



Leica MZ16 A

User manual

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Dear User

Thank you for your confidence in our products. We hope you will enjoy the high-quality and powerful products from Leica Microsystems.

In developing our instruments, we have placed great weight on simple, self-explanatory directions. In order to utilize all the benefits of your new stereomicroscope, we suggest studying this user manual in detail. Should you have any questions, please consult your local Leica representative. You will find the address of the closest local representative as well as valuable information about products and services from Leica Microsystems on our homepage www.leica-microsystems.com. We are gladly at your service. Customer service is a big thing with us. Not only before the sale, but afterwards as well.

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The user manual

Your instrument is supplied with a printed user manual in English. Additional languages and information can be found on the interactive CD-ROM. User manuals and updates are available for download on our homepage at www.stereomicroscopy.com.

This user manual describes the special functions of the motorized Leica MZ16 A stereomicroscope. The safety regulations, mounting of the Leica MZ16 A to stands, binocular tubes, accessories, etc. as well as the handling and the optical data can be found in the user manual for Leica M stereomicroscopes, M2-105-0. If you purchased a motor focus system with your Leica MZ16 A, please read the user manual M1-267-1.



Please read this manual and the user manual for Leica M stereomicroscopes, M2-105-0, before commissioning the instrument. Please observe the safety notes, in particular the safety regulations for electrically operated equipment.

Overview

Components



Components

- 1 Stand (transmitted light or incident light with suitable illumination)
- 2 Optics carrier Leica MZ16 A
- 3 ErgoTubus™
- 4 Wide-field eyepieces for spectacle wearers
- 5 Objective nosepiece with 2 objectives
(or an interchangeable objective, see the figure on page 5)
- 6 Motor focus system
(or manual coarse/fine drive, see the figure on page 5)
- 7 Manual control for motor zoom with connector
for motor focus manual control
- 8 Manual control for motor focus
- 9 Transformer (not illustrated)

For assembly and installation of the Leica MZ16 A refer to the user manual for Leica M stereomicroscopes, M2-105-0

Connections without motor focus

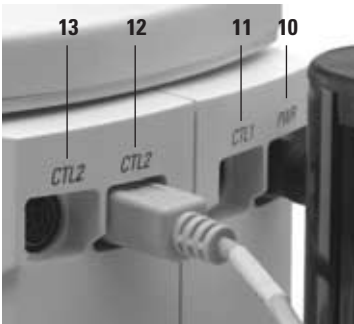
Power supply required.

- 10 PWR: power supply connection
- 11 CTL1: Connection for motor zoom foot switch
and/or PC interface kit (with Y-cable)
- 12 CTL2: Connection for motor zoom manual control or empty
- 13 CTL2: Connection for motor zoom manual control or empty

Connections with motor focus

Supply through power supply of motor focus, no other power supply is required.

- 10 PWR: empty
- 14 CTL1: Connection for motor zoom foot switch and/or PC
interface kit (with Y-cable)
- 12 CTL2: Connection for motor zoom manual control or empty
- 13 CTL2: Connection for short connecting cable to motor focus
- 14 Short connection for motor zoom manual control:
motor focus manual control

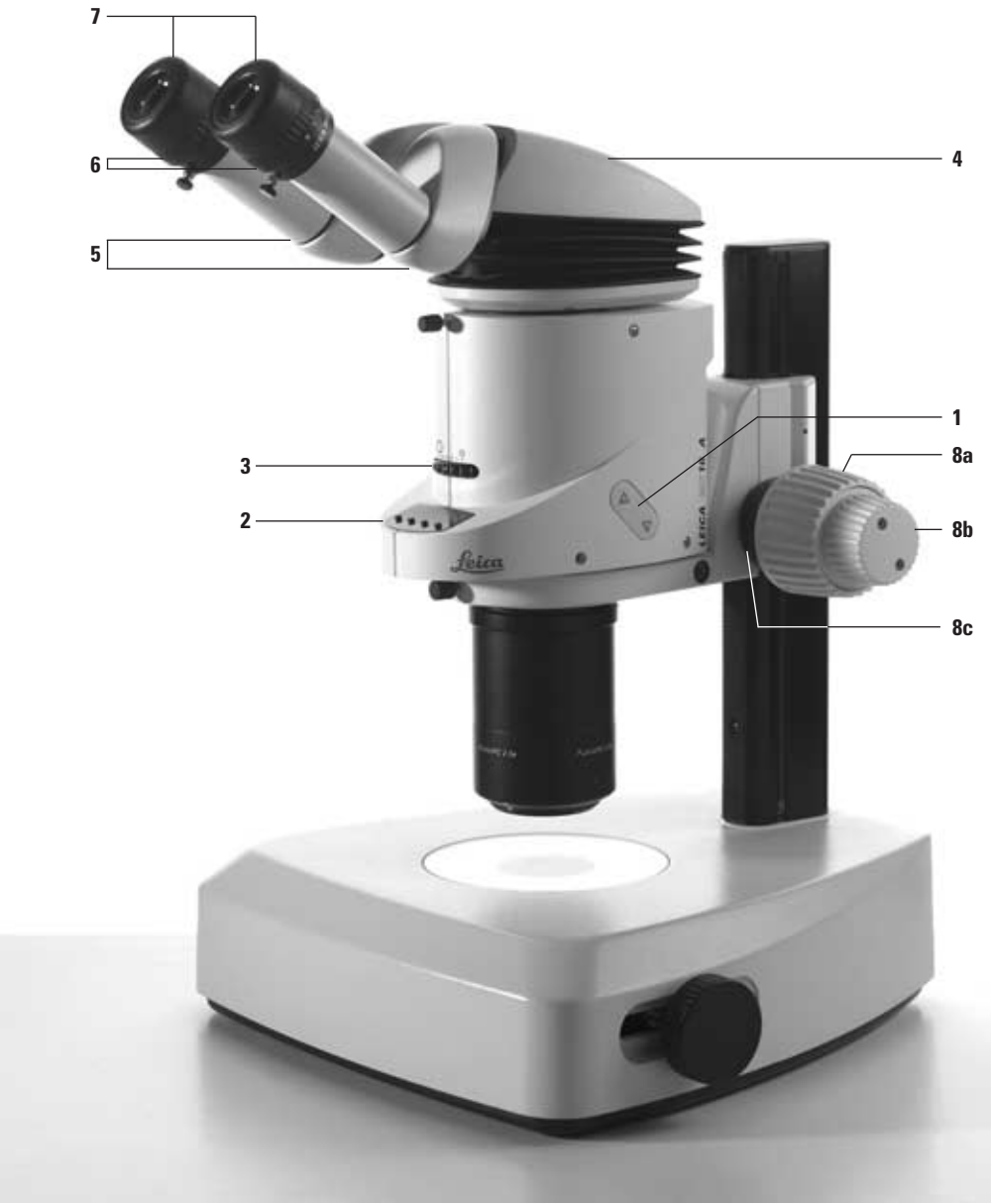


For equipment with motor focus, is imperative that the cable holder is affixed (glued) onto the motor focus and the short connecting cable from the manual control of the motor zoom is clamped underneath it. Otherwise the cable could be squeezed between stop and motor focus during focusing.

Connection to PC

The connection to a PC requires a standard PC with RS-232 interface and a Leica PC interface kit. The individual functions and commands are described in a separate user manual supplied with the PC interface kit.

Operating controls and functions



Stereomicroscope

- 1 Up/down key for motor zoom and selection in menu
- 2 Display with function keys
- 3 Double-iris diaphragm for adjusting the depth of field
- 4 ErgoTubus™ with variable viewing angle from 10°–50°
- 5 Adjustable eyepiece tubes for adjusting the interpupillary distance from 52–76 mm
- 6 Knurled rings to adjust diopters from +5 to –5
- 7 Adjustable eyecups
- 8 Manual focusing drive
(or motor focus system, see figure on page 4)
 - 8a Inside coarse drive
 - 8b Outside fine drive
 - 8c Adjustable ring for adjusting ease of movement

Display function keys

OPT Selection of eyepiece and objective factors / coaxial illumination / acoustic signal

SEL Confirm and display the selection

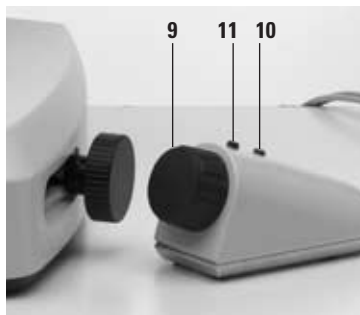
CAL Calibrate motor zoom

REF Display diameter of reference circle for measurements



Manual control of motor zoom

- 9 Handwheel for precise zooming
- 10 Red key: Saving / Traveling / Canceling of stored zoom positions
- 11 Black key: Toggling between quick and fine adjustment



Manual control of motor focus

For details and description see the user manual M1-267-1.

System operation

Starting up ► Attach the power supply to the supply.

When the power cable is removed from the supply, the selection under **OPT**, the calibration and the diameter of the reference circles are maintained. The zoom positions saved with the manual control are canceled.

Display Display at power-on:

- init and software version (e.g. SW V1.3):
The unit is being initialized. (Beep)
- MZ16 A initialization concluded (2 beeps)
- Actual magnification

Factory settings	Objective	1.0×
	Eyepiece	10×
	Coaxial illumination	no
	CAL	C dist. (reference distance)
	REF	FOV (field of view diameter)
	Acoustic signal	on

Keys ▲ ▼

Function 1: Motor zoom up/down:
Function 2: in the Selection Key menu

OPTc

- Select eyepiece and objective factors
- Coaxial illumination (yes/no)
- Acoustic signal (on/off)

SELect

Confirm and display the selection

CALibration

Calibrating the motor zoom

REFerence

Display diameter of reference circle for measurements

SEL + CAL (simultaneously)

Travel to the calibrated zoom position

SEL (press for approx. 2 seconds)

Reset user settings to factory settings

Display: def. val.

Selection of eyepiece / objective / coaxial illumination / acoustic signal

OPT

Select eyepiece factor	▲ ▼
Confirm and display the selection	SEL (beep)
Select objective factor	▲ ▼
Confirm and display the selection	SEL (beep)
Coaxial illumination yes/no	▲ ▼
Confirm and display the selection	SEL (beep)
Acoustic signal (beep) on/off	▲ ▼
Confirm and display the selection	SEL (beep)

Motor zoom

The motor zoom 16:1 is used for ergonomic zooming with key, manual control, foot switch or computer control. In addition to continuous zooming, 11 fixed ratchet steps can be traveled very quickly. Furthermore, 5 individual zoom positions can be saved and traveled with the manual control. Compared to a manual magnification changer, the motor zoom offers the following:

- Ergonomically better
- Uniform simple operation
- More flexibility for the user
- Leaves the hands free
- Saves time during repetitive tasks.

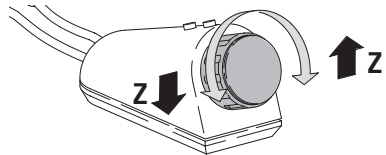
Key A zoom button is located on both sides of the optics carrier.



Triangle pointing to user: Motor zoom up / Triangle pointing to stand column: Motor zoom down

- Constant pressure: Zoom travels continuously up/down. Precise fine adjustment with handwheel.
- Short click: Motor zoom advances from ratchet step to ratchet step. Overall, 11 additional ratchet steps can be traveled in addition to the upper and lower zoom position.
- Double-click: Motor zoom travels to the highest/lowest magnification at maximum speed.

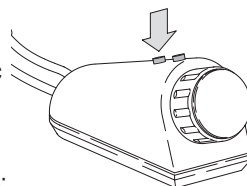
Handswitch Use the handwheel for ergonomic and precise fine adjustment.
Left rotation – down,
right rotation – up.



Storing zoom positions

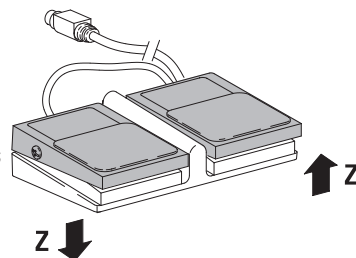
- 5 zoom positions can be stored using the manual control.
- If a sixth zoom position is stored, the one nearest to it will be canceled.
- Each zoom position can be canceled individually.
- The system will travel to each of the individual zoom positions in the sequence in which they were stored.
- Switching off the system cancels the stored zoom positions.

- ▶ Travel to the desired zoom position with the handwheel.
- ▶ Press the red key until the acoustic signal sounds (2 beeps).
- ▶ If required, travel to 5 zoom positions and store them.
- ▶ Travel to the stored focus positions: Briefly press the red key.
- ▶ Cancel the memory position: Press the red key until the acoustic signal sounds (2 short beeps, pause, 2 long beeps).



Footswitch

- Zooming with the foot switch: left-hand switch – down, right-hand switch – up.
- Toggling between quick and fine adjustment: Press left-hand and right-hand switches simultaneously.
- Zoom positions cannot be stored by means of the footswitch.



Functionality is identical to the zoom keys ▲ ▼ at the optics carrier (see page 10):

- Constant pressure: Zoom travels continuously up/down. Precise fine adjustment with handwheel.
- Short click: Motor zoom advances from ratchet step to ratchet step. Overall, 11 additional ratchet steps can be traveled in addition to the upper and lower zoom position.
- Double-click: Motor zoom travels to the highest/lowest magnification at maximum speed.

Calibrating the motor zoom

The adjustment accuracy of the motor zoom is factory-set to $\pm 5\%$. If you need to work more precisely, e.g. when measuring, the system can be calibrated. The calibration remains stored until it is changed or canceled.

- Always perform the calibration at a ratchet step (50.0 in the example).
- Calibration modes: Magnification (C magn.) or reference distance (C dist.)
- Calibration aids: Specimen micrometer in the specimen plane and graticule (10447182) in the eyepiece. The diameter of the inner circle measures 7 mm. To insert the graticule see user manual M2-105-0.
- The optional gliding stage facilitates the precise movement of the specimen micrometer.

At Limit If this message appears on the display during calibration of the reference distance with the handwheel, you traveled beyond the adjustable range.

Initializing calibration

- ▶ Delete the preceding calibration (see the section on page 13).
- ▶ Travel to desired zoom ratchet step with **▲ ▼** key (50.0 in the example).
- ▶ Initialize calibration with **CAL** key.
- ▶ Select calibration mode with **▲ ▼** key: Magnification (C magn.) or reference distance (C dist.), C magn. in the example
- ▶ Confirm and display the selection **SEL** (beep).

Depending on the selected calibration mode continue with the section "Calibrating CM" or "Calibrating CD".

Calibrating magnification (CM)

Display after confirming the selection: CM 50.3 in the example (CM = process start)

- ▶ Look into the eyepieces.
- ▶ Focus the specimen micrometer.
- In the example, the diameter of the small circle of 7 mm at zoom position 50 $\times$ corresponds to a distance of 1.40 mm on the specimen micrometer (7 : 5).
- ▶ Adjust the magnification with the handwheel so that the diameter of the small circle (inside line) corresponds to the distance of 1.40 on the specimen micrometer.
- ▶ Confirm and display the calibration **2 $\times$ CAL** (beep). Display (in the example) A 50: A = Marking of the zoom position used for the calibration

**Calibrating the
reference distance
(CD)**

Initialize the calibration and select the calibration mode see on the left.

Display after confirming the selection: CD 1.418 in the example (CD = process start)

- ▶ Look into the eyepieces.
- ▶ Focus the specimen micrometer.
- ▶ Adjust the magnification with the handwheel so that the diameter of the small circle (inside line) corresponds to the distance of 1.40 on the specimen micrometer.
- ▶ Confirm and display the calibration **2× CAL** (beep).
Display (in the example) A 50: A = Marking of the zoom position used for the calibration

**Canceling the
calibration**

- ▶ Press **CAL** key at any zoom position.
Display: C dist. or C magn. depending on the selected mode.
- ▶ **SEL** key
Display: CD XXX or CM XXX depending on the selected mode
Press **CAL** for 2 seconds (2 beeps)
- ▶ Display: To indicate that the calibration was canceled, the **A** in front of the magnification is deleted.

Reference circle for measurements

The small or the large reference circle on the graticule in the eyepiece or the complete field of view can be selected as reference circle for measurements. The selected reference circle remains stored until it is canceled or replaced by a different mode.

Selecting the reference circle and unit of measure

- ▶ Activate **REF** menu.
The display shows the reference circle C2 (or C1 or FOV) selected last and the diameter for the current magnification. The current magnification returns after 3 seconds.
- ▶ Activate the selection menu **REF** while the current reference circle is displayed.
- ▶ Select circle 1 or 2 or FOV (field of view) ▲ ▼
- ▶ Confirm and display the selection **SEL** (beep).
Display: C2 (or C1 or FOV) and mm (or inch or mil) depending on the selection
- ▶ Select mm, inch or mil ▲ ▼
- ▶ Confirm and display the selection **SEL** (beep).
The current magnification returns after 3 seconds.
Repeat measurement display with **REF**.

Measuring



We recommend using the optional gliding stage for very fine positioning of the specimen for measurement purposes.

- ▶ Adjust the magnification to be used for measuring.
- ▶ Focus the specimen.
- ▶ Activate the menu **REF**.
- ▶ Activate the selection menu **REF** while the current reference circle is displayed.
- ▶ Observe which reference circle is the closest correspondence to specimen section to be measured and correspondingly select Circle 1 or 2 or FOV (field of view) with ▲ ▼
- ▶ Confirm and display the selection **SEL** (beep).
Display: C2 (or C1 or FOV) and mm (or inch or mil) depending on the selection.
- ▶ Select mm, inch or mil ▲ ▼
- ▶ Confirm and display the selection **SEL** (beep).
The current magnification returns after 3 seconds.
- ▶ Observe the specimen section to be measured and adjust the magnification with the handwheel so that the specimen section completely fills the reference circle.
- ▶ Display the measurement with **REF**.
The current magnification returns after 3 seconds.
Repeat measurement display with **REF**.

Technical data

Weights

Optics carrier	2 kg
Microscope carrier	0.495 kg
Objective nosepiece	0.76 kg
Planapochromatic objective 2×	1.1 kg
Focusing drive with column	1.15 kg

Technical data of power supply

Input voltages	85 V to 264 V, 47 Hz to 63 Hz
Output voltage	12 VDC
Supply connector	IEC 320
Low-voltage connector	Mini-DIN 5-pole
Operating temperature	+10 °C to +40 °C
Relative humidity	< 85 %
Storage temperature	−20°C to +55°C



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