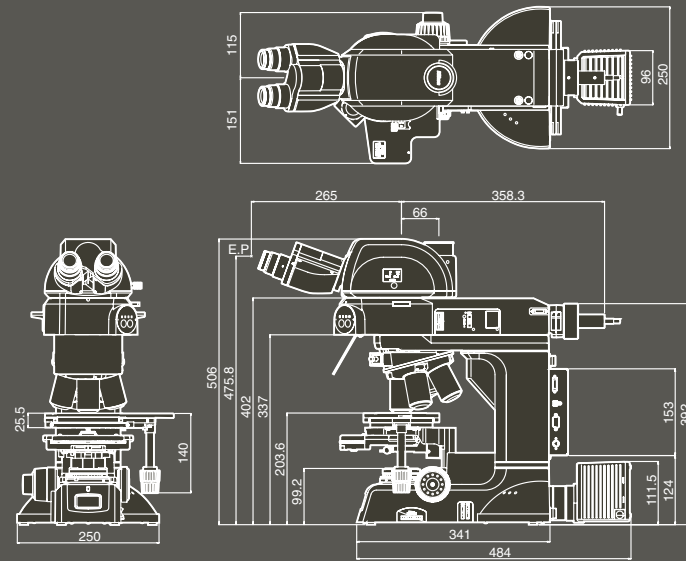


Dimensions

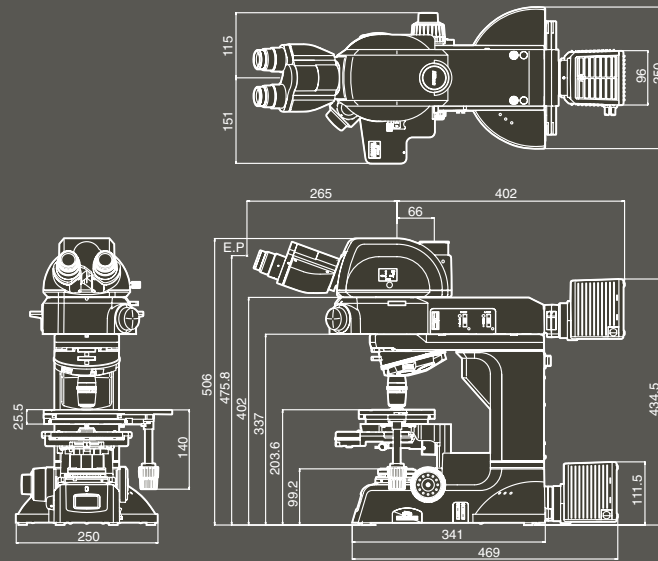


LV100DA-U



LV100DA-U+LV-TT2+LV-UEPI2A+LV-S32

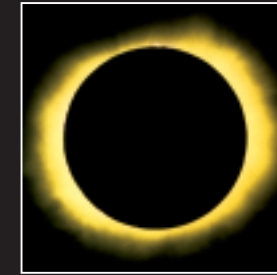
LV100D-U



LV100D-U+LV-TT2+LV-UEPI2+LV-S32



Industrial Microscopes
ECLIPSE LV100D-U/LV100DA-U/LVDIA-U



ECLIPSE

LV-UDM

Universal Design Microscope



LV100D-U/LV100DA-U

CFI60

90th Anniversary

Specifications and equipment are subject to change without any notice or obligation on the part of the manufacturer. May 2007 ©2007 NIKON CORPORATION

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



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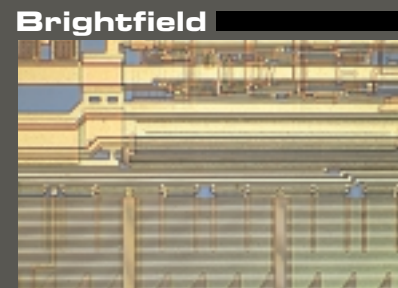


Versatility is Our Solution

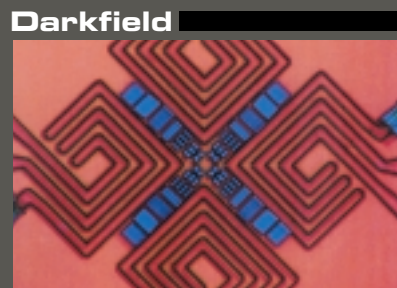
the Visible and the Invisible

The new Eclipse LV100DA-U and LV100D-U bring together Nikon's world renowned CFI60 and CFI LU60 optical systems on one universal microscope platform! Materials ranging from thin films, plastics, fibers, nanoparticles, emulsions, to material science, metallography, FPDs and microcircuits can be easily visualized and documented with a single microscope. A true solution for both routine and R & D applications.

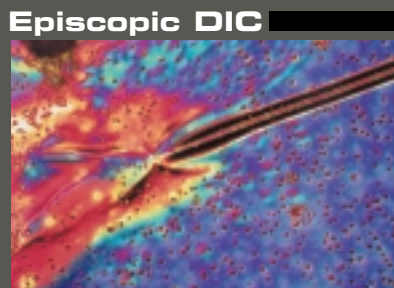
Universal - Nosepiece and Condenser
 Design - Advanced Observation Methods
 Microscope - Motorized and Manual



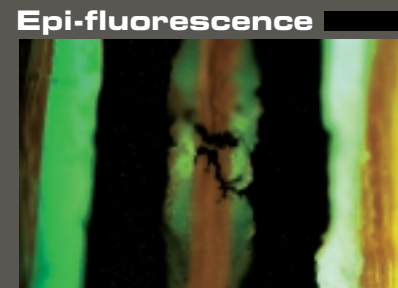
Brightfield
Semiconductor (wafer)



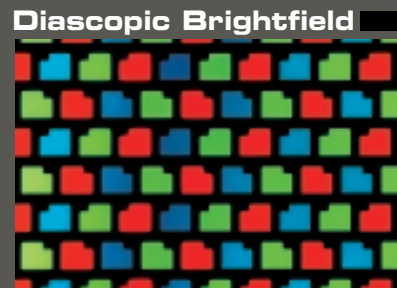
Darkfield
Carbon nanotubes
Photo courtesy of Dr. Jacques Lefebvre and Dr. Pedro Barrios of the National Research Council of Canada



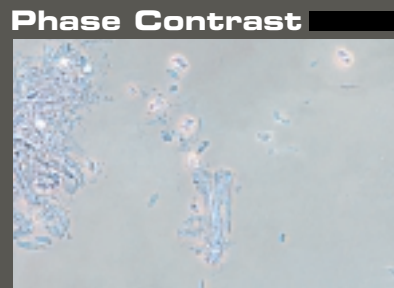
Episcopic DIC
Amorphous selenium
Photo courtesy of Karlene Rosera Maskaly



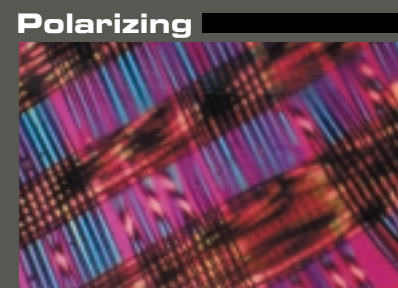
Epi-fluorescence
PCB (ion migration)



Diascopic Brightfield
LCD (color filter)



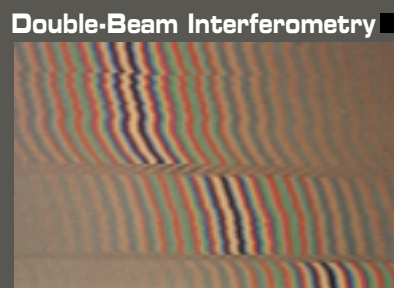
Phase Contrast
Asbestos



Polarizing
Nylon
Photo courtesy of John Auman



Diascopic DIC
Nanoparticle (silver)
Photo courtesy of Dr. Virginia A. Davis and Bennett Marshall of Department of Chemical Engineering, Auburn University



Double-Beam Interferometry
Tourmaline



LV100D-U
(Manual)

LV100DA-U
(Motorized)

Enables a Wide Range of Observation Methods

These microscopes enable a wide range of observation methods by combining illuminator, nosepiece, condenser and objective lenses.

| | Brightfield | Darkfield | DIC | Fluorescence | Polarizing | Phase-contrast | Double-Beam Interferometry |
|-----------|-------------|-----------|-----|--------------|------------|----------------|----------------------------|
| Episcopic | ○ | ○ | ○ | ○ | ○ | — | ○ |
| Diascopic | ○ | ○ | ○ | — | ○ | ○ | — |

Universal Nosepiece

LV-NU5AI Universal Motorized Quintuple Nosepiece

No nosepiece changeover necessary

The LV100DA-U features a newly developed motorized nosepiece. In addition to brightfield and darkfield observation, the LV-NU5AI Universal Nosepiece enables a wide range of observation methods including episcopic and diascope DIC. The LV-NCNT2 motorized nosepiece controller can be used in combination with the LV-NU5AI on the LV100D-U.



Universal Condenser Lens

LV-CUD Universal Condenser Dry

More diascope features

Brightfield, darkfield, DIC, simple Pol and phase contrast observation are all possible. Simply select the condenser position for the method you wish to use.

- Darkfield: D-C Darkfield Ring
- Phase-contrast: D-C PHModule
- DIC: D-C DIC Module Dry

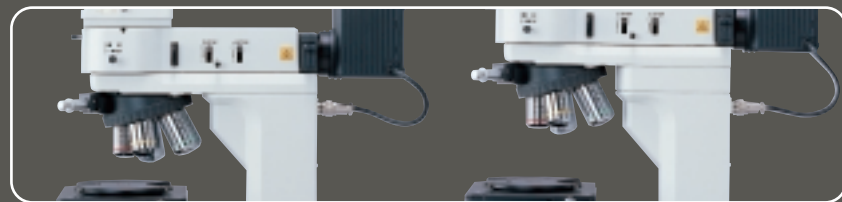


Supports a Wide Range of Samples

Increased maximum sample height

The standard maximum specimen height is 38mm (33mm when combined with the LV-NU5AI nosepiece). Combined with a column riser, it is 73mm (or 68mm with the nosepiece), and with a combination of the LV-DIA-U DIA Base U and LV-FM FM module, specimens with a height up to 102mm (or 97mm) can be accommodated.

* With diascope illumination, the maximum specimen height depends on the focal length of the condenser used.



Without column riser

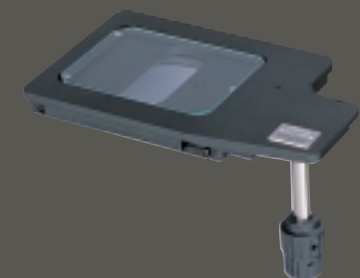
With column riser



LV-DIA-U+LV-FM

Accepts various stages

In addition to the LV-S32 3x2 Stage, users can select a wide variety of stages according to their needs, including the LV-S64 6x4 Stage for larger specimens, or the LV-SRP Fine Rotating Stage for polarized light microscopy.



LV-S32 3x2 Stage

LV-S32 3x2 is a compact stage for industrial microscopes. Its triple-plate design ensures durability, stability and ease of use, even when heavy samples such as metallic materials are observed. The standard glass plate makes this stage suitable for episcopic and diascope illumination.



LV-S32PL
ESD Plate



LV-S32SGH
Slideglass Holder

High-Intensity 12V-50W Halogen Light Source: LV-LH50PC Precentered Lamphouse

Although the LV-LH50PC Precentered Lamphouse is 12V-50W, the brightness is equivalent to or higher than that of 12V-100W. The low power-consumption halogen light source contributes to the compact design of the microscope while also being friendly to the environment. Defocus induced by heat is substantially reduced.



HG Precentered Fiber Illuminator—Intensilight (for LV-UEPI2/LV-UEPI2A)

The use of the Intensilight precentered fiber illuminator eliminates the need for centering and focus adjustment, even after the lamp is replaced. Because the light source can be placed away from the microscope, heat and electrical noise to the microscope body is reduced. Six levels of light intensity from 3% to 100% are available, including a built-in shutter. The lamp lasts an average of 2,000 hours, reducing replacement frequency and cost. Both manual (C-HGFI) and motorized (C-HGFIE) models are available. The C-HGFIE should be used in combination with the LV100DA-U. The motorized model can be controlled from an optional dedicated remote controller or a PC with Nikon's NIS-Elements imaging software installed. It can also be controlled directly from the microscope itself.



C-HGFIE (motorized)

Why is 50W brighter than 100W?

Image brightness is not determined by wattage. Nikon's new light source delivers greater brightness by optimizing the lamp filament size and improving pupil illumination fulfillment by optically expanding the size of the light source. This has resulted in a 50W light source that is brighter than a 100W lamp. With 50x or higher objectives, brightness is about 20% greater under episcopic illumination, 40-50% greater with diascope illumination, than previous Nikon illuminators.

Clear, aberration-free images are the standard.

The LV series utilizes Nikon's world renowned CFI60 & CFI LU60 infinity optics to provide world-class optical performance, with the highest levels of resolution, contrast, and transmission and longer working distances. Clear, aberration-free images are the standard.

CFI Plan Fluor

CFI Plan Fluor objectives have high transmission throughout the entire visible spectrum including applications that require IR and UV. These objectives can be used in all transmitted light applications including brightfield, Darkfield, DIC, simple Pol and epifluorescence. They are designed for use with specimens using standard coverslips unlike the CFI LU Plan Fluor objectives, which are designed for uncovered or opaque materials. A number of these objectives have correction collars which can compensate for glass windows up to 2mm thick with long working distances for chamber applications.



CFI Plan Fluor

CFI LU Plan Fluor

CFI LU Plan Fluor lenses have high transmittance in the ultraviolet region, making them suitable for use with many methods including episcopic/diascope brightfield, episcopic/diascope darkfield (only BD objective lens for episcopic darkfield), episcopic DIC, simple polarization, and epifluorescent (visible/UV) observation. They are designed for use without a coverglass.



CFI LU Plan Fluor

CFI P Acromat

CFI POL Achromat lenses are strain free and designed for quantitative transmitted polarized light applications. They are designed for use with coverslipped specimens.



CFI P Acromat

CFI Plan Fluor DL/DLL

CFI Plan Fluor DL/DLL lenses provide phase contrast observation. Phase Contrast allows for observation of transparent or low contrast materials such as plastics, fibers and emulsions. They can be used for other applications such as brightfield, fluorescence and DIC with very acceptable results. They are designed for use with coverslips.



CFI Plan Fluor DL/DLL

CFI LU Plan EPI P

CFI LU Plan EPI POL are strain free and designed for quantitative reflected and transmitted polarized light applications with materials that have no coverslip.



CFI LU Plan EPI P

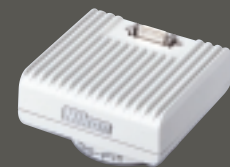
Optimized Digital Image Capture

The motorized model LV100DA-U meets all requirements for digital imaging, analysis, Z stacks, Extended Depth of Focus (EDF) and archiving among others. Used in conjunction with the motorized universal episcopic illuminator LV-UEPI2A, digital cameras DS-Fi1 or DS-2Mv with control units DS-L2 or DS-U2, and Elements imaging software, observation methods and illumination conditions can be optimized for image capture. The LV100DA-U also supports external quantitative control, and data communication and control of the magnification information required for measurement functions and display of scale.



LV100DA-U+DS-Fi1+DS-U2

Camera Heads



High-definition color camera head

DS-Fi1

5-megapixel high-definition color. The DS-Fi1 offers advanced performance, including a high dynamic range and superior red sensitivity, and is optimal for brightfield, darkfield, phase contrast, and DIC image capture.



High-speed color camera head

DS-2Mv

The DS-2Mv features a 2-megapixel color CCD with a high frame rate. This camera head enables the smooth display of live images and high quality still images.

*See the Digital Sight series catalog for more information.

Stand-alone Control Unit

DS-L2

The DS-L2 features a large high-definition LCD and a host of features. There is no need for a PC and monitor, which allows the system to be used with a flick of a switch.



An extensive array of tool functions

Users can measure captured images and enter line contrast and other settings using the overlay. Users can also save data in image files and output measurement data.

Measurement and alignment function

Measurement and alignment is possible by standard-length calibration (up to seven types can be registered).

Scale display/alignment functions



Measurement functions



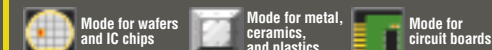
Drawing functions

Users can input and display lines, comments, and other useful elements.

- Straight lines (Arrows can be set.)
- Curves
- Count markers
- Text entry
- Superimposition (semitransparent image overlay for comparative purposes)

Scene mode

The unit features three scene modes for industrial samples. These modes all offer capture conditions optimized for the particular sample type. Users can also register up to seven freely configurable custom modes.



Microscope Control Function (option)

Enables microscope control (including motorized nosepiece and Z focus) via the LV100 DA-U GUI. Detection of magnification is possible through the intelligent nosepiece.



LV100DA-U GUI

PC-based Control Unit

DS-U2

The DS-U2 enables everything from live image display, advanced image processing, analysis to capturing on a computer. It supports a wide range of applications.

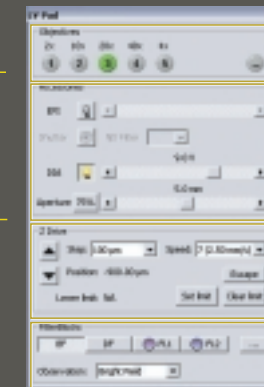


Simple connection with high-speed USB 2.0

The unit employs a USB 2.0 interface for easy connection with a PC.

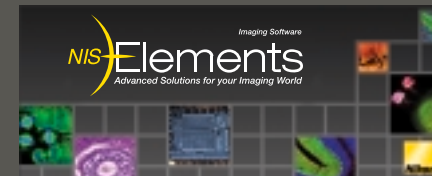
Microscope Control Function

Enables microscope control (including motorized nosepiece and Z focus) via the LV PAD. Detection of magnification is possible through the intelligent nosepiece.



Microscope control window (LV-Pad)

- A Objective Magnification
- B Accessories
- C Motorized Z Focus
- D Filter block



NIS-Elements Series of Newly Developed Imaging Software

The NIS-Elements series is used for the control software. This software allows the user to perform everything from basic image capture to the measurement, analysis, and management of captured images. Users can add a wide array of the plug-ins to basic packages according to their intended use.

F NIS-Elements F Package

This package enables display of a scale over a live image, switching to full-screen display, and other functions. It allows the user to easily capture images with a simple intuitive control screen.

D NIS-Elements Documentation

This package provides functions for performing measurements and creating reports. Use it for general microimage capture in the industrial field. Expandability is also possible by adding plug-ins, such as EDF and databases.

Br NIS-Elements Basic Research

In addition to the measurement function and report-generating function of NIS-Elements Documentation, this package enables automatic object measurement by creating a binary image. Expandability is also possible by adding plug-ins, such as EDF and databases.

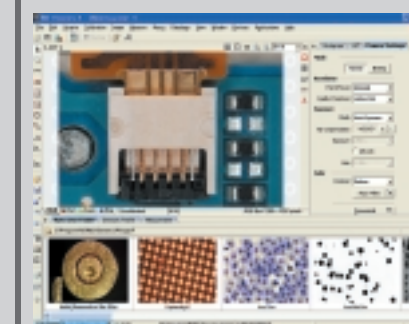
Operating environment

The following PC environment is recommended for maximizing the performance of NIS-Elements.

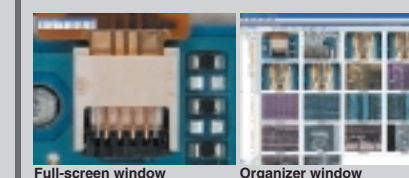
| | |
|-----------------|---|
| CPU | 3.2GHz Intel® Pentium® IV processor or better |
| RAM | 1GB or more |
| OS | Microsoft® Windows® XP SP2 (English version) |
| Hard disk space | 600MB or more required for installation |
| Display | 1280 x 1024 dots or better (TrueColor mode) |

Application window

Freely select the window layout according to the purpose at hand.



Docked controls window



Full-screen window

Organizer window

Measurement

Measure quantity, length, radius, angle, area, and pixel intensity profile.

Report generator

Create reports containing images, database descriptions, and measured data. PDF files can be created directly from NIS-Elements.



EDF (Extended Depth of Focus):

Create an all-in-focus image and a 3D surface image from images that have been captured in a different Z-axis.





Episcopic DIC (motorized nosepiece)

- 1 LV-NU5AI Universal Motorized Quintuple Nosepiece
- 2 LV-UPO Polarizer
- 3 LV-FLAN FL Analyzer
- 4 LV-λP λPlate
- 5 LV-DIC Slider Position A
- 6 LV-DIC Slider Position B
- 7 LV-DIHC Slider (High Contrast) Position A
- 8 LV-DIHC Slider (High Contrast) Position B
- 9 CFI LU Plan Fluor EPI Objectives



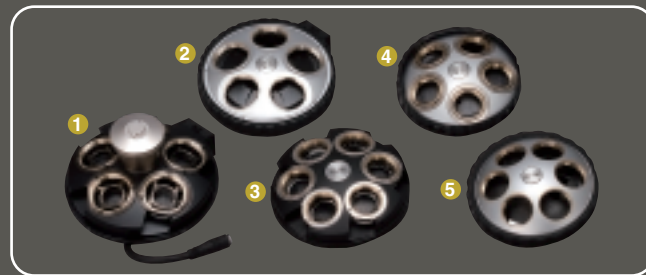
Diascopic DIC (motorized nosepiece)

- 1 D-DP DIC Rotatable Polarizer
- 2 D-C DIC Module N1 Dry
- 3 D-C DIC Module N2 Dry
- 4 LV-CUD LV Universal Condenser Dry
- 5 LV-NU5AI Universal Motorized Quintuple Nosepiece
- 6 LV-FLAN FL Analyzer
- 7 LV-LP λPlate
- 8 D-C DIC Slider 10x, 20x, 40xI, 100xII
- 9 CFI Plan Fluor Objectives



Diascopic DIC (manual nosepiece)

- 1 D-DP DIC Rotatable Polarizer
- 2 D-C DIC Module N1 Dry
- 3 D-C DIC Module N2 Dry
- 4 LV-CUD LV Universal Condenser Dry
- 5 D-ND6 Sextuple DIC Nosepiece
- 6 D-DA DIC Analyzer
- 7 D-LP λPlate
- 8 D-C DIC Slider 10x, 20x, 40xI, 100xII
- 9 CFI Plan Fluor Objectives



Nosepiece

- 1 LV-NU5AI Universal Motorized Quintuple Nosepiece
- 2 L-NBD5 BD Quintuple Nosepiece
- 3 D-ND6 Sextuple DIC Nosepiece
- 4 P-N Centering Quintuple Nosepiece
- 5 C-N Sextuple Nosepiece



Diascopic Darkfield

- 1 LV-CUD LV Universal Condenser Dry
- 2 D-C Darkfield Ring



Diascopic Phase Contrast

- 1 LV-CUD LV Universal Condenser Dry
- 2 D-C DIC PH-1 Ring
- 3 D-C DIC PH-2 Ring
- 4 D-C DIC PH-3 Ring
- 5 CFI Plan Fluor DL/DLL Objectives



Polarizing

- 1 LV-SRP Fine R Stage
- 2 P-AMH Mechanical Stage
- 3 P-N Centering Quintuple Nosepiece
- 4 P-TT2 Trinocular tube
- 5 P-CB Berek Compensator
- 6 C-SP Simple Polarizer
- 7 P Achromat Condenser
- 8 P-CL λPlate
- 9 P-I Intermediate tube
- 10 Filter 546/12-45mm for retardation measurement
- 11 Filter 45mm GIF
- 12 LV-PO Polarizer
- 13 P-CS Senarmont Compensator
- 14 P-CQ Quartz Wedge
- 15 CFI LU Plan Fluor EPI P Objectives



Base Unit

- 1 LV-DIA-U DIA Base U

| | LV100DA-U | LV100D-U |
|---------------------------------|---|--|
| Base unit | Baseless type (a column riser can be added between the arm and stand) Maximum sample height 33mm (using the LV-NU5AI U5AI nosepiece and LV-S32 3x2 stage or LV-S64 6x4 stage) / 68mm when using a column riser Integral 12V50W power supply for light adjustment Uniaxial coarse and fine refocusing handle Left: Coarse refocusing/ Right: Fine refocusing Stroke 40mm Coarse focusing 14mm per rotation (with torque adjustment and refocusing mechanism) Fine focusing 0.1mm per rotation (1μm/scale) | Baseless type (a column riser can be added between the arm and stand) Maximum sample height 38 mm (using the D-ND6 DIC nosepiece and LV-S32 3x2 stage or LV-S64 6x4 stage) / 73mm when using a column riser Integral 12V50W power supply for light adjustment Uniaxial coarse and fine focusing handle Left: Coarse focusing/ Right: Fine focusing Stroke 40mm Coarse focusing 14mm per rotation (with torque adjustment and refocusing mechanism) Fine focusing 0.1mm per rotation (1μm / scale) |
| Interface | Motorized nosepiece: LV-NU5AI U5AI nosepiece Episcopic illuminator: LV-UEPI2A, HG precentered fiber illuminator: C-HGFIE (PC controlled) Microscope digital camera controller: DS-L2, DS-U2 (NIS-ELEMENTS) | |
| Nosepiece | LV-NU5AI U5AI nosepiece (Heavy duty motorized universal 5-hole with anti-flare function) | D-ND6 DIC nosepiece (Universal 5-hole), L-NBD BD5 nosepiece (Bright/darkfield 5-hole nosepiece: With anti-flare function), C-N6 nosepiece (Brightfield 6-hole), P-N6 nosepiece (Brightfield 6-hole) |
| Episcopic Illuminator | LV-UEPI2A 12V50W high-brightness halogen lamp illuminator HG precentered fiber illuminator: C-HGFIE (with light adjustment: PC controlled) Motorized operation and control of the illumination switching turret Bright/darkfield switching and linked motorized aperture stop (with centering: automatic optimization for the objective lens used) and field stop (with centering) φ25mm filters can be inserted (NCB11, ND16, ND4) Polarizer/analyzer, λplate, and excitation light balancer can be inserted | LV-UEPI2 12V50W high-brightness halogen lamp illuminator HG precentered fiber illuminator: C-HGFI (with light adjustment) Bright/darkfield switching and linked aperture stop (with centering) and field stop (with centering) * With a function for optimizing lighting conditions by switching among brightfield, darkfield, and epifluorescent observation φ25mm filters can be inserted (NCB11, ND16, ND4) Polarizer/analyzer, λplate, and excitation light balancer can be inserted |
| Diascopic Illuminator | 12V50W high-brightness halogen lamp illuminator (Fly Eye optical system), field stop, integral filter (ND8, NCB11) | |
| Lens tube | LV-TI3 trinocular eyepiece tube (Erected image, FOV: 22/25), LV-TT2 TT2 tilting trinocular eyepiece tube (Erected image, FOV: 22/25), Y-TB binocular lens tube (Inverted image, FOV: 22) | |
| Stage | LV-S32 3x2 stage (Stroke: 75x50 mm with glass plate) / LV-S32SGH slide glass holder / C-SRR right handle stage (Stroke: 78x54mm) C-HL 2L holder, C-HC11C holder / C-SR2 right handle stage (Stroke: 78x54 mm: Used with stage adapter LV-SAD) / LV-S64 6x4 stage (Stroke: 150x100mm with glass plate) / LV-SRP P revolving stage / P-GS2 revolving stage: Used with stage adapter LV-SAD | |
| Condenser | LV-CUD U Condenser Dry (brightfield, darkfield, phase contrast, DIC), LWD Achromat, Achromat 2-100 Slide, and others | |
| Eyepieces | CFI eyepiece series | |
| Objective lens | CFI ₆₀ optical system Objective lens series: Combinations in accordance with the method | |
| Electrostatic Decay Time | 1,000 to 10V, within 0.2 sec. (excluding certain accessories) | |
| Power consumption | 1.2A/90W | 1.2A/75W |
| Weight (Main Body) | Approximately 10kg | Approximately 9.5kg |

Objective Lens Chart

| | | Episcopic illumination | | | | | |
|-----------------------|---------------------|------------------------|-----------|-----|------------|------------------|----------------------------|
| | | Brightfield | Darkfield | DIC | Polarizing | Epi-fluorescence | Double-beam interferometry |
| CFI LU Plan Fluor EPI | without cover glass | ○ | — | ○ | ○ Simple p | ○ | — |
| CFI LU Plan Fluor BD | | ○ | ○ | ○ | ○ Simple p | ○ | — |
| CFI LU Plan EPI P | | ○ | — | ○ | ○ | ○ | — |
| CF Plan EPI TI/DI* | | TI/○ DI/— | — | — | — | — | ○ |
| CFI Plan Fluor | with cover glass | — | — | — | — | ○ | — |
| CFI Plan Fluor DL/DLL | | — | — | — | — | ○ | — |
| CFI Plan | | — | — | — | — | ○ | — |
| CFI Plan DL | | — | — | — | — | — | — |
| CFI P Acromat | | — | — | — | — | ○ | — |

| | | Diascopic illumination | | | | |
|-----------------------|---------------------|------------------------|-----------|----------------|------------|-----|
| | | Brightfield | Darkfield | Phase-contrast | Polarizing | DIC |
| CFI LU Plan Fluor EPI | without cover glass | ○ | ○ | — | ○ Simple p | — |
| CFI LU Plan Fluor BD | | ○ | ○ | — | ○ Simple p | — |
| CFI LU Plan EPI P | | ○ | ○ | — | ○ | — |
| CFI Plan Fluor | with cover glass | ○ | ○ | — | ○ Simple p | ○ |
| CFI Plan Fluor DL/DLL | | ○ | ○ | ○ | — | — |
| CFI Plan | | ○ | ○ | — | — | — |
| CFI Plan DL | | ○ | ○ | ○ | — | — |
| CFI P Acromat | | ○ | ○ | — | ○ | — |

* Parfocal distance is 45mm. A separate adapter is required.

System Diagram

