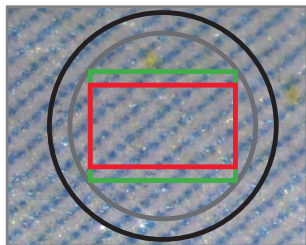
- HDMI port: HDMI-capable screen or television set to the HD ready (720 p) or Full-HD (1080 p) standard.
- and/or
- USB port: Computer with USB connector

6.1.3 EFFECTIVE DISPLAYED SECTION

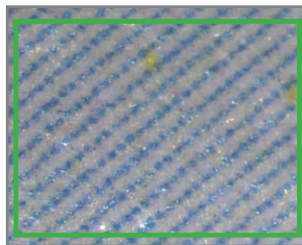


The live image and captured image do not show the same section one sees when looking through eyepieces.

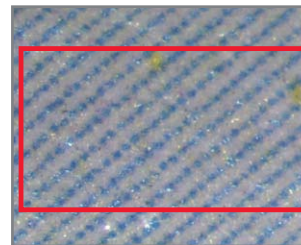
To simplify image centering, install 10.5× eyepiece with crosshair graticule.



10× eyepiece
12.5× eyepiece
4:3 aspect ratio
16:9 aspect ratio



4:3 section



16:9 section

6.2 SD MEMORY CARD

i INFO

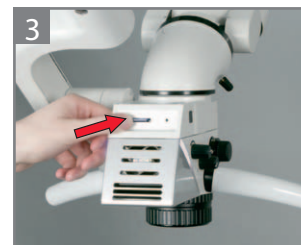
An SD memory card cannot be formatted in the video camera. Format it at a computer or external digital camera. The video camera is designed for SD memory cards up to 32 GB. Leica recommends SD memory cards from Kingston or SanDisc (Speed Class 4 or better).



Push down the cover flap.



Insert the SD memory card into the video camera.



Push in the SD memory card and remove it.

6.3 REMOTE CONTROL

6.3.1 CHANGING THE BATTERY

Changing the battery

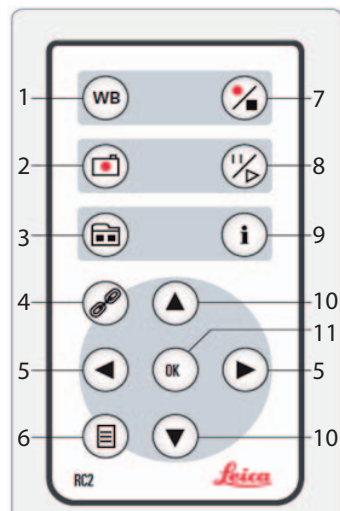


Remove the battery insert from the rear side.



Replace the battery.
(Button battery type CR2032)

6.3.2 OVERVIEW



- 1 Perform white balance adjustment
- 2 Save still image to SD Card
- 3 Thumbnail mode / live view mode
- 4 Perform remote control pairing
- 5 Arrow keys for navigation
- 6 Enter / exit Camera Menu
- 7 Start / stop video recording
- 8 Freeze live view / pause video
- 9 Show / hide information menu
- 10 Arrow keys for navigation
- 11 OK / confirm


6.4 GRAPHICAL USER INTERFACE

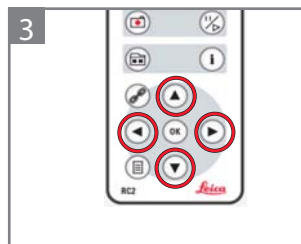
6.4.1 CAMERA MENU



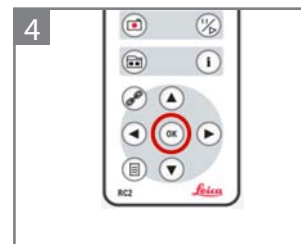
Point the remote control towards the camera..



Call up the Camera Menu with  button.



Navigate with arrow keys.



Press  to confirm.

6.4.2 COLOR (WHITE BALANCE)

Manual White Balance (recommended)



COLOR	OK ▶	SET WB	PRESS OK
EXPOSURE	◀ [Menu]	WB MODE	MANUAL
RESOLUTION		RED LEVEL	039
SETUP CAMERA		BLUE LEVEL	039
SETUP USER		BLACK LEVEL	000
SET FILENAME			

SET WB	PRESS OK
WB MODE	MANUAL
RED LEVEL	039
BLUE LEVEL	039
BLACK LEVEL	000



Use neutral white or gray color chart for manual white balance adjustment.

Manual white balance can be set by:

1. Lay a neutral white paper or gray chart under the focus of the microscope.
Press **WB** on the remote control.

2. Lay a neutral white paper or gray chart under the focus of the microscope. Select "Set WB" and press **OK**. Adjust 'RED LEVEL', 'BLUE LEVEL', and 'BLACK LEVEL' as needed.



3. Select "MANUAL" under WB mode. Adjust 'RED LEVEL', 'BLUE LEVEL', and 'BLACK LEVEL' as needed.

Automatic White Balance

COLOR	OK ▶	SET WB	PRESS OK
EXPOSURE	◀ [Menu]	WB MODE	AUTO
RESOLUTION		RED LEVEL	039
SETUP CAMERA		BLUE LEVEL	039
SETUP USER		BLACK LEVEL	000
SET FILENAME			

SET WB	PRESS OK
WB MODE	AUTO
RED LEVEL	039
BLUE LEVEL	039
BLACK LEVEL	000



Select "AUTO" for automatic white balance adjustment. White balance is adjusted automatically in real-time. Adjust the "BLACK LEVEL" as needed.

6.4.3 EXPOSURE

Manual exposure

COLOR

EXPOSURE

RESOLUTION

SETUP CAMERA

SETUP USER

SET FILENAME

OK

EXP MODE

MANUAL

EXPOSURE

067

GAIN

067

BRIGHTNESS

077

GAMMA

0.40

ALC

NO MASK

Select "MANUAL" for manual exposure.
Correct the values for "EXPOSURE", "GAIN", and "GAMMA".

Automatic exposure (Recommended)

COLOR

EXPOSURE

RESOLUTION

SETUP CAMERA

SETUP USER

SET FILENAME

OK

EXP MODE

AUTO

EXPOSURE

067

GAIN

067

BRIGHTNESS

077

GAMMA

0.40

ALC

NO MASK

Select "AUTO" for automatic exposure.
Correct the values for "BRIGHTNESS" and "GAMMA".

Automatic Light Control (ALC)

COLOR

EXPOSURE

RESOLUTION

SETUP CAMERA

SETUP USER

SET FILENAME

OK

EXP MODE

AUTO

EXPOSURE

067

GAIN

067

BRIGHTNESS

077

GAMMA

1.40

ALC

NO MASK

For automatic exposure, 5 types of "ALC" can be selected:
"NO MASK", "GRID", "S CIRCLE", "M CIRCLE" and "L CIRCLE"

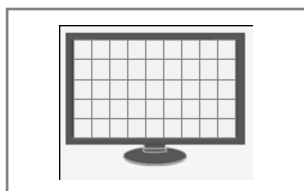


No Mask



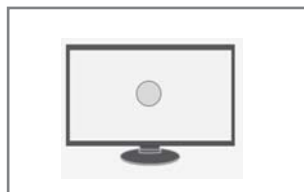
The exposure is automatically adjusted based on the entire image seen on the screen.

Grid



The exposure is automatically adjusted based on the grid(s) selected.

S Circle



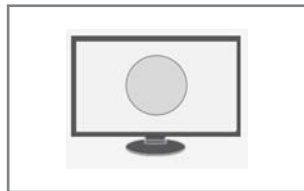
The exposure is automatically adjusted based on the small sized circle ("S CIRCLE"), as indicated on the screen.

M Circle



The exposure is automatically adjusted based on the medium sized circle ("M CIRCLE"), as indicated on the screen.

L Circle



The exposure is automatically adjusted based on the large sized circle ("L CIRCLE"), as indicated on the screen.

6.4.4 RESOLUTION

LIVE

COLOR
EXPOSURE
RESOLUTION
SETUP CAMERA
SETUP USER
SET FILENAME



LIVE	<	HD 1080-25	>
CAPTURED		10.0MP-JPG	
MOVIE		HD 1080-MP4	



Select the resolution for live view:
(16×9 mode)

HD720p50, HD720p60, HD1080p25, HD1080p30,
HD1080i50, HD1080i60.

(4×3 mode)

720p50-4×3, 720p60-4×3, 1080i50-4×3, 1080i60-4×3.

CAPTURED

COLOR
EXPOSURE
RESOLUTION
SETUP CAMERA
SETUP USER
SET FILENAME



LIVE		HD 1080-25	
CAPTURED	<	10.0MP-JPG	>
MOVIE		HD 1080-MP4	



Select resolution for still image:
2.5 MP, 5.0 MP, 10.0 MP.

MOVIE

COLOR
EXPOSURE
RESOLUTION
SETUP CAMERA
SETUP USER
SET FILENAME



LIVE		HD 1080-25	
CAPTURED		10.0MP-JPG	
MOVIE	<	HD 1080-MP4	>



Select resolution for video file:
HD1080, HD720.



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 button: Pressing the 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 and a signal tone is output. Repeat the last step until a live image is displayed. The camera can activate 10 different resolutions in sequence.

6.4.5 SETUP CAMERA (VIDEO CAMERA SETTINGS)

CAPTURE MODE

COLOR
EXPOSURE
RESOLUTION
SETUP CAMERA
SETUP USER
SET FILENAME

OK ▶

◀ [Menu]

CAPTURE MODE

◀ NORMAL ▶

SET DATE/TIME PRESS OK

SHOW DATE/TIME NONE

SHOW FILENAME NONE

FLIP IMAGE 0°

AUDIO/BEEP ON

LEICA LOGO NONE

RESET CAM PRESS OK



Select the still image capture mode:
Normal: Normal capture mode (Recommended)
High Sens: High sensitivity mode. This option helps to capture sharper image when the object is moving
Burst: 3 images will be captured consecutively

SET DATE/TIME

COLOR
EXPOSURE
RESOLUTION
SETUP CAMERA
SETUP USER
SET FILENAME

OK ▶

◀ [Menu]

CAPTURE MODE

NORMAL

SET DATE/TIME PRESS OK

SHOW DATE/TIME NONE

SHOW FILENAME NONE

FLIP IMAGE 0°

AUDIO/BEEP ON

LEICA LOGO NONE

RESET CAM PRESS OK



Set the date/time and select the format:
"DMY" = Day/Month/Year, 24 h
"MDY" = Month/Day/Year, 12 h (AM/PM)
"YMD" = Year/Month/Day, 24 h

SHOW DATE/TIME

The screenshot shows the camera's menu system. On the left, a vertical list of menu items includes 'COLOR', 'EXPOSURE', 'RESOLUTION', 'SETUP CAMERA' (highlighted in red), 'SETUP USER', and 'SET FILENAME'. An 'OK' button with a right arrow is next to 'SETUP CAMERA'. To the right, a second menu is displayed with options: 'CAPTURE MODE' (NORMAL), 'SET DATE/TIME' (PRESS OK), 'SHOW DATE/TIME' (highlighted in red), 'SHOW FILENAME' (NONE), 'FLIP IMAGE' (0°), 'AUDIO/BEEP' (ON), 'LEICA LOGO' (NONE), and 'RESET CAM' (PRESS OK). A left arrow and a right arrow are positioned next to the 'SHOW DATE/TIME' option. To the right of the menu, a text box explains the selection options for 'Show Date/Time':

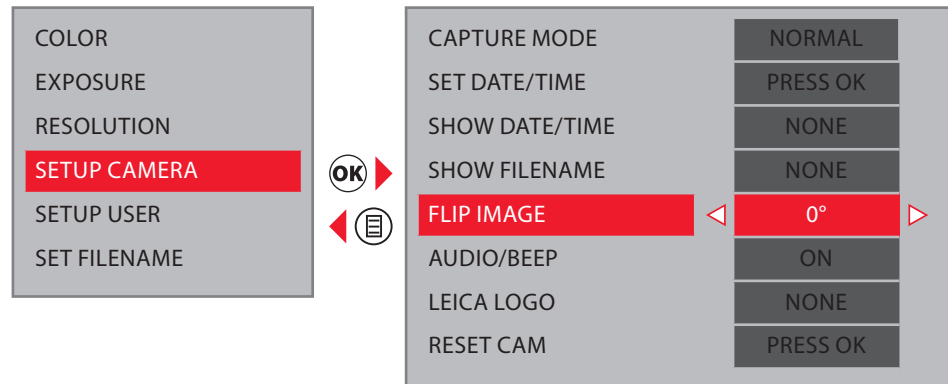
Select the option for Show Date/Time:
 LIVE ONLY: Date/Time in live view only
 IMG ONLY: Date/Time in still captures only
 LIVE + IMG: Date/Time in live view + still captures

SHOW FILENAME

The screenshot shows the camera's menu system. On the left, a vertical list of menu items includes 'COLOR', 'EXPOSURE', 'RESOLUTION', 'SETUP CAMERA' (highlighted in red), 'SETUP USER', and 'SET FILENAME'. An 'OK' button with a right arrow is next to 'SETUP CAMERA'. To the right, a second menu is displayed with options: 'CAPTURE MODE' (NORMAL), 'SET DATE/TIME' (PRESS OK), 'SHOW DATE/TIME' (NONE), 'SHOW FILENAME' (highlighted in red), 'FLIP IMAGE' (0°), 'AUDIO/BEEP' (ON), 'LEICA LOGO' (NONE), and 'RESET CAM' (PRESS OK). A left arrow and a right arrow are positioned next to the 'SHOW FILENAME' option. To the right of the menu, a text box explains the selection options for 'Show Filename':

Select the option for Show Filename:
 LIVE ONLY: Filename in live view only
 IMG ONLY: Filename in still captures only
 LIVE + IMG: Filename in live view + still captures



FLIP IMAGE



The screenshot shows the camera's main menu with 'SETUP CAMERA' highlighted in red. To the right, the 'FLIP IMAGE' sub-menu is displayed, with '0°' selected. Navigation icons (OK, back, forward, and a list icon) are shown between the menus.

COLOR	CAPTURE MODE	NORMAL
EXPOSURE	SET DATE/TIME	PRESS OK
RESOLUTION	SHOW DATE/TIME	NONE
SETUP CAMERA	SHOW FILENAME	NONE
SETUP USER	FLIP IMAGE	0°
SET FILENAME	AUDIO/BEEP	ON
	LEICA LOGO	NONE
	RESET CAM	PRESS OK

Select the option for the image orientation:

- 0° Original orientation
-  Image is mirrored horizontally
-  Image is mirrored vertically
- 180° Image is rotated 180°

AUDIO/BEEP



The screenshot shows the camera's main menu with 'SETUP CAMERA' highlighted in red. To the right, the 'AUDIO/BEEP' sub-menu is displayed, with 'ON' selected. Navigation icons (OK, back, forward, and a list icon) are shown between the menus.

COLOR	CAPTURE MODE	NORMAL
EXPOSURE	SET DATE/TIME	PRESS OK
RESOLUTION	SHOW DATE/TIME	NONE
SETUP CAMERA	SHOW FILENAME	NONE
SETUP USER	FLIP IMAGE	0°
SET FILENAME	AUDIO/BEEP	ON
	LEICA LOGO	NONE
	RESET CAM	PRESS OK

Select "ON" to have audio signal when capturing still images or initiating video recordings.

LEICA LOGO

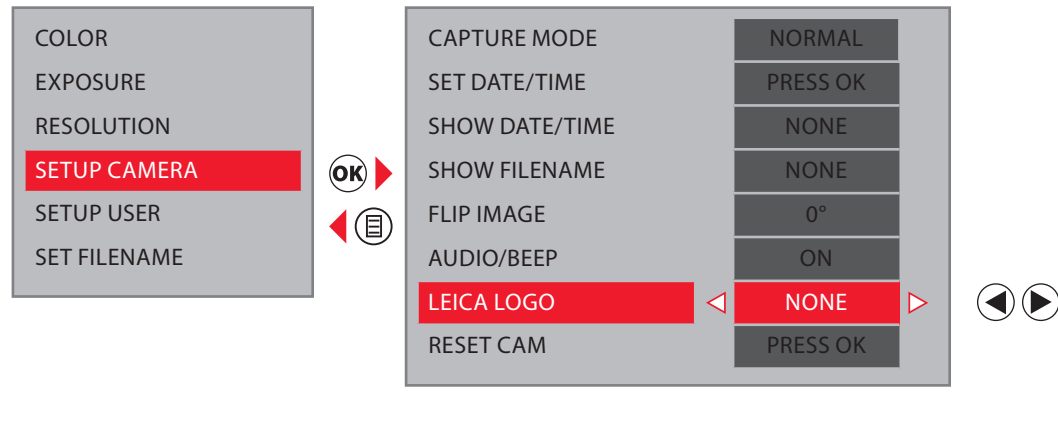


Diagram illustrating the navigation steps to select the Leica Logo option:

- From the main menu, select **SETUP CAMERA**.
- From the setup menu, select **LEICA LOGO**.
- Select the option for Leica Logo:
 - NONE** : No Logo display
 - LIVE ONLY** : Logo in live view only
 - IMG ONLY** : Logo in still captures only
 - LIVE + IMG** : Logo in live view + still captures

RESET CAMERA

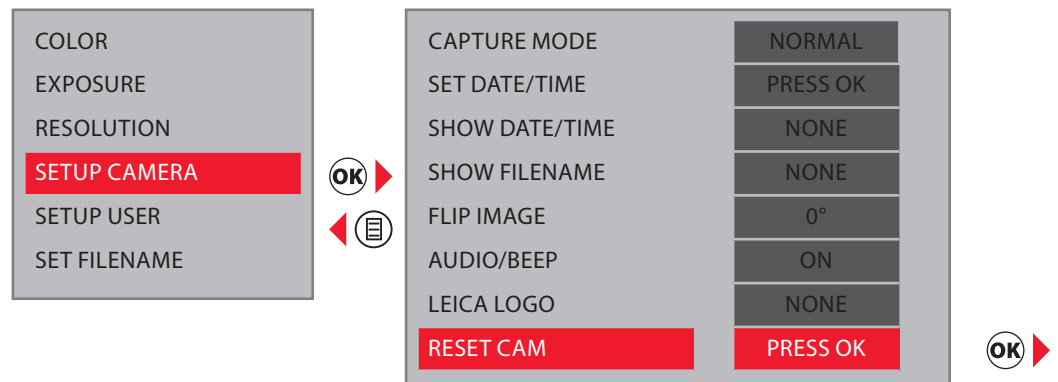
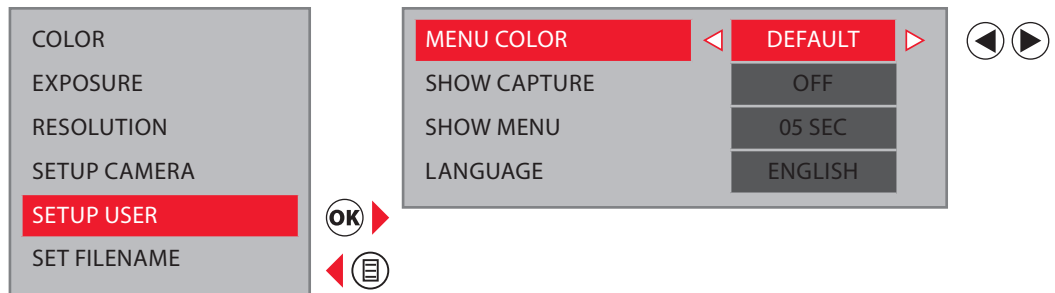


Diagram illustrating the navigation steps to reset the camera:

- From the main menu, select **SETUP CAMERA**.
- From the setup menu, select **RESET CAM**.
- Press **OK** to restore all settings of the video camera to the factory settings.

6.4.6 SETUP USER (USER-DEFINED SETTINGS)

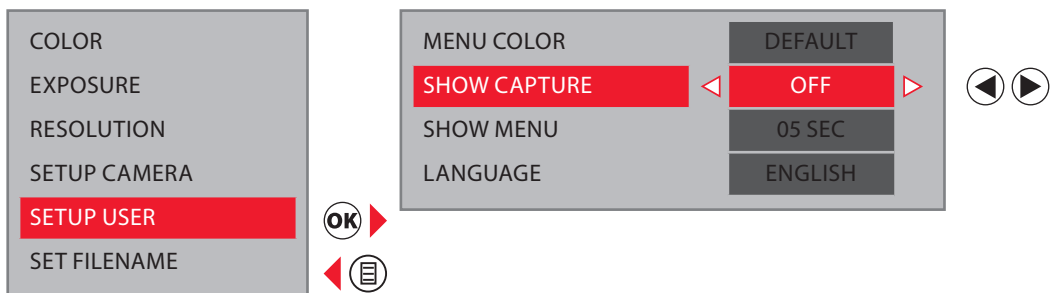
MENUE COLOR



Color scheme for menu:

- "LEICA/LAS " : red
- "DEFAULT" : blue

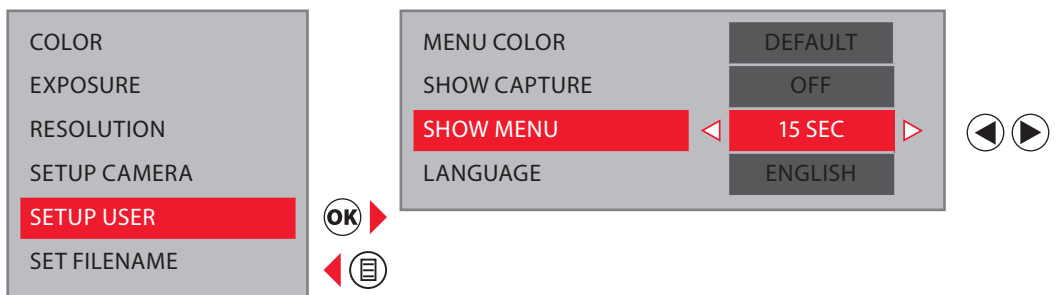
SHOW CAPTURE



Display mode & display duration of the image after it is captured:

- "OFF", "FULL-1SEC", "PIP-1SEC", "FULL-3SEC", "PIP-3SEC", "PIP-INFI".
- FULL: : Full screen
- PIP: : Picture in picture

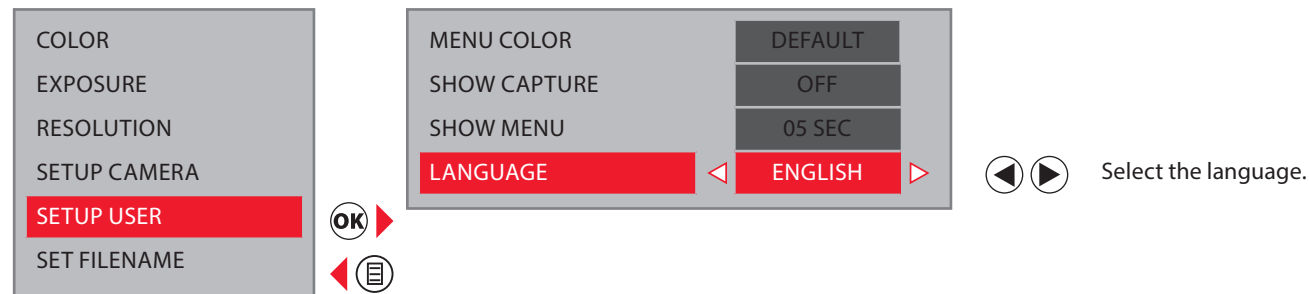
SHOW MENUE



Display duration of the Camera Menu on the screen:

- "5 SEC ", "10 SEC ", "15 SEC ", "20 SEC ", "25 SEC ", "30 SEC "

LANGUAGE



6.4.7 SET FILENAME



6.4.8 QUICK MENU



FILE TRANSFER MODE



QUICK MENU

◀ FILE TRANSFER ▶



Press  to call up the "QUICK MENU".
Select "FILE TRANSFER MODE", and press .



In "FILE TRANSFER MODE", the SD card will appear as 'Removable Disk' on the PC, and files can be copied from the SD card and pasted to the local PC.

SET FILENAME



QUICK MENU

◀ SET FILENAME ▶



Select "SET FILENAME" to enter "SET FILENAME" menu.


LENS SHADING



QUICK MENU

◀ LENS SHADING ▶



Select "LENS SHADING" and press .

Select the lens shading setting based on the actual magnification used:
6.4×, 10.0×, 16.0×, 25.0×, 40.0×.



6.4.9 AUTOMATIC LIGHT CONTROL (ALC)



ALC

NO MASK



Press   to select the ALC mode:
 "NO MASK", "GRID", "S CIRCLE", "M CIRCLE", OR "L CIRCLE"


6.4.10 CAPTURE MODE



CAPTURE MODE

NORMAL





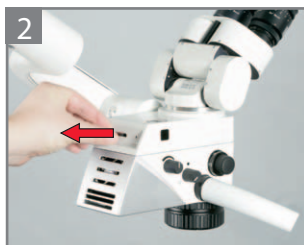
Press  to select the capture mode:
 "NORMAL", "HIGH SENS" or "BURST"

6.5 ACQUISITION

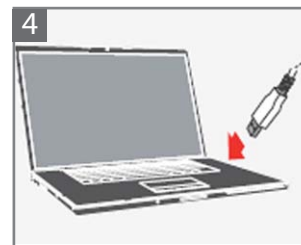
6.5.1 IMAGES



Press  on the remote control or  on the video camera still images. A signal tone sounds.







Files can be transferred to PC by:
1. Removing the SD card from the camera and insert the SD card into the SD card reader on the computer.



2. Entering "FILE TRANSFER MODE" and the SD card will appear as "Removable Disk" on the computer.

6.5.2 VIDEOS



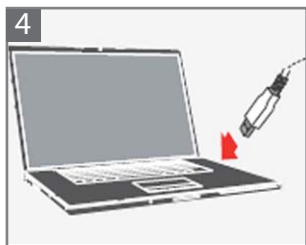
Press  on the remote control or  on the video camera to initiate video recordings. A signal tone sounds. To end the video recording, press  on the remote control or  on the video camera. A signal tone sounds.



Files can be transferred to PC by:
1. Removing the SD card from the camera and insert the SD card into the SD card reader on the computer.



Transfer the video to a computer using the SD card reader.



2. Entering "FILE TRANSFER MODE" and the SD card will appear as "Removable Disk" on the computer.



You can show and hide the timer using the **i** key.

6.5.3 VIEWING IMAGES



Press **[Thumbnail Mode]** to enter thumbnail mode.



Navigate by using the arrow keys.
Press **[OK]** to select the image.

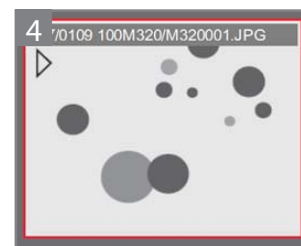
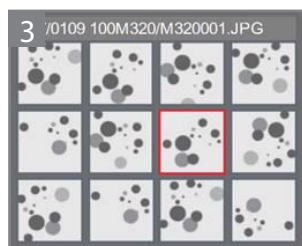


Image selected will be displayed in full screen.

ROTATING IMAGE



To rotate the image, press to enter the rotation menu.



Press to rotate the image counter clockwise.
Press to rotate the image clockwise.



Press to return to live view.

ZOOMING IMAGE



Press to enlarge the still image.
(Zoom 2x)

Continue to press to enlarge the still image.
(Zoom 3x, Zoom 4x)

Press 4 times to return to original image size.

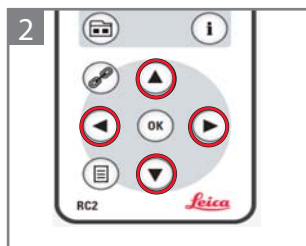


Press to return to live view.

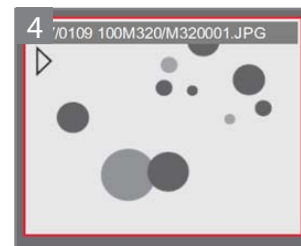
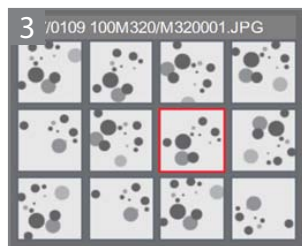
6.5.4 VIEWING VIDEOS



Press to enter thumbnail mode.



Navigate by using the arrow keys.
Press to play the video.



Press to forward the video.
Press to rewind the video.
Press to pause / resume the video.

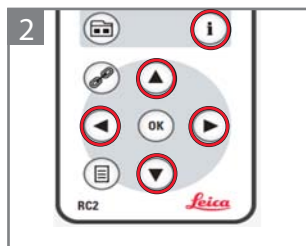


Press to return to live view.

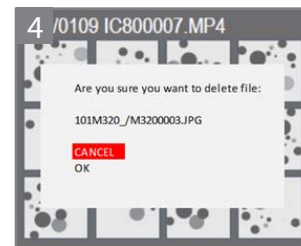
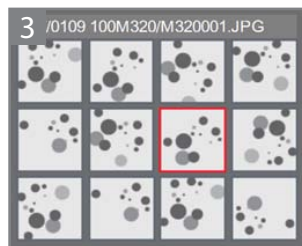
6.5.5 DELETING FILES



Press to enter thumbnail mode.



Navigate by using the arrow keys.
Press to select the image for deletion.




Confirm the file name to be deleted.
Select "OK" to permanently delete the file from SD card.
Select "CANCEL" to cancel the file deletion process.

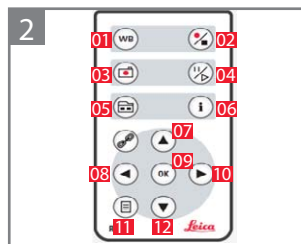
6.5.6 PAIRING REMOTE CONTROL


i INFO

Remote control pairing allows the camera to only respond to the one specific remote control, which had been paired to the camera previously. This is helpful when there are multiple cameras and remote controls in the same room.





Press  to start or end the pairing. Press and hold the button on the remote control, to define the pairing button, until the confirmation message is displayed on the screen.



All of the buttons (01–12) except the  button can be used for this. Upon completion, a 'beep' sound will be generated and the camera will only respond to this particular remote control after pairing.

i INFO

In order to achieve successful pairing and avoid pairing by mistake, the second step must be performed within 4 seconds. If a "timeout" is displayed after 4 seconds, press the "Pair" button again to start the process.

Resetting to factory setting:
Press the  button to start the process.
Press the  button until a corresponding confirmation is displayed on the display.



NOTE

Possible loss of data!
Before decommissioning the surgical microscope, end the video recording procedure.



Bring the surgical microscope into transport position (see "5.3 Transporting the microscope").



Switch off the surgical microscope at the main switch.

8.1 MAINTENANCE INSTRUCTIONS

- Keep accessories away from dust when not in use, e.g. protect them using a dust cover.
- Remove dust with a pneumatic rubber bulb and a soft brush.
- Clean lenses and eyepieces using special optics cleaning cloths and pure alcohol.
- Thoroughly clean the optics carrier using germicidal disinfectant after each time it is handled.
- Protect your microscope from moisture, fumes and acids and from alkaline and caustic materials. Do not store chemicals close to the instrument.
- Protect from improper use. Never install other device sockets or unscrew optical systems and mechanical parts unless explicitly instructed to do so in this User Manual.
- Protect the microscope from oil and grease. Never oil or grease the guide surfaces or mechanical parts.
- Remove coarse contamination using a damp disposable cloth.
- Use disinfectants based on the following active ingredients: aldehydes, alcohols, quaternary ammonium compounds.
- Do not use preparations based on the following: halogen-splitting compounds, strong organic acids, oxygen-splitting compounds.
- Camera: Keep optical components clean. Clean optical surfaces using a lint-free cloth. Soak the cloth using a little methanol or glass cleaner. Do not use alcohol.
- Do not use ethanol or spirits.

Tropical environment/fungus

Leica Microsystems employs certain safety precautions in its manufacturing techniques and materials. Other preventive measures include:

- Keep optical parts clean.
- Use and store them in a clean environment only.
- Store under UV light when not in use.
- Use in continuously climate-controlled rooms only.
- Keep moisture away and cover using a plastic cover filled with silica gel.

Notes on reprocessing of resterilizable products

Limitations on reprocessing

Observe local legal regulations when processing medical products used to treat patients who have or are suspected to have Creutzfeldt-Jakob disease (CJK) or its variant (vCJK). Usually, these resterilizable medical products can be safely disposed of by burning.

Occupational safety and health protection

Observe work safety and health protection of persons responsible for processing contaminated products.

Current regulations of hospital hygiene and prevention of infection must be observed in the preparation, cleaning and disinfection of the products.

Instructions

Workplace

Remove surface contamination with a paper towel.

Reprocessing

Recommended: reprocess a product immediately after use.

Sterilization

		Permissible sterilization methods	
Article No.	Designation	Steam autoclave 134 °C, t > 10 min.	Ethylene oxide max. 60 °C
10428328	Rotary knob, binocular tube T	x	
10384656	Rotary knob, transparent	x	
10443792	Lever extension	x	
10446058	Protective glass, multifocal lens		x ¹⁾
10448431	Protective objective glass, Leica M320		x ¹⁾
10448296	Objective protective glass, Leica M720, spare part (package of 10)		x ¹⁾
10448280	Protective objective glass, Leica M720, complete, sterilizable		x ¹⁾
10446469	Protective objective glass, Leica M680/FL400		x ¹⁾
10446467	Protective objective glass, Leica M840/M841		x ¹⁾
10180591	Clip-on handle	x	
10446842	Handle for Leica M400, sterilizable	x	
10445341	Handle for Leica M655, sterilizable	x	
10445340	Cap for Leica M655/M695, sterilizable	x	
10448440	Cover, sterilizable for Leica M320 handle	x	
10448581	Cover, sterilizable for Leica RUV800	x	

¹⁾ Products with optical components can be steam-autoclaved using the conditions listed above. However, this may cause a layer of dots and streaks to form on the glass surface, which may reduce the optical performance.

Cleaning

Needed: water, detergent, spirits, microfiber cloth

1. Flush the surface with running water (<40 °C), using a little detergent if necessary.
2. Also use spirits to clean optical components.
3. Dry optical components using a microfiber cloth, dry the rest of the product using a paper towel.

Disinfection

After disinfection, thoroughly clean optical surfaces using running water/fresh drinking water and then rinse using fresh, demineralized water.

Dry the products completely before the subsequent sterilization.

Leica Microsystems (Schweiz) AG validates:

The instructions above are suitable for preparing a product to be reused. The processor is responsible for the desired results.

Before deviating from the instructions provided, first verify the deviations for effectiveness and possible consequences.

Maintenance

The Leica M320 surgical microscope is maintenance-free. To ensure operational safety and reliability, Leica Microsystems (Schweiz) AG recommends taking the precaution of contacting the responsible service organization. There, periodic inspections can be agreed or a maintenance contract can be concluded.

8.2 CHANGING FUSES

**WARNING**

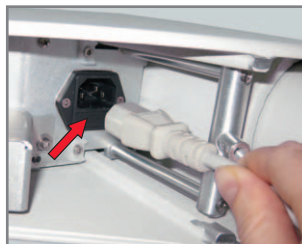
Danger of fatal electric shock!
Disconnect the power cable
from the instrument power
socket before changing fuses.

**INFO**

The fuse is in a fuse holder
(arrow) in the device power
socket.



Remove cover of the
horizontal arm.



Push out fuse holder with
screwdriver.
Remove fuse from the fuse
holder (arrow) and replace.



Screw in the cover of the
horizontal arm and tighten it.

9.1 MICROSCOPE

Problem	Solution	Location
Swing arm moves up/down by itself.	Balance system/swing arm.	See "5.1 Balancing the swing arm"
Swing arm is lowered when the articulation brakes are engaged.	<ul style="list-style-type: none"> - Reduce the total weight (at the optics carrier). - Turn the lever for locking the vertical position. 	See "5.1 Balancing the swing arm"
Microscope moves with difficulty or not at all.	Loosen/reset the articulation brakes.	See "3.5 Brake knobs/ articulation brakes"
No light.	<ul style="list-style-type: none"> - Check/replace lamp. - Check illumination control and illuminance. - Check the filter and diaphragm control. - Lower the swing arm, the tilt switch may be active. - Check the socket and fuse. - Contact service technician. 	Instructions for replacing the LED
Insufficient light.	Check illumination control and illuminance.	See "5.4.3 Adjusting the illumination"
Image is not sharp.	<ul style="list-style-type: none"> - Screw in eyepieces firmly. - Set the parfocality and diopter settings correctly. 	See "5.4.4 Adjusting the interpupillary distance"
Microscope tilting.	- Balance system/swing arm.	See "5.1 Balancing the swing arm"
Interference from light reflections.	Turn the protective glass, must be at an oblique angle relative to the work surface.	
Streaks in the image.	Clean optics.	
No image.	Magnification control not engaged.	
Beep every four seconds, light switches off automatically after five minutes.	Contact service technician, have fan replaced.	
Double beep every four seconds, light switches off automatically after five minutes.	Allow the LED to cool off, switch off the instrument.	

9.2 VIDEO CAMERA

Problem	Solution	Location
No acquisition possible, "SD Card Lock" appears on the screen.	Push the slide bar for write protection on the SD memory card upwards.	
No acquisition possible.	Insert SD memory card.	See "6.2 SD memory card"
Remote control does not work.	<ul style="list-style-type: none"> - Check battery. - Point remote control at video camera, not at screen. 	See "6.3.1 Changing the battery"
Specimen out of focus.	<ul style="list-style-type: none"> - Focus accurately. - Use eyepiece with crosshair reticle. 	
No image on screen.	<ul style="list-style-type: none"> - Check cable connection. - Check screen. 	See "6 Video camera"
Photo is too dark.	Reset colors.	See "6.4.2 COLOR (white balance)"
Colors not accurate.	Carry out white balance.	See "6.4.2 COLOR (white balance)"
File Transfer not possible	Check USB cable connection	



If your instrument has a malfunction that is not described here, contact your Leica representative.

Electrical data

Power socket	
Stand F12, W12, C12, FP12, TC12, TP12, LW12	Centrally located on the control unit 100-240 V AC ($\pm 10\%$), 50/60 Hz
Fuse	2 \times T 6.3 AL/250 V
Power consumption	Leica M320 F12/C12/W12/FP12/TC12/TP12/LW12: 100 VA
Safety class	Class I / IP20
Control unit	Connection sockets for - Power cable - HDMI - USB

Surgical microscope

Magnification	Manual apochromatic 5-step magnification changer 6.4/10/16/25/40 \times
Stereo base	24 mm
Fix Objective (standard) Fix Objective (optional)	f=250 mm f=200, 225, 250, 300, 350, 400 mm
Manual fine focus Objective (optional)	f=200, 250, 300 mm
Eyepiece (standard) Eyepiece (optional)	10 \times 21B 12.5 \times 17B, 8.33 \times 22B, eyepiece 10 \times 21B with centered crosshair graticule
Tilt	-30°/+100°
Reset functions	Limit switch for light on/off

Lamps

Light source	Direct and long-lasting 2-LED illumination Average service life of 60,000 h for an end-of-life criterion of 70 % of the initial brightness; Class 1 LED Product
UV filter	UV and IR-free LED illumination
Orange filter	OG530
Light intensity adjustment	Using a drive knob on the optics carrier

Optical Data

Objective f = 250 mm				
Eyepiece	Total magnification (mm)		Field of view \varnothing (mm)	
	min.	max.	max.	min.
8.33 \times 22	2.1	13.4	86.2	13.6
10 \times 21	2.6	16.2	82.2	13.1
12.5 \times 17	3.2	20.2	66.6	10.6

Stands

Leica M320 F12 Floor stand	
Max. extension range	1775 mm (Fully stretched for the inclined version)
Travel range (up/down)	800 mm
Base	Footprint: 608 \times 608 mm
Transportation height, min.	1621 mm
Balancing Range	Min. 1.1 kg to max. 4 kg load on the optics carrier
Brake system	Fine adjustable mechanical brakes for all rotation axis with detachable brake knob.
Rotation ranges	At column: 360° For the swing arm: +190°/-125° For the microscope carrier at swing arm: $\pm 155^\circ$ For the lateral microscope carrier movement: $\pm 60^\circ$
Weight of the whole	
System with max. load	ca. 116 kg

Accessories

Binocular tube - with fixed angle - variable	3 different selection options 3 different selection options
Handles	2 variants: Sterilizable/disinfectable or disinfectable
Rotary knobs	Sterilizable
Protective glass	Sterilizable
Orange filter	External UV light filter up to 530 nm for illumination and observation
ErgoWedge	5°- to 25°-angle for binocular tubes with fixed angle
ErgonOptic Dent	with 52° swivel angle, for binocular tubes variable from 0° to 180°
Remote control	IR remote control for the integrated video camera
Counterweight	Weight for balancing the optics carrier
Beam splitter	50/50 % and 70/30 %
Stereo adapter	Spacer for assembly of the beam splitter
Eyepieces	8.33×, 10×, 10× with crosshair graticule, 12.5×

Video Accessories

Leica M320 FULL HD Video & Photo Camera	
Integrated (optional) Full HD video camera	1920×1080 px video resolution and 10 MB photo resolution
Functions	Playback function for video and photo and thumbnail view
Storage	Video and photo on SD card, video optionally also on external recording system
Video signal	Available in HDMI and analog (PAL/NTSC selectable)
Video/photo control	IR remote control and two hard keys on camera body, all camera settings with on screen menu
Leica M320 IVA Integrated Video Adapter	
Adapter	Integrated (optional) video adapter for attachment of external c-mount cameras
Length of optics	Focal length of optics f=55 mm

Ambient conditions

Use	+10 °C to +40 °C +50 °F to +104 °F 30 % to 75 % relative humidity 500 mbar to 1060 mbar air pressure
Storage	-30 °C to +70 °C -22 °F to +158 °F 10 % to 100 % relative humidity 500 mbar to 1060 mbar atmospheric pressure
Transport	-30 °C to +70 °C -22 °F to +158 °F 10 % to 100 % relative humidity 500 mbar to 1060 mbar atmospheric pressure

Standards fulfilled

- CE conformity:**
- Medical Devices Directive 93/42/EEC including amendments.
 - Classification: Class I, in compliance with Appendix IX, Rule 1, and Rule 12 of the Directive.
 - Medical electrical equipment, part 1: General requirements for Safety IEC/60601-1; EN/60601-1; UL60601-1; CAN/CSA-C22.2 NO. 601.1-M90.
 - Electromagnetic compatibility IEC/60601-1-2; EN/60601-1-2.
 - According to SQS certificate, Leica Microsystems (Schweiz) AG, Medical Division has a management system which corresponds to the requirements of the international standards ISO/9001, ISO/13485 and ISO/14001 for quality management, quality assurance and environmental management.

Limitations on use

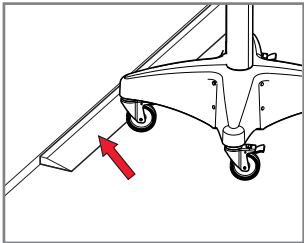
The Leica M320 surgical microscope may be used in enclosed rooms and on flat surfaces with max. 0.3° unevenness and on stable walls or ceilings that fulfill our specifications (see Installation Manual).

Not intended for ophthalmology.

The Leica F12 stand is not intended to be moved down steps of more than 20 mm in height.

To move the surgical microscope over thresholds of 20 mm, the wedge (arrow) included in the packaging can be used.

Without auxiliary equipment, the Leica M320 can only be moved across thresholds up to a max. height of 5 mm.



Place the wedge (arrow) in front of the threshold.

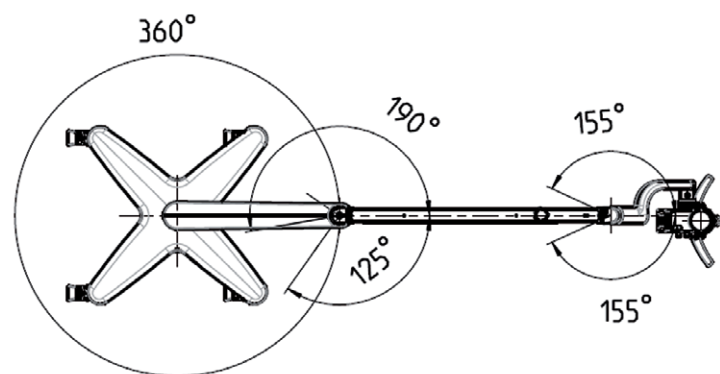
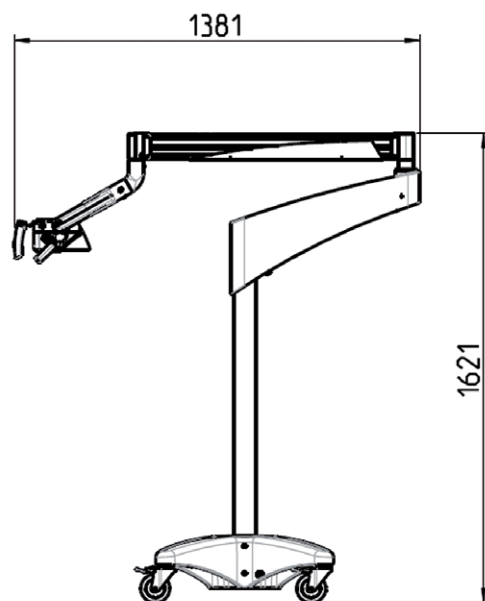
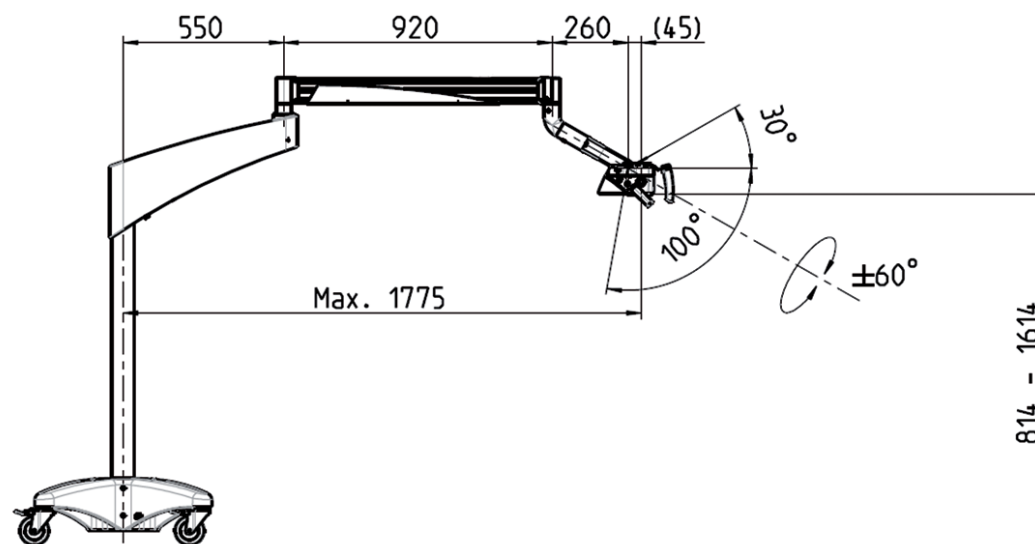
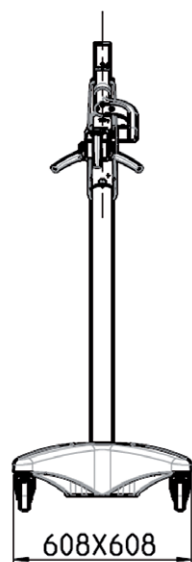
Move the surgical microscope across the threshold in transport position, pushing it by the handgrip.

Working range

	Leica M320 F12 long swing arm (standard)	Leica M320 short swing arm	Leica M320 W12	Leica M320 C12
Max. extension range	1775 mm	1455 mm	1775 mm	1775 mm
Travel range (up/down)	800 mm	300 mm	800 mm	800 mm
Base	608×608 mm		NA	Diameter 247 mm
Transportation height, min.	1621 mm		NA	NA
Balancing Range	Min 1.1 kg to max 4 kg	Min 1.5 kg to max 4 kg	Min 1.1 kg to max 4 kg	Min 1.1 kg to max 4 kg
Brake system	Fine adjustable brakes for all axes with detachable brake knob.			
Rotation ranges	<ul style="list-style-type: none"> - For column 360° - Swing arm +190°/-125° - Microscope carrier on swing arm ±155° - Lateral microscope carrier movement ±60° 	<ul style="list-style-type: none"> - For column 360° - Swing arm +150°/-150° - Extension arm on swing arm ±150° - Microscope carrier on extension arm ±155° - Lateral microscope carrier movement ±60° 	<ul style="list-style-type: none"> - For column 180° - Swing arm +190°/-125° - Microscope carrier on swing arm ±155° - Lateral microscope carrier movement ±60° 	<ul style="list-style-type: none"> - For column 180° - Swing arm +190°/-125° - Microscope carrier on swing arm ±155° - Lateral microscope carrier movement ±60°
Total weight of the system with maximum load	116 kg	110 kg	35 kg	48 kg

Leica M320 FP12	Leica M320 TC12	Leica M320 TP12	Leica M320 LW12	Comment
1775 mm	1455 mm	1455 mm	1455 mm	Fully stretched for the inclined version
800 mm	300 mm	300 mm	300 mm	
Diameter 247 mm	250×250 mm	250×250 mm	NA	
NA	NA	NA	NA	
Min 1.1 kg to max 4 kg	Min 1.5 kg to max 4 kg	Min 1.5 kg to max 4 kg	Min 1.5 kg to max 4 kg	Load on the optics carrier
Fine adjustable brakes for all axes with detachable brake knob.				
<ul style="list-style-type: none"> - For column 360° - Swing arm +190°/-125° - Microscope carrier on swing arm ±155° - Lateral microscope carrier movement ±60° 	<ul style="list-style-type: none"> - For column 180° - Swing arm +150°/-150° - Extension arm on swing arm ±150° - Microscope carrier on extension arm ±155° - Lateral microscope carrier movement ±60° 	<ul style="list-style-type: none"> - For column 180° - Swing arm +150°/-150° - Extension arm on swing arm ±150° - Microscope carrier on extension arm ±155° - Lateral microscope carrier movement ±60° 	<ul style="list-style-type: none"> - For column 180° - Swing arm +150°/-150° - Extension arm on swing arm ±150° - Microscope carrier on extension arm ±150° - Lateral microscope carrier movement ±60° 	
46 kg	41 kg	38 kg	30 kg	

Dimensions (in mm)



Manufacturer's declaration of electromagnetic compatibility (EMC)



This "Guidance and manufacturer's declaration" document is based on EN 60601-1-2: 2007.

Table 1: Emission

Guidance and manufacturer's declaration - electromagnetic emissions		
The Leica M320 surgical microscope is intended for use in the electromagnetic environment specified below. The customer or the user of the Leica M320 surgical microscope should assure that it is used in such an environment.		
Emission test	Compliance	Electromagnetic environment - guidance
RF emissions CISPR 11	Group 1	The Leica M320 surgical microscope uses RF energy only for its internal function. Therefore, its RF emissions are very low and are not likely to cause any interference in nearby electronic equipment.
RF emissions CISPR 11	Class A	"The Leica M620 F20 surgical microscope is suitable for use in establishments other than domestic and those directly connected to the public low-voltage power supply network that supplies buildings used for domestic purposes."
Harmonic emissions IEC 61000-3-2	Class A	
Voltage fluctuations / flicker emissions IEC 61000-3-3	according	

Table 2: Immunity (all devices)

Guidance and manufacturer's declaration - electromagnetic immunity			
The Leica M320 surgical microscope is intended for use in the electromagnetic environment specified below. The customer or the user of the Leica M320 surgical microscope should assure that it is used in such an environment.			
Immunity test standard	IEC 60601 test level	Conformity level	Electromagnetic environment - Guidance
Electrostatic discharge (ESD) IEC 61000-4-2	±6 kV contact discharge ±8 kV air discharge	±6 kV contact discharge ±8 kV air discharge	Floors should be of wood, concrete or ceramic tile. If floors are covered with synthetic material, the relative humidity must be at least 30 %.
Electrical fast transient / burst IEC 61000-4-4	±2 kV for power supply lines ±1 kV for input/output lines	±2 kV for power supply lines ±1 kV for input/output lines	Mains power quality should be that of a typical commercial or hospital environment.
Surge IEC 61000-4-5	±1 kV differential mode ±2 kV common mode	±1 kV differential mode ±2 kV common mode	Mains power quality should be that of a typical commercial or hospital environment.
Voltage dips, short interruptions and voltage variations on power supply lines IEC 61000-4-11	<5% U_T (0.5 cycle) 40% U_T (5 cycles) 70% U_T (25 cycles) <5% U_T for 5 s	<5% U_T (0.5 cycle) 40% U_T (5 cycles) 70% U_T (25 cycles) <5% U_T for 5 s	Mains power quality should be that of a typical commercial or hospital environment.
Power frequency (50/60 Hz) magnetic field IEC 61000-4-8	3 A/m	Not applicable	

Note: U_T is the a.c. mains voltage prior to application of the test level.

Table 4: Immunity (not life-supporting devices)

Guidance and manufacturer's declaration - electromagnetic immunity			
The Leica M320 surgical microscope is intended for use in the electromagnetic environment specified below. The customer or the user of the Leica M320 surgical microscope should assure that it is used in such an environment.			
Electromagnetic environment - guidance			
Portable and mobile RF communications should be used no closer to any part of the Leica M320 surgical microscope, including cables, than the recommended separation distance calculated from the equation applicable to the frequency of the transmitter. ^a			
Immunity test standard	IEC 60601 test level	Conformity level	Recommended separation distance
Conducted RF equipment IEC 61000-4-6	3 V _{rms} 150 kHz to 80 MHz	3 V _{rms}	$d = 2.4 \sqrt{P}$ 150 kHz to 80 MHz
Radiated RF disturbance variables IEC 61000-4-3	3 V/m 80 MHz to 2.5 GHz	3 V/m	$d = 2.4 \sqrt{P}$ 80 MHz to 2.5 GHz
Where P is the maximum output power rating of the transmitter in watts (W) according to the transmitter manufacturer and d is the recommended separation distance in meters (m). Field strengths from fixed RF transmitters, as determined by an electromagnetic site survey, should be less than the compliance level in each frequency range. ^b Interference may occur in the vicinity of equipment marked with the following symbol:			



Note 1: At 80 MHz and 800 MHz, the higher frequency range applies.

Note 2: These guidelines may not apply in all situations. Electromagnetic propagation is affected by absorption and reflection from structures, objects and people.

- Field strengths from fixed transmitters, such as base stations for radio (cellular/cordless) telephones and land mobile radios, amateur radio, AM and FM broadcast and TV broadcast cannot be predicted theoretically with accuracy. To assess the electromagnetic environment due to fixed RF transmitters, an electromagnetic site survey should be considered. If the measured field strength in the location in which the Leica M320 surgical microscope is used exceeds the applicable HF compliance levels above, the Leica M320 surgical microscope should be kept under observation in order to determine whether it is operating correctly. If abnormal performance is observed, additional measures may be necessary, such as reorienting or relocating the Leica M320.
- Over the frequency range 150 kHz to 80 MHz, field strengths should be less than 3 V/m.

Table 6: Recommended separation distances (not life-supporting devices)


Recommended separation distances between portable and mobile RF communications equipment and the Leica M320 surgical microscope			
The Leica M320 surgical microscope is intended for use in an electromagnetic environment in which RF interference is controlled. The customer or the user of the Leica M320 surgical microscope can help prevent electromagnetic interference by maintaining a minimum distance between portable and mobile RF communications equipment (transmitters) and the Leica M320 surgical microscope as recommended below, according to the maximum output power of the communications equipment.			
Rated maximum output power of transmitter in W	Separation distance according to frequency of transmitter in m		
	150 kHz to 80 MHz $d = 2.4 \sqrt{P}$ in m	80 MHz to 800 MHz $d = 2.4 \sqrt{P}$ in m	800 MHz to 2.5 GHz $d = 2.4 \sqrt{P}$ in m
0.01	0.24	0.24	0.24
0.1	0.8	0.8	0.8
1	2.4	2.4	2.4
10	8.0	8.0	8.0
100	24.0	24.0	24.0
For transmitters rated at a maximum output power not listed above, the recommended separation distance d in meters (m) can be estimated using the equation applicable to the frequency of the transmitter, where P is the maximum output power rating of the transmitter in watts (W) according to the transmitter manufacturer.			


Note 1: These guidelines may not apply in all situations. Electromagnetic propagation is affected by absorption and reflection from structures, objects and people.


Warning Message


Using accessories or cables other than those specified here or as approved by the manufacturer of the Leica M320 surgical microscope can lead to elevated electromagnetic emissions or reduced interference resistance.


The Leica M320 surgical microscope may not be used in direct proximity of other devices. If it is necessary to operate it in the vicinity of other instruments, the instrument should be monitored to ensure that it functions properly in this arrangement.



Leica Microsystems (Schweiz) AG
CH-9435 Heerbrugg




MODEL LEICA M320 LW12/ TP12/ TC12
100V-240V ~ 50/60Hz
100VA
 2x T6.3AL/ 250V









Grounding reliability can only be achieved when EQUIPMENT is connected to equivalent receptacle marked "Hospital only" or "Hospital Grade"



**ETL LISTED
CONFORMS TO
UL STD 60601-1
CERTIFIED TO
CAN/CSA STD C22.2 NO. 601.1**
Intertek
2003535


Leica Microsystems (Schweiz) AG
CH-9435 Heerbrugg



MODEL LEICA M320 F12/ W12/ C12/ FP12
100V-240V ~ 50/60Hz
100VA
 2x T6.3AL/ 250V

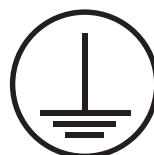







- Transportposition
- Transport position
- Position de transport
- Posizione di trasporto
- Posición de transporte
- Kuljetusasento
- Transportstand
- Transportstilling
- Transportstilling
- Transportläge
- Posição de transporte
- Θέση μεταφοράς
- Pozycja do transportu

TYPE 10NNNNNN
SN TTMMJJxxx
XYZ ^ ^ ^ ^
XYZ



Caution, follow the User Manual

**Class 1
LED PRODUCT**

LEICA W12

LEICA C12

 Alternating current

 Fuse

The fruitful collaboration “with the user, for the user” has always been the foundation of Leica Microsystems’ innovative strength. On this basis, we have developed our five corporate values: Pioneering, High-end Quality, Team Spirit, Dedication to Science, and Continuous Improvement.

MEDICAL DIVISION

What does a surgeon expect from an outstanding surgical microscope? Sharp, clear images, and a modular system aligned with the surgeon and OR staff needs.

Innovations for your practice

From the first surgical microscope with widefield optics in the 1980s to the first microscopes with Horizontal Optics and with LED illumination, Leica Microsystems has been at the forefront of innovation in the development of surgical microscopes.

HD video, fluorescence and retinal viewing systems also demonstrate the continued innovative nature of the Leica team. We strive to provide the surgeon with leading edge technology to enhance performance, surgeon comfort, and patient outcomes.

Leica Microsystems – an international company with a strong network of worldwide customer services:

Active worldwide	Tel.		Fax	
USA · Buffalo Grove/Illinois	+1	800 248 0123	+1	847 405 0164
Canada · Concord/Ontario	+1	800 248 0123	+1	847 405 0164
Australia · North Ryde/NSW	+61	2 8870 3500	+61	2 9878 1055
Austria · Vienna	+43	1 486 80 50 0	+43	1 486 80 50 30
Belgium · Diegem	+32	2 790 98 50	+32	2 790 98 68
Denmark · Ballerup	+45	4454 0101	+45	4454 0111
France · Nanterre Cedex	+33	811 000 664	+33	1 56 05 23 23
Germany · Wetzlar	+49	64 41 29 40 00	+49	64 41 29 41 55
Italy · Milan	+39	02 574 861	+39	02 574 03392
Netherlands · Rijswijk	+31	70 4132 100	+31	70 4132 109
Portugal · Lisbon	+351	21 388 9112	+351	21 385 4668
Spain · Barcelona	+34	900 210 992	+34	93 494 95 40
Sweden · Kista	+46	8 625 45 45	+46	8 625 45 10
Switzerland · Heerbrugg	+41	71 726 34 34	+41	71 726 34 44
United Kingdom · Milton Keynes	+44	800 298 2344	+44	1908 246 312
China · Hong Kong	+852	2 564 6699	+852	2 564 4163
· Shanghai	+86	21 6039 6000	+86	21 6387 6698
Japan · Tokyo	+81	3 5421 2800	+81	3 5421 2896
Korea · Seoul	+82	2 514 65 43	+82	2 514 65 48
Singapore	+65	6779 7823	+65	6773 0628

