Nikon

Digital Imaging & Metrology

Nikon Measuring Microscopes
MM-400/800 Series

Digital Imaging & Metrology

Next-Generation Measuring Microscopes

MM-400/800 Series

Nikon is proud to present the MM-400/800 series of Measuring Microscopes, which incorporate key performance features expected in an advanced next generation measuring microscope:

• Greater Accuracy
• Digital Imaging and Vision Processing Metrology
• Larger Stage for Increased Workpiece Handling
• Non Contact Z-height Measurements
• Coordination with Data Processing Systems

- The new Nikon measuring microscope can be equipped with a TTL Laser AF (universal type) and a new Focusing Aid mechanism that provides sharper and more accurate focusing. High precision Z-axis measurement is simpler than ever.

- Digital image capture using a Nikon digital camera and E-Max metrology software allows rapid measurement with precise auto edge detection.

- A fully motorized high power microscopy model is also available for digital imaging.

- By offering many options in illuminators and light sources, an expanded observation range has been achieved. These include a high-intensity white LED illuminator for brightfield observation, a universal epi-illuminator to respond to various observation needs, and a 12V-50W halogen light source.

- A motorized Z-axis movement mechanism (LM models) simplifies accurate vertical motion through the use of a dedicated controller.

- Added body strength enables the use of larger stages, such as the newly developed 12x8 stage, allowing for larger workpieces.

- Ease of operation has been greatly improved by use of various motorized controls and ergonomic design. Even the 12x8 stage is easy to manipulate despite its large size.

- Stands with the integrated MM Controller interface and the newly developed DP-E1 Data Processor or SC counters and PC-based E-Max data processing software provide excellent geometric data processing and storage.

Function Icons

AF — **Autofocus (Universal Type)**
TTL Laser AF (Autofocus) enables quick perfect focusing.

FA — **Focusing Aid**
The Focusing Aid (FA) ensures accurate Z-axis focusing.

UFA — **Universal Epi-illuminator Focusing Aid**
A universal epi-illuminator with Focusing Aid (FA) mechanism.

Z-axis Motorized Motion
A dedicated controller provides easy and accurate up/down movements.

2 — **Dual Side Coarse/Fine Focus Knob**
Coarse/fine focus knobs are on both sides.

L — **Built-in Z-axis Linear Scale**
Z-axis reading is possible for non-contact height measurement.

T — **Trinocular Optical Head**
Ideal for configuration with photomicrography equipment.

M — **Monocular Optical Head**
For applications where cost performance is priority.

U-EPI — **Universal Epi-illuminator**
Supports a wide range of applications.
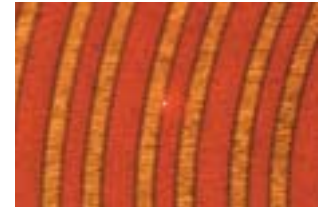
LED — **LED Illuminator**
A high-intensity white LED illuminator for brightfield use.

Stellar New Features Enhance Z-axis Measurement Accuracy
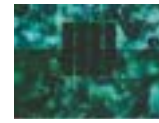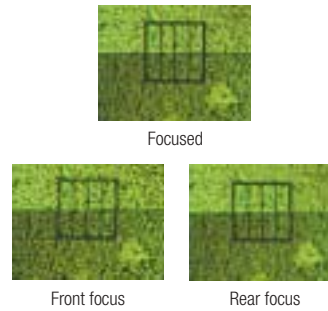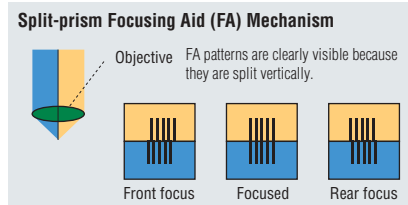
TTL Laser AF (Universal Type)
These are the first measuring microscopes to offer an optional TTL Laser Auto-Focus. This Laser AF system features a 0.5 second focusing speed with a repeatability as high as 0.5μm (2).

Focusing Aid (FA)
The newly developed split-prism Focusing Aid (FA) delivers sharp patterns to allow accurate focusing during Z-axis measurements. Measurement errors due to differences in the depth of focus of different objectives are minimized.

Laser AF Tracking on FPC

Split-prism Focusing Aid (FA) Mechanism

Objective — FA patterns are clearly visible because they are split vertically.

Front focus   Focused   Rear focus

Focused

Low reflection surface can be precisely focused, too.

Front focus   Rear focus

Motorized Z-Axis Movement (LM Model Stands)
A motorized vertical movement mechanism with a 10mm/sec. speed has been incorporated. Up/down control is accurately provided with a dedicated controller.

Improved Illuminators Broaden Observation Ranges

A high-intensity white LED illuminator is provided as standard for brightfield use. This illuminator features no bulb replacement and constant color temperature, enabling measurement with high-precision and efficiency. For the universal type (except FA), a newly designed 12V-50W halogen light is included. Brightness has been substantially improved, particularly at high magnifications.

Built-in Continuous Light Control
A continuous light control is built into the system, enabling light control from the PC without touching the dial on the main body. Measurements can now be made under the same conditions, assuring precise video edge detection for repeatable measurements.

LED Illuminator
This high-intensity illuminator uses white LED and comes with a quick light intensity control.

8-Segment LED Ring Light CYN-E1
This ring light enables illumination control from eight directions, eliminating the need to pull out and adjust the fiber illuminator each time a measurement is made.
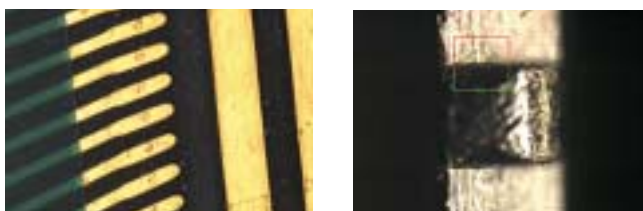
Digital Imaging & Vision Processing

The use of a Nikon microscope digital camera and E-Max software will streamline your workflow from observation and capture, to the storage of high-definition digital images of your workpieces.

MM Controller Backpack Interface

Illumination, X/Y stage and Z data can be connected to the MM Controller as an interface to an external computer running E-Max software for data processing and system control.

New 12x8 Stage for Large Workpieces
(MM-800 only)

An enhanced body design using Computer Aided Engineering (CAE) for stress analysis enables the mounting of a larger stage to accommodate larger workpieces. A 300 x 200mm (12" x 8") stroke stage can be mounted to the MM-800.

Improved Interface with Data Processor and Software

Interfacing to data processors and PC software has been greatly improved to include comprehensive support throughout the entire measurement process, from image capture and measurements, to analysis and data storage.

Data Processor DP-E1
The DP-E1 Data Processor is compact, yet easy to use. For quick measurements and data processing you can place the read-out display near the eyepiece while the control pad is placed at your fingertips. The DP-E1's seamless interface to a PC platform makes it easy to perform computations and management of your measurement results.

Data Processing Software E-MAX Series
Digital image measuring performance of the E-MAX software has been upgraded. Combined with Nikon's digital camera and measuring microscope, the system achieves digital image measurements with precision never before possible.

3rd-party DRO Connectable (S Models)
The MM-400S, SL and MM-800S, SL models were created for use with Metronics Quadra-Chek and other 3rd-party digital read-outs. They offer an economical alternative if non-Nikon data processors are used.

QuadraChek is a trademark of Metronics Inc.

DP-E1

High-Precision Type (Factory Option)

The design of the MM-400/800 series measuring microscope has been revamped to provide users with increased flexibility in choosing modules for system configurations. You can configure the optimum system according to your needs, including an ultrahigh-precision system boasting precision as high as 1.5+L/100μm (L: measurement length in mm) with combination correction. Also, since the construction of the entire microscope has improved rigidity, the system exhibits excellent reliability during measurements with configurations consisting of a digital camera and/or other accessories.

* For details on system configuration, contact Nikon.

MM-400/800 Combination Precision
- Without correction: (3+L/50) μm
- With correction: (1.5+L/100) μm
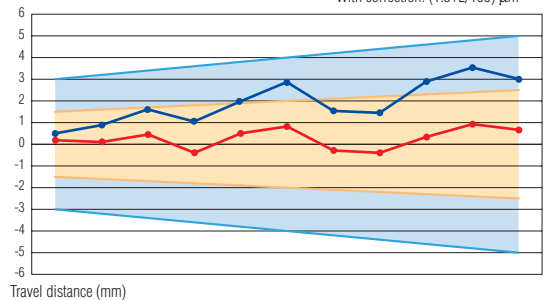
Travel distance (mm)

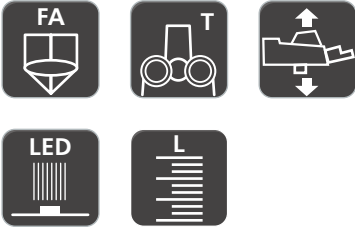The LM models have a built-in motorized Z-axis scale, enabling accurate 3-axis measurements. In addition, the optional Focusing Aid uses a split prism to ensure Z-axis focusing accuracy and minimize measurement errors caused by the difference in the objective's depth of focus.

MM-800/LM

Configured with 10x6 stage, trinocular optical FA head

Connector - Housing Inside
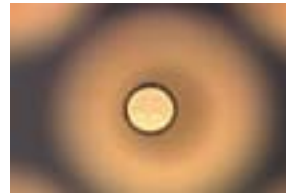
Applications:
Dies & molds, Finely machined parts, Stamped parts, Injection molded parts, Medical devices

PGA - Insertion Pin
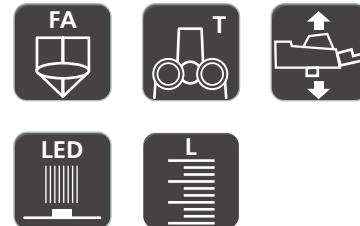
MM-400/LM

Configured with 6x4 stage, trinocular optical FA head

Specifications

*TE2-PS100W power supply is required

Type		MM-800/LM	MM-400/LM
Z-axis movement		Motorized (max. speed: 10mm/sec)	
MM controller backpack interface		Built-in	
Optical head		Monocular optical head, Trinocular optical head, Trinocular optical FA head	
Z-axis linear scale		Built-in	
Eyepiece		CFWN10x (Field No. 20)	
Objective		Measuring microscope objectives	
Stage		12x8, 10x6, 8x6	6x4, 4x4, O3L, 2x2
Light source	Diascopic	LED diascopic illuminator (standard), 12V-50W halogen light source (option)*	
	Episcopic	LED episcopic illuminator	
Max. workpiece height		200mm	150mm
Dimensions (W x D x H)/weight		385 x 785 x 725mm/approx. 65kg	300 x 600 x 638mm/approx. 50kg

With a built-in Z-axis scale, this type is the basic standard for Nikon's measuring microscope series. Various models are available—with or without Focusing Aid, monocular or trinocular optical head. You can select the best one according to your measuring range, use and budget. The SL model is recommended for 3rd-party (non-Nikon) digital read-outs and therefore does not include the MM controller that interfaces with the Nikon DRO.

Plastic Gear Teeth with Smaller Module

MM-800/L
MM-800/SL with 3rd-party DRO

Configured with 8x6 stage, trinocular optical FA head

Applications:
Dies & molds, Finely machined parts, Stamped parts, Injection molded parts, Medical devices

Black Injection Molding Parts - Connector

MM-400/L
MM-400/SL with 3rd-party DRO

Configured with 4x4 stage, trinocular optical head

Specifications

*TE2-PS100W power supply is required

Type		MM-800/L	MM-800/SL	MM-400/L	MM-400/SL
Z-axis movement		Manual (dual side coarse/fine focus knob)			
MM controller backpack interface		Built-in	—	Built-in	—
Optical head		Monocular optical head, Trinocular optical head, Trinocular optical FA head			
Z-axis linear scale		Built-in			
Eyepiece		CFWN10x (Field No. 20)			
Objective		Measuring microscope objectives			
Stage		12x8, 10x6, 8x6		6x4, 4x4, O3L, 2x2	
Light source	Diascopic	LED diascopic illuminator (standard), 12V-50W halogen light source (option)*			
	Episcopic	LED episcopic illuminator			
Max. workpiece height		200mm		150mm	
Dimensions (W x D x H)/weight		385 x 785 x 725mm/approx. 65kg		300 x 600 x 638mm/approx. 50kg	

These are the basic models in the MM-400/800 series. High in cost performance, these models are expressly designed for 2-axis (XY) applications. To meet your application and budget, various models are available—monocular or trinocular optical heads, plus 12x8 large stage or 2x2 small stage sizes are available. The 400S and 800S models are specifically for use with non-Nikon digital read-outs.
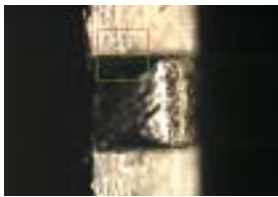
MM-800

Configured with 8x6 stage, trinocular optical head

Applications:
Dies & molds, Finely machined parts, Stamped parts, Injection molded parts, Medical devices

MM-400

Configured with 2x2 stage, monocular optical head

Specifications

*TE2-PS100W power supply is required

Type		MM-800	MM-400
Z-axis movement		Manual (dual side coarse/fine focus knob)	
MM controller backpack interface		Built-in	
Optical head		Monocular optical head, Trinocular optical head	
Z-axis linear scale		—	
Eyepiece		Dedicated 10x (Field No. 20)	
Objective		Measuring microscope objectives	
Stage		12x8, 10x6, 8x6	6x4, 4x4, O3L, 2x2
Light source	Diascopic	LED diascopic illuminator (standard), 12V-50W halogen light source (option)*	
	Episcopic	LED episcopic illuminator	
Max. workpiece height		200mm	150mm
Dimensions (W x D x H)/weight		385 x 785 x 725mm/approx. 65kg	300 x 600 x 638mm/approx. 50kg

MM-800/S with 3rd-party DRO

Applications:
Stamped parts, Injection molded parts,
Medical devices, Drills, Micro tooling,
Automotive Components

Configured with 8x6 stage,
trinocular optical head,
Quadra-Chek®300

MM-400/S with 3rd-party DRO

Configured with O3L stage,
trinocular optical head,
Quadra-Chek®200

Specifications

*TE2-PS100W power supply is required

| Type		MM-800/S	MM-400/S
Z-axis movement		Manual (dual side coarse/fine focus knob)	
MM controller backpack interface		—	
Optical head		Monocular optical head, Trinocular optical head	
Z-axis linear scale		—	
Eyepiece		CFWN10x (Field No. 20)	
Objective		Measuring microscope objectives	
Stage		12x8, 10x6, 8x6	6x4, 4x4, O3L, 2x2
Light source	Diascopic	LED diascopic illuminator (standard), 12V-50W halogen light source (option)*	
	Episcopic	LED episcopic illuminator	
Max. workpiece height		200mm	150mm
Dimensions (W x D x H)/weight		385 x 785 x 725mm/approx. 65kg	300 x 600 x 638mm/approx. 50kg

High Power Microscopic Model with Universal Epi-Illuminator

Motorized Z-axis & Microscopic Observation Mode Switchover

These "Universal" models combine a measuring stand with the best of Nikon's metallurgical microscope components for high resolution imaging and critical measurements. Featuring the full range of Nikon advanced LU objectives and microscopy techniques including: brightfield, darkfield, DIC contrast, polarizing and epi-fluorescence. Up to five objectives may be mounted on the nosepiece. Moreover, important controls in the microscope—e.g. Z-axis movement, focusing and illumination switchover—have been automated or motorized to streamline imaging operations such as digital image capture, digital field-of-view measurement and data storage.

Brightfield
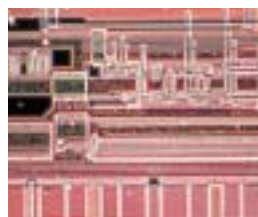
Darkfield

Brightfield

Epi-fluorescence
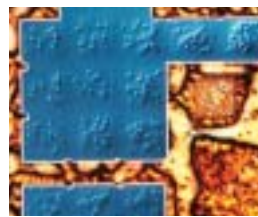
DIC

Centralized Control for Different Microscopic Observations, Motorized Motions

Control of the motorized epi-illuminator and various light sources, universal motorized nosepiece and aperture diaphragm, DIC changeover, and other important operations can be performed at a single place via the illumination & AF controller.

TTL Laser AF (Auto-Focus)
The MM-400/800 U models are the measuring microscope series equipped with TTL Laser AF, these models accomplish focusing quickly with repeatability as high as 0.5µm (when a 20x objective is used).

Universal Motorized Nosepiece
The LV-NU5A universal nosepiece simplifies objective changeovers. Programmed magnification changeover is available via the illumination & FA controller.

A Wide Choice of Illuminators

A new lineup of motorized universal illuminators is available in addition to manual types. A white LED illuminator is available for brightfield use. Users can choose either a 12V-50W halogen or a white LED light source according to observation purpose and workpiece.

LV-U EPI Universal Epi-Illuminator
This universal epi-illuminator enables brightfield, darkfield, simple polarizing, and DIC observations. The illuminator automatically opens the field and aperture diaphragms when switching observation from brightfield to darkfield. When returning to brightfield, the previous field and aperture conditions are automatically restored.

LV-U EPI2 Universal Epi-Illuminator
In addition to brightfield, darkfield, simple polarizing, and DIC, this illuminator enables epi-fluorescence observation. The illuminator automatically sets optimum illumination through linkage to the shutter, field and aperture diaphragms.
This minimizes the complexity of operating a measuring microscope, allowing the user to concentrate on the observation.

LV-U EPI2A Motorized Epi-Illuminator
With the LV-U EPI2A, the illumination changeover turret, the aperture diaphragm and the illumination voltage control have been motorized, allowing optimum image capture conditions. The aperture diaphragm is automatically optimized through linkage with objective and observation. Also, illumination parameters can be arbitrarily changed according to observation purpose and workpiece. When loaded on the LM type measuring microscope, the illuminator can be controlled from the microscope operation panel or a connected PC. When the illumination & AF controller is used, the microscope can be controlled externally from a PC.

LV-U EPI FA Universal Epi-Illuminator Focusing Aid
This universal epi-illuminator is equipped with an optical split image prism Focusing Aid (FA) mechanism to provide greater accuracy in Z-axis measurements.

LV-EPI LED White LED Illuminator
The LV-EPI LED is a light, compact white LED illuminator exclusively designed for brightfield use. The white LED maintains constant color temperature to prevent any adverse effects on measurement. External control is possible either with the attached power supply controller or the illumination & AF controller.

Motorized Z-axis Movement

The MM-400/800LM models feature a motorized focusing module, enabling Z-axis movement with a dedicated controller.

High-Intensity White LED Illuminator or 12V-50W Halogen Light Source Selectable

LED illuminator can be used as an episcopic light source, eliminating the need for lamp replacement while providing quick response and very low heat emission. Also, thanks to new optical design, the 12V-50W MM-LH50PC precentered lamphouse provides images brighter than ever before. 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 drift is substantially reduced.

MM-LH50PC precentered lamphouse
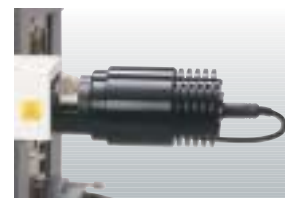
LED illuminator for episcopic light source

The motorized system satisfies digital image capture and data storage requirements. In combination with the motorized universal epi-illuminator, it is possible to set and reproduce illumination optimized for a selected observation method and/or objective lens. Focusing and objective changeover can be electrically performed with the illumination & AF controller.

MM-800/LMU
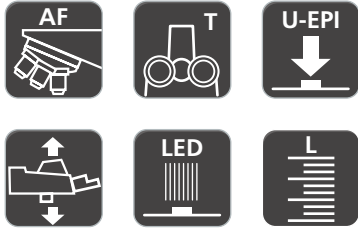
Configured with 12x8 stage, TTL Laser AF, LV-U EPI2A motorized universal epi-illuminator
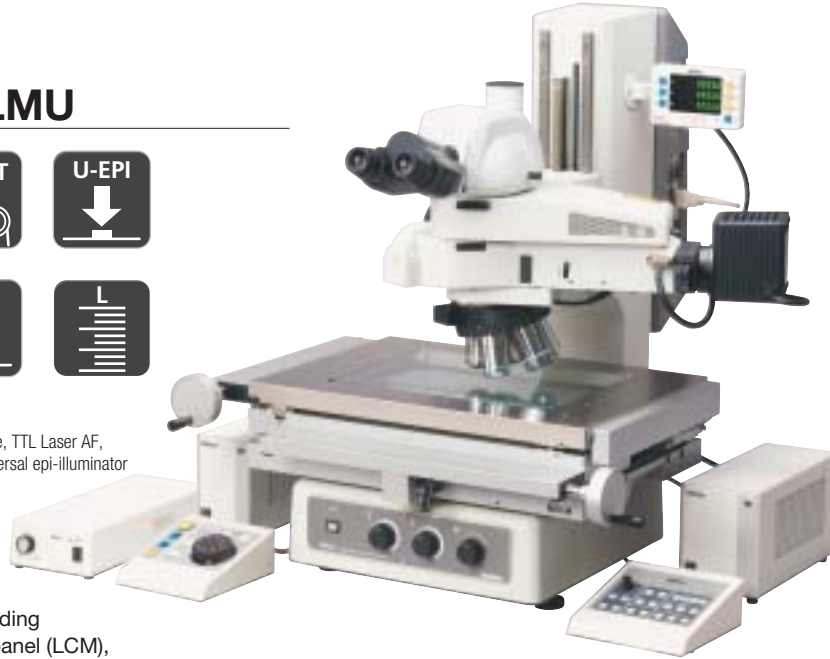
Metallized Patterns of FPC

CCD

Applications:
Semiconductor packages, Bonding placement, Loop height, FPD panel (LCM), MEMS, Wafer level CSP, HDD slider

MM-400/LMU
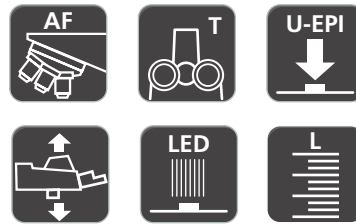
Configured with 6x4 stage, TTL Laser AF, LV-U EPI2A motorized universal epi-illuminator

Specifications

*TE2-PS100W power supply is required

| Type		MM-800/LMU	MM-400/LMU
Z-axis movement		Motorized (max. speed: 10mm/sec)	
MM controller backpack interface		Built-in	
Optical head		Y-TB binocular eyepiece tube, LV-TI3 trinocular eyepiece tube, LV-TT2 tilting trinocular eyepiece tube (with built-in reticle)	
Z-axis linear scale		Built-in	
Eyepiece		CFI10x (Field No. 22), CFI10x CM (Field No. 22)	
Objective		CFI60 LU Plan Fluor EPI series, CFI60 LU Plan Fluor BD series, CFI60 L Plan EPI CR series	
Stage		12x8, 10x6, 8x6	6x4, 4x4, O3L, 2x2
Light source	Diascopic	LED diascopic illuminator (standard), 12V-50W halogen light source (option)*	
	Episcopic	White LED illuminator LV-EPI LED, Motorized universal epi-illuminator LV-U EPI2A*, Universal epi-illuminator LV-U EPI2*, Universal epi-illuminator U-EPI*, Universal epi-illuminator with Focusing Aid LV-U EPI FA	
Max. workpiece height		200mm	150mm
Dimensions (W x D x H)/weight		385 x 785 x 725mm/approx. 65kg	300 x 600 x 638mm/approx. 50kg

The system is equipped with a universal epi-illuminator that responds to various observation needs such as brightfield, darkfield, simple polarizing and DIC, as well as epi-fluorescence. A bright 12V-50W halogen light source and a white LED light source are available depending on the workpiece or observation purpose. The 12V-50W halogen light source provides images brighter than ever. LSU models are is also available for connection to a 3rd-party DRO.

MM-800/LU
MM-800/SLU with 3rd-party DRO

U-EPI	T	2

L	LED

Configured with 12x8 stage, LV-U EPI2 universal epi-illuminator, tilting trinocular eyepiece tube with built-in reticle

FPD-Cell Process

Applications:
Semiconductor packages, Bonding placement, Loop height, FPD panel (LCM), MEMS, Wafer level CSP, HDD slider

Color Filter

MM-400/LU
MM-400/SLU with 3rd-party DRO

UFA	T	U-EPI

LED	2	L

Configured with 6x4 stage, LV-U EPI FA universal epi-illuminator with Focusing Aid

Specifications

*TE2-PS100W power supply is required

Type		MM-800/LU	MM-800/SLU	MM-400/LU	MM-400/SLU
Z-axis movement		Manual (dual side coarse/fine focus knob)			
MM controller backpack interface		Built-in	—	Built-in	—
Optical head		Y-TB binocular eyepiece tube, LV-TI3 trinocular eyepiece tube, LV-TT2 tilting trinocular eyepiece tube (with built-in reticle)			
Z-axis linear scale		Built-in			
Eyepiece		CFI10x (Field No. 22), CFI10x CM (Field No. 22)			
Objective		CFI60 LU Plan Fluor EPI series, CFI60 LU Plan Fluor BD series, CFI60 L Plan EPI CR series			
Stage		12x8, 10x6, 8x6		6x4, 4x4, O3L, 2x2	
Light source	Diascopic	LED diascopic illuminator (standard), 12V-50W halogen light source (option)*			
	Episcopic	White LED illuminator LV-EPI LED, Motorized universal epi-illuminator LV-U EPI2A*, Universal epi-illuminator LV-U EPI2*, Universal epi-illuminator U-EPI*, Universal epi-illuminator with Focusing Aid LV-U EPI FA			
Max. workpiece height		200mm		150mm	
Dimensions (W x D x H)/weight		385 x 785 x 725mm/approx. 65kg		300 x 600 x 638mm/approx. 50kg	

This model is designed exclusively for 2-axis high magnification measurement of fine geometries. It is equipped with a universal epi-illuminator that allows observations such as brightfield, darkfield, simple polarizing and DIC. A bright 12V-50W halogen light source and a white LED light source are available depending on the workpiece or observation purpose. The 12V-50W halogen light source provides image brightness equivalent to or higher than that of 12V-100W.

MM-800/U
MM-800/SU with 3rd-party DRO

U-EPI	T	2	LED

Configured with 12x8 stage, LV-U EPI2 universal epi-illuminator, tilting trinocular eyepiece tube with built-in reticle

Applications:
Semiconductor packages, Bonding placement, FPD panel (LCM), MEMS, HDD slider

MM-400/U
MM-400/SU with 3rd-party DRO

U-EPI	LED	T	2

Configured with 6x4 stage, LV-U EPI universal epi-illuminator

Specifications

*TE2-PS100W power supply is required

Type		MM-800/U	MM-800/SU	MM-400/U	MM-400/SU
Z-axis movement		Manual (dual side coarse/fine focus knob)			
MM controller backpack interface		Built-in	—	Built-in	—
Optical head		Y-TB binocular eyepiece tube, LV-TI3 trinocular eyepiece tube, LV-TT2 tilting trinocular eyepiece tube (with built-in reticle)			
Z-axis linear scale		—			
Eyepiece		CFI10x (Field No. 22), CFI10x CM (Field No. 22)			
Objective		CFI60 LU Plan Fluor EPI series, CFI60 LU Plan Fluor BD series, CFI60 L Plan EPI CR series			
Stage		12x8, 10x6, 8x6		6x4, 4x4, 03L, 2x2	
Light source	Diascopic	LED diascopic illuminator (standard), 12V-50W halogen light source (option)*			
	Episcopic	White LED illuminator LV-EPI LED, Motorized universal epi-illuminator LV-U EPI2A*, Universal epi-illuminator LV-U EPI2*, Universal epi-illuminator U-EPI*, Universal epi-illuminator with Focusing Aid LV-U EPI FA			
Max. workpiece height		200mm		150mm	
Dimensions (W x D x H)/weight		385 x 785 x 725mm/approx. 65kg		300 x 600 x 638mm/approx. 50kg	

Dimensional Diagram

Unit: mm

MM-400 with Monocular Optical Head
2x2 Stage
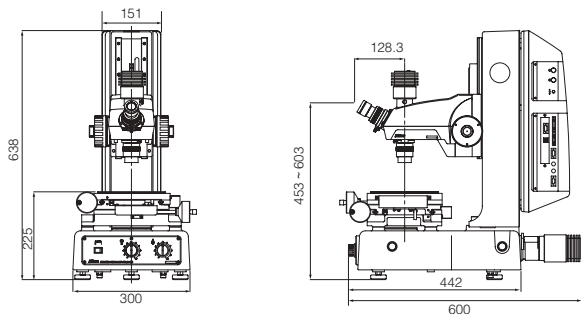
MM-400/LU
6x4 Stage
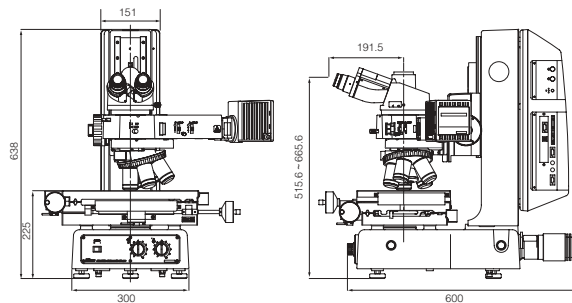
MM-400/L
6x4 Stage
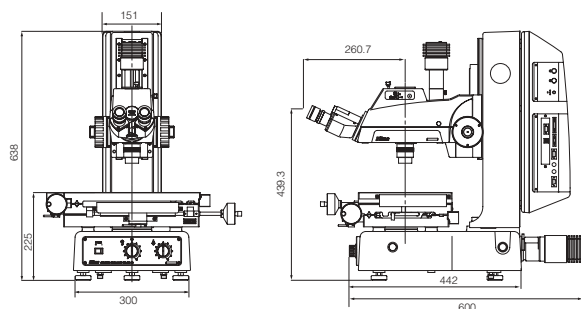
MM-800/LU
12x8 Stage
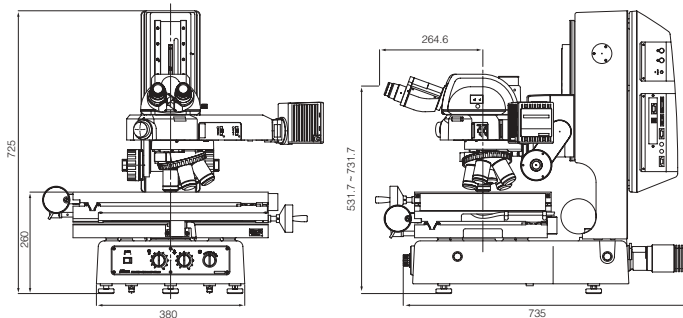
MM-800/L
12x8 Stage
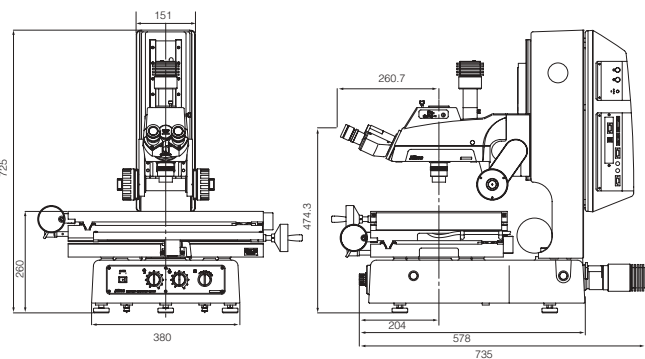
MM-800/LMU
12x8 Stage
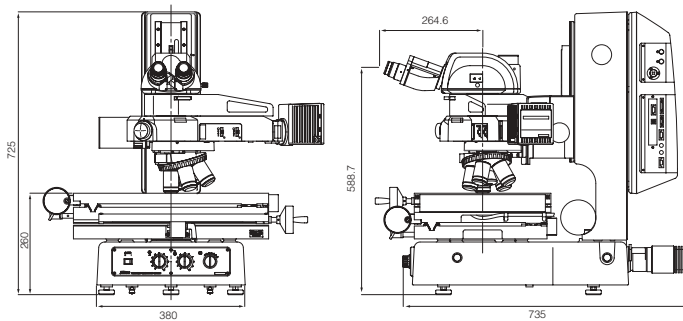
MM-800/LM
12x8 Stage

15
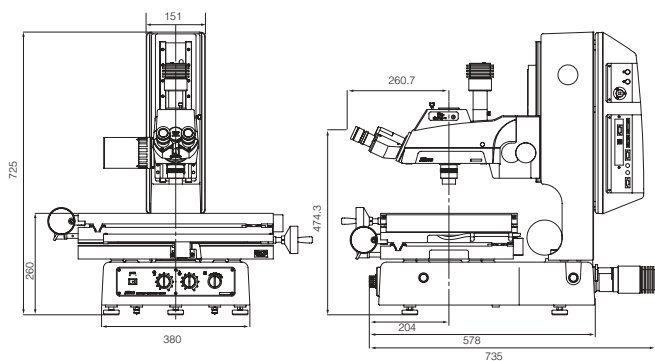
New Series of High-performance Objective Lenses Enhances Optical Performance

Standard objective lens with improved transmission rate for UV wavelength
CFI60 LU Plan Fluor Series

The transmission rate in the UV wavelength range has been improved for the new CFI60 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, DIC and UV epi-fluorescence observations. These objective lenses offer high resolution and ease of use.

CFI60 LU Plan Fluor EPI series

CFI60 LU Plan Fluor BD series

Objective lenses with correction ring
## CFI60 L Plan EPI CR Series

The CFI60 series now includes the CFI60 L Plan EPI CR series objectives to cope with the thinner cover-glass used in liquid crystal displays and highly integrated, dense devices. Coverglass correction can be continuously made from 0 mm up to 1.2mm (0-0.7mm and 0.6-1.3mm 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

Without correction (50x)

With correction at 0.7mm (50x)

CFI60 Series Objectives

Brightfield

Type	Magnification	NA	W.D. (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

Brightfield/Darkfield

Type	Magnification	NA	W.D. (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

With correction mechanism

Type	Magnification	NA	W.D. (mm)	Glass thickness correction range (mm)
CFI L Plan EPI CR	20x	0.45	10.9-10.0	0-1.2
CFI L Plan EPI CR	50x	0.7	3.9-3.0	0-1.2
CFI L Plan EPI CRA	100x	0.85	1.2-0.85	0-0.7
CFI L Plan EPI CRB	100x	0.85	1.3-0.95	0.6-1.3

Newly developed tilting trinocular eyepiece tube

LV-TT2 Tilting Trinocular Eyepiece Tube with Built-in Reticle

The newly developed LV-TT2 tilting trinocular eyepiece tube (erect image) with built-in reticle 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 a monitor.

Selectable nosepieces

Highly Durable Motorized Universal Nosepieces LV-NU5A/LV-NU5AC

Two types of motorized universal quintuple nosepieces are available. The LV-NU5A boasts greater durability thanks to a new click mechanism and control system. Programmed magnification change with a controller is possible.The LV-NU5AC comes with a centering mechanism that suppresses image drift during objective changeover.

LV-NU5A nosepiece   LV-NU5AC nosepiece

Manual Nosepieces

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)

Motorized Observation Controller

This controller makes it possible to control the light source, motorized illuminator, nosepiece, Z-movement and TTL Laser AF. When E-MAX software is used, control is also possible through the software's teaching program.

Connectable units
• Motorized universal epi-illuminator LV-U EPI2A
• Halogen lamphouse MM-LH50PC (TE2-PS100W power supply is required)
• PC-control type high-intensity mercury fiber light source
• White LED illuminator LV-EPI LED
• Motorized universal nosepiece LV-NU5A, LV-NU5AC (with centering mechanism)
• TTL Laser AF (U-AF)
• Diascopic/episcopic illumination

Stages

Nikon offers a broad range of stages to choose from including the new 12x8 stage. All models (except the O3L) boast an outstanding accuracy of 3+L/50μm (L=measurement length). An optional high accuracy type (1.5+L/100μm) is also available.

Stages for MM-800 series

12x8 Stage

Cable length: approx. 2,000mm
22-M6 depth 10 tool installation screw hole
(mm)

10x6 Stage

Cable length: approx. 2,000mm
18-M6 depth 10 tool installation screw hole
(mm)
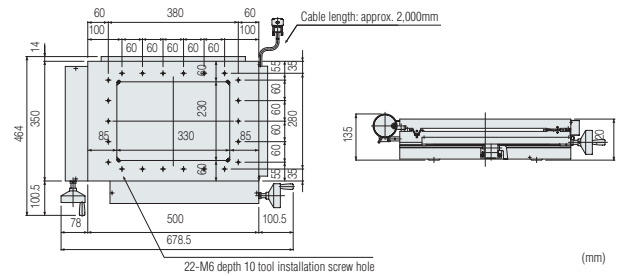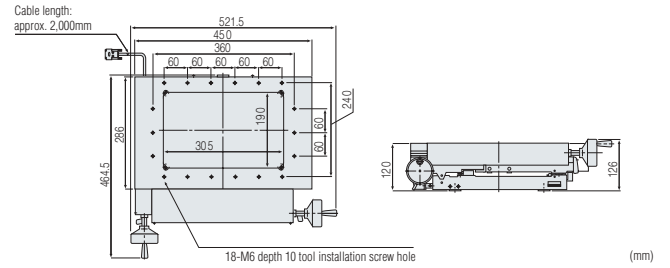
8x6* Stage
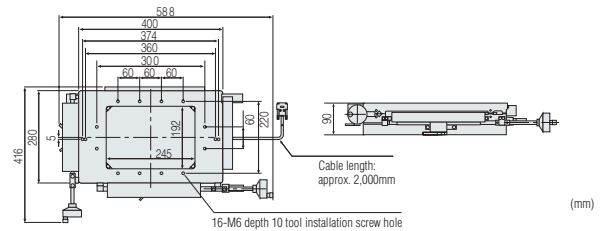
*Stage adapter is required.

Cable length: approx. 2,000mm
16-M6 depth 10 tool installation screw hole
(mm)

Stages for MM-400 series

6x4 Stage

Cable length: approx. 2,000mm
12-M6 depth 10 tool installation screw hole
(mm)

4x4 Stage

Cable length: approx. 2,000mm
10-M6 depth 10 tool installation screw hole
(mm)

O3L Stage

Cable length: approx. 2,000mm
(mm)

2x2 Stage

Cable length: approx. 2,000mm
6-M6 depth 7
(mm)
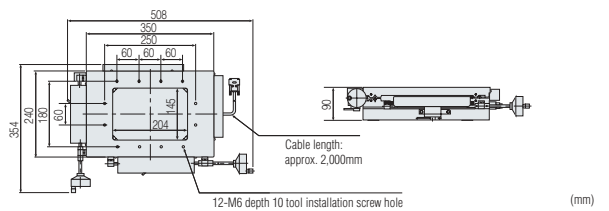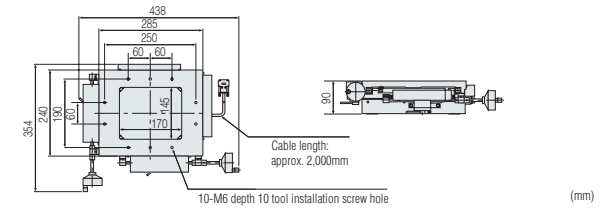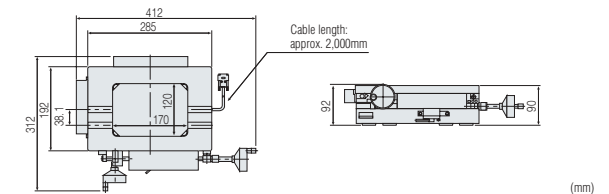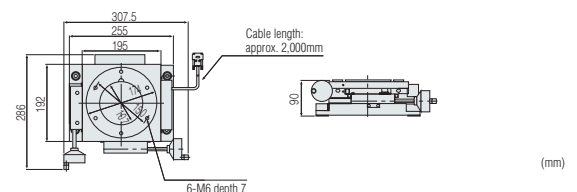
Stage specifications

Type	Surface area (mm)	Stage glass dimensions (mm)	Stroke (mm)	Reading method	Min. reading (mm)	Zero position adjustment (mm)	Stage top	Tool installation	Loading capacity (kg)	Weight (kg)
12x8	500 x 350	330 x 230	300 x 200	Linear encoder	0.0001	Discretionary	—	M6 (screw)	20	Approx. 70
10x6	450 x 286	305 x 190	250 x 150	Linear encoder	0.0001	Discretionary	—	M6 (screw)	20	Approx. 50
8x6	400 x 280	245 x 192	200 x 150	Linear encoder	0.0001	Discretionary	—	M6 (screw)	15	Approx. 36
6x4	350 x 240	204 x 145	150 x 100	Linear encoder	0.0001	Discretionary	—	M6 (screw)	10	Approx. 27
4x4	285 x 240	170 x 145	100 x 100	Linear encoder	0.0001	Discretionary	—	M6 (screw)	6	Approx. 23
O3L	285 x 192	170 x 120	100 x 50	Linear encoder	0.0001	Discretionary	—	Dovetail	5	Approx. 15
2x2	195 x 192	107 in diameter	50 x 50	Linear encoder	0.0001	Discretionary	360° rotatable	M6 (screw)	5	Approx. 13

Tool installation groove dimensions (mm)
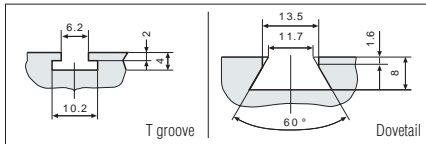
T groove   Dovetail

T groove: Graduated goniometer type 2   Dovetail: O3L
- Stages other than O3L and rotating table C/D require M6 depth 10 tool installation screw holes.
- T grooves may be specially ordered for 2x2 rotating boards.

Bottom screw positions for fixing stage (mm)

For stages except 12x8   For 12x8 stage
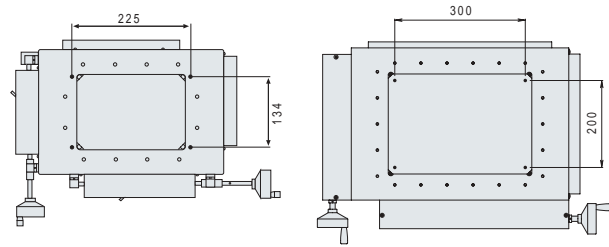
Stage Accessories

Stage Adapter
This adapter is used to mount 8x6, 6x4, 4x4, O3L, or 2x2 stage to the MM-800.

For MM-800

Rotating Tables
Used to rotate the workpiece and align it in the direction to which the stage moves.

Rotating Table Type 3
For 6x4, 4x4
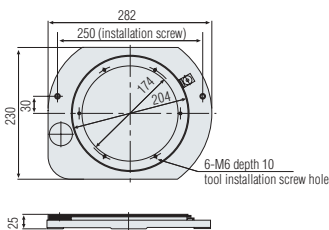
Rotating Table Type 4
For 12x8*, 10x6, 8x6

Tool installation screw holes (6-M6 depth 9) are located at six equidistant positions around the circumference.
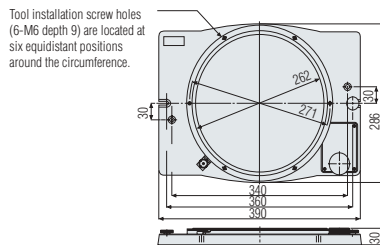
*X-axis stroke is limited to 262mm when used with 12x8 stage. For details, please contact your local dealer.

Graduated Goniometer Type 2
For O3L

mm
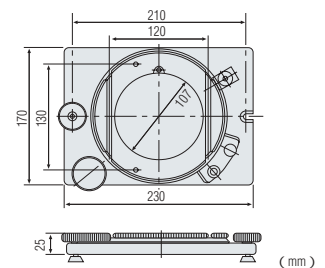
Rotating table specifications

	Table diameter	Glass insert diameter	Rotation range	Tool installation	Weight
Rotating table type 3	204mm	165mm	360° (uncalibrated)	Screw hole 6-M6	Approx. 5kg
Rotating table type 4	282mm	262mm	360° (uncalibrated)	Screw hole 6-M6	Approx. 8kg
Graduated goniometer type 2	160mm	107mm	360° (2' reading)	T groove/Screw hole 2-M6	Approx. 4kg

Tilting Center Fixture A
Used to hold machined workpieces.

	Max. workpiece diameter and length when held level	Center height	Tilting angle	Weight
A	ø68 x 120mm	45mm	10° (in 1° increment)	Approx. 2.2kg

Tilting center fixture A configured with graduated goniometer type 2

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FOV Measurement with Advanced Digital Image Processing Technology

Data Processing Software E-Max Series

In combination with Nikon's digital still camera, DS-2Mv, the new E-MAX series software provides state-of-the-art image processing technology. Automated edge detection with sub-pixel processing enables more precise and repeatable measurement. Effectively used in conjunction with a measuring microscope/ profile projector, the new E-MAX series software provides the user with various advanced measurements and processing functions, ranging from two-dimensional data processing and image measurements, to data storage.

Finer video images and fast image transfer with Nikon's innovative image processing technologies

The new E-MAX DS-V software provides FOV (field-of-view) measurements without a dedicated image processing board. This allows the software to be installed in high performance laptop PCs, greatly saving work space. SVGA (800 x 600) images from the digital camera can be captured via USB2.0 and can be processed and measured using Nikon's latest Automated Video Edge Detection and measuring algorithms.

Navigation function

The graphic window displays the next measurement position in brown, preventing errors and allowing speedy measurement (during replay). The current position is displayed in pink.

Chart measurement

A Chart with nominal shapes and tolerance lines can be generated from CAD data. It can be superimposed on the actual video image for easy and quick Go/No Go judgments.
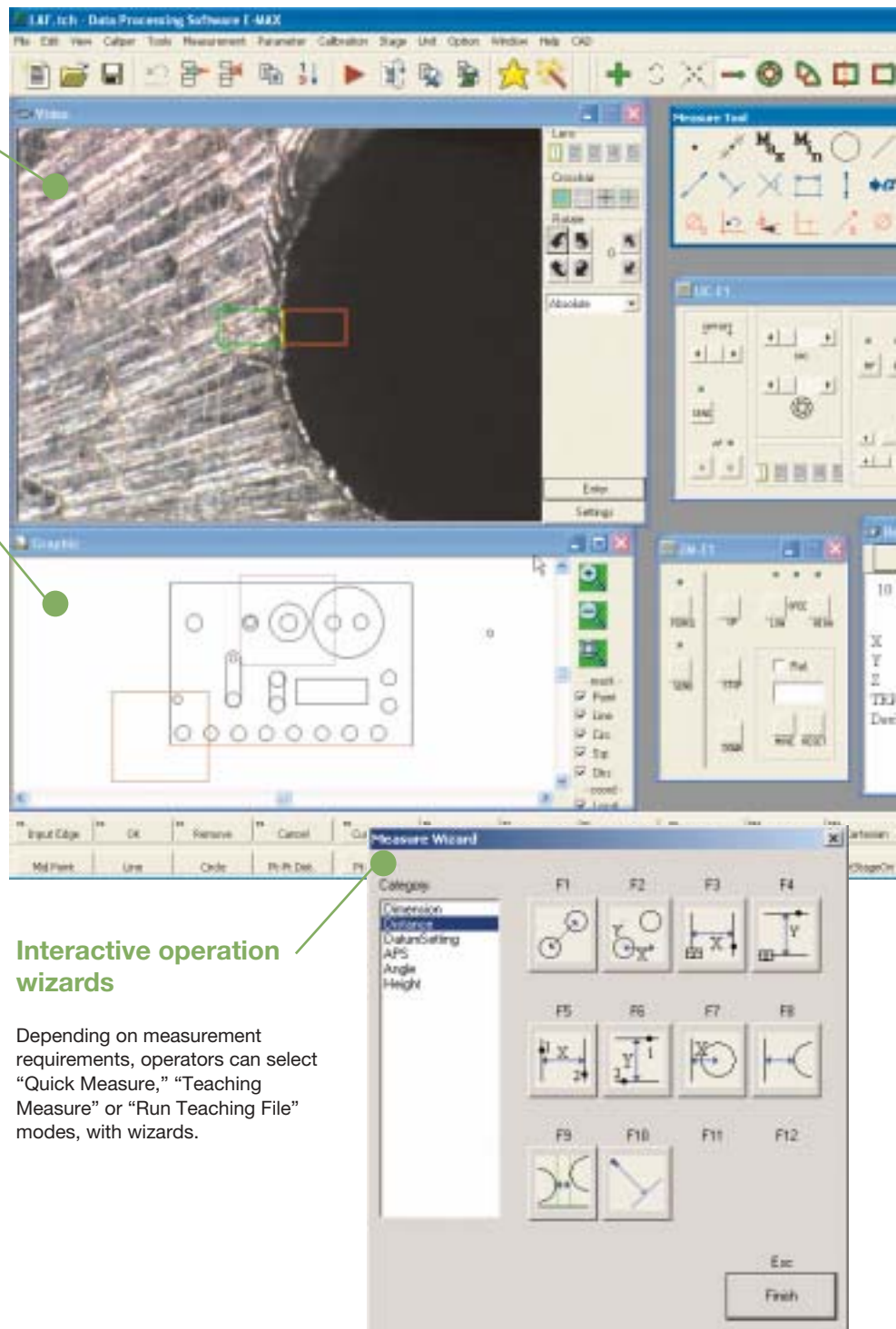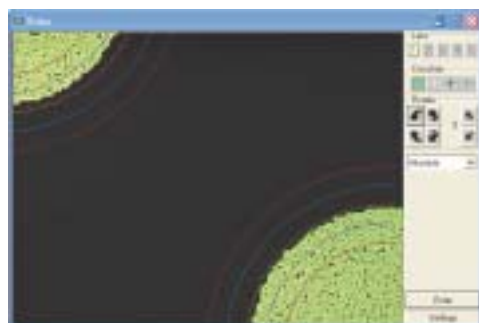
Interactive operation wizards

Depending on measurement requirements, operators can select "Quick Measure," "Teaching Measure" or "Run Teaching File" modes, with wizards.

Larger icons support touch screen operation environment

Larger Icon Mode is selectable for a touch screen operation environment. The mouseless operation enables operators to concentrate on measurements.
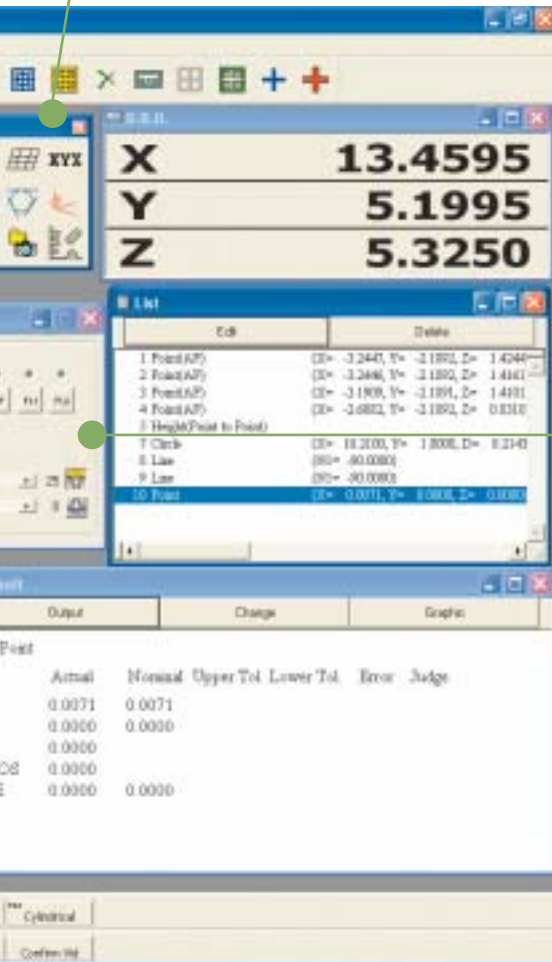
Illumination controls, motorized nosepiece, universal epi-illuminator, and TTL Laser AF controls

White LED illumination control is possible from E-MAX software. With motorized nosepiece, universal epi-illuminator and/or TTL Laser AF, E-MAX controls magnification switchover, microscopic methods, aperture setting, Laser AF, etc.

Functions provided by each set

	DS-V set	D set
Data processing	✓	✓
Navigation during replay	✓	✓
Live video monitoring	✓	–
Chart measurement	✓	–
Automated video edge detection	✓	–

Real-time SPC via DDE (Dynamic Data Exchange)

Using a DDE Link function, measured data can be immediately transferred to spreadsheets such as Microsoft Excel®, SPC-PC IV, SPC-PC IV Excel, and others, making real-time SPC analysis possible.

Note: SPC-PC IV and SPC-PC IV Excel are products of Quality America Inc.

Data Processor with improved accuracy and ease of use

DP-E1

New DP-E1 data processor has been developed to improve accuracy and efficiency as a measuring system. A 0.1μm-reading counter display is built into the compact body. The 320 x 240-pixel LCD greatly improves ease of use. Effectively used in combination with a measuring microscope/profile projector, it quickly calculates and processes measurement data.

Simple & interactive operation

Feature Oriented Operation of the DP-E1 allows the user to conduct measurements by following the graphics, providing a seamless measuring environment when used in combination with the NEXIV VMR/E-MAX series software. Measurement results are automatically memorized as teaching steps and can be easily used as a measurement routine.

GD&T compliance

Geometric Dimensioning & Tolerancing defined by the ANSI Y 14.5M Specification is supported. In addition to Location Tolerancing such as True Position, MMC and LMC, determination of Form, Orientation and Runout can be conducted interactively.

Multi-language support

English, German, Japanese and various other Asian and European languages are supported.

Data storage & software upgrades via USB drive

A USB drive can be used for storing measurement results and upgrading new functions.

Digital Thermal Printer DPU-414 (option)

Prints out measurement results.

Control panel

Code

Measure code key

[Basic feature elements]

• Point
Calculates entered measurement point, or average point from multiple points.

• Line
Calculates line from two entered measurement points or from multiple points by least-square method.

• Circle/arc
Calculates circle from three entered measurement points or from multiple points by least-square method.

• Rectangle
Calculates square from entered five measurement points.

[Constructed elements]

• Mid-point
Calculates middle point from two measured points.

• Pitch
Calculates pitch between multiple measured points.

• Mid-line
Calculates middle line from two measured lines.

• Distance
Calculates distance between two measured points.

• Intersection
Calculates intersection point from two measured lines.
Calculates intersection point from measured point and line.
Calculates intersection point from two measured circles.

• Tangent
Calculates tangent point from measured point and circle.
Calculates circle to contact two measured lines.
Calculates circle to contact three measured lines.

[Coordinate systems]

• Set origin (datum)
Sets up origin of local coordinate system.

• Set axis (datum)
Sets up axis of local coordinate system.

• Displacement
Sets up move, rotation and reversion of local coordinate system.

Macro code key

M1
• Macro key

MACRO
• Macro setup key
Registers combination of measurement codes for macro keys (M1 to M4).

File key

[File run]
• Run key
RUN
Runs teaching file.

REPEAT
• Repeat key
Sets up repetition number of teaching file.

[File control]
• Print key
PRINT
Conducts print output at discretionary timing during teaching.

FILE
• File key
Shows menu to access file for file controls.

INSERT
• Insert key
Inserts measurement codes between list items.

DELETE
• Delete key
Deletes measurement code and entered measurement point. Deletes file during file control.

Display setting key

DISP.
• Disp. key
Switches display settings.

Data input key

LOAD
• Load key
Enters measurement points.

Accessory function key

EXT1
• Ext1 key
Sets up print out of standard deviation.

EXT2
• Ext2 key
Reserved

OTHERS
• Others key
Reserved

Function key

F1
• Function key
Performance differs depending on displayed screen and item.

Specifications

Processing unit	mm/in. Number of digits: 3/4/5 after decimal point selectable for mm, 4/5/6 after decimal point selectable for in. Angle. Degree/minute/second, Deg, Rad
Key switch	55 (function, measurement code, coordinate reset, file operation, macro, data load, and numeric keys)
Counter display	Display on LCD
External printer	Prints out measurement results via the RS-232C port connection
External memory	USB memory, floppy disk drive with USB interface (FAT format)
LCD	QVGA (320 x 240) monochrome LCD, backlight color: blue, non-interlace, screen size: 5.7in.
Power source	DC12V (less than 300mV ripple), less than 4A (with dedicated AC adapter), CR2032 x 2 backup battery for real-time clock
Operating/setup conditions	Operating conditions: temperature 0-40ºC, humidity 70% (non condensing), altitude 2,000m or less. Storage conditions: temperature –20-60ºC, humidity 90% (non condensing). Degree of pollution: 2
Dimensions (W x D x H) (main body)	300 x 240 x 99 (feet folded) mm
Weight	2.5kg

Retrofit Unit

To use the DP-E1 data processor with Measuring Microscope models MM-40/60 or Profile Projector models, V-24B, V-12B, or V-12BS, a Retrofit Unit is required as an interface.

Application Software for Measurement Support/Data Processing System

Custom Fit QC: Report and chart generating program

Suitable for lot control of inspection data such as maximum value, minimum value, range, standard deviation and process capability index.

- In addition to 10 standard inspection result sheet forms, it is possible to customize original forms.
- BMP and JPEG files can be pasted onto the inspection result sheet.
- Automatic generation of graph and changeable degree/minute/second display.
- Easy to generate histograms, $\overline{X}$-R control charts and scatter diagrams.

> Operating environment: Windows®
> 2000/XP
> Microsoft Excel 2000 or later
> Required memory: 128MB (min)
> Codevelopment: Aria Co., Ltd.

VMR Report Generator: Report generating program

This software enables quick generation of inspection result sheets in various report forms including user-designed forms. Users can even customize the program by creating macro scripts to meet any special requirements.

> Operating environment: Windows®
> 2000/XP
> Microsoft Excel 2000 or later
> Required memory: 128MB (min)
> Codevelopment: Pronics Co., Ltd.

An example of user-defined macro script: In order to manually input data measured by other instruments and compile them into one report, the macro will automatically create the necessary cells and highlight them in sky-blue, followed by a message prompt requesting the source of the manual inputs.

Custom Create: Direct link to Excel sheet programs

Measurement data from counters and/or data processors can be transferred directly to Excel sheets.

- Usable measuring instruments: MM-400/800 series, DP-E1, V-20B, V-12B
- Allows data transfer to customized inspection-result sheet form
- Three standard inspection-result sheet forms are available
- Transfer from multiple worksheets allows for more efficient measurements

> Operating environment: Windows®
> 2000/XP
> Microsoft Excel 2000 or later
> Required memory: 128MB (min)
> Codevelopment: Aria Co., Ltd.
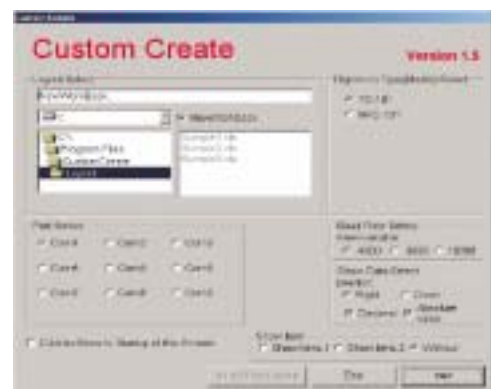
Digital Camera for Microscopes Digital Sight DS Fi1-L2

The all-in-one digital camera for microscopes enables display, measurement, image capture and storage with a simple mouse-click without PC connection.

Large, high-definition display for immediate microscopic observation
• Stand-alone camera control unit DS-L2 has 8.4-inch LCD monitor (XGA)
• DS-Fi1 camera head with 5.0-megapixel CCD provides high frame rate of 12fps and allows smooth focusing on monitor.

Imaging mode provides optimal photography with single mouse-click
• Optimal imaging parameters are preset for different sample types and observation methods including brightfield and darkfield to enable fast and easy photography with a single mouse-click.

Imaging mode for industrial sample

Wafer IC-chip   Metal Ceramic   Circuit Board

DS Fi1-L2 configured with MM-800/LM

Various measuring tools are available
• Scale and grid line display, two-point distance measurement, and other measuring tools are available as standard.
• Convenient tools such as text input, line and graphic drawing, and super-impose are supported.
• Measurement results can be stored as CSV file for easy report generation with other PC software.

Objectives 1x, 3x, 5x, 10x, 20x, 50x, 100x

These compact objectives feature long working distances and excellent resolution. All have almost the same parfocal distances, come with lens adapter for quick and easy replacement.

The 3x objective is standard with the microscope.

Magnification	1x	3x	5x	10x	20x	50x	100x
W.D. (mm)	79	75	64	49	20	15	4

TV Reticle Adapter

To reduce user eyestrain, a Video CCTV camera can be used to make measurements on a monitor with the use of a TV reticle. The TV reticle will project sharp lines onto the monitor enabling measurements to be made. The accuracy of the reticles projected onto the monitor is the same as those seen through the eyepiece.

Direct C-mount Adapter

Used to install a C-mount NTSC CCTV camera on the microscope. To use, replace the straight tube in a trinocular tube with this adapter.

Note: LV-TV tube is required.

Protractor Eyepieces *(For all measuring microscopes except those with universal illumination.)*

Note: Monocular adapter (standard equipment) is required when using these eyepieces with trinocular tubes.

1-Minute Reading Eyepiece

The viewfield includes crosshairs and 60° lines, and angle indexes are read by appropriate microscopes. The measuring range is 360°.

10-Minute Reading Eyepiece

The viewfield includes crosshairs and angle indexes, and when the knurled ring at the lower section of the eyepiece tube is turned, the crosshairs and the vernier both rotate up to 180°.

Illuminators

8-Segment LED Ring Light CYN-E1

The CYN-E1 enables flexible illumination from eight directions. It is not necessary to adjust the position of illumination fibers by hand at each measurement and/or observation.

Can be used with measuring microscope MM-400/800.

Can be used with E-max series software.

The RS-232C cable is standard with the illuminator.

An E-BUS cable is required to control the illuminator with E-MAX.

Fluorescent Lamp Illuminator

The ring fluorescent tube provides smooth, uniform illumination without shadows over the entire field. The fluorescent tube has a service life of approximately 2,000 hours and is easy to replace.

Fluorescent lamp transformer: 120 (W) x 150 (D) x 70 (H)mm

Cannot be used with metallurgical microscope objectives.

Cannot be mounted when 20x, 50x and 100x measuring microscope objectives are used.

MM Adapter for External Illuminator (except 8-Segment LED Ring Light CYN-E1)

This adapter mounts standard Stereo Microscope Ring Illuminators onto the MM-400/800 stands with TM objectives. May be used to mount Fiber Optic Ring, fluorescent lamp ring and LED ring illuminators.

Fiber-optics Bifurcated and Ring Illuminators

Since a 15V-150W halogen lamp with reflective mirror is used, a bright light source is obtained and the brightness is adjustable. The ring fiber illuminator produces cone-shaped illumination, minimizing shadows caused by any unevenness on the workpiece surface. The bifurcated fiber enables flexible illumination from two directions.

Fiber transformer: sequential adjustment of brightness from 7 to 14 volts.

Cannot be used with metallurgical microscope objectives.

Cannot be mounted when 20x, 50x and 100x measuring microscope objectives are used.

LED Ring Illuminator

This illuminator uses 60 high output white LEDs with a variable intensity control and constant color temperature. The LEDs have a very long service life making them ideal for a production environment as there are no bulbs to change.

Cannot be used with metallurgical microscope objectives.

Cannot be mounted when 20x, 50x and 100x measuring microscope objectives are used.

Counter

3-Axis/2-Axis Counter

2-axis and 3-axis counters are available. The separate display unit can be mounted on the measuring microscope. Counters can be connected with data processors and digital printers via the RS-232C port.

3-axis counter

2-axis counter

XY Reset Switch

An XY reset switch can be attached to the microscope body so that coordinates can be easily reset while stage is in operation.

Y-axis

X-axis

Remote Switch

Enables reset and SEND remote control of counter.

Digital Thermal Printer DPU-414

Prints out counter values once connected to rear control box of measuring microscope MM-400/800.

Foot Switch

Used to send load command to DP-E1 and DPU-414. Frees both hands to enhance measurement efficiency.

Standard 300mm Scale

This scale is used to calibrate measuring stage travel up to 300mm. Both 10mm-interval sensor patterns and calibrations are provided. It is made of low expansion glass to minimize thermal error.

Accuracy: Within 1μm against compensation values.

Templates

The following dedicated templates are available to facilitate profile comparison and measurements.
• Standard angle templates (standard equipment)
• Concentric; diameter 0.2-4.6*

Note: Designed for 3x objectives.
*Cannot be attached to monocular type

System Diagram

MBJ99000
Eye Guard for
CFWN 10x Eyepiece

(N)

EDG40100
MM Eyepiece Lens 10x
for Monocular Head

(N)

EDG20100
Eyepiece 10x

EDG20600
Protractor 10' Reading

EDG20701
Protractor 1' Reading A

EXA20340
Monocular Eyepiece
Tube Adapter

(C)

(L)

MBJ22100
ME CFWN 10x CM

(N)

MBJ20100
ME CFWN 10x

(N)

EDB40200
Binocular Tube

(C)

C-mount Camera   DS-2Mv   (R)

MQD42000
C-mount Adapter

MBB63430
LV-TV Tube

(K)

EDH40400
Concentric Circles
Reticle (0.2-4.6mm
diameters in 0.2mm
increments)

(U)

EDD50000
LED Epi-illuminator

(D)

EDD52000
Epi-illuminator for
MM400/800
Monocular
Optical Head

(M)

MBE60310
LV-U EPI2A

(F)

MBE60300
LV-U EPI2

(F)

MBE60200
LV-U EPI

(F)

(K)

EDC50000
Trinocular Optical Head

(C)
(D)
(H)
(S)

EDC50200
Trinocular Optical
FA Head

(C)
(D)
(H)
(S)

EDC52000
Monocular Optical Head

(L)
(M)
(H)
(S)

EDC54000
U Bracket Mount LV

(S)

EDF50001
Measuring Microscope
Objective Adapter

EDF20010
TM Objective Lens 1x

EDF20031
TM Objective Lens 3x

EDF20052
TM Objective Lens 5x

EDF20100
TM Objective Lens 10x

EDF20200
TM Objective Lens 20x

EDF20500
TM Objective Lens 50x

EDF21000
TM Objective Lens 100x

(P)

(A)

(E)
(F)

EDA54300 EDA54400
MM-400/S 400/SL Stand
Z: Manual Motion
SL: Z-axis Scale

(P)

(A)

(E)
(F)

EDA54000 EDA54100
MM-400 400/L Stand
MM Controller Backpack Interface
Z: Manual Motion
L: Z-axis Scale

(J)

(A)

(E)
(F)

EDA54200
MM-400/LM Stand
MM Controller Backpack Interface
Z Motorized Control with Linear Scale

EXA20409
MM Adapter
for External Illuminator

(H)

MME39600
C-FID Bifurcated
Fiber Light Guide

EXK30024
8-segment
LED Ring Light
CYN-E1

MXK21640
LED Ring
Illuminator

MMF34910
C-FRL Fluorescent
Ring Lamp 8W

MME39610
C-FIR Ring Fiber
Illuminator Guide

MMF32820/MMF32840
C-FI115/230 Fiber
Illuminator with Power Cord

MMF32920/MMF32940
C-FPS115/230
Fluorescent Ring
Illuminator with Transformer

(P)
(J)

EXA20411 E-BUS Cable

(E)   EDD51000
LED Dia-illuminator

(F)   EDD55800
MM-U Epi
Lamphouse LV

MXA23045
LV-HL50W
12V50W-LL
Halogen Lamp

MXA 20095
12V50W Lamp

(G)

MEF42252
TE-PS100W
Power Supply

(Q)

EDD52200
Halogen Light
Intensity
Control Cable

MBB72100
Y-TB Binocular
Eyepiece Tube

MBB63420
LV-TI3 Trinocular
Eyepiece Tube

K

EDB50300
LV-TT2 Tilting Trinocular Eyepiece Tube
with Built-in Reticle

PPG40000
Tilting Center
Fixture A

PPE50110
Rotating Table Type 4*

EDC55000
U-AF Unit

PPB25100
2x2 Stage

PPB56000
8x6 Stage

A
PPE32100
Graduated
Goniometer Type 2

EDC52200
LV-U EPI FA

E

MBE60500
LV-EPI LED

G

R

PPB35120
O3L Stage

A
PPE42100
Rotating Table Type 3

PPB67000
10x6 Stage

B

LV-NU5A Nosepiece
MBP60101, etc.

MXA23017
LU Nosepiece Adapter
M32-25

PPB35140
4x4 Stage

PPB77000
12x8 Stage

LU PLAN FLUOR EPI
Objective Lens
MUE10050, etc.

A

B

LU PLAN FLUOR BD
Objective Lens
MUE41050, etc.

PPB45300
6x4 Stage

B

A

EFH28000
MM Stage Adapter MM800
(8x6 or smaller)

B

P

P

J

B

B

B

E

E

E

F

F

F

EDA58300 EDA58400
MM-800/S 800/SL Stand
Z: Manual Motion
SL: Z-axis Scale

EDA58000 EDA58100
MM-800 800/L Stand
MM Controller Backpack Interface
Z: Manual Motion
L: Z-axis Scale

EDA58200
MM-800/LM Stand
MM Controller Backpack Interface
Z Motorized Control with Linear Scale

J

Q

Power Source Unit for
Motorized Z-axis

EDE51000
Motorized U EPI Driver

P

EFB50200
2-axis Digital Counter
SC2-E1

PPL00200
XY Reset Switch

EFE00202
Foot Switch 4

PPL00100
Counter Remote
Switch

P

PAE00100
MM AC Adapter

PAE08250
Power Cord

Motorized Z-axis Console

EDE52000
MM400/800 U-AF
Controller

EXA20364
SC213
Display Arm

EFB50300
3-axis Digital Counter
SC3-E1

EFB51000
Data Processor Console
DP-E1

P
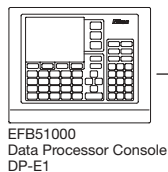
E-MAX
DS-V Type

E-MAX
D Type

Laptop PC

Laptop PC

Q

R

MQF52051
AC Adapter Dsi (100-240V)

Identical with MPF52061
FA AC Adapter 2

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Measuring Microscope MM-400/800 Suggested Configuration Chart

Measuring microscope

		MM-400/S	MM-400	MM-400/L	MM-400/SL	MM-400/LM	MM-800/S	MM-800	MM-800/SL	MM-800/L	MM-800/LM
	Model	MM-400/S	MM-400	MM-400/L	MM-400/SL	MM-400/LM	MM-800/S	MM-800	MM-800/SL	MM-800/L	MM-800/LM
	Z-axis Motion	Manual	Manual	Manual	Manual	Motorized	Manual	Manual	Manual	Manual	Motorized
	Z-axis Scale	No	No	Yes	Yes	Yes	No	No	Yes	Yes	Yes
	MM Controller Backpack Interface	No	Yes	Yes	No	Yes	No	Yes	No	Yes	Yes
	Stage	4x4	2x2	6x4	6x4	6x4	8x6	10x6	10x6	12x8	12x8
	Head	Trinocular	Monocular	Trinocular	Trinocular	Trinocular	Trinocular	Trinocular	FA	Trinocular	FA
	Illuminator	-	-	Halogen Fiber Ring	-	8-seg. LED Ring	-	White LED Ring	-	8-seg. LED Ring	8-seg. LED Ring
Order	**Data Processor**	3rd Party	-	DP-E1	3rd Party	E-MAX DS-V	3rd Party	DP-E1	3rd Party	E-MAX DS-V	E-MAX DS-V
Main Body Stand											
EDA54000	MM-400 Stand		✓								
EDA54100	MM-400/L Stand			✓							
EDA54200	MM-400/LM Stand					✓					
EDA54300	MM-400/S Stand	✓									
EDA54400	MM-400/SL Stand				✓						
EDA58000	MM-800 Stand							✓			
EDA58100	MM-800/L Stand									✓	
EDA58200	MM-800/LM Stand										✓
EDA58400	MM-800/SL Stand								✓		
EDA58300	MM-800/S Stand						✓				
PAE00100	MM AC Adapter	✓	✓	✓ 2pcs	✓		✓	✓ 2pcs	✓	✓	
PAE08210/410	Power Cable	✓	✓	✓ 2pcs	✓	✓	✓	✓ 2pcs	✓	✓	✓
Optical Head & Eyepiece Tube/Lenses											
EDC52000	Monocular Optical Head		✓								
EDG40100	MM Eyepiece Lens 10x for Monocular Head		✓								
EDC50000	Trinocular Optical Head	✓		✓	✓	✓	✓	✓		✓	
EDC50200	Trinocular Optical FA Head								✓		✓
EDB40200	Binocular Tube	✓		✓	✓	✓	✓	✓	✓	✓	✓
MBJ20100	ME CFWN 10x (2pcs)	✓		✓	✓	✓	✓	✓	✓	✓	✓
Illuminators											
EDD51000	LED Dia-illuminator	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
EDD50000	LED Epi-illuminator	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
EDD52000	Epi-illuminator for MM400/800 Monocular Optical Head		✓								
EXK30024	8-segment LED Ring Light CYN-E1 (100-240V)					✓				✓	✓
EXA20411	E-BUS Cable			✓		✓		✓		✓	✓
PAE08210/410	Power Cable					✓				✓	✓
EXA20409	MM Adapter for External Illuminator			✓				✓			
MME39610	C-FIR Ring Fiber Illuminator Guide			✓							
MMF32820/40	C-FI115/230 Fiber Illuminator with Power Cord			✓							
MXA25002	Halogen Lamp 12V-100W for Fiber Illuminator			✓							
MXK21640	LED Ring Illuminator (100-240V) (ESD Type only)							✓			
Objective Lenses											
EDF20031	TM Objective Lens 3x	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
EDF20100	TM Objective Lens 10x								✓		✓
EDF50001	Measuring Microscope Objective Adapter	✓	✓	✓	✓	✓	✓	✓	✓ 2pcs	✓	✓ 2pcs
Stages & Rotating Tables											
PPB25100	2x2 Stage		✓								
PPB35140	4x4 Stage	✓									
PPB45300	6x4 Stage			✓	✓	✓					
PPB56000	8x6 Stage						✓				
PPB67000	10x6 Stage							✓	✓		
PPB77000	12x8 Stage									✓	✓
EFH28000	MM Stage Adapter MM800 (8x6 or smaller)						✓				
PPE42100	Rotating Table Type 3			✓	✓	✓					
PPE50110	Rotating Table Type 4						✓	✓	✓		
DRO/Data Processing Unit/Printer											
EFB50200	2-axis Digital Counter SC2-E1		✓								
EFB50300	3-axis Digital Counter SC3-E1					(✓)*				(✓)*	(✓)*
EFB51000	Data Processor Console DP-E1			✓				✓			
PXA20218	SC-213 Z-signal Cable				✓				✓		
PPL00200	XY Reset Switch		✓								
EFE00202	Foot Switch 4			✓		✓		✓		✓	✓
EXK21072	Digital Thermal Printer Model DPU-414			✓				✓			
EXK21073/74	DPU-414 AC Adapter			✓				✓			
EXK21156	Printer Paper for SC-7P/DPU-414 (1 roll)			✓				✓			
EXA20366	9-9 Pins RS-232C Normal Cable (2m)			✓				✓			
Data Processing System E-MAX DS-V Set											
EDF11000	Data Processing Software E-MAX Ver. 5.0					✓				✓	✓
EXA20371	E-MAX Calibration Plate					✓				✓	✓
MQA12000	DS-2Mv Color Camera Head					✓				✓	✓
MQA25010	DS-U2 CCU					✓				✓	✓
MQF11000	DS Camera I/F Cable					✓				✓	✓
MQF52051	AC Adapter Dsi (100-240V)					✓				✓	✓
MBB63430	LV-TV Tube					✓				✓	✓
MQD42000	C-mount Adapter					✓				✓	✓
PAE08210/410	Power Cable					✓				✓	✓
MXK37228	USB A to B Cable					✓ 2pcs				✓ 2pcs	✓ 2pcs

*With the combination of MM firmware Ver. 1.09.08 and E-MAX software Ver. 5.20 or later,
2-axis Digital Counter SC2-E1 and 3-axis Digital Counter SC2-E3 are not always required.
E-MAX Software Ver. 5.20 or later supports DRO reset and MM settings.

		MM-400/U	MM-400/LU	MM-400/LMU	MM-800/SU	MM-800/LU	MM-800/SLU	MM-800/LMU	MM-800/LMU	MM-800/SLU
	Model	MM-400/U	MM-400/LU	MM-400/LMU	MM-800/SU	MM-800/LU	MM-800/SLU	MM-800/LMU	MM-800/LMU	MM-800/SLU
	Z-axis Motion	Manual	Manual	Motorized	Manual	Manual	Manual	Motorized	Motorized	Manual
	Z-axis Scale	No	Yes	Yes	No	Yes	Yes	Yes	Yes	No
	MM Controller Backpack Interface	Yes	Yes	Yes	No	Yes	No	Yes	Yes	No
	Stage	4x4	4x4	6x4	8x6	12x8	10x6	12x8	12x8	10x6
	Head	Y-TB	TT2 with Reticle	TI3	TI3	TT2 with Reticle	TT2 with Reticle	TT2 with Reticle	TT2 with Reticle	TI3
	Illuminator	LV-EPI LED	LV-U EPI FA	LV-U EPI2	LV-U EPI	LV-U EPI FA	LV-U EPI FA	LV-U EPI FA	LV-U EPI2A + LAF	LV-U EPI FA
	Data Processor	-	E-MAX DS-V	E-MAX DS-V	3rd Party	E-MAX DS-V	3rd Party	E-MAX DS-V	E-MAX DS-V	3rd Party
Order	Microscopy	BF	BD-DIC	BD-DIC-FL	BF	BD-DIC	BD	BD-DIC	BD-DIC-FL	BF
Main Body Stand, U-bracket & Illuminator										
EDA54000	MM-400 Stand	✓								
EDA54100	MM-400/L Stand		✓							
EDA54200	MM-400/LM Stand			✓						
EDA54400	MM-400/SL Stand									
EDA58000	MM-800 Stand									
EDA58100	MM-800/L Stand					✓				
EDA58200	MM-800/LM Stand							✓	✓	
EDA58400	MM-800/SL Stand						✓			✓
EDA58300	MM-800/S Stand				✓					
PAE00100	MM AC Adapter	✓	✓		✓	✓	✓			✓
PAE08210/410	Power Cable	✓	✓	✓	✓	✓	✓	✓	✓	✓
EDC54000	U Bracket Mount LV	✓	✓	✓	✓	✓	✓	✓	✓	✓
EDD51000	LED Dia-illuminator (used for U-FA as Epi-illuminator)	✓	✓ 2pcs	✓	✓	✓ 2pcs	✓ 2pcs	✓ 2pcs	✓	✓ 2pcs
Stages & Rotating Tables										
PPB35140	4x4 Stage	✓	✓							
PPB45300	6x4 Stage			✓						
PPB56000	8x6 Stage				✓					
PPB67000	10x6 Stage						✓			✓
PPB77000	12x8 Stage					✓		✓	✓	
EFH28000	MM Stage Adapter MM800 (8x6 or smaller)				✓					
PPE42100	Rotating Table Type 3		✓							
PPE50110	Rotating Table Type 4						✓			
DRO/Data Processing System										
EFB50200	2-axis Digital Counter SC2-E1	✓								
EFB50300	3-axis Digital Counter SC3-E1		(✓)*	(✓)*		(✓)*		(✓)*	(✓)*	
PXA20218	SC-213 Z-signal Cable						✓			✓
EFE00202	Foot Switch 4		✓	✓		✓		✓	✓	
EDF11000	Data Processing Software E-MAX Ver. 5.0		✓	✓		✓		✓	✓	
EXA20371	E-MAX Calibration Plate		✓	✓		✓		✓	✓	
MQA12000	DS-2Mv Color Camera Head		✓	✓		✓		✓	✓	
MQA25010	DS-U2 CCU		✓	✓		✓		✓	✓	
MQF11000	DS Camera I/F Cable		✓	✓		✓		✓	✓	
MQF52051	AC Adapter Dsi (100-240V)		✓	✓		✓		✓	✓	
MBB63430	LV-TV Tube		✓	✓		✓		✓	✓	
MQD42000	C-mount Adapter		✓	✓		✓		✓	✓	
PAE08210/410	Power Cable		✓	✓		✓		✓	✓	
MXK37228	USB A to B Cable		✓ 2pcs	✓ 2pcs		✓ 2pcs		✓ 2pcs	✓ 2pcs	
Manual, Motorized Control U-Epi Illuminator/LAF System										
MBE60500	LV-EPI LED	✓								
MPF52061	FA AC Adapter 2 (same as MQF52051)	✓								
PAE08210/410	Power Cable	✓								
MBE60200	LV-U EPI (BF DF DIC)				✓					
EDC52200	LV-U EPI FA		✓			✓	✓	✓		✓
MBE60300	LV-U EPI2 (BF DF DIC FL)			✓						
EDE51000	Motorized U EPI Driver								✓	
PAE00100	MM AC Adapter (For EDE51000)								✓	
PAE08210/410	Power Cable								✓	
EDE52000	MM400/800 U-AF Controller								✓	
MBE60310	LV-U EPI2A (BF DF DIC FL)								✓	
EDC55000	U-AF Unit								✓	
Filters & Halogen Light Source										
MBN66750	YM-NCB25 NCB11				✓	✓			✓	
MBN66760	YM-ND25 ND4/ND16				✓	✓			✓	
MXA23045	LV-HL50W 12V50W-LL Halogen Lamp				✓	✓			✓	
MEF42252	TE-PS100W Power Supply (100-240V)				✓	✓			✓	
PAE08210/410	Power Cable				✓	✓			✓	
EDD55800	MM-U Epi Lamphouse LV				✓	✓			✓	
EDD52200	Halogen Light Intensity Control Cable (LV-EPI LED or MEF42252 Power Supply to MM Controller)	✓		✓	✓				✓	
Tubes & Eyepiece Lenses										
MBB72100	Y-TB Binocular Eyepiece Tube	✓								
MBB63420	LV-TI3 Trinocular Eyepiece Tube			✓	✓					✓
EDB50300	LV-TT2 Trinocular Tube with Built-in Reticle		✓			✓	✓	✓	✓	
MAK10100	CFI 10x	✓	✓ 2pcs	✓	✓					✓
MAK30100	CFIUW 10x (2pcs)					✓	✓	✓	✓	
MAK12100	CFI 10x CM Crosshair Reticle with Diopter Adjustment	✓		✓	✓					
Revolving Nosepiece										
MBP60101	LV-NU5A U5A Nosepiece								✓	
MBP60110	L-NU5 U5 Nosepiece ESD		✓	✓		✓		✓		
MBP60120	L-NBD5 BD5 Nosepiece						✓			
MBP71300	C-N6 Nosepiece (up to 5 objective lenses)	✓			✓					✓
BF Objectives										
MUE10050	LU PLAN FLUOR EPI 5x	✓			✓					✓
MUE10100	LU PLAN FLUOR EPI 10x	✓			✓					✓
MUE20200	LU PLAN EPI ELWD 20x	✓			✓					✓
MUE20500	LU PLAN EPI ELWD 50x	✓			✓					✓
BD/DIC/FL Objectives & Accessories										
MUE41050	LU PLAN FLUOR BD 5x		✓	✓		✓	✓	✓	✓	
MUE41100	LU PLAN FLUOR BD 10x		✓	✓		✓	✓	✓	✓	
MUE60200	LU PLAN BD ELWD 20x		✓	✓		✓	✓	✓	✓	
MUE60500	LU PLAN BD ELWD 50x		✓	✓		✓	✓	✓	✓	
MUE60900	LU PLAN BD ELWD 100x		✓	✓		✓	✓	✓	✓	
MBP60170	L2-DIC DIC Prism for Eclipse Microscopes		✓	✓		✓		✓	✓	
MBN66921	YM-PO Polarizer for LV-U EPI (MBE60200)		✓	✓		✓		✓	✓	
MBN66922	L-AN Analyzer for LV-U EPI (MBE60200)		✓	✓		✓		✓	✓	
MBE44500	C-FL Epi-Fl Filter Block N B-2A			✓					✓	

TTL Laser AF (Universal Type) is a
Class 1 Laser Product

CLASS 1 LASER PRODUCT

LED Episcopic & Diascopic Illuminator
 is a Class 1 LED Product

CLASS 1 LED PRODUCT

8-segment LED Ring Light CYN-E1 is a
Class 2 LED Product

**CAUTION – CLASS 2 LED RADIATION
DO NOT STARE INTO THE BEAM**

Specifications and equipment are subject to
change without any notice or obligation on the
part of the manufacturer. November 2007.
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⚠ **WARNING** | TO ENSURE CORRECT USAGE, READ THE CORRESPONDING MANUALS CAREFULLY BEFORE USING YOUR EQUIPMENT.

ISO/IEC 17025 Certified

Nikon Corporation Instruments Company has been certified as an ISO/IEC 17025
accredited calibration laboratory for projectors and measuring microscopes by the Japan
Accreditation Board for Conformity Assessment.
(ISO/IEC 17025: International standard, which specifies the general requirements to ensure
that a laboratory is competent to carry out specific tests and/or calibrations)

Date of accreditation: September 8, 2006
Scope of accreditation: X/Y-axis indication accuracy of measuring microscopes
X/Y-axis indication accuracy and magnification accuracy of projectors
Accredited section: CS 1st Engineering Section, Sales Department, Industrial Instruments Division
Calibration site: Customer's laboratory (field service)
Best measurement capability: X/Y-axis indication accuracy of measuring microscopes and projectors
Linear scale up to 250mm: $(1.3 + 1.9 \times 10^{-3} \times L)\mu m$
Micrometer up to 50mm: 2.2μm
Magnification accuracy of projectors
Magnification 5x, 10x: $4.6 \times 10^{-2} – 1.5 \times 10^{-4} \times L$ (%)
Magnification 20x: $4.8 \times 10^{-2} – 1.5 \times 10^{-4} \times L$ (%)
Magnification 50x: $5.2 \times 10^{-2} – 1.7 \times 10^{-4} \times L$ (%)
Magnification 100x: $9.3 \times 10^{-2} – 3.0 \times 10^{-4} \times L$ (%)

Certified ISO 9001 by **BVQi** UKAS QUALITY MANAGEMENT 008
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