At the Center of Your Research Discoveries

The Essence of Cutting-edge Microscopy Research

Microscopes are critical tools for cutting-edge research in biology, medical and pharmaceutical sciences. To satisfy the demands of today’s high-end research, Nikon has developed the new Ti series of microscopes. Combined with NIS-Elements imaging software, the Ti supports diverse image acquisition and analysis methods such as multi-dimensional time-lapse imaging to acquire temporal, spatial and spectral information of fast, dynamic live cell processes. Intelligently designed automation and further expansion of Nikon’s powerful modular approach make the Ti ideal for applications such as confocal, FRET, High Content Analysis (HCS), and photobleaching/photo activation to study interaction of fluorescence protein molecules in living cells and tissues.

Nikon’s exclusive Perfect Focus System (PFS) is now incorporated into the microscope unit and allows for the simultaneous use of two separate levels for additional illuminators or detectors. The newly developed “full intensity” phase contrast unit enables acquisition of incredible phase contrast images without the use of light-attenuating phase contrast objectives.

Advanced functions of Ti-E dramatically expand research imaging possibilities

Fast and Automated
High-speed motorized components allow fast, coordinated and seamless image acquisition [P4]

Screening
Multimode scanning of well plate at an unprecedented speed [P5]

Time-lapse Imaging
Built-in Perfect Focus System (PFS) for automatic focus correction [P9]

High-quality Phase Contrast Observation
Newly developed “full intensity” optical components enable phase contrast with high NA non-phase-contrast objectives [P8]

Multiple Cameras
Image acquisition and analysis with multiple side ports and back port cameras [P9]

Motorized Laser TIRF (Total Internal Reflection Fluorescence) Observation
Alternate time-lapse observation between widefield fluorescence and TIRF (NA 1.49) images by fast illumination switching and motorized control of laser incident angle [P10]

Photo Activation
The photo activation unit allows cell marking and dynamic analysis using photoactivatable and photoswitchable proteins such as PA-GFP and Kaede [P11]

Confocal Imaging
Seamless integration with confocal microscope systems for high-performance spectral confocal imaging [P19]

The flagship model that is fully motorized for automated multimode image techniques and acquisition

The universal model that comes standard with four output ports and potential for motorized components

The basic model that can be dedicated to specific tasks, built with two output imaging ports
**Ti: Stress-Free Operation**

**High-speed Motorized Control and Acquisition**

The synchronized control of many motorized components such as the nosepiece, fluorescence filters, shutters, condenser turret and stage, allows researchers to use the microscope for a wide range of automated multi-dimensional experiments. Faster device movement and image acquisition decrease overall light exposure and subsequent photo-toxicity, leading to more meaningful data.

Enhanced speed of individual motorized components

- Operation and/or changeover speed of objectives, filter cubes, XY stage, excitation/barrier filters has been greatly enhanced, realizing stress-free operational environment that enables researchers to focus on observations and image capture routines.

- The newly developed controller that memorizes and reproduces observation conditions and the joystick that enables stage control at will make the microscope feel like an extension of your eyes and hands.

- The newly developed digital Controller Hub significantly increases motorized accessory speed by reducing the communication overhead time between components, boosting total operation speed.

- New multipoint snapshots of HeLa cells transiently expressing Venus-tubulin and mCherry-actin and stained with Hoechst33342 and DiD. (All in pseudo-color)

- Photos courtesy of: Kenta Saito and Takeharu Nagai, Research Institute for Electronic Science, Hokkaido University

Newly developed digital Controller Hub

- Signal communication
- Stage movement
- Filter changeover
- Image capture

Remarkably Fast Image Acquisition!

Screening image capture of 96 wells in three modes (two-channel fluorescence and phase contrast) is possible at a speed of more than twice that of conventional models.

Multipoint snapshots of HeLa cells transiently expressing Venus-tubulin and mCherry-actin and stained with Hoechst33342 and DiD. (All in pseudo-color)

Photos courtesy of: Tatsuo Saki and Takeshi Haga, Research Institute for Electronic Science, Hokkaido University

![Multipoint snapshots of HeLa cells](image-url)
Nikon’s exclusive and integrated Perfect Focus System (PFS) eliminates focus drift

Focus drift is one of the biggest obstacles in time-lapse observation. Nikon’s PFS design corrects focus drift during long-term observation and when reagents are added. Even with high magnification, high NA objectives and techniques like TIRF, your images are always in sharp focus. Additionally, incorporating PFS in the nosepiece unit saves space and does not limit the use of the Ti expanded infinity space stratum structure (see page 6).

### Real-time focus correction

The PFS employs high-performance optical offset, making real-time correction in the desired Z-plane possible. The state of the PFS is prominently displayed on the front of the microscope. Moreover, when the PFS is not in use, the optical component of the PFS can be simply retracted from the optical path.

### Concept of the Perfect Focus System

The diagram shows the case when an immersion type objective is used. A dry type objective is also available.

### Compatible with diverse fluorescence dyes with improved performance in broader wavelength range

By employing 870nm wavelength for the coverglass interface detection, near-infrared fluorescence dyes including Cy5.5 can be used. As the optical characteristics from ultraviolet to infrared range are also improved, the number of usable objectives is increased, realizing stable focus in applications requiring a wide range of wavelengths from Ca²⁺ concentration measurement in the UV to laser tweezers in the IR.

### Comprehensive Imaging Software NIS-Elements Provides Secure System Control

Nikon’s original imaging software NIS-Elements provides an integrated control of the microscope, cameras, components and peripherals and allows the programming of automated imaging sequences. The intuitive GUI makes setting of the experiment parameters easy and reproducible. NIS-Elements offers many tools and controls to facilitate flexible and reliable data acquisition, paired with a diverse suite of analysis tools for measurement, documentation and databasing.

#### NIS-Elements 6D time-lapse imaging system

By combining the Nikon motorized stage, motorized filter turret and “smart” specified shutters, acquisition of multipoint, multi-channel time-lapse images and Z-axis information of each of these points is possible.
High-quality Phase Contrast Images with High NA Lens, as well as Bright Fluorescence Images

Nikon’s world-leading optical designers have developed the unique “full intensity” external phase contrast unit. With this revolutionary system, a phase ring is incorporated in the microscope body instead of the objective lens, allowing the use of specialized objectives without phase rings and acquisition of high-quality images with high NA objectives. Moreover, using the objectives without a phase ring enables capturing of “full intensity” bright fluorescence images.

Phase ring is incorporated in the microscope body

Incorporating a phase ring—that was normally positioned within the phase contrast objective lens—into the external phase contrast unit optically allows use of specified high NA objectives to produce high-resolution phase contrast images. Four types of phase contrast rings are available according to the objectives used. (common for Ti-E/U/S)

Changing the conventional concept of phase contrast

● Unprecedented high resolution
Nikon’s high-performance objective lenses, including the 60x and 100x TIRF objectives with the world’s highest numerical aperture of 1.49 incorporating spherical aberration correction collars, deliver high-resolution phase contrast images that cannot be captured with any standard phase contrast objective.

● Bright fluorescence image using same objective
Because there is no light loss due to a phase ring, bright “full intensity” fluorescence, confocal and TIRF images can be captured using the same objective as well as providing phase contrast observation.

● Use of laser tweezers without changing lens
Because an objective without a phase ring can be used for phase contrast observation, use of laser tweezers is possible without changing the objective lens.

Phase contrast observation with water immersion objective

It is now possible to use a water immersion objective for phase contrast observation. Great, high-resolution—refractive index matched—phase contrast images with minimal aberration of deep specimen areas can be captured.

● High resolution effective for image analysis
Because phase contrast observation is also possible with the same objective used for TIRF observation as well as DIC observation, phase contrast images with less oblique background shading than that of DIC observation are captured, allowing high-precision data processing and image analysis such as cell contour definition of TIRF image specimen.

Bright fluorescence image using same objective

Because there is no light loss due to a phase ring, bright “full intensity” fluorescence, confocal and TIRF images can be captured using the same objective as well as providing phase contrast observation.

Back port enables multiple camera imaging

Use of an optional back port expands the image capture capability. Used in combination with the side port it allows simultaneous image acquisition for two wavelengths with two cameras. For example, when observing interaction between fluorescence proteins with FRET ( Förster Resonance Energy Transfer) and intensity difference between GFP and YFP is great, individual camera sensitivity adjustment allows comparison of high S/N ratio images.

Stratum structure enables flexible extandibility

The Ti employs the stratum structure that takes advantage of infinity optics. In addition, the PFS is incorporated in the nosepiece unit, allowing two optical component levels in addition to the PFS to be attached by using the “stage up position set.” Simultaneous mounting of laser tweezers and photo activation unit as well as multiple stacked epifluorescence filter turrets is possible. Each of the tiered motorized filter cube turrets can be controlled individually.

Example: In addition to the PFS, a photo activation module (upper tier) and a back port (lower tier) are mounted.

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**Ti: Advanced Applications**

**Advanced Fluorescence Illumination Functions Respond to Leading Bio-imaging from Live Cell to Single Molecule**

The Ti series provides a diverse choice of fluorescence illuminators to support cutting-edge research of cell biology, molecular biology and biophysics using the new imaging and photo activation technologies.

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**Photo activation**

When fluorescence proteins such as Kaede and PA-GFP are exposed to 405nm illumination, fluorescence characteristics change. For example, Kaede changes fluorescence colors from green to red, and PA-GFP increases fluorescence intensity 100 times. Kaede and PA-GFP are used, respectively, for selectively highlighting cells and proteins of interest within live specimens and studying their dynamics. The photo activation illuminator utilizes lasers ranging from 405nm to 647nm to produce target spots of varying diameters, allowing time-lapse recording between fluorescence and multi-wavelength TIRF images.

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**Principle of TIRF (Total Internal Reflection Fluorescence)**

When light is incident to the coverslip at an angle greater than the critical angle (θ) for Total Internal Reflection, the light no longer propagates through the specimen, but sets up an evanescent field at the coverslip-specimen interface that can excite fluorescence in the specimen in an optical section less than 100nm. By exciting such a thin section within the specimen, extremely high S/N data can be acquired.

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**Time-lapse imaging by switching TIRF and epi-fluorescence observation**

For observation of cell membrane dynamics and single molecules.
For analysis of intracellular Ca²⁺ concentration

Using FRET (Förster Resonance Energy Transfer) technique, intermolecular interactions between molecules within close proximity of one another can be detected and measured. Using the optional back port, each FRET channel can be separated by wavelength and sent to separate cameras simultaneously. This enables the capture of high-resolution images in the entire frame for each wavelength. Even when intensity difference between wavelengths is large, a high-quality FRET image can be captured by adjusting camera sensitivity for each wavelength.

Imaging histamine-evoked Ca²⁺ release in mammalian cells reported by a FRET-based Ca²⁺ indicator, YC3.60
Photo courtesy of: Kenta Saito and Takeharu Nagai, Research Institute for Electronic Science, Hokkaido University

White light TIRF

This unit allows high-performance yet cost-effective total internal reflection fluorescence microscopy as well as oblique and standard widefield fluorescence techniques using mercury illumination. The wide wavelength band of mercury illumination makes multiple wavelength TIRF observation possible by simply changing filter cubes.

Photo courtesy of: Yasushi Okada, Cell Biology, Graduate School Medical Department, The University of Tokyo

Epi-fluorescence

Chromatic aberration has been significantly improved over a broad wavelength range to provide sharper and brighter fluorescence images.

Photo courtesy of: Richard Cheney Ph.D., UNC Chapel Hill

FRET

With the integration of the laser TIRF illuminator and photo-activation unit, both functions are now combined on one microscope. The user can switch between the two functions with ease.

Photo courtesy of: Hiroshi Saito and Takaharu Nagai, Research Institute for Electronic Science, Hokkaido University
Ti: Excellent Imaging

Use of Optimal Optical Technology for Each Observation Method Allows Uncompromised Image Capture

Nikon’s uncompromising optical technologies provide diverse multi-modal visual information of a specimen using any observation method, delivering the full range of cellular details to researchers.

Nikon Advanced Modulation Contrast

Nikon has developed dedicated objectives for advanced modulation contrast. Colorless and transparent samples can be observed in high relief with a plastic dish, which is not possible in DIC observation. The direction of contrast can be matched to S Plan Fluor ELWD objectives, thereby allowing optimal contrast selection for techniques like microinjection and ICSI.

Nomarski DIC

The perfect balance of high contrast and high resolution is imperative for the observation of smaller structures. Nikon’s unique DIC system is designed to achieve uniform high resolution images even at low magnifications. The new DIC sliders (dry types) include high-resolution and high-contrast choices.

Fast and comfortable operation with motorized components

- Operation buttons on both sides of microscope body
- VFD screen and operation buttons on front of microscope body
- Remote controller touch panel and preset buttons

Phase contrast

For critical phase contrast observation, the CFI Plan Fluor ADH 100x (Oil) objective is available. This objective reduces halos and doubles the contrast of minute cell detail compared to conventional phase contrast objectives. It enables phase contrast observation of specimens with low-contrast minute structures within the cell.

Enhanced Operability Enables Comfortable Observation

All buttons and control switches for motorized operation are designed considering ease of operation, visibility and understandability. Users can concentrate on their research without being hindered by microscope operations.

- Motorized analyzer cube
- Filter cube style DIC analyzer
- Darkfield
- Operation buttons on both sides of microscope body
- Fluorescence filter changeover, objective changeover, objective retraction, 2-axis coarse/ fine changeover, PFS on/off control and offset storage, diascopic illumination on/off control can be operated quickly with easy-to-identify buttons on the microscope body.

- Phase contrast
- PFS offset dial
- Newly developed joystick and ergonomic controllers
- Phase contrast

By inclining the front part of the microscope’s body slightly backward the distance between the operator’s eyepoint and the specimen has been reduced by about 40mm, improving visibility and ergonomic design.
### Motorized Elements for Comfortable Observation

**Fast, automatic operation by integrated control with NIS-Elements software**

Microscopes have evolved from merely observation devices to software-controlled data acquisition devices. Nikon’s Ti series not only features fast and comfortable motorized operation, but it also realizes acquisition of reliable data by controlling all motorized components for automatic imaging with the NIS-Elements imaging software.

<table>
<thead>
<tr>
<th><strong>● Nikon motorized XY stage</strong></th>
<th><strong>● Piezo Z stage</strong></th>
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</thead>
<tbody>
<tr>
<td>Fast and precise positioning is possible. Suitable for multipoint time-lapse observation. (Available as encoded or non-encoded versions)</td>
<td>High-speed, precise Z-axis control is possible. (Manufactured by Mad City Labs, Inc.)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>● Motorized nosepiece</strong></th>
<th><strong>● Motorized filter rotating turret</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>Six objective positions can be changed. (Photo shows motorized PFS nosepiece)</td>
<td>Position of fluorescence filter cubes can be changed in 0.3 sec. per position. (Photo shows high-performance type)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>● Motorized condenser turret</strong></th>
<th><strong>● Motorized barrier filter wheel</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>Motorized condenser changeover is possible.</td>
<td>Fluorescence barrier filter positions (5 positions) — using 25mm filters — can be changed at a high speed of 0.15 sec. per position.</td>
</tr>
</tbody>
</table>

**Ti-E can be fully motorized with the HUB-A**

Communication speed is dramatically increased through proprietary motorization algorithms, innovatively accelerating the sequence of operation. The Ti-E assures more reliable and efficient data acquisition in the research field.

**Four components of Ti-U/S can be motorized with the HUB-B**

By attaching HUB-B unit to the Ti-U/S, two optional motorized components, such as fluorescence filter turret and condenser turret, in addition to the stage and nosepiece, can be motorized, greatly enhancing flexibility.
NIS-Elements D, designed for easy image acquisition yet powerful and economical, is also available.

The National Institute of Advanced Industrial Science and Technology (AIST)

Photos courtesy of: Kaoru Katoh and Ayako Kojima, Neuroscience Research Institute, with YFP, and mitochondria labeled with DsRed. Spectral image captured with 408nm and 488nm laser exposure (left). The fluorescence spectra of the captured image are unmixed using reference spectra (right).

Ar (advanced research) package that allows image acquisition up to 6D (X, Y, Z, time, Lambda, Ti-E)

6D/4D packages selectable depending on purpose

NIS-Elements has been developed by Nikon, a leader in microscope and camera technology. It allows automated operations from advanced image acquisition to analysis and measurement by integrating control of microscope, camera and peripherals. It is Nikon’s modular imaging software ideally integrated for all microscopy applications.

Advanced Confocal Laser Scanning Microscopes optimally match the Ti-E

Confocal microscope

- A1R/A1
  - The A1R with a revolutionary hybrid scanner realizes ultrastiff and high-resolution imaging
  - Hybrid scanner capable of high-speed imaging at 430 fps (512 x 32 pixels) allows simultaneous imaging and photo activation (A1R)
  - High-resolution imaging up to 4096 x 4096 pixels
  - With the VNAS pixels unit, flare can be eliminated and image brightness retained; different sections can be imaged after image acquisition
  - Electronic mirror with 30% increased fluoroscan efficiency provides high image quality

- True spectral imaging confocal microscope
  - A1Rsi/A1si
  - High-performance spectral detector supports simultaneous excitation of multiple wavelengths
  - Acquisition of 32 channels (512 x 32 pixels) at 24 fps in a single scan
  - Accurate, real-time unmixing
  - Simultaneous excitation of four lasers
  - V-filtering function adjusts individual sensitivity of up to four spectral ranges, allowing production of customized filters that are optimal for various fluorescence probes

Multiphoton confocal microscope

- A1R-MP
  - High-speed imaging of deep area in a living specimen
  - Resonant scanner enables imaging up to 420 fps (512 x 32 pixels)
  - Deep imaging with high sensitivity NDD (non-descanned detector)
  - Sharper, brighter imaging with high NA objectives deposited with Nano Crystal Coat
  - High-speed, high-precision unmixing with NDD
  - Multiphoton laser beam can be automatically aligned with a single click

Confocal microscope

- C1 plus
  - Personal confocal microscope now supports FRAP
  - 1105nm optical zoom of ROX
  - ROX scanning is possible with an optional AOM/ATF
  - Accommodates a greater variety of lasers with wavelengths ranging from 405 to 640nm
  - 4-channel simultaneous acquisition such as 3-channel confocal plus DIC

- True spectral imaging confocal microscope
  - C1si
  - Spectra across a wide 320nm range captured with a single scan
  - High-speed, low-invasive imaging by a single scan acquisition
  - Unmixing of spectral images without crosstalk
  - Nikon’s proprietary DESS and DSP technology for bright images
  - Accuracy of spectra is maintained with diverse correction technologies

Digital Sight series digital cameras for microscopes

These camera systems allow for smooth integration with a microscope and other products. Different combinations of camera head and control unit meet the requirements for any microscopic image acquisition.

Camera heads

- DS-Q1
  - Definitive camera for fluorescence time-lapse imaging features high sensitivity, low noise, superior quantitative linear response and quantum efficiency, wide dynamic range and high frame rate.
- DS-W1
  - High-speed 2.0-megapixel color camera head displays smooth, high-quality live images.
- DS-R1
  - Ultra-high resolution 12.7-megapixel, 2250TV/line cooled color camera that provides faithful reproduction of specimen color and has display of live images. A Peltier cooling mechanism reduces heat noise.
- DS-L2
  - Standalone control unit with high-resolution large 8.4-in. LCD monitor allows image capture without a PC. Pre-programmed imaging modes realize optimal imaging settings by choosing icons of the illumination method. Annotation, calibration and measurement tools are provided. Various digital interfaces and networking function enable images to be shared. Various USB 2.0 media storage, HUB and host control are provided.

Control units

- DS-S2
  - USB2.0PC-use control unit is suitable for operations from advanced image capture to image processing and analysis by integrating control of camera, peripherals and microscope with NIS-Elements imaging software.
- DS-S2
  - DS-145
  - DS-114
  - DS-104
  - DS-84
  - DS-64

Comprehensive Imaging & Analysis Software

Imaging software NIS-Elements

NIS-Elements has been developed by Nikon, a leader in microscope and camera technology. It allows automated operations from advanced image acquisition to analysis and measurement by integrating control of microscope, camera and peripherals. It is Nikon’s modular imaging software ideally integrated for all microscopy applications.
**Accessories**

- **Incubator**
  The internal temperature of the case is maintained at 37°C. However, temperature adjustment from room temperature to 50°C is possible. The incubator is compatible with both the rectangular stage and the motorized stage. Various dishes can be used, including a well plate, with different inside attachments.

- **Stage incubation system INU series**
  It sustains the internal temperature at 37°C with humidity of 90% and CO₂ of 5% to keep the specimen in a stable and precise condition for about three days. A special technique is employed to minimize focus drift caused by thermal expansion of a stage. The glass heater on top of the chamber prevents condensation and enables clear images.

- **NT-88-V3 micromanipulator system**
  A packaged set of compact instrumentation—about half the size of a conventional model—for cellular micromanipulation, the NT-88-V3 is ideal for IVF (in-vitro fertilization), ICSI (intra-cytoplasmic sperm injection), cryopreservation, and many other biological applications. This dual-handled design provides superior ergonomics and operability. Remote oil hydraulic operation minimizes pipette vibration. An index of the coarse manipulator enables easy position adjustment of the pipette.

- **Ergonomic Eyepiece Tube**
  Eyepiece inclination is adjustable from 15° to 45°. Includes darkslide shutter and Bertrand lens.

- **Binocular Eyepiece Tube D**
  Observation of conoscopic image with incorporated Bertrand lens is possible and a darkslide shutter is provided.

- **Binocular Eyepiece Tube S**
  Standard model

- **Eye Level Riser**
  Two 25mm emission filters can be installed.

- **Stage Base**
  Stage base for configuration without diascopic illumination

- **Back Port Unit**
  Combined use with stage up riser allows a camera to be mounted on a back port.

- **High NA Condenser (Oil/Dry)**
  Perfect for observation with high NA objectives

- **CLWD Condenser**
  For high NA long working distance objectives

- **NAMC Condenser**
  For observation of Nikon Advanced Modulation Contrast

- **Stage Ring**
  Lightsources and illumination optics for high S/N images

- **Epi-fluorescence Attachments**
  For attaching two light sources

- **Double Lamphouse Adapter**
  For attaching two light sources

- **Thermal plate warmer ThermoPlate MATS series**
  A temperature controllable stage ring with a glass heating plate keeps the specimen at a set temperature. Temperature is adjustable from room temperature to 50°C in 0.1°C increments.

- **Stage Up Position Set**
  Stage-height can be raised by 70mm to mount multiple components utilizing expanded stratum structure.

- **Eye Level Riser**
  Two 25mm emission filters can be installed.

- **Plain Eyepiece Tube Base Unit**
  TV port is incorporated.

- **Binocular Eyepiece Tube S**
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### Specifications

<table>
<thead>
<tr>
<th>Main body</th>
<th>Port</th>
<th>Ti-E, Ti-E/B</th>
<th>Ti-U, Ti-U/B</th>
<th>Ti-S, Ti-S/L100</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>4</td>
<td>4</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Ti-E: eyepiece 100% left 100%, right 100%, eyepiece 20%/left 80% left 100%, right 100%, bottom 100% Motorized port switching</td>
<td>Ti-U: eyepiece 100%, left 100%, right 100%, optional Ti-U/B: eyepiece 100% left 100%, right 100%, bottom 100% Motorized port switching</td>
<td>Ti-S: eyepiece 100%, eyepiece 20%/left 80% left 100% left*100% bottom 100% right 100% Manual port switching</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Two ports (tube base unit with side port, back port) can be added optionally. Motorized port switching</td>
<td>*Changeable to right as option.</td>
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</tr>
<tr>
<td>Focusing</td>
<td></td>
<td>Via motorized nosepiece up/down movement Stroke (motorized): up 7.5mm, down 2.5mm Motorized (pulse motor) Minimum step: 0.025µm Maximum speed: 2.5mm/sec or higher Motorized escape and refocus mechanism (coarse/ fine switchable)</td>
<td>Via nosepiece up/down movement Stroke (manual): up 8mm, down 3mm Coarse stroke: 5.0mm/rotation Fine stroke: 0.1mm/rotation Minimum fine reading: 1µm Coarse refocusing mechanism —</td>
<td></td>
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<tr>
<td>Intermediate magnification</td>
<td>1.5x</td>
<td>—</td>
<td>—</td>
<td></td>
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<tr>
<td>Other</td>
<td>Light intensity control, Light on/off switch, VFD on front of body, Operation with controller</td>
<td>—</td>
<td>—</td>
<td></td>
</tr>
<tr>
<td>Eyepiece tube</td>
<td>Eyepiece tube body</td>
<td>Ti-TD Binocular Tube D, Ti-TS Binocular Tube S, Ti-TERG Ergonomic Tube</td>
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</tr>
<tr>
<td></td>
<td>Eyepiece tube base</td>
<td>Ti-T-B Eyepiece Tube Base Unit, Ti-T-BPH Eyepiece Tube Base Unit for PH, Ti-T-BS Eyepiece Tube Base Unit with Side Port</td>
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<td>—</td>
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<tr>
<td>Eyepiece lens</td>
<td>CR10x, 12.5x, 15x</td>
<td>—</td>
<td>—</td>
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<tr>
<td>Illumination pillar</td>
<td>Ti-DS Diascopic Illumination Pillar 30W, Ti-DH Diascopic Illumination Pillar 100W</td>
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<tr>
<td>Condenser</td>
<td>ELWD condenser, LWD condenser, NAMC condenser, ELWD-S condenser, High NA condenser, Darkfield condenser, CLWD condenser</td>
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<tr>
<td>Nosepiece</td>
<td>Ti-N6-6 Motorized Sextuple DIC Nosepiece, Ti-N6 Sextuple Nosepiece, Ti-NID6 Sextuple DIC Nosepiece, Ti-NID6-PFS Perfect Focus with Motorized Sextuple DIC Nosepiece</td>
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<tr>
<td>Objectives</td>
<td>CF100 objectives</td>
<td>—</td>
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<tr>
<td>Stage</td>
<td>Ti-S-ER Motorized Stage with Encoders, Ti-S-E Motorized Stage—Cross travel: X110 x Y75mm, Size: W400 x D300mm (except extrusions) Ti-SR Rectangular Stage, Ti-SRF Rectangular Stage with front positioned knob, Ti-SSR Short-handle Rectangular Stage—Cross travel: X70 x Y90mm, Size: W310 x D300mm Ti-SP Plain Stage—Size: W260 x D300mm Ti-SAM Attachable Mechanical Stage—Cross travel: X126 x Y84mm when used with Ti-SP Plain Stage</td>
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<td></td>
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<tr>
<td>Motorized functions</td>
<td>Focusing, Port switching, Coarse focusing</td>
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<td></td>
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<tr>
<td>Epi-fluorescence attachment</td>
<td>Sextuple fluorescence filter cube rotating turret, Filter cubes with noise terminator mechanism, Field diaphragm centerable, 33mm ND4/ND8 filters, 25mm heat absorbing filter Option: Motorized sextuple fluorescence filter cube rotating turret, Motorized excitation filter wheel, Motorized barrier filter wheel</td>
<td>—</td>
<td>—</td>
<td></td>
</tr>
<tr>
<td>Nomarski DIC system</td>
<td>Contrast control: Senarmont method (by rotating polarizer) Objective side prism: for individual objectives (installed in nosepiece) Condenser side prism: LWD N1/N2/3N, (Dry), NAMC N2/3N (Dry/Oil) types</td>
<td>—</td>
<td>—</td>
<td></td>
</tr>
<tr>
<td>Weight (approx.)</td>
<td>Phase contrast set: 41.5kg Epi-fl: set: 45.4kg</td>
<td>Phase contrast set: 38.5kg Epi-fl set: 42.3kg</td>
<td>Phase contrast set: 29.6kg Epi-fl set: 33.4kg</td>
<td></td>
</tr>
<tr>
<td>Power consumption (max.)</td>
<td>Full set (with HUB-A and peripherals): approx. 95W</td>
<td>Full set (with HUB-B and peripherals): approx. 40W</td>
<td>—</td>
<td></td>
</tr>
</tbody>
</table>
Nikon’s Inverted Microscope Legacy and the History of Discovery

- **2007**
  - *Eclipse Ti-E*, the next generation of discoveries begins today
  - PFS (perfect focus system)
  - Laser TIRF
  - Simplified DNA sequencing on the TE2000

- **2000**
  - *Eclipse TE2000*
  - IR laser trapping
  - Special inverted model used in space
  - Cumulina the mouse cloned on the TE300

- **1996**
  - *Eclipse TE300*
  - Breakthroughs: CFI 60 optics expanded infinity space
  - Dolly the sheep cloned on the Diaphot 300
  - First intracytoplasmic sperm injection (ICSI) on the Diaphot

- **1990**
  - *Diaphot 300*
  - High NA DIC
  - Rectified DIC
  - Extra long working distance optics
  - The brightest fluorescence
  - World’s first IVF baby on the Diaphot TMD

- **1980**
  - *Diaphot TMD*, a revolutionary market leader for inverted microscopy
  - Beginning of FURA/CA^+ 340nm imaging

- **1976**
  - First CF optics
  - First Hoffman Modulation Contrast®

- **1966**
  - *Model MSD*, the first affordable tissue culture microscope

- **1964**
  - *Model M*, the legacy begins
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**Landmark achievements for Nikon**
- Nikon’s unique technical innovations in inverted microscopy
- Key scientific breakthroughs and Nikon’s participation in some of these
Nikon promotes the use of eco-glass that is free of toxic materials such as lead and arsenic.

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WARNING

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

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