



# Leica MacroFluo™

User manual

## Dear User,

Thank you for your faith in our product. We hope your work with it is both enjoyable and successful.

Leica MacroFluo™ with zoom 6.3:1 or 16:1 are worldwide the only macro documentation systems for fluorescence. The MacroFluo™ concept combines the advantages of macroscopy – large fields of view, large working distances, parallax-free and precise imaging – with fluorescence technology (including multi color fluorescence) at a high resolution. For this purpose, we combined the excellent optics of the apochromatic zoom systems Leica Z6 APO (6.3:1 Zoom) or Z16 APO (16:1 Zoom) with the brilliant Leica fluorescence technology. The Leica MacroFluo™ systems are the correct choice to examine and digitally detect the effects of a gene defect on living transgenic models from the size of a whole mouse at highest precision and resolution in an intensively fluorescent image field.

In developing our instruments, we place great value on simple, self-explanatory operation. However, please take the time to read the user manual and the operating safety information to become familiar with the advantages and options of your Leica MacroFluo™, so that you can use them optimally and safely.

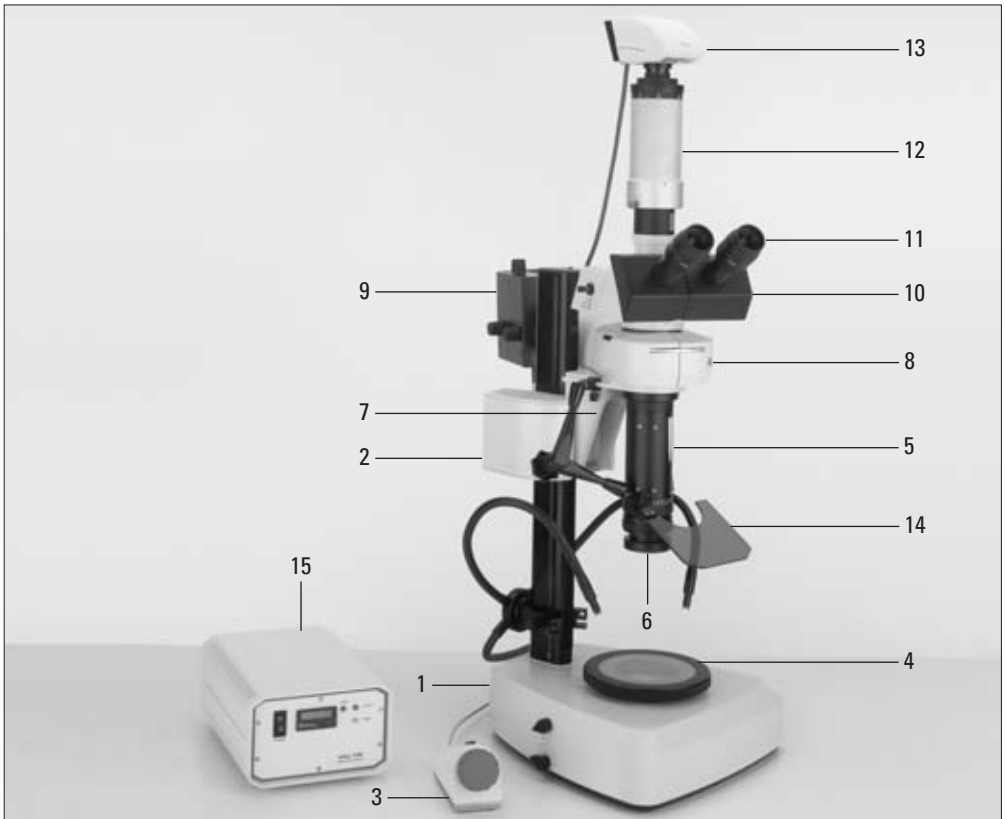
Should you have any questions, please consult your local Leica representative. You will find the address of the closest local representative as well as valuable information about products and services from Leica Microsystems on our homepage at [www.leica-microsystems.com](http://www.leica-microsystems.com)

We are gladly at your service. Customer service is a big thing with us – before and after the sale.

Leica Microsystems (Switzerland) Ltd.  
Stereo & Macroscopy Systems  
[www.stereomicroscopy.com](http://www.stereomicroscopy.com)

*The Leica MacroFluo™ systems were developed in conjunction with the Imaging Centre of IGBMC.*

# Overview of the instrument



**Fig. 1** Leica MacroFluo™ with zoom system 16:1

- |  |   |
|--|---|
| <b>1</b> Base of stand (transmitted-light base HL RC™ shown)   | <b>8</b> Coaxial incident light fluorescence illuminator LRF 4/22   |
| <b>2</b> Focusing drive with column (shown with motor focus) and focusing stop (shown with holder for fiber-optic light guide) | <b>9</b> Lamp housing 106 z with 100 W high-pressure mercury burner |
| <b>3</b> Handheld controller (only if fitted with motor focus)   | <b>10</b> Trinocular tube (FSA HC L 3TP 4/5/7 shown)                |
| <b>4</b> Gliding stage (optional), glass stage plate is standard   | <b>11</b> Wide-angle HC plan eyepieces 10×/22 or 10×/25             |
| <b>5</b> Zoom system 6.3:1 or 16:1 (Z16 APO shown with 16:1 zoom)  | <b>12</b> TV adapter of your choice                                 |
| <b>6</b> Objective of your choice  | <b>13</b> CCD camera of your choice (Leica DFC300 FX shown)         |
| <b>7</b> Carrier for the incident illuminator  | <b>14</b> UV protection screen with arm                             |
|  | <b>15</b> Supply unit Hg 100W and 103 W/2                           |

# Contents

	Page
<b>1 Safety concept</b> .....	<b>5</b>
1.1 The user manual .....	5
1.1.1 Diagrams .....	5
1.1.2 Symbols used .....	6
1.2 Safety instructions .....	6
1.3 Light source: Safety instructions .....	9
<b>2 Assembly</b> .....	<b>10</b>
2.1 Expansion diagram .....	10
2.2 Assembly sequence .....	11
2.3 Stand assembly .....	11
2.4 Incident light fluorescence illuminator .....	11
2.5 Trinocular tube .....	13
2.6 Zoom system .....	13
2.7 Objectives .....	14
2.8 UV protection screen .....	15
2.9 Lamp housing .....	16
2.10 Instrumentation of nosepiece disc .....	16
2.11 Connection of digital or video cameras .....	18
2.12. Electrical connections .....	18
<b>3 Operation</b> .....	<b>19</b>
3.1 Starting up .....	19
3.1.1 Transmitted light or incident light observation .....	19
3.1.2 Incident light fluorescence .....	19
3.1.3 Disconnecting from the power supply .....	19
3.2 Trinocular tube .....	19
3.3 Zoom .....	20
3.4 Iris diaphragm .....	21
3.5 Focusing .....	21
3.5.1 Fine focusing .....	21
3.6 Microscopy with/without glasses .....	21
3.7 Adjusting diopter settings .....	22
3.8 Incident light fluorescence illuminator .....	24
3.8.1 Field diaphragm .....	24
3.8.2 Aperture diaphragm .....	24
3.8.3 Light stop .....	25
3.8.4 Filter BG38 .....	25
3.8.5 Filter blocks .....	25
<b>4 Appendix</b> .....	<b>26</b>
4.1 Filter blocks for macro-fluorescence .....	26
4.2 Assignment of fluorochromes and filter blocks .....	27
4.3 Optical data .....	31
4.4 Technical data, performance characteristics .....	32
4.5 Dimensions .....	34

# 1. Safety concept

## 1.1 The user manual

Included with your Leica MacroFluo™ is an interactive CD-ROM with all pertinent user instructions in German, English, French, Spanish, Italian, Portuguese, Dutch, Danish, Swedish, Finnish, and Greek. Keep it in a safe place, and readily accessible to the user. User manuals and updates are also available for you to download and print from our web site at [www.stereomicroscopy.com](http://www.stereomicroscopy.com).

This operating manual describes the special functions of the Leica MacroFluo™ system and contains important instructions for their operational safety, maintenance, and accessories. Leica MacroFluo™ systems feature a modular design. The following components are described in special user instructions on the supplied CD-ROM:

- Leica Z6 APO and Z16 APO zoom systems: Operating instructions M2-416-0
- Lamp housing with high-pressure mercury burner: Operating instructions M2-216-1
- Supply unit ebq 100 isolated for 100-W high-pressure mercury burner.
- Incident light fluorescence illuminator
- Operating instructions M2-105-0 M series
- Motor focus system: Operating instructions M2-267-1
- Leica transmitted-light base HL RC™: Operating instructions M2-216-2



**These operating instructions are an essential component of the instrument. Carefully read these operating instructions and those listed above before assembly, startup and use. In particular, please observe all safety instructions. To maintain the unit in its original condition and to ensure safe operation, the user must follow the instructions and warnings contained in these user manuals.**

### 1.1.1 Diagrams

(1.8)

Numbers in parentheses within the descriptions pertain to the numbers of the diagrams and the items in the diagrams.

Example (1.8): Figure 1 is found on Page 3 and item 8 is the coaxial incident illuminator.

## 1.1.2 Symbols used



### Warning of a danger

This symbol indicates especially important information that, if not observed,

- can cause hazards to personnel,
- can lead to functional disturbances and damaged instruments.



### Warning of hazardous electrical voltage

This symbol indicates especially important information that, if not observed,

- can cause hazards to personnel,
- can lead to functional disturbances and damaged instruments.



### Danger due to hot surface.

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



### Important information

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

### Action

- ▶ This symbol refers to actions described in the text that are to be carried out.

### Explanatory notes

- This symbol indicates additional notes and explanations provided in the text.

## 1.2 Safety instructions

### Description

Leica MacroFluo™ systems are microscopes with vertical beam path for precise fluorescence applications. Leica MacroFluo™ systems are modular and can be combined individually. A MacroFluo™ equipment consists of:

- a zoom system of your choice with an objective of your choice, poss. fine focusing
- the carrier for the incident illuminator
- the incident light fluorescence illuminator
- filter blocks of your choice
- the lamp housing with 100-W high-pressure mercury burner, stray-light protection and supply unit
- the UV protection screen with arm and clamp
- a trinocular tube of your choice
- two eyepieces of your choice
- a stand base of your choice
- a focusing drive of your choice
- a high-performance digital camera with photo/video adapters of your choice

### Documents, unpacking

Please carefully compare your supply with the packing slip, delivery note or invoice. We recommend to keep a copy of these documents together with the operating instructions. Please ensure that no small parts are left in the packaging material when unpacking.

In accordance with our guidelines (to ISO 14001), we are using packaging material that allows for environmentally-friendly recycling, as well as bubble wrap that corresponds to the latest technical standards (RESY).



Do not connect any devices to the supply system at this time.

## Permitted uses

The Leica MacroFluo™ allows for examining, manipulating, sorting and documenting entire unprepared fluorescent objects. The high resolution, high light utilization and specially selected filter blocks allow for distinguishing the finest structures and increase the richness of information with incident light fluorescence. But the Leica MacroFluo™ can also be used to perform observations without fluorescence in transmitted light or incident light.

## Non-intended use

If the Leica MacroFluo™, its components or accessories are used other than as described in the user manual, injury or property damage may occur. Never:

- install other plugs or cables.
- change, rebuild or take apart parts, if not specifically instructed to in this manual.
- allow unauthorized persons to open parts.
- use the Leica MacroFluo™ for examinations and operations involving the human eye.

The devices and accessories described in this operating manual have been tested for safety and potential hazards. The responsible Leica affiliate or the Leica headquarters in Wetzlar must be consulted whenever the device is altered, modified or used in conjunction with non-Leica components that are outside of the scope of this manual! Unauthorized alterations to the device or noncompliant use shall void all rights to any warranty claims!

## Place of use

- The Leica MacroFluo™ may only be operated in closed, dust-free rooms at +10 °C to +40 °C.
- Ensure that the room is free of oil and other chemical fumes and extreme humidity.
- Electrical components must be assembled at least 10cm away from the wall and from flammable substances.
- Large temperature fluctuations, direct sunlight and vibrations should be avoided. These conditions can distort measurements and microscopic images.
- Optical instruments in warm and warm-damp climatic regions require special care in order to prevent the build up of fungus.

## Responsibilities of the person(s) in charge of instrument

Ensure that

- the Leica MacroFluo™ and accessories are operated, maintained and repaired by authorized and trained personnel only.
- the operating personnel has read, understands, and is observing these instructions as well as those listed on page 5, and, in particular, the safety instructions.

## Transport

- Use the original packaging for shipping or transporting the Leica MacroFluo™ and their accessory components.
- In order to prevent damage from vibrations, disassemble all moving parts that (according to the user manual) can be assembled and disassembled by the customer and pack them separately. These include the objective, trinocular tube, eyepieces, lamp housing, burner, etc.

## Repairs and servicing

- Only Leica Microsystems-trained service technicians, or technical specialists assigned by the person in charge of the instrument, are permitted to carry out repairs.
- Only original Leica Microsystems spare parts may be used.
- Unplug the power cable, the power supply or the supply unit before opening voltage carrying parts such as the Leica MacroFluo™.



**Touching the live circuit can cause injury.**

## Integration in third-party products

When installing Leica products into third-party products, note the following: The manufacturer of the complete system or its dealer is responsible for following all applicable safety instructions, laws and guidelines.

## Electrical connections

Observe the following notes and warnings to ensure a perfect safety-related condition of the devices:

- Connect the power plug only to a grounded power outlet.
- Contact the service in case of systems without protective conductor.
- The protective action must not be canceled by using an extension cable without protective conductor.

## Disposal

- The products described here must be disposed off in accordance with applicable local laws and regulations.
- High-pressure mercury burners must be disposed of as hazardous waste.

## Legal requirements

Adhere to general and local regulations relating to accident prevention and environmental protection.

## Conformity with European Community directive

The Leica MacroFluo™ and their accessories are constructed based on the state of the art of technology and are provided with an EU Declaration of Conformity.

## Health risks

The ergonomic optics concept and the design of Leica instruments aim to limit the strain on the user to the lowest possible level.



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

- A basic requirement is a stable stage at optimal height (70 – 80cm). Together with an ergonomically correct, multi-adjustable chair, these are the external requirements for fatigue-free microscopy work.
- optimal arrangement of workplace, work assignments and work flow (changing tasks frequently).
- thorough training of the personnel, giving consideration to ergonomic and organization aspects.





Direct contact with eyepieces is a potential transmission method for bacterial and viral infections of the eye. Users should be made aware of the potential risk of infection. The risk can be kept to a minimum by using personal eyepieces for each individual or detachable eyecups.

### 1.3 Light source: Safety instructions

Protective measures of the manufacturer:

- UV protection screen in front of the object plane prevents direct view onto the UV beams.
- The design prevents direct UV radiation on the eyes in case of empty positions of the nose-piece disc.
- UV filter in the observation beam paths protects the eyes.
- Stray-light protection on the lamp housing prevents irradiation of the hands.



**Warning: UV radiation could damage the eyes.**

For this reason:

- never look at the light spot on the object plane without UV protection screen.
- do not select a white, heavy reflecting background for the objective.
- Never open the lamp housing while the lamp is switched on.  
Danger of explosion, UV radiation, danger of blinding!

### Supply unit

Do not connect the unit until the lamps have been assembled. Check the setting of the power supply voltage and correct it, if necessary. See also the special guideline.

Always disconnect the power plug of the supply unit from the supply system:

- when assembling or disassembling the lamp housing,
- before opening the lamp housing,
- when changing the high-pressure mercury burner and remaining parts, such as the heat-absorbing filter or the collector,
- for service work on the supply unit.

### Lamp housing

Leica MacroFluo™ with fluorescence illuminator may be used only with the Leica lamp housing 106 z for 100-W mercury bulb, supply unit and stray-light protection.



**For assembly work, always pull the power plug of the supply unit from the socket! Before inserting the burner, disconnect the power supply connection. Adjust the burner immediately after ignition. See also the special guideline.**

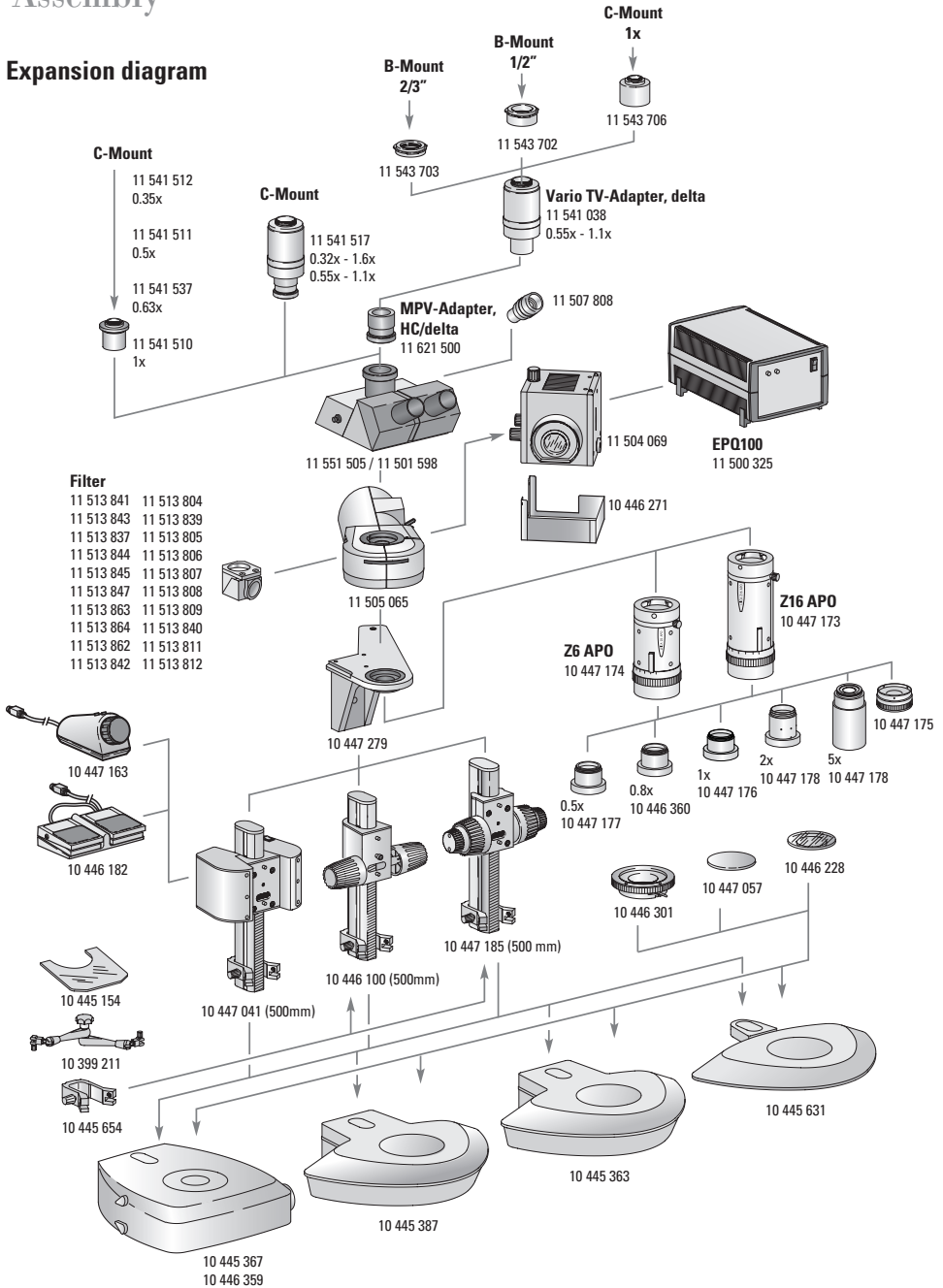


**Leica Microsystems assumes no liability for damages if bulbs from other manufacturers are used.**

- Minimum distance of lamp housing (hot surfaces!) 10cm (4") from flammable objects such as books, curtains, wallpaper. Fire hazard!
- Never look into the direct beam path! Danger of blinding!
- Never open the lamp housing when the lamp is switched on. Disconnect the power plug of the supply unit from the supply system.  
Danger of explosion, UV radiation, danger of blinding!
- Let the lamp housing cool off for at least 15 min.  
Danger of explosion, danger of burns.
- Never cover the venting slots on the lamp housing. Fire hazard!
- Use stray-light protection.  
UV radiation can damage the eyes.

# 2. Assembly

## 2.1 Expansion diagram



## 2.2 Assembly sequence

Assemble the components in the following order:

- Stand: Base, column with focusing drive, focusing stop, glass stage plate or optional spacial stage (gliding stage, Leica MATS heating stage)
- carrier for the incident illuminator
- Incident light fluorescence illuminator
- Trinocular tube and two eyepieces
- Zoom system and objective, optional fine focusing
- UV protection screen with arm and clamp
- Lamp housing with 100-W high-pressure mercury burner, stray-light protection and supply unit
- Instrumentation of nosepiece disc with filter blocks
- For transmitted-light stand HL RC™: Fiber-optic light guide with light source
- For motor focus: Handheld controller and/or foot switch and poss. PC
- Optional digital camera with photo/video adapters
- Electrical connections

Either the Allen keys included in delivery or the integrated clamping screws are necessary for assembly.

## 2.3 Stand assembly

The assembly of the transmitted-light stand HL RC™ is described in the special M2-216-2 operating instructions. Additional stands and the manual focusing drive can be found in the M2-105-0 operating instructions on the supplied CD-ROM and the motorized focusing drive in the special M2-267-1 operating instructions.



Do not connect any devices to the supply system at this time.

## Focusing drive → Base of stand



When using the motorized focus, it is mandatory to read the separate M2-267-1 operating instructions, in particular the safety instructions.

Fig. 2 see p. 12

- ▶ Attach the focusing drive (2.2) with column to the base (2.1) according to the operating instructions. Tool: Allen key.
- ▶ Attach the focusing stop (2.3) on the stand column below the focusing drive using the clamping screw.
- ▶ Insert the glass stage plate or special stage (2.5) in the stage opening.

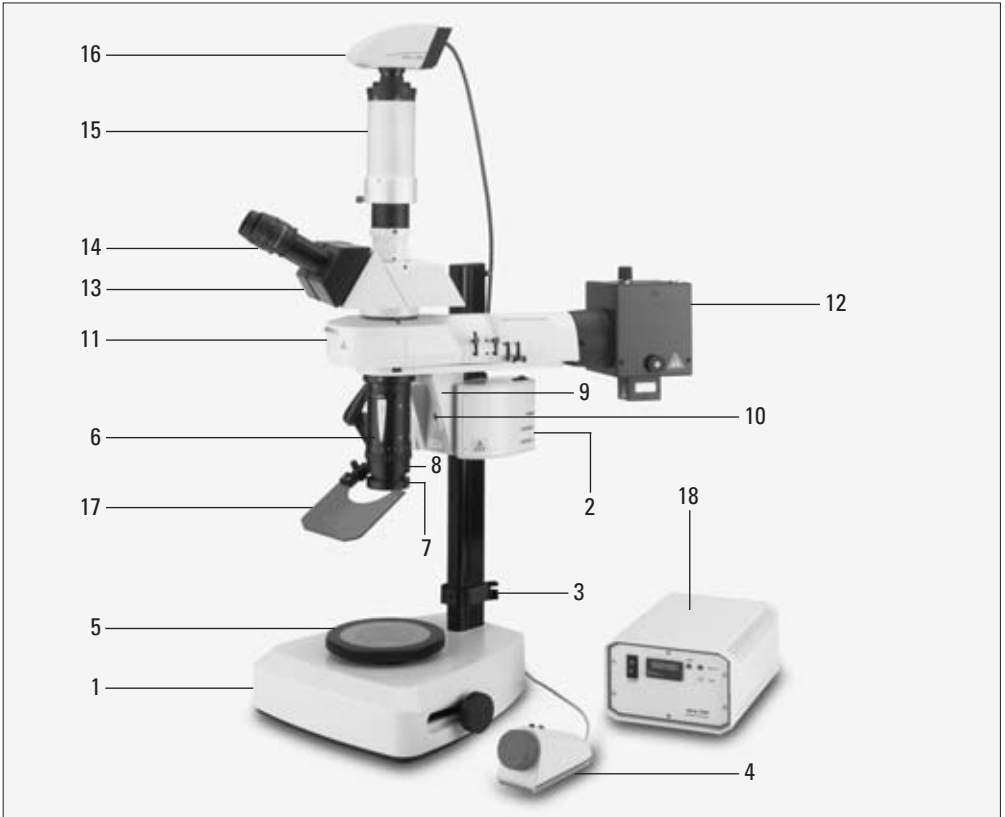
## 2.4 Incident light fluorescence illuminator

### Carrier for the incident illuminator → focusing drive

Fig. 3 see p. 13

Tool: Allen key.

- ▶ Fasten the carrier (3.1) with hexagon-head screw (3.2) on the focusing drive (3.3).
- ▶ Fasten the incident illuminator (3.4) with hexagon-head screw (3.5) to the carrier (3.1).



**Fig. 2** Leica MacroFluo™ with zoom 6:1

- |   |  |
|---|--|
| <p><b>1</b> Base of stand (transmitted-light base HL RC™ shown)</p> <p><b>2</b> Focusing drive with column (shown with motor focus)</p> <p><b>3</b> Focusing stop</p> <p><b>4</b> Handheld controller (only if fitted with motor focus)</p> <p><b>5</b> Gliding stage (optional) with glass stage plate</p> <p><b>6</b> Zoom system (Z6 APO shown)</p> <p><b>7</b> Objective of your choice</p> <p><b>8</b> Diaphragm ring</p> <p><b>9</b> Carrier for the incident illuminator</p> <p><b>10</b> Hexagon-head screw</p> | <p><b>11</b> Coaxial incident light fluorescence illuminator LRF 4/22</p> <p><b>12</b> Lamp housing 106 z with 100 W high-pressure mercury burner</p> <p><b>13</b> Trinocular tube (FSA HC L 3TP 4/5/7 shown)</p> <p><b>14</b> Wide-angle HC plan eyepieces 10×/22 or 10×/25</p> <p><b>15</b> TV adapter of your choice</p> <p><b>16</b> CCD camera of your choice (Leica DFC300 FX shown)</p> <p><b>17</b> UV protection screen with arm and clamp on side-faced column</p> <p><b>18</b> Supply unit Hg 100 W and 103 W/2</p> |
|---|--|

## 2.5 Trinocular tube

### Trinocular tube → incident illuminator

Tool: Allen key.

- ▶ Slightly unscrew the hexagon-head screw (3.9).
- ▶ Insert the trinocular tube FSA HC L 3TP (3.8) in the circular mount (dovetail ring) and align by turning (view from the front). Ensure that the components do not jam.
- ▶ Tighten the clamping screw (3.9).

### Eyepieces

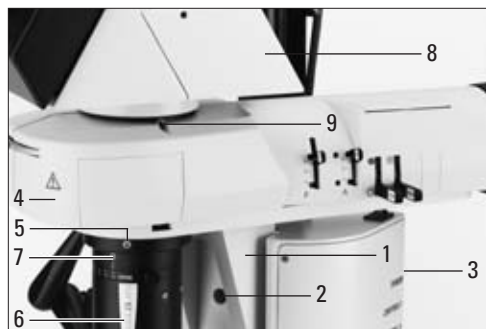
- The designation on the eyepiece, e.g. 10×/25, indicates the magnification and the eyepiece field number. The field number (FN) designates the diameter of the intermediate image in the eyepiece in mm, i.e. the diameter of the circular diaphragm that limits the image and is located within the eyepiece.
  - Wide-angle HC plan eyepieces 10×/25 and 10×/22 feature a removable or invertible eyecup and can be used by users with and without glasses. For microscopy with glasses, the attached eyecup (10.3) must be removed or inverted; otherwise, it may not be possible to view the total field of view any longer.
  - On principle, use only two eyepieces with identical magnification and field number.
  - Wide-angle HC plan eyepieces 10×/25 and 10×/22 feature an adjustable eye lens for diopter compensation and a mount for reticule graticules with a diameter of 26mm.
- ▶ Insert the wide-angle HC plan eyepiece 10×/25 or 10×/22 in the tubes.

## 2.6 Zoom system

The MacroFluo™ can be combined with a 6:1 (Z6 APO) or 16:1 (Z16 APO) zoom system.

### Zoom system → Carrier for incident illuminator

- ▶ Release the hexagon-head screw (3.7) using the Allen key provided.
- ▶ Adjust the zoom system (3.6) to the dovetail ring of the carrier for the incident illuminator (3.1) and tighten the hexagon-head screw (3.7).



**Fig. 3**

- 1 Carrier for the incident illuminator
- 2 Hexagon-head screw for fastening the carrier for the incident illuminator to the focusing drive
- 3 Focusing drive
- 4 Incident light fluorescence illuminator
- 5 Hexagon-head screw for fastening the incident illuminator to the carrier
- 6 Zoom system
- 7 Hexagon-head screw for fastening the zoom system to the carrier for the incident illuminator
- 8 Trinocular tube
- 9 Hexagon-head screw for fastening the trinocular tube to the incident illuminator

## 2.7 Objectives

- We recommend using the 1×, 2×, 0.8×, 0.5× planapochromatic objectives, in order to take advantage of the high performance of the apochromatic zoom system.
- Use the objectives directly on the diaphragm ring of the zoom system or with fine focusing. Remove the diaphragm ring if the fine focusing is used (see below).
- A planapochromatic 5× HR objective is available for magnifications in the microrange (see assembly diagram p. 10). Always use the HR objective with fine focusing.
- The Leica M series 0.63×, 0.5×, 0.32× achromatic objectives, which can be attached to the diaphragm ring of the zoom system or the fine focusing using an adapter (see assembly diagram on p. 10), can also be used.

### Diaphragm ring

At the bottom of the zoom system is a diaphragm ring (4.4). The diaphragm ring must be removed if fine focusing is used.

### Objective → zoom system

- Fasten planapochromatic objective (4.3) counter-clockwise on the diaphragm ring of the zoom system (4.4).

Or:

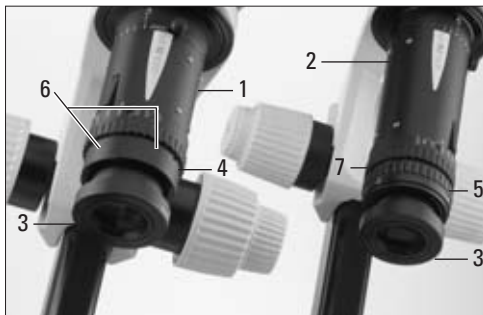
- Fasten achromates to the diaphragm ring of the zoom system (4.4) by means of the adapter.

### Objective → fine focusing → zoom system

- Loosen 3 hexagon-head screws (4.6) at diaphragm ring (4.4) and remove diaphragm ring.
- Tighten the fine focusing (4.5) with 3 hexagon-head screws (4.7) to the zoom system (4.2).
- Fasten planapochromatic objective (4.3) counter-clockwise on the fine focusing (4.5).

Or:

- Fasten achromates to the fine focusing (4.5) by means of the adapter.



**Fig. 4** Z6 APO on the left: Mount the objective on the diaphragm ring of the zoom system. Z16 APO on the right: Objective mounted on the fine focusing (diaphragm ring removed).

- 1 Z6 APO with zoom 6:1
- 2 Z16 APO with zoom 16:1
- 3 Objective
- 4 Diaphragm ring
- 5 Fine focusing
- 6 3 hexagon-head screws for fastening the diaphragm ring to the zoom system (the figure does not show all 3 hexagon-head screws)
- 7 3 hexagon-head screws for fastening the fine focusing to the zoom system (the figure does not show all 3 hexagon-head screws)

## 2.8 UV protection screen

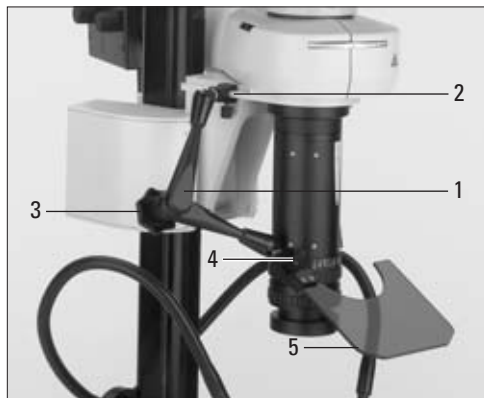
- ▶ Fasten UV protection screen (5.5) with clamp (5.4) on the hinged arm (5.1).
- ▶ Fasten hinged arm with UV protection screen to the carrier using the clamp (5.2).



The hinged arm can be opened and closed via the central rotary knob (5.3). In the opened state, all joints are freely movable and the hinged arm can be placed in any position. To block all hinged arms, turn the rotary knob clockwise.



Always position the UV protection screen so that the operator can never look directly onto the light spot (see p. 9).



**Fig. 5** Hinged arm with UV protection screen

- 1 Hinged arm
- 2 Clamp with clamping screw for fastening to carrier
- 3 Central rotary knob
- 4 Clamp with clamping screw for fastening to UV protection screen
- 5 UV protection screen

## 2.9 Lamp housing

The Leica lamp housing 106 z (11 504 069) is the light source for the incident illuminator LRF 4/22. It is used with 100-W mercury burners (11 500 138) or 103 W/2 (11 500 321) with extended life, the supply unit ebq 100 W and 103 W/2 (11 500 325) and stray-light protection (10 446 271).



### Please read

- the separate operating instructions M2-216-1 and the safety instructions for the Leica lamp housing
  - the operating instructions and safety instructions for the supply unit ebq 100
  - the operating instructions and safety instructions of the burner manufacturer and specifically its notes in reference to lamp breakage and the release of mercury.
- ▶ Fasten the stray-light protection to the lamp housing 106 z (1.9) as described in the operating instructions M2-216-1.
  - ▶ Fasten the lamp housing 106 z (1.9) to the adapter component of the incident illuminator as described in the operating instructions M2-216-1.
  - ▶ Connect the cable from the lamp housing to the supply unit ebq 100 W and 103 W/2.
  - ▶ Connect the supply unit to mains. Power cable must meet country standards.
  - ▶ Insert the 100-W or 103 W/2 mercury burner as described in the operating instructions M2-216-1 in the lamp mount and in the lamp housing.



Only switch on the supply unit after you familiarized yourself with the functions described in the "Operation" chapter of the Leica MacroFluo™ system in transmitted light.



After activation, the burner must be adjusted immediately (see operating instructions M2-216-1).

## 2.10 Instrumentation of nosepiece disc

The nosepiece disc can be fitted with a total of 4 filter blocks (filter system). At present, 19 fluorescence blocks (p. 25) are available for various macro and multicolor applications (additional filter blocks upon request). The filter block offer from Leica Microsystems is continuously expanded with respect to the latest application requirements. The filter blocks (filter systems) consist of a combination of excitation filter, beam-splitting mirror and suppression filter.



It is not necessary to occupy all 4 positions. The design prevents eyes from being blinded.

- ▶ Remove the cover (6.1) on the right side of the illuminator by pulling it up (recess [6.2] for placing a finger on the bottom of the cover).
- ▶ Push the filter block with the tapered end of the dovetail guide (7.1) first into the guide until it stops.
- ▶ Turn the nosepiece disc (6.3) and populate the 4 positions.



The 4 positions of the nosepiece disc are each labeled with the numbers 1 through 4 on the left side of the dovetail guide. The numbers can be seen in the opened nosepiece slot. In addition, the active position in the beam path is displayed on the outside of the nosepiece disc (6.3). The filter blocks are supplied with self-adhesive labels numbered 1 through 4 and labels with short designations of the filter block (e.g. GFP).

- ▶ Affix the label 1 2 3 4 in the rectangular recess at the front of the illuminator (Fig. 8).
- ▶ Compare which position on the nosepiece disc (number on the left of the dovetail guide) you equipped with which filter block. Attach the labels with the short designations below the corresponding labels 1 through 4 at the front of the illuminator.
- ▶ Reengage the cover (6.1) by applying pressure.



**Never look into the direct incident light beam path!**

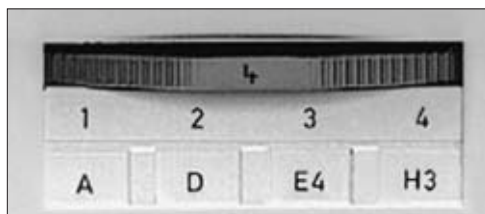


**Fig. 6** Incident light fluorescence illuminator

- 1 Cover of nosepiece slot
- 2 Recess for placing a finger
- 3 Nosepiece disc for changing filter blocks



**Fig. 7** Filter block: Filter system consisting of excitation filter, beam-splitting mirror and suppression filter.



**Fig. 8** Self-adhesive labels and nosepiece disc

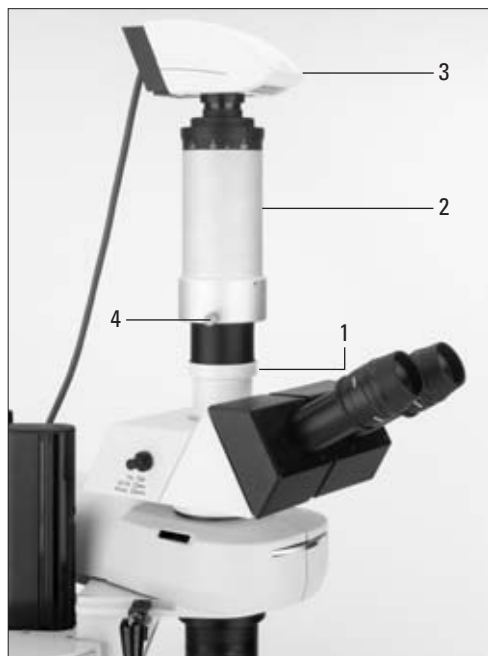
## 2.11 Connection of digital or video cameras

The trinocular tube is observation and photo tube in one and features a photo mount for adapting digital or video cameras. Various adapters as well as Vario TV adapters (with variable magnification) with C and B-mount are available. The image detail on the monitor depends on the adapter being used and the chip size of the camera.



**Fig. 10** Photo mount

**1** Hexagon-head screw for fastening a TV adapter in the photo mount



**Fig. 9** Structure of digital camera with Vario TV adapter

- 1** Photo mount on the trinocular tube
- 2** Vario TV adapter
- 3** Leica digital camera
- 4** Clamping screw for fastening the adjustment option of the Vario TV adapter

## 2.12. Electrical connections

The following must be connected depending upon the equipment:

- Fiber-optic light guide / transmitted-light stand HL or HL RC™ / light source / supply system
- Fiber-optic light guide for oblique incident light / light source / supply system
- Lamp housing with burner / supply unit / supply system



**Do not yet switch on the supply unit with high-pressure mercury lamp. The burner must be adjusted immediately after switch-on.**

## 3. Operation

### 3.1 Starting up



We recommend that you familiarize yourself with the operation of your Leica MacroFluo™ systems, such as adjusting the parfocality, zoom, focusing drive, eyebase, etc. in transmitted light and to experiment with it.

If you switch on the supply unit for the high-pressure mercury lamp, the burner must be adjusted immediately according to operating instructions M2-216-1.



When switching on electrical accessories, observe the safety instructions.

Observe the power supply voltage and fuses.

#### 3.1.1 Transmitted light or incident light observation

▶ Activate transmitted or incident illumination at the light source.

Detailed information about the operation of the transmitted-light stand or the incident illumination is located in the corresponding operating instructions.

If the fluorescence illumination is activated at the supply unit and adjusted:

▶ Switch filter turret (14.1) to an empty position or close the light stop (14.4) (Fig. 14 see p. 24).

#### 3.1.2 Incident light fluorescence

Detailed information about the operation of the supply unit and the lamp housing is located in the corresponding operating instructions. Adjust the burner according to the operating instructions M2-216-1.

For operation of the incident light fluorescence illuminator, see ch. 3.8

▶ Activate the lamp housing for the incident light fluorescence illuminator at the supply unit and adjust the burner.

#### 3.1.3 Disconnecting from the power supply

Unplug all the power cables from the power supply.

#### 3.2 Trinocular tube HC L3TP 4/5/7

- Observation and photo beam path are switchable in three positions.
- The eyebase is adjustable from 55 to 75mm.

Switching positions:

Vis: 50% in both eyepieces for binocular observation

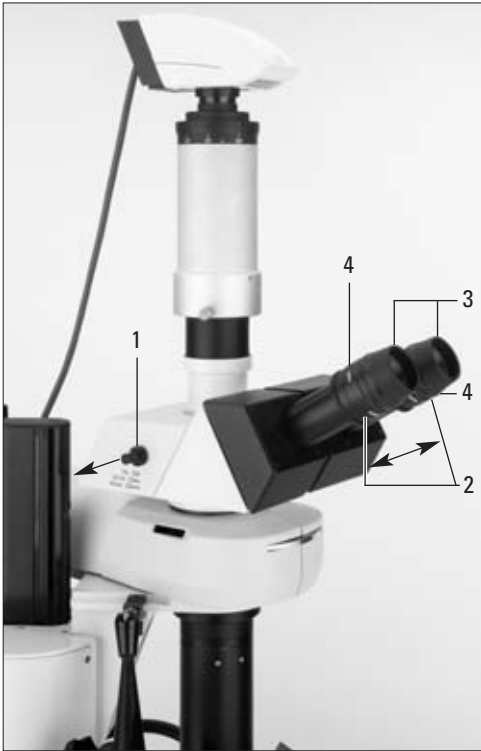
50/50: 50% for photography and 50% for observation through an eyepiece

Photo: 100% for photography

Fig. 11 see p. 20

- ▶ Adjust the positions by moving the push rod (11.1).
- ▶ Eyebase: Set push rod (11.1) to position Vis. Look into the eyepieces and push tubes (11.2) together or apart using both hands.

The eyebase is correctly set if you see a single circular image field with both eyes.



**Fig. 11** Trinocular tube HC L3TP

- 1 Push rod with 3 switching positions for deflecting the light to the eyepieces or to the connected camera
- 2 Eyebase adjustment by moving the tubes
- 3 Eyecup
- 4 Adjustable eye lens (diopter setting)

### 3.3 Zoom

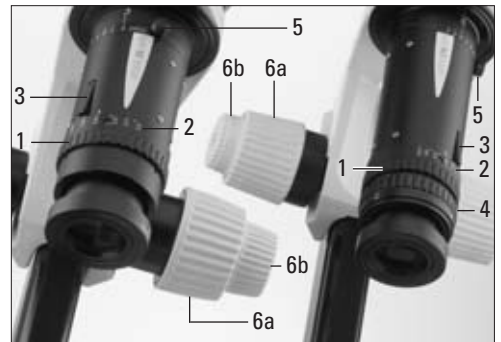
- The Leica Z6 APO zoom system with 6.3:1 zoom allows continuous magnification change from 0.57 $\times$  – 3.6 $\times$ .
- The Leica Z16 APO zoom system with 16:1 zoom allows continuous magnification change from 0.57 $\times$  – 9.2 $\times$ .

There are certain switchable zoom positions which can be activated for repetitive tasks:

- For the Leica Z6 APO, these are 0.57 / 0.8 / 1 / 1.25 / 1.6 / 2 / 2.5 / 3.2 / 3.6.
- For the Leica Z16 APO, these are 0.57 / 0.8 / 1 / 1.25 / 1.6 / 2 / 2.5 / 3.2 / 4 / 5 / 6.3 / 8 / 9.2

The overall magnification is increased by the factor 1.25 of the trinocular tube HC L3TP (see the table on p. 30).

- ▶ Adjust the magnification by turning the knurled ring (12.1).
- ▶ The magnification factors can be read from the scale (12.2).
- ▶ If needed, activate or deactivate the zoom click stops by pressing the switch (12.3).



**Fig. 12** Zoom: left 6.3:1, right 16:1

- 1 Knurled ring for zoom adjustments
- 2 Scale with magnification factors
- 3 Switch for activating/deactivating the zoom click stops
- 4 Fine focusing (optional)
- 5 Clamping screw for adjusting and locking the iris diaphragm
- 6 Focusing drive, coarse (6a), fine (6b)

### 3.4 Iris diaphragm

The integrated iris diaphragm is used for continuous adjustment of the depth of field without changing the magnification. Reducing the diaphragm diameter enlarges the depth of field. The size of the light cone is also reduced, and the brightness of the image decreases.

The clamping screw (12.5) is used as a handle for adjusting and locking the iris diaphragm:

1 = smallest diameter (largest depth of field)

5 = OPEN.

### 3.5 Focusing

The coarse/fine drive carries up to 15kg.

– Resolution with a load of 5kg: 1 micron

– Resolution with a load of 10kg: 2 microns

▶ Adjust large distances with the internal coarse drive (12.6a).

▶ Fine focusing with the external fine drive (12.6b).



If a motor focus system is used, please observe the separate operating instructions.

### Control ease of adjustment

Does the focusing drive turn too easily / tightly, or does the equipment move down by itself?

Depending upon weight of the equipment and personal needs, the ease of adjustment can be adjusted on an individual basis:

▶ Hold the left or right fine drive (12.6b).

▶ Turn the other fine drive until the desired resistance is reached during focusing.

### 3.5.1 Fine focusing at the objective

The optional fine focusing (12.4) allows for sensitive and precise focusing in a range of 10mm. The fine focusing is required for precise focusing at high magnifications, particularly when using HR microscope objectives.

▶ Adjust the image sharpness by turning the knurled ring (12.4).

### 3.6 Microscopy with/without glasses

– The user can adjust his or her diopter settings at the rotating eye lenses (11.4) of the eyepieces.

– For microscopy work with glasses, the eyecup (11.3) must be removed or inverted; otherwise, the complete field of view can no longer be viewed.

– Bifocal and no-line multi-focal glasses must be removed for microscopy work.

– For microscopy work without glasses, the user can set the eyecups (11.3) to his or her individual needs. Many users desire a close eye contact and use the eyecups.



To avoid eye infections, we recommend that every user uses his or her own pair of eyecups.



If you turn the eye lens, an engraved silver line running all around on the outside of the eyepiece housing becomes visible. It indicates the correct position of the eye lens for normal eyesight and for users wearing glasses during microscopy work with glasses.

### 3.7 Adjusting diopter settings (parfocality)

With adjustable eye lenses at the eyepieces, the observer can compensate his or her defective vision. The correct diopter compensation is required for both eyes so that focusing remains constant during zooming (parfocal). With a correct setting, you no longer have to refocus during zooming.



If you turn the eye lens, an engraved silver line running all around on the outside of the eyepiece housing becomes visible. It indicates the correct position of the eye lens for normal eyesight and for users wearing glasses during microscopy work with glasses.

#### Diopter compensation for defective vision



We recommend to perform the following settings in transmitted light or incident light.

- ▶ Activate transmitted or incident light at the light source.

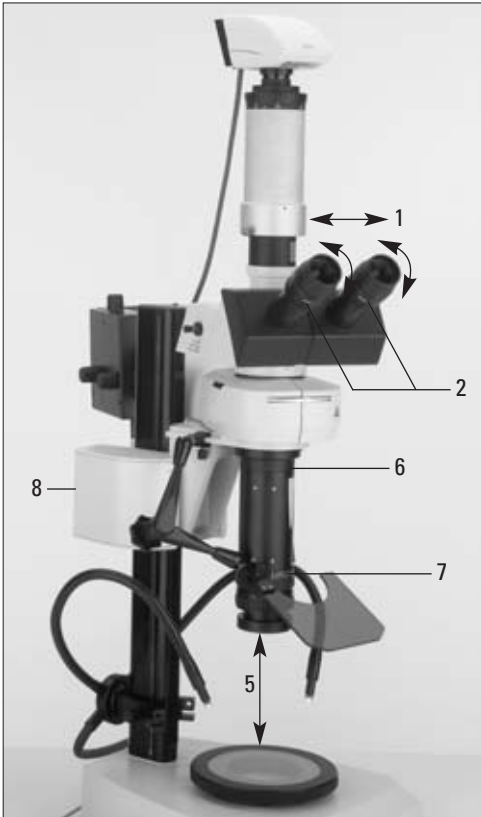
If the fluorescence illumination is already activated at the supply unit and the burner is adjusted:

- ▶ Switch filter turret to an empty position (14.1) or close the light stop (14.4).
- ▶ Set up the zoom system in the working distance (13.5) of the objective used (see the table on p. 30).
- ▶ Set the eyebase (13.1).
- ▶ Fully OPEN the iris diaphragm (13.6).
- ▶ Turn the eye lenses (13.2) until the rotating part reaches the line engraved in the eyepiece housing.

While adjusting the eye lenses, securely hold the eyepiece at the bottom of the knurled ring.

- ▶ Set the lowest zoom position at the magnification changer (13.7).
- ▶ Illuminate a flat test object with sharp contours using transmitted light or incident light and focus it using the focusing drive (13.8, shown with motor focus).
- ▶ Set the highest zoom position and optimize image sharpness with focusing drive.
- ▶ Set the lowest zoom position at the magnification changer (13.7).
- ▶ Individually adjust the image sharpness for each eye by turning the eye lenses (13.2):
  - For example, first observe the object with the left eye while closing the right eye. Slowly turn the left eye lens until you can sharply see the test object with the left opened eye.
  - Now close your left eye and adjust the eye lens for the right eye.
- ▶ Set the highest zoom position at the magnification changer (13.7).
- ▶ If necessary, use the focusing drive (13.8) to fine-focus again.
- ▶ Set the lowest zoom position at the magnification changer (13.7).
- ▶ Check image sharpness and parfocality: Slowly zoom to the highest zoom position (13.7).
- The image sharpness will now remain constant at all magnification levels, without the need to refocus with the focusing drive.

If this is not the case, repeat this procedure.



**Fig. 13** Parfocality

- 1 Adjustable tubes for adjusting the eyebase
- 2 Eye lenses for adjusting the diopter settings
- 3 Adjustable eyecups
- 4 Working distance
- 5 Iris diaphragm
- 6 Knurled ring for zoom adjustments
- 7 Focusing drive (motor focus shown)

### 3.8 Incident light fluorescence illuminator

The patented Leica zero-pixel-shift technology ensures an exact convergence for the superposition of different fluorescences. When the filter blocks are switched, no interfering pixel offset occurs between the individual images of the different spectral ranges – an ideal prerequisite for digital multicolor fluorescence experiments.

The illumination is coupled into the zoom optics. This unique innovation from Leica Microsystems guarantees exact light guide, maximum light utilization and homogenous fields of view in any zoom position.

#### 3.8.1 Field diaphragm

The field diaphragm is used for reflection protection and specimen protection.

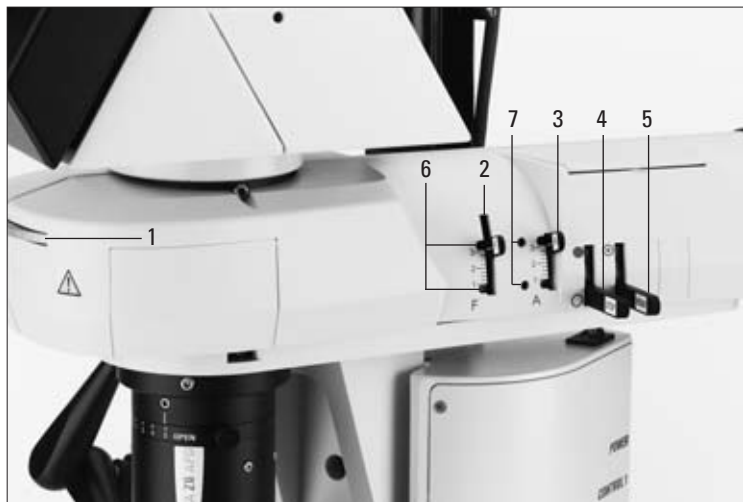
- ▶ Open the field diaphragm F (14.2) until the complete field of view is illuminated.

3 = open

To protect sensitive fluorescence specimens Restrict the field diaphragm (14.2) as needed.

Centering the field diaphragm

- ▶ Insert the supplied centering keys in the two centering openings (14.6)
- ▶ Turn the centering key until the diaphragm is centered.



**Fig. 14** Incident light fluorescence illuminator LRF 4/22

- |   |  |
|---|--|
| <b>1</b> Nosepiece disc with 4 positions    | <b>5</b> Blue filter BG 38                               |
| <b>2</b> Adjustment of field diaphragm F    | <b>6</b> Sockets for centering keys (field diaphragm)    |
| <b>3</b> Adjustment of aperture diaphragm A | <b>7</b> Sockets for centering keys (aperture diaphragm) |
| <b>4</b> Light stop (dark flap) STOP        |  |



### 3.8.2 Aperture diaphragm

The aperture diaphragm is used for setting the contrast for reflecting specimens or, if necessary, for reducing the excitation radiation to prevent excessive bleaching of the specimens.

► Aperture diaphragm A (14.3): Fully opened for fluorescence.

To reduce reflections and protect specimens, restrict the aperture diaphragm (14.3) as needed.

### 3.8.3 Light stop

If you want to work with transmitted light or incident light without fluorescence:

- Close the light stop (14.4) if all 4 positions in the filter turret are occupied with filter blocks. If there are empty positions in the filter turret, you can also switch over to the empty position using the filter wheel (14.1).

### 3.8.4 Filter BG38

The BG38 filter prevents a slight red background in the image. If this does not pose a problem, the BG38 filter (14.5) can be swung out to use the full lamp power for exciting the fluorescence.

### 3.8.5 Filter blocks

The filter turret (14.1) can accommodate up to four filter blocks (ch. 2.10). These filter blocks contain the excitation filter, dichromatic beam-splitting mirror and suppression filter.

- The excitation filter selects exactly those wavelengths from the beam selection of the light source that are used for exciting the fluorescence. This is made possible by highest transmissivity in the excitation range, while using the highest possible suppression effect in other wavelength ranges.
- The dichromatic beam-splitting mirror reflects the short-wave excitation radiation to the specimen, while being transparent for the fluorescent light emitted from the specimen.
- The suppression filter blocks excitation light dispersed by the specimen and entering in the objective. However, it features the highest transmissivity for the specific fluorescence radiation.

# 4. Appendix

## 4.1 Filter blocks for macro-fluorescence

Filter block	Fluorochrome	Excitation	Excitation filter	Dichromatic Mirrors	Suppression filter	Order no.
A	various	UV	BP 340-380	400	LP 425	11 513 804
+ A4	various	UV	BP 360/40	400	BP 470/40	11 513 839
D	various	UV / violet	BP 355-425	455	LP 470	11 513 805
E4	various	violet / blue	BP 436/7	455	LP 470	11 513 806
H3	various	violet / blue	BP 420-490	510	LP 515	11 513 807
I3	various	blue	BP 450-490	510	LP 515	11 513 808
K3	various	blue	BP 470-490	510	LP 515	11 513 809
+ L5	various	blue	BP 480/40	505	BP 527/30	11 513 840
M2	various	green	BP 546/14	580	LP 590	11 513 811
N2.1	various	green	BP 515-560	580	LP 590	11 513 812
+ N3	various	green	BP 546/12	565	BP 600/40	11 513 841
+ TX2	TEXAS RED	green	BP 560/40	595	BP 645/75	11 513 843
+ Y3	CY3	green	BP545/30	565	BP 610/75	11 513 837
+ Y5	CY5	red	BP 620/60	660	BP 700/75	11 513 844
+ Y7	CY7	red	BP 710/75	750	BP 810/90	11 513 845
+ GFP	Green-FP	blue	BP 470/40	500	BP 525/50	11 513 847
+ YFP	Yellow-FP	blue	BP 500/20	515	BP 535/30	11 513 863
+ Red GFP	Red-FP	green	BP 546/12	560	BP 605/75	11 513 864
+ CGFP	Cyan-FP	violet / blue	BP 436/20	455	BP 480/40	11 513 862
Empty system*			0	0	0	11 513 842

BP bandpass filter, wavelength in nm  
 LP long-pass filter, flank wavelength in nm  
 + Specifically for multi-parameter fluorescence  
 \* for customer-specific instrumentation

On principle, it is possible to arrange filter combination according to customer information (with filters from other manufacturers) so that they meet the requirements according to 0-pixel shift (ch. 3.8). This requires that the third-party products meet certain minimum quality requirements.

## 4.2 Assignment of fluorochromes and filter blocks

<b>Fluorochromes</b>	<b>Filter block</b>
– Acridine-blue	A
– Acridine-yellow	I 3, H 3
– Acridine-orange	I 3, H 3
– Acridine-red	N 2.1, N 3
– Acriflavine	E 4, H 3
– Acriflavine feulgen SITS (AFS)	D
– Alizarin complexion	N 2.1
– Alizarin-red	N 2.1
– Allophycocyanine (APC)	Y 3, Y 5
– AMCA (Aminocoumarine)	A
– Aminoactinomycinn D-AAD	N 2.1, N 3
– Aniline-blue	A
– ACMA	E 4
– Astrazon brilliant red 4G	N 2.1
– Astrazon red 6B	N 2.1
– Astrazon yellow 7 CLL	H 3
– Astrazon orange R	I 3, L 5
– Atabrin	E 4, H 3
– Auramin	I 3, H 3
– Aurophosphin, Aurophosphin	G I 3, H 3
– BCECF	L 5
– Berberine sulfate	H 3
– Benzoxanthene yellow	D
– BisAminophenyl Oxdiazol (BAO)	A
– Bisbenzimidazole (Hoechst)	A, D
– Blankophor BA	A, D, H 3
– Blankophor SV	A
– BODIPY FL	L 5, K 3, I 3
– Brilliant sulfoflavine FF	D, H 3
– Bromobimane (Thiolyte)	D
– Calcein	I 3

– Calcein-blue	A
– Calcium crimson	Y 3
– Calcium green	K 3, I 3, L 5
– Calcium orange	M 2, N 2.1
– Calcofluor white	H 3, D
– Calcufluor white standard solution	A
– Carboxyfluoresceindiacetat C-FDA	I 3, L 5
– Cascade blue A,	D
– Catecholamine (Adrenaline, noradrenaline, dopa, dopamine)	D
– Chromomycine A (Mithramycine, olivomycine)	E 4
– Coriphosphine O	I 3, H 3
– Coumarine phalloidine	D
– Cy 3	Y 3
– Cy 5	Y 5
– Cy 7	Y 7
– DANS (Dimethylamino Naphtyl sulfonic acid)	A
– DAPI	A, D
– DAPI (selective)	A 4
– Dansylchloride	A
– DIPI	A
– Dil	Y 3
– DiO	I 3, K 3
– Diphenyl brilliant flavine 7	GFF H 3
– Dopamine	A
– DPH (Diphenylhextaria)	A
– Eosin B	N 2.1
– Ethidiumbromide	N 2.1
– Euchry sine	H 3, D
– Evans blue	N 2.1
– Fast blue	A
– Fast green FC G	N 2.1, M 2
– Feulgen	N 2.1, TX 2
– FDA (FluoresceinDiAcetate)	I 3, H 3, K 3, L 5
– FIF (Formaldehyde induced fluorescence)	D, A

– FITC (FlouresceinIsoThioCyanate)	I 3, H 3, K 3, L 5
– FITC/Ethidiumbromide	I 3, L 5, N 2.1
– FITC (selective)	L 5
– Texas red (selective)	TX 2
– FITC/TRITC	L 5, N 3
– TRITC (selective)	N 3
– Fluo 3	I 3, L 5
– Fluoro Gold	A
– Fluram (Fluorescamine)	A
– Genacryl brilliant red B	N 2.1
– Genacryl brilliant yellow	E 4
– Generic blue	D
– GFP (Green Fluorescent Protein)	GFP
– Granular blue	A
– Haematoporphyrin	N 2.1
– Hoechst dye no. 33258	A, D, A 4
– No. 33342	A, D, A 4
– Hydroxy-4-methylconmarin	A
– Lissamin-rhodamin B (RB 200)	N 2.1, M 2
– Lucifer Yellow	E 4
– Magdala Red	N 2.1
– Maleimide	A
– Mepacrin	D
– Merocyanine 540	N 2.1
– Mithramycine	E 4
– MPS (Methy green pyronine stilbene)	A
– Nile Red	I 3, L 5, N .21
– Nuclear Fast Red	N 2.1, M 2, N 3
– Nuclear Yellow	A
– Olyvomycine	E 4
– Oregon Green (488, 500, 514)	L 5
– Oxytetracycline	D
– Pararosiline (Feulgen)	N 2.1, TX 2
– Phosphine 3 R	I 3, H 3

– Phycoerythrin (PE)	N 2.1, N 3
– Primulin O	D
– Procion Yellow	D, E 4, H 3
– Propidiumiodide	N 2.1
– Pyronin B	N 2.1, M 2
– Quinacrine mustard (QM)	E 4
– Resorufin	N 2.1, Y 3
– Reverine	D
– Rhodamine B	N 2.1
– Rhodamine 123	I 3, L 5
– Acid fuchsin	N 2.1, M 2
– Serotine	A, D
– SITS (Stilben Iso Thio Sulfonic acid)	A
– SITS Acriflavine Feulgen	D
– Spectrum orange	M 2, N 2.1
– Sulfaflavine	A
– Tetracyclines: Oxytetracycline, tetracycline, Reverine (Pyrrolidinomethyltetracycline), Chlortetracycline, Dimethylchlortetracycline	D
– Texas red	TX 2
– Thiazine-red R	N 2.1, M 2
– Thioflavine S	H 3, D
– Thioflavine TCN	A
– Thiolyte (Bromobimane)	D, A
– TRITC (Tetramethyl rhodamine Isothiocyanat)	N 2.1, N 3
– TRITC (selective)	N 3
– True Blue	A
– Uranine B	H 3
– Uvitex 2 B	A, D
– XRITC	N 2.1, N 3
– Xylene-orange	N 2.1, M 2

### 4.3 Optical data

#### Visual data

Eyepieces HC Plan 10×/25 (11507808)

Tube factor: 1.25× trinocular tube FSA HC L 3TP

Iris diaphragm open

Objectives	Planapo 1× (10 447 176)		Planapo 2× (10 447 178)		Planapo 5× / 0.5 (10 447 243)		Planapo 0.5× (10 447 177)		Planapo 0.8× (10 446 360)	
Working distances	97mm		39mm		19.8mm		187mm		112mm	
Zoom position	Total magnification ×	Field of view diameter mm	Total magnification ×	Field of view diameter mm	Total magnification ×	Field of view diameter mm	Total magnification ×	Field of view diameter mm	Total magnification ×	Field of view diameter mm
0.57 } 0.8 } 1 } 1.6 } 2 } 2.5 } 3.2 } 3.6 } 4 } 5 } 6.3 } 8 } 9.2 } 16:1	7.1 10 12.5 20 25 31.3 40 45 50 62.5 78.8 100 115	35 25 20 12.5 10 8 6.25 5.6 5 4 3.2 2.5 2.2	14.3 20 25 40 50 62.5 80 90 100 125 158 200 230	17.5 12.5 10 6.25 5 4 3.1 2.9 2.5 2 1.6 1.25 1.1	35.6 50 62.5 100 125 156 200 225 250 313 394 500 575	7 5 4 2.5 2 1.6 1.25 1.1 1 0.8 0.6 0.5 0.4	3.6 5 6.3 10 12.5 15.6 20 22.5 25 31 39.4 50 57.5	70 50 40 25 20 16 12.5 11 10 8 6.4 5 4.4	5.7 8 10 16 20 25 32 36 40 50 63 80 92	44 31 25 15.6 12.5 10 7.8 7 6.25 5 4 3.1 2.7

#### Data with Leica DFC300 FX Full Frame digital camera

Tube factor: 1.25× trinocular tube FSA HC L 3TP

Video objective 0.63×

Iris diaphragm open

Objectives	Planapo 1× (10 447 176)		Planapo 2× (10 447 178)		Planapo 5× / 0.5 (10 447 243)		Planapo 0.5× (10 447 177)		Planapo 0.8× (10 446 360)	
Working distances	97mm		39mm		19.8mm		187mm		112mm	
Zoom position	Magnifica- tion chip : object	Field of view projected onto chip mm × mm	Magnifica- tion chip : object	Field of view projected onto chip mm × mm	Magnifica- tion chip : object	Field of view projected onto chip mm × mm	Magnifica- tion chip : object	Field of view projected onto chip mm × mm	Magnifica- tion chip : object	Field of view projected onto chip mm × mm
0.57 } 0.8 } 1 } 1.6 } 2 } 2.5 } 3.2 } 3.6 } 4 } 5 } 6.3 } 8 } 9.2 } 16:1	0.45 0.6 0.79 1.3 1.6 2 2.5 2.8 3.2 3.9 5 6 7.25	20 15 14 11 11.4 8.5 7.1 5.3 5.7 4.3 4.6 3.4 3.6 2.7 3.2 2.4 2.9 2.1 2.3 1.7 1.8 1.4 1.4 1 1.2 0.93	0.9 1.3 1.6 2.5 3.15 3.9 5 5.7 6 7.9 9.9 12.6 14.5	10 7.5 7 5.3 5.7 4.3 3.6 2.7 2.9 2.1 2.3 1.7 1.8 1.3 1.6 1.2 1.4 1 1 0.85 0.9 0.7 0.7 0.5 0.6 0.5	2.2 3.2 3.9 6.3 7.9 9.8 12.6 14.2 15.8 19.7 24.8 31.5 36	4 3 2.85 2 2.9 1.7 1.4 1.1 1 0.9 0.9 0.7 0.7 0.5 0.6 0.47 0.6 0.4 0.5 0.3 0.4 0.3 0.3 0.2 0.2 0.2	0.2 0.3 0.4 0.6 0.8 1 1.3 1.4 1.6 2 2.5 3 3.6	40 30 28.5 21 22.8 17 14 11 11 8.5 9 6.8 7 5.3 6.3 4.7 5.7 4.3 4.6 3.4 3.6 2.7 2.9 2 2.5 1.9	0.4 0.5 0.6 1 1.3 1.9 2 2.3 2.5 3.2 4 5 5.8	25 18.7 17.8 13 14 10.6 8.9 6.7 7 5.3 5.7 4.3 4.5 3.3 4 3 3.6 2.7 2.9 2 2.3 1.7 1.8 1.3 1.5 1.2

## 4.4 Technical data, performance characteristics

Designation	Leica MacroFluo™ with 6.3 : 1 zoom	Leica MacroFluo™ with 16 : 1 zoom
Microscope type	Macroscope with vertical beam path, apochromatic zoom system, Incident illuminator, fluorescence illumination coupled into the zoom optics, and trinocular tube	
Zoom system	Apochromatic zoom 6.3 : 1 Leica Z6 APO, lead-free	Apochromatic zoom 16 : 1 Leica Z16 APO, lead-free
Zoom factor	0.57 – 3.6×	0.57 – 9.2×
Switchable zoom positions for repetitive tasks	0.57 / 0.8 / 1 / 1.25 / 1.6 / 2 / 2.5 / 3.2 / 3.6	0.57 / 0.8 / 1 / 1.25 / 1.6 / 2 / 2.5 / 3.2 / 4 / 5 / 6.3 / 8 / 9.2
Tube	Trinocular tube FSA HC L 3TP 4/5/7 with: – Photo-TV output 100%: 0% / 50%:50% / 0 % : 100% – Viewing angle 30°	
Integrated iris diaphragm	For continuous depth of field adjustment	
<b>Fluorescence illuminator</b>		
Type	Coaxial incident illuminator LRF 4/22 and carrier for incident light fluorescence and incident light bright field with: – Reflector disc for 4 filter blocks, 0-pixel technology = no pixel offset during the change – Aperture and field diaphragm can be centered – Switchable blue filter BG 38 and UV light stop – Light trap for suppression of ambient light	
Fluorescence filter	– filter system (excitation filter, beam-splitting mirror and suppression filter) on a filter block – Extensive filter block selection (see p. 26), filter combinations based on customer specifications	
Light source	Lamp housing 106 z with: – 100-W High-pressure mercury burner (direct current, stabilized/nonstabilized, type 103 W/2) – Chromatically corrected collector, focusable – Lamp mount can be centered – Supply unit ebq 100	
Safety measures	UV protection screen, UV light stop, stray-light protection for lamp housing	

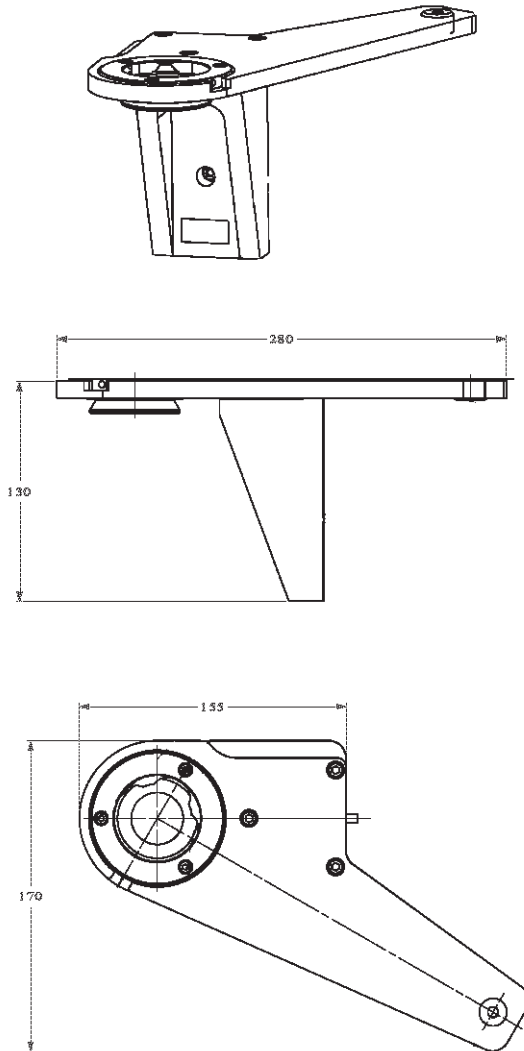


<b>Optical accessories</b>			
Objectives	Type/magnification factor	Working distance	Max. field of view $\varnothing$
	Planapo 1 $\times$	97mm	35mm
	Planapo 0.8 $\times$	112mm	44mm
	Planapo 2 $\times$	39mm	17.5mm
	Planapo 0.5 $\times$	187mm	70mm
	Achromat 0.63 $\times$	149mm	56mm
	Achromat 0.5 $\times$	187mm	70mm
	Achromat 0.32 $\times$	297mm	112mm
	Planapo 5 $\times$ /0.5 LWD	19mm	5mm
Fine focusing	10mm travel, 1 micron resolution		
Tubes	– Trinocular tube FSA HC L 3TP (1.25 $\times$ ) – Trinocular tube HL L 2 TU		
Eyebase	55mm – 75mm		
Large field eyepiece for spectacle wearers	Wide-field HC plan eyepieces 10 $\times$ /22, 10 $\times$ /25		

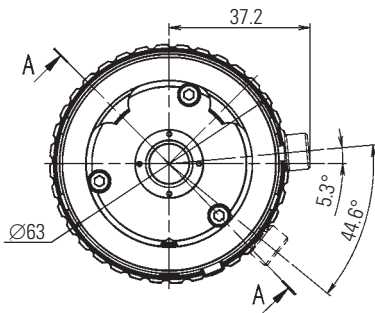
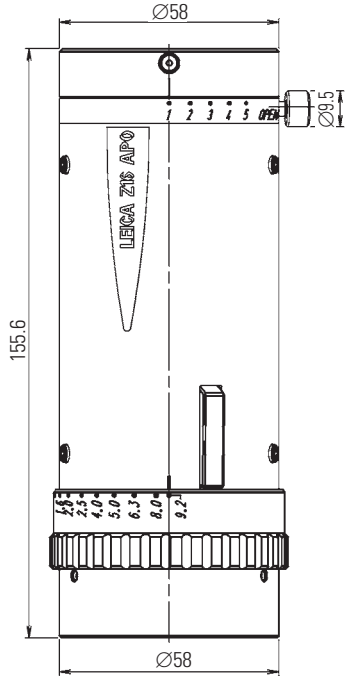
## Module system

<b>Imaging</b>	
Image recording/storage and processing	Various digital FireWire camera systems for fluorescence
Software for image archiving, analysis and processing	Leica Image Manager with Image Overlay modules and multifocus, FW4000, QWin
Video objectives	– 0,35 $\times$ , 0,5 $\times$ , 0,63, 1 $\times$ with C-mount – 2/3", 1/2" B-mount
<b>Stands, illuminations</b>	
Transmitted-light stands	High-performance base HL RC with innovative contrasting method, High-performance base HL, stand for bright field and bright/dark field
Incident-light stand	With stage plate, black and white, $\varnothing$ 120mm
Motor focus system	With 500mm column, control via handswitch, footswitch or PC
Manual focusing drive	Coarse/fine focus, adjustable torque, with 500mm column
Stages	Gliding stage, heating stage Leica MATS thermocontrol system, polarization
Additional illuminations	Cold-light sources

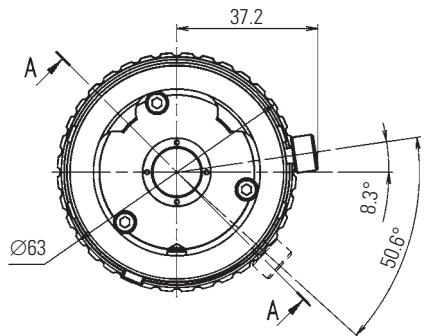
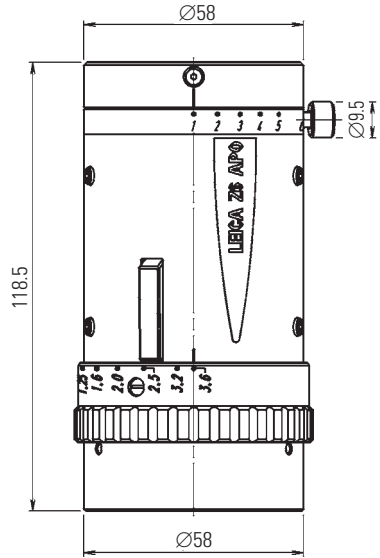
## 4.5 Dimensions



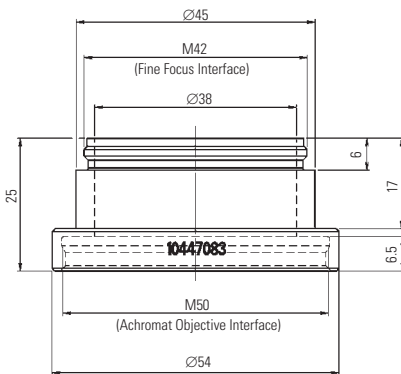
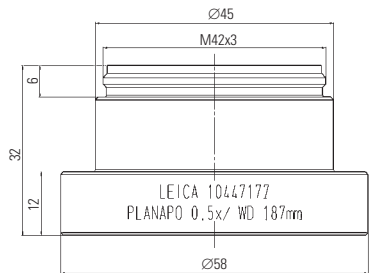
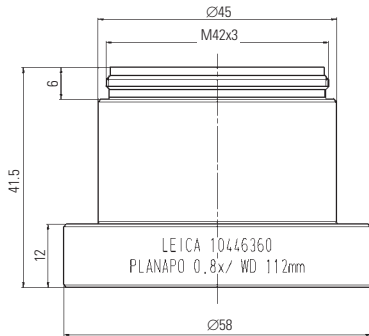
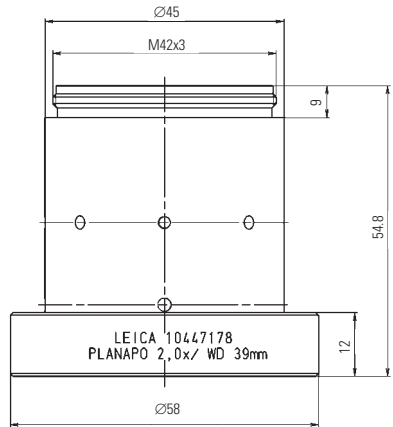
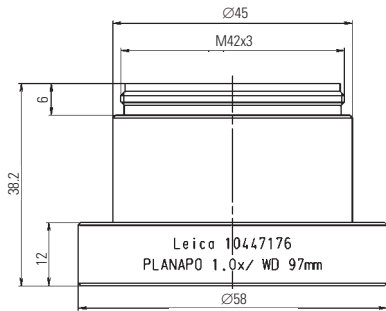
Dimensions in mm



**Leica Z16 APO**



**Leica Z6 APO**



### Adapter for achromatic objectives



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