

# Profile

**SteREO Discovery.V8**  
**SteREO Discovery.V12**  
**SteREO Discovery.V20**



Seeing "summa cum laude"



We make it visible.

**Curiosity is always the first step  
when solving a problem.**

*Galileo Galilei*

**This is the origin of all innovations.  
At Carl Zeiss innovations are a celebrated tradition.  
That's why we work systematically and consistently  
on the development of innovative concepts.**

**The world of science and industry is changing constantly.  
Time and again, this change presents new challenges to  
all of us. It requires faster and more efficient development  
cycles, innovative and unique products and requires  
continuous optimization of processes in businesses and  
institutions.**

**In this Profile, Carl Zeiss proudly presents the SteREO  
Discovery family of innovative stereomicroscopes.  
This is the sum of decades of experience in the conception,  
development and production of optical innovations.**

**In order to be able to offer you such advanced, forward  
thinking solutions, it's not just calculus that is required –  
our enthusiasm and passion are vital.**

**With precisely these qualities we will support, guide  
and assist you from the initial consultation through  
to realization - with all of our knowledge and experience.**

**So that you can rediscover 'seeing'.**

# Contents



**Microscope Bodies** 4



**Observation Tubes** 5



**Exchangeable Optics** 6

**Stands** 8

**Stages** 10

**Reflected-Light Illumination** 12

**Transmitted-Light Illumination** 16

**Fluorescence Contrast** 20

**Polarization Contrast** 21

**Operation** 22

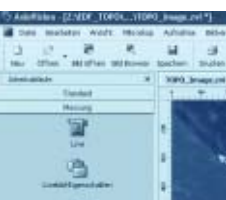
**Image Documentation** 24

**Image Processing** 26

**System Overview** 28

**Technical Data** 34

**Technology** 37







AxioCam HSc



Carl Zeiss  
455043-9100 01

Carl Zeiss  
455043-9100 01

ZEISS

STOP

ZEISS

ZEISS

PlanApo 5 1.0x FWD 60mm

ZEISS

Apo 5 0.83x FWD 50mm

ZEISS

Apo 5 1.5x FWD 30mm

AxioVision - [Mouse neuverbinden...]

Datei Bearbeiten Ansicht Mikroskop

Neu Öffnen Bild Öffnen Bild Browser

Arbeitsbereich

- Mikroskop
- Kamera
- Skalierungen
- Multidimensional Acquisition
- Panorama
- Resalt
- Bildverarbeitung
- Erweiterte Tiefenschärfe
- Messen
- Anmerkung
- Skizze

Abwesen Aufhöhe Durchlicht Tisch

Vergrößerung

0,63 1 2,3

Mikroskopeneigen

Lichtschieber eingeschaltet  
Lichtmanager-Modus:  
Kombination (AL und DL)

Zoom

Vergrößerungswahl

Zoom: 0,63x 10x

0,80x

Okularwert:  
4,00x 4x ... 80x

Kamerawert:  
0,40x 0,4x ... 5x

Fokussierungsart

Auflicht

Position Z [µm]: 0,000

Position Z [µm]: 0,000

Stop

Home

0-Position setzen:

Plan



# See so Much More

The pancratic magnification changer of the microscope body forms the core of a zoom stereomicroscope and, consequently, has a considerable influence on the optical performance of the entire system.

With the SteREO Discovery, Carl Zeiss has proven all its experience and competence, and has driven this system of common main objective (CMO) stereomicroscopes to the limits of what is optically feasible.

The SteREO Discovery.V12 and V20, with their maximum NAs of 0.144, are among the most powerful stereomicroscopes in the world.

*The first stereomicroscope to exceed the 1000 LP/mm resolution limit: SteREO Discovery.V12 with PlanApo S 2.3x objective..*



Three different microscope bodies are available:

**SteREO Discovery.V8**

- apochromatic zoom optics
- manual zoom 1x ... 8x
- maximum NA of 0.116
- engageable click stops

**SteREO Discovery.V12**

- apochromatic zoom optics
- motorized zoom 0.8x ... 10x
- maximum NA of 0.144
- electronic click stops
- double iris diaphragm
- selectable zoom speeds
- real time display of magnification, resolution, depth of field and the object field of the system

**SteREO Discovery.V20**

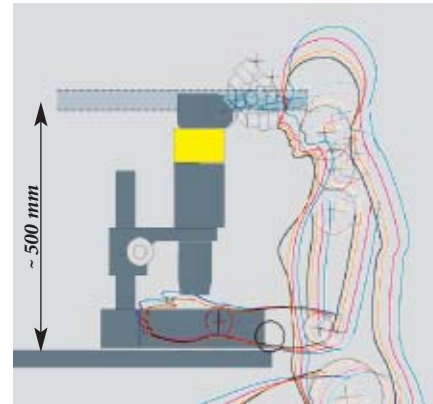
- apochromatic zoom optics
- motorized zoom 0.75x ... 15x
- maximum NA of 0.144
- electronic click stops
- double iris diaphragm
- selectable zoom speeds
- real time display of magnification, resolution, depth of field and the object field of the system



*Double iris diaphragm to increase depth of field. Beneficial when observing and documenting three dimensional objects.*



Observation tubes deliver two unreversed and upright images in stereo and contribute greatly to the ergonomic quality of the microscope. For example, with the ergotube it is possible to freely adjust the viewing angle within a defined range. Intermediate tubes help to optimize the viewing height of the stereomicroscope.



According to the results of an international study, a viewing height of approx. 500 mm with a viewing angle of around 20 degrees is best for avoiding tension and neck pain when using a microscope.

**1 Binocular tube S 35°**

- viewing angle of 35 degrees, fixed
- adjustable interpupillary distance 55 - 75 mm

**2 Binocular tube S 20°**

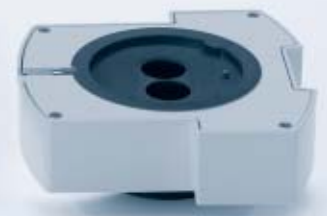
- viewing angle of 20 degrees, fixed
- adjustable observation positions (low and high) for two viewing heights
- adjustable interpupillary distance 55 - 75 mm

**3 Binocular phototube S 20°**

- viewing angle of 20 degrees, fixed
- adjustable eyepiece positioning (low and high) for two viewing heights
- adjustable interpupillary distance 55 - 75 mm
- photo port 100/100, switchable

**4 Binocular ergo-phototube S 5-45°**

- viewing angle of 5 ... 45 degrees, adjustable
- adjustable eyepiece positioning (low and high) for two viewing heights 55 - 75 mm
- photo port 100/100, switchable

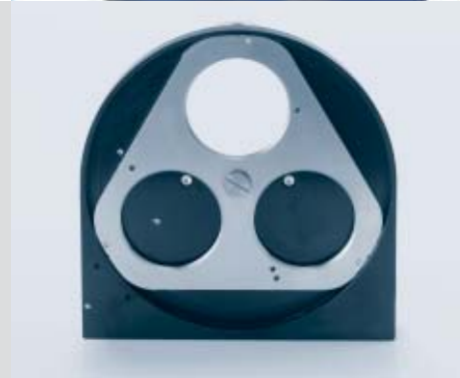


For simple equipment in reflected-light, use of the **Intermediate tube S, 40 mm** is recommended to guarantee an ergonomic viewing height.

# Center of Exemplary Performance

Change the objective simply by hand. The objective locks into place securely. In the SyCoP (System Control Panel), the encoded nosepiece ensures the automatic conversion of all optical parameters, such as total magnification, object field, resolution and depth of field.

The objective is the eye of a microscope and is a decisive factor in determining the quality of the microscopic image. At Carl Zeiss objectives are a source of pride and a symbol of quality. For the Stereo Discovery objectives that range extends from the economical Achromat and powerful Plan Achromat through to the high end Plan Apochromat



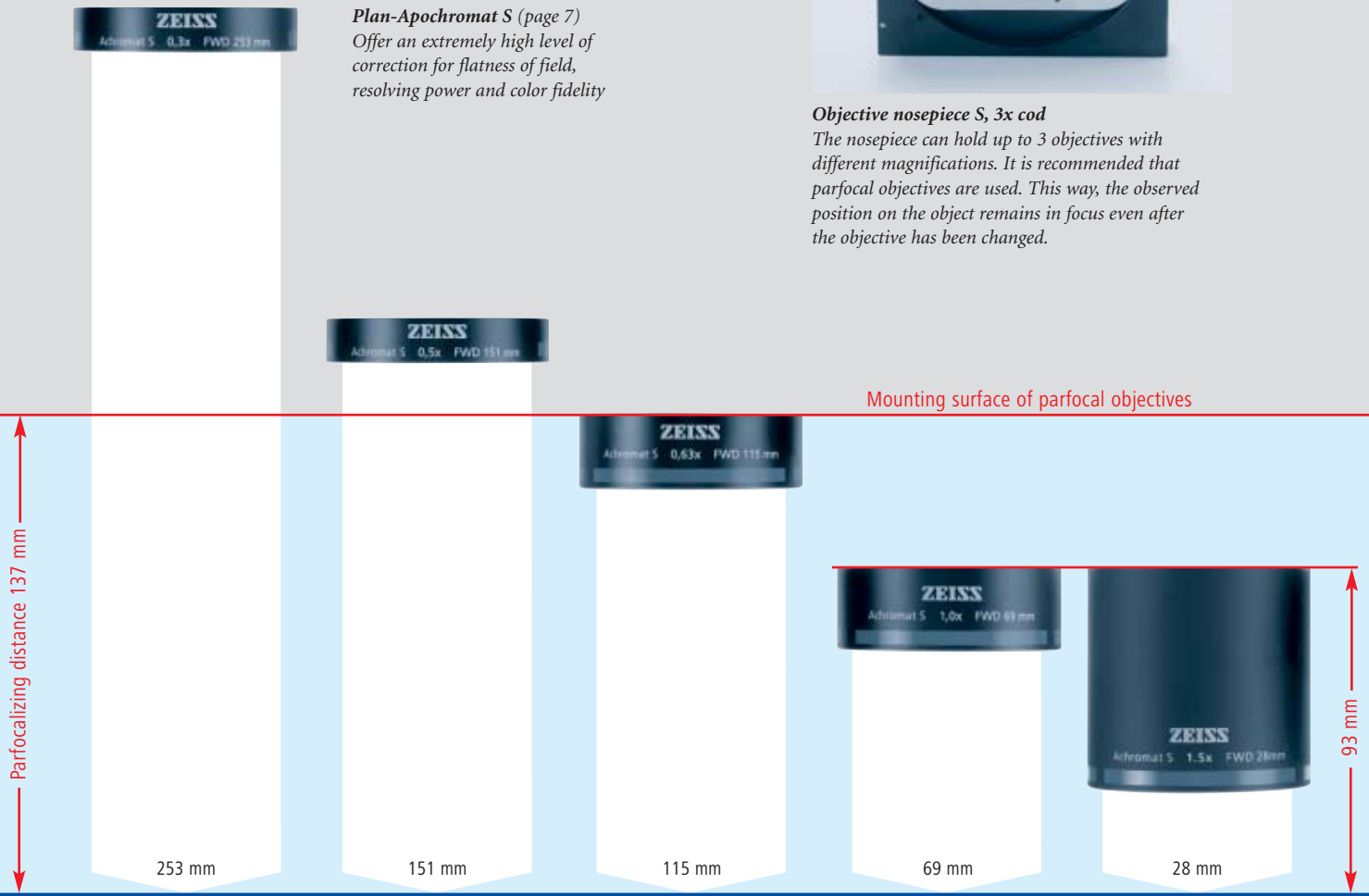
**Achromate S**  
For high contrast imaging of three dimensional structures

**Plan-Achromat S** (page 7)  
Flat field corrected objectives for the observation and documentation of flat objects in particular; especially suitable for measurement tasks

**Plan-Apochromat S** (page 7)  
Offer an extremely high level of correction for flatness of field, resolving power and color fidelity

**Objective nosepiece S, 3x cod**  
The nosepiece can hold up to 3 objectives with different magnifications. It is recommended that parfocal objectives are used. This way, the observed position on the object remains in focus even after the objective has been changed.

Mounting surface of parfocal objectives







# The Backbone of a Microscope

Powerful modern stereomicroscopes such as the SteREO Discovery.V12 and V20 achieve resolutions of over 1,000 LP/mm. This places significantly greater demands on the construction of stand systems. Steady, stable and with minimal vibration – these are the properties of a stand required for precise and rapid focusing across the entire magnification range of the microscope.

A variety of interfaces makes it possible to add on components effectively for illumination, contrasting, and for positioning the object under the microscope.



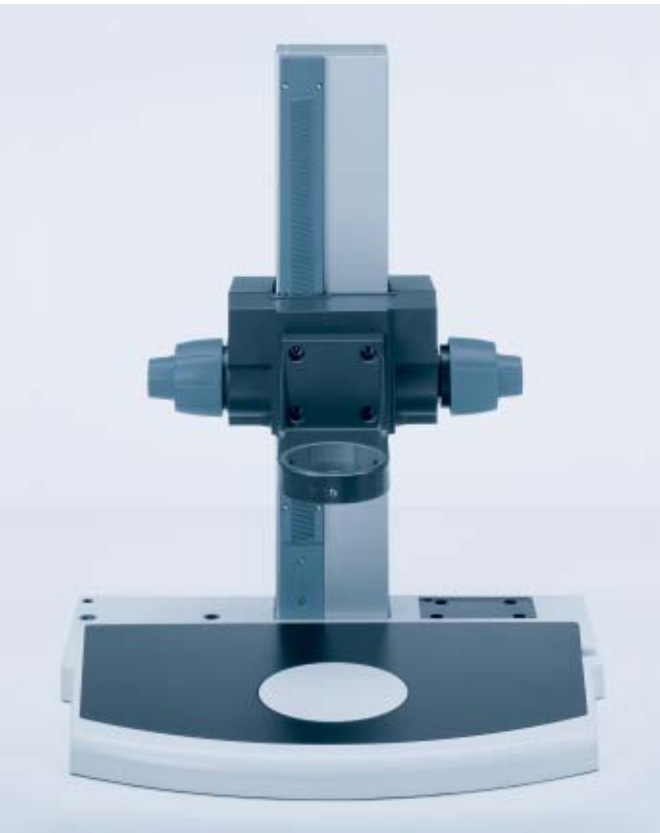
Reliable, sensitive focusing of complex equipment up to 10 kg: Coarse/fine drive with Profile S column.

### Coarse/fine drive with Profile S column on Stand base 450 to Profile S

This highly stable stand has a manual coaxial coarse/fine drive on both sides, and allows precise focusing. The specially coated, scratch resistant work plate is generously proportioned. It provides plenty of space and an excellent overview in the sample space.

Mount S with  $d = 76 \text{ mm}$  support can be used at two different working heights.

- footprint: 450 x 300 mm
- insert plate: 410 x 250 mm
- round plate:  $d = 120 \text{ mm}$
- profile S column:  $h = 490 \text{ mm}$
- focus range: 340 mm
- load capacity: max. 10 kg
- carrier for microscope:  $d = 76 \text{ mm}$



### Stand N with 350 mm column\*

The sandwich construction offers a compromise between stability and mobility.

For simple equipment:

- footprint: 440 x 370 mm
- round plate:  $d = 84 \text{ mm}$
- column  $d = 32 \text{ mm} / h = 350 \text{ mm}$
- focus range: +/- 25 mm
- load capacity: max. 5 kg

### Horizontal arm-SDA Boom stand\*

Suitable for examining larger objects.

- reach: up to 600 mm
- height of column: 600 mm
- focus range : +/- 25 mm
- load capacity: max 5 kg

\* with Stemi mount with drive for column 32



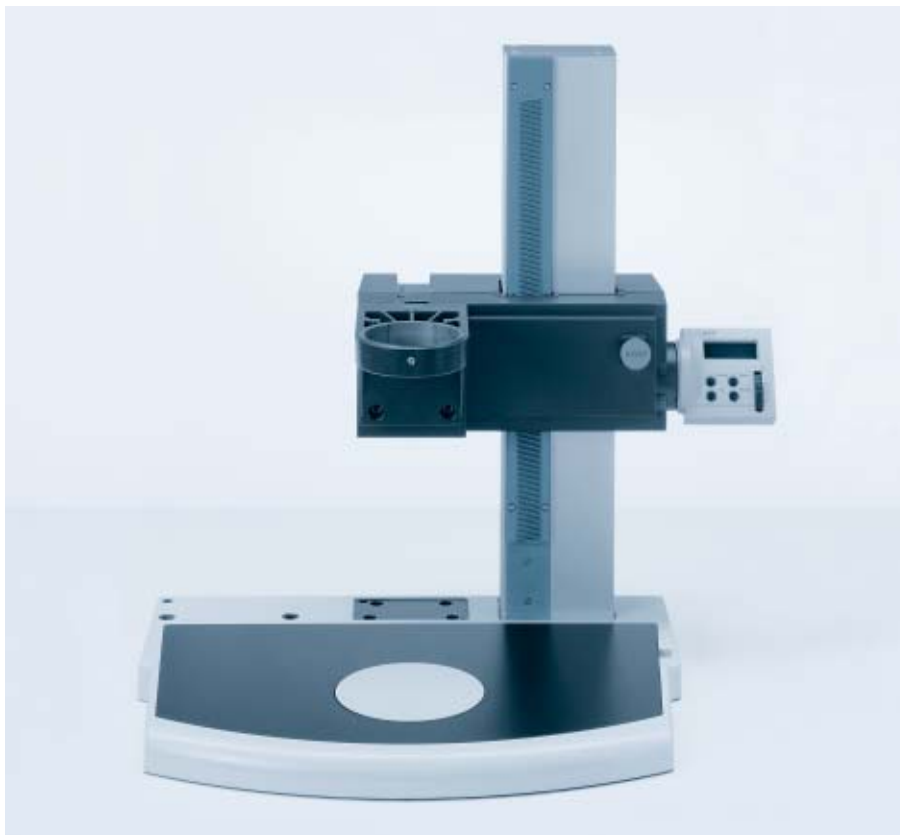
# Quicker to the Mark

Speed and reproducibility take their place alongside stability and precision. The motor focus is as precise and reliable as clockwork. New wear resistant materials make this possible.

**HIP** (Human Interface Panel) replaces the knobs that were previously used for focusing. Always on display: the current Z position with a display accuracy of 10  $\mu$ m.



Quick and precise focusing with **SyCoP**. A quick push of the joystick switches to the fine focus mode.



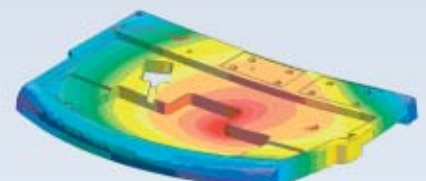
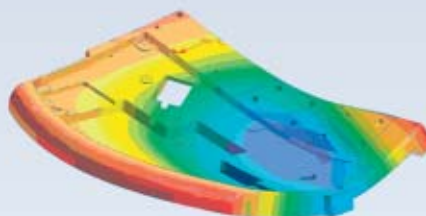
**Focus motor with Profile S column on Stand base 450 to Profile S**  
Focus manager, specimen protection and Z measurement are a standard part of the motor focus.

- footprint: 450 x 300 mm
- insert plate: 410 x 250 mm
- round plate insert: d = 120 mm
- profile S column: h = 490 mm
- focus range: 340 mm
- increment distance: 350  $\mu$ m
- load capacity: max. 17 kg
- support for microscope: d = 76 mm

The ribbed die cast components of conventional stand bases suffer significantly greater deformations...

...than the SteREO Discovery's new Stand base 450 to Profile S, designed as a milled component.

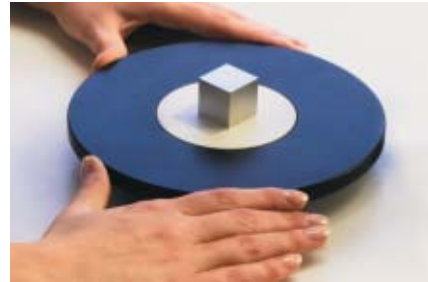
The FEM slides show the possible deformation of the stand's base plate in the case of assumed complex microscope equipment weighing 17 kg.



Scale factor: 500

# Precise Positioning that Protects the Specimen

Specimen stages make it easier to move objects smoothly and evenly during observation. Depending on your requirements and applications, sliding, rotating, mechanical and ball-and-socket stages are available. They fit into the mount of the stand's insert plate (d = 120 mm).



### Gliding stage 110 x 110 S, d = 120 mm

For the sensitive positioning of even large samples in reflected and transmitted-light. Equipped with a glass plate 116 x 116 mm.

- positioning range: 110 x 110 mm
- stand mount: d = 120 mm

Alternative to glass plate:

- mounting frame 116 x 116 / 84 mm for stage diaphragms - d = 40 mm opening
- d = 25 mm opening
- B/W plastic plate

### Mechanical stage 100 x 100 S, d = 120 mm

(not illustrated) For the defined movement of samples in reflected and transmitted-light. Operation via horizontally arranged coaxial drive, left or right.

Equipped with a glass plate 116 x 116 mm

- travel range: 100 x 100 mm
- stand mount: d = 120 mm

Alternative to glass plate:

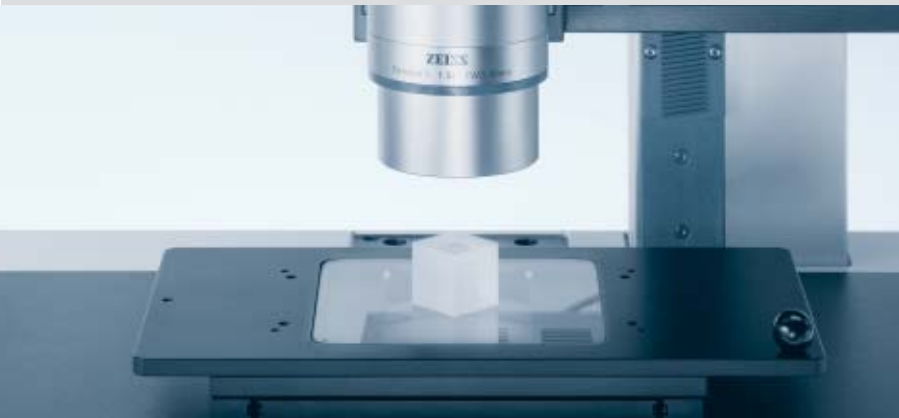
- mounting frame 116 x 116 mm / 84 mm for stage diaphragms - d = 40 mm opening
- d = 25 mm opening
- B/W plastic plate

- LED illumination mount for transmitted-light brightfield and polarizer S

### Gliding stage

For the positioning and rotating of specimens in reflected- and transmitted-light.

- stage diameter = 190 mm
- adjustment range: +/- 20 mm
- insert plate: d = 84 mm
- stand mount: d = 84 mm



### Ball-and-socket stage

Because the stage can be tilted and rotated in all directions, three dimensional specimens can be examined efficiently from all sides. Preferably for applications in reflected-light. The exchangeable adhesive soft pad allows specimens to be affixed.

- stage diameter = 158 mm
- insert plate: d = 84 mm (adhesive soft pad)
- tilt range: +/- 30 degrees
- stand mount: d = 84 mm

### Rotating Pol stage for transmitted- and reflected-light

For the precise rotation of specimens.

- stage diameter = 115 mm
- rotation range: 360° with graduation
- stand mount: d = 84 mm

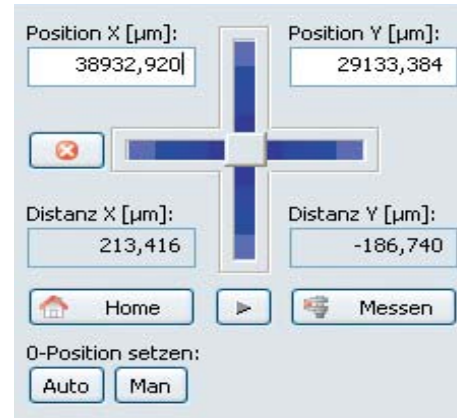
If required, can be retrofitted with an object guide:

- adjustment range: 75 x 25 mm
- Additional accessories for polarization in transmitted-light:
- Polarizer S, d = 84 mm
- full wave plate in slider

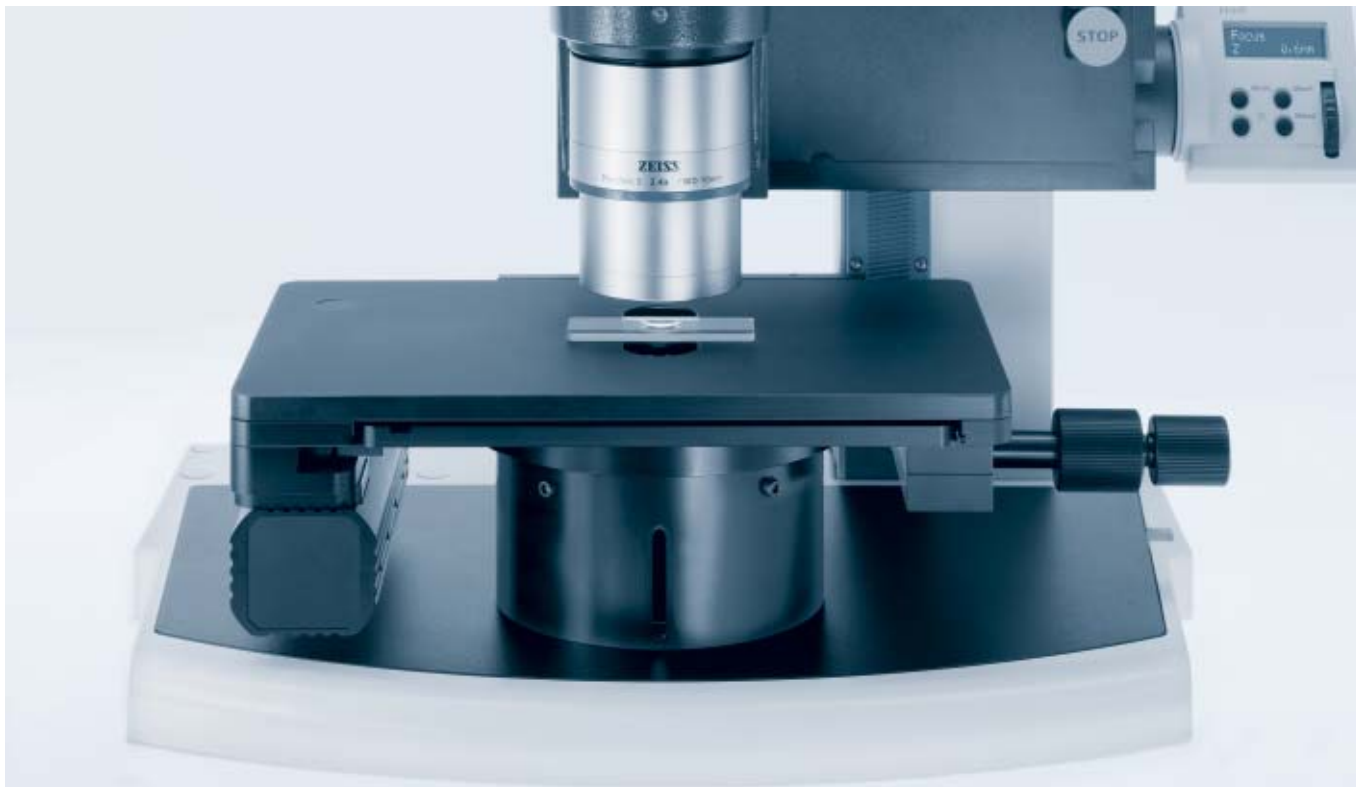


## Precisely on the Mark

There is an increasing demand for motorized stages in stereomicroscopy. They make it possible to scan large samples for documentation or analysis and to locate details on the specimen with speed, precision and in a reproducible way. When working with automated imaging techniques in particular, such as MosaiX or Mark&Find (AxioVision microscope software modules), these stages are already a prerequisite.



Precise location of a sample detail via PC



### **Mechanical stage 75 x 50 mot CAN**

(Illustrated without object guide)

Simple to operate – via the electronic coaxial drive arranged horizontally on the right of the stage or via PC.

- travel range: 75 x 50 mm
- speed: max. 200 mm/sec
- increment distance: 0.1  $\mu\text{m}$
- accuracy of reproduction: < 1  $\mu\text{m}$

A selection of mounting frames for specimen slides, petri dishes and reflected-light samples are available for different specimens.



### **Stage carrier S, d = 120 mm**

This makes it possible to mount motor stages securely and precisely on the extremely stable base plate.

- height: 85 mm
- stand mount: d = 120 mm
- LED illumination mount for transmitted light brightfield and Polarizer S



## Proven Classics

Cold-light illuminators have a long track record in stereo-microscopy. They illuminate the specimen with high intensity, and yet protect it from becoming too warm. Depending on the amount of light required, different cold-light sources are available with an extensive range of fiber optic components.



*Extremely precise alignment of the illuminator is a must in order to achieve good 3D contrast in oblique reflected-light. Special clamps, illuminator carriers and articulated arms are available to ensure that the fixing is exact. Focusing attachments help to concentrate the light on the object field.*



*Single arm spot illuminator –  
Variable oblique illumination with deliberate shadow cast effect*

- one branch flexible or self supporting light guides with focusing attachment
- light guides with variable active diameter:
  - $d = 4,5 \text{ mm}$  (fig. left)
  - $d = 8 \text{ mm}$  (fig. above)
  - $d = 15 \text{ mm}$  (fig. right)



*Dual arm spot illuminator –  
Variable oblique illumination for the reduction of disruptive deep shadows*

- flexible or self supporting light guides with active diameter:
  - $d = 4.5 \text{ mm}$  or  $d = 5.6 \text{ mm}$
- focusing attachments



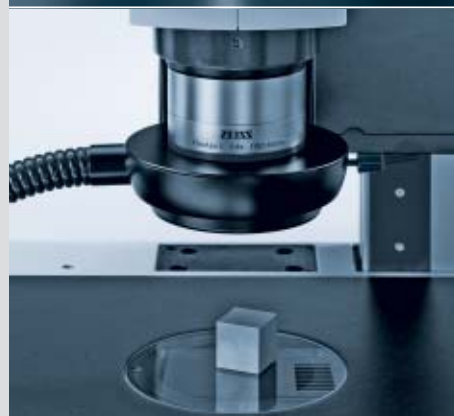
**Line light S, l = 50 mm**

*Converts the round cross section of the light guide into a narrow fiber optic slit. This produces an extremely flat angle of illumination – the light spreads flatly over the specimen. The shadow cast effect makes even very small surface structures visible. Also suitable for high magnification objectives with smaller working distances.*



*Slit ring illuminator for reflected-light brightfield –  
Ideal for the shadow free and homogeneous illumination of objects with large surface areas.*

- with flexible light guides
- with active diameter:
  - $d = 9 \text{ mm}$  (fig. left)
  - with active diameter  $d = 15 \text{ mm}$  (fig. right)



The better a specimen is illuminated, the more details it reveals to the observer. For example, fiber optic illumination components optimized for different applications generate very specific lighting effects on the surface of the specimen. The range extends from simple spot illuminators and ring lights through to specifically shaped glass fiber bundle geometries.



**Ring illuminator  
for reflected-light darkfield**

The light hits the surface of the specimen very flatly from all sides. As a result only the light dispersed from the structure of the specimen reaches the objective. Extremely fine structures are illuminated in their natural colors on a dark background.

- flexible light guide with active diameter:  $d = 9 \text{ mm}$



**Coaxial epi-illumination S**

Particularly suitable for flat, specular specimens. Optimum image results are achieved using the PlanApo S 1.0x objective. The quarter wave plate should be used in the case of vertical observation or documentation using the S/doc objective slide.



**Diffusor S, telescopic,  $d = 66 \text{ mm}$**

Indirect reflected-light illumination for the contrasting of three dimensional specimens with shiny surfaces. Glare is avoided due to the soft light. Recommended: sliding and/or ball-and-socket stage for improved alignment of the specimen.

**Move Your Specimen  
into a New Cold-Light**

Powerful and effective:

The ZEISS CL 1500 ECO cold-light source

- high light output, continuous control
- 15V/150W halogen lamp
- flicker free light for stable live images on the monitor
- quiet ventilation
- tailored standard accessories:
  - flexible light guides with active  $d = 4.5 \text{ mm}$
  - 2x goose-neck light guides with active  $d = 4.5 \text{ mm}$
  - Slit ring illuminator with active  $d = 9 \text{ mm}$

All other light guides with an active diameter of up to  $d = 9 \text{ mm}$  can be used with the ZEISS CL 1500 ECO.



## Pure Daylight from Above

The VisiLED illumination system offers all the advantages of LEDs. Infrared free, offering the best daylight quality and electronically controllable – these are the reasons why this long lasting method of illumination is particularly recommended for illumination and contrasting tasks in stereomicroscopy.



The light from the VisiLED ring light is ripple and flicker free. It is also insensitive to fluctuations in the power supply.

Reflected-light brightfield with:

- **VisiLED ring light S 80-55 BF** (fig. above right) for objectives with a free working distance of 55 to 135 mm.
- **VisiLED ring light S 80-25 BF** (fig. right) for objectives with a free working distance of 25 – 50 mm.

Circular reflected-light darkfield with:

- **VisiLED ring light S 40-10 DF** (not illustrated)
- ALDF adapter for securing the ring light to the objective

VisiLED ring light/holder and distance rings are secured directly onto SteREO objectives (d = 66 mm).



Two operating units are available for controlling the VisiLED ring lights:

**Multi Controller MC 1500**

- for the control of one or two ring lights
- brightness control with display
- segment control and rotation
- storage of 4 illumination settings
- strobe mode and trigger operation
- thermo controller
- RS 232 interface
- foot switch optional

**Multi Controller MC 750** (not illustrated)

- for the control of one ring light
- adjustable transformer to set brightness
- thermo controller





## Light and Shade

In addition to their high level of efficiency, the VisiLED ring lights also offer another substantial advantage. If required, they can be combined into segments and controlled individually.

In reflected-light this makes variable oblique illumination possible. Shadows generated on the surface of the specimen in such a way reveal additional details.



All VisiLED ring lights can be controlled segment by segment. You not only choose between shadow free or oblique illumination – by rotating the segments you can also direct the illumination optimally onto the specimen.



Reflected-light  
brightfield,  
quarter circle



Reflected-light  
darkfield,  
full circle



Mixed-light

While the contours of the striking on this cent coin are highlighted in particular in darkfield, in mixed-light it is primarily the irregularities of the surface that are revealed more clearly.



In order to combine brightfield and darkfield in reflected-light, the **VisiLED ring light S 40-10 DF** is mounted onto the brightfield ring light using a special adapter.

With the MC 1500 Multi-Controller it is possible to work in brightfield, darkfield or mixed-light. Once illumination settings have been optimized, these can be stored and reproduced at the touch of a button.

Thanks to the additional opportunities afforded by segmentation, virtually all contrasting possibilities are available in reflected-light.

## Moveable for Optimum Contrast

The structures and details of transparent and semi-transparent objects can be made visible in transmitted-light. By using a moveable mirror the direction of light can be changed in a targeted way. This allows the contrast to be geared towards the nature of the specimen in question. The contours and outlines of specimens are also displayed clearly.



### *Transmitted-light equipment S*

With this retrofittable module for stand base 450 it is possible to analyze samples in brightfield, darkfield and oblique transmitted-light. The large, rugged transmitted-light base offers plenty of room in the object space and makes it easier to screen batches of petri dishes or work with large samples

- footprint: 450 x 300 mm
- work surface: 410 x 250 mm
- glass plate:  $d = 120$  mm
- illuminated object field: max. 50 mm
- cold-light source: ZEISS CL 1500 ECO or KL 1500 LCD or KL 2500 LCD

Ample possibilities for contrasting in transmitted-light. With 3 sliders it is possible to change the position of the mirror in relation to the specimen. Labeling makes it easier to reproduce the setting.

- Top slider: sets the tilt of the mirror in relation to the specimen
- Middle slider: moves the mirror in a north-south direction
- Bottom slider: changes between two different reflectors for directional or diffused illumination



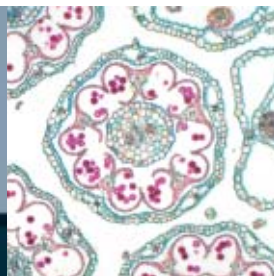


# A Question of Adjustment

The continuous mirror adjustment with several degrees of freedom makes it possible to freely adjust the angle of illumination. This allows to individually optimize illumination and contrast for a very wide range of specimens.



Setting: *Brightfield*  
for transparent, high contrast specimens and also used to display contours and outlines



*Daisy*  
Transmitted-light brightfield  
PlanApo S 1.5x objective  
Magnification: 150x\*



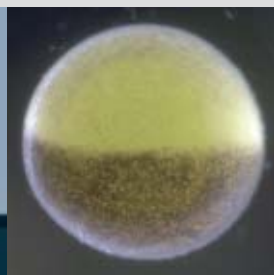
Setting: *Oblique illumination*  
makes low contrast structures visible in transparent and opaque specimens



*Desmid algae Micrasterias*  
Oblique illumination in transmitted-light  
PlanApo S 1.5x objective  
Magnification: 150x\*



Setting: *One sided darkfield*  
low contrast fine structures shine brightly against a very dark background



*Frog embryo*  
Transmitted-light darkfield  
PlanApo S 1.5x objective  
Magnification: 150x\*

\*visual magnification with 10x eyepieces

## See the Light

Depending on what is required and the tasks at hand, two different cold-light sources are available with LCD display and a broad range of fiber optic illumination components.



- KL 1500 LCD**
- 15V/150W light source
  - for light guides with an active diameter of up to 9 mm
  - continuous electronic and mechanical attenuation (patented grid hole pattern diaphragm)
  - filter mount

- KL 2500 LCD**
- high power light source (24V/250W)
  - for light guides with an active diameter of up to 15 mm
  - continuous electronic and mechanical attenuation (patented grid hole pattern diaphragm)
  - 5x filter turret
  - remote control



## Pure Daylight from Below

The **VisiLED transillumination-contrast stage ACT** (**A**dvanced **C**ontrast **T**ransmitted) also offers the advantages of LED illumination for applications in transmitted-light. This dynamic and sophisticated illumination stage delivers brightfield, darkfield and oblique illumination with options to control the direction of illumination. This combination stage and illuminator is ideal for stereoscopic analysis of challenging, low contrast samples.

### *VisiLED transillumination-contrast stage ACT, d = 120 mm*

*This retrofittable transmitted-light solution allows analyses to be performed in brightfield and darkfield. Precise control of the variable slit diaphragm allows for generation of relief contrast at high magnifications particularly.*

- illuminated object field: max. 50 mm
- stage diameter: 160 mm
- glass plate: 120 mm
- sliding stage adjustment range: +/- 10 mm
- insert plate mount: d = 120 mm

*The LED is controlled using the MC 1500 Multi-Controller or via PC*



### *VisiLED transillumination BF, d = 84 mm*

*Retrofit into the Stand base 450 to Profile S or the Stage carrier S for simple transmitted-light brightfield applications.*

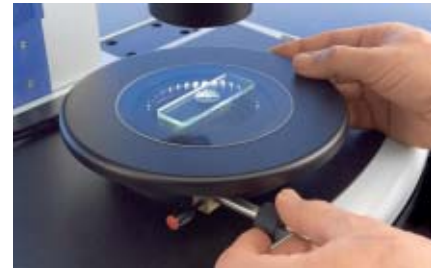
- illuminated object field: max. 50 mm
- segment illumination for oblique illumination (using MC 1500)
- stand mount: d = 84 mm

*The LED is controlled using the MC 750 or MC 1500 Multi-Controller.*



# Half Diaphragms - no Half Measures

Two horizontally arranged, moveable half diaphragms are positioned between an LED area light for brightfield and an LED ring light for darkfield. This variable slit diaphragm makes it possible to observe and document low contrast specimens in relief contrast at higher magnifications. It ensures stunning effects and renders considerably more information about the specimen.



Equipped with a gliding stage, salient positions on the specimen can be brought into position easily, without jostling the sample.

Contrasting of an embryo *SteREO Discovery.V12* with a *PlanApo S 1.5x* objective. Visual magnification of 150x with 10x eyepieces.

<p>Settings on <i>VisiLED</i> transillumination-contrast stage ACT</p> <ul style="list-style-type: none"> <li>- brightfield area light "on"</li> <li>- half diaphragms open</li> <li>- darkfield ring light "off"</li> </ul>		<p>Transmitted-light brightfield (diffused brightfield)</p>	
<ul style="list-style-type: none"> <li>- brightfield area light "on"</li> <li>- slit diaphragm positioned excentrically to the north, defined open</li> <li>- darkfield ring light "off"</li> </ul>		<p>Oblique illumination ("positive" relief contrast)</p>	
<ul style="list-style-type: none"> <li>- brightfield area light "on"</li> <li>- slit diaphragm positioned centrally, defined open</li> <li>- darkfield ring light "off"</li> </ul>		<p>Transmitted-light brightfield (directional brightfield)</p>	
<ul style="list-style-type: none"> <li>- brightfield area light "on"</li> <li>- slit diaphragm positioned excentrically to the south, defined open</li> <li>- darkfield ring light "off"</li> </ul>		<p>Oblique illumination ("negative" relief contrast)</p>	
<ul style="list-style-type: none"> <li>- brightfield area light "off"</li> <li>- diaphragm closed</li> <li>- darkfield ring light "on"</li> </ul>		<p>Transmitted-light darkfield (circular darkfield)</p>	



# Bright Fluorescence Signals



Fluorescence stereomicroscopy means visualizing specific fluorochromes and fluorescent proteins, working with large object fields and high resolution, three dimensional images.

With the "PentaFluar" S solution, the SteREO Discovery can be equipped for demanding fluorescence applications in no time at all.

Depending on the light source used, two different illuminators are available:

**PentaFluar S/X-Cite fluorescence illuminator**

- for X-Cite 120 S or HXP 120 illuminators

**PentaFluar S/HBO fluorescence illuminator**

(not illustrated)

- for HBO 50 or HBO 100 illuminators

This intermediate tube works like a coaxial illuminator. Excitation takes place via two chromatic beam splitters through both observation channels. In this way, the visible object field is always fully illuminated when zooming.

- magazine for 5 filter blocks
- mechanical shutter
- iris for adjusting the diameter of the illuminated field

The reflector turret holds up to 5 different filter blocks. Each filter block has an excitation filter and two emission filters permanently built in:

- Filter block 38 GFP BP
- Filter block 43 Cy3/Rhod/RFP
- Filter block 45 Texas Red/FRFP
- Filter block 46 YFP
- Filter block 47 CFP
- Filter block 50 Cy5
- Filter block 57 GFP LP
- Filter block 58 Cascade Yellow



Embryos of the *Drosophila melanogaster* fruit fly, immunofluorescence, SteREO Discovery.V8 with Achromat S 1.5x objective, visual magnification 120x with 10x eyepieces

Specimen: Sameer Phalke, Institute for Genetics, Halle University, Germany



# Polarization Brings it to Light

Polarizing equipment makes it possible to analyze birefringent materials using the stereomicroscope. Simple measurements can then be performed, for example the determination of the relative birefringence. The use of polarizers also helps reduce distracting reflections.

For transmitted-light analyses in polarized light, the **Rotating Pol stage** is used with the **Polarizer S** and can be equipped, when necessary, with an **specimen guide 28 x 75 mm** and a **Full wave plate in a slider** (first order red). The **Polarizer S**,  $d = 84 \text{ mm}$  can also be mounted directly into the **Transmitted-light equipment S** for simple analyses between crossed polars in transmitted-light.



**Polarizer S**  
 - for inserting into the rotating stage  
**Polarizer S**,  $d = 84 \text{ mm}$  (not illustrated)  
 - for inserting into transmitted-light equipment and stages  
**Analyzer S**, rotatable,  $d = 66 \text{ mm}$   
 - for clamping to objectives  
**Full wave plate in slider**  
 - as slider for Rotating Pol stage

For improved illumination of shiny surfaces, rotating **Polarization filter** can be screwed onto the focusing attachments (for light guides with an active diameter of  $d = 4.5 \text{ mm}$ ). **Analyzer S** fitted to the objective then allows disturbing reflections to be minimized.

Additional accessories for analyses in polarized reflected-light include:

- **Polarization filter set S VisiLED** (not illustrated)
- **Polarization filter set S**,  $d = 66 \text{ mm}$  for slit ring illuminators





# SyCoP - State of the Art

SyCoP (System Control Panel) is a new operating element, patented by Carl Zeiss, for controlling complex stereomicroscopes and illumination systems. It combines push buttons, a joystick and a touchscreen to create a handy, mobile control unit. All the essential functions of the stereomicroscope are integrated in one place, enabling safe and efficient one handed control of the system so that you never have to look away from the specimen.



Complete attention can be given to the specimen...

...thanks to SyCoP.



The joystick - for zooming and focusing.



The keys - for illuminating and contrasting.



The touchscreen - for switching to additional functions and for information.

**HIP for zooming:**

HIP offers a choice between three different speed profiles and provides a real time display of magnification, diameter of the object field, resolution and depth of field. Additionally, preset magnifications can be stored and recalled via the two memory keys.

**HIP (H**uman **I**nterface **P**anel) replaces the conventional knobs for focusing and zooming on the SteREO Discovery.V12 and V20.



**HIP for focusing:**

This HIP also offers three different speed profiles and provides a real time display of the current Z position. Additionally, preset focus can be stored and recalled via the two memory keys.



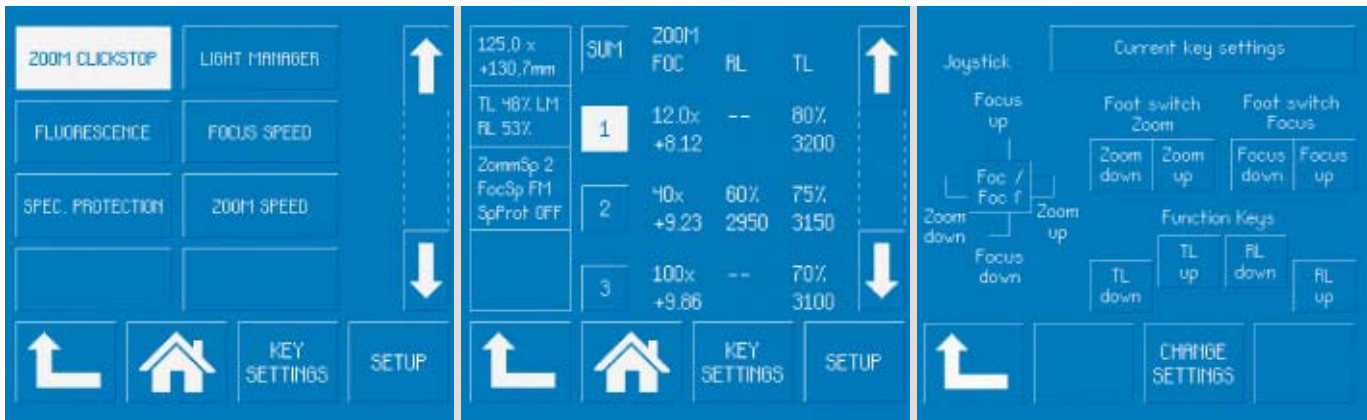
The wheel responds dynamically to the movement of the thumb: slowly and sensitively with small movements and more quickly with larger movements.

# SyCoP Delivers Information



A further innovation in stereomicroscopy. SyCoP delivers information. In addition to its function as a control unit, the SyCoP also displays real time data on all the important optical parameters of the current microscope setting.

The EMS electronics module not only allows the microscope to be operated via SyCoP but also via AxioVision software or foot pedals.



In the **FUNCTION** menu it is possible, for example, to set ClickStops, activate electronic specimen protection, select speeds for zooming and focusing and activate the light or focus manager.

Under **SETUP**, up to five instrument settings per user can be programmed and called up by touching the screen.

Under **SETUP**, important and frequently used functions of the stereomicroscope can be assigned individually to the keys of the SyCoP or to the foot switch.

The main window of SyCoP displays information on the important, current optical data relating to the stereomicroscope, such as:

- total magnification
- visible object field
- maximum possible resolution
- depth of field

Additional settings relating to the basic instrument and illumination are displayed in the status window. Buttons on the touchscreen lead to the respective sub-windows.



## Protect Valuable Information

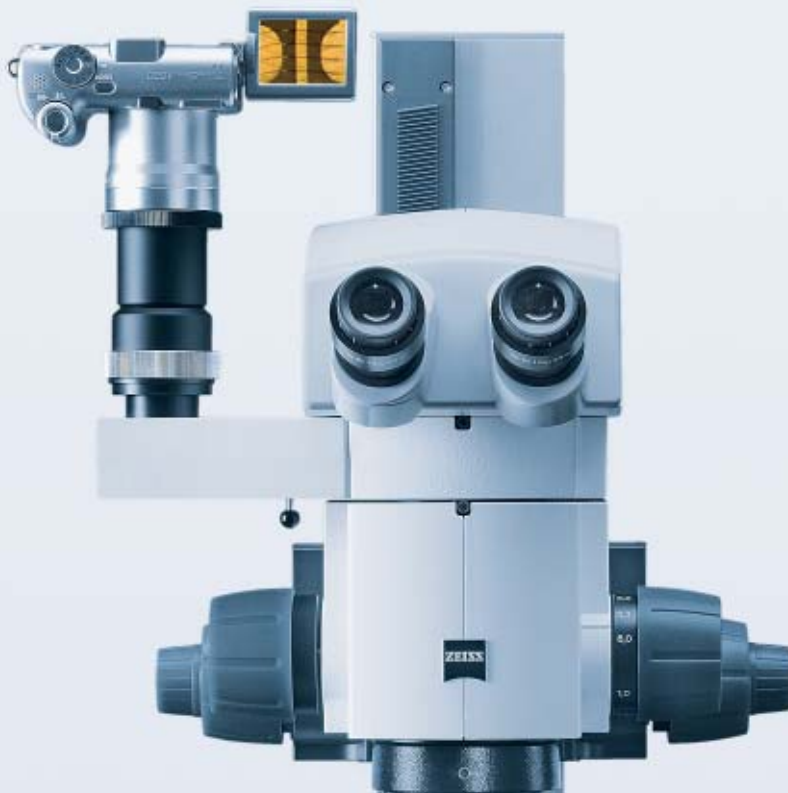
Whether it's for research or routine tasks in biology, medicine or industry – the requirements for the reliable and rapid documentation of microscopic images are becoming ever more demanding.

A series of adapters for the 60N interface on the microscopes allows easy coupling to the following documentation systems:

- AxioCam digital microscope cameras
- video cameras
- digital compact cameras
- analog and digital mirror reflex cameras



SteREO Discovery.V8 with a Canon PowerShot on the **Intermediate phototube S, left 100/100**. Digital consumer compact/mirror reflex cameras are connected via the 60N interface.



### **Intermediate phototube S, left 100/100**

For the adaptation of a camera, with switching between 100% observation or 100% photo

### **Intermediate phototube S with two 50:50 ports**

For the adaptation of two cameras, with permanent splitting for simultaneous stereoscopic observation and documentation



With AxioCam, Carl Zeiss has created a series of digital microscope cameras in order to address the ever expanding range of tasks performed in laboratories and research institutes. The accompanying AxioVision software ensures that the processes of microscopic image analysis can be completed simply, quickly and accurately.



A feature of AxioCam cameras:  
Encapsulated CCD sensor with C-Mount adapter

*SteREO Discovery.V12 with binocular ergo-phototube S 5-45° and AxioCam MRc5*  
Compact, powerful and fast.  
A camera for virtually all applications in stereomicroscopy:  
- resolution: 5 mega pixels in color  
- sensor size: 2/3"  
- FireWire/IEEE 1394 interface  
- connection: C-Mount

#### **AxioCam IC**

Two genuine microscope cameras for biomedical and industrial applications provide pin sharp, true color images.

##### **AxioCam ICc3**

- resolution: 3.3 mega pixels
- sensor size: 1/1.8"
- FireWire 1394a
- connection: C-Mount

##### **AxioCam ICc1 (not illustrated)**

- resolution: 1.4 mega pixels
- sensor size: 1/2"
- FireWire 1394a
- connection: C-Mount



#### **AxioCam H5m**

The high-speed camera for the digital documentation of dynamic processes in B/W.

- basic resolution: 330 K pixels
- image rate:  
up to 198 images/second  
(5x5 Binning)
- sensor size: 1/2"
- FireWire 1394a
- connection: C-Mount

(see [www.zeiss.de/micro](http://www.zeiss.de/micro) for more cameras)



# AxioVision is The Software

**AxioVision – a complete suite of software for microscopy and image analysis.** Geared to current requirements in stereomicroscopy thanks to its unique modular structure and offering attractive options for the future development of this field, AxioVision integrates microscope control, image acquisition, image processing, image management and archiving to form a complete system.

**Extended Focus module**

*In situations where the height of the sample exceeds the depth of field of the stereomicroscope. This module allows information collected in a Z-stack to be combined in to a single image.*

**Interactive Measurement module**

*For the measurement of morphological parameters on interactively defined contours.*

*(see [www.zeiss.de/axiovision](http://www.zeiss.de/axiovision) for more modules)*

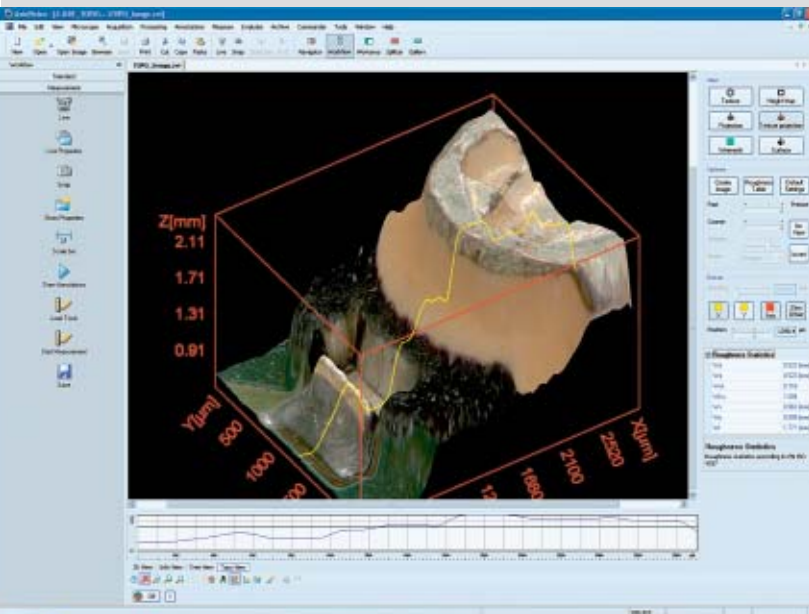
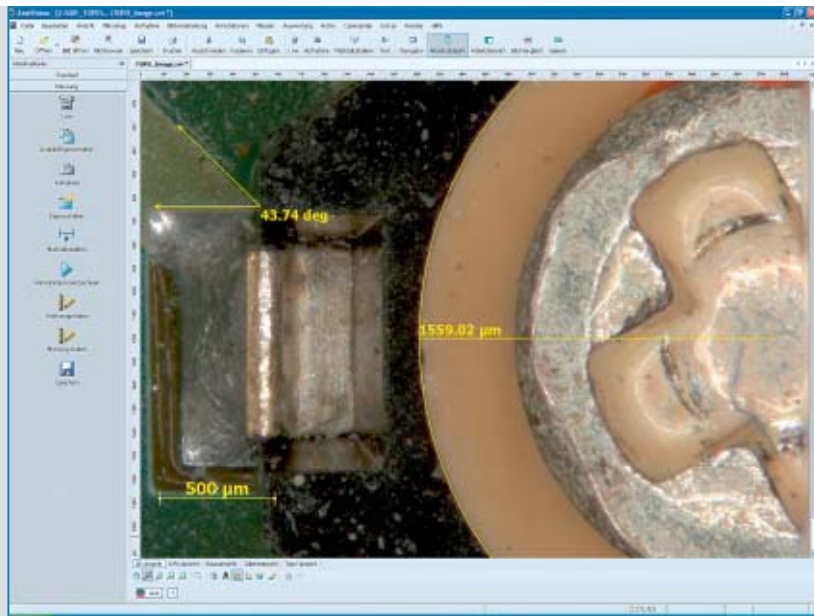
**Electronic component**

*Reflected-light brightfield*

*SteREO Discovery.V12 with PlanApo S 0.63x*

*AxioCam MRc5*

*Specimen: Carl Zeiss MicroImaging GmbH*



**Topography module**

*Height maps can now be generated from Z stacks and displayed in three dimensions. The topographic image created in this way contains all the important information. Other displays are also possible:*

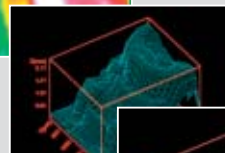


*Texture image*



*Color coded height image*

*Isometric grid projection*



*Shadow projection*





## Perpendicular Perfection

The S/doc objective slider is recommended for professional documentation as well as for more precise measurement in the microscopic image. Depending on the position of the photo port, you can choose to shift the objective centrally under the right or left observation channel.

The now perpendicular, axial view of the object results in freedom from parallax and optimum imaging quality.



Simple switching from stereoscopic observation to a parallax free macro view of the object by the camera



**Objective slide S/doc**

- switched to left channel for documentation

- central position for stereoscopic viewing

- switched to right channel for documentation

**Panorama module.** Using this module, high resolution overview images can be generated perfectly from single images, without the need for a motorized stage.

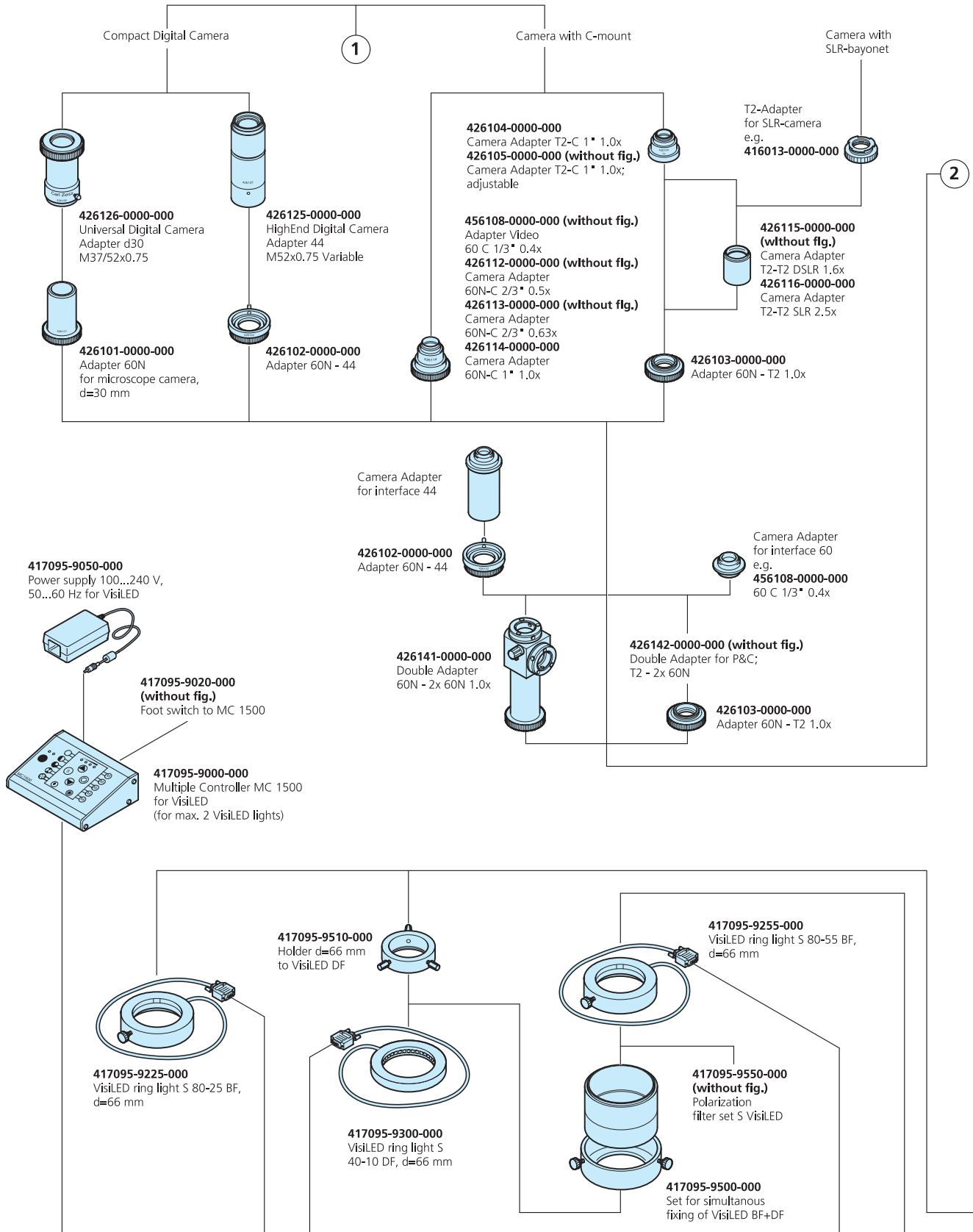
Skeleton specimen of a newborn wild-type mouse  
Transmitted-light brightfield

SteREO Discovery.V12  
with PlanApo S 0.63x  
AxioCam MRC5

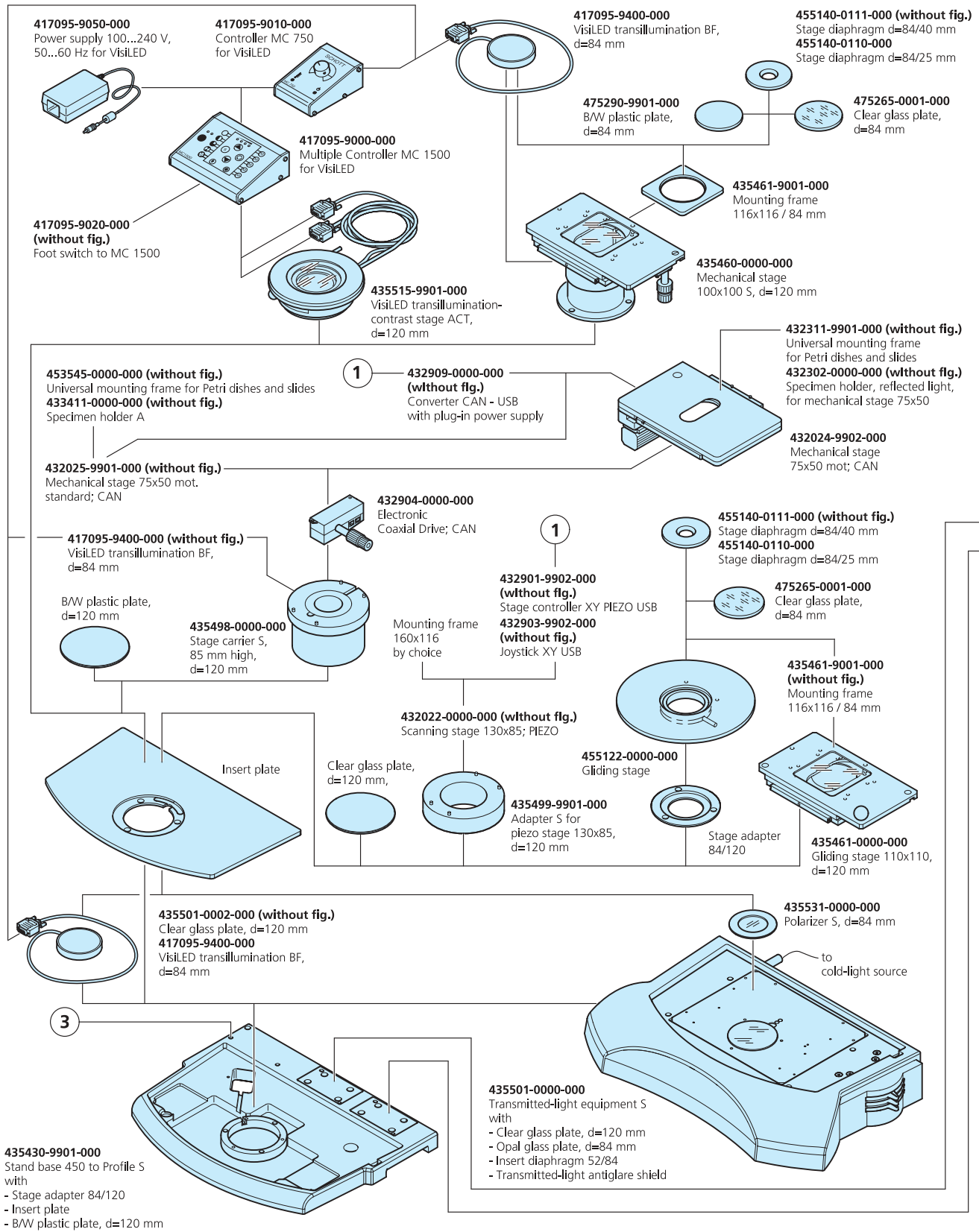
Specimen:  
Dr. Kenji Imai, M.D., PhD.  
GSF National Research Center  
for Environment and Health,  
Neuherberg, Germany



# System Overview



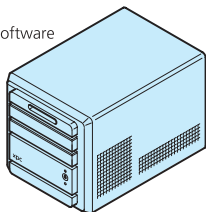
# System Overview



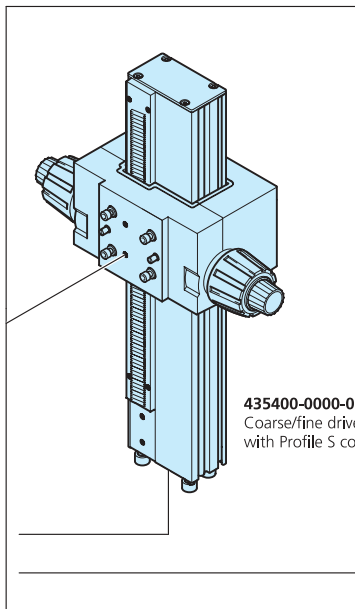


**434303-0000-000**  
Dust protection Set M

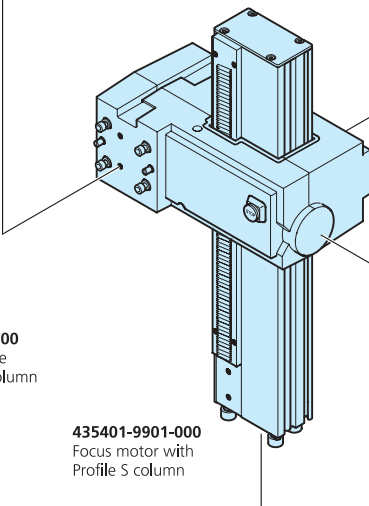
PC Work station  
with AxioVision software



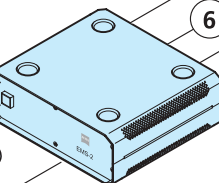
1



**435400-0000-000**  
Coarse/fine drive  
with Profile S column

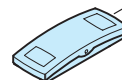


**435401-9901-000**  
Focus motor with  
Profile S column

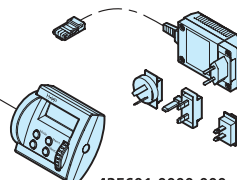


6

**435600-9902-000**  
System Control Panel SYCOP  
with EMS-2, 100...240 V,  
50...60 Hz, 230 VA

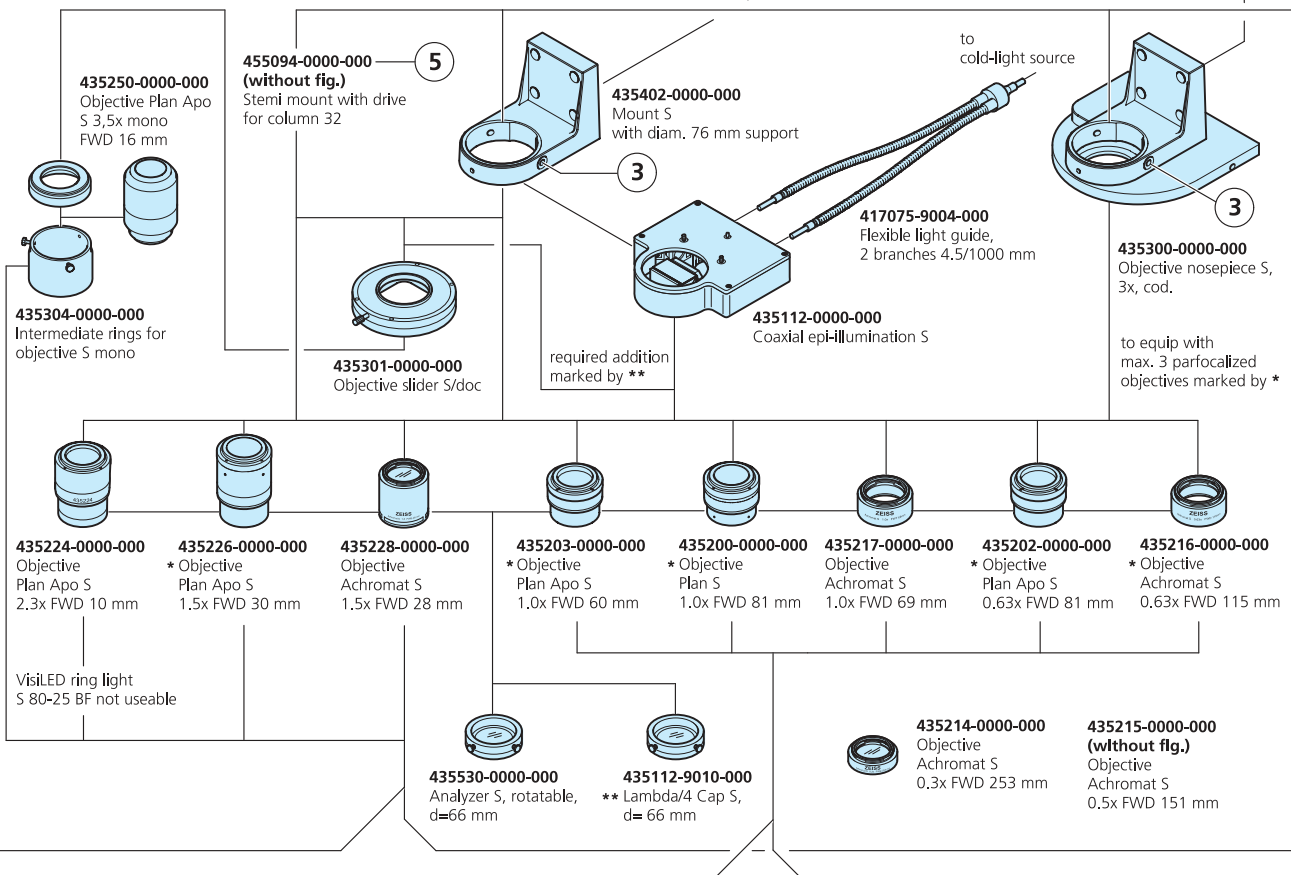


**435602-0000-000**  
Foot pedal S



**435601-0000-000**  
Human Interface Panel HIP  
with plug-in power unit  
100...240 V, 50...60 Hz

or/and  
System Control Panel SYCOP  
with EMS-1 (CSA)



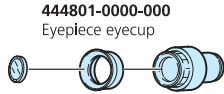
2

**474066-9901-000**  
Crossline micrometer  
10:100, d=26 mm

**455044-9901-000**  
Eyepiece W-PL 10x/23 Br. foc.



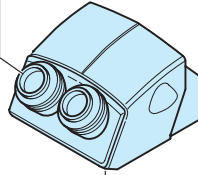
**444801-0000-000**  
Eyepiece eyecup



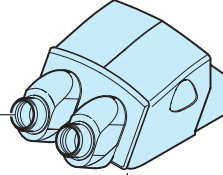
**444801-0000-000**  
Eyepiece eyecup

**434011-0000-000**  
Micrometer  
10:100, d=21 mm

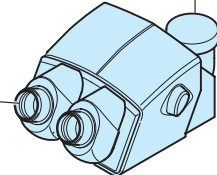
**444054-0000-000**  
Eyepiece PL16x/16 Br. foc.



**435114-0000-000**  
Binocular tube S 35°

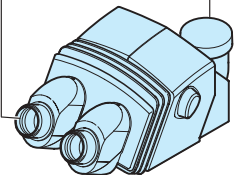


**435104-0000-000**  
Binocular tube S 20°

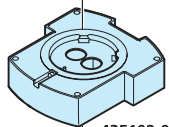
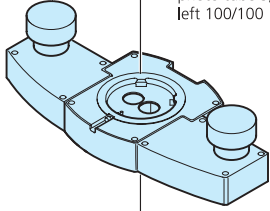


**435107-0000-000**  
Binocular phototube S 20°

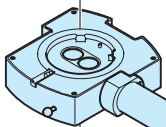
**435100-0000-000**  
Binocular ergo phototube S 5-45°



**435108-0000-000**  
Intermediate photo tube S, left 100/100

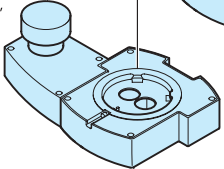


**435102-0000-000**  
Intermediate tube S, fixed 40 mm

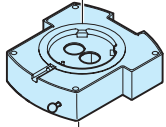


**435111-0000-000**  
Drawing intermediate tube S, switchable

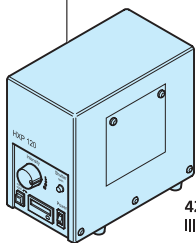
**435109-0000-000**  
Intermediate phototube with 2 ports 50:50



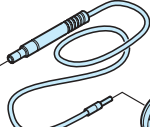
**435117-0000-000**  
Y intermediate tube S, switchable



**000000-0482-730**  
(without fig.)  
Lamp HXP 120, spare

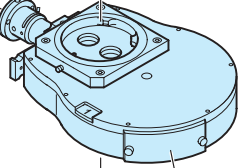


**000000-0482-760**  
Lightguide HXP 120 with liquid fill, 2 m

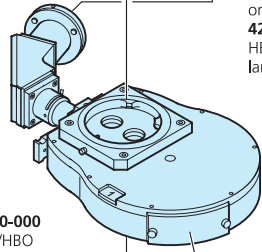


**423013-0000-000**  
Illuminator HXP 120

**435115-0000-000**  
PentaFluar S/X-Cite vertical illuminator  
- Antiglare shield FL S, M8  
- Clamping ring 2x M8  
- Illuminator carrier S, M8-M8



**435113-0000-000**  
PentaFluar S/HBO vertical illuminator  
- Antiglare shield FL S, M8  
- Clamping ring 2x M8  
- Illuminator carrier S, M8-M8



**432604-9901-000 (without fig.)**  
Power supply unit for HBO 100, 90...250 V, 50...60 Hz, 265 VA

**380301-9350-000 (without fig.)**  
Super-pressure mercury lamp HBO 103 W/2

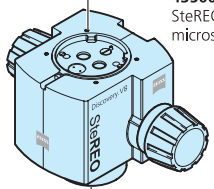
**423011-9901-000 (without fig.)**  
HBO 100 illuminator, self-adjusting with lamp mount and collector or

**423010-0000-000 (without fig.)**  
HBO 100 illuminator with lamp mount and collector

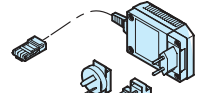
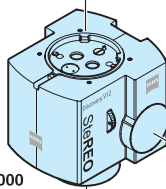
max. 5 filter cubes insertable



**435000-0000-000**  
SteREO Discovery.V8 microscope body



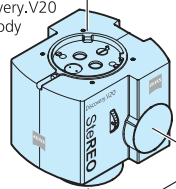
**435001-0000-000**  
SteREO Discovery.V12 microscope body



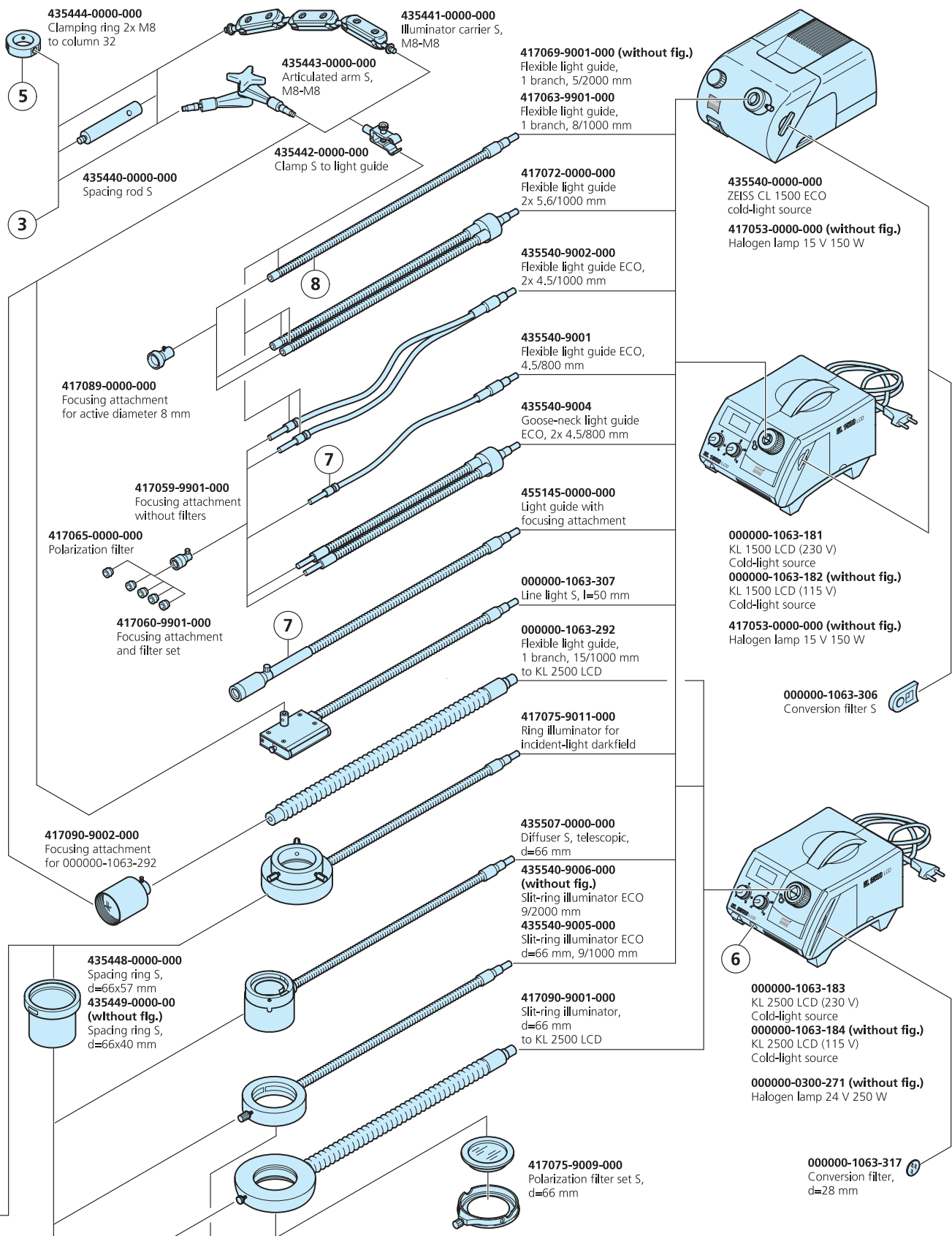
**435601-0000-000**  
Human Interface Panel HIP with plug-in power unit 100...240 V, 50...60 Hz

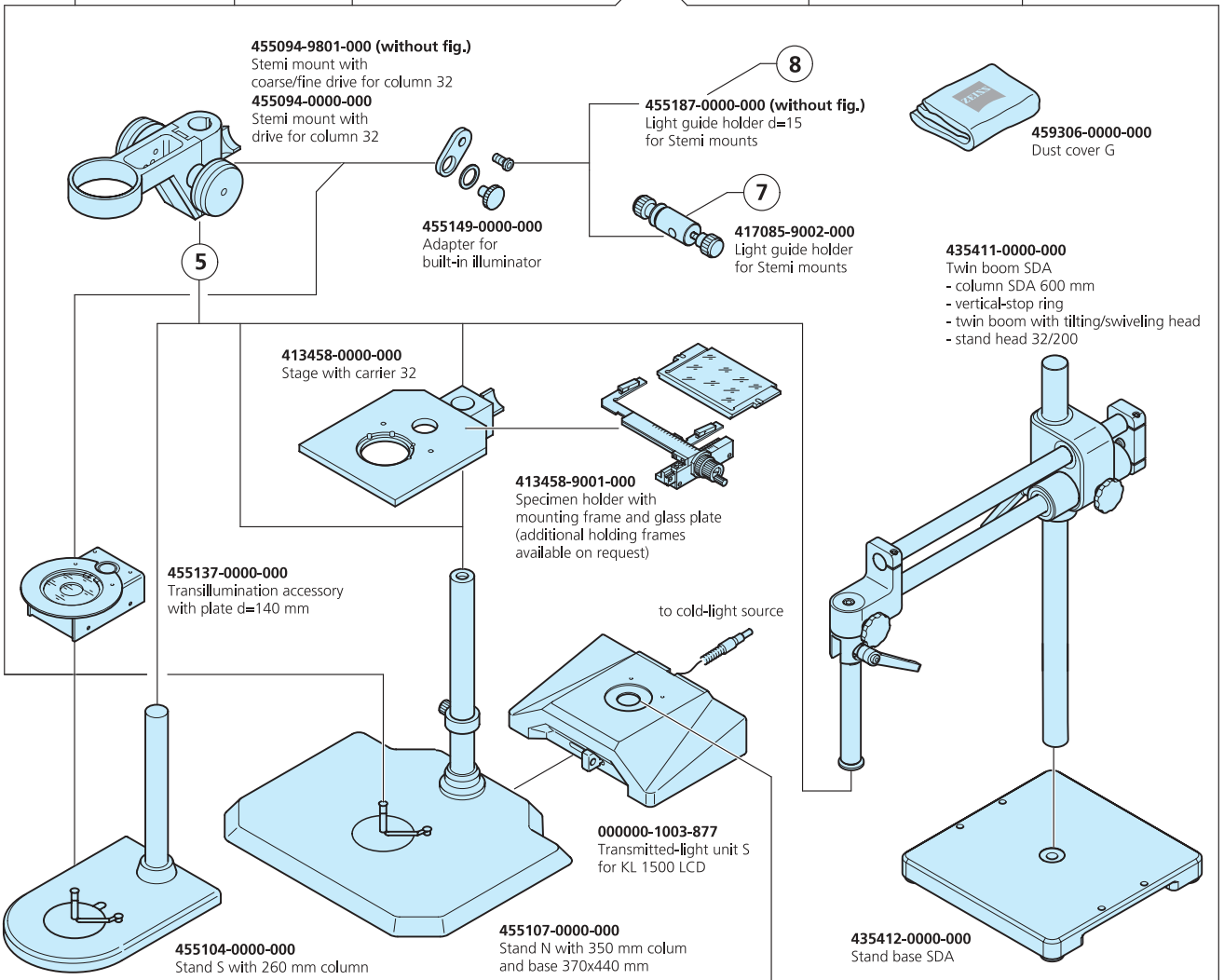
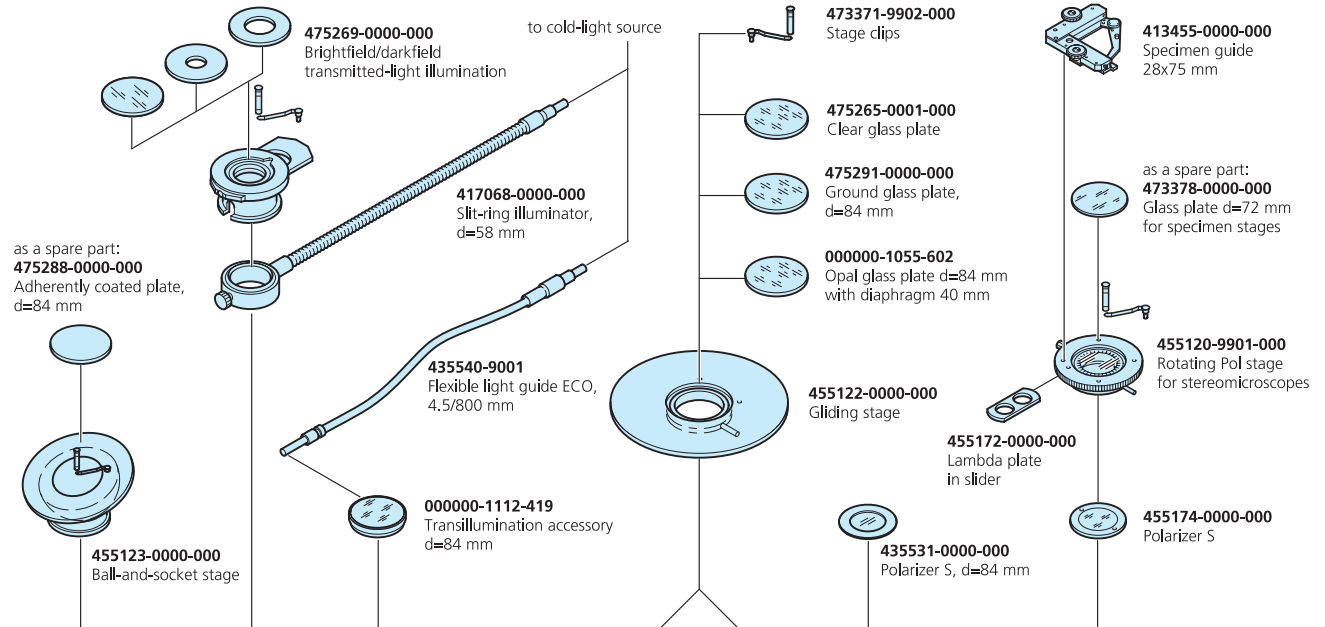
or/and  
System Control Panel SYCOP with EMS-1 (CSA)

**435003-0000-000**  
SteREO Discovery.V20 microscope body









SteREO Discovery.V8

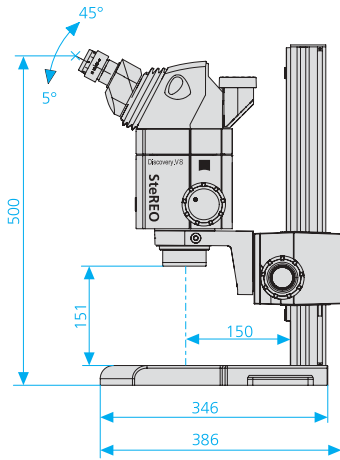
SteREO Discovery.V12

SteREO Discovery.V20

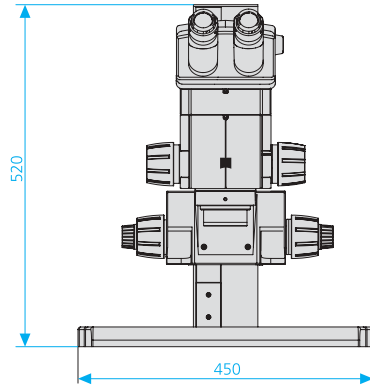
Objectives		Eyepieces					
Name	FWD (mm)	WPL 10x/23 Br. foc		WPL 16x/16 Br. foc		W 25x/10 foc	
		Magnification	Object field (mm)	Magnification	Object field (mm)	Magnification	Object field (mm)
PlanApo S 0,63x	81	6,3 x ... 50,4x	36,5 ... 4,6	10,1 x... 80,6x	25,4 ... 3,2	15,8 x... 126 x	15,9 ... 2,0
		5 x ... 63 x	45,6 ... 3,7	8 x... 100,8x	28,5 ... 2,3	12,6 x...157,5x	18,3 ... 1,5
		4,7 x ... 94,5x	48,7 ... 2,4	7,6 x... 151 x	33,9 ... 1,7	11,8 x... 236 x	21,1 ... 1,1
PlanApo S 1,0x	60	10 x ... 80 x	23,0 ... 2,9	16 x... 128 x	16,0 ... 2,0	25 x...200 x	10,0 ... 1,3
		8 x... 100 x	28,8 ... 2,3	12,8 x... 160 x	18,0 ... 1,4	20 x... 250 x	11,5 ... 0,9
		7,5 x... 150 x	30,7 ... 1,5	12 x... 240 x	21,3 ... 1,1	18,8 x... 375 x	13,3 ... 0,7
PlanApo S 1,5x	30	15 x... 120 x	15,3 ... 1,9	24 x... 192 x	10,7 ... 1,3	37,5 x...300 x	6,7 ... 0,8
		12 x...150 x	19,2 ... 1,5	19,2 x... 240 x	12,0 ... 1,0	30 x... 375 x	7,7 ... 0,6
		11,3 x... 225 x	20,4 ... 1,0	18 x... 360 x	14,2 ... 0,7	28,1 x... 563 x	8,9 ... 0,4
PlanApo S 2,3x	10	23 x... 184 x	10,0 ... 0,7	36,8 x... 294,4x	6,3 ... 0,8	57,5 x... 460 x	4,0 ... 0,5
		18,4 x... 230 x	12,5 ... 1,0	29,4 x... 368 x	7,8 ... 0,6	46 x...575 x	5,0 ... 0,4
		17,3 x... 345 x	13,3 ... 0,7	27,6 x... 552 x	9,3 ... 0,5	43,1 x...863 x	5,8 ... 0,3
PlanApo S 3,5x mono	16	35 x...280 x	6,6 ... 0,8	56 x... 448 x	4,1 ... 0,5	87,5 x...700 x	2,6 ... 0,3
		28 x...350 x	8,2 ... 0,7	44,8 x... 560 x	5,1 ... 0,4	70,5 x...875 x	3,3 ... 0,3
		26,3 x... 525 x	8,8 ... 0,4	42 x... 840 x	5,5 ... 0,27	65,6 x...1312,5x	3,5 ... 0,18
Plan S 1,0x	81	10 x... 80 x	23,0 ... 2,9	16 x... 128 x	16,0 ... 2,0	25 x... 200 x	10,0 ... 1,3
		8 x... 100 x	28,8 ... 2,3	12,8 x... 160 x	18,0 ... 1,4	20 x...250 x	11,5 ... 0,9
		7,5 x... 150 x	30,7 ... 1,5	12 x... 240 x	21,3 ... 1,1	18,8 x...375 x	13,3 ... 0,7
Achromat S 0,3x	253	3 x... 24 x	76,7 ... 9,6	4,8 x... 38,4x	53,3 ... 6,7	7,5 x ... 60 x	33,3 ... 4,2
		2,4 x... 30 x	95,8 ... 7,7	3,8 x... 48 x	59,9 ... 4,8	6 x... 75 x	38,3 ... 3,1
		2,3 x... 45 x	102 ... 5,1	3,6 x... 72 x	71,1 ... 3,6	5,6 x... 113 x	44,4 ... 2,2
Achromat S 0,5x	151	5 x... 40 x	46,0 ... 5,8	8 x... 64 x	32,0 ... 4,0	12,5 x... 100 x	20,0 ... 2,5
		4 x... 50 x	57,5 ... 4,6	6,4 x... 80 x	35,9 ... 2,9	10 x... 125 x	23,0 ... 1,8
		3,8 x... 75 x	61,3 ... 3,1	6 x... 120 x	42,7 ... 2,1	9,4 x... 188 x	26,7 ... 1,3
Achromat S 0,63x	115	6,3 x... 50,4x	36,5 ... 4,6	10,1 x... 80,6x	25,4 ... 3,2	15,8 x... 126 x	15,9 ... 2,0
		5 x... 63 x	45,6 ... 3,7	8 x... 100,8x	28,5 ... 2,3	12,6 x...157,5x	18,3 ... 1,5
		4,7 x... 94,5x	48,7 ... 2,4	7,6 x... 151 x	33,9 ... 1,7	11,8 x... 236 x	21,1 ... 1,1
Achromat S 1,0x	69	10 x... 80 x	23,0 ... 2,9	16 x... 128 x	16,0 ... 2,0	25 x... 200 x	10,0 ... 1,3
		8 x... 100 x	28,8 ... 2,3	12,8 x... 160 x	18,0 ... 1,4	20 x... 250 x	11,5 ... 0,9
		7,5 x... 150 x	30,7 ... 1,5	12 x... 240 x	21,3 ... 1,1	18,8 x... 375 x	13,3 ... 0,7
Achromat S 1,5x	28	15 x... 120 x	15,3 ... 1,9	24 x... 192 x	10,7 ... 1,3	37,5 x... 300 x	6,7 ... 0,8
		12 x... 150 x	19,2 ... 1,5	19,2 x... 240 x	12,0 ... 1,0	30 x... 375 x	7,7 ... 0,6
		11,3 x... 225 x	20,4 ... 1,0	18 x... 360 x	14,2 ... 0,7	28,1 x... 563 x	8,9 ... 0,4

<b>Operating concept</b>	Telescope or CMO (Common Main Objective)			
<b>Panratic zoom range</b>	SteREO Discovery.V8	1 x ... 8 x	manual zoom body	
	SteREO Discovery.V12	0,8 x ... 10 x	motorized zoom body	
	SteREO Discovery.V20	0,75 x ... 15 x	motorized zoom body	
<b>Magnification range and max. resolution for stereo observation</b>	SteREO Discovery.V8	10 x ... 80 x	max. 346 Lp/mm	Basic version*
		3 x ...460 x	max. 801 Lp/mm	with exchangeable optics
	SteREO Discovery.V12	8 x ...100 x	max. 429 Lp/mm	Basic version*
		2,4 x ...575 x	max. 1000 Lp/mm	with exchangeable optics
	SteREO Discovery.V20	7,5 x ...150 x	max. 432 Lp/mm	Basic version*
		2,3 x ...552 x	max. 1000 Lp/mm	with exchangeable optics
<b>Magnification range and max. resolution for 2D observation</b>	SteREO Discovery.V8	3 x ...700 x	max. 1211 Lp/mm	with exchangeable optics
	SteREO Discovery.V12	2,4 x ...875 x	max. 1502 Lp/mm	with exchangeable optics
	SteREO Discovery.V20	2,3 x ...840 x	max. 1512 Lp/mm	with exchangeable optics
<b>Observation tubes</b>	Binocular tube S 35°	Binocular phototube S 20°		
	Binocular tube S 20°	Binocular ergo-phototube S 5-45°		
	Interpupillary distance at 2 viewing heights, adjustable from 55 mm to 75 mm			
<b>Intermediate tubes</b>	Intermediate phototubes S 100/100 and S 50/50		Drawing intermediate tube S	
	Y intermediate tube S (for 2D macroscope setting)		Intermediate tube S, fixed 40 mm (ergo component)	
<b>Objectives</b>	Achromat S	0,3x/0,4x/0,63x/1x/1,5x		
	Plan S	1x		
	PlanApo S	0,63x/1x/1,5x/2.3x/3,5x macro		
<b>Eyepieces</b>	W-PL 10x/23 Br. foc.	E-PL 10x/20 Br. foc.	PL 16x/16 Br. foc.	W 25x/10 foc.
<b>Mounts</b>	Mount S with d = 76 mm support		Stemi mount with drive for column 32	
	Objective nosepiece S, 3x cod		(weight-bearing capacity 5 kg)	
<b>Stands</b>	Coarse/fine drive with Profile S column on stand base 450 to Profile S			Stand S with 260 mm column 32
	Motor focus with Profile S column on stand base 450 to Profile S			Stand N with 350 mm column 32
	Boom stand A and SDA			
<b>Stages</b>	Mechanical stage S 100 x 100		Gliding stages	
	Mechanical stage 75 x 50 mot. CAN		Ball-and-socket stage	
	Scanning stage 130 x 85, PIEZO		Rotating Pol stage	
<b>Reflected-light</b>	<b>Fiber optic cold-light 150W or 250W</b>		<b>LED</b>	
	Spot illuminators, 1 and 2 branch		VisiLED segment ring light for brightfield	
	Ring lights for brightfield and darkfield		VisiLED segment ring light for darkfield	
	Line light			
	Coaxial reflected-light brightfield illumination S			
	Diffuser S			
<b>Transmitted-light</b>	<b>Fiber optic cold-light 150W or 250W</b>		<b>LED</b>	
	Transmitted light equipment S		VisiLED ACT transillumination-contrast stage ACT	
	- brightfield, darkfield, oblique light		- brightfield, darkfield, oblique slit illumination (relief contrast)	
	Addition for transmitted-light		VisiLED transillumination BF	
	- brightfield		- brightfield and diffused oblique-light	
<b>Fluorescence contrast</b>	PentaFluar S fluorescence illuminator		Coaxial excitation with HBO/XBO/X-Cite 120/HXP120	
<b>Polarization contrast</b>	Transmitted light polarization		Fiber optic cold-light	
	Reflected light polarizer for ring lights and spots		Fiber optic cold-light	
<b>Documentation</b>	Microscope cameras AxioCam IC, MR, HR, HS			
	Adaptation for digital compact and mirror reflex cameras			
<b>Image processing</b>	AxioVision microscopy and image analysis software			
<b>*Basic version</b>	with 1x objective and 10x eyepieces			

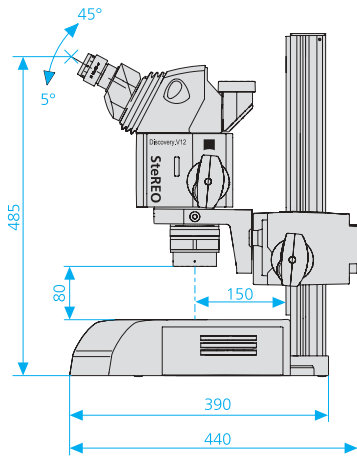




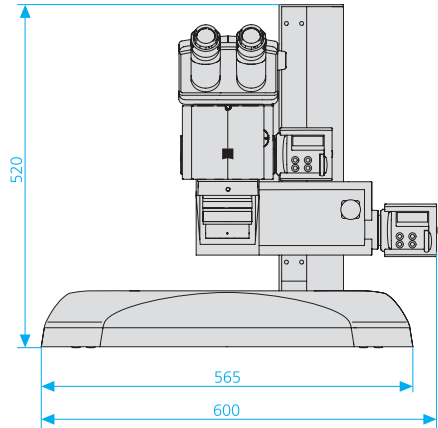
Weight 23,2 kg



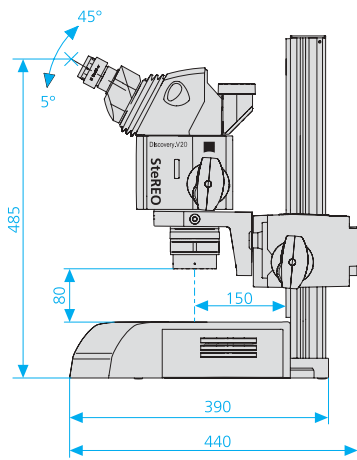
SteREO Discovery.V8



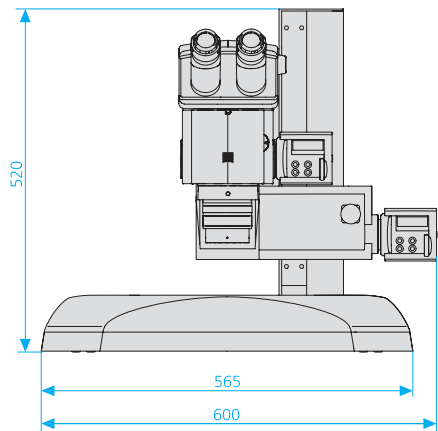
Weight 32,7 kg



SteREO Discovery.V12



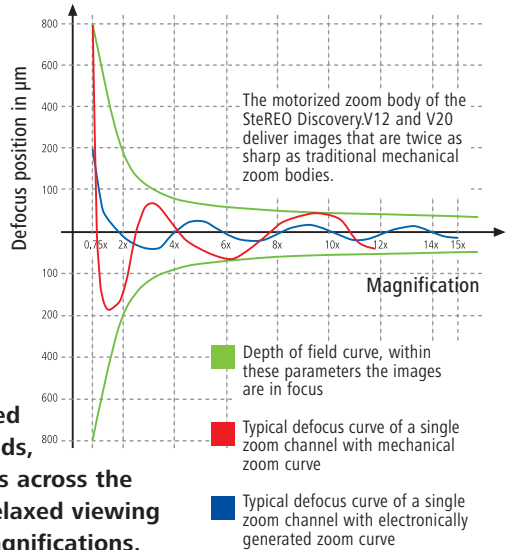
Weight 32,8 kg



SteREO Discovery.V20

# Behind the Scenes

On the SteREO Discovery.V12 and V20, mechanical zoom control curves have been replaced by ones that are generated electronically. This level of precision yields, considerably sharper microscopic images across the entire zoom range. The result is more relaxed viewing in 3D and improved contrast at high magnifications.



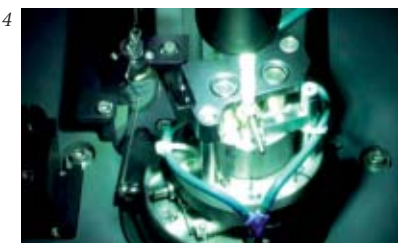
Before assembly begins, each lens is exactly calibrated against a reference "null lens set" and the values are saved in a data pool. This feeds the database used by a computer to select optimally matched lenses for the zoom system. By doing this, an optimally coordinated lens family is developed for every stereomicroscope.



The rotating reflex of a lens of the zoom optics. As soon as it is in the circle ...



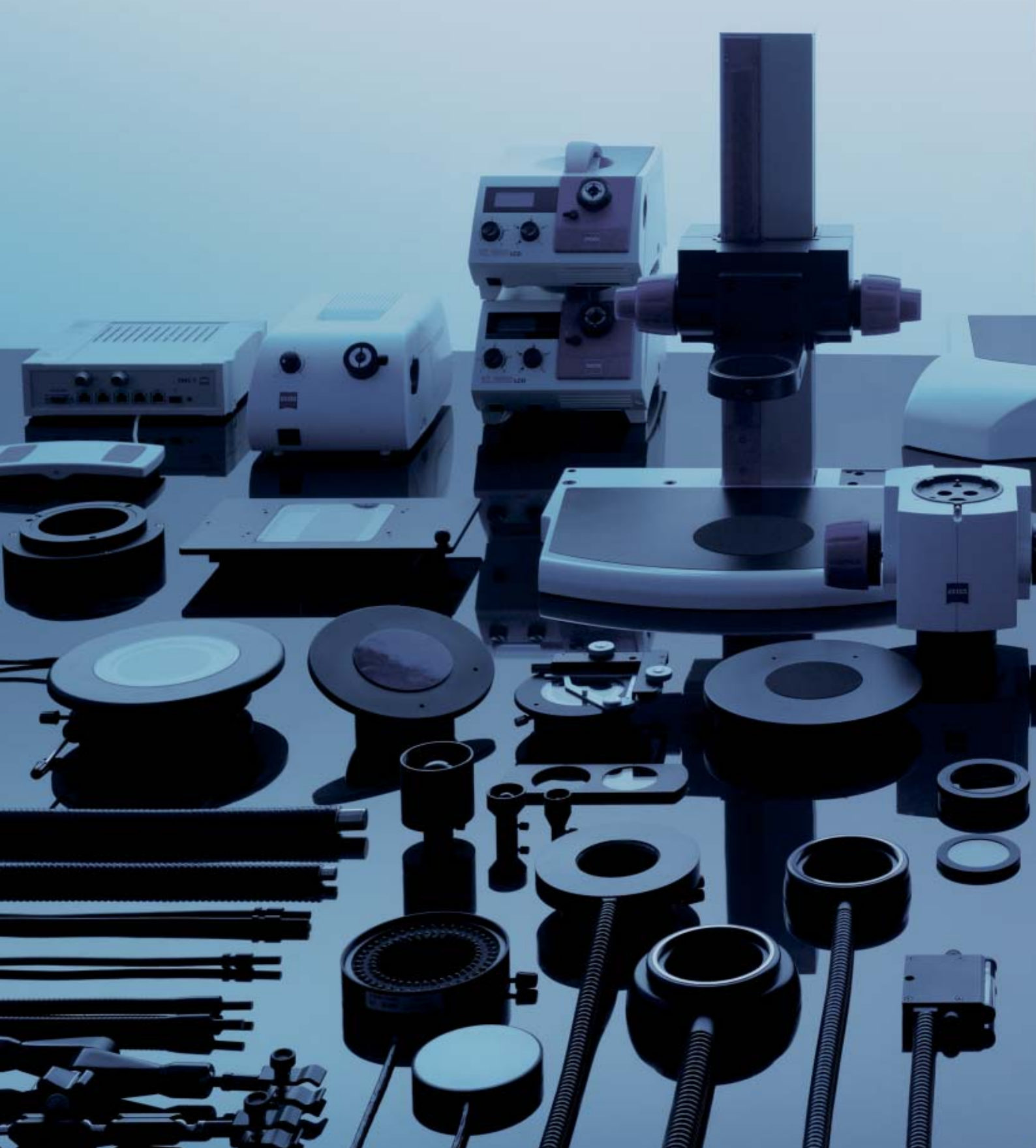
... the moveable micro clapper on the computer controlled glue leveling machine automatically adjusts the final fine alignment.



The lens which has been positioned carefully is then fixed immediately. The machine lays highly calibrated, uninterrupted glue beads through a strong 0.5 mm cannula and hardens it using UV light.



In the zoom body adjusting device, the precise procedures of all moveable optical elements are programmed. To do this, approximately 7,000 reference points are analyzed by computer. In doing so, each stereomicroscope receives its own completely individual zoom control curve.



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