



Industrial Microscopes  
ECLIPSE LV150/LV150A/LV100D/LV100DA  
LV Focusing Modules  
LV-IM/LV-IMA/LV-FM/LV-FMA



**ECLIPSE**

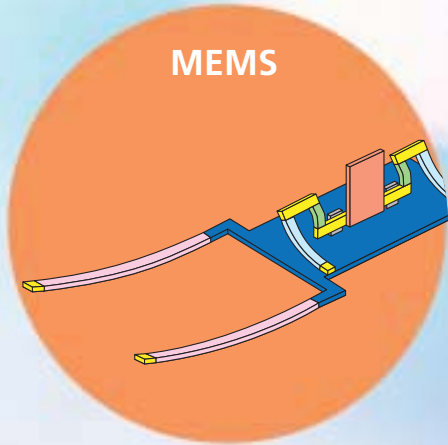
**Industrial Microscopes**

**LV150/LV150A  
LV100D/LV100DA**

**LV Focusing Modules**

**LV-IM/LV-IMA  
LV-FM/LV-FMA**



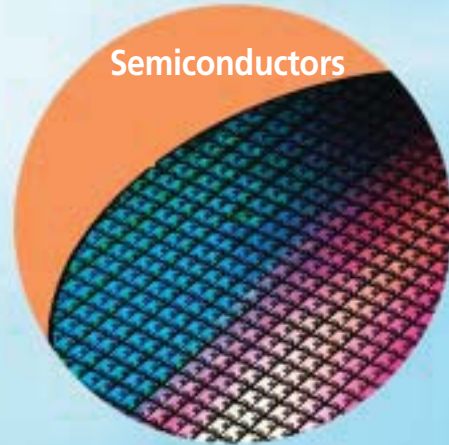


**MEMS**

- Printer heads
- Micro sensors
- Optical switches
- GMR heads for HDD

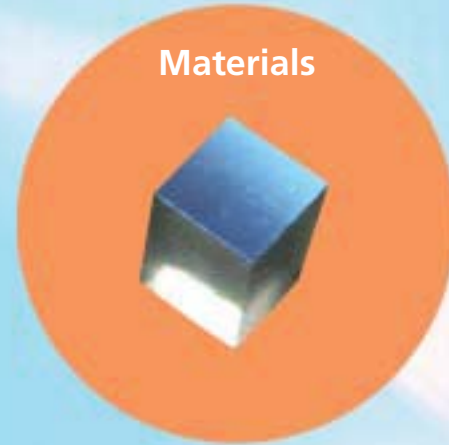


**Versatility**



**Semiconductors**

- Bare wafers
- Lithography process
- Probe, test processes
- Post-dicing

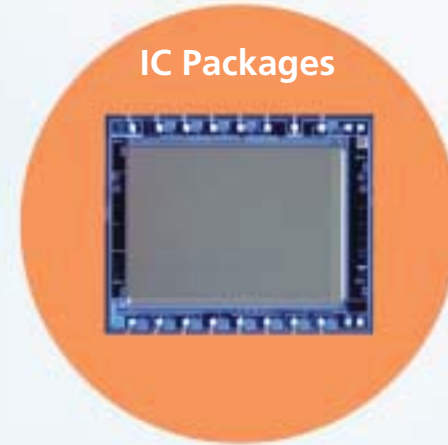


**Materials**

- Macromolecules, monomeric materials
- Organic/inorganic materials
- Polymers
- Thin film
- Magnetic materials
- Crystals
- Metallography



**Extend Your Vision**



**IC Packages**

- LF/TAB
- WL-CSP
- QFP
- SIP
- BGA, CSP, FC



**Casts and Parts**

- OA equipment parts
- Cell phones, PDAs, DSC, PC parts
- Automobiles, aeronautics



**LV150/LV150A**



**LV100D**



**LV100DA**

(To be released in Feb. 2006)



**LV-IM/LV-IMA  
LV-FM/LV-FMA**

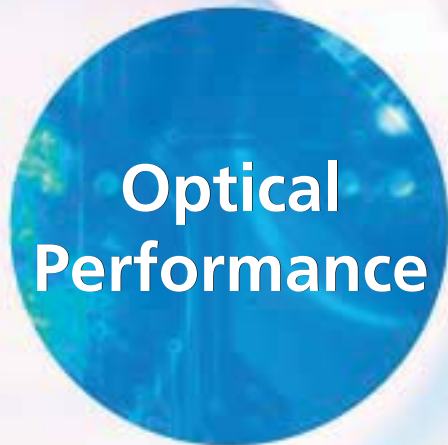
(To be released in Feb. 2006)

**A versatile microscope system with a modular design**

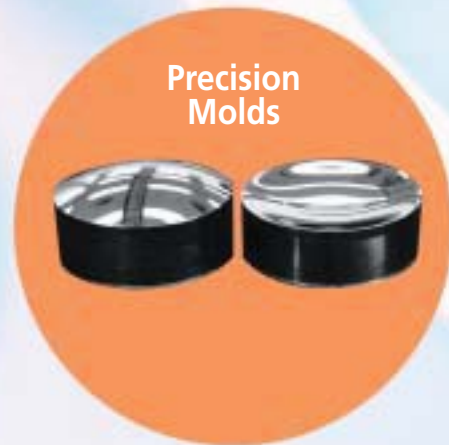


**PCB**

- Medium/small PCB
- FPC
- Interposer substrates



**Optical Performance**



**Precision Molds**

- Precision molds

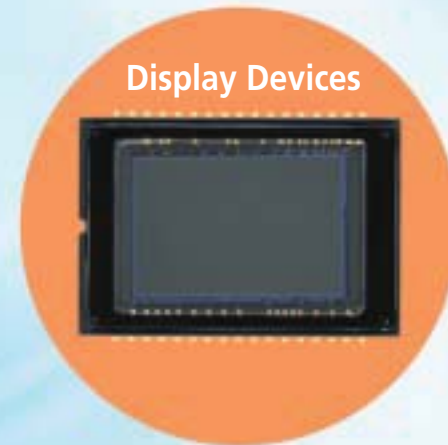


**FPD**

- LCD, color filters
- Polarizing filters
- Organic EL



**Improved Performance**



**Display Devices**

- CCD
- CMOS
- LCOS
- DMD

# Versatility

The modular design of the Eclipse LV series allows an unprecedented level of versatility. The Eclipse LV series offers flexibility that enables it to cover a wide variety of products and applications, extending from development and quality control to inspection in the manufacturing process. Users will recognize the superb performance of the Eclipse LV series when inspecting semiconductors, FPD, packages, electronics substrates, materials (material science), medical devices, cast/metallic/ceramic parts, precision molds, MEMS, telecommunications devices, and a wide variety of other samples.

## Modular Design

Major parts of the microscope main body—arm, stand, base, etc.—have been modularized for greater flexibility according to use. The LV-ARM Basic Arm, LV-FM FM Module, LV-FMA FM Module A, LV-EPI Epi Base, and LV-DIA Dia Base can be freely combined or incorporated into the system.



LV-ARM Basic Arm



LV-FMA FM Module A (motorized)



LV-FM FM Module (manual)



LV-EPI Epi Base



LV-DIA Dia Base

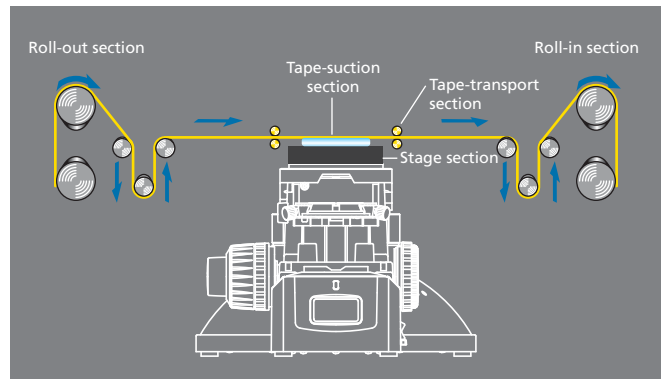
## Modular Design



An example configuration of the LV150

If the LV-DIA Dia Base is used, a diascope illuminator can be incorporated into the system\*.

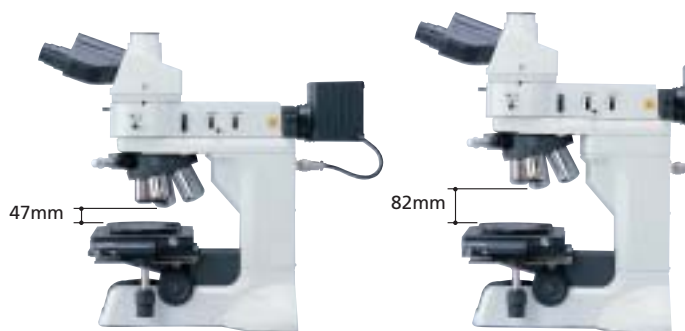
\* An optional power source, the TE2-PS100W, and related options are needed to perform diascope illumination.



An example of the LV-DIA Dia Base incorporated into a tape-transport sample inspection system.

## Accepts Thicker Samples

The maximum sample height can be increased to 82mm from 47mm by inserting the LV-CR Column Riser 35 between the main body and arm of the microscope. This feature is useful for viewing the surfaces of precision molds, optical materials and other thick samples.



Without column riser

With column riser

## Non-Nikon Stages (LV150 or LV150A only)

Use of non-Nikon stages, such as the Suruga Seiki B23-60CR, in combination with the LV-SUB Substage 2 allows the microscope to handle thicker samples of up to 116.5 mm, thereby enabling the observation of fiber ends and other tools.



Combination of LV-150 with LV-SUB Substage 2 and Suruga Seiki B23-60CR stage

## Extensive Range of Industrial Stages and Accessories

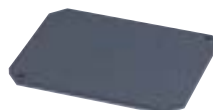
Users can select suitable models based on sample and stage stroke. All stages are highly durable with their triple-plate design.

### Compact Industrial Stage: LV-S32 3x2 Stage

The newly designed 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 diascopic illumination.



LV-S32 3x2 Stage  
Stroke: 75 x 50 mm



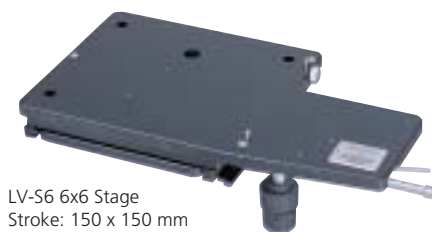
LV-S32PL ESD Plate  
(for LV-S32 3x2 Stage)



LV-S32SGH Slideglass Holder  
(for LV-S32 3x2 Stage)



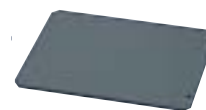
LV-S64 6x4 Stage  
Stroke: 150 x 100 mm



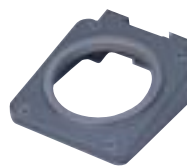
LV-S6 6x6 Stage  
Stroke: 150 x 150 mm



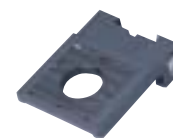
L-S6WH Wafer Holder  
(for LV-S6 6x6 Stage)



L-S6PL ESD Plate  
(for LV-S6 6x6 Stage)



LV-SUB Stage  
(exclusive for LV150/LV150A)



LV-SUB Substage 2  
(exclusive for LV150/LV150A)

Appropriate holder and substage are selected based on sample and stage combination.

## Extend Your Vision

A wide variety of observation methods are available with the Eclipse LV series. Observation with first-order red compensator, UV polarizing, and epi-fluorescence observation with UV excitation, in addition to brightfield, darkfield, DIC, simple polarizing, epi-fluorescence (excitation using visible light) and double-beam interferometry are all possible. A new motorized illuminator has been added to the existing manual type. A 12V-50W halogen light source—equivalent to or even brighter than the 12V-100W type—and a high-intensity mercury fiber light source are available. The inclusion of a compact and lightweight white LED illuminator exclusively for brightfield use gives you the option of selecting the most appropriate combination for your purpose.

### Universal Epi-Illuminator: LV-UEPI

The LV-UEPI universal epi-illuminator enables brightfield, darkfield, simple polarizing and DIC observations. Field and aperture diaphragms are automatically opened when the observation is switched from brightfield to darkfield, and return to their original position when switched back to brightfield.



- Brightfield
- Darkfield
- Simple polarizing
- DIC
- Double-beam interferometry

### Universal Epi-Illuminator 2: LV-UEPI2

The LV-UEPI2 universal episcopic illuminator is equipped with advanced optics suitable for a wide variety of observation methods—brightfield, darkfield, DIC and epi-fluorescence. It allows the operator to concentrate on the observation by automatically maintaining optimal illumination conditions for the aperture diaphragm, shutter, filters, including diffuser and ND filter.



- Brightfield
- Darkfield
- Simple polarizing
- Observation with first-order red compensator
- DIC
- Epi-fluorescence (UV excitation possible)
- UV polarizing epi-fluorescence
- Double-beam interferometry

### Motorized Universal Epi-Illuminator 2: LV-UEPI2A

In this illuminator, the illumination changeover turret and the aperture diaphragm, as well as the illumination voltage control, have been motorized, for accurate reproduction of illumination—therefore, images can be taken under consistent illumination. Aperture is automatically optimized according to the objective and illumination technique in use. It can, however, also be changed manually depending on the sample and purpose.

When configured with the LV100DA microscope, this illuminator can be controlled on the microscope or from the connected PC. Control from the PC is possible when the illuminator is incorporated into the system using the LV-ECON E controller.



- Brightfield
- Darkfield
- Simple polarizing
- Observation with first-order red compensator
- DIC
- Epi-fluorescence (UV excitation possible)
- UV polarizing epi-fluorescence
- Double-beam interferometry

### Optimal Illumination Function

	Field diaphragm	Aperture diaphragm	Shutter	UV-cut filter
BF	Any diameter	Any diameter	Open	Insert
DF	Open	Open	Open	Insert
FL1	Any diameter	Any diameter	Open	—
FL2	Any diameter	Any diameter	Open	—

### LV-PAB PA Cube

With a polarizer and analyzer attached in the shape of a crossed Nicol prism, this cube is used for DIC observations. It is used by installing it into the turret of the LV-UEPI2 or LV-UEPI2A epi-illuminator; to begin observations simply insert a DIC slider into the optical path.



# Extend your vision

## 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.



## High-intensity Mercury Fiber Light Source (for LV-UEPI2/LV-UEPI2A)

Use of the fiber light source eliminates the centering process when replacing the lamp and reduces the influence of heat to the microscope. Brightness can be mechanically adjusted in 5 steps from 0-100%. Two types are available: manual type and PC-control type that enables external control via RS-232C interface. When configured with the LV150A or LV100DA microscope, use the PC-control type that enables control via the LV-ECON controller.



Manual control type

## 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 diasopic illumination, than previous Nikon illuminators.

## LV-EPILED White LED Illuminator

With emphasis on light weight and compact design, this white LED illuminator was specially developed for brightfield use. It is operated via the attached power source controller. By using the LV-ECON E controller, external control is also possible.



## Improved Transmission Rate for UV Wavelength

### CFI LU Plan Fluor series

The transmission rate in the UV wavelength range has been improved for the new CFI LU Plan Fluor series. These objective lenses are suitable for various research, analysis and examination needs, while maintaining Nikon's commitment to high NA and long working distance. Only one kind of objective lens is needed for brightfield, darkfield, simple polarizing, observation with first-order red compensator, DIC and UV epifluorescence observations. These objective lenses, which offer high resolution and easy-to-use performance, can be combined not only with microscopes but also with other equipment for even greater versatility.



CFI60 LU Plan Fluor EPI series



CFI60 LU Plan Fluor BD series

## Objective Lenses with Correction Ring

### CFI L Plan EPI CR series

The CFI60 series now includes the CFI L Plan EPI CR series to cope with the thinner coverglass used in liquid crystal displays, and highly integrated, and dense devices. Coverglass correction can be continuously made from 0 mm up to 1.2 mm (0-0.7 mm and 0.6-1.3 mm for 100x) with the correction ring. The 100x objective lens offers 0.85 high NA, while enabling high-contrast imaging of cells and patterns without being affected by the coverglass.



CFI60 L Plan EPI CR series of objective lenses with correction ring

## Environment Friendly

The eco glass used in the CFI LU Plan Fluor and L Plan EPI CR series does not contain harmful substances such as lead and arsenic.



Without correction (50x)



With correction at 0.7 mm (50x)

## CFI60 Series Objectives

### Brightfield

Model	Magnification	NA	Working Distance (mm)
CFI L Plan EPI	2.5X	0.075	8.8
CFI LU Plan Fluor EPI	5X	0.15	23.5
	10X	0.30	17.5
	20X	0.45	4.5
	50X	0.80	1.0
	100X	0.90	1.0
CFI LU Plan EPI ELWD	20X	0.40	13.0
	50X	0.55	10.1
	100X	0.80	3.5
CFI L Plan EPI SLWD	20X	0.35	24.0
	50X	0.45	17.0
	100X	0.70	6.5
CFI LU Plan Apo EPI	100X	0.95	0.4
	150X	0.95	0.3
CFI L Plan Apo EPI WI	150X	1.25	0.25

### With correction mechanism

Model	Magnification	NA (mm)	Working Distance (mm)	Glass Thickness Correction Range
CFI L Plan EPI CR	20x	0.45	10.9-10.0	0-1.2mm
CFI L Plan EPI CR	50x	0.7	3.9-3.0	0-1.2mm
CFI L Plan EPI CRA	100x	0.85	1.2-0.85	0-0.7mm
CFI L Plan EPI CRB	100x	0.85	1.3-0.95	0.6-1.3mm

### Bright/darkfield

Model	Magnification	NA	Working Distance (mm)
CFI LU Plan Fluor BD	5X	0.15	18.0
	10X	0.30	15.0
	20X	0.45	4.5
	50X	0.80	1.0
	100X	0.90	1.0
CFI LU Plan BD ELWD	20X	0.40	13.0
	50X	0.55	9.8
	100X	0.80	3.5
CFI LU Plan Apo BD	100X	0.90	0.51
	150X	0.90	0.4

## Condensers

Product Name	N.A.	W.D. (mm)
LWD Achromat condenser	0.65	10.2
C-C Slide Achromat condenser 2-100X	0.9	1.2-2.2
C-C Abbe condenser	0.9	1.9
C-C Achromat condenser	0.85	4.2
Darkfield (dry) condenser	0.8-0.95	4

# Improved Performance

Overall performance has been improved with better durability and rigidity.

## Tilting Trinocular Eyepiece Tube



### LV-TT2 Tilting Trinocular Eyepiece Tube

The newly developed LV-TT2 tilting trinocular eyepiece tube (erect image) offers comfort to all users, regardless of their stature or viewing positions. The optical path changeover of 100:0/20:80 allows simultaneous use of monitor.

\*C-mount adapter 0.55x can be directly mounted to LV-TT2 and LV-TI3 for the DS-2M series.

## Thorough ESD Protection



All parts of the microscope that might be touched, including the body, tube and stage, have been insulated. This improves anti-contamination and prevents samples from being harmed by electrostatic, thereby improving yields.

Electrostatic decay time: 1000-10V, within 0.2 sec.

## Highly Durable Motorized Universal Nosepieces



LV-NU5A Nosepiece

LV-NU5AC Nosepiece

### LV-NU5A and LV-NU5AC Nosepieces

Two types of motorized universal quintuple nosepieces are available. The LV-NU5A boasts greater durability thanks to a new click mechanism and control system. The LV-NU5AC comes with a centering mechanism that suppresses image drift during objective changeover. These nosepieces can not only be configured with the LV150A or LV100A microscope, but also incorporated into other devices in combination with the LV-NCNT nosepiece controller and LV-ECON controller.

### Manual Nosepiece

A variety of manual control nosepieces are available to suit all needs.



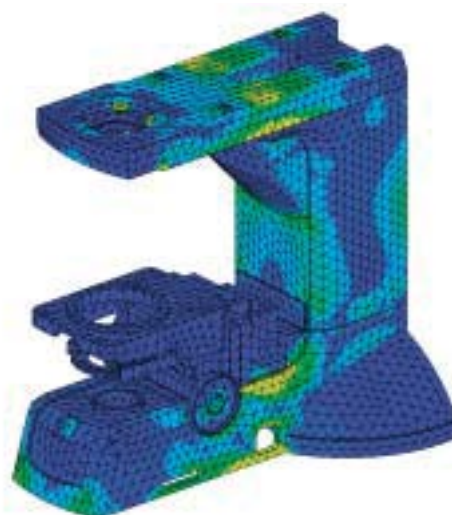
C-N6 Nosepiece (Brightfield)

L-NBD5 Nosepiece (Bright/darkfield)

L-NU5 Nosepiece (Universal)

## Highly Rigid, Vibration-Free Body

The use of structural analysis during the design process has improved rigidity and anti-vibration parameters to yield clear images even at high magnification.



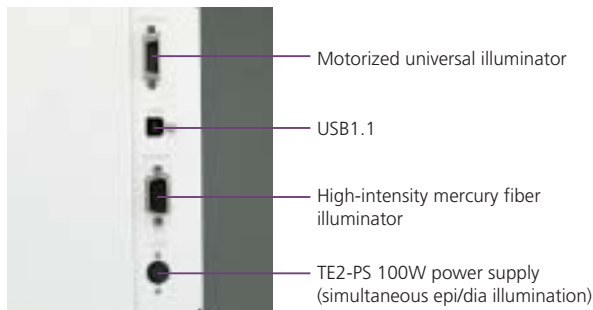


# A motorized system that optimizes image capturing conditions— LV100DA



An example configuration of the LV100DA

## LV100DA Interface



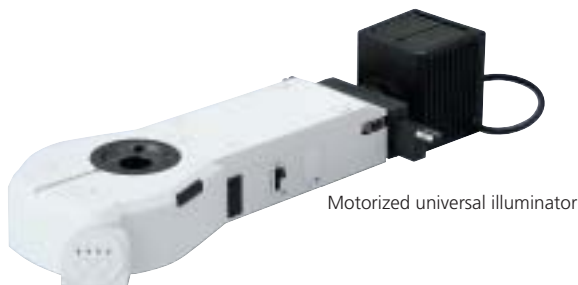
Among performance requirements demanded of a microscope, those associated with digital imaging—digital image capture, analysis, and database formation—are growing faster than ever before. The LV100DA motorized system squarely addresses these demands and now comes equipped with a mechanism that automatically optimizes observation technique and illumination—and these settings can be quantitatively controlled from external devices.

## Auto Optimization of Illumination

In configuration with the LV-UEPI2A motorized universal illuminator, the system automatically sets optimum illumination conditions for the objective and observation technique in use, for quick recall of observation conditions.



Synchronized control window (setup software)



Motorized universal illuminator



Objective lens window (setup software)

# LV100DA, Focusi

# Focusing Modules and Controller Amply Support Motorized Control

Four types of new focusing modules are available.

- **For incorporation into system:**
  - LV-IMA IM Module A (motorized)
  - LV-IM IM Module (manual)
- **For incorporation into microscope:**
  - LV-FMA FM Module A (motorized)
  - LV-FM FM Module (manual)

The new offerings complement Nikon's rich variety of modular units—such as the LV-UEPI2A Motorized Universal Illuminator, LV-NU5A Motorized Universal Nosepiece, LV-NU5AC Motorized Universal Nosepiece with centering mechanism, and LV-ECON E Controller—to give you greater flexibility in configuring a system best suited to your purpose.

## LV-IMA IM Module A (motorized)/LV-IM IM Module (manual)



An example configuration of the LV-IMA



LV-IMA IM Module A



LV-IM IM Module

These modules are suitable for incorporation into systems.

The position for the mounting screw holes is selectable from the back or bottom.

- The LV-IMA IM Module A (motorized) has a vertical stroke of 20mm, while the LV-IM IM Module (manual) has one of 30mm.
- To ensure a good grip of hefty modules such as the LV-UEPI2A motorized universal illuminator, the rigidity of the modules has been greatly enhanced.
- The LV-IMA IM Module A (motorized) can be externally controlled via the LV-ECON E controller.

## LV-FMA FM Module A (motorized)/LV-FM FM Module (manual)



An example configuration of the LV-FMA



Nosepiece moves up and down.



LV-FMA FM Module A



LV-FM FM Module

These modules are suitable for incorporation into microscopes. Mounting screw holes are located on the bottom of the units only.

- The LV-FMA FM Module A (motorized) has a 20mm vertical stroke. When configured with the LV-EPI Epi Base or the LV-DIA Dia Base, it turns your microscope into a system with a motorized nosepiece up/down mechanism; the system can be externally controlled via the LV-ECON E Controller.
- The combination of the LV-FM FM Module (manual; 30mm vertical stroke) and the LV-EPI Epi Base creates a system with a nosepiece up/down mechanism that has an ultra-long vertical stroke of 68mm—it facilitates operations such as semiconductor probe inspections.

## LV-ECON E Controller

This controller provides interface to externally control the light source, motorized illuminator, nosepiece, focusing module and other motorized units from the connected PC and other devices. Communication between this and the PC is established via USB1.1. It is also possible to manually operate the connected units from the front panel. A Software Development Kit (SDK) is available to support the user in creating software for proper incorporation and operation of the units.

\* Nikon's warranty covers Nikon equipment only.

### Interface

- Motorized universal illuminator, LV-UEPI2A
- Halogen lamphouse, LV-LH50PC (TE2-PS100W power supply is required)
- PC-control type high-intensity mercury fiber light source
- White LED illuminator, LV-EPILED
- Motorized universal nosepiece, LV-NU5A, LV-NU5AC (with centering mechanism)
- Motorized focusing module, LV-IMA IM Module A
- Motorized focusing module, LV-FMA FM Module A
- USB1.1



LV-UEPI2A Motorized Universal Illuminator



LV-EPILED White LED Illuminator



LV-IMA IM Module A



LV-ECON Controller



LV-NU5AC  
Nosepiece



LV-FMA FM Module A



LV-NU5A  
Nosepiece

# LV150/LV150A

(Episcopic Illumination Type)



CFI-Series Eyepiece

LV-TI3 Trinocular Tube

A trinocular tube with an optical path changeover of 100:0/0:100.

LV-LH50PC Precentered Lamphouse

A low power-consumption 12V-50W halogen light source equivalent to or higher than the 12V-100W type.

LV-UEPI

An illuminator that can be used for brightfield, darkfield, simple polarizing and DIC observations.

LV150/LV150A

The LV150 and LV150A microscopes are used for episcopic illumination.

LV-NU5A Nosepiece

A universal motorized nosepiece that is 10 times more durable than its predecessors.

CFI LU Plan Fluor Series

These objective lenses feature high NA, long working distances and improved transmission rate in the UV range.

LV-S6 6x6 Stage

An episcopic illumination stage capable of inspecting 150mm wafers. (With 6" wafer holder)

L150A controls



An example configuration of the LV150A

Motorized nosepiece controls

# LV100D

(Episcopic/Diascopic Illumination Type)

## LV-TT2 Tilting Trinocular Tube

The LV-TT2 is a tilting trinocular tube that has an optical path changeover of 100:0/20:80.

## LV-LH50PC 12V-50W Lamphouse

A low power-consumption 12V-50W halogen light source equivalent to or higher than the 12V-100W type.

## CFI-Series Eyepiece

## LV-UEPI2

The LV-UEPI2 illuminator enables brightfield, darkfield, DIC, simple polarizing, and UV excitation epi-fluorescence observations.

## Nosepiece

Selectable from C-N6 (brightfield), L-NBD5 (bright/darkfield) and L-NU5 (universal) nosepieces.

## LV-S32 3x2 Stage

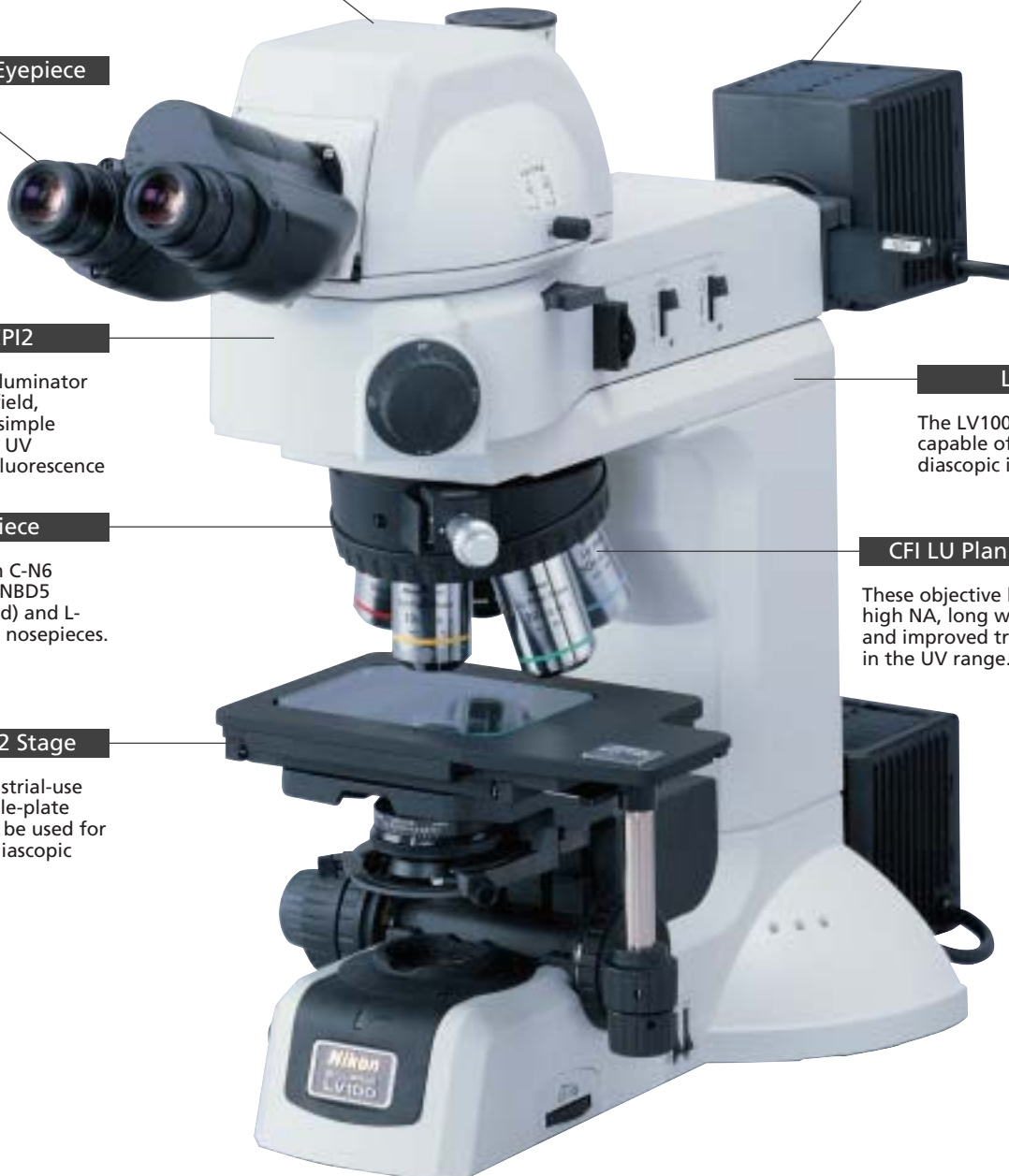
This small, industrial-use stage has a triple-plate design and can be used for episcopic and diascopic illumination.

## LV100D

The LV100D microscope is capable of episcopic and diascopic illumination.

## CFI LU Plan Fluor Series

These objective lenses feature high NA, long working distances and improved transmission rate in the UV range.



An example configuration of the LV100D

# LV100DA

(Episcopic/Diascopic Illumination Type)

## LV-TT2 Tilting Trinocular Tube

The LV-TT2 is a tilting trinocular tube that has an optical path changeover of 100:0/20:80.

## LV-LH50PC 12V-50W Lamphouse

A low power-consumption 12V-50W halogen light source equivalent to or higher than the 12V-100W type.

## CFI-Series Eyepiece

## LV100DA

Compatible with both episcopic and diascopic illumination and supports the LV-UEPI2A motorized universal epi-illuminator and motorized nosepiece.

## LV-UEPI2A

This illuminator controls the illumination changeover turret and aperture diaphragm via a motor. The diaphragm is automatically optimized according to the objective in use.

## Nosepiece

The LV-NU5AC motorized nosepiece comes with a centering mechanism that minimizes image drift during objective changeover.

## LV-S64 6×4 Stage

Compatible with both episcopic and diascopic illumination, this stage accommodates samples up to 150 x 100mm.

## CFI LU Plan Fluor Series

These objective lenses feature high NA, long working distances and improved transmission rate in the UV range.

## LV100DA controls

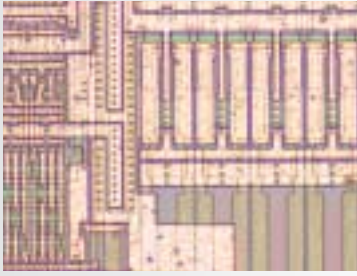
An example configuration of the LV100DA

Enable motorized control of motorized nosepiece, illumination changeover turrets, aperture diaphragm, light source (epi/dia), etc.



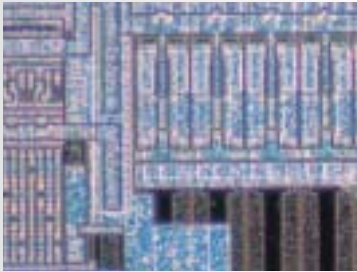
# Observation Methods

## Brightfield



The antireflective design applied to the objective lenses and light source ensures bright, and high-contrast images.

## Darkfield



Nikon's unique "Fly-eye Lens" used in the darkfield illuminator yields a threefold increase in brightness over previous models. This allows high-sensitivity detection of defects and height gaps in samples.

## Nomarski DIC



L-DIC DIC Prism (standard)



L-DIHC DIC Prism (high contrast)



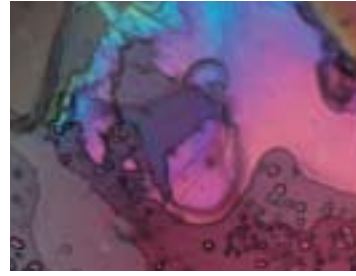
YM-PO Polarizer L-AN Analyzer L2-DIC DIC Prism L-DIHC High-contrast DIC Prism



LV-PAB PA Cube

Standard or high contrast DIC sliders can be selected to suit the sample. This method is useful for the surface observations of various devices and precision molds.

## Simple Polarizing



In addition to simple polarizing, a lambda plate can be inserted into the optical path to achieve first-order red compensator observation. This is useful for liquid crystal inspections (when used in combination with the LV-UEPI 2).



YM-PO Polarizer L-AN Analyzer



LV-PO Polarizer LV-FLAN FL Analyzer LV-XP λ Plate

## Epi-Fluorescence



Brightfield Epi-fluorescence B-2A

UV, V, BV, B or G excitation fluorescence filter blocks can be selected. This method is perfect for the observation of OLED, ion migration and other substrate uses.



Fluorescence filter blocks



LV-UVPO Polarizer LV-FLAN FL Analyzer

## Double-Beam Interferometry Equipment (measures nano scale height gaps)

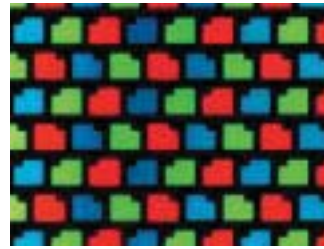


Michelson (TI) and Mirau (DI) types of episcopic double-beam interferometry can be carried out. A filar micrometer eyepiece can be used to examine or measure samples while avoiding direct contact.



Episcopic double-beam Interferometry Equipment TI/DI

## Diascopic Illumination



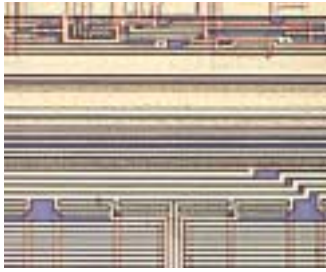
Diascopic illumination is used to observe optical parts, FPD and other samples that transmit light.



Condensers

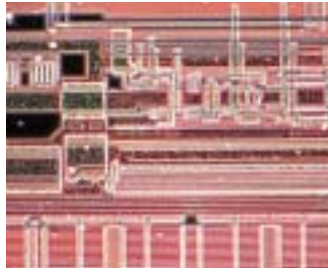
# Applications

Semiconductor (wafer)



Brightfield

Semiconductor (wafer)



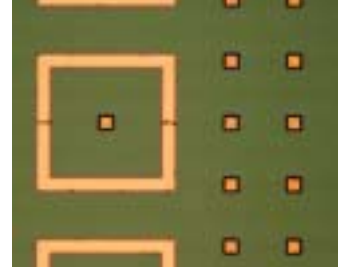
Darkfield

MEMS (optical switch)



Brightfield

Micro Bump



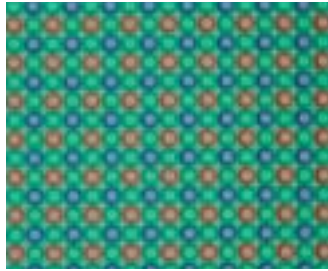
Brightfield

Compact Disc (CD)



Simple polarizing

Image Sensors (CCD)



Brightfield

PCB (ion migration)



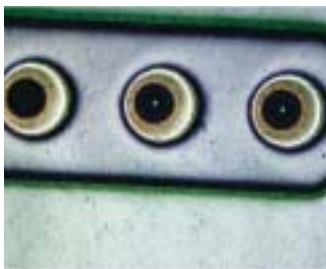
Brightfield

PCB (ion migration)



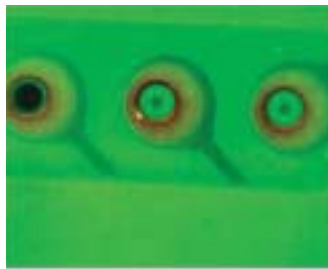
Epi-fluorescence

PCB



Brightfield

PCB



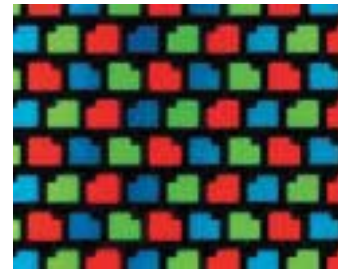
Epi-fluorescence

Precision Mold



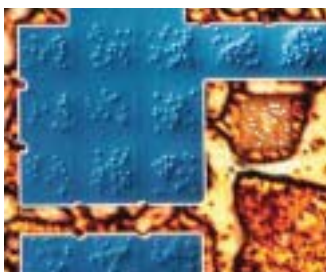
DIC

LCD (color filter)



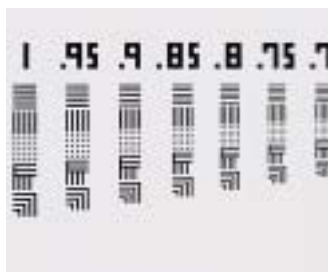
Diascopic brightfield

LCD (conductive particle)



DIC

Test reticle



Diascopic brightfield

Spodumene



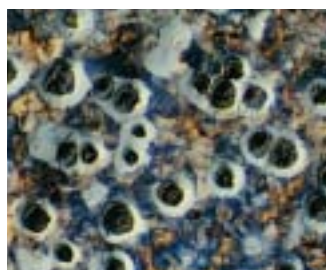
DIC

Carbon Paper



Brightfield

Nodular Graphite Cast Iron



DIC

Tourmaline



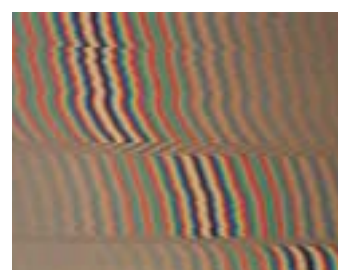
Brightfield

Tourmaline



DIC

Tourmaline



Double-beam interferometry



### Eyepiece Tubes



LV-TI3 Trinocular Eyepiece Tube

LV-TT2 Tilting Trinocular Eyepiece Tube

### Eyepieces

Model	F.O.V.	Remarks
CFI 10x	22	
CFI 10xM	22	Photomask included
CFI 10xCM: for C-TE binocular ergo tube	22	Crosshairs and micrometer included
CFI 12.5x	16	
CFI 15x	14.5	
CFI UW 10x	25	
CFI UW 10xM	25	Photomask included
Mirometer eyepiece 10xN	20	Stroke 10 mm Main scale: 0.1 mm/increments Sub scale: 0.01 mm/increments

### Illuminators



LV-UEPI



LV-UEPI2



LV-UEPI2A

### White LED Illuminator



LV-EPILED

### Double Port



Y-IDP Double Port (Ratio 100:0/55:45)  
Y-IDP Double Port 0/100 (Ratio 100:0/0:100)

### Polarizing/DIC accessories

#### Simple Polarizing



YM-PO Polarizer L-AN Analyzer

#### Observation with First-Order Red Compensator



LV-PO Polarizer LV-FLAN FL Analyzer LV-λP λ Plate

#### UV Polarizing with Epi-Fluorescence



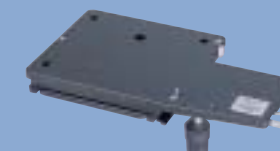
LV-UV PO UV Polarizer

#### DIC

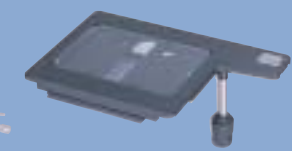


YM-PO Polarizer L-AN Analyzer L2-DIC DIC Prism L-DIHC DIC Prism HC

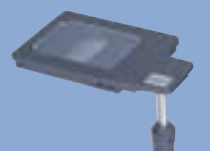
### Substages (LV150/LV150A)



LV-S6 6x6 Stage



LV-S64 6x4 Stage

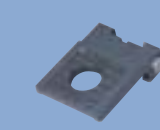


LV-S32 3x2 Stage

### Substages (for LV150/LV150A)



LV-SUB Stage



LV-SUB Stage 2

### HOLDERS

#### For LV-S6 6x6 Stage



L-S6WH Wafer Holder



L-S6PL ESD Plate

#### For LV-S32 3x2 Stage

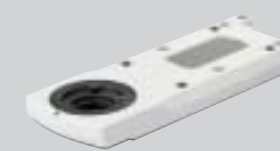


LV-S32PL ESD Plate



LV-S32SGH Slideglass Holder

### Arm



LV-ARM Basic Arm

### Focusing Modules



LV-FM FM Module (manual)



LV-FMA FM Module (motorized)

### Bases



LV-EPI Epi Base



LV-DIA Dia Base

### Nosepieces



C-N6 Nosepiece (Brightfield)



L-NBD5 Nosepiece (Bright/darkfield)



L-NU5 Nosepiece (Universal)



LV-NU5A Motorized Nosepiece (Universal)



LV-NU5AC Motorized Nosepiece (Universal; with centering mechanism)

### Objective Lenses



CFI LU PLAN FLUOR EPI series



CFI L PLAN EPI CR series



CFI LU PLAN FLUOR BD series

### Objective Adapters



LU Objective Adapter M32-25



C-OA 15mm Adapter

### Diascopic Illumination Condensers



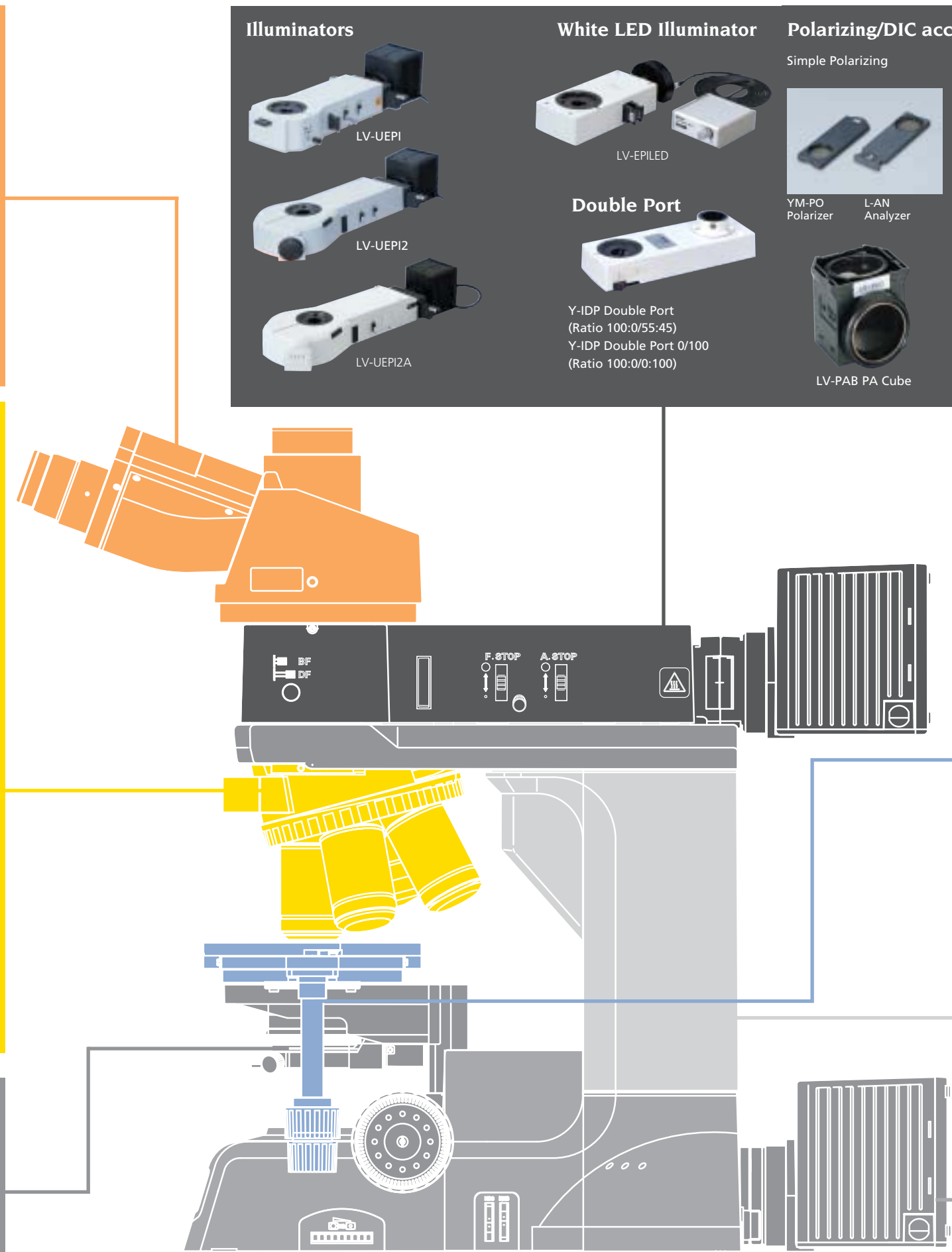
LWD Achromat

Slide Achromat 2-100x

C-C Abbe

C-C Achro

Darkfield (Dry)



# Modular Design

## Digital Sight

The Digital Sight series is a powerful imaging system for monitoring/capturing images taken under brightfield, darkfield, DIC, epi-fluorescence, and other observation methods.

### Standalone Type

This type comes with an LCD monitor, making it convenient for on-screen monitoring without PC and in applications that require long/multiple exposures.



### Real-time imaging Camera—DS-2Mv-L1

- Live image display at 30fps max.
- Image size: 1600 x 1200 pixels
- 6.3" TFT monitor
- Analog RGB output
- CompactFlash card slot
- USB mass-storage-class compatible
- Direct print function (Pict bridge compatible) optional<sup>\*1</sup>
- Ethernet (100BASE/TX) port<sup>\*2</sup>



\*1: A CP900DC dedicated printer and C-mount adapter are necessary. Provided with real 10 mode (10X printing).

\*2: FTP Client/Server, HTTP Server Telnet Server functions provided.

### PC-Connection Type

This type requires connection to PC and allows observation on a PC monitor, image capture, measurement and analysis when the special application software ACT-2U is used.



### Real-time imaging Camera—DS-2Mv-U1

- Live image display at 12fps (800 x 600) max.
- Image size: 1600 x 1200 pixels
- PC connection via USB2.0
- Dedicated application software—ACT-2U



Dedicated camera control software ACT-2U



### Camera Control Software for DS-L1/DS-U1

#### Scene mode—optimal imaging with a single mouse click

Optimal imaging parameters have been preset for each sample type, therefore anyone, regardless of experience, can easily perform photography of the highest level.



Wafer/IC Chip



Metal/Ceramics



PCB

#### A host of measuring tools



Two-point distance



Scale



Point to line distance



Intersection angle



Circumference/diameter



Area (DS-U1 only)



XY Scale



Screen pattern (crossline, circle)



XY measurement (DS-L1 only)

\*Dedicated ACT-2U camera control software is necessary when using the DS-U1.

### Camera Heads

The following four camera heads are available in addition to the DS-2Mv to suit your sample and application.

#### For brightfield, darkfield, DIC observations

##### DS-2MBW



- Image size: 1600 x 1200 pixels
- 15 fps (30 max.)
- Superb movie
- Sensitivity 5 times greater than before

##### DS-5M



- Image size: 2560 x 1920 pixels
- True-to-life recording of minute images

#### For fluorescence observations (that require long exposure)

##### DS-2MBWc



- Image size: 1600 x 1200 pixels
- Sensitivity approx. 5 times greater than predecessors
- Includes a Peltier device
- Brilliant images with minimum noise

##### DS-5Mc



- Image size: 2560 x 1920 pixels
- Includes a Peltier device
- Brilliant images with minimum noise

# Ultra-high-definition Digital Camera DXM1200F

The DXM1200F produces true-to-life, extremely high-quality images with up to approximately 12 million output pixels. It meets the demanding requirements of professional users and is excellent for image analysis in the advanced R&D fields.

- Approx. 12 million output pixels comparable to high-end film cameras, thanks to Nikon's exclusive micro-step high-density imaging technology
- Live image display at a frame rate of 12 fps max.
- The wide exposure latitude produces true-to-life images regardless of brightness level.

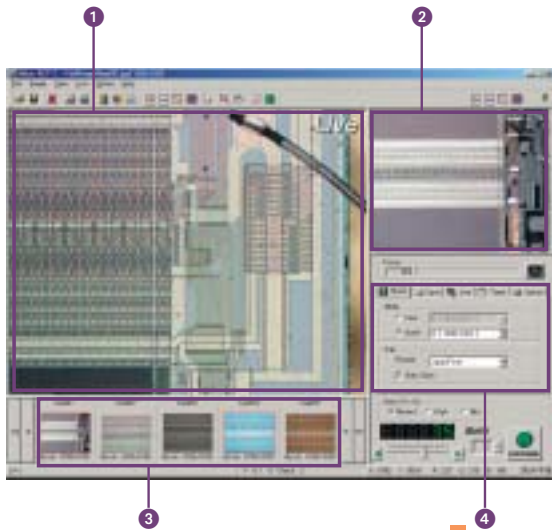


## Camera Control Software

### ACT-1

**Minimizes fatigue during large-volume and extended time shooting.**

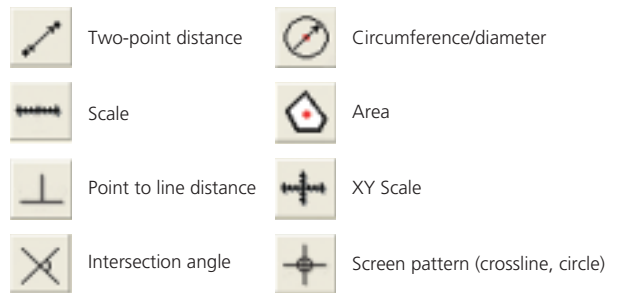
All essential sections, including ① live image preview, ② captured image window, ③ thumbnail, and ④ image capture parameter setting panel, are simultaneously displayed on a single screen, enabling users to easily understand image capture procedures. The size of the parameter setting panel has been reduced to leave more space for image display.



### Option: Camera Control Software

### ACT-2U

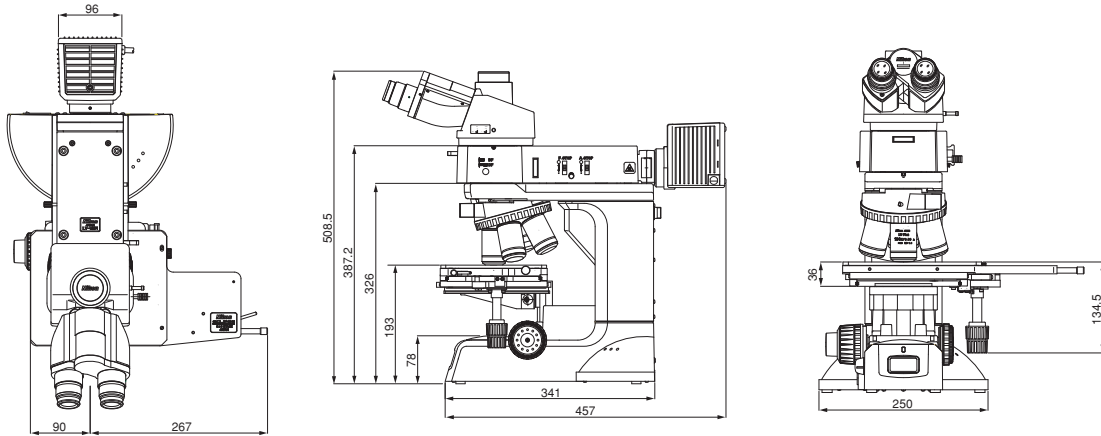
The optional ACT-2U software offers the following arrays of convenient measurement tools.



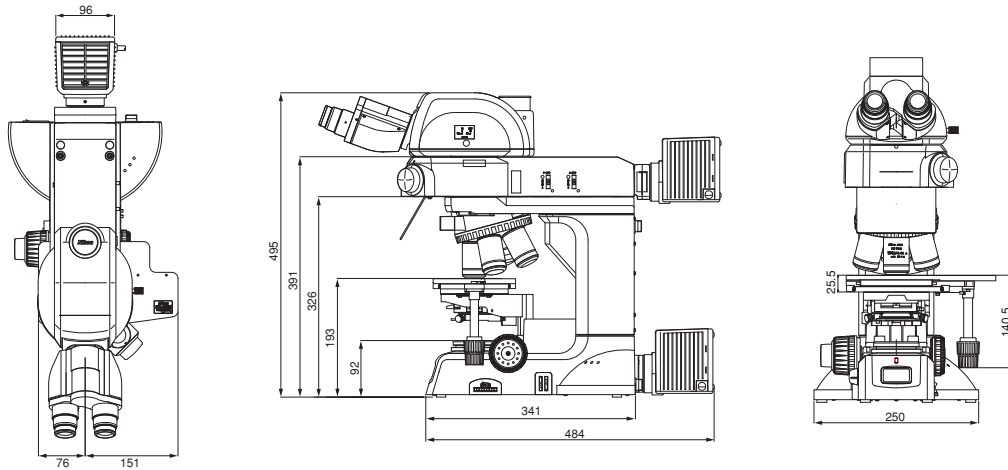
# Dimensional Diagrams

Unit: mm

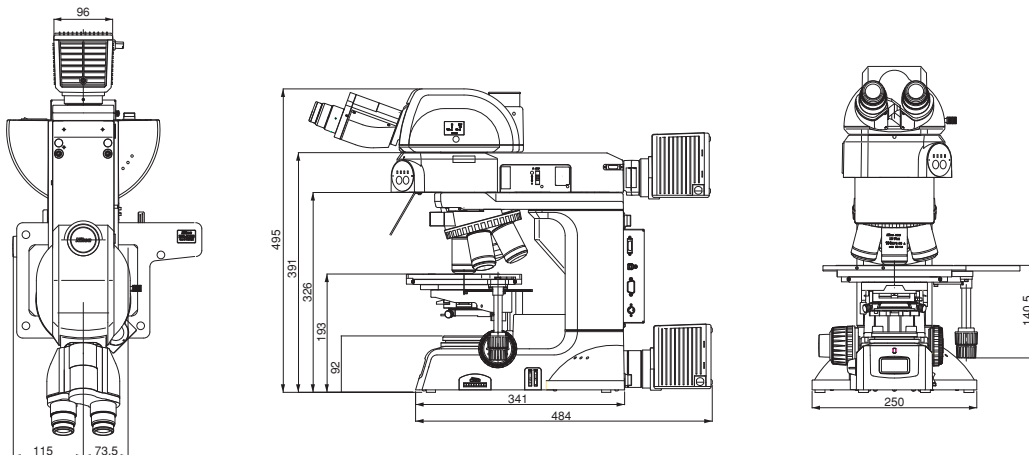
## LV150A/LV150



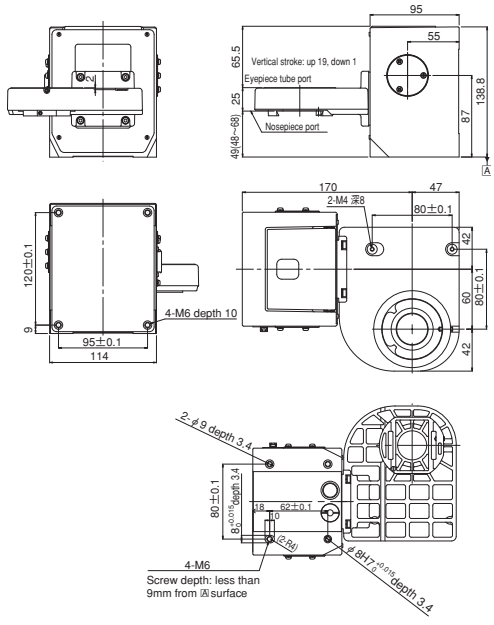
## LV100D



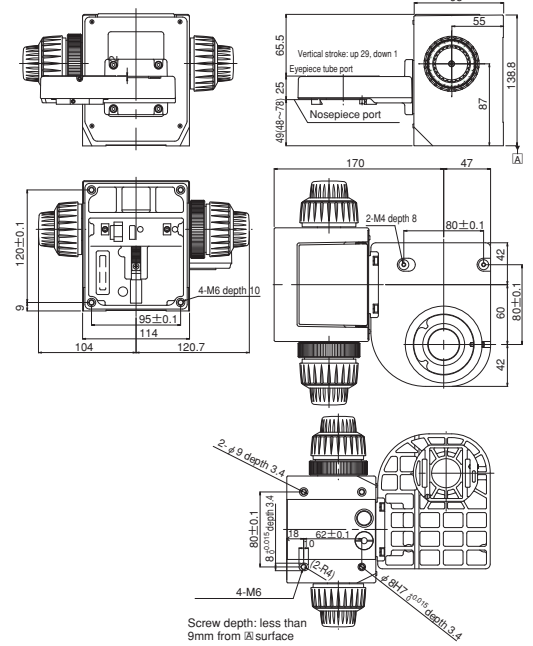
## LV100DA



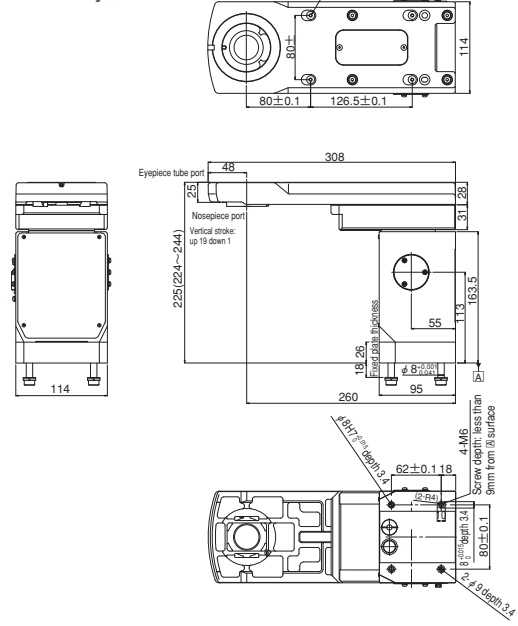
### LV-IMA IM Module A (motorized)



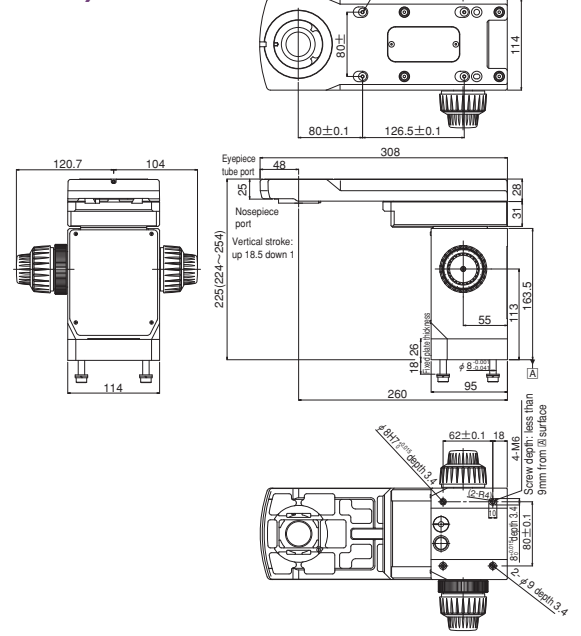
### LV-IM IM Module (manual)



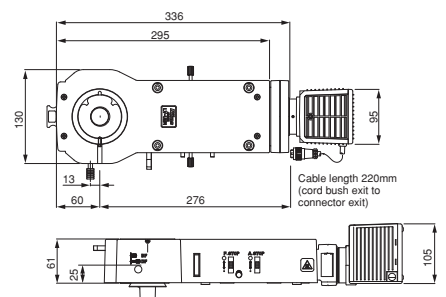
### LV-FMA FM Module A (motorized)



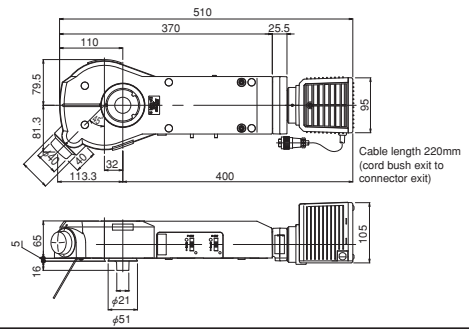
### LV-FM FM Module (manual)



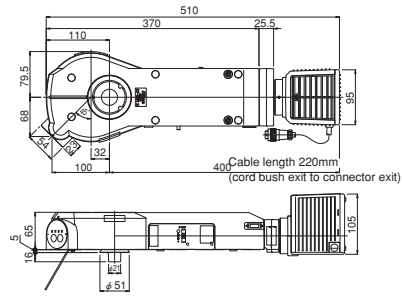
### LV-UEPI Universal Epi-Illuminator



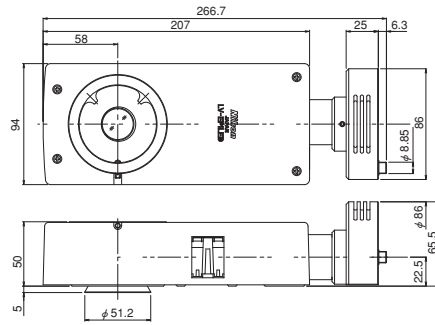
### LV-UEPI2 Universal Epi-Illuminator 2



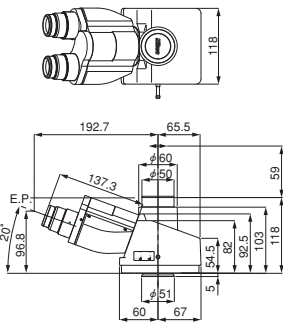
### LV-UEPI2A Motorized Universal Epi-Illuminator



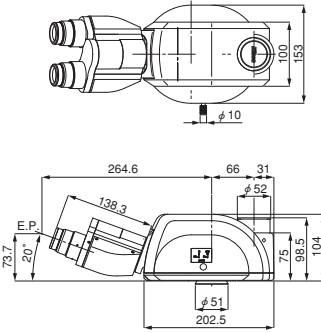
### LV-EPIELD White LED Illuminator



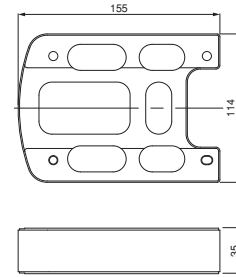
### LV-TI3 Trinocular Tube ESD



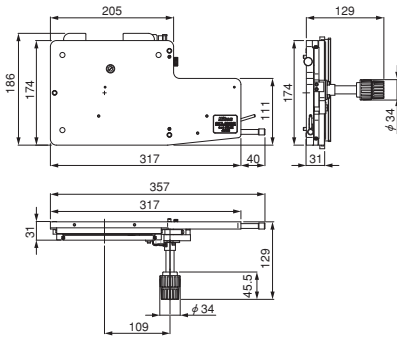
### LV-TT2 Tilting Trinocular Tube



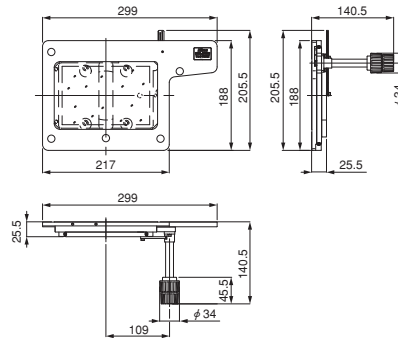
### LV-CR Column Riser 35



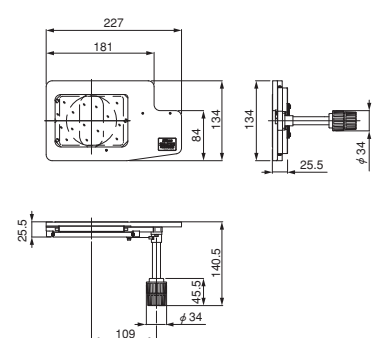
### LV-S6 6x6 Stage



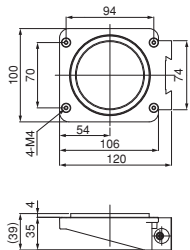
### LV-S64 6x4 Stage



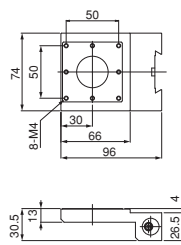
### LV-S32 3x2 Stage



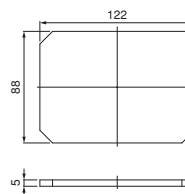
### LV-SUB Stage



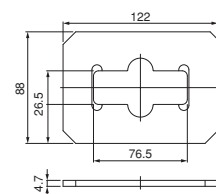
### LV-SUB Stage 2



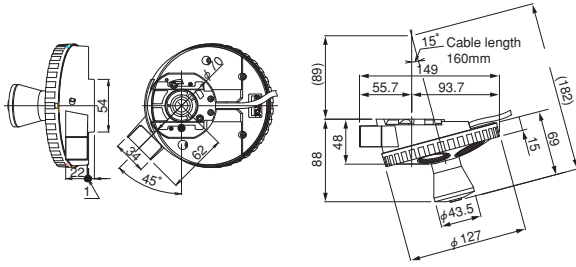
### LV-S32PL ESD Plate



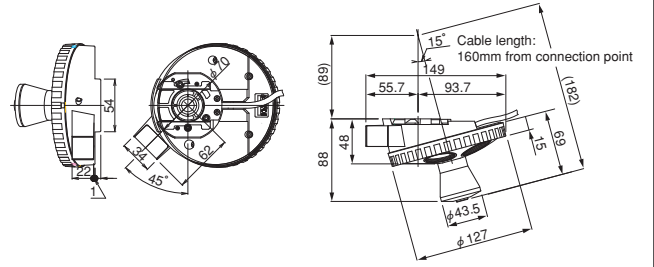
### LV-S32SGH Slide Glass Holder



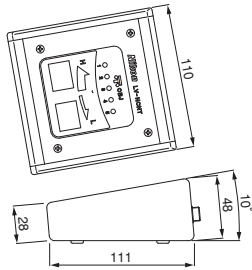
### LV-NU5AC Nosepiece



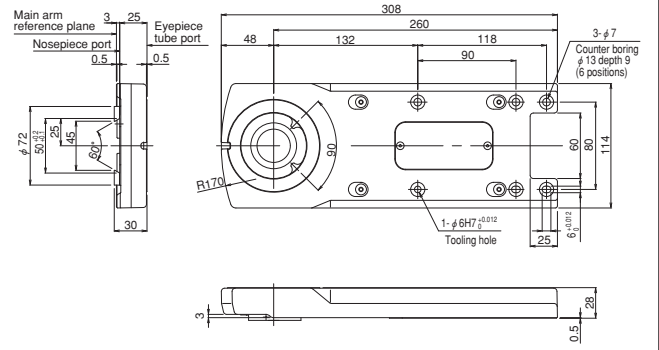
### LV-NU5A Nosepiece



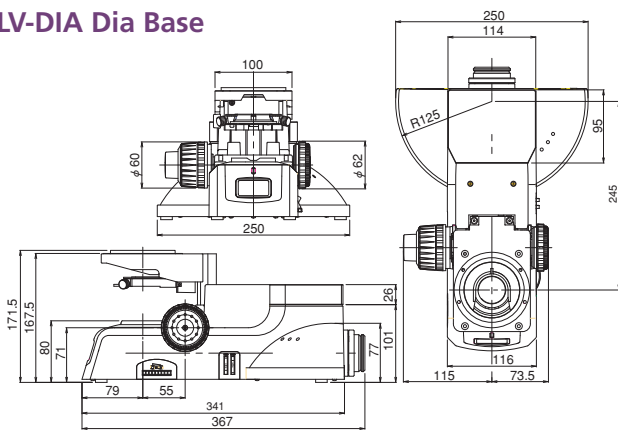
### LV-NCNT Nosepiece Controller



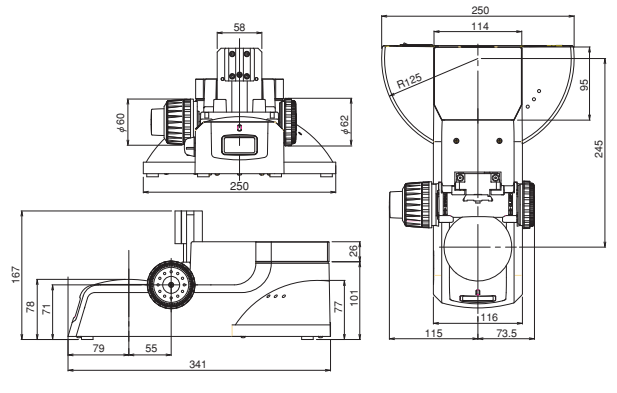
### LV-ARM Basic Arm



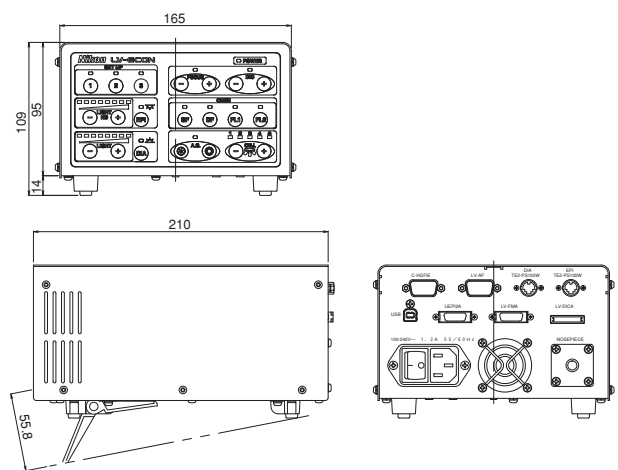
### LV-DIA Dia Base



### LV-EPI Epi Base

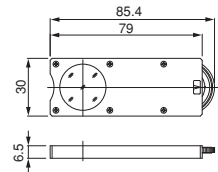


### LV-ECON E Controller

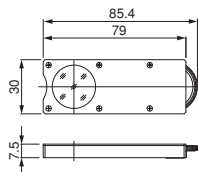


## Polarizers/Analyzers/ $\lambda$ Plate

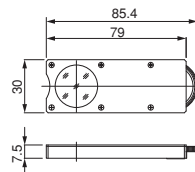
YM-PO Polarizer



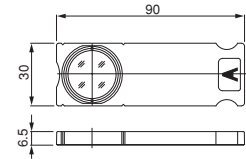
LV-PO Polarizer



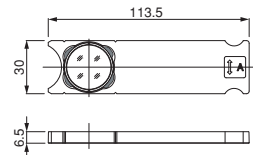
LV-UVPO Polarizer



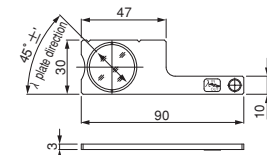
L-AN Analyzer



LV-FLAN FL Analyzer



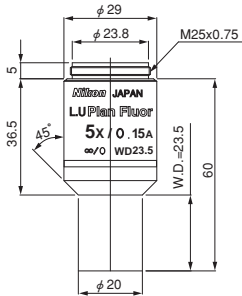
LV- $\lambda$ P  $\lambda$ Plate



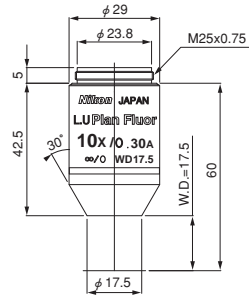
## Objective Lenses

### CFI LU PLAN FLUOR

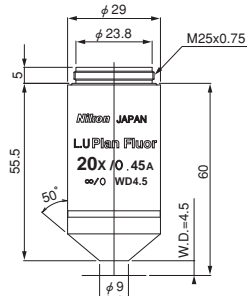
CFI LU Plan Fluor EPI 5X



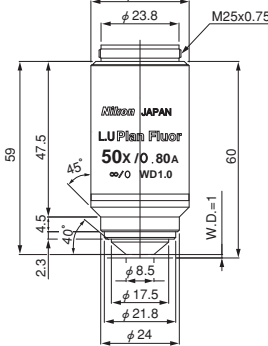
CFI LU Plan Fluor EPI 10X



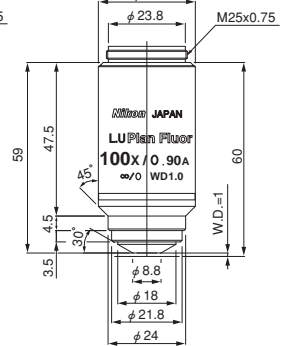
CFI LU Plan Fluor EPI 20X



CFI LU Plan Fluor EPI 50X

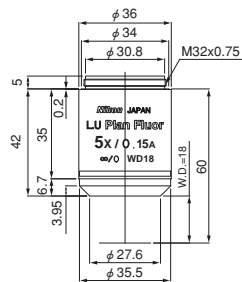


CFI LU Plan Fluor EPI 100X

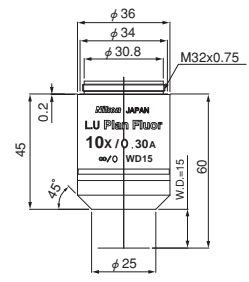


### CFI LU PLAN FLUOR BD

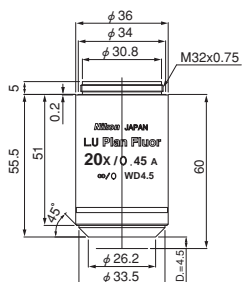
CFI LU Plan Fluor BD 5X



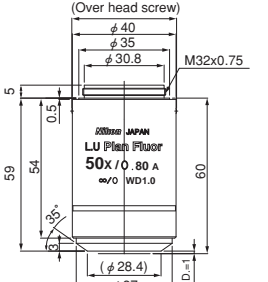
CFI LU Plan Fluor BD 10X



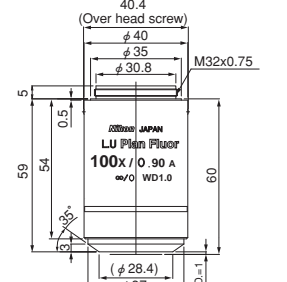
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CFI LU Plan Fluor BD 50X

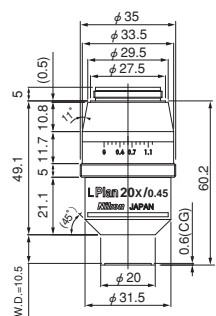


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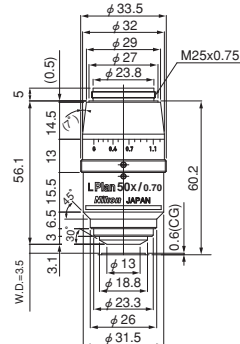


### CFI L PLAN EPI CR

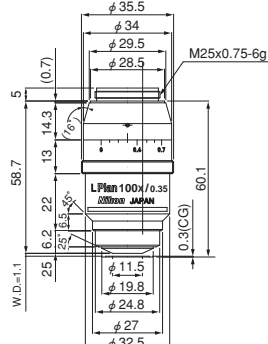
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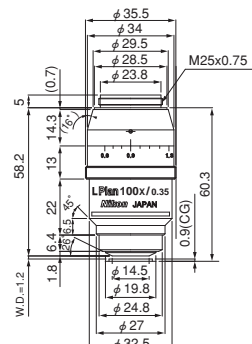
CFI L PLAN EPI 50XCR



CFI L PLAN EPI 100XCRA



CFI L PLAN EPI 100XCRB





# Main Specifications

## LV150/150A

Main body	Baseless type (column riser insertable between arm and stand); Max. sample height 47mm (when configured with 3x2 stage/6x4 stage), 82mm with column riser, 116.5mm with Suruga Seiki B23-60CR; 12V-50W brightness control transformer built in
Focusing mechanism	Coaxial coarse/fine focus knob, left: coarse/fine, right: fine; Stroke 40mm, coarse 14.0mm/rotation (torque adjustable, with refocusing mechanism), fine focusing 0.1mm/rotation (1µm/increments)
Nosepiece	C-N6 Nosepiece (brightfield, sextuple), L-NBD5 Nosepiece (bright/darkfield quintuple, with flare prevention), L-NU5 Nosepiece (universal quintuple, with flare prevention), LV-NU5A Nosepiece (for LV150A, high-durability motorized universal quintuple, with flare prevention)
Episcopic illuminator LV-U EPI	12V-50W high-intensity halogen lamp; Field (centerable) and aperture diaphragms synchronized with B/D changeover; ø25mm filter (NCB11, ND16, ND4) insertable; Polarizer/analyzer insertable
Episcopic illuminator LV-U EPI2	12V-50W high-intensity halogen lamp; 120W high-intensity mercury-fiber illuminator (with brightness control, no centering necessary) mountable; Centerable field and aperture diaphragms synchronized with B/D changeover; ø25mm filter (NCB11, ND16, ND4) insertable; Polarizer/analyzer/λ plate insertable, excitation balancer insertable
Eyepiece tube	LV-TI3 Trinocular (erect image, F.O.V. 22/25), LV-TT2 Tilting Trinocular (erect image, F.O.V. 22/25), Y-TF Trinocular (inverted image, F.O.V. 22/25), Y-TT Trinocular (inverted image, F.O.V. 22/25)
Stage	LV-S32 3x2 Stage (stroke: 75x50 mm including glass plate) LV-S64 6x4 Stage (stroke: 150x100 mm including glass plate) LV-S6 6x6 Stage (stroke: 150x150 mm; only for episcopic illumination)
Eyepiece	CFI eyepiece series
Objective lens	CFI60 series
Electrostatic decay time	1000-10V, within 0.2 sec.
Power consumption	1.2A/75W
Weight (main body)	LV150: approx. 8.6kg; LV150A: approx. 8.7kg

## LV100D

Main body	Baseless type (column riser insertable between arm and stand); Max. sample height 29mm (with LV-S32 3x2 Stage or LV-S64 6x4 Stage), 64mm with column riser; 12V-50W brightness control transformer built in
Focusing mechanism	Coaxial coarse/fine focus knob, left: coarse/fine, right: fine; Stroke 30mm, coarse 14.0mm/rotation (torque adjustable, with refocusing mechanism), fine focusing 0.1mm/rotation (1µm/increments)
Nosepiece	C-N6 Nosepiece (brightfield, sextuple), L-NBD5 Nosepiece (bright/darkfield quintuple, with flare prevention), L-NU5 Nosepiece (universal quintuple, with flare prevention)
Episcopic illuminator LV-U EPI	12V-50W high-intensity halogen lamp; Field (centerable) and aperture diaphragms synchronized with B/D changeover; ø25mm filter (NCB11, ND16, ND4) insertable; Polarizer/analyzer insertable
Episcopic illuminator LV-U EPI2	12V-50W high-intensity halogen lamp; High-intensity mercury-fiber illuminator (with brightness control, no centering necessary); Centerable field and aperture diaphragms synchronized with B/D changeover; ø25mm filter (NCB11, ND16, ND4) insertable; Polarizer/analyzer/λ plate insertable, excitation balancer insertable
Diascopic illuminator	12V-50W high-intensity halogen lamp; Field (centerable) and aperture diaphragms synchronized with B/D changeover; Filters (ND8, NCB11) insertable
Condenser	LWD Achromat, Sliding Achromat 2-100x, C-C Abbe, C-C Achromat, Darkfield (dry)
Eyepiece tube	LV-TI3 Trinocular (erect image, F.O.V. 22/25), LV-TT2 Tilting Trinocular (erect image, F.O.V. 22/25), Y-TF Trinocular (inverted image, F.O.V. 22/25), Y-TT Trinocular (inverted image, F.O.V. 22/25)
Stage	LV-S32 3x2 Stage (stroke: 75x50 mm including glass plate) LV-S64 6x4 Stage (stroke: 150x100 mm including glass plate)
Eyepiece	CFI eyepiece series
Objective lens	CFI60 series
Electrostatic decay time	1000-10V, within 0.2 sec.
Power consumption	1.2A/75W
Weight (main body)	Approx. 9.4kg

# Main Specifications

## 100DA

Main body	Baseless type (column riser insertable between arm and stand); Max. sample height 29mm (with LV-S32 3x2 Stage or LV-S64 6x4 Stage), 64mm with column riser; 12V-50W brightness control transformer built in
Focusing mechanism	Coaxial coarse/fine focus knob, left: coarse/fine, right: fine; Stroke 30mm, coarse 14.0mm/rotation (torque adjustable, with refocusing mechanism), fine focusing 0.1mm/rotation (1µm/increments)
Interface	Motorized nosepiece: LV-NU5A Nosepiece, LV-NU5AC Nosepiece (with centering mechanism) Episcopic illuminator: LV-UEPI2A, High-intensity mercury fiber illuminator (PC-control only)
Nosepiece	LV-NU5A Nosepiece (high-durability motorized universal quintuple, with flare prevention mechanism) LV-NU5AC Nosepiece (high-durability motorized universal quintuple, with flare prevention and centering mechanisms)
Episcopic illuminator LV-UEPI2A	12V-50W high-intensity halogen lamp; High-intensity mercury-fiber illuminator (with brightness control, PC control); Motorized operation/control of illumination changeover turret; Motorized aperture diaphragm (centerable, automatically optimized for the selected objective)/field diaphragm (centerable) synchronized with B/D changeover; ø25mm filter (NCB11, ND16, ND4) insertable; Polarizer/analyzer/λ plate insertable, excitation balancer insertable
Diascopic illuminator	12V-50W high-intensity halogen lamp; Centerable field and aperture diaphragms; Built-in filters (ND8, NCB11)
Condenser	LWD Achromat, Sliding Achromat 2-100x, C-C Abbe, C-C Achromat, Darkfield (dry)
Eyepiece tube	LV-T13 Trinocular (erect image, F.O.V. 22/25), LV-TT2 Tilting Trinocular (erect image, F.O.V. 22/25), Y-TF Trinocular (inverted image, F.O.V. 22/25), Y-TT Trinocular (inverted image, F.O.V. 22/25)
Stage	LV-S32 3x2 Stage (stroke: 75x50 mm including glass plate) LV-S64 6x4 Stage (stroke: 150x100 mm including glass plate)
Eyepiece	CFI eyepiece series
Objective lens	CFI60 series
Electrostatic decay time	1000-10V, within 0.2 sec.
Power consumption	1.2A/90W
Weight (main body)	Approx. 9.9kg

## LV-IMA (motorized)/LV-IM (manual)/ LV-FMA (motorized)/LV-FM (manual)

Main body	LV-IMA IM Module/LV-FMA FM Module A (motorized) Motorized nosepiece up/down section: stroke 20mm, resolving power 0.025µm, max. speed 2.5mm/sec. (resolving power 0.05µm) LV-IM IM Module/LV-FM FM Module (manual) Coarse/fine focus knob: stroke 30mm, coarse 5.2mm/rotation, fine 0.1mm/rotation (in 1µm increments)
Nosepiece	C-N6 Nosepiece (brightfield, sextuple), L-NBD5 Nosepiece (bright/darkfield quintuple, with flare prevention), L-NU5 Nosepiece (universal quintuple, with flare prevention), LV-NU5A Nosepiece (high-durability motorized universal quintuple, with flare prevention), LV-NU5AC Nosepiece (high-durability motorized universal quintuple, with flare prevention and centering mechanism)
Episcopic illuminator LV-UEPI	12V-50W high-intensity halogen lamp; Field (centerable) and aperture diaphragms synchronized with B/D changeover; ø25mm filter (NCB11, ND16, ND4) insertable; Polarizer/analyzer insertable
Episcopic illuminator LV-UEPI2	12V-50W high-intensity halogen lamp; High-intensity mercury-fiber illuminator (with brightness control, manual control/PC control); Centerable field and aperture diaphragms synchronized with B/D changeover; ø25mm filter (NCB11, ND16, ND4) insertable; 2 epi-filter cubes insertable; Polarizer/analyzer/λ plate insertable, excitation balancer insertable
Episcopic illuminator LV-U EPI2A	12V-50W high-intensity halogen lamp; High-intensity mercury-fiber illuminator (with brightness control, PC control); Motorized operation/control of illumination changeover turret; Motorized aperture diaphragm (centerable, automatically optimized for the selected objective)/field diaphragm (centerable) synchronized with B/D changeover; ø25mm filter (NCB11, ND16, ND4) insertable; 2 epi-filter cubes insertable; Polarizer/analyzer/λ plate insertable, excitation balancer insertable
Eyepiece tube	LV-T13 Trinocular (erect image, F.O.V. 22/25), LV-TT2 Tilting Trinocular (erect image, F.O.V. 22/25), Y-TF Trinocular (inverted image, F.O.V. 22/25), Y-TT Trinocular (inverted image, F.O.V. 22/25), TV tube lens unit 0.5x, 1x
Eyepiece	CFI eyepiece series
Objective lens	CFI60 series
Electrostatic decay time	1000-10V, within 0.2 sec.
Weight (main body)	LV-IMA: approx. 3.7kg, LV-IM: approx. 3.5kg, LV-FMA: approx. 6.0kg, LV-FM: approx. 5.8kg,

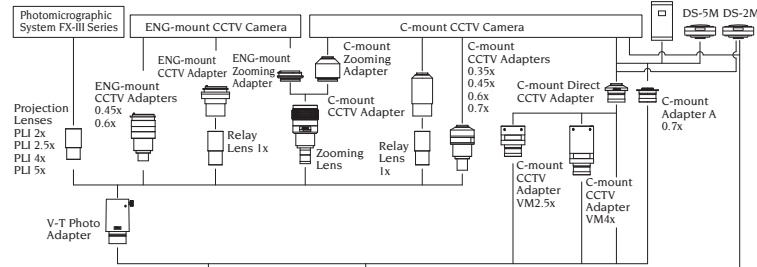
## LV-ECON Controller

Interface	Motorized nosepiece: LV-NU5A, LV-NU5AC (with centering mechanism) Episcopic illuminator: LV-UEPI2A, LV-EPILED, high-intensity mercury fiber light source (PC-control type only) Motorized focusing module: LV-IMA, LV-FMA Halogen lamphouse (powered by TE2-PS 100W power source): LV-LH50PC PC (USB1.1) *Software Development Kit (SDK) is available.
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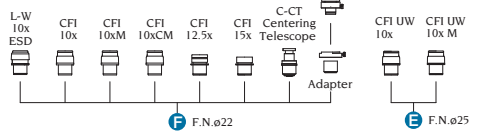
# System Diagram

## LV150/LV150A

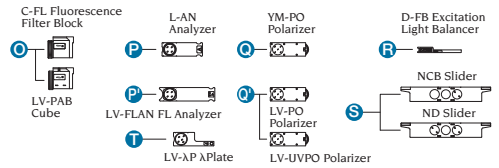
### Camera Mount



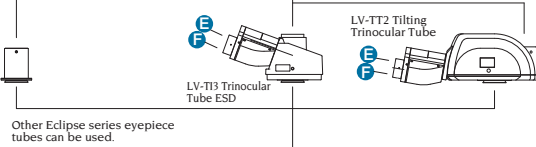
### Eyepieces



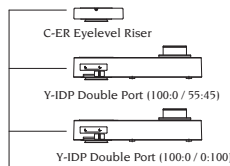
### Filter Blocks and Sliders



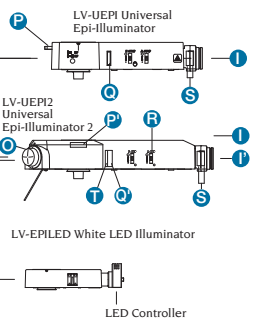
### Eyepiece Tubes



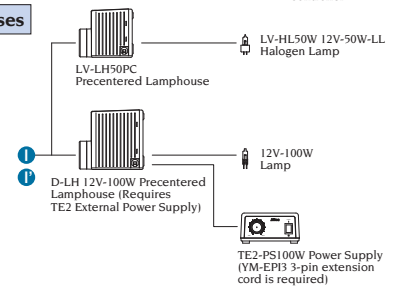
### Intermediate Modules



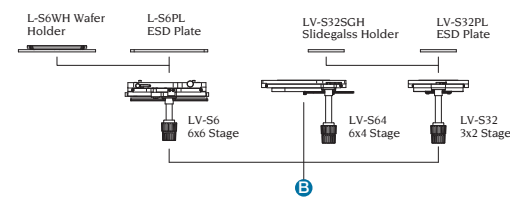
### Episcopic Illuminators



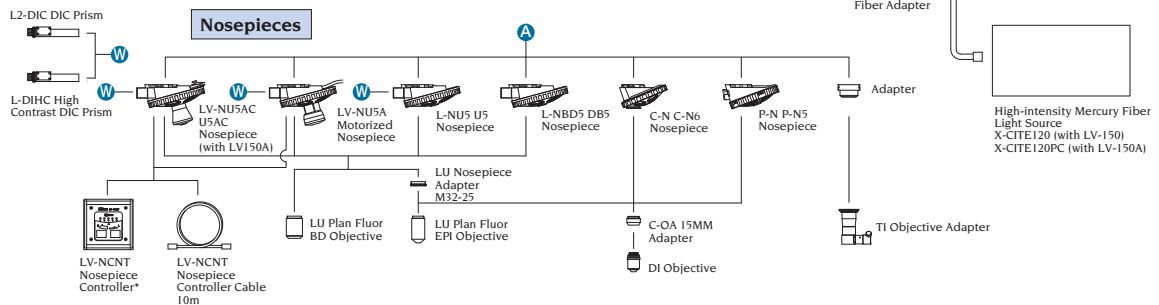
### Lamphouses



### Stages



### Nosepieces

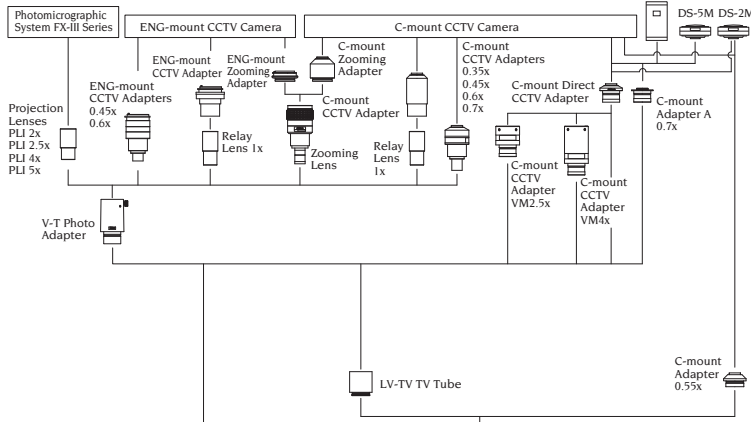


\*Not necessary on the LV150A as the operation unit has been built into the main body.

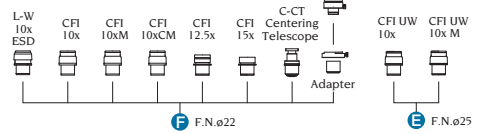
# System Diagram

## LV100D

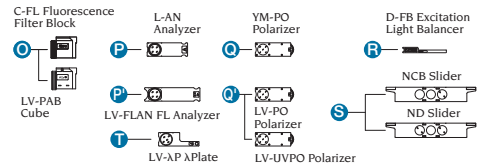
### Camera Mount



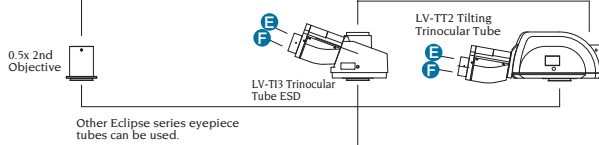
### Eyepieces



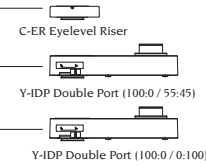
### Filter Blocks and Sliders



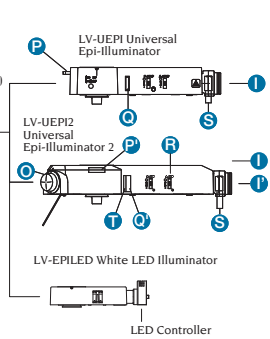
### Eyepiece Tubes



### Intermediate Modules

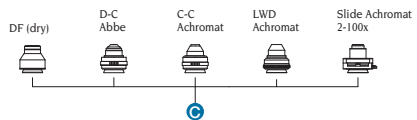


### Episcopic Illuminators

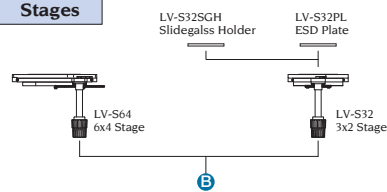


## LV100D

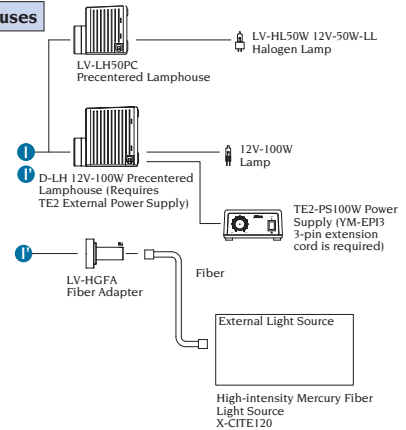
### Condensers



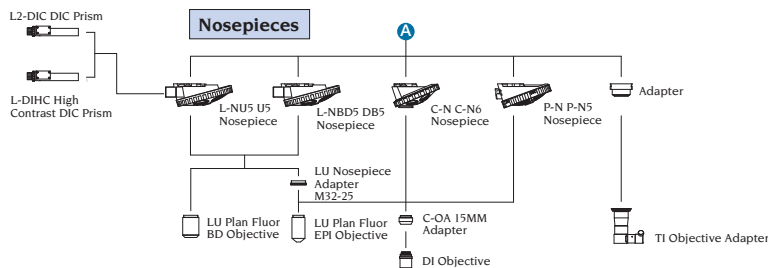
### Stages



### Lamphouses

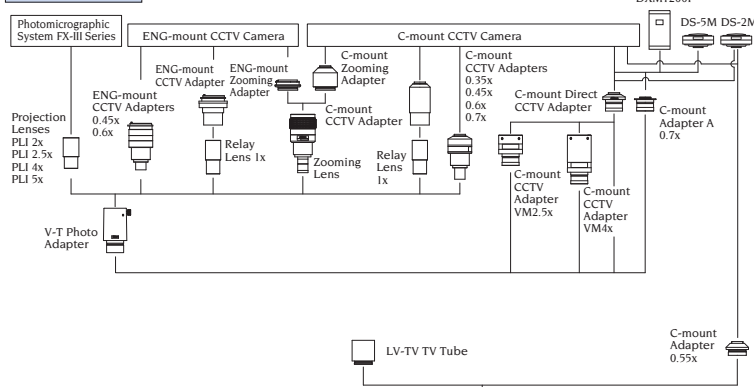


### Nosepieces

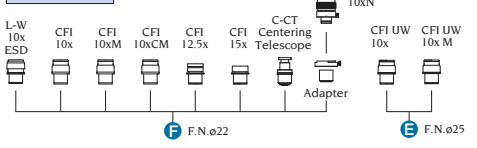


# LV100DA/LV-FMA/LV-FM/LV-IMA/LV-IM

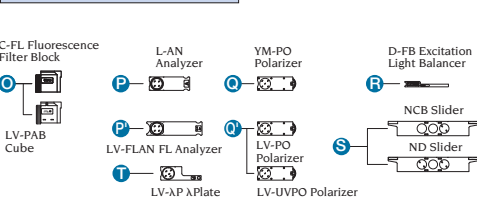
## Camera Mount



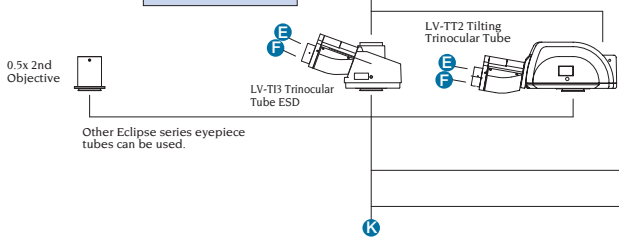
## Eyepieces



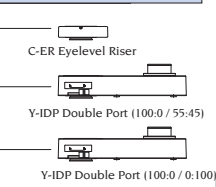
## Filter Blocks and Sliders



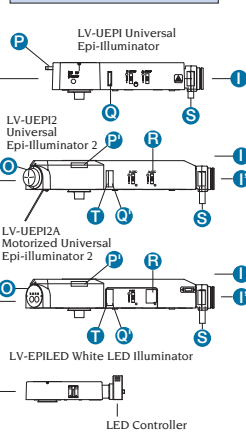
## Eyepiece Tubes



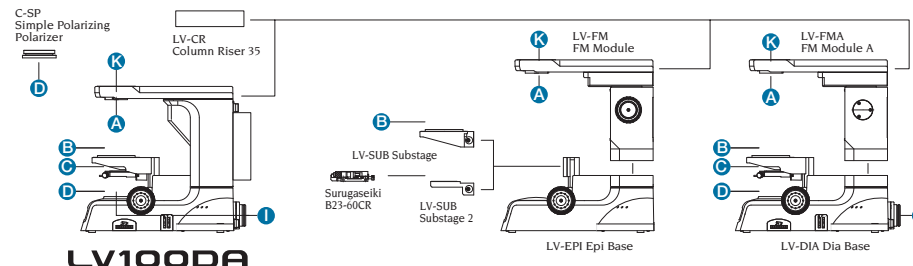
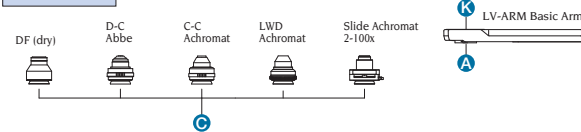
## Intermediate Modules



## Episcopic Illuminators

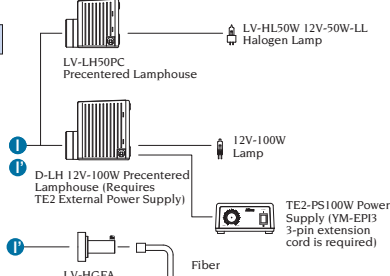


## Condensers

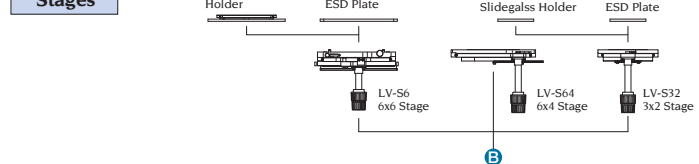


## LV100DA

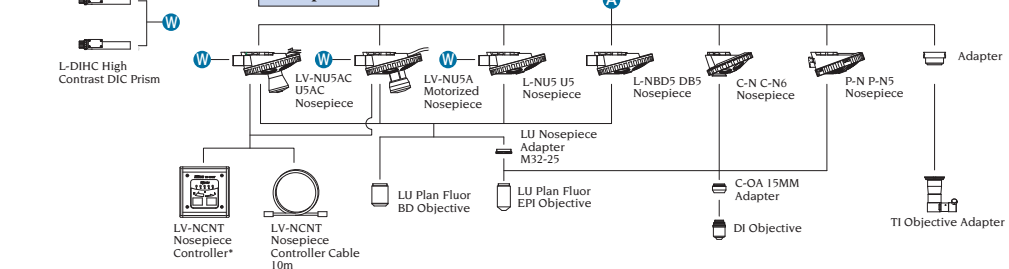
## Lamphouses



## Stages



## Nosepieces



\*Not necessary on the LV150A as the operation unit has been built into the main body.

Specifications and equipment are subject to change without any notice or obligation on the part of the manufacturer. December 2005. ©2005 NIKON CORPORATION

 <b>WARNING</b>	TO ENSURE CORRECT USAGE, READ THE CORRESPONDING MANUALS CAREFULLY BEFORE USING YOUR EQUIPMENT.
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