

From Eye to Insight



Stereo Microscopes

# TEACHING AND LEARNING MADE EASY

Leica E Series



# HANDS-ON EXPERIENCE BEATS MEMORIZING FORMULAS

Learning starts with perception. Sensory impressions leave their marks and become the building blocks of knowledge. Increasing young persons' involvement in their classroom work and offering them more opportunities to gather experiences independently facilitates their learning process. Leica stereo microscopes are an ideal tool for expanding the repertoire of teaching staff and are outstandingly suited to supplementing and reinforcing conventional classroom instruction. Observing magnified views of whole objects such as plants, microorganisms and minerals opens whole new perspectives that would not otherwise be available to the unaided eye.

## FIT FOR THE FUTURE

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Independent experimentation, exploration and comparisons are fun and enrich students' learning experience. Successes motivate them and promote their will to excel. Students not only stand to improve their motor skills, they can also learn to view, observe, describe, classify, compare, identify, investigate, experiment, draw, record their findings and explore habitats. They can learn to approach their tasks methodically and develop sound work habits. Character traits such as precision, reliability, patience and teamwork also benefit. As their instructor, you can accompany their classroom activities and enjoy their excitement, dedication, willingness to learn and surprising results.

## LEICA STEREO MICROSCOPES AT UNIVERSITY LEVEL

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Practical courses and laboratory trainings are important aspects of study that reinforce the theoretical material provided in lectures. The biology practical training provides students with the practical tools that are necessary to enable them to work on scientific problems independently. The Leica stereo microscopes are economically priced laboratory instruments ideal for training students in the observance of biological phenomena, structures and processes. They call for intensive cooperation from students as they practise preparation techniques and carry out experiments as central elements of scientific methodology.

**“Sense impressions are a deeper soil for growing memories than the best systems and analytical methods.”  
Hermann Hesse**



Excursions are an exciting alternative to conventional classroom work.



Beetles, worms and larvae can be found in soil samples or decaying leaves.



Starfish



And before you know it, the students are exploring independently and gathering their own experiences.

## AND HERE'S HOW

School must be fun if young people are to learn. The Leica stereo microscopes offer a broad, varied field for experience and learning and are easy to integrate into classroom instruction. Special microscopy or specimen preparation skills are not required in order to observe whole objects found in nature such as plants and insects, or items from around the house such as coins, stamps, pieces of cloth or an old clockwork. The students will soon be able to use the stereo microscope independently after a brief introduction and a few practical exercises.

### STUDENTS DO NOT NEED SPECIALIZED MICROSCOPY SKILLS

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The Leica educational stereo microscopes are compact, rugged and designed to be handled by students, without individual parts requiring assembly or that can be removed easily. Simply place it on a solid tabletop, plug in the power cable, and the instrument is ready to use. The stereo microscope's use is uncomplicated and self-explanatory. After all, we want you and your students to experience the wonders of the microscopic world without long preparatory work.

### WHAT WILL THE STUDENTS LEARN?

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- › Leica stereo microscopes sharpen students' observation skills.
- › They will be able to examine, compare, describe and identify the structures, functions and development of plants and other organisms.
- › They will gain insight into evolution and ethology and will recognize nature's variety and systematic structure.
- › They will be able to relate practical experiences in the field and with the stereomicroscope to knowledge gained in classroom instruction.
- › They will experience their biological space, recognize the dependencies and relationships between organisms and their surroundings, and will develop an awareness of their environment.
- › They will understand the ecological relationships of selected topics and the problems of various ecosystems.

### EXPENSIVE SPECIMENS ARE NOT REQUIRED

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Stereo microscopes have the advantage that you do not need to make or purchase microtomed or ground sections or smears in order to experience the variety of nature. Interesting objects are available virtually anywhere – bark, moss, lichen, feathers, grasses, flowers, leaves, seeds, grains or shells. What could therefore be more natural than taking field trips to breathe life into topics covered in the classroom? Forests, meadows, ponds and lakes contain a wealth of suitable objects that students can collect and observe.

### WHAT CAN STUDENTS EXPLORE?

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Depending on the curriculum and their personal interests, the students can investigate indigenous plants and insects, record their observations and identify species on the basis of the observed characteristics. With a Leica stereo microscope, the typical shapes of insect mandibles, hairs and antennae can be distinguished with the same ease as the calyx lobes, petals and stamen of flowers. Things really get exciting when students discover lively microorganisms such as mayfly larvae or daphnia in water samples collected outdoors.



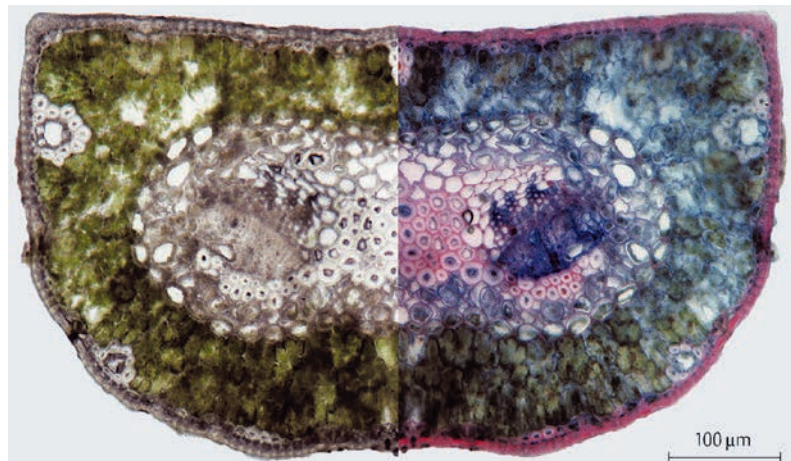
The anemone (*Anemone nemorosa* L.), a member of the dicotyledonous buttercup family, creates true carpets of blossoms in the spring



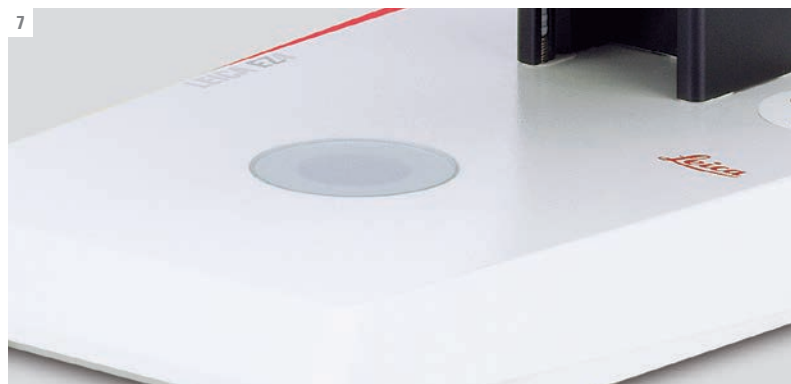
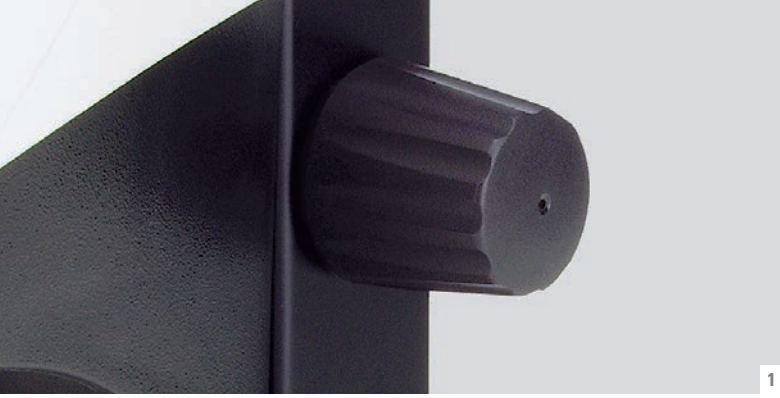
The largest potter wasp in Central Europe – the peaceful and unjustly feared hornet



Underwater flea circus – a number of branchiopods fan fresh breathing water and food to a water flea



Sections provide information about cell structures and are easy to make with a razor blade. Club moss section



# THE QUALITY OF A SYSTEM LIES IN THE DETAIL

## 1 FOCUSING DRIVE

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Can be adjusted in its ease of movement for comfortable focusing by students and teachers illuminator.

## 3 VIBRATION-RESISTANT FEET

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Prevent annoying shake while adjusting the instrument and stop it from sliding.

The special transparent rubber material does not mark tabletops.

## 5 EASY VIEWING

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Provide optimal viewing conditions, whether you wear eyeglasses or not. They are sealed in place against loss or theft (except for the Leica EZ4 with open eyepiece tubes). The soft eyecup protect eyeglasses against scratching. They can be replaced and cleaned for hygienic reasons.

The 60° viewing angle is equally ergonomic for students and teachers with different physical builds.

The eyepiece tubes adjust simultaneously from 50 to 75 mm to provide the correct personal interpupillary distance for all users.

## 7 BASE AND GLASS STAGE PLATE

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Provides excellent stability despite its small footprint, and a pleasantly low handrest for comfortable work. The glass stage plate is an easy-to-clean object holder.

The housing as well as the membrane switch and glass stage plate can be cleaned easily with a soft cloth and diluted dishwashing liquid. The membrane switch and glass stage plate are sealed into the surface to prevent the accidental entry of liquids that could damage the transmitted-light illuminator.

## 2 LED INCIDENT LIGHT

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Can be switched independently or combined, and can be controlled via the membrane switch on the Leica EZ4 models.

## 4 MAGNIFICATION CHANGER

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The magnification changer and focusing drive remain responsive, precise and easy to adjust, even after years of use, thanks to their precision design and solid workmanship. The annoying jumps and imprecision typical of cheap stereo microscopes from other manufacturers do not occur in Leica instruments.

## 6 OPTICS CARRIER / THE 10° GREENOUGH OPTICAL SYSTEM

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Contains a Greenough optical system. Thanks to the parfocality of the optical system, the image remains in focus from the lowest magnification to the highest.

It corresponds to natural, and thus fatigue-free, eyesight.

It provides excellent depth of field, thus presenting a greater range of three-dimensional objects in focus and reducing the need to adjust the focus while observing.

Flat, thin specimens are displayed as truly level, without optical distortion.

## 8 THE GRIP

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Is integrated for safe carrying.

# POWER FOR BRIGHT MINDS: INNOVATIVE LED ILLUMINATION TECHNOLOGY

The light-emitting diode, or LED, is currently revolutionizing the world of illumination. As small as they may be, LEDs are true power packs in every respect: they last longer than incandescent lamps, use less energy, stay cool and require no maintenance. The powerful LEDs in our educational stereo microscopes generate intense, homogeneous, color-neutral incident and transmitted light.

## A LEICA EXCLUSIVE: OUR SPECIAL LED INCIDENT-LIGHT TECHNOLOGY

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We developed our completely Leica LED incident-light technology to provide observers of a wide variety of objects – from strongly structured pine cones to flat stamps – with optimal illumination to obtain a maximum of information from their observation work. The integrated LEDs can be switched individually, dimmed and combined with transmitted light on all Leica EZ4 models.

The membrane switch that controls the illuminator is integrated in the base and has a watertight seal. The daylight color temperature remains constant when dimmed and over the entire service life of the illuminator. Colors are rendered faithfully and sensitive microorganisms and plants are not harmed, as the LEDs do not get hot.

## PRACTICAL, RELIABLE AND ECONOMICAL FOR SCHOOL USE

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When used for five hours a day, the power LEDs have a service life of around 25 years and cause no maintenance costs. The LEDs are sealed against dust and water spray in a very compact installation in the Leica stereo microscopes. As a result, there is no lamp housing requiring regular alignment or which interferes with focusing or manipulating the objects.

LEDs are not fragile and can handle rough treatment in school settings. The Leica illumination system complies with safety regulations for laboratory equipment. The protective low voltage contributes to user safety, as does the fact that LEDs cannot explode.





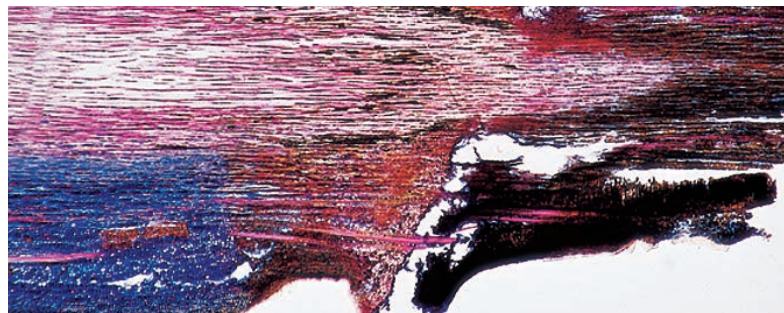
Stage 1 incident light: all five LEDs are lit for maximum intensity.



Stage 2 incident light: the upper three LEDs provide shadow-free light from directly above the object.



Stage 3 incident light: the lower two LEDs light finely structured objects from a low level, increasing contrast.



Transmitted light can be selected individually, dimmed and combined with incident light, without reflections from the glass stage plate.



Bees nest

# DISCOVERIES START WITH CURIOSITY

High-performance stereo microscopes by Leica Microsystems are being used successfully in renowned university institutes and laboratories for a wide variety of scientific and medical research projects. Now, a range of economical stereo microscopes featuring proven Leica quality, reliability and longevity is available for practical and laboratory instruction in university and technical college settings. By concentrating on essential functions, the laboratory instruments help students train practical routine and research skills.

## OPTIMAL START INTO A SCIENTIFIC CAREER

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With our Leica stereo microscopes, we would like to make students' entry into the world of science as pleasant as possible. The category of training stereo microscopes includes cheap instruments that quickly become a source of frustration due to their poor performance. The Leica Microsystems educational stereo microscopes, however, deliver the same high standards of imaging and illumination quality, longevity and environmental friendliness as our instruments for professional applications.

The Leica E-Line stands out from the crowd of school and university stereo microscopes by offering the best value for money and the following features:

- › A complete line for training specimen preparation techniques, workflows and experiments including digital documentation (Leica EZ4 W or Leica EZ4 E) and measurements (Leica EZ4 with a choice of eyepieces)
- › Leica's typical high image quality, color and detail fidelity
- › Leica's typical mechanical precision for decades of maintenance-free functionality
- › Precise zoom and focusing systems for the finest, most exact control
- › Dimmable power LED illumination system for incident and transmitted light
- › Unique Leica 3-way incident light technology

**“Why not begin education with the observation of actual things, rather than their description with words?**

**Once something has been shown, a lecture may follow to explain further.”**

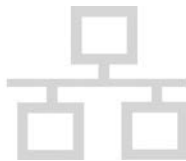
**The Great Didactic by the educational reformer Comenius (1592-1670)**

## GOOD CONNECTION!

Live microscopy imaging with the highest quality is critical for displaying fine microstructures. The Leica EZ4 W or Leica EZ4 E camera offers an economical, integrated solution for viewing fast live images in High Definition (HD). The complete system allows the user to view specimens on the display and through the eyepieces, with or without a computer connection for versatile workstation possibilities.



Students can connect to the Leica EZ4 W either through its own **internal Wi-Fi signal** using Wi-Fi mode or through the facilities' network using Ethernet mode.

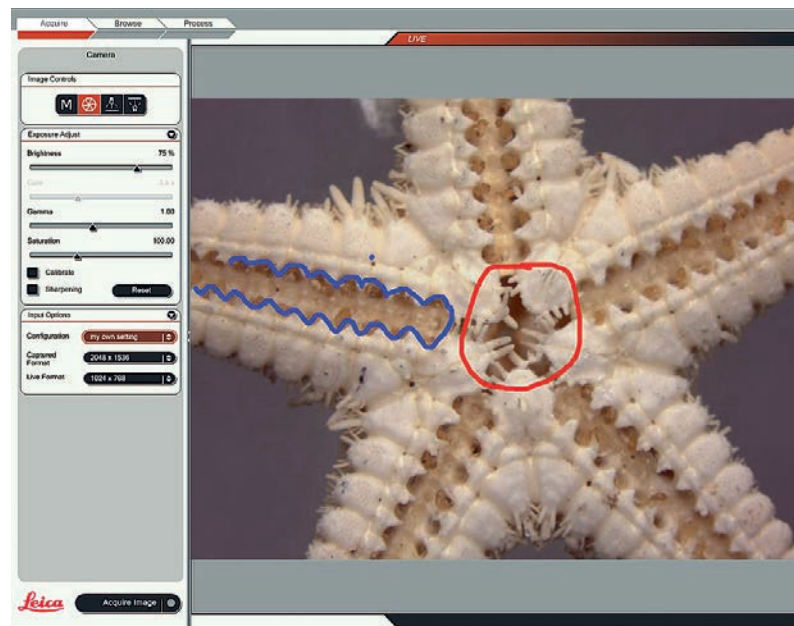
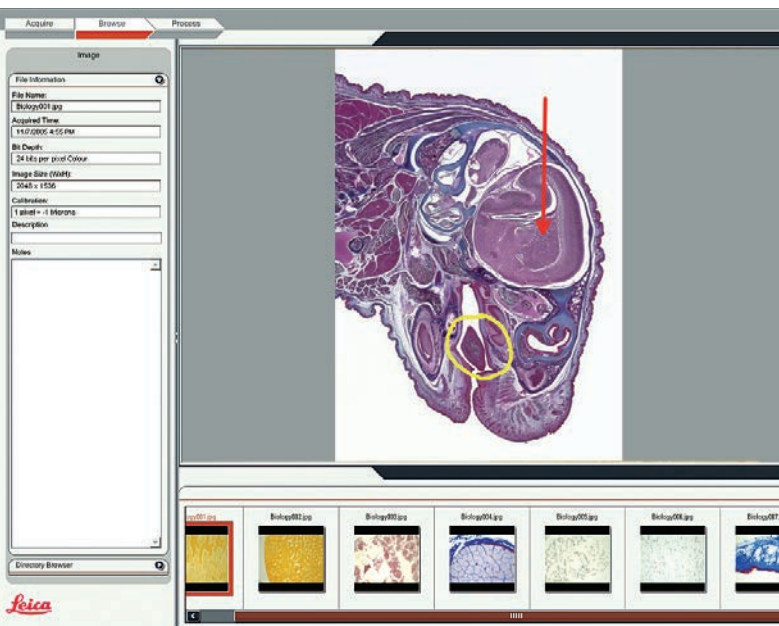


The EZ4 E **exclusively** uses your facilities' **network (WLAN or LAN)** to allow students to connect to the microscope. This is an ideal solution if you don't want to add additional Wi-Fi access points to your network.

### ADVANTAGES OF THE EZ4 W AND EZ4 E

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- › In Ethernet mode, the connection to the camera is provided through your own network, allowing a maximum number of users to connect to the camera. To use this to full extent, all devices have to be on the same network as the microscope.
- › In USB mode you can connect your PC directly via USB cable to the camera, which is helpful when you aim for the fastest live images e.g. of moving samples.
- › Computer users can use the Leica Imaging software to connect to the camera and work with the images. For PC use Leica Application Suite software, and use Leica Acquire for Mac.
- › Use lots of options with Leica AirLab App: It enables camera setup, annotations, measuring, image capture, and sharing to email, photo folders, or other social media connections. Leica AirLab App is available free of charge for Android and iOS devices.
- › Stay flexible if there is no PC or mobile device around: Just capture images directly onto a memory card.
- › Fine-tune camera settings conveniently, capture images onto the SD card, and view the SD card gallery – all possible with the remote.
- › Project your images: Use the HDMI port for screen projections or output to HD screens.
- › You don't need any extra cables: The built-in camera is powered and controlled directly from the microscope.



# LEICA EDUCATIONAL STEREO MICROSCOPES STILL WORK AT THE CLASS REUNION 20 YEARS LATER

Their modern, sleek design already says it all – the Leica Microsystems educational stereo microscopes aren't toys, but optical instruments featuring world-renowned Leica quality and precision. Our goal is to equip teachers with a rugged, useful resource that they will be able to put to work successfully for many years to come. We also want to make your students' first experiences in microscopy and scientific work in general as pleasant and effective as possible.

From the 2-magnification starter model to the digital zoom model with its integrated 5-megapixel CMOS camera, the Leica educational stereo microscopes combine superb optical and illumination quality with ease of use and comfort for extended use. The rugged design is completely maintenance-free and is built for rough-and-tumble school environments. Like all our instruments, the quality, lead-free optics and recyclable housing satisfy environmental management requirements.

**"After families, the next most important institution in society is school. Children simply don't want to sit at home and absorb their learning from a monitor. They need the group, the human aspect. They need teachers."  
Bill Gates, founder of Microsoft**



# SPECIFICATIONS / FEATURES

Stereo microscope	Leica ES2	Leica EZ4 10x	Leica EZ4 16x	Leica EZ4 open	Leica EZ4 W Leica EZ4 E Digital 10x
Optical system	10° Greenough, parfocal	10° Greenough, parfocal	10° Greenough, parfocal	10° Greenough, parfocal	10° Greenough, parfocal
Magnification changer	2-level, 3:1	zoom 4.4:1	zoom 4.4:1	zoom 4.4:1	zoom 4.4:1
Eyepieces for spectacle wearers	10x/20 fixed	10x/20 fixed	16x/15 fixed	replaceable, fixed or adjustable: 10x/20, 16x/16 20x/12 not suitable for spectacles	10x/20 fixed
Diopter correction				from +5 to -5 (adj. eyepieces)	
Viewing angle	60°	60°	60°	60°	60°
Working distance	100 mm	100 mm	100 mm	100 mm	100 mm
Magnification range	10x/30x	8x to 35x	13x to 56x	8x to 70x	8x to 35x
Max. resolution	159 Lp/mm	170 Lp/mm	170 Lp/mm	170 Lp/mm	170 Lp/mm
Max. num. aperture	0.053 nA	0.057 nA	0.057 nA	0.057 nA	0.057 nA
Object field diameter	20 mm/6.7 mm	5.7 to 25 mm	4.3 to 18.8 mm	3.4 to 25 mm	5.7 to 25 mm
Eyecups	replaceable	replaceable	replaceable	replaceable	replaceable
Interpupillary distance	50 to 75 mm	50 to 75 mm	50 to 75 mm	50 to 75 mm	50 to 75 mm
Beam path	100 % visual	100 % visual	100 % visual	100 % visual	50 % visual/ 50 % camera
Focusing drive torque	individually adjustable, 75 mm stroke (all instruments)				
Grip	integrated	integrated	integrated	integrated	integrated
<b>LED illumination system</b>	integrated, independent or combined incident and transmitted light (all instruments)				
Control	On/Off switch	membrane switch	membrane switch	membrane switch	membrane switch
Incident light method	angled incident light with 3 LEDs	choice of 3 methods: maximum intensity with 5 LEDs, top light with three LED's, side light with 2 LED's			
Dimmer	–	yes, for incident and transmitted light	yes, for incident and transmitted light	yes, for incident and transmitted light	yes, for incident and transmitted light
Auto OFF	–	after 2 hours	after 2 hours	after 2 hours	after 2 hours
LED service life	approx. 25,000 h	approx. 25,000 h	approx. 25,000 h	approx. 25,000 h	approx. 25,000 h
Light quality	homogeneous daylight 6,500° reflected, 4,500° transmitted, free of UV and IR radiation (all instruments)				
Maintenance	maintenance-free	maintenance-free	maintenance-free	maintenance-free	maintenance-free
Power supply	universal from 100 V to 240 V, voltage-sensitive, integrated (all instruments)				
<b>Digital camera</b>					integrated 5.0x megapixel CMOS camera
› WiFi mode					› WiFi broadcasting (only available for Leica EZ4 W)
› USB mode					› USB cable connection to PC
› Ethernet mode					› Ethernet cable connection to network
› SD mode					› Capture to SD card
HDMI port					High Definition output for desktop or large HD displays
Integrated slot					SD (Secure Digital)
Recording					switch for image capture
Software					› Leica software for PC/MAC › Leica apps for mobile devices
Graticules, stage micrometers				for length stage micrometer usable in adjustable eyepieces	

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