



# Leica M420

Macroscope

The modular system

*Leica*

# Welcome!

Thank you for your attention. We are proud to present the Leica M420 macroscope, a Leica creation. As with a stereomicroscope, large objects can be viewed in their entirety and without preparation, thanks to the wide fields of view and the favourable working distances. However, the Leica M420 macroscope offers a vertical beam path and a high-resolution apochromatic zoom objective, making it ideal for distortion-free photography, for parallax-free measurement and for obtaining correct polarization colours.

## **The modular system**

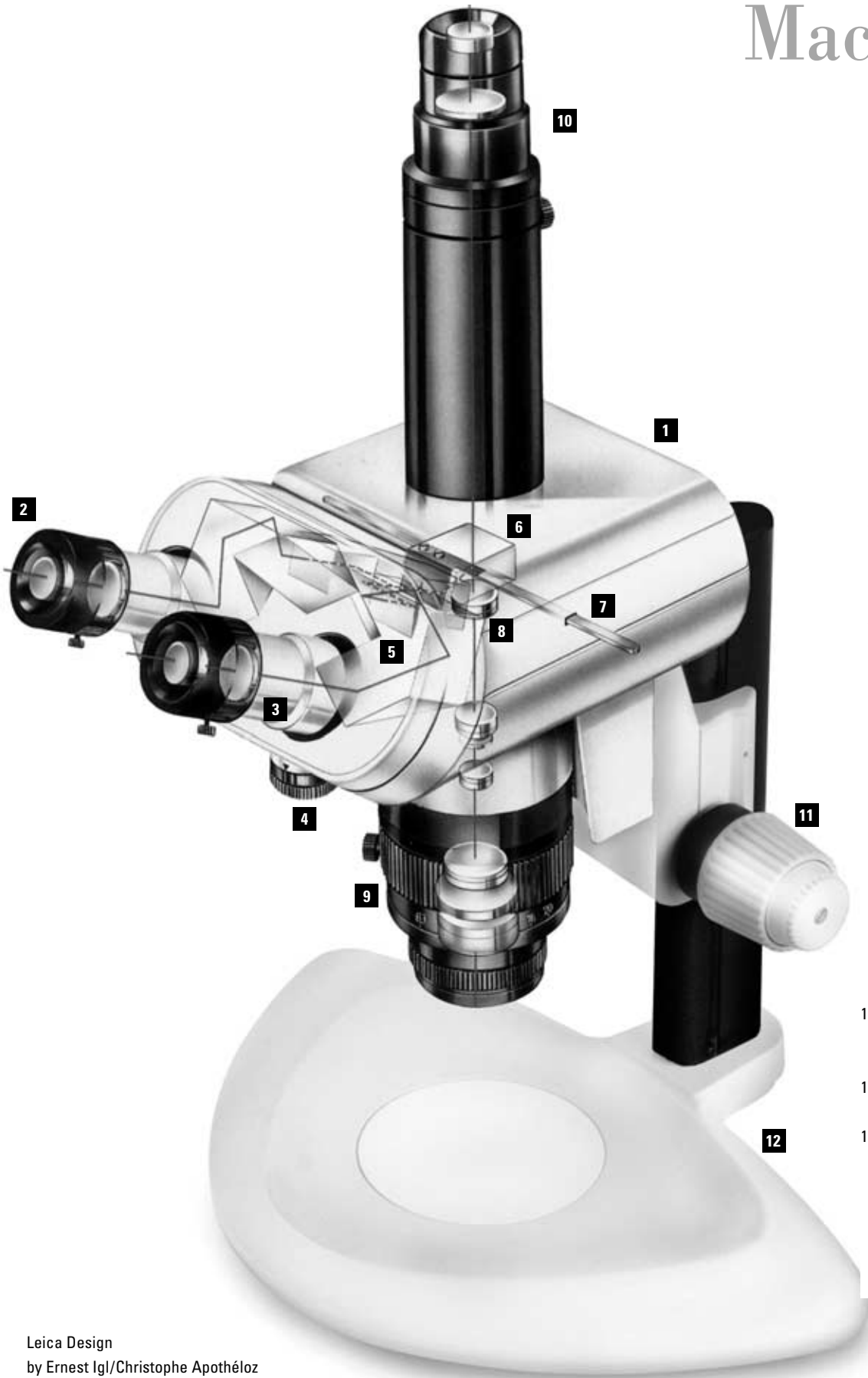
The Leica M420 macroscope is designed on the building-block principle and can be matched to the individual requirements of the user, and to the dictates of the workplace, at any time. This brochure shows a large number of combinations with appropriate accessories. A clear assembly diagram helps you to put together the specific configuration that you need. If you still have questions, get in touch with your local Leica agency or directly with Leica Microsystems Ltd in Heerbrugg, Switzerland. We will be pleased to help. CUSTOMER SERVICE is a big thing with us. Not only before the sale, but afterwards as well.



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# Macroscope



- 1 Leica M420 optics carrier
- 2 Wide-field eyepieces for spectacle wearers, distortion free, with diopter setting adjustable between +5 and -5 and with adjustable eyecups
- 3 Binocular tube: Interpupillary adjustment range 54mm-75mm, ergonomically positioned, 30° viewing angle
- 4 Aperture diaphragm: With it in its mid position, the image-side brightness remains constant
- 5 Prisms: For erecting the image and directing it into the two eyepiece tubes
- 6 Beam splitter: Directs 50% of the light to the video-/phototube and the rest to the binocular tube
- 7 Stop: Prevents stray light from entering the eyepieces during photography
- 8 Tube lens: Magnifies the image 1.25×
- 9 Macrozoom objective (5:1 zoom) or Apozoom objective (6:1 zoom)
- 10 Video-/phototube accepts Leica photoautomats; cine, video and TV cameras; and digital cameras
- 11 Focusing drive: With coarse and fine focusing
- 12 Incident-light stand with stage plate and with 300mm or 500mm column

Leica Design  
by Ernest Igl/Christophe Apothéoz

## The requirements

A modern macroscope must bring its user the maximum possible benefits and must uncompromisingly fulfil the requirements demanded of it. Like the macroscopes from Leica, the modular components of which can be combined in accordance with your wishes. Get in touch with us. We will gladly help you to assemble the ideal outfit for your needs in examination, in training or in documentation.

### **Macroscope**

Macroscopes are optical precision instruments for studying objects in their entirety in conjunction with large working distances and large fields of view. The multiple-coated optical system involves a single vertical beam path which, for purposes of comfortable observation in the binocular tube, is then split into two identical parts. The vertical observation mode ensures parallax-free imaging and is ideal for faithful documentation, precise measuring, and investigations involving polarized light.

The Leica M420 macroscope is an instrument for optical inspection in all fields of science and technology where image quality and user comfort are both rated highly.

### **The modular system**

The optics carrier with binocular tube can be equipped with a Macrozoom- or Apozoom objective, with one of several additional objectives, with eyepieces of various intrinsic magnifications, and with an appropriate stand and illuminator.

Additional accessories for photography, TV, digital imaging, measuring and polarization can be easily added.

### **Adapting any camera**

The incorporated video-/phototube will accept most still cameras and CCD-, TV- and cine cameras. If however a Leica modular photomicrographic system is used, there is a choice between two fully-automatic systems.

Photo eyepieces (8×, 10×, 16×) in the video-/phototube enlarge the image and project it into the film plane (two-stage magnification). There is an additional magnification factor of 1.25× in both the observation beam path and the photo beam path. The limits and sharpness of the image can be inspected by looking into either the binocular tube or the focusing telescope of the camera. The light is partitioned 50%/50% between observation and photography.

# Optical accessories

## The requirements

Because the working distance, the total magnification and the field of view must all be adapted to the application, the user needs to be able to choose from a range of high-quality objectives and eyepieces.



Additional objectives, with bayonet mount: 0.5× and 2.0× for the Macrozoom, 0.4× and 2.0× for the Apozoom, and rotatable quarter-wave plate.



Wide-field eyepieces for spectacle wearers, 10×/21, 16×/14, 25×/9.5, 40×/6



1:5 Macrozoom and 1:6 Apozoom objectives

The Macrozoom- and Apozoom objectives can be combined with the coaxial incident-light housing, with a quarter-wave plate, and with additional objectives.

### 1:5 Macrozoom objective

The Macrozoom objective is inscribed with the magnification range 6.3× to 32×. This means that, if 10× eyepieces are used in the binocular tube (which introduces a tube factor of 1.25×), objects can be observed at constant sharpness over a zoom range from 7.9× to 40×. The optical components are computed to give wide aperture and good resolution, multiple-coated to ensure high image contrast, and well corrected to produce image fidelity and crispness. The 0.5× and 2.0× additional objectives can be used with the Macrozoom objective.

### 1:6 Apozoom objective

The intrinsic zoom range of the Apozoom objective is from 5.8× to 35×, i.e. the zoom range down the binocular tube if 10× eyepieces are used is 7.3× to 43.8×.

Because of its excellent chromatic correction for three spectral colours and for all intermediate tones, the Apozoom is the objective of choice if requirements stipulate maximum sharpness, highest resolution and maximum contrast rendition, even for the finest structures.

The 0.4× and 2.0× additional objectives used with the Apozoom objective have been specially designed for it.

### Wide-field eyepieces for spectacle wearers, distortion-free

- Intrinsic magnifications 10×, 16×, 25× and 40×
- Usable with or without spectacles
- Adjustable eyecups
- Diopter setting adjustable from +5 to -5
- Accepting graticules for measuring and for photography

The basic outfits include distortion-free, wide-field eyepieces (10×/21B) for spectacle wearers, with excellent imaging characteristics. Because of their long exit pupil distance of 22mm (at this distance the observer sees the full field of view) these eyepieces are usable either with or without spectacles. If you work without spectacles and want closer contact to the eyepieces or to the eyecups, you can displace the height of the eyecup above the eyelens within the range from 4mm to 20mm.

# Focusing drive

## **Coarse/fine drive for incident- and transmitted-light stands**

The coarse/fine focusing drive permits focusing along the full length of the side-faced column. The coarse drive permits focusing over long distances; the fine drive permits fine focusing. The focusing drive and the side-faced column, 300mm or 500mm long, are supplied already assembled. The low-positioned, conveniently-shaped, bilateral drive knobs enable you to work comfortably with your arms supported. The ease of movement can be adjusted individually in accordance with the loading.

## **New: Leica motor-focus system**

The new motor-focus system enables any microscope outfit to be moved weightlessly up and down with light movements of the fingers or feet, or through computer control. With the hand control, five exact focus settings can be stored; with the computer, the number is unlimited, and the instrument can travel to these positions directly. The motor-focus system can easily be fitted to the incident- and transmitted-light stands and to the large swinging-arm and table-clamp stands.

Information in brochure M1-267-1en.



Motor-focus system, on transmitted-light stand HL

Coarse/fine focusing



# Incident-light stand

## The requirements

It must be possible to arrange the stereomicroscope work station exactly in accordance with requirements. The instrument can only be fully integrated into the work process if the sturdy stand offers unrestricted access to the object and adequate space for tools and jigs.

### **Incident-light stand**

The incident-light stand consists of a stable baseplate and a 300mm- or 500mm long side-faced column. The column bears the focusing drive and therefore also the microscope carrier and the optics carrier. The stand also includes a 120mm-diameter black/white stage plate. The ergonomic shape of the baseplate, and its soft upper surface, provide pleasant support for the hands of the user.



Incident-light stand



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# Swinging-arm stands

## **Swinging-arm and table-clamp stands**

These stands offer ample space for large objects such as rocks, metal objects or circuit boards, which can be manipulated directly on the surface of the bench. The many possibilities for adjusting on the column, the horizontal arm and the inclinable carrier rod enable the working area to be planned as required.

The inclinable drive housing has a lift of 128mm. The coarse/fine focusing drive helps to focus quickly over long distances, and to adjust the final setting accurately.

The large swinging-arm stand is supplied with a 550mm long column.

The table-clamp stand (550mm long column) can be clamped to bench- or table tops having thicknesses of between 20mm and 50mm, and also to machines or jigs.



Large swinging-arm stand with motor-focus system

# Universal stand



Universal stand with horizontal arm and with inclinable focusing drive



Drive housing with coarse/fine drive on universal stand

## Universal stand

The universal stand is noted for its stability. Vibrations, which can cause difficulties at high magnifications and in photography, are eliminated. Large objects, and stage carriers with magnetic linkage that will accept various stages, can be conveniently positioned on its baseplate. As in the large swinging-arm stand, the optics carrier is connected to the horizontal arm by means of an inclinable drive housing or a coarse/fine drive housing.

Masks and wafers can be examined with the help of a cross stage, which is available on request; it has 6in×6in travel with rapid XY movement and with fine adjustment.

## Drive housing with coarse/fine movement for 50mm diameter columns

When fitted to the universal stand, this unit provides a very stable outfit for examining large objects. The coarse/fine drive enables the image to be focused precisely at the higher magnifications and with heavy microscope configurations.



# Incident illuminators

## The requirements

The correct illuminator is the key to informative investigation and inspection. The better the illumination of the object, the more details become visible, and so the more reliable the inspection and the better the photography.

### **Oblique incident light, dark field**

Three-dimensional objects are illuminated obliquely from above. The angle of incidence can be anything from steep to flat. To avoid strong shadowing, the object should be illuminated from two sides, or by means of a ring lamp.

### **Coaxial incident light, bright field**

This is used for illuminating flat, highly-reflecting objects such as wafers, ICs, LCDs and metal sections; its success depends on differential scattering or on the creation of interference colours. In this technique, the light beam follows the observation beam path of the microscope. The rays pass through the objective and impinge vertically on the flat shiny surface of the object, from where they are reflected back along the same path into the objective. The degree of extinction is adjustable with a rotatable quarter-wave plate. It may be possible to increase the contrast, depending on the position and surface texture of the object.



6V/20W incident lamp on adapter for side-faced columns



6V/20W incident lamp on cast foot



6V/10W incident lamp on adapter for side-faced columns

#### 6V/10W incident illuminator

- Competitively-priced incident lamp for observation
- 6V/10W halogen bulb
- Focusable light spot
- Colour temperature 2800K
- Built-in diffuser
- Built-in filterholders
- Various lampholders and fitting possibilities
- Adjustment of the light intensity with a regulating- or step transformer

The 6V/10W incident lamp is suitable for observing spatial objects. The size of the bright and uniform spot can be matched to the diameter of the field of view.

The 6V/10W incident lamp is supplied with a swing-in filterholder with KG1 heat-absorbing filter. If required, three additional 50mm-diameter filterholders, accepting a range of filters, can be attached.

The lampholder can be secured in any position with the freeze lock. Various adapters enable it to be connected to the column, to the objective mount, or to the cast foot.

#### 6V/20W incident illuminator

- High-quality incident lamp for observation and photography
- Centrable 6V/20W halogen bulb
- Variable diameter for light spot
- Colour temperature 3200K
- Built-in, heat-absorbing filter
- Swing-in frosted filter
- Swing-in filterholder
- Freely-positionable lampholder
- Various lampholders and possibilities for fitting
- Light intensity adjustable using variable- or step transformer.

The 6V/20W incident lamp is the preferred choice for ideal light quality, high light output, completely-uniform illumination, and a colour temperature of 3200K.

The brightness is continuously adjustable with the regulating transformer. The size of the light spot can be continuously matched to that of the field of view.

In addition to the diffusing filter supplied, three swing-in filterholders, accepting 32mm-diameter filters, can be attached to the lamp housing. The large lampholder is very flexible and has a central freeze lock. The thread permits fitting to the column (using adapter), to the cast base, and to the drive housing of the universal stand.

#### Coaxial incident light

- Flare-free illumination of flat shiny surfaces
- For Macrozoom and Apozoom objectives
- Quarter-wave plate, rotatable to increase contrasts
- 6V/20W halogen bulb
- 0–7V regulating transformer

Flat, highly-reflecting surfaces appear dark in inclined incident light, but can be seen if they are illuminated vertically from above. The coaxial incident light housing, usable with the Macrozoom objective, meets this requirement. It includes a centrable 6V/20W halogen bulb; a concave mirror, collector lens and condenser lens to maximize the illumination; and polarizing filters that quench stray light. The degree of light extinction is determined by the position of a rotatable quarter-wave plate; rotation can improve the contrast.

The coaxial illuminator also includes a filterholder with diffuser. If required, additional filterholders for 32mm-diameter filters can be added.

Leica M420 with cold-light source  
Leica CLS150 and ring lamp



### Fibre-optic light guides

Fibre-optic illuminators are commercially available. Goose-neck guides can be clamped to the microscope carrier. Manufacturers of cold-light sources also supply various adapters to enable goose-neck guides and ring lamps to be attached to microscopes.

### Cold-light sources of the Leica CLS series

The Leica cold-light sources CLS50, CLS100, CLS150 and CLS150D provide high-intensity, flicker-free white light within a small space, combined with the minimum generation of heat on the specimen. The cold-light sources are lightweight and compact. They are user-friendly and maintenance-free. The fan is quiet. All models in the CLS series have a mechanical diaphragm for uniform illumination and constant colour temperature at all illumination intensities without altering the size of the illuminated field. The comprehensive program of accessories allows almost unlimited application of these cold-light sources.

### Regulating transformer

- Continuous adjustment of the light intensity from 0–7V
- Pilot lamp shines at 6V
- Sockets for two illuminators
- Safety tested: LGA, GS, EN 60950, CCA

The incident lamps, and the coaxial illuminator with halogen bulb, can be connected to the 0–7V/40VA (115V/230V) regulating transformer.

### Step transformer

A low-priced transformer for powering an incident- or coaxial lamp with halogen bulb. Brightness adjustable in three steps, 4/5/6V.

### Filter-slide housing

In, for example, photography using artificial light, colour-compensating filters are required in order to avoid colour shifts. The filter-slide housing is supplied with two filter slides that can be quickly slid into the beam path when required.

Coaxial incident illuminator



Step transformer 4/5/6V

Filter-slide housing



Regulating transformer for incident illuminators



# Transmitted-light stands

## The requirements

To study transparent objects under the stereomicroscope, transmitted-light stands are required. Even low-contrast objects must be reproduced crisply and in true colour. A further requirement is the facility to observe double-refracting materials (including thin sections) in transmitted polarized light.

Leica M420 with transmitted-light stand, bright and dark field, and with Leica CLS150D cold-light source



### **Transmitted light**

is used for inspecting transparent objects such as fibres and insect parts, and also specially-prepared and stained objects such as smears and thin sections. The following illumination techniques are possible with the Leica macrocope:

### **Transmitted light, bright field**

Bright field is suitable for contrasty structures. The object is illuminated directly from beneath and is seen in sharp contrast and in its normal colours against a bright background.

### **Transmitted light, dark field**

This technique increases the information obtainable from low-contrast objects with structures that are either poorly defined or very fine. Light rays meet the object at grazing incidence from below and those that are then reflected or refracted into the objective cause edges and structural elements to appear bright on a dark background.

### **Inclined transmitted light**

which traverses the object obliquely will produce effects advantageous for observing small translucent objects such as foraminifera and fish eggs.

### **Polarized transmitted light**

This makes double-refraction visible and measurable. Birefringent materials, such as many organic and inorganic crystals (including minerals), bones, polymers, strained glass and liquid-crystal displays, can be studied.

Transmitted-light stand for bright field



#### **Transmitted-light stand, bright field**

- Direction of illumination can be varied (advantages of oblique illumination)
- Option of asymmetrical dark-field illumination
- Uniformly-illuminated field of view
- Continuous brightness adjustment
- 6V/20W halogen source
- Holder for 50mm-diameter filters
- Socket for incident lamp
- Built-in transformer
- Large working area; 120mm-diameter glass stage plate
- Comfortable handrests
- High stability

The transmitted-light stand for bright field includes a complete illumination system, comprising a 6V/20W lamp and a 0–7V regulating transformer. A tiltable mirror enables the light to impinge on the specimen plane at any angle from vertical to grazing incidence.

The mirror can be adjusted to produce a continuous gradation from bright field to asymmetrical dark field.

#### **Transmitted-light stand, bright and dark field**

- Changeover between bright and dark field
- Uniformly-illuminated field of view
- Illumination by fibre-optic light guide
- Base remains cool
- Large working surface; 120mm-diameter glass stage plate
- Comfortable handrests
- High stability

This is the preferred stand for observations and photomicrography in bright and dark field. The changeover between the two techniques takes only a moment with the lever. Unlike the asymmetrical dark-field effect obtained with inclined transmitted light, the dark-field effect produced in this stand is uniform from all sides; it is created by a fibre-optic ring. The fibre-optic light guide, powered by an external source, does not cause the base to heat up.



Gliding stage



Cup stage



Universal carrier

### New: Transmitted-light stand HL

- For highest requirements in observation and documentation
- High stability for video and photography
- Ratchet for exact bright field with maximum brightness
- Extremely bright and uniform illumination
- Additional condenser for increasing the resolution
- Adjustable mirror for vertical and oblique illumination
- Mirror has clear and matt sides for direct or diffuse illumination
- Cold light source and fibre-optic light guide
- Glass stage plate, diam. 120mm.

In the HL high-performance stand, the angle at which the light encounters the object from beneath can be varied in accordance with the characteristics of the object and the type of information required. The base contains a deviating mirror that can be rotated and also displaced towards the column, enabling particular structures to be emphasized. The light for the transmitted-light base HL originates from a fibre-optic light guide attached to an external cold-light source. As a result, no heat is developed which might damage organic subjects. Information in brochure M1-296-1en.

## Stages

The stages fit into the port in the incident- and transmitted-light stands by means of the 120/80mm spacing ring. They fit directly into the stage carrier with magnetic linkage.

### Gliding stage

Specimens on the gliding stage can be accurately displaced and turned. Depending on the application, this stage will accept a black/white stage plate or a glass stage plate (both 80mm in diameter), or a cup stage.

### Cup stage

Petri dishes, and spatial objects such as plants and insects, can be pinned to the rubberized surface of the stage and studied from all sides.

### Universal carrier

The universal carrier is intended for fitting individually-designed jigs to the stands.



Leica M420 macroscope with transmitted-light stand HL



# Measuring, polarization



Centrable rotatable polarizing stage, vernier, analyzer, sensitive-tint plate and mechanical stage

## Polarizing sets

There is a choice of two polarizing sets usable with the transmitted-light stands. A 120/80mm spacing ring is required.

- Analyzer, centrable rotatable polarizing stage with 360° scale and vernier, sensitive-tint plate, mechanical stage, and crosshair graticule
- Analyzer, and polarizer on glass stage plate

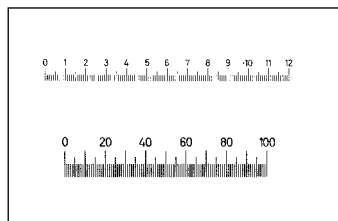
By using the polarizing stage together with the sensitive-tint plate, even weak double refraction can be detected. After the crosshair graticule in one eyepiece has been used to centre the stage, the specimen slide held in the mechanical stage can be turned without causing features to drift out of the field of view. The range of movement of the mechanical stage is 76mm × 28mm. The 360° scale on the centrable rotatable polarizing stage, and the vernier to 0.1°, enable extinction angles to be measured.



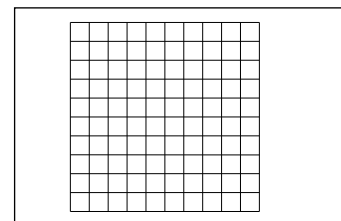
Graticule and sleeve

## Accessories for measuring

The mounted graticules for measuring and counting fit into the eyepieces. They are calibrated against a stage micrometer bearing an accurately-calibrated 50mm scale that carries 0.1mm and 0.01mm divisions.



Scale  
12mm:120  
and scale  
5mm:100



Grid 100×1mm<sup>2</sup>

# Photoautomats

## The requirements

The user of a macroscope for the purposes of inspection and investigation generally wants to record the results, e.g. for damage analysis, for scientific publication, for the analysis of work procedures, or for monitoring.

### A complete modular photomicrographic system comprises:

- Eyepiece tube
- Photo eyepiece
- Shutterpiece
- Control unit / photoautomat
- Interchangeable 35mm magazine with or without data back, or large-format attachment
- Format-indicating graticule or, for MPS60, focusing telescope

For further details, please refer to brochure M1-360-4en.

### Components

The built-in video-/phototube upgrades a Leica macroscope to a complete video-/photo work station, quickly and without fuss. The video-/phototube is usable for all modern documentation techniques.

Leica MPS60 photoautomat  
and data back



Leica MPS30 photoautomat



### Leica MPS30 photoautomat

This budget-priced, easy-to-use photomicrographic system for routine photography features a digital display, integrated metering, automatic exposure, exposure with an individually-selected fixed time, and various additional applications. The functions are nearly all automatic: coding the camera factor, DX-coding, reciprocity-failure correction. Just three keys control the input of film speed, individual exposure factor and exposure mode, ensuring rational and problem-free working.

Performance feature	MPS30 photoautomat	MPS60 photoautomat
Integrated-/spot metering	integrated	switchover, 1% spot
Light partition: – metering – focusing telescope – exposure	– 100% – 100%	switchover: – 100% – 100% – 100%
Photo sensor	SPD (silicon photodiode)	SPD (silicon photodiode)
Linear metering range at 100 ASA	0.01 – 3300 sec	0.01 – 4200 sec with integrated- and spot metering
Film speed (ISO)	12/12°–12 800/42° digital	12/12°–12 800/42° digital
Reciprocity failure correction	switchable in and out	switchable in and out
Memory for film speed / reciprocity-failure correction / individual exposure factor / bright- or dark field		two memories for each of four film formats
Individual modification of exposure time	0.25× – 4×, digital	0.25× – 4×, digital
Bright- / dark field compensation		switchable in and out
Coding of camera factor	automatic	automatic
Display of exposure time	$\frac{1}{100}$ sec – 100 min, digital	$\frac{1}{100}$ sec – 100 min, digital
Display of progress of exposure	digital	digital
Exposure time	automatic, fixed time	automatic, fixed time, manual
Preset / memory for fixed exposure time	×	×
Warning displays	×	×
DX-coding	×	×
Data back	32 characters	32 characters
Film transport (35mm)	automatic	automatic, but multiple exposures possible
Formats	35mm, $3\frac{1}{4}$ in × $4\frac{1}{4}$ in, 4in × 5in, 9cm × 12cm, and sheet- and pack film	35mm, $3\frac{1}{4}$ in × $4\frac{1}{4}$ in, 4in × 5in, 9cm × 12cm, and sheet- and pack film
Focusing and framing	in binocular tube	in binocular tube and in telescope

### Leica MPS60 photoautomat

100% of the available light can be directed to the highly-sensitive photodiode, and the spot measures only 1% of the 35mm film format. Perfect photographs can therefore be obtained with minimum exposure times, even if the light signals are very weak. A wide range of additional functions and storage options enables routine shots to be taken quickly and reliably, as well as permitting full creativity and a wide range of photographic techniques.

### Data back and input unit

The interchangeable 35mm magazine with data back imprints a 32-character line of text. The information can include:

- Date
- Time
- Frame number
- Photographic conditions
- Individual texts with upper- and lower-case letters
- Numbers
- Punctuation characters
- Various special characters

The input unit can be placed anywhere. Additional features are the opportunity to correct errors, the display, and the start key.

### Camera backs for all film formats

Leica modular photomicrographic systems are usable with all film formats from 35mm to 4in × 5in, and with all commercially-available film materials, whether conventional emulsions or Polaroid, whether sheet film or pack film.

Leica MPS30 photoautomat



Leica MPS60 photoautomat



# Digital imaging, video, filming, 35mm photography (SLR)

## The requirements

A high-performance microscope must be capable of producing records with modern CCD cameras in order to document work sequences, the movement of living organisms, and sequences that are rarely seen or are not easily reproducible, for the purposes of training and documentation.

For the efficient administration and archiving of digitized images, an intelligent image database needs to be available.

### **Accessories for various video cameras**

The availability of a range of video objectives and adapters opens up many options for using the Leica DC 100 and DC 200 CCD cameras with C-mount, or a different commercially-available video camera, on Leica microscopes equipped with video-/phototubes.

The combination modes for the components involved are described in the brochure M1-360-4en.



Leica DC 200 digital  
imaging system

**New: Leica DC 100 and DC 200 digital imaging systems**

Digitized images can be created on the monitor in a moment, and can then be processed, stored, deleted or reused. They can be printed or transmitted, or combined with multi-media applications or Internet publishing. The Leica DC 100 (0.9 megapixels) and DC 200 (2.6 megapixels) are high-performance instruments with a favourable price/performance ratio, suitable for almost any application in industry, medicine or research. The optical components and the software were designed specially for microscopy and enable digitized images to be efficiently created, manipulated and stored, irrespective of whether the microscopical technique involves incident- or transmitted light.

Information in brochure M1-395-1en.

**New: SLR camera system**

For taking long series of photographs under the same conditions, there is now an excellent alternative to the Leica modular photomicrographic systems; namely the Ricoh XR-X3000D single-lens reflex camera with data back. This camera fully meets all photomicrographic requirements and is extremely suitable for uncomplicated routine photography. The new Leica 2.5× projection eyepiece enables the Ricoh camera, or another single-lens reflex camera, to be fitted to Leica macroscopes.

Information in brochure M1-381-1en.

C-mount adapter and video camera



2.5× projection eyepiece, T2 camera adapter, Ricoh XR-X3000D single-lens reflex camera and remote-release key



# Optical data

Eyepiece	Zoom position	Macrozoom objective Apozoom objective 1.0×		In combination with additional objective					
				0.5×		0.4×		2.0×	
		Working distances							
		100mm Macrozoom 102mm Apozoom		192mm Macrozoom		253mm Apozoom		39mm Macrozoom 45mm Apozoom	
		Total magnification	Field diameter	Total magnification	Field diameter	Total magnification	Field diameter	Total magnification	Field diameter
<b>10×/21B</b>	5.8×	7.3×	29.0mm			2.9×	72.4mm	14.5×	14.5mm
	6.3×	7.9×	26.7mm	3.9×	53.3mm	3.2×	66.7mm	15.8×	13.3mm
	10.0×	12.5×	16.8mm	6.3×	33.6mm	5.0×	42.0mm	25.0×	8.4mm
	20.0×	25.0×	8.4mm	12.5×	16.8mm	10.0×	21.0mm	50.0×	4.2mm
	32.0×	40.0×	5.3mm	20.0×	10.5mm	16.0×	13.1mm	80.0×	2.6mm
	35.0×	43.8×	4.8mm			17.5×	12.0mm	87.05×	2.4mm
<b>16×/14B</b>	5.8×	11.6×	19.3mm			4.6×	48.3mm	23.02×	9.7mm
	6.3×	12.6×	17.8mm	6.3×	35.6mm	5.0×	44.4mm	25.02×	8.9mm
	10.0×	20.0×	11.2mm	10.0×	22.4mm	8.0×	28.0mm	40.0×	5.6mm
	20.0×	40.0×	5.6mm	20.0×	11.2mm	16.0×	14.0mm	80.0×	2.8mm
	32.0×	64.0×	3.5mm	32.0×	7.0mm	25.6×	8.8mm	128.0×	1.8mm
	35.0×	70.0×	3.2mm			28.0×	8.0mm	140.0×	1.6mm
<b>25×/9.5B</b>	5.8×	18.0×	13.0mm			7.3×	32.8mm	36.3×	6.6mm
	6.3×	19.7×	12.0mm	9.8×	24.0mm	7.9×	30.2mm	39.4×	6.0mm
	10.0×	31.3×	7.6mm	15.6×	15.2mm	12.5×	19.0mm	62.5×	3.8mm
	20.0×	62.5×	3.8mm	31.3×	7.6mm	25.0×	9.5mm	125.0×	1.9mm
	32.0×	100.0×	2.4mm	50.0×	4.8mm	40.0×	5.9mm	200.0×	1.2mm
	35.0×	109.4×	2.2mm			43.8×	5.4mm	218.8×	1.0mm
<b>40×/6B</b>	5.8×	29.0×	8.3mm			11.6×	20.7mm	58.0×	4.0mm
	6.3×	31.5×	7.6mm	15.8×	15.2mm	12.6×	19.0mm	63.0×	3.8mm
	10.0×	50.0×	4.8mm	25.0×	9.6mm	20.0×	12.0mm	100.0×	2.4mm
	20.0×	100.0×	2.4mm	50.0×	4.8mm	40.0×	6.0mm	200.0×	1.2mm
	32.0×	160.0×	1.5mm	80.0×	3.0mm	64.0×	3.8mm	320.0×	0.8mm
	35.0×	175.0×	1.4mm			70.0×	3.4mm	350.0×	0.5mm

## Zoom range

Macrozoom 5:1: 6.3× – 32×  
Apozoom 6:1: 5.8× – 35×

## Image scales

on 35mm film: 1:1 to 45:1 (16× photo eyepiece)  
on Polaroid 3¼ × 4¼ in: 3:1 to 112:1 (16× photo eyepiece)

# Performance features

## Leica M420 microscope

Design principle	Vertical beam path, binocular observation
Zoom objectives	Macrozoom 5:1, achromatic Apozoom 6:1, apochromatic
Built-in video-/phototube	Beam-splitter ratio: 50% video or photo, 50% observation Built-in stop for eliminating stray light during the exposure
Magnification factor	1.25× for observation and for photo/video
Built-in aperture diaphragm	For adjusting the depth of field
Numerical aperture	0.116 / 0.232 with 2.0× additional objective
Resolution	348 lp/mm (696 lp/mm with 2.0× additional objective)
Zoom range (with 10× eyepieces)	Macrozoom: 7.9× – 40× / Apozoom 7.3× – 43.8×
Total magnifications	Macrozoom: 3.9× – 320× / Apozoom: 2.9× – 350×
Field diameter	Macrozoom: 0.8mm – 53.3mm / Apozoom: 0.7 – 72.4mm
Working distances	Macrozoom: 100mm, additional objective 0.5×: 192mm, 2.0×: 39mm Apozoom: 102mm, additional objective 0.4×: 253mm, 2.0×: 45mm
Additional objectives	For Macrozoom: 2.0×, 0.5× / For Apozoom: 2.0×, 0.4×
Wide-field eyepieces for spectacle wearers	10×/21B, 16×/14B, 25×/9.5, 40×/6B, distortion free
Dioptric correction	+5 to –5
Eyecups	Eye contact adjustable
Binocular tube	Ergonomically low, with 30° viewing angle
Interpupillary distance	Range of adjustment 54mm to 75mm
<b>Stands, illuminators</b>	
Incident-light stand	300mm and 500mm side-faced columns; 120mm diameter stage plate
Focusing drive	Coarse/fine, manual and motorized
Swinging-arm stand	Column length 550mm, diam. 50mm, also available with clamp for table tops and with motorized focusing
Universal stand	Column diam. 50mm, length 450mm or 800mm, magnetic carrier for stages
Transmitted-light stands	Bright field, bright and dark field, and high-performance base
Stages	Several, including rotatable polarization stage
Incident lamps	Including inclined, coaxial with quarter-wave plate, fibre-optic light guides
<b>Accessories</b>	
Photomicrographic systems	Leica MPS30 and MPS60, fully automatic, with data back
Video, filming; archiving- and post-processing software	Leica DC 100 and DC 200 digital imaging systems, image manager
Measuring graticules	For measuring lengths and for counting
Filter-slide housing	For two gelatine filters







# Complete outfits

## M420 macroscope

Outfit with Macrozoom objective 5:1 and with wide-field eyepieces for spectacle wearers, 10×/21B, distortion-free

# 1 Leica M420 with incident-light stand and coarse/fine focusing drive

# 2 Leica M420 with incident-light stand and motor-focus system (manual control)

# 3 Leica M420 with transmitted-light stand HL and coarse/fine focusing drive

# 4 Leica M420 with transmitted-light stand for bright field, 20W, and coarse/fine focusing drive

# 5 Leica M420 with transmitted-light stand for bright and dark field, and coarse/fine focusing drive

# 6 Leica M420 with transmitted-light stand HL, coarse/fine focusing drive and rotatable polarization stage

# 7 Leica M420 with swinging-arm stand and coarse/fine focusing drive

# 8 Leica M420 with swinging-arm stand and motor-focus system

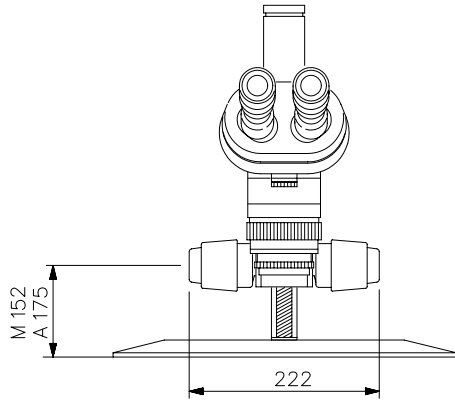
## Incident illuminators

Incident illuminator 1×6V/10W	Incident illuminator 1×6V/20W	Coaxial incident illuminator 6V/20W	
# 1	# 1		with clamp for side-faced column
		# 5	with halogen bulb

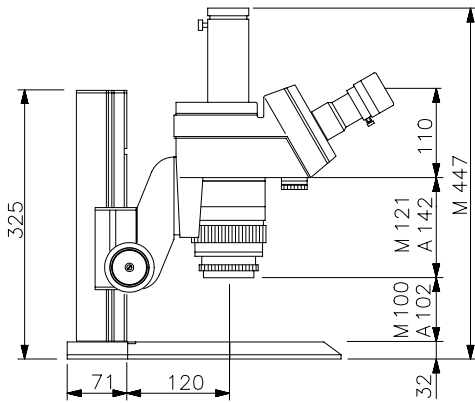
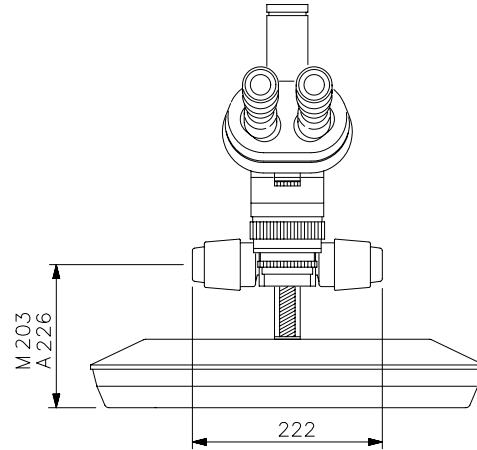
## Photoautomats

	Leica MPS30 Integrated metering	Leica MPS60 Integrated- and spot metering
Interchangeable 35mm magazine	# 1	# 4
Interchangeable 35mm magazine, data back and input unit	# 2	# 5
with 0.8× camera back and magazine for 3 <sup>1</sup> / <sub>4</sub> in×4 <sup>1</sup> / <sub>4</sub> in Polaroid pack film	# 3	# 6
Interchangeable 35mm magazine, and focusing telescope		# 1
Interchangeable 35mm magazine, focusing telescope, data back and input unit		# 2
with 0.8× camera back, magazine for 3 <sup>1</sup> / <sub>4</sub> in×4 <sup>1</sup> / <sub>4</sub> in Polaroid pack film and focusing telescope		# 3

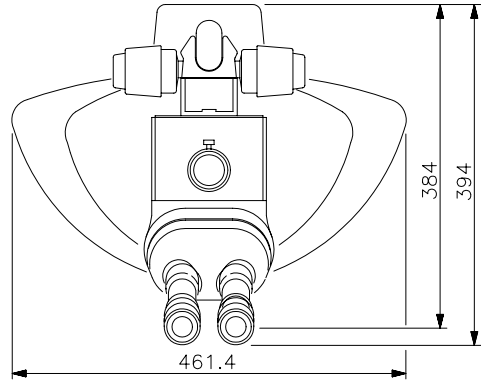
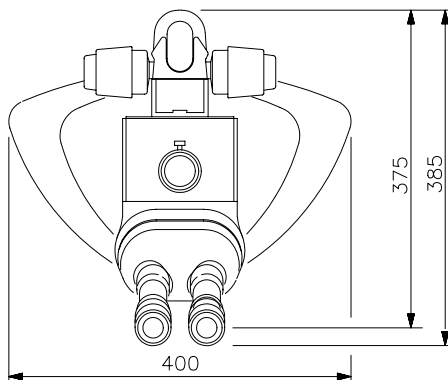
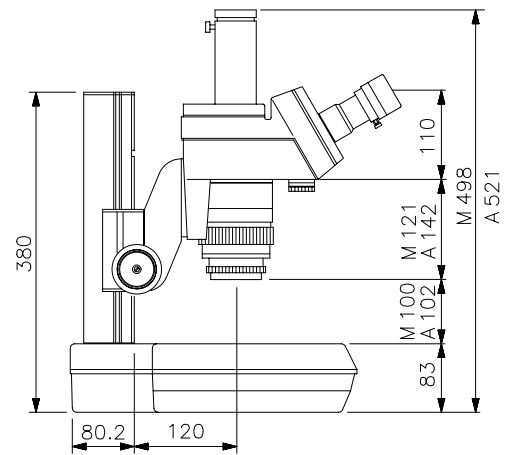
Dimensions of Leica M420  
with incident-light stand



Dimensions of Leica M420  
with transmitted-light stand



M = Macrozoom  
A = Apozoom



# Leica Microsystems – the brand for outstanding products

The Leica Microsystems Mission is to be the world's first-choice provider of innovative solutions to our customers' needs for vision, measurement, lithography and analysis of microstructures.

Leica, the leading brand for microscopes and scientific instruments, has grown from five brand names with a long tradition: Wild, Leitz, Reichert, Jung and Cambridge Instruments. Leica symbolizes both tradition and innovation.

## List of brochures and flyers

M1-421-0en	Leica M420 macroscope
M1-141-0en	Leica MS5, MZ6 stereomicroscopes
M1-145-1en	The antistatic Leica stereomicroscopes
M1-175-0de	Leica MZ75 zoom stereomicroscope
M1-195-0en	Leica MZ95 zoom stereomicroscope
M1-125-0en	Leica MZ125 zoom stereomicroscope
M1-143-0en	Leica MZAPO zoom stereomicroscope
M5-105-004	New high-performance stereomicroscopes, poster
M1-160-0en	Leica MZ FLIII fluorescence stereomicroscope
M5-160-004	Fluorescence stereomicroscope, poster
M1-267-1en	Motor-focus system
M1-395-1en	Leica DC 100 and DC 200 digital imaging systems
M1-502-0en	IM 1000 image manager
M1-330-0en	Leica MPS30 photoautomat
M1-360-0en	Leica MPS60 photoautomat
M1-381-1en	SLR camera system
M1-275-1en	Measuring
M1-296-1en	Transmitted-light stand HL
M1-205-1en	CLS cold-light sources
M5-106-1en	Ergonomics, poster
M3-215-1en	Ergonomics
M3-109-1en	Botany
M3-105-1en	Freshwater biology
M3-118-0en	Entomology
	Customer magazine "Resolution"

The Business Units in Leica Microsystems hold the management system certificates for the international standards ISO 9001 and ISO 14001 relating to quality management, quality assurance and environmental management.

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