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Stereo Microscopes



Parallel-optics type

Research Stereo Microscope

SMZ25/SMZ18

Evolutionary stereo microscope

Nikon has developed an all-new stereo microscope that features a large zoom ratio of 25:1, high resolution and exceptional fluorescence transmission capability. The new stereo microscope meets the increasing needs for imaging systems that span spatial scales from single cells to whole organisms.

World's widest zoom range and highest resolution for a stereo microscope

- First stereo microscope to offer a 25:1 zoom range (SMZ25)
- Both eye paths boast numerical apertures (NA) of up to 0.156, using the SHR Plan Apo 1x objective and SMZ25

Automation and digital imaging

- Motorized focus and zoom operation (SMZ25)
- Imaging Software NIS-Elements enables the use of multiple imaging, processing and analysis modalities, including z-stack capture, time-lapse imaging and EDF image generation



SMZ25 Motorized zoom model with the highest zoom ratio and resolution in the SMZ series

Bright, high-contrast fluorescent images

- Fly-eye lens ensures uniform brightness over the entire field of view even at the lowest magnifications
- Breakthroughs in optical design mean significantly improved signal to noise ratio and crystal clear fluorescent images

Easy to use

- User-friendly remote control (SMZ25)
- Easy-to-operate slim LED DIA base with OCC illumination
- Wide range of illuminators and accessories that accommodate a variety of observation methods



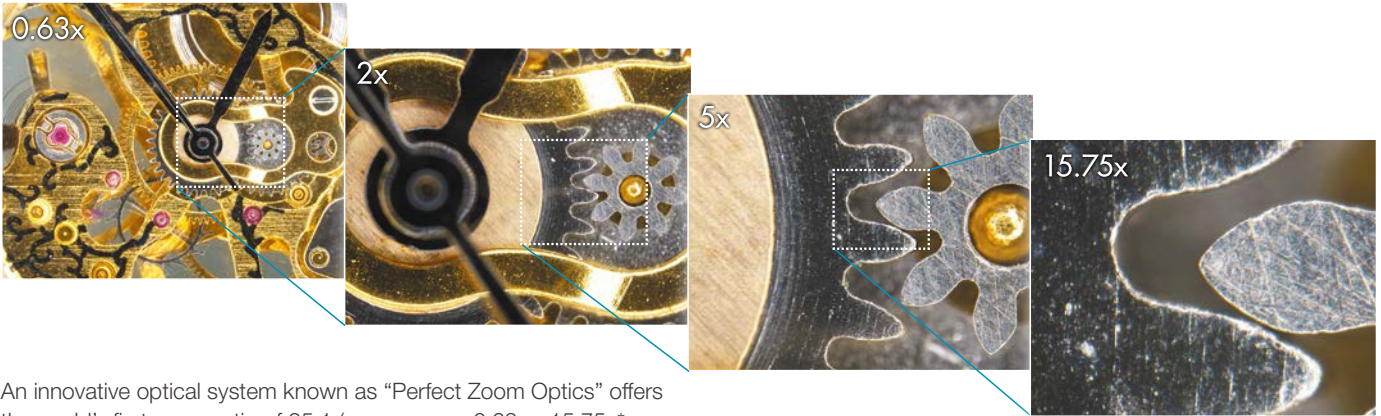
SMZ18 Manual zoom model providing advanced optical performance and incredibly bright fluorescence at an attractive price

| Model | SMZ25 | SMZ18 |
|-----------------------|--|--|
| Type | Motorized zoom | Manual zoom |
| Observation | Brightfield/Darkfield/Fluorescence/Simple polarizing | |
| Zoom ratio | 25:1 | 18:1 |
| Magnification range | 0.63x - 15.75x | 0.75x - 13.5x (with 0.75/1/2/3/4/5/6/8/10/12/13.5x click stops) |
| Maximum magnification | 315x ^{*1} | 270x ^{*1} |
| Maximum FOV | ø70 mm ^{*2} | ø59 mm ^{*2} |
| Maximum NA of | 0.312 ^{*3} | 0.3 ^{*3} |

*1: Using SHR Plan Apo 2x/ C-W10xB *2: Using SHR Plan Apo 0.5x/ C-W10xB *3: Using SHR Plan Apo 2x

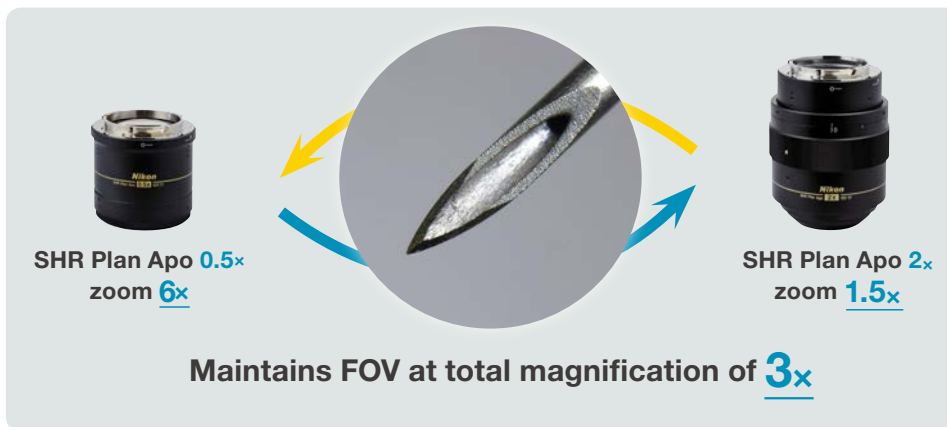
Remarkable resolution and the world's widest zoom range

Dynamic zoom ratio of 25:1 SMZ25



An innovative optical system known as "Perfect Zoom Optics" offers the world's first zoom ratio of 25:1 (zoom range: 0.63x - 15.75x*; *as of May 2013). The SMZ25 can seamlessly capture the entire dish while simultaneously delivering microscopic details.

Auto Link Zoom (ALZ) supports seamless viewing at different scales SMZ25



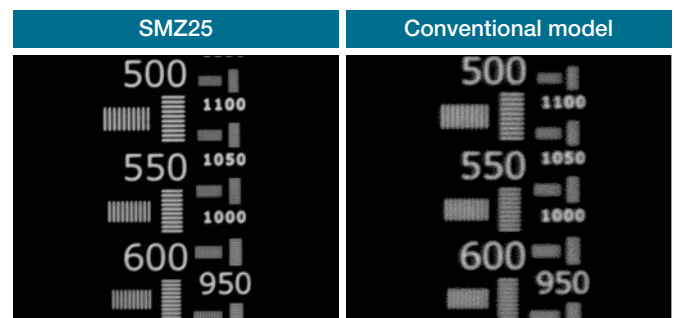
ALZ automatically adjusts the zoom factor to maintain the same field of view when switching objective lenses. This function enables seamless switching between whole organism imaging at low magnifications and detailed imaging at high magnifications.

Superior resolution never before seen on a stereo microscope SMZ25 SMZ18

Newly developed SHR (Super High Resolution) Plan Apo series objective offers a resolution of 1100LP/mm (observed value, using SHR Plan Apo 2x at maximum zoom). The 0.5x, 1x, or 1.6x lower magnification objectives deliver a bright field of view and brilliant images with true-to-life colors.



Comparison of resolution and color aberration by resolution chart



Parallel-optics type

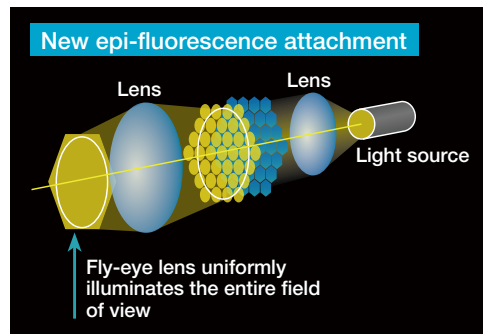
Bright, high-contrast fluorescent images SMZ25 SMZ18

Enhanced brightness and uniform illumination in a low magnification range

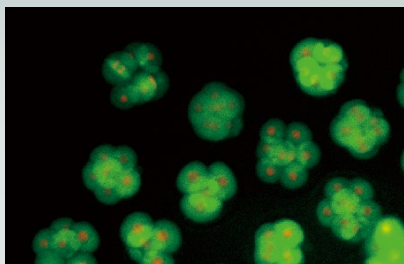
The SMZ25 series is the first stereo microscope in the world to use a fly-eye lens on an epi-fluorescence attachment. This ensures bright, uniform illumination even at low magnifications across a large field of view.

Improved S/N ratio and crystal clear fluorescent images thanks to an improved optical system

Nikon has succeeded in improving the signal and reducing noise in fluorescent images by using a short-wavelength, high-transmission Fluor lens. This enables observations of cell division and samples with weak fluorescence, both of which are difficult using conventional stereo microscopes.

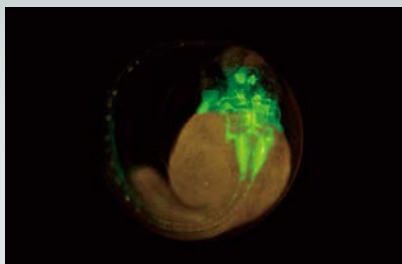


Sample images



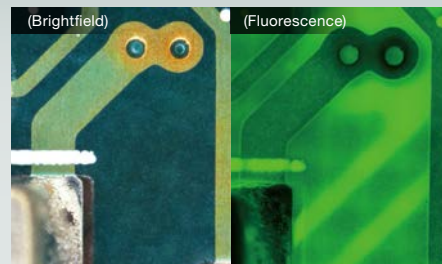
Fertilized mouse egg

Image courtesy of Kazuo Yamagata, Ph.D., Center for Genetic Analysis of Biological Responses, Research Institute for Microbial Diseases, Osaka University



2 days old Transgenic Zebrafish embryo, Tg (isl1-GFP)

(using SHR Plan Apo 1x at zoom magnification of 6x with SMZ25)
Image courtesy of Hisaya Kakinuma, Ph.D., Laboratory for Developmental Gene Regulation, Developmental Brain Science Group, RIKEN Brain Science Institute



Board

Automation and digital imaging SMZ25 SMZ18

A wide range of digital imaging capabilities with the Digital Sight series and NIS-Elements imaging software

Easily obtain the information required, such as Z drive position, zoom factor, objective lens, filter cube and LED DIA brightness, by using the Digital Sight series and NIS-Elements or Digital Sight series DS-L3 together with the microscope.



| Detected observation condition/available control | ⊙ : Detection and control of observation condition possible ○ : Detection of observation condition possible | | | |
|--|---|--------------|--|--------------|
| | SMZ25 | | SMZ18 | |
| | <ul style="list-style-type: none"> • Motorized focus unit • Motorized epi-fluorescence set (control box A) | | <ul style="list-style-type: none"> • Manual focus unit • Manual epi-fluorescence set (relay box and control box B) | |
| | DS-L3 | NIS-Elements | DS-L3 | NIS-Elements |
| Zoom magnification | ○ | ⊙ | ○ | ○ |
| Focusing | ○ | ⊙ | — | — |
| Objective (with nosepiece) | ○ | ○ | ○ | ○ |
| Diascopic LED illumination stand (ON/OFF, light intensity control) | ○ | ⊙ | ○ | ⊙ |
| Fluorescence illuminator (light intensity control) | ○ | ⊙ | ○ | ⊙ |
| Filter cube | ○ | ⊙ | ○ | ○ |

For other combinations, please confirm with Nikon.

* With NIS-Elements F (Free package), functions above are not available. Use NIS-Elements D/Br/Ar.

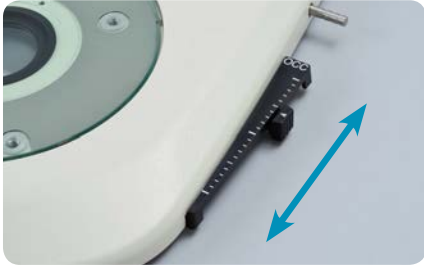
Improved observation efficiency

Easy-to-use OCC illumination

SMZ25

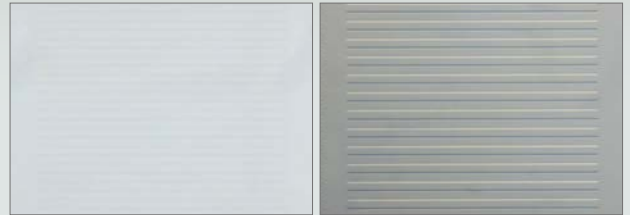
SMZ18

The new LED DIA Base with built-in OCC illuminator generates minimal heat, consumes little power and has a long life. The illuminator also enhances the contrast of uneven surfaces, such as those of film.



The OCC illuminator can be controlled using a slide lever. Thanks to scales on the slide lever, the user can save and reproduce desired illumination levels. In addition, an OCC plate can be inserted into the illumination unit from the front and rear sides, so images with different shadow direction can be observed.

Comparison images (film)



Conventional diascope illumination OCC illumination

What is OCC illumination?

OCC stands for oblique coherent contrast, a form of oblique lighting method developed by Nikon. Compared to conventional diascope illumination that illuminates directly from below, OCC illumination applies coherent light to samples in a diagonal direction, adding contrast to colorless and transparent sample structures.

User-friendly remote control

SMZ25

The all-new remote control provides easy access to zoom and focus controls and is designed for both right- and left-hand use. The remote control contains an LCD monitor with an adjustable backlight that provides at-a-glance information about zoom factor, objective lens, filter cube and LED DIA brightness.



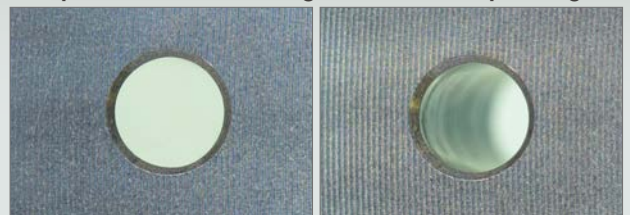
On-axis imaging for digital images

SMZ25

SMZ18

Easily switch between stereo position (stereoscopic view) and mono position (on-axis view) when using the P2-RNI2 Intelligent Nosepiece by simply moving the objective lens.

Comparison of on-axis image and stereoscopic image



On-axis image

Stereoscopic image

Wide range of dedicated accessories for SMZ25/SMZ18 for all types of observation

Base Unit, Focus Unit, Stand/Focus Mount

Base Unit

Nikon has improved ease of use by moving the controls to the front of the base, including the brightness adjustment dial and the on/off switch.

Fiber DIA base

The Fiber DIA base features condenser lenses that can be switched between low and high magnifications. Furthermore, the OCC illumination system allows high-contrast illumination.



1 P2-DBF Fiber Diascopic Illumination Base

Slim Bases

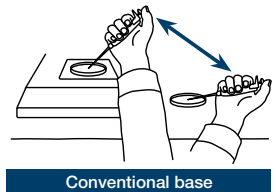
The slimmer LED DIA Base and Plain Base help increase efficiency of sample manipulation by bringing the level of the sample closer to the table.



2 P2-DBL LED Diascopic Illumination Base



3 P2-PB Plain Base



Conventional base



Slim base

Focus Unit

The focus unit is combined with the base unit. Choose from either a manual or motorized focus unit.



1 P2-MFU Motorized Focus Unit

2 P2-FU Focus Unit

Stand/Focus Mount

SMZ18

SMZ18 can be mounted on various compact stands using a focus mount.



1 P2-FMDN Focus Mount
2 P-PS32 Plain Stand

3 P-DSL32 LED Diascopic Illumination Stand

4 P-DSF32 Fiber Diascopic Illumination Stand

SHR Plan Apo Objective Series

The SHR Plan Apo series features higher NA, wider field of view and superior flatness and color aberration correction. These objective lenses can be seamlessly switched because all magnifications have the same parfocal distance. The new bayonet mount design allows lenses to be safely and easily removed.



1 P2-SHR Plan Apo 0.5x
2 P2-SHR Plan Apo 1x
3 P2-SHR Plan Apo 1.6x
4 P2-SHR Plan Apo 2x

| | | SHR Plan Apo 0.5x | SHR Plan Apo 1x | SHR Plan Apo 1.6x | SHR Plan Apo 2x |
|------------------|-------|-------------------|-----------------|-------------------|------------------|
| Maximum NA | SMZ25 | 0.078 | 0.156 | 0.25 | 0.321 |
| | SMZ18 | 0.075 | 0.15 | 0.24 | 0.3 |
| Working distance | | 71 mm | 60 mm | 30 mm | 20 mm |
| Correction ring | | — | — | — | 3 mm water depth |
| Wavelength | | 380-700 nm | | | |

Tubes

Choose from two types of tilting trinocular tube and one type of low eyelevel trinocular tube. All tubes have a camera port for seamless integration with the Digital Sight series.



1 P2-TERG100 Trinocular Tilting Tube (eyepiece: port 100:0 / 0:100)



2 P2-TERG50 Trinocular Tilting Tube (eyepiece: port 100:0/50:50)



3 P2-TL100 Trinocular Tube L (eyepiece: port 100:0 / 0:100)

Nosepiece/Focus Mount Adapter

Both single and double nosepieces are available.



1 P2-RNI2 Intelligent Nosepiece



2 P2-FM Focus Mount Adapter

Stage

The stage features an XY stroke of 6x4* inches (150 mm x 100 mm) and can be attached to any of the bases, making it effective for capturing large images when used in combination with imaging software NIS-Elements. A sliding stage and tilting stage are also available. *Limited Y travel with 32 mm column bases



P-SXY XY Stage

Remote Control

Nikon offers a remote control unit that can be used to operate the microscope and capture images by hand. A footswitch is also available, allowing the user to operate the microscope and capture images by foot, freeing the hands for sample manipulation.



P2-RC Remote Controller



1 AZ-PCR Photo Release
2 AZ-FSW Foot Switch

Darkfield Observation Accessory

Darkfield viewing is possible simply by attaching the darkfield unit to the base.

- 1 P-DF LED Dark Field Unit
- 2 Shading cover



Polarizing Observation Accessory

The analyzer is attached to the objective and the polarizer to the base or stand to enable polarized viewing.

- 1 P2-POL Simple Polarizing Attachment



Epi-fluorescence Set

Motorized Epi-fluorescence Set

The fluorescent turret can be operated using the remote control or imaging software NIS-Elements.

- 1 P2-EFLM Motorized Epi Fluorescence Attachment
- 2 Light shading Plate (comes with Fluorescence Attachment)
- 3 P2-EFL Filter Cube (GFP-B/GFP-L/RFP)
- 4 P2-EFLBF Filter Cube (Bright Field)
- 5 P2-CTLA Control Box
- 6 P2-RC Remote Controller
- 7 P2-CIA QL1x/0.5x 1/4 λ Plate



Combinations with SMZ25

Manual Epi-fluorescence Set

An easy-to-use manual model for Nikon's newly developed high-performance epi-fluorescence attachment.

- 1 P2-EFLI Epi Fluorescence Attachment
- 2 Light shading Plate (comes with Fluorescence Attachment)
- 3 P2-EFL Filter Cube (GFP-B/GFP-L/RFP)
- 4 P2-EFLBF Filter Cube (Bright Field)
- 5 P2-CTLB Control Box
- 6 P2-CIA QL1x/0.5x 1/4 λ Plate



Combinations with SMZ18

Fiber Illuminator Set

Flexible Double Arm Fiber Illumination Set

The direction and angle of illumination can be changed to suit the sample by making adjustments with these double arms. The fiber holder position can also be changed to obtain the optimal position for illuminating samples.

- ① C-FDF Flexible Double Arm Fiber Illumination Unit
- ② C-FIDH Fiber Holder
- ③ C-FLED2 LED Light Source for Fiber Illuminator



Combinations with SMZ18

Ring Fiber Illumination Set

This ring fiber illumination set features an episcopic illumination unit that effectively captures images (can be used with 1x and 0.5x objective lenses).

- ① P2-FIR Ring Fiber Illumination Unit
- ② C-FLED2 LED Light Source for Fiber Illuminator



Combinations with SMZ18

Coaxial Illuminator

The coaxial light illuminator makes it possible to view light reflected from the surface of a sample. It is ideal for shooting shadow-less images of thick samples.

- ① P2-CI Coaxial Epi Illuminator
- ② C-FLED2 LED Light Source for Fiber Illuminator
- ③ P2-CIA QL1x/0.5x 1/4 λ Plate



Combinations with SMZ18

Ring LED Illuminator

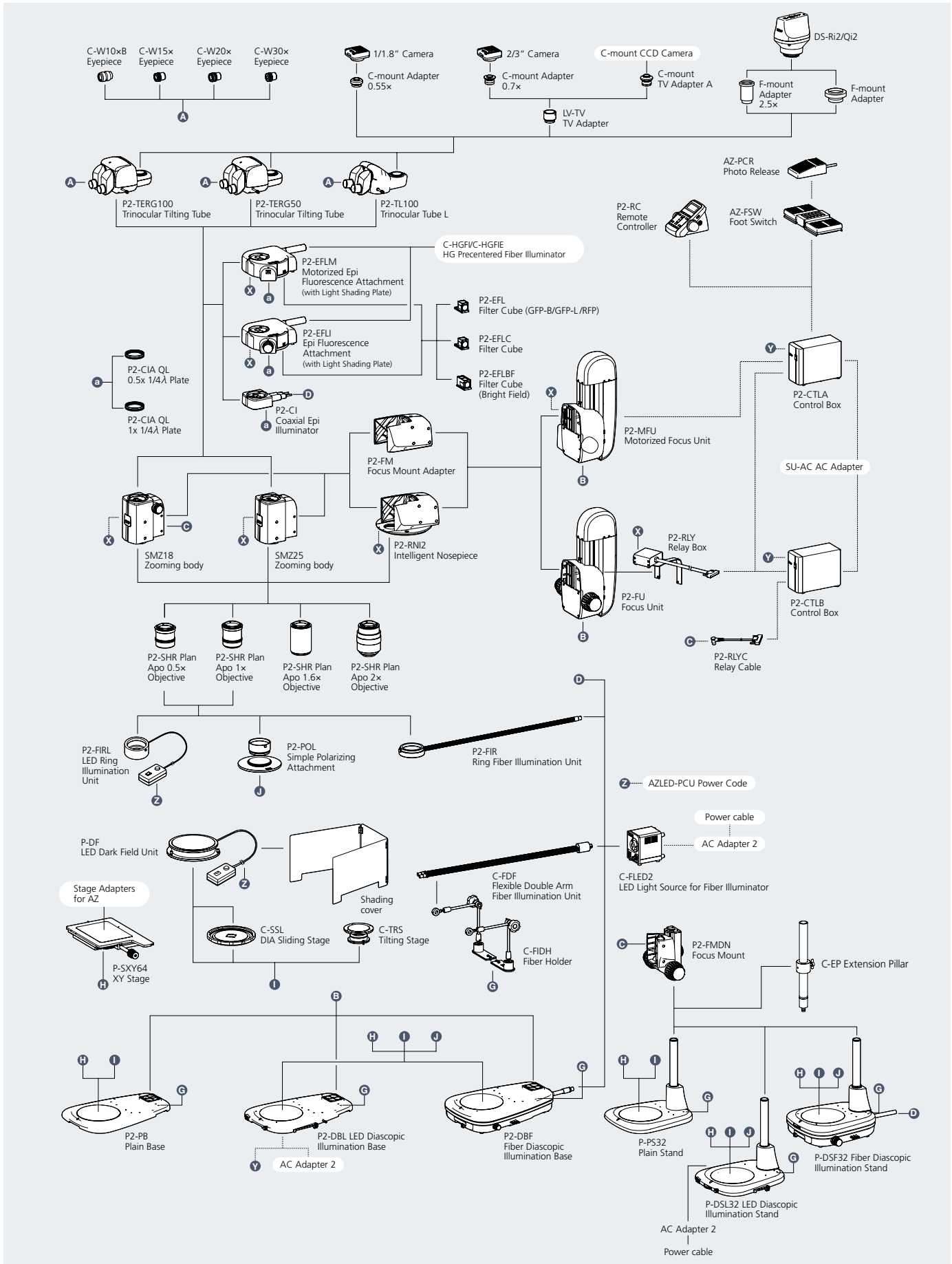
Ring LED illuminator is equipped with high-intensity, long-life (20,000 hours) LEDs. The illuminator's dial adjusts the intensity of the white LED.

- ① P2-FIRL LED Ring Illumination Unit



Combinations with SMZ25

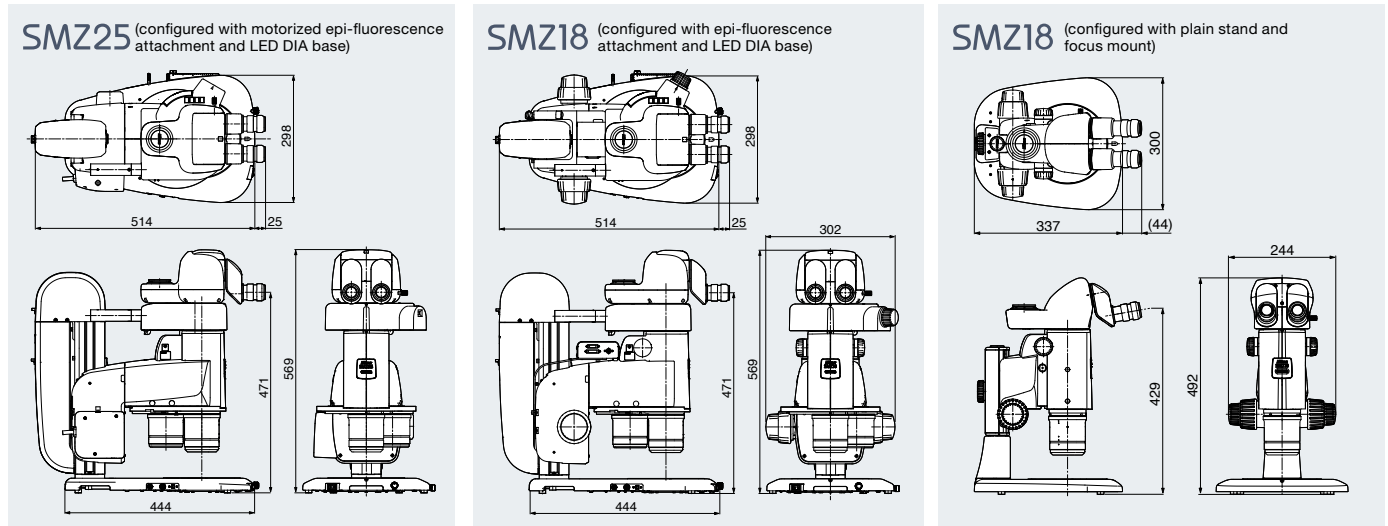
System Diagrams (SMZ25/SMZ18)



Specifications/Dimensions (SMZ25/SMZ18)

| Specifications | | SMZ25 | SMZ18 |
|--|--|---|-------|
| Zooming body | | | |
| Optical system | Parallel-optics type (zooming type), apochromatic optical system | | |
| Zoom | Motorized | Manual | |
| Zoom ratio | 25:1 | 18:1 | |
| Zoom range | 0.63-15.75x | 0.75-13.5x (with 0.75/1/2/3/4/5/6/8/10/12/13.5x click stops) | |
| Aperture diaphragm | Zooming body built-in | | |
| Objectives NA, WD (mm) | | | |
| P2-SHR Plan Apo 2x | 0.312, 20 (with a correction ring for water 0 to 3 mm in depth) | 0.3, 20 (with a correction ring for water 0 to 3 mm in depth) | |
| P2-SHR Plan Apo 1.6x | 0.25, 30 | 0.24, 30 | |
| P2-SHR Plan Apo 1x | 0.156, 60 | 0.15, 60 | |
| P2-SHR Plan Apo 0.5x | 0.078, 71 | 0.075, 71 | |
| Total Magnification (using C-W10xB eyepieces) | 3.15-315x (depending on objective used) | 3.75-270x (depending on objective used) | |
| Eyepieces (F.O.V. mm) | <ul style="list-style-type: none"> • C-W10xB (22) • C-W 15x (16) • C-W 20x (12.5) • C-W 30x (7) | | |
| Tubes (eyepiece/port) | <ul style="list-style-type: none"> • P2-TERG 100 Trinocular Tilting Tube (100/0 : 0/100) • P2-TERG 50 Trinocular Tilting Tube (100/0 : 50/50) Inclination angle : 0-30 degree • P2-TL100 Trinocular Tube L (100/0 : 0/100) Inclination angle : 15 degree | | |
| Focusing Unit (stroke from objective's parfocal point) | <ul style="list-style-type: none"> • P2-MFU Motorized Focus Unit (up 96 mm/down 4 mm) • P2-FU Focus Unit (up 97 mm/down 5 mm) | | |
| Focus mount adapter/nosepiece | <ul style="list-style-type: none"> • P2-FM Focus Mount Adapter • P2-RNI2 Intelligent Nosepiece (2 objectives can be attached) • P2-FMDN Focus Mount (for P-PS32/P-DSL32/P-DSF32 stands) | | |
| Bases/stand | <ul style="list-style-type: none"> • P2-PB Plain Base • P2-DBL LED Diascopic Illumination Base (OCC illuminator built-in) • P2-DBF Fiber Diascopic Illumination Base • P-PS32 Plain Stand (only for SMZ18) • P-DSL32 LED Diascopic Illumination Stand (OCC illuminator built in) (only for SMZ18) • P-DSF32 Fiber Diascopic Illumination Stand (only for SMZ18) | | |
| Stages | <ul style="list-style-type: none"> • P-SXY64 Stage • C-SSL DIA Sliding Stage • C-TRS Tilting Stage | | |
| Observation methods | Bright Field, Epi Fluorescence, Simple Polarizing (with P2-POL Simple Polarizing Attachment), Dark Field (with P-DF LED Dark Field Unit), Oblique Lighting | | |
| Epi-fluorescence attachments | 4 filter cubes mountable, fly-eye lens built-in | | |
| Epi-fluorescence light sources | <ul style="list-style-type: none"> • P2-EFLM Motorized Epi Fluorescence Attachment • P2-EFLI Epi Fluorescence Attachment • HG Precentered Fiber Illuminator Intensilight C-HGFIE HG/C-HGFI HG (130W) • P2-FIRL LED Ring Illumination Unit | | |
| Episcopic illuminators | Use with fiber light source | | |
| Episcopic light source | <ul style="list-style-type: none"> • P2-CI Coaxial Epi Illuminator • P2-FIR Ring Fiber Illumination Unit • C-FDF Flexible Double Arm Fiber Illumination Unit • C-FLED2 LED Light Source for fiber illuminator | | |
| Weight (approx.) | 32 kg (Motorized Epi Fluorescence Attachment configuration with Trinocular Tilting Tube, Motorized Focus Unit, Intelligent Nosepiece, LED DIA Base and Objectives 1x and 0.5x) | 30 kg (Epi Fluorescence Attachment configuration with Trinocular Tilting Tube, Focus Unit, Intelligent Nosepiece, LED DIA Base and Objectives 1x and 0.5x) | |
| Power consumption (approx.) | 30W (Motorized Epi Fluorescence Attachment configuration with Trinocular Tilting Tube, Motorized Focus Unit, Intelligent Nosepiece and LED DIA Base) | 10W (Epi Fluorescence Attachment configuration with Trinocular Tilting Tube, Focus Unit, Intelligent Nosepiece and LED DIA Base) | |

Dimensions



Related Products

Digital Cameras for Microscopes

Camera Head

Microscope Camera

DS-Ri2 **NEW**

16.25-megapixel Color High-resolution



Monochrome Microscope Camera

DS-Qi2 **NEW**

16.25-megapixel Monochrome Cooled

* DS-Ri2 and DS-Qi2 do not require DS-U3 and DS-L3.

High-definition color camera head

DS-Fi2

5.0-megapixel Color High-resolution

High-definition cooled color camera head

DS-Fi1c

5.0-megapixel Color Cooled High-resolution

High-speed color camera head

DS-Vi1

2.0-megapixel Color



PC-use Control Unit

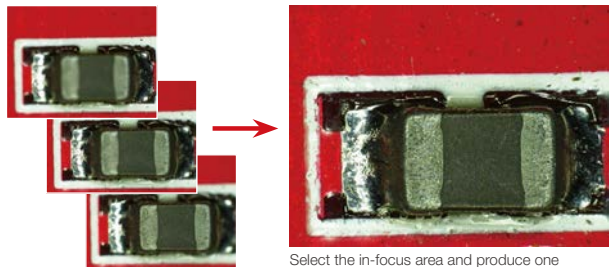
DS-U3 + **NIS-Elements** Imaging Software

Enables a wide range of advanced digital imaging capabilities using a PC

EDF (Extended Depth of Focus)

option: Ar Br D

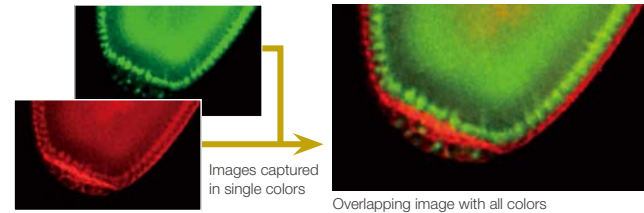
Captures multiple high-resolution images at different focal depths to create a single extended depth of focus image or quasi-3D image.



Select the in-focus area and produce one all-in-focus image

Multichannel (multicolor)

Multiple fluorescent channels can be captured in conjunction with other imaging methods, such as OCC or brightfield.



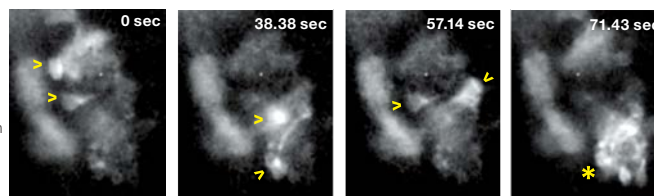
Individual cells resolved in a live drosophila embryo expressing GFP and mCherry

(Using SHR Plan Apo 2x at zoom magnification of 8x with SMZ25)
Image courtesy of Max V. Staller, Ph.D., Clarissa Scholes, and Angela DePace, Ph.D., Harvard Medical School

Time lapse

NIS-Elements makes it easy to set up a time-lapse imaging experiment.

(Using SHR Plan Apo 2x at zoom magnification of 9x with SMZ25 and camera head DS-Qi1)
Image courtesy of Joe Fetcho, Ph.D., Cornell University



Calcium-imaging: Time-lapse imaging of GCaMP expressing neurons inside a live zebrafish shows individual neurons firing at different times (arrowheads). The last time-frame shows a whole cluster of neurons firing (asterisk).

Standalone Control Unit

DS-L3



Offers an easy-to-use high-definition, large-touch-panel monitor that can be used to quickly capture images without the use of a PC or monitor.

Scene mode

Optimal imaging parameters for each sample type and observation method can easily be set using the icons.

| Scene mode (bioscience) | Scene mode (industrial) |
|--|-------------------------|
| Darkfield/fluorescence | Wafer/IC-chip |
| Differential interference/phase contrast | Metal/ceramic |
| Brightfield | Board |
| HE staining | FPD |
| Enzyme labeled antibody method | |

Various tools

Simple measurements of acquired image are possible, allowing lines and comments to be added to image data. In addition, data storage and output functions for a wide range of applications are available.

Measurement function

- Distance
- Perpendicular
- Distance between circle centers
- Angle
- Circle (perimeter/diameter)
- Area
- Pitch distance

Scale display/positioning functions

- SCALE
- XSCALE
- GRID
- XY MEAS
- X HAIRS

Drawing functions

- Count mark
- Text input
- Free curved line

Optical Systems

Parallel-optics type (zooming type)

This system has a parallel optical path into which various intermediate tubes, including a beam splitter, coaxial episcopic illuminator, epi-fluorescence attachment, teaching head, drawing tube and eye-level riser, can be inserted.

Greenough type (zooming type)

Allows a compact body that is suited for incorporation into other devices.

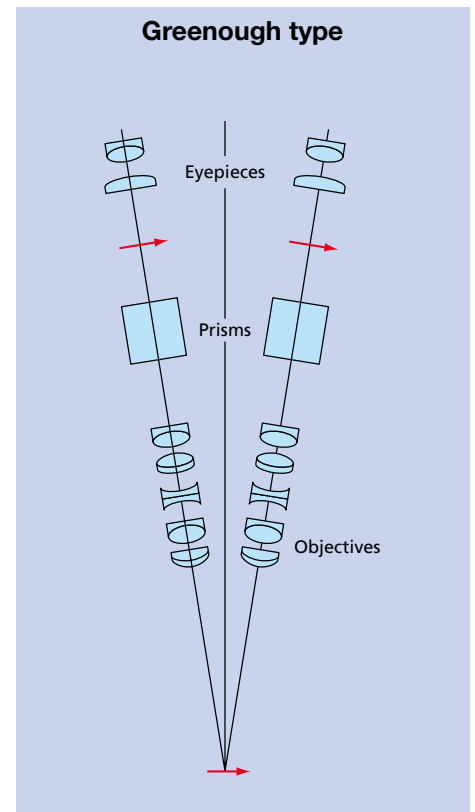
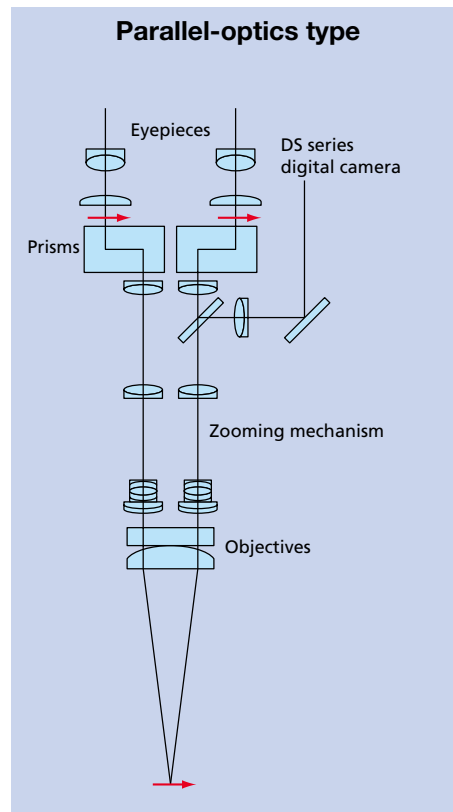


Image used in page 2 composite image courtesy of Julie C. Canman, Ph.D., Columbia University

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*Products: Hardware and its technical information (including software)

Specifications and equipment are subject to change without any notice or obligation on the part of the manufacturer. March 2015

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|--|----------------|--|
|  | WARNING | TO ENSURE CORRECT USAGE, READ THE CORRESPONDING MANUALS CAREFULLY BEFORE USING YOUR EQUIPMENT. |
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