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Nikon

## Measuring Microscopes

# MM-Series



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## Nikon Measuring Microscopes

# MM Series

**Innovative measuring microscopes designed for industrial measurement and image analysis.**

- Greater accuracy
- Digital imaging and vision processing metrology
- Stage sizes to handle larger stages for increased sample handling
- Non-contact Z-height measurements
- Coordination with data processing systems



**Focused on high-precision and easy operability, a wide range of MM products are available.**

| | | Basic Model MM-400 | Large-Stage Model MM-800 | Compact Model MM-200 |
|---|---|---|---|---|
| | |  |  |  |
| Stage Size/ Loading Capacity | 50×50 mm / 5 kg | ✓ | ✓ | ✓ |
| | 100×100 mm / 15 kg | ✓ | ✓ | – |
| | 150×100 mm / 15 kg | ✓ | ✓ | – |
| | 200×150 mm / 20 kg | – | ✓ | – |
| | 250×150 mm / 20 kg | – | ✓ | – |
| | 300×200 mm / 20 kg | – | ✓ | – |
| Maximum Sample Height | | 150 mm | 200 mm | 110 mm |
| Optical Head | Monocular | ✓ | – | ✓ |
| | Binocular | ✓ | ✓ | – |
| X-Y-Z | 2-axis | ✓ | ✓ | ✓ |
| | 3-axis | ✓ | ✓ | – |
| CCD | | ✓ | ✓ | ✓* |
| Obj. Magnification | | 1×/3×/5×/10×/20×/50×/100× | | 1×/3×/5×/10× |

*For C-mount video head only
✓: Available / –: Not available

### MM Type

With Nikon's optical technology stages, high-precision measurement can be achieved.



### Universal Type

Offers a lineup compatible with dimensional measurement and various observation methods.



# MM-400 Series MM-Type

## MM-400/LM



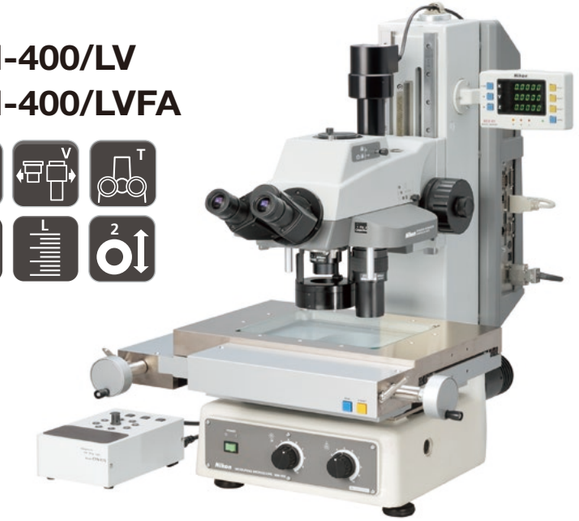
Configured with PS 6x4B stage,
trinocular optical FA head

## MM-400/L
## MM-400/SL



Configured with PS 4x4B stage,
trinocular optical head

## MM-400/LV
## MM-400/LVFA



## MM-400



Configured with PS 4x4B stage,
monocular optical head

## MM-400/S



Configured with PS 4x4B stage,
trinocular optical head

## Function Icons

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

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

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

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

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

**Variable Magnification**
Two objective lenses can be attached, making magnification changeover easy.

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

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

**Universal Epi-illuminator**
Supports a wide range of applications.

**LED Illuminator**
A high-intensity white LED illuminator for brightfield use.

# MM-800 Series MM-Type

## MM-800/LM



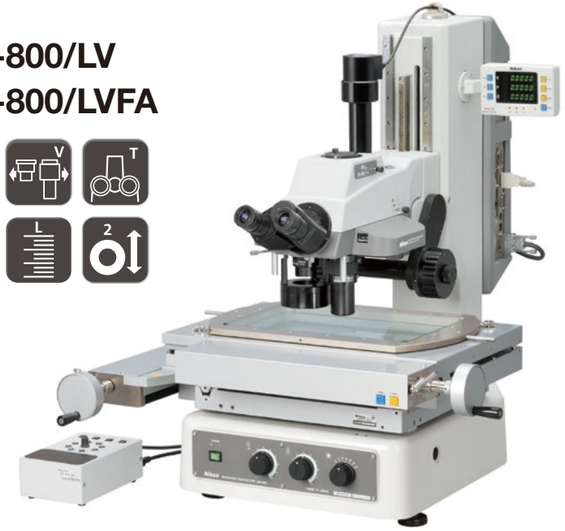
Configured with PS 10x6B stage,
trinocular optical FA head

## MM-800/L
## MM-800/SL



Configured with PS 8x6B stage,
trinocular optical FA head

## MM-800/LV
## MM-800/LVFA



## MM-800



Configured with PS 8x6B stage,
trinocular optical head

## MM-800/S



Configured with PS 8x6B stage,
trinocular optical head

## Function Icons

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

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

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

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

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

**Variable Magnification**
Two objective lenses can be attached, making magnification changeover easy.

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

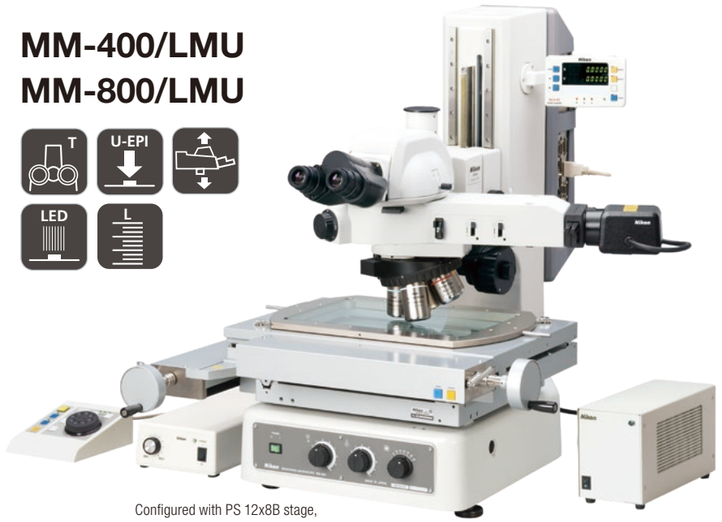
**Dual Side Coarse/Fine Focus Knob**
Coarse/fine focus knobs are on both sides.

**Universal Epi-illuminator**
Supports a wide range of applications.

**LED Illuminator**
A high-intensity white LED illuminator for brightfield use.

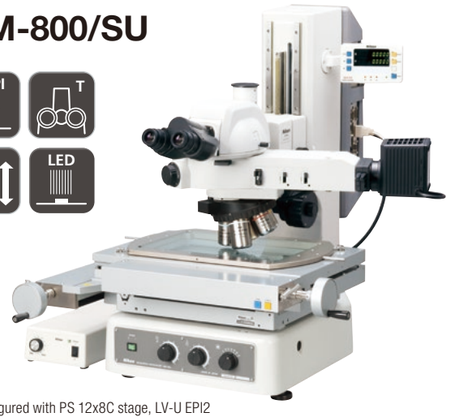
# MM-400/800 Series U-Type

## MM-400/LMU
## MM-800/LMU



Configured with PS 12x8B stage,
LV-U EPI2 universal epi-illuminator

## MM-400/U
## MM-400/SU
## MM-800/U
## MM-800/SU



Configured with PS 12x8C stage, LV-U EPI2 universal epi-illuminator, tilting trinocular eyepiece tube with built-in reticle

## MM-400/LU
## MM-400/SLU
## MM-800/LU
## MM-800/SLU



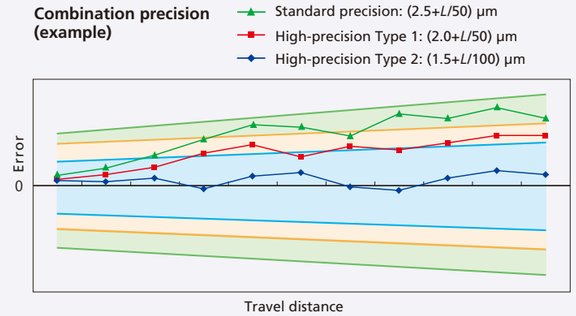
## MM Series High-Precision Type

Nikon offers high-precision type measuring microscopes for customers who need higher precision. Type 1 is calibrated by a certified engineer for customer site. Type 2 (available only for MM-800) is calibrated with high-precision stage at Nikon factory before shipment.

| Accuracy (with MM main body) | Stage |
|---|---|
| • 1.5+*L*/100 µm (Type 2)*1*2 | PS 12x8C, PS 10x6B, PS 8x6B |
| • 2.0+*L*/50 µm (Type 1)*2<br>• 2.5+*L*/50 µm (Standard Type; calibration data included) | PS 12x8C, PS 10x6B, PS 8x6B, PS 6x4B, PS 4x4B, PS 2x2B |

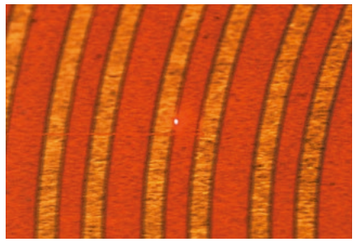
To ensure accuracy, both types require a temperature controlled room.
*1 Type 2 requires objective lens higher that 10x and vibration isolation table.
*2 Please contact Nikon for details regarding Type 1 and Type 2.

**Combination precision (example)**

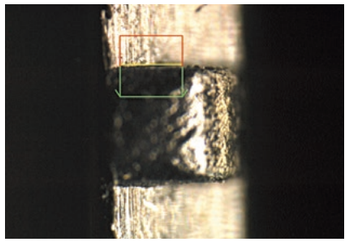




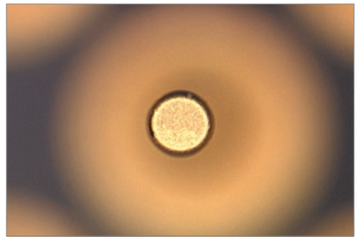

Plastic Gear Teeth with Smaller Module



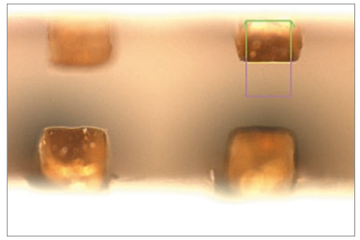
Laser AF Tracking on FPC



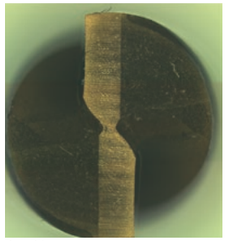
Black Injection Molding Parts - Connector



PGA - Insertion Pin



Connector - Housing Inside



Drill Bits

## Function Icons

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

**Universal Epi-illuminator Focusing Aid**
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Z-axis reading is possible for non-contact height measurement.

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

**Universal Epi-illuminator**
Supports a wide range of applications.

**LED Illuminator**
A high-intensity white LED illuminator for brightfield use.

# MM-400/800 Specifications

## MM-400 Series

| Type | | MM-400 | MM-400/S | MM-400/L | MM-400/SL | MM-400/LM | MM-400/LV | MM-400/LVFA | MM-400/U | MM-400/SU | MM-400/LU | MM-400/SLU | MM-400/LMU |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Z-axis movement | | Manual (dual side coarse/fine focus knob) | | | | Motorized (max. speed: 10 mm/sec) | Manual (dual side coarse/fine focus knob) | | Manual (dual side coarse/fine focus knob) | | | | Motorized (max. speed: 10 mm/sec) |
| MM contoller backpack interface | | Built-in | — | Built-in | — | Built-in | — | | Built-in | — | Built-in | — | Built-in |
| Optical head | | Monocular optical head, Trinocular optical head | | Monocular optical head, Trinocular optical head, Trinocular optical FA head | | | Variable magnification optical head, Variable magnification optical FA head | | C-TB binocular tube, LV-TI3 trinocular eyepiece tube, LV-TT2 tilting trinocular eyepiece tube (with built-in reticle) | | | | |
| Z-axis linear scale | | — | | Built-in | | | — | | — | | Built-in | | |
| Eyepiece inclination angle | | 25° | | | | | 25° | | — | | | | |
| Eyepiece | | MM Eyepiece for Monocular optical head, CFWN10x (Field No. 20) for Trinocular optical head | | | | | MM Eyepiece for Monocular optical head, CFWN10x (Field No. 20) for Trinocular optical head | | CFI10x (Field No. 22), CFI10x CM (Field No. 22) | | | | |
| Objective | | Measuring microscope objectives | | | | | Low magnification: 1x, 3x, 5x, 10x<br>High magnification: 5x, 10x, 20x, 50x, 100x | | CFI60-2 TU Plan Fluor EPI series, CFI60-2 TU Plan Fluor BD series, CFI60 L Plan EPI CR series | | | | |
| Stage | | PS 6x4B, PS 4x4B, PS 2x2B | | | | | | | PS 6x4B, PS 4x4B, PS 2x2B | | | | |
| Light source | Diascopic | LED diascopic illuminator (standard), 12V-50W halogen light source (option)*1 | | | | | | | LED diascopic illuminator (standard), 12V-50W halogen light source (option)* | | | | |
| | Episcopic | LED episcopic illuminator | | | | | LED episcopic illuminator | | White LED illuminator LV-EPI LED, Universal epi-illuminator LV-U EPI2*1, Universal epi-illuminator U-EPI*1, Universal epi-illuminator with Focusing Aid LV-U EPI FA1, MM-LL LED Lamphouse (option for LV-U EPI and LV-U EPI2)*1 | | | | |
| Maximum sample height | | 150 mm | | | | | | | 150 mm | | | | |
| Dimensions (W x D x H) | | 300 x 600 x 638 mm | | | | | | | 300 x 600 x 638 mm | | | | |
| Weight (approx.) | | 50 kg | | | | | | | 50 kg | | | | |

*1 TI-PS100W power supply is required

## MM-800 Series

| Type | | MM-800 | MM-800/S | MM-800/L | MM-800/SL | MM-800/LM | MM-800/LV | MM-800/LVFA | MM-800/U | MM-800/SU | MM-800/LU | MM-800/SLU | MM-800/LMU |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Z-axis movement | | Manual (dual side coarse/fine focus knob) | | | | Motorized (max. speed: 10 mm/sec) | Manual (dual side coarse/fine focus knob) | | Manual (dual side coarse/fine focus knob) | | | | Motorized (max. speed: 10 mm/sec) |
| MM contoller backpack interface | | Built-in | — | Built-in | — | Built-in | — | | Built-in | — | Built-in | — | Built-in |
| Optical head | | Monocular optical head, Trinocular optical head | | Monocular optical head, Trinocular optical head, Trinocular optical FA head | | | Variable magnification optical head, Variable magnification optical FA head | | C-TB binocular tube, LV-TI3 trinocular eyepiece tube, LV-TT2 tilting trinocular eyepiece tube (with built-in reticle) | | | | |
| Z-axis linear scale | | — | | Built-in | | | — | | — | | Built-in | | |
| Eyepiece inclination angle | | 25° | | | | | 25° | | — | | | | |
| Eyepiece | | MM Eyepiece for Monocular optical head, CFWN10x (Field No. 20) for Trinocular optical head | | | | | MM Eyepiece for Monocular optical head, CFWN10x (Field No. 20) for Trinocular optical head | | CFI10x (Field No. 22), CFI10x CM (Field No. 22) | | | | |
| Objective | | Measuring microscope objectives | | | | | Low magnification: 1x, 3x, 5x, 10x<br>High magnification: 5x, 10x, 20x, 50x, 100x | | CFI60-2 TU Plan Fluor EPI series, CFI60-2 TU Plan Fluor BD series, CFI60 L Plan EPI CR series | | | | |
| Stage | | PS 12x8C, PS 10x6B, PS 8x6B, PS 6x4B, PS 4x4B, PS 2x2B*2 | | | | | | | PS 12x8C, PS 10x6B, PS 8x6B, PS 6x4B, PS 4x4B, PS 2x2B*2 | | | | |
| Light source | Diascopic | LED diascopic illuminator (standard), 12V-50W halogen light source (option)*1 | | | | | | | LED diascopic illuminator (standard), 12V-50W halogen light source (option)*1 | | | | |
| | Episcopic | LED episcopic illuminator | | | | | White LED illuminator LV-EPI LED, Universal epi-illuminator LV-U EPI2*1, Universal epi-illuminator U-EPI*1, Universal epi-illuminator with Focusing Aid LV-U EPI FA, MM-LL LED Lamphouse (option for LV-U EPI and LV-U EPI2)*1 | | | | | |
| Maximum sample height | | 200 mm | | | | | | | 200 mm | | | | |
| Dimensions (W x D x H) | | 385 x 785 x 725 mm | | | | | | | 385 x 785 x 725 mm | | | | |
| Weight (approx.) | | 72 kg | | | | | | | 72 kg | | | | |

*1 TI-PS100W power supply is required
*2 For PS 6x4B stages or smaller, a stage adapter is required

# MM-200



## Compact, light, precise and easy to use measuring microscope for dimensioning and tolerancing



Shortens measurement time with its built-in 50 x 50 mm stage and rotating table.



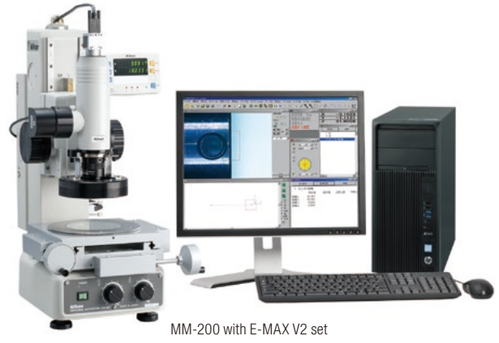
Built-in light sources are all long-life white LEDs. The optional LED ring light enhances edge observation with the use of an oblique illumination angle.




Features a space-saving design with a footprint equivalent to an A3 size sheet, or 420 x 297 mm*.
*Value does not include handles

### E-MAX set

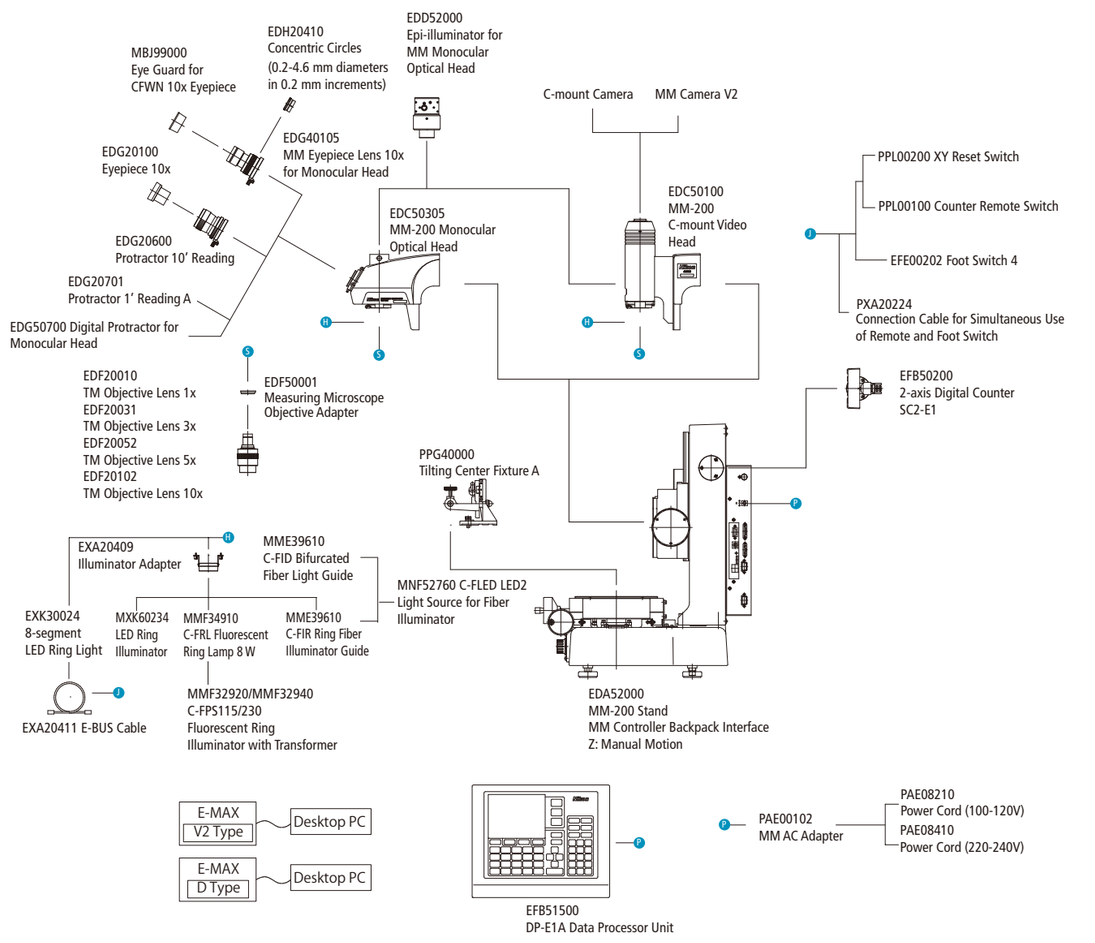
Combine digital camera with E-MAX software for advanced edge detection.



MM-200 with E-MAX V2 set

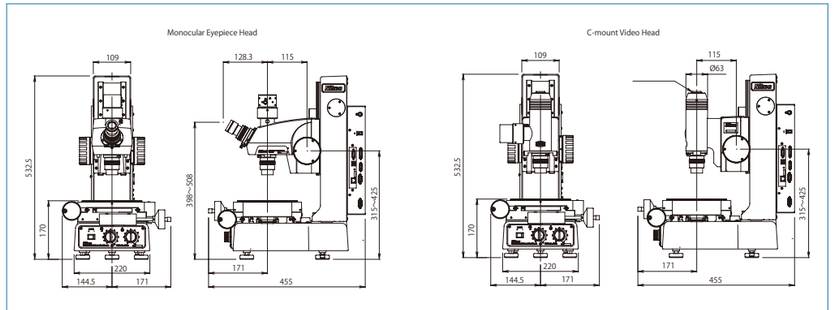
| Type | Monocular Eyepiece Tube Type | C-mount Video Head Type |
|---|---|---|
| Optical head | MM-200 monocular optical head | C-mount video head for MM-200 |
| XYZ stroke | 50 x 50 x 110 mm | |
| Stage accuracy | 2.5 + *L*/50 µm (with LEC), 3 + *L*/50 µm (*L* = measurement length in mm) | |
| Scale resolution | 0.01 / 0.1(default) / 1 / 10 µm | |
| Max. loading weight | 2 kg for guaranteed accuracy, 5 kg for operation | |
| Magnification accuracy | 0.1 % | |
| Objective lenses (WD) | Standard: 3x (75.5 mm)<br>Optional: 1x (79 mm), 5x (64 mm), 10x (48 mm) | |
| Light sources | Standard: diascopic/episcopic (white LED)<br>Optional: 8-segmented ring light (white LED) | |
| Dimensions & weight | 316 x 455 x 533 mm (W x D x H), 40 kg | |
| Input voltage range | 100 - 240 V (Max. 1.8 A) | |

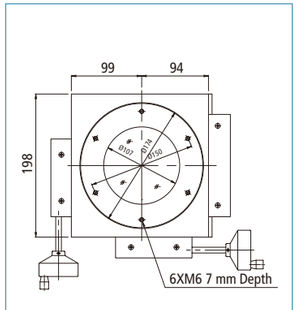
## *MM-200 System Diagram*




## *MM-200 Dimensional Diagram*

Unit: mm



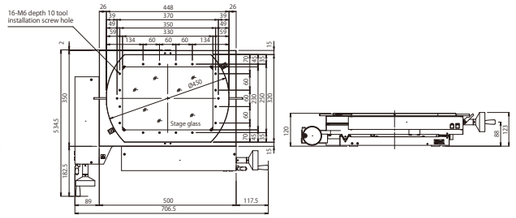



# Stages

Stages for MM-800 series

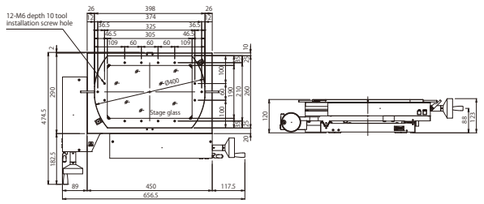
## PS 12x8C
**Stage**



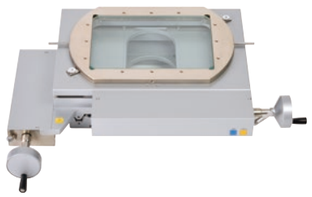


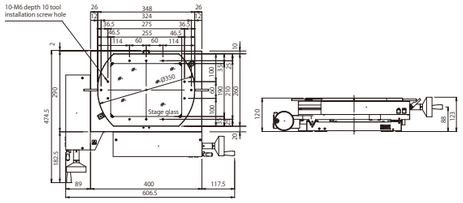

## PS 10x6B
**Stage**






## PS 8x6B
**Stage**

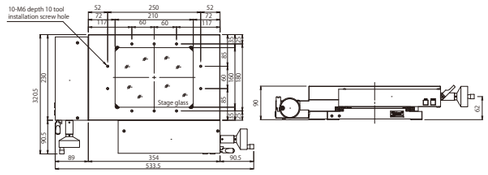




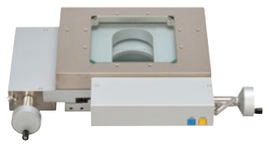

Stages for MM-400 series

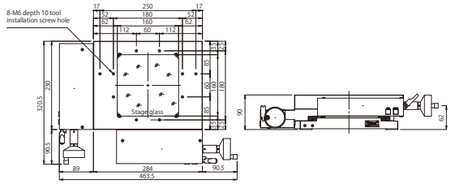
## PS 6x4B
**Stage**





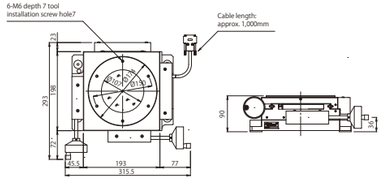

## PS 4x4B
**Stage**






## PS 2x2B
**Stage**








**Stage specifications**

| Type | Surface area | Stage glass dimensions | Stroke | Reading method | Min. reading | Rotation range | Tool installation screw hall | Loading capacity | Weight (approx.) |
|---|---|---|---|---|---|---|---|---|---|
| PS 12x8C | 448 x 320 mm | 330 x 230 mm | 300 x 200 mm | Linear encoder | 0.0001 mm | ±3° (Swivel plate) | 16-M6 depth 10 | 20 kg | 67 kg |
| PS 10x6B | 398 x 260 mm | 305 x 190 mm | 250 x 150 mm | | | | 12-M6 depth 10 | | 52 kg |
| PS 8x6B | 348 x 260 mm | 255 x 190 mm | 200 x 150 mm | | | | 10-M6 depth 10 | | 49 kg |
| PS 6x4B | 350 x 230 mm | 210 x 160 mm | 150 x 100 mm | | | — | 10-M6 depth 10 | 15 kg | 27.5 kg |
| PS 4x4B | 284 x 230 mm | 160 x 160 mm | 100 x 100 mm | | | | 8-M6 depth 10 | | 23.5 kg |
| PS 2x2B | ø174 mm | ø107 mm | 50 x 50 mm | | | 360° | 6-M6 depth 7 | 5 kg | 15.5 kg |

# Stage Accessories

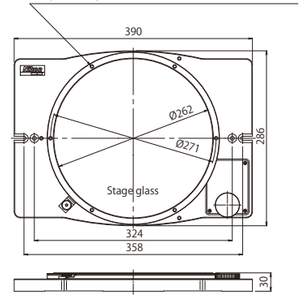
### Stage Adapter
Used to mount PS 6x4B, PS 4x4B, or PS 2x2B stages to MM-800.



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

Rotating Table Type 4
For PS 12x8C*, PS 10x6B, PS 8x6B

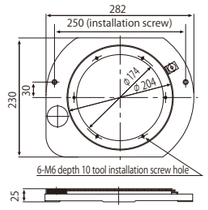





*When using rotating table type 4, stage stroke is limited for X and Y axis.

Rotating Table Type 3
For PS 6x4B, PS 4x4B






**Rotating table specifications**

| | Table size | Glass insert size | Rotation range | Tool installation screw hole | Weight (approx.) |
|---|---|---|---|---|---|
| Rotating table type 4 | ø282 mm | ø262 mm | 360° (uncalibrated) | 6-M6 depth 9 | 8 kg |
| Rotating table type 3 | ø204 mm | ø165 mm | 360° (uncalibrated) | 6-M6 depth 10 | 5 kg |

### Tilting Center Fixture A
Used to hold machined samples for MM-200, PS 2x2B, and Rotating Table Type 3.



| Max. sample diameter and length when held level | Center height | Tilting angle | Weight (approx.) |
|---|---|---|---|
| ø68 x 120 mm | 45 mm | 10° (in 1° increment) | 2.2 kg |

### Large Stage Adjustment Knob
Enables fine adjustment of swivel plate rotation for PS 12x8C, PS 10x6B and PS 8x6B.



# E-Max Series

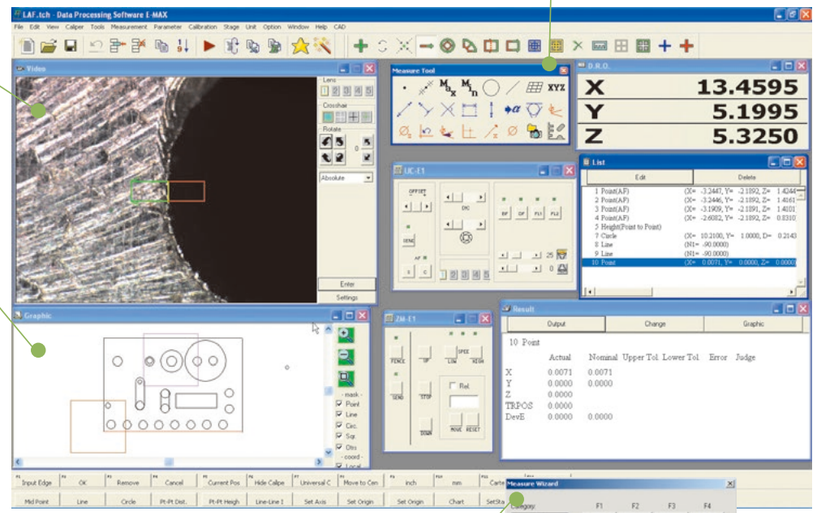
## FOV Measurement with advanced digital image processing technology

Combined with the V2 digital camera, E-MAX series software provides various advanced measurements and processing functions, ranging from 2D data processing and image measurement, to data storage. Automated edge detection with sub-pixel processing enables more precise and repeatable measurement.

Larger icons support touch screen operation environment

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

Navigation function




Interactive operation wizards

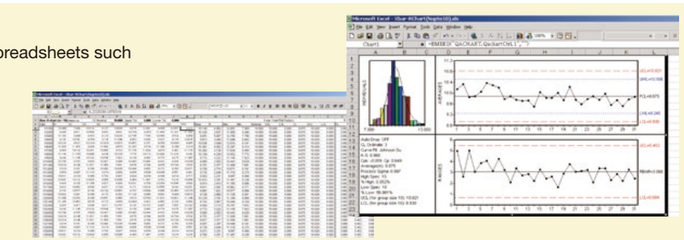


**Functions provided by each set**

| | V2 set | D set |
|---|---|---|
| Data processing | ✓ | ✓ |
| Navigation during replay | ✓ | ✓ |
| Live video monitoring | ✓ | – |
| Chart measurement | ✓ | – |
| Automated video edge detection | ✓ | – |

### DDE (Dynamic Data Exchange) Function

Measured data can be immediately transferred to spreadsheets such as Microsoft Excel®, making real-time SPC analysis possible.





# DP-E1A

## Data Processor with improved accuracy and ease of use

Effectively used in combination with a measuring microscope/profile projector, the DP-E1A quickly calculates geometrical features with simple and interactive operations. Measurement results are automatically memorized as teaching steps and can be easily used as a measurement routine.

### Simple & interactive operation

Feature Oriented Operation allows the user to conduct measurements by following the graphics, providing a seamless measuring environment. Measurement results are automatically memorized as teaching steps and can be easily used as a measurement routine.

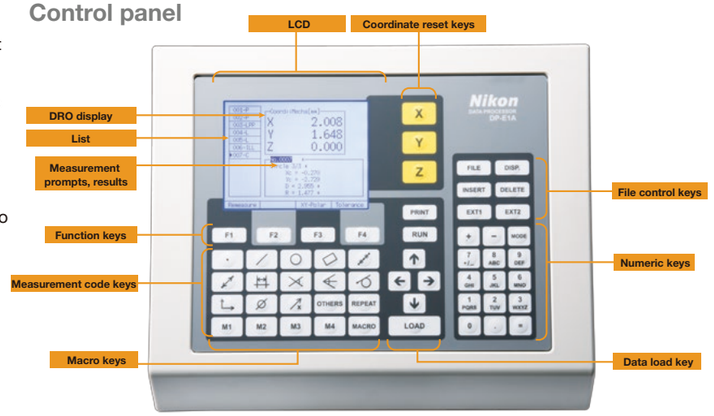
### GD&T compliance

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.

### Control panel




**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**

- **Macro key**
- **Macro setup key** — Registers combination of measurement codes for macro keys (M1 to M4)

**File key**

**[File run]**

- **Run key** — Runs teaching file

- **Repeat key** — Sets up repetition number of teaching file

**[File control]**

- **Print key** — Conducts print output at discretionary timing during teaching
- **File key** — Shows menu to access file for file controls
- **Insert key** — Inserts measurement codes between list items
- **Delete key** — Deletes measurement code and entered measurement point; Deletes file during file control

**Display setting key**

- **Disp. key** — Switches display settings

**Data input key**

- **Load key** — Enters measurement points

**Accessory function key**

- **Ext1 key** — Sets up print out of standard deviation
- **Ext2 key** — Reserved
- **Others key** — Reserved

**Function key**

- **Function key** — Performance differs depending on displayed screen and item

### Retrofit Unit

To use DP-E1A with the following models, a Retrofit Unit is required as an interface:
Measuring Microscopes MM-40/MM-60, MM-400S/SL, MM-800S/SL and Profile Projectors V-12B/V-20B



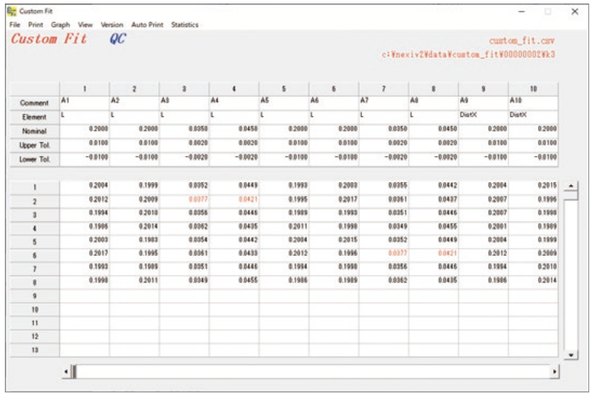
# Accessories

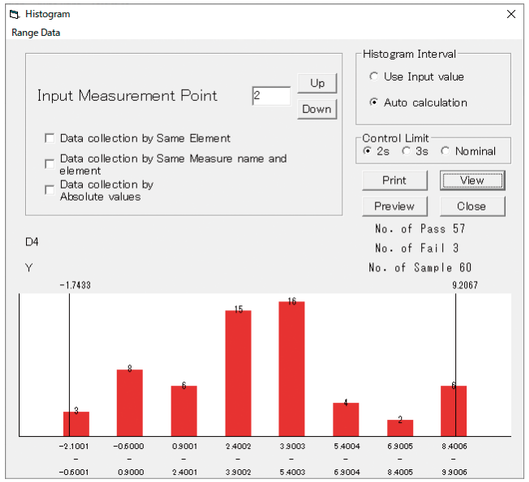
## *Application Software for Measurement Support/Data Processing System*

## Custom Fit QC: Report and chart generating

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

- Customization of inspection result sheets are possible, in addition to the 10 standard sheets
- BMP and JPEG files can be pasted onto the inspection result sheets
- Graphs can be automatically generated
- Displays are adjustable between degree/minute/second
- Easy to generate histograms, X-R control charts, and scatter diagrams

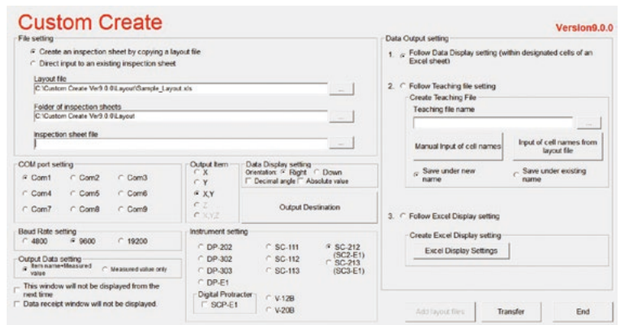



## Custom Create: Direct link to Excel worksheets

Measurement data from counters and/or data processors can be transferred directly to Excel sheets. Multiple worksheets can be transferred at once, achieving efficient measurements.

- Compatible measuring instruments:
MM-400/800 series, DP-E1A, V-20B, V-12B
- Allows data transfer to customized inspection-result sheet forms
- 3 standard inspection result sheets are available




Operating environment: Windows®7 or Windows®10
Microsoft Excel® 2003 or later
Required memory: 512MB (min)
Codevelopment: Aria Co., Ltd.



## Counters

**3-Axis/2-Axis Counters**
The display unit can be mounted on either side of the main body. Counters can be connected with data processors and digital printers via the RS-232C port.



3-axis counter



2-axis counter

**XY Reset Switch**
Can be attached to the main body to easily reset values while using the stage.


Y-axis


X-axis

**Counter Remote Switch**
Enables remote control of the counter's RESET and SEND.



## Digital Thermal Printer TSP700II

Connect to the MM-400/800 control box to print out values from the counter.


TSP700II

## Calibration Scale 300mm

Used to calibrate feeding accuracy of stage up to 300mm. The scale is made of low expansion glass to minimize thermal error. Both 10mm-interval sensor patterns and calibrations are provided. Accuracy: Within 1µm against compensation values.



## Vibration Isolation Table

Provides a stable, even surface by reducing floor vibrations. Compatible with measuring microscopes, data processing systems, external light modulators, and computers.

| | MM-400/800 |
|---|---|
| Installation part (W x D) | 450 x 689 mm |
| Dimensions (W x D x H) | 1058 x 689 x 751 mm |



## Foot Switch

Used to send load command to DP-E1A. Frees both hands to enhance measurement efficiency.



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

These compact objectives feature long working distance and excellent resolution. Almost all have the same parfocal distances and come with lens adapters for quick and easy replacement.

• 3x objective is included with the measuring microscope

| Magnification | 1x | 3x | 5x | 10x | 20x | 50x | 100x |
|---|---|---|---|---|---|---|---|
| WD (mm) | 79 | 75 | 64 | 49 | 20 | 15 | 4 |



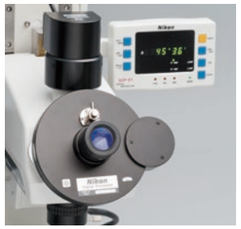
# Protractor Eyepieces (for MM Type only)

Note: Monocular adapter is required when using these eyepieces with trinocular tubes

### Digital Protractor Eyepiece*

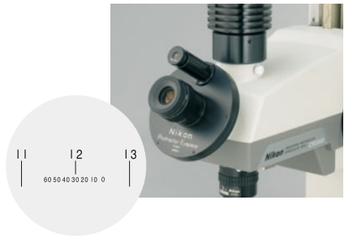
Rotate crosshairs in the viewfield to measure angles.
Display unit: 1 minute, 10 minutes

*Not available for S and SL models



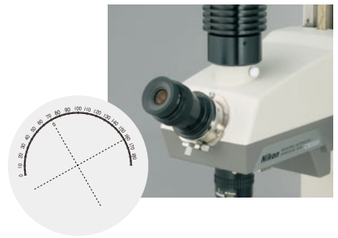
### 1-Minute Reading Eyepiece

Viewfield includes crosshairs and 60° lines. Angle indexes are read by appropriate microscopes.
Measuring range: 360°



### 10-Minute Reading Eyepiece

Viewfield includes crosshairs and angle indexes. When the knurled ring at the lower section of the eyepiece tube is turned, the crosshairs and the vernier both rotate 180°.



# Illuminators

### 8-Segment LED Ring Light

Enables illumination from eight directions.

• Can be used with MM-400/800 and E-MAX
• RS-232C cable comes standard
• E-BUS cable is required to control with E-MAX



### Ring Illuminator Adapter

Can be used to mount fiber-optic, fluorescent lamp, and LED ring illuminator.

• Cannot be mounted with 8-segment LED Ring Light



### Fiber-optics Illuminator Set

Offers easily adjustable brightness. The ring fiber illuminator minimizes shadows caused by any unevenness on the sample surface. The bifurcated fiber enables illumination from two directions.



• Cannot be used with metallurgical microscope objectives
• Cannot be mounted when using 20x, 50x and 100x measuring microscope objectives

### LED Ring Illuminator

Ideal for use in a production environment as LEDs have long product life. Uses white LEDs with a variable intensity control and constant color temperature.

• Cannot be used with metallurgical microscope objectives
• Cannot be mounted when 20x, 50x and 100x measuring microscope objectives are used

# Direct C-mount Adapter

Used to install C-mount camera on the measuring microscope.

• LV-TV tube is required



# High-performance Objective Lenses

### Standard objective lenses

## CFI60-2 TU Plan Fluor Series

Suitable for various research, analysis, and examination needs, while maintaining Nikon's commitment to high NA and long working distance. Offering high resolution and ease of use, these objectives can be used for brightfield, darkfield, simple polarizing, DIC and UV epifluorescence observations.



TU Plan Fluor series

### Objective lenses with correction ring

## CFI60 L Plan EPI CR Series

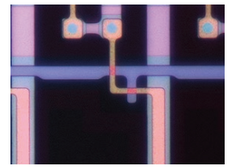
Objectives for use with thin cover-glass used in liquid crystal displays and highly integrated, dense devices. Coverglass correction can be continuously made from 0mm up to 1.2mm (0-0.7mm and 0.6-1.3mm for 100x). The 100x objective lens offers 0.85 high NA, while enabling high-contrast imaging of cells and patterns without being affected by the coverglass.



L Plan EPI CR series of objective lenses with correction ring



Without correction (50x)



With correction at 0.7mm (50x)

### CFI60/CFI60-2 Series

**Brightfield**

| Type | Magnification | NA | W.D. (mm) |
|---|---|---|---|
| L Plan EPI | 2.5x | 0.075 | 8.8 |
| T Plan EPI | 1x | 0.03 | 4.0 |
| | 2.5x | 0.075 | 6.5 |
| TU 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 |
| TU Plan EPI ELWD | 20x | 0.40 | 19.0 |
| | 50x | 0.60 | 11.0 |
| | 100x | 0.80 | 4.5 |
| T Plan EPI SLWD | 10x | 0.20 | 37.0 |
| | 20x | 0.30 | 30.0 |
| | 50x | 0.40 | 22.0 |
| | 100x | 0.60 | 10.0 |
| TU Plan Apo EPI | 50x | 0.80 | 2.0 |
| | 100x | 0.90 | 2.0 |
| | 150x | 0.90 | 1.5 |

**Brightfield/Darkfield**

| Type | Magnification | NA | W.D. (mm) |
|---|---|---|---|
| TU 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 |
| TU Plan BD ELWD | 20x | 0.40 | 19.0 |
| | 50x | 0.60 | 11.0 |
| | 100x | 0.80 | 4.5 |
| TU Plan Apo BD | 50x | 0.80 | 2.0 |
| | 100x | 0.90 | 2.0 |
| | 150x | 0.90 | 1.5 |

**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 |

# Accessories

## Tilting trinocular eyepiece tube

The LV-TT2 tilting trinocular eyepiece tube with built-in reticle offers comfort to all users, regardless of their viewing positions. The optical path changeover of 100:0/20:80 allows simultaneous use of a monitor.



## Manual nosepieces

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

| | Brightfield | Darkfield | DIC |
|---|---|---|---|
| C-N6 | ○ | — | — |
| L-NBD5 | ○ | ○ | — |
| L-NU5 | ○ | ○ | ○ |

○ : Supported -: Not supported

## New light source for EPI illuminators

A newly designed compact LED EPI lamphouse for brightfield, darkfield, and DIC observations has been added to the existing lineup.

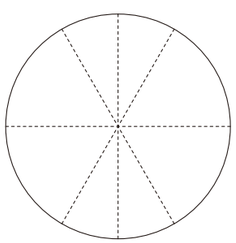



## Templates

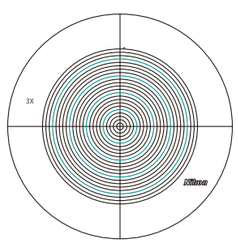
The following dedicated templates are available to facilitate profile comparison and measurements. Templates are designed for 3x objectives.

- Standard angle templates (standard)
- Concentric (diameter 0.2-4.6)*

*Cannot be attached to monocular type



Standard




Concentric

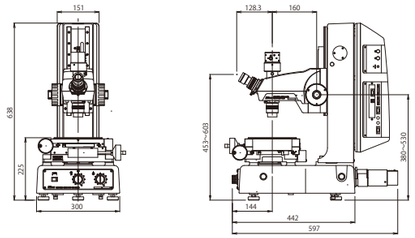


# Dimensional Diagram

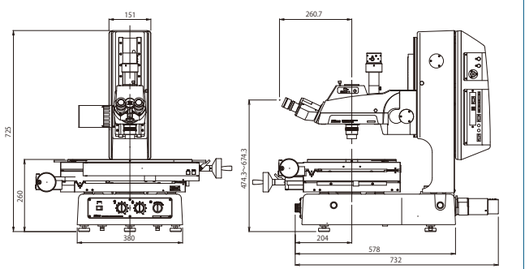
Note: Dimensions will vary, depending on which stage and eyepiece tube are used.

Unit: mm

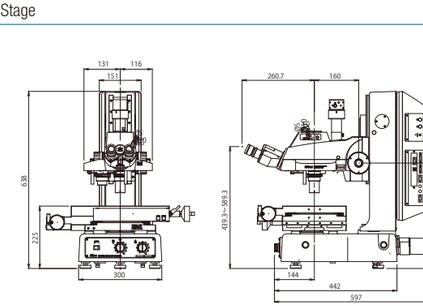
MM-400/M
PS 2x2B Stage



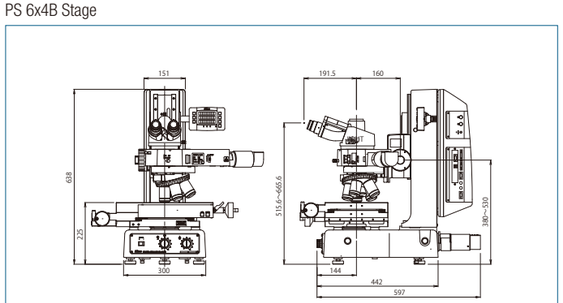

MM-800/LM
PS 12x8C Stage



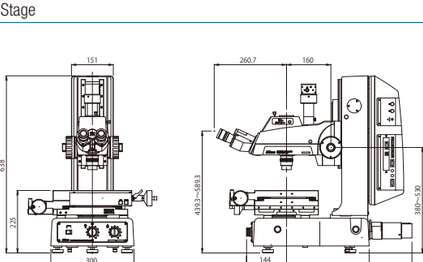

MM-400LV
PS 6x4B Stage



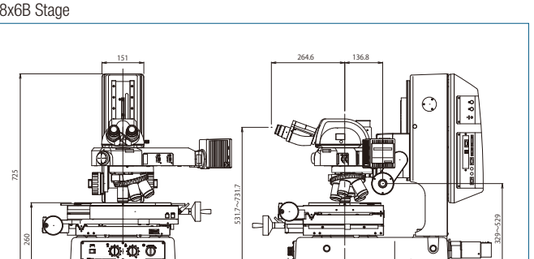

MM-400/LUFA
PS 6x4B Stage



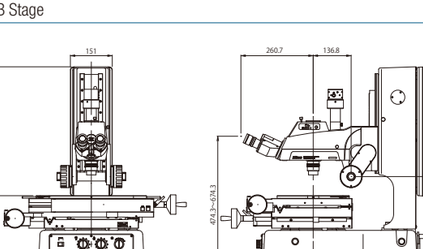

MM-400/L
PS 4x4B Stage



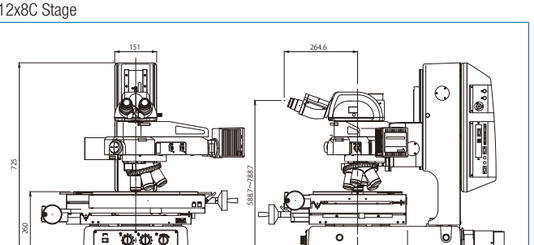

MM-800/LU
PS 8x6B Stage



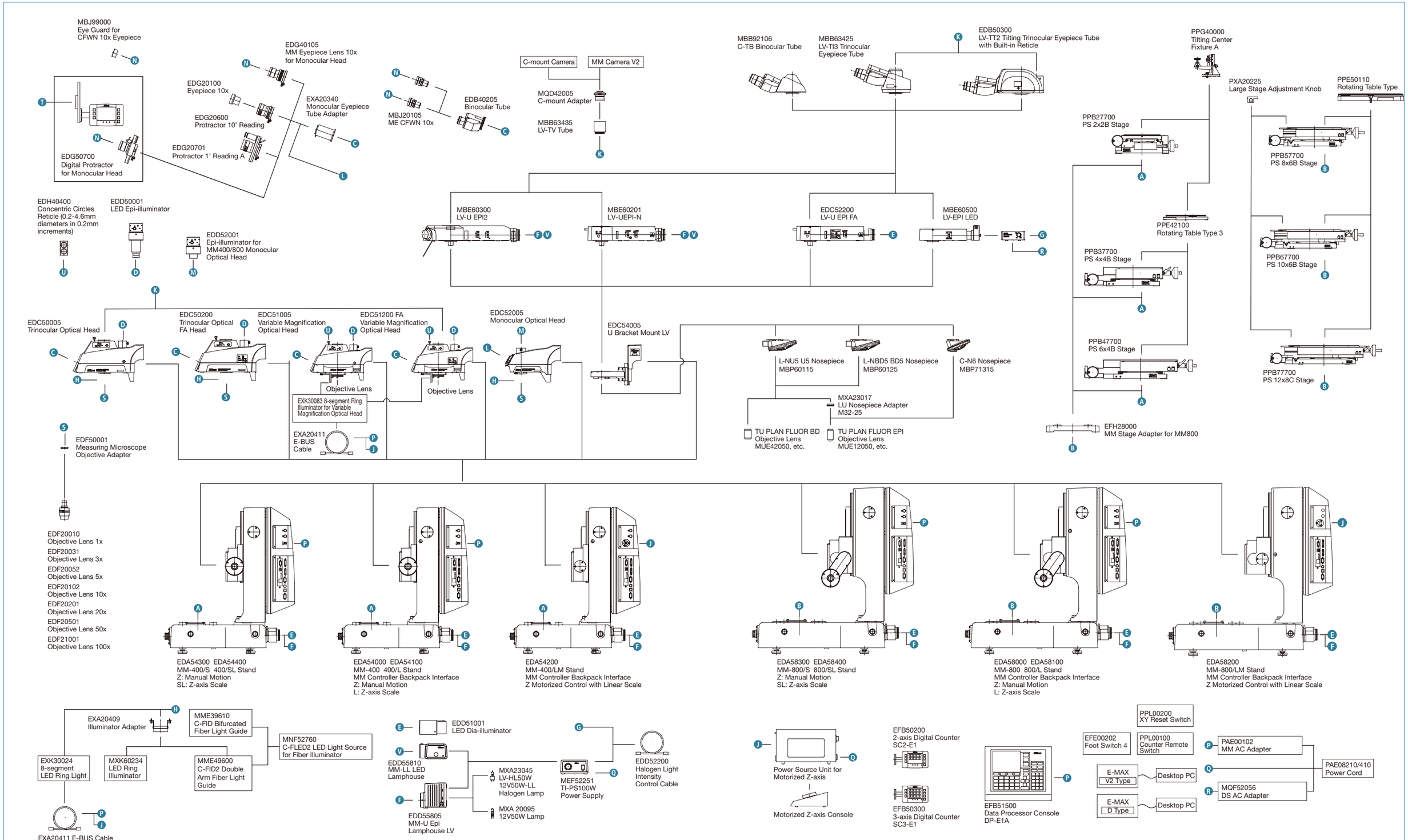

MM-800/L
PS 10x6B Stage




MM-800/LMU
PS 12x8C Stage



# MM-400/800 System Diagram



# Suggested Configuration Chart

## *MM-Type*

| | Product Code | 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 | PS 4x4B | PS 2x2B | PS 6x4B | PS 6x4B | PS 6x4B | PS 8x6B | PS 10x6B | PS 10x6B | PS 12x8C | PS 12x8C |
| | | Head | Trinocular | Monocular | Trinocular | Trinocular | Trinocular | Trinocular | Trinocular | FA | Trinocular | FA |
| | | Illuminators | – | – | Fiber Ring | – | 8-seg. LED Ring | – | White LED Ring | – | 8-seg. LED Ring | 8-seg. LED Ring |
| | | Data Processors | – | – | DP-E1A | – | E-MAX V2 | – | DP-E1A | – | E-MAX V2 | E-MAX V2 |
| 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 | | | | | | ✓ | | | | |
| | PAE00102 | MM AC Adapter | ✓ | ✓ | ✓ 2pcs | ✓ | | ✓ | ✓ 2pcs | ✓ | ✓ | |
| | PAE08210/410 | Power Cable | ✓ | ✓ | ✓ 2pcs | ✓ | ✓ | ✓ | ✓ 2pcs | ✓ | ✓ | ✓ |
| Optical Head and Eyepiece Tube/ Lenses Illuminators | EDC52005 | Monocular Optical Head | | ✓ | | | | | | | | |
| | EDG40105 | MM Eyepiece Lens 10x for Monocular Head | | ✓ | | | | | | | | |
| | EDC50005 | Trinocular Optical Head | ✓ | | ✓ | ✓ | ✓ | ✓ | ✓ | | ✓ | |
| | EDC50200 | Trinocular Optical FA Head | | | | | | | | ✓ | | ✓ |
| | EDB40205 | Binocular Tube | ✓ | | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| | MBJ20105 | CFWN 10x Eyepiece (2pcs) | ✓ | | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| | EDD51001 | LED Dia-illuminator | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| | EDD50001 | LED Epi-illuminator | ✓ | | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| | EDD52001 | Epi-illuminator for MM400/800 Monocular Optical Head | | ✓ | | | | | | | | |
| | EXK30024 | 8-segment LED Ring Light (100-240V) | | | | | ✓ | | | | ✓ | ✓ |
| | EXA20411 | E-BUS Cable | | | ✓ | | ✓ | | ✓ | | ✓ | ✓ |
| | PAE08210/410 | Power Cable | | | | | ✓ | | | | ✓ | ✓ |
| | EXA20409 | Illuminator Adapter | | | ✓ | | | | ✓ | | | |
| | MME39610 | C-FIR Ring Fiber Illuminator Guide | | | ✓ | | | | | | | |
| | MNF52760 | C-FLED2 LED Light Source for Fiber Illuminator | | | ✓ | | | | | | | |
| | MXK60234 | LED Ring Illuminator (100-240V) (ESD Type only) | | | | | | | ✓ | | | |
| Objective Lenses | EDF20031 | Objective Lens 3x | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| | EDF20102 | Objective Lens 10x | | | | | | | | ✓ | | ✓ |
| | EDF50001 | Measuring Microscope Objective Adapter | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ 2pcs | ✓ | ✓ 2pcs |
| Stages and Rotating Tables | PPB27700 | PS 2x2B Stage | | ✓ | | | | | | | | |
| | PPB37700 | PS 4x4B Stage | ✓ | | | | | | | | | |
| | PPB47700 | PS 6x4B Stage | | | ✓ | ✓ | ✓ | | | | | |
| | PPB57700 | PS 8x6B Stage | | | | | | ✓ | | | | |
| | PPB67700 | PS 10x6B Stage | | | | | | | ✓ | ✓ | | |
| | PPB77700 | PS 12x8C Stage | | | | | | | | | ✓ | ✓ |
| | EFH28000 | MM Stage Adapter for MM800 (PS 6x4B or smaller) | | | | | | | | | | |
| | PXA20225 | Large Stage Adjustment Knob | | | | | | ✓ | ✓ | ✓ | ✓ | ✓ |
| | PPE42100 | Rotating Table Type 3 | | | ✓ | ✓ | ✓ | | | | | |
| | PPE50110 | Rotating Table Type 4 | | | | | | ✓ | ✓ | ✓ | | |
| Data Processing System and Printer | EFB50200 | 2-axis Digital Counter SC2-E1 | | ✓ | | | | | ✓ | | | |
| | EFB50300 | 3-axis Digital Counter SC3-E1 | | | ✓ | | ✓ | | | | ✓ | ✓ |
| | EFB51500 | Data Processor Console DP-E1A | | | ✓ | | ✓ | | ✓ | | | |
| | PXA20218 | SC-213 Z-signal Cable | | | | ✓ | | | | ✓ | | |
| | PPL00200 | XY Reset Switch | | ✓ | | | | | | | | |
| | EFE00202 | Foot Switch 4 | | | ✓ | | ✓ | | ✓ | | ✓ | ✓ |
| | EXK30314 | Thermal Printer Model SP700 II | | | ✓ | | | | ✓ | | | |
| | EXA20478 | 9-25 Pins RS-232C Cross Cable (2m) | | | ✓ | | | | ✓ | | | |
| | EXK30105 | Printer Paper | | | ✓ | | | | ✓ | | | |
| | PAE08210/410 | Power Cable | | | ✓ | | | | ✓ | | | |
| | EDF11000 | Data Processing Software E-MAX | | | | | ✓ | | | | ✓ | ✓ |
| | EXA20371 | E-MAX Calibration Plate | | | | | ✓ | | | | ✓ | ✓ |
| | EDE50100 | MM Camera V2 | | | | | ✓ | | | | ✓ | ✓ |
| | EDE50110 | MM Camera V2 Cable | | | | | ✓ | | | | ✓ | ✓ |
| | MBB63435 | LV-TV Tube | | | | | ✓ | | | | ✓ | ✓ |
| | MQD42005 | C-mount Adapter | | | | | ✓ | | | | ✓ | ✓ |

• MM Cable for Simultaneous Use (PXA20224) is required for simultaneous use of Foot Switch and [RESET/SEND] buttons.



## *U-Type*

| | Product Code | 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 | Manual | 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 | PS 4x4B | PS 4x4B | PS 6x4B | PS 8x6B | PS 12x8C | PS 10x6B | PS 12x8C | PS 12x8C | PS 10x6B |
| | | Head | C-TB | TT2 | TI3 | TI3 | TT2 | TT2 | TT2 | TT2 | 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 EPI2 | LV-U EPI FA |
| | | Illuminators | – | E-MAX V2 | E-MAX V2 | – | E-MAX V2 | – | E-MAX V2 | E-MAX V2 | – |
| | | Data Processors | BF | BD-DIC | BD-DIC-FL | BF | BD-DIC | BD | BD-DIC | BD-DIC-FL | BF |
| Main Body Stand, U-bracket and 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 | | | | ✓ | | | | | |
| | PAE00102 | MM AC Adapter | ✓ | ✓ | | ✓ | ✓ | ✓ | | | ✓ |
| | PAE08210/410 | Power Cable | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| | EDC54005 | U Bracket Mount LV | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| | EDD51001 | LED Dia-illuminator (used for U-FA as Epi-illuminator) | ✓ | ✓ 2pcs | ✓ | ✓ | ✓ 2pcs | ✓ 2pcs | ✓ 2pcs | ✓ | ✓ 2pcs |
| Stages and Rotating Tables | PPB37700 | PS 4x4B Stage | ✓ | ✓ | | | | | | | |
| | PPB47700 | PS 6x4B Stage | | | ✓ | | | | | | |
| | PPB57700 | PS 8x6B Stage | | | | ✓ | | | | | |
| | PPB67700 | PS 10x6B Stage | | | | | | ✓ | | | ✓ |
| | PPB77700 | PS 12x8C Stage | | | | | ✓ | | ✓ | ✓ | |
| | EFH28000 | MM Stage Adapter for MM800 (PS 6x4B or smaller) | | | | | | | | | |
| | PXA20225 | Large Stage Adjustment Knob | | | | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| | PPE42100 | Rotating Table Type 3 | | ✓ | | | | | | | |
| | PPE50110 | Rotating Table Type 4 | | | | | | ✓ | | | |
| Data Processing System and Printer | 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 | | ✓ | ✓ | | ✓ | | ✓ | ✓ | |
| | EXA20371 | E-MAX Calibration Plate | | ✓ | ✓ | | ✓ | | ✓ | ✓ | |
| | EDE50100 | MM Camera V2 | | ✓ | ✓ | | ✓ | | ✓ | ✓ | |
| | EDE50110 | MM Camera V2 Cable | | ✓ | ✓ | | ✓ | | ✓ | ✓ | |
| | MBB63435 | LV-TV Tube | | ✓ | ✓ | | ✓ | | ✓ | ✓ | |
| | MQD42005 | C-mount Adapter | | ✓ | ✓ | | ✓ | | ✓ | ✓ | |
| U-Epi Illuminators | MBE60500 | LV-EPI LED | ✓ | | | | | | | | |
| | MQF52056 | DS AC Adapter 2 | ✓ | | | | | | | | |
| | PAE08210/410 | Power Cable | ✓ | | | | | | | | |
| | MBE60201 | LV-U EPI (BF DF DIC) | | | | ✓ | | | | | |
| | EDC52200 | LV-U EPI FA | | ✓ | | | ✓ | ✓ | ✓ | | ✓ |
| | MBE60300 | LV-U EPI2 (BF DF DIC FL) | | | ✓ | | | | | ✓ | |
| Filters and Light Sources | MBN66750 | YM-NCB25 NCB11 | | | ✓ | ✓ | | | | ✓ | |
| | MBN66760 | YM-ND25 ND4/ND16 | | | ✓ | ✓ | | | | ✓ | |
| | EDD55805 | MM-U Epi Lamphouse LV | | | ✓ | ✓ | | | | ✓ | |
| | EDD55810 | MM-LL LED Lamphouse | | | ✓ | ✓ | | | | ✓ | |
| | EDD52200 | Halogen Light Intensity Control Cable | ✓ | | ✓ | ✓ | | | | ✓ | |
| | MXA23045 | LV-HL50W 12V50W-LL Halogen Lamp | | | ✓ | ✓ | | | | ✓ | |
| | MEF52251 | TI-PS100W Power Supply (100-240V) | | | ✓ | ✓ | | | | ✓ | |
| | PAE08210/410 | Power Cable | | | ✓ | ✓ | | | | ✓ | |
| Tubes and Eyepiece Lenses | MBB92106 | C-TB Binocular Tube | ✓ | | | | | | | | |
| | MBB63425 | LV-TI3 Trinocular Eyepiece Tube | | ✓ 2pcs | ✓ | ✓ | | | | | ✓ |
| | EDB50300 | LV-TT2 Trinocular Tube with Built-in Reticle | | ✓ | | | ✓ | ✓ | ✓ | ✓ | |
| | MAK10110 | CFI 10x Eyepiece | ✓ | ✓ | ✓ | ✓ | | | | | ✓ |
| | MAK12105 | CFI 10x CM Eyepiece with Crosshairs | ✓ | | ✓ | ✓ | | | | | ✓ |
| Revolving Nosepiece | MBP60115 | L-NU5 U5 Nosepiece ESD | | ✓ | ✓ | | ✓ | | ✓ | | |
| | MBP60125 | L-NBD5 BD5 Nosepiece | | | | | | ✓ | | | |
| | MBP71316 | C-N6 Nosepiece (up to 5 objective lenses) | ✓ | | | ✓ | | | | | ✓ |
| Objective Lenses and Accessories | MUE12050 | TU PLAN FLUOR EPI 5x | ✓ | | | ✓ | | | | | ✓ |
| | MUE12100 | TU PLAN FLUOR EPI 10x | ✓ | | | ✓ | | | | | ✓ |
| | MUE21200 | TU PLAN EPI ELWD 20xA | ✓ | | | ✓ | | | | | ✓ |
| | MUE21500 | TU PLAN EPI ELWD 50xA | ✓ | | | ✓ | | | | | ✓ |
| | MUE42050 | TU PLAN FLUOR BD 5x | | ✓ | ✓ | | ✓ | ✓ | ✓ | ✓ | |
| | MUE42100 | TU PLAN FLUOR BD 10x | | ✓ | ✓ | | ✓ | ✓ | ✓ | ✓ | |
| | MUE61200 | TU PLAN BD ELWD 20x | | ✓ | ✓ | | ✓ | ✓ | ✓ | ✓ | |
| | MUE61500 | TU PLAN BD ELWD 50x | | ✓ | ✓ | | ✓ | ✓ | ✓ | ✓ | |
| | MUE61900 | TU PLAN BD ELWD 100x | | ✓ | ✓ | | ✓ | ✓ | ✓ | ✓ | |
| | MBP60170 | L2-DIC DIC Prism for Eclipse Microscopes | | ✓ | ✓ | | ✓ | | ✓ | ✓ | |
| | MBN66923 | LV-PO Polarizer for LV-U EPI2 (MBE60200) | | ✓ | ✓ | | ✓ | | ✓ | ✓ | |
| | MBN66922 | L-AN Analyzer for LV-U EPI2 (MBE60200) | | | ✓ | | | | | ✓ | |
| | MBN66921 | YM-PO Polarizer for LV-U EPI FA (EDC52200) | | ✓ | | | ✓ | | ✓ | | |

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**CLASS 1 LED PRODUCT**

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

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| | |
|---|---|
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