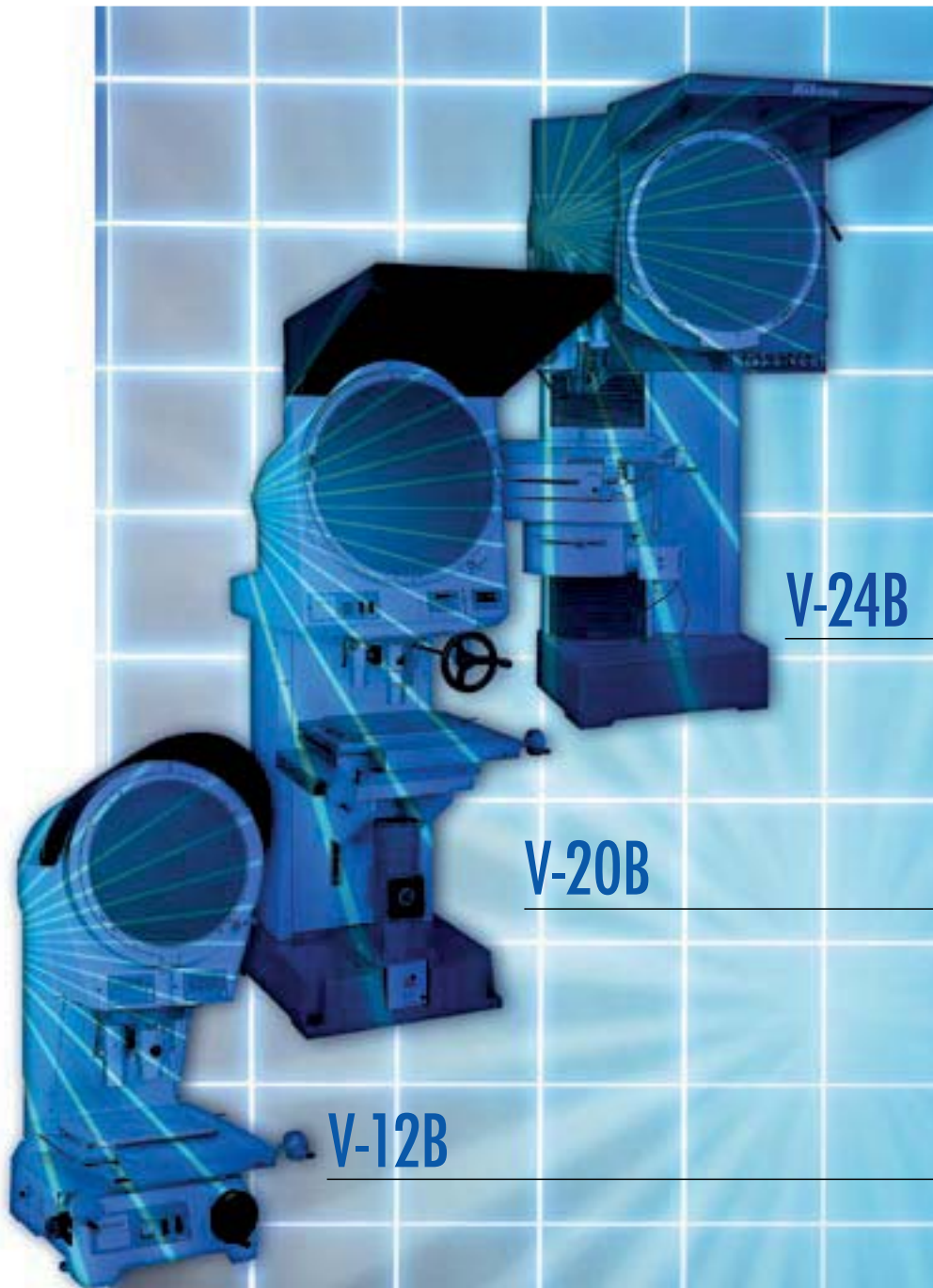




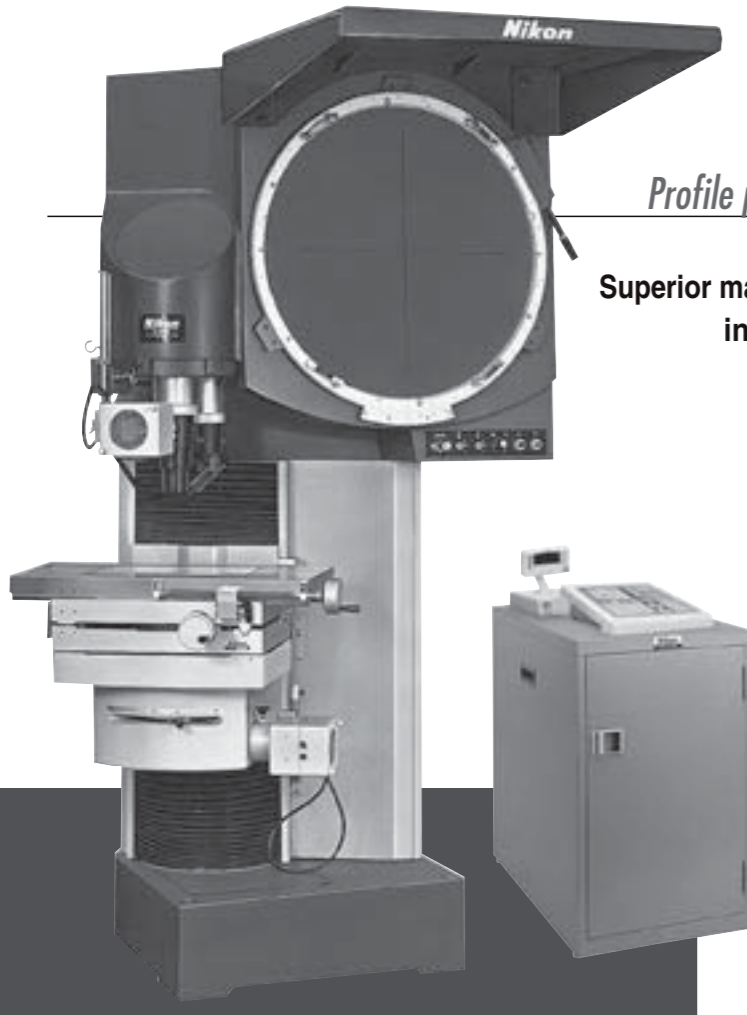
# PROFILE PROJECTORS



V-24B

V-20B

V-12B



# PROFILE PROJECTOR V-24B

*Profile projector with an effective 600mm screen diameter*

**Large effective screen diameter of 600mm.**  
**Superior magnification accuracy is ideal for measurement and inspection of the profiles, surface conditions, and other aspects of large workpieces.**

### Large stage mountable

A large stage with wide cross-travel can be mounted. The up/down stage movement is motorized, accommodating workpieces as tall as 250mm.

### Halogen light source

The halogen light source provides sufficient brightness regardless of whether contour or surface illumination is used, making measurements and observations simple and easy.

### Concentric and parfocal

Projection lenses from 5x up to 100x have the same parfocal distance and are all concentric. This simplifies operations when magnifications must be changed often.

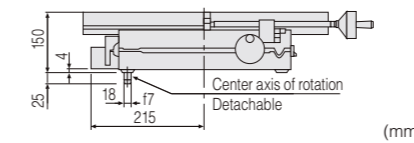
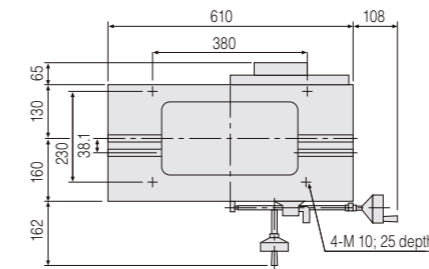
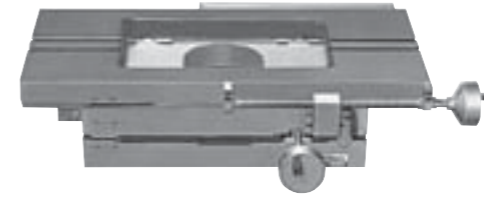
### Highest magnification accuracy

Featuring a magnification accuracy of  $\pm 0.05\%$  with contour illumination and  $\pm 0.075\%$  with surface illumination, this instrument's accuracy is extremely high when compared with other models.

V-24B configured with 9V Stage + Retrofit Counter/DP Unit + 2-Axis Counter Display + DP-E1

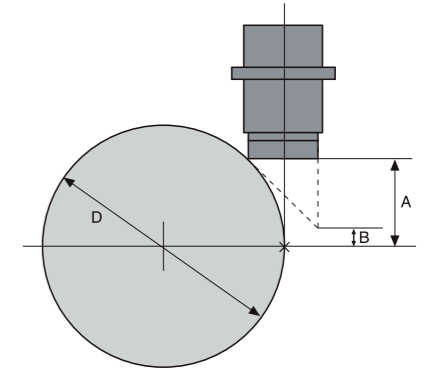
### Dedicated 9V Stage

Surface area	610x290mm
Stage glass size	330x200x10mm
Cross travel	225x100mm
Reading method	Linear encoder
Minimum readout	0.01 $\mu$ m
Tool mounting groove	Dovetail
Loading capacity	30kg
Weight	Approx. 75kg



## PROJECTION LENSES

Five types of projection lenses are available for the V-24B profile projector, each featuring a different magnification, working distance, and field of view with a different diameter. Select the appropriate one to suit your application.

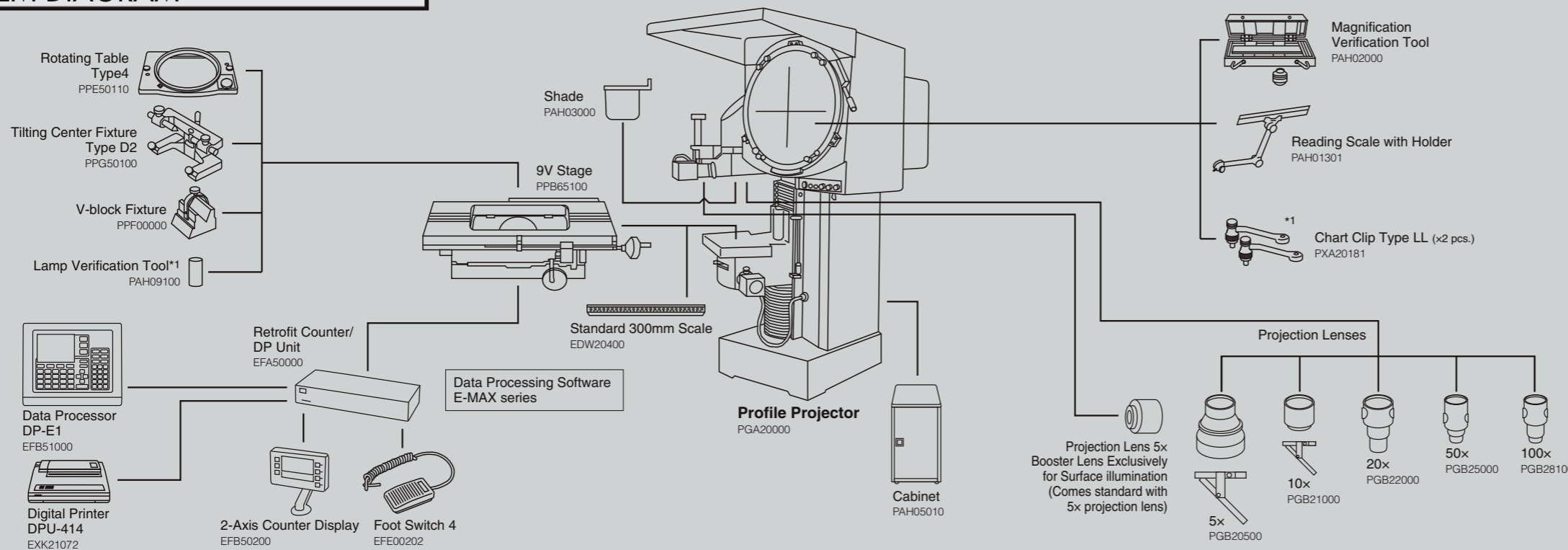


A=working distance  
 B=working distance when a half reflecting mirror is attached (5x, 10x)  
 D=maximum diameter of a measurable cylindrical specimen

Magnification	Diameter of field of view	Half mirror	A	B	D
5x	120	Detachable	174	24	502
10x	60	Detachable	106	26	330
20x	30	Built-in; fixed	46	-	113
50x	12	Built-in; switchable	39	-	99
100x	6	Built-in; switchable	35	-	81

\*Part of the field of view is vignetted when the 9V Stage and a 5x lens are used under contour illumination.

## SYSTEM DIAGRAM



\*1: Standard accessory

## SPECIFICATIONS

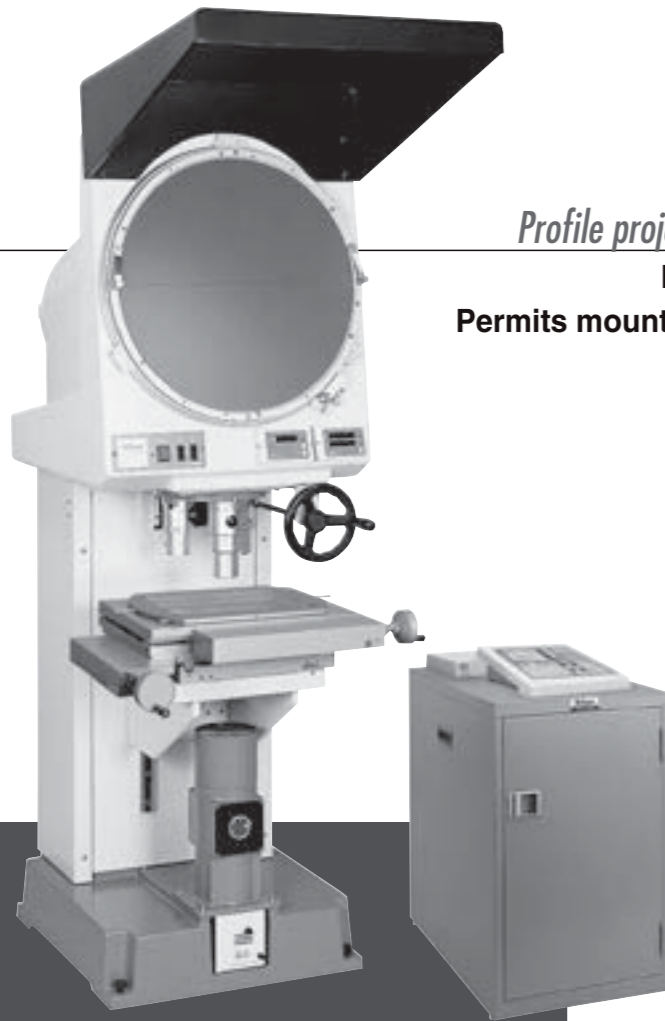
Type	Vertical optical axis
Image	Inverted and reversed
Screen	$\phi 600$ mm; etched center crossline; 1-minute protractor; inclined 4 off vertical
Lens mount	3-lens turret mount; screw type
Projection lens	5x, 10x, 20x, 50x, 100x
Magnification accuracy	0.05% for contour illumination 0.075% for surface illumination
Light source	24V-150W halogen for both contour and surface illumination
Max. workpiece height	250mm
Stage	9V Stage directly mountable
Power input	AC 100-120V (CSA), 220-240V (CEE), 240V (SAA)
Dimensions(WxDxH)	1,180x1,100x1,900mm
Weight	Approx. 800kg

# PROFILE PROJECTOR V-20B

Profile projector with an effective 500mm screen diameter

Large effective screen diameter of 500mm.

Permits mounting of a large stage and includes a built-in digital counter and digital protractor.



V-20B configured with PS 10x6B Stage + DP-E1

## Parfocal projection lenses

All projection lenses have the same parfocal distance and feature long working distances. The built-in half mirror eliminates the need to adjust illumination each time the magnification is changed. With improved images with excellent quality, while enabling observation in a comfortable posture by adjusting the eye-point height.

## Workpieces up to 20kg measurable

The stage up/down movement unit is rigidly built, and if the PS 10x6B Stage is used, workpieces as heavy as 20kg can be loaded.

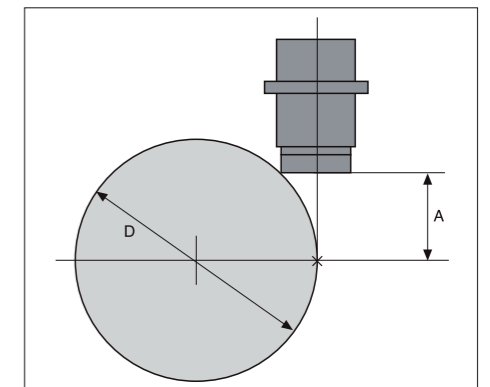
## Stage Adapter S For the V-20B

This adapter is used to mount a stage other than the PS 10x6B, PS 8x6B Stage to the V-20B profile projector.



## PROJECTION LENSES

Five types of projection lenses are available for the V-20B profile projector, each featuring a different magnification, working distance, and field of view with a different diameter. Select the appropriate one to suit your application.

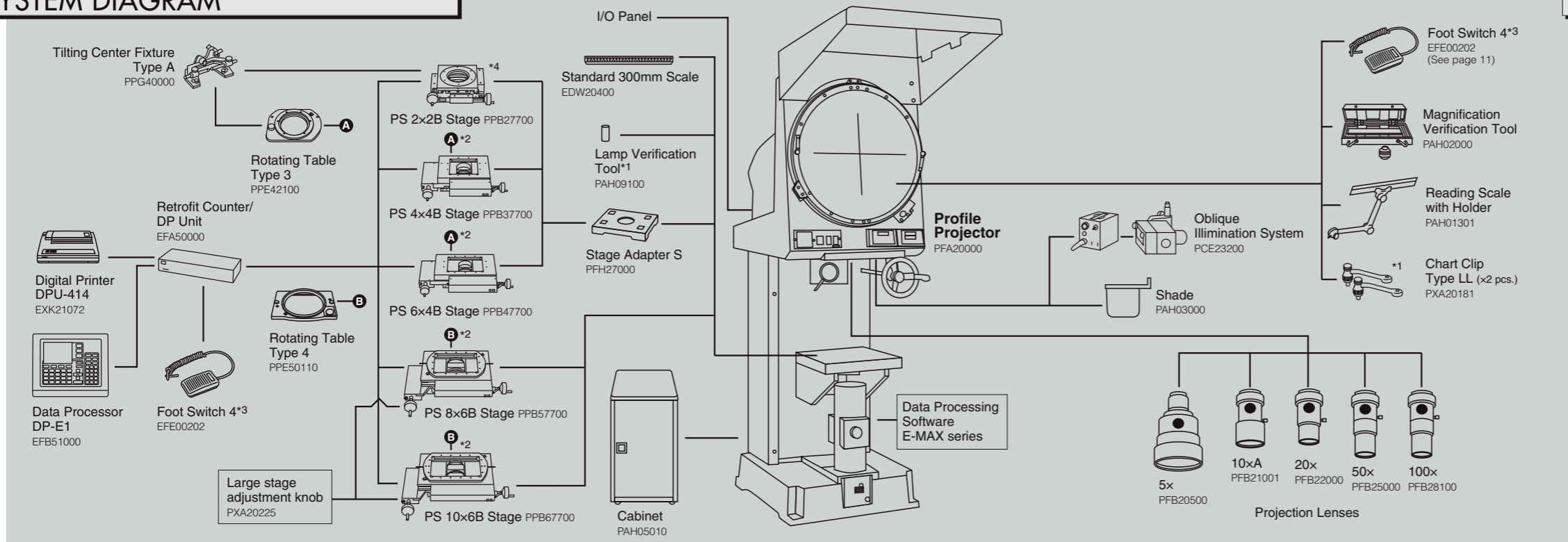


A=working distance  
D=maximum diameter of a measurable cylindrical specimen

Magnification	Diameter of field of view	Half mirror	A	D
5x	100	Built-in; fixed	73	149
10x	50	Built-in; switchable	79	215
20x	25	Built-in; switchable	85	313
50x	10	Built-in; switchable	50.5	130
100x	5	Built-in; switchable	50.5	130

\*Part of the field of view is vignetted when the 5x or 10x projection lens are used under contour illumination.

## SYSTEM DIAGRAM

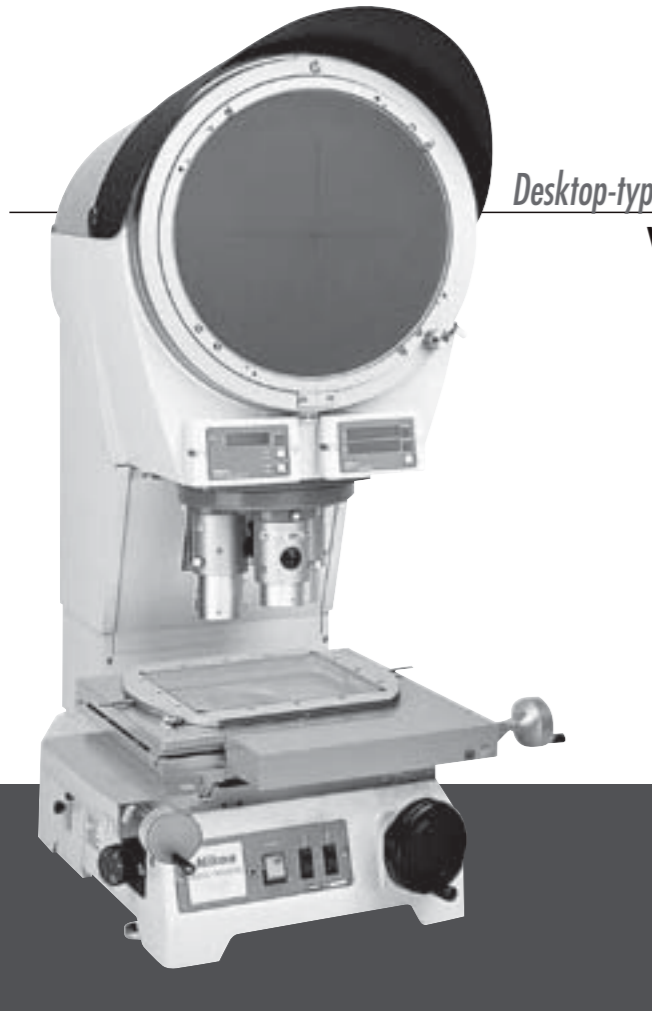


## SPECIFICATIONS

Type	Vertical optical axis
Image	Inverted and reversed
Screen	ø500mm; protractor screen; inclined 8°
Lens mount	3-lens turret mount; screw type
Projection lens	5x, 10x, 20x, 50x, 100x
Magnification accuracy	0.1% for contour illumination 0.15% for surface illumination
Light source	24V-150W halogen lamp
Max. workpiece height	150mm
Stage	PS 10x6B, PS 8x6B Stage directly mountable. PS 6x4B, PS 4x4B, PS 2x2B Stage mountable via adapter
Power input	AC 100-120V (CSA), 220-240V (CEE), 240V (SAA)
Dimensions(WxDxH)	570x1,200x1,900mm
Weight	Approx. 260kg

\*1: Standard accessory \*2: Letters above the stages represent accessories that can be mounted.

\*3: Please use the Foot Switch 2 (EFE00200) for Profile Projectors that have serial numbers starting with 1 or 2. To use the Foot Switch and [Reset/Send] buttons simultaneously, the "MM cable for simultaneous use (PXA20224)" is required. \*4: 5x projection lens is not available.



V-12BDC configured with PS 10x6B Stage

# PROFILE PROJECTOR V-12B Series

Desktop-type profile projectors with an effective 305mm screen diameter

Wide measurable range: cross travel 250x150mm.

Models with a built-in digital counter and/or protractor are available.

Four types selectable

	Built-in digital protractor	Built-in digital counter
V-12BDC	●	●
V-12BD	●	-
V-12BSC	*Fixed screen	●
V-12BS	*Fixed screen	-

D: Deluxe type. Comes with a built-in digital protractor.

S: Standard type. No digital protractor is included.

C: With built-in X-Y digital counter.

\*The V-12BSC and V-12BS types have a fixed screen.

Therefore, angular measurement by rotating the screen is not possible.

### Large stage mountable

The V-12B adapts a focusing mechanism that achieves focus by moving the objective head up and down, allowing stages with longer cross travel to be mounted. When the PS 10x6B Stage is used, the projector can measure areas as wide as 250x150mm.

### Adjustable base feet

Because the base is 2mm away from the installation surface and the base feet are adjustable, the projector is less affected by irregularities in the installation surface and external vibrations.

### Increased maximum workpiece height

Because the rigidity of the instrument is increased, thanks to CAE (Computer-Aided Engineering) design, workpieces as tall as 100mm can be loaded.

### Built-in digital counter and protractor

The V-12BDC and V-12BSC types come with a digital XY counter, while the V-12BDC and V-12BD types have a built-in digital protractor for greater ease of use.

### Erect images

Projection images are erect and unreversed for easy measurements, and their quality is as sharp as inverted images.

### Switchable vertical/oblique illumination

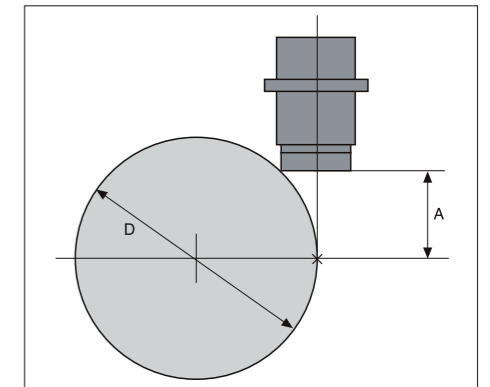
The built-in surface illuminator can be switched between vertical and oblique illumination, making detection of edges in resin parts and other workpieces much easier.

### Four-step zooming condenser lens

When contour illumination is used, this condenser lens delivers the right amount of light to suit the magnification of the projection lens selected. (The DIA condenser must be used with this lens when the magnification is 200x)

## PROJECTION LENSES

Three projection lenses can be mounted on the rotary turret at one time. All projection lenses boast high resolution and minimal distortion, while their working distances are longer than competitive lenses.



A=working distance

D=maximum diameter of a measurable cylindrical specimen

(mm)

Magnification	Diameter of field of view	Half mirror	A	D
5x	61	Built-in; fixed	60	127
10x	30	Built-in; switchable	74	215
20x	15	Built-in; switchable	74	244
25x	12	Built-in; switchable	62	178
50x	6	Built-in; switchable	61	173
100x	3	Built-in; switchable	49	123
200x	1.5	Built-in; switchable	24	49

\*Part of the field of view is vignetted when the 5x projection lens is used under contour illumination.

### EPI Condenser Lens

Under surface illumination, the EPI condenser lens is necessary when 200x projection lenses are used.

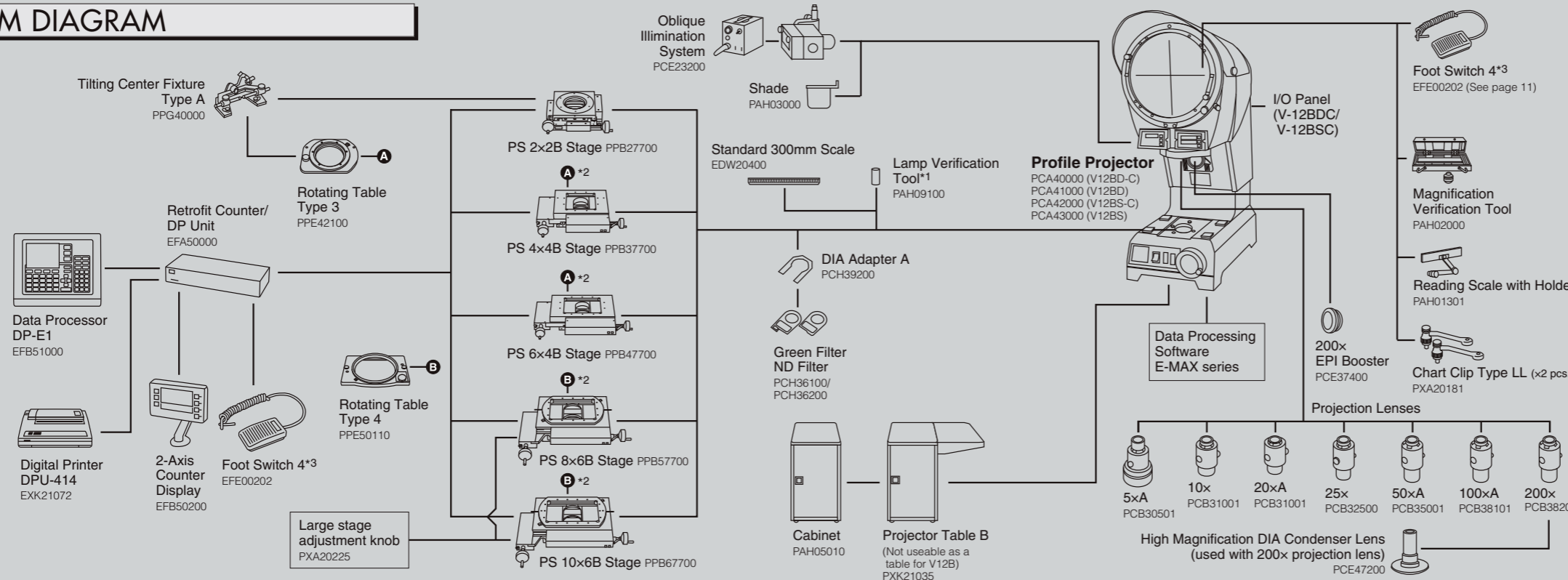


### DIA Condenser Lens

Under contour illumination, the DIA condenser lens is necessary when 200x projection lenses are used.



## SYSTEM DIAGRAM



## SPECIFICATIONS

Type	Vertical optical axis bench type
Image	Erect and unreversed
Screen	V-12BDC/V-12BD ø305mm; etched center crossline; provided with digital protractor fine rotation knob; 360 rotatable (with digital reading to 1 minute of arc)
	V-12BSC/V-12BS ø305mm fixed screen
Lens mount	3-lens turret mount; clamping type
Projection lens	5x, 10x, 20x, 25x, 50x, 100x, 200x
Magnification accuracy (except 200x)	0.1% for oblique surface/contour illumination 0.15% for vertical surface illumination
Light source	24V-150W halogen for both contour and surface illumination
Max. workpiece height	100mm (70mm: with PS 10x6B, PS 8x6B Stage)
Stage	PS 10x6B, PS 8x6B, PS 6x4B, PS 4x4B or PS 2x2B Stage directly mountable
Power input	AC 100/120V (50/60 Hz), AC 220/230/240V (50/60 Hz)
Dimensions(WxDxH)	410x650x938-1038mm
Weight	Approx. 80kg
XY counter	V-12BDC Built-in (1.0/0.5m selectable) V-12BD Not provided V-12BSC Built-in (1.0/0.5m selectable) V-12BS Not provided

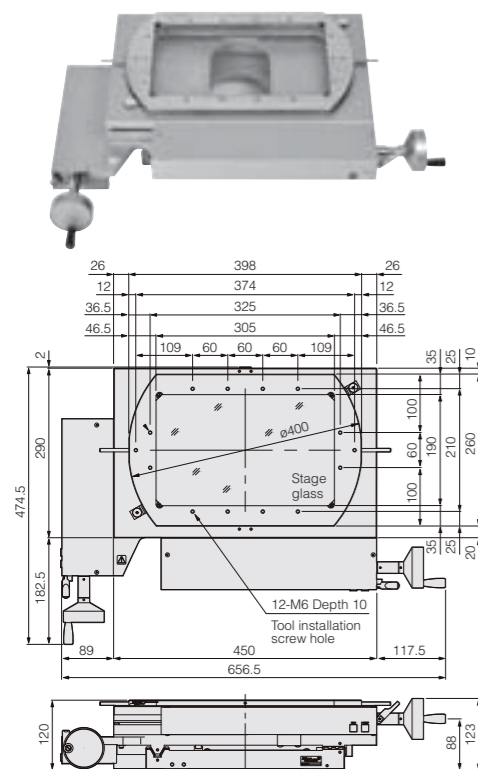
\*1: Standard accessory \*2: Letters above the stages represent accessories that can be mounted.

\*3: \*3: Please use the Foot Switch 2 (EFE00200) for Profile Projectors that have serial numbers starting with 1 or 2. To use the Foot Switch and [Reset/Send] buttons simultaneously, the "MM cable for simultaneous use (PXA20224)" is required.

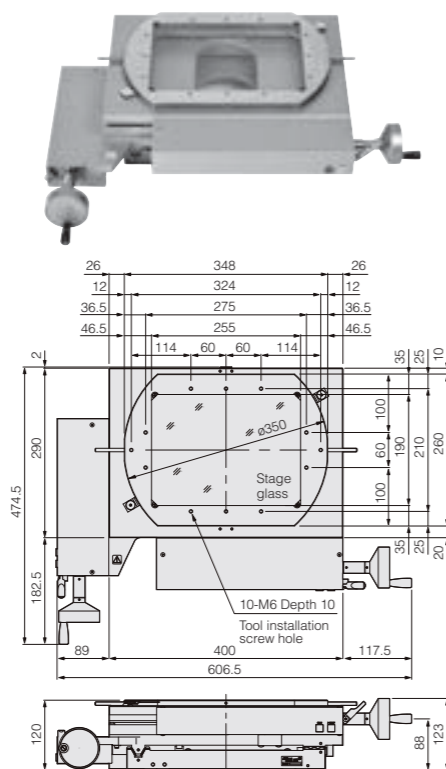
# ACCESSORIES

## Stages (mm)

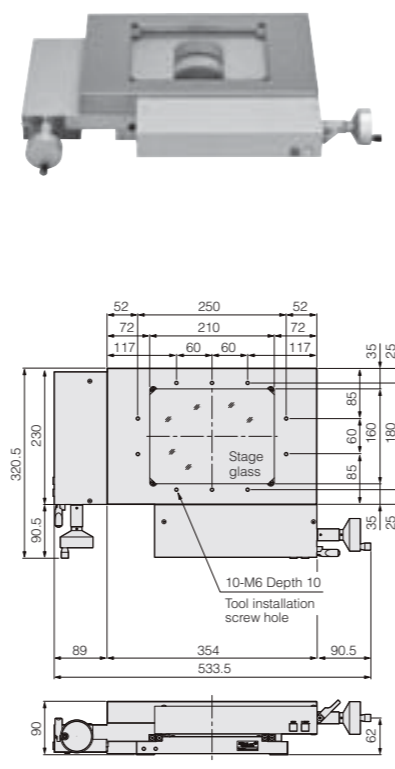
PS 10×6B



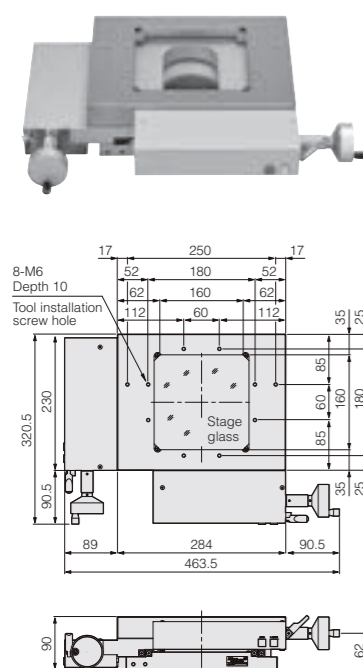
PS 8×6B



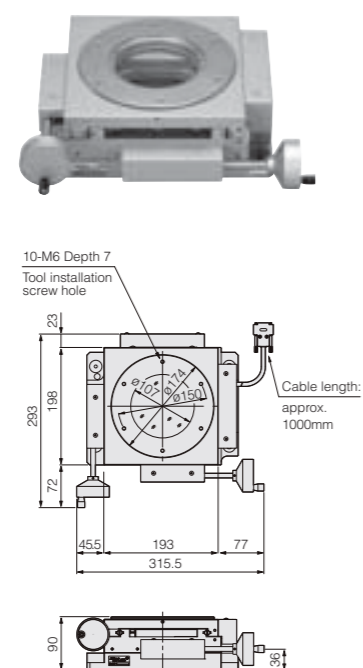
PS 6×4B



PS 4×4B



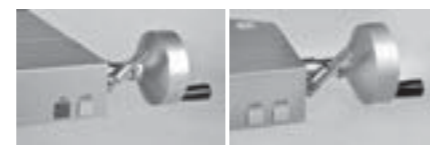
PS 2×2B



### New Function

- Twist roller drive allows smooth changeover of course/fine stage movement
- Swivel plate comes as standard for PS 10×6B and PS 8×6B stage.
- The course/fine changeover lever and the RESET and SEND buttons are located near the X- and Y- axis knobs.

This function is not available for PS 2×2B stage.



X-axis knob (near buttons) Y-axis knob (near buttons)

### Large stage adjustment knob

- Enables fine adjustment of swivel plate rotation.

This is available for PS 10×6B and PS 8×6B stage.



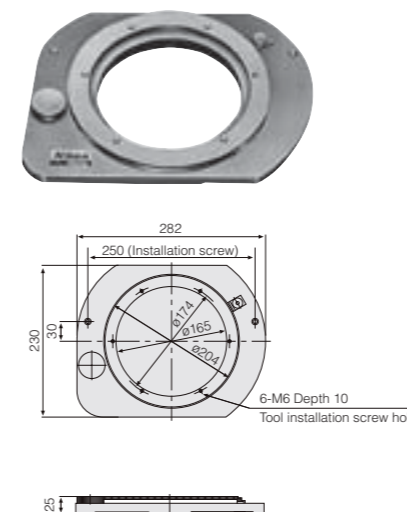
## Stage Specifications

Type	Surface area (mm)	Stage glass dimensions (mm)	Stroke (mm)	Reading method	Min. reading (μm)	Rotation range	Tool installation screw hole	Loading capacity (kg)	Weight (kg)
PS 10×6B	398×260	305×190	250×150	Linear encoder	0.1	±3° (swivel plate)	12-M6 depth 10	20	51.5
PS 8×6B	348×260	255×190	200×150				10-M6 depth 10		48.5
PS 6×4B	354×230	210×160	150×100			10-M6 depth 10	15	27.5	
PS 4×4B	284×230	160×160	100×100			8-M6 depth 10	23.5		
PS 2×2B	∅174	∅107	50×50			±360° (rotation table)	6-M6 depth 7	5	15.5

## Rotating Tables (mm)

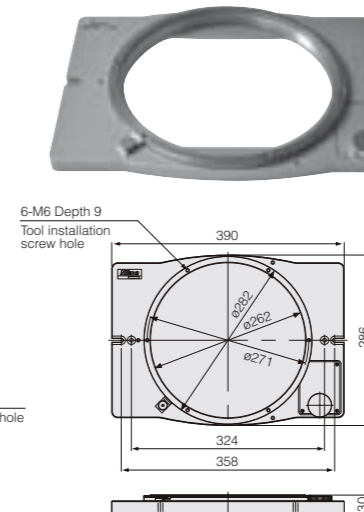
### Rotating Table Type 3

For PS 6×4B, PS 4×4B



### Rotating Table Type 4

For 9V, PS 10×6B, PS 8×6B



## Rotating Table Specifications

	Table diameter (mm)	Glass insert diameter (mm)	Reading range	Tool installation	Weight (Approx. kg)
Rotating Table Type 3	204	165	360° (uncalibrated)	Screw hole 6-M6	5
Rotating Table Type 4	282	262	360° (uncalibrated)	Screw hole 6-M6	8

### Standard 300mm Scale

Gauges stage travel accuracy up to 300mm. Both 10mm-interval sensor patterns and calibrations are provided. Made of low heat-expansion glass, for minimizing influence of heat.

Accuracy: Within 1m against compensation values



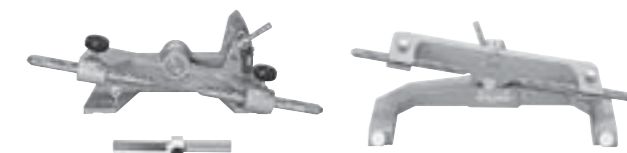
### Magnet-type V-Block Fixture

The dedicated V-block fixture is available for the stage type 9V. Contact Nikon for detail on system configuration.



### Tilting Center Fixture

Used to tilt samples around the center axis. Type A2 is available for PS 2×2B with Rotating table type 3. Type B is available for 9V stage.



	Maximum sample size diameter×length (mm)	Center height (mm)	Tilt angle	Weight (Approx. kg)
A2	∅68×120	45	10° (in 1° increment)	2.2
B	∅100×250	100	15° (in 1° increment)	6.0

# ACCESSORIES

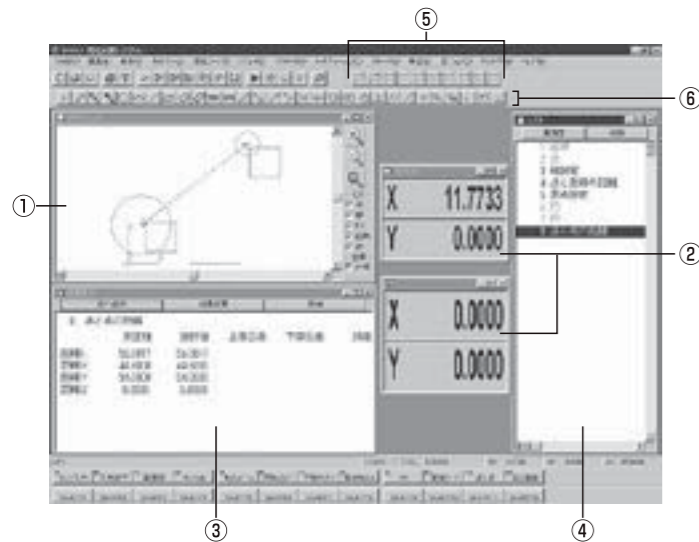
Nikon has a complete lineup of measurement support/data processing systems for specific purposes and applications that support data utilization, as well as a wide variety of accessories.

## Data Processing Software E-MAX Series

Measurement support application (option): VMR Report Generator (document support system)

### Introducing general-purpose measurement support systems with a common user interface for PCs

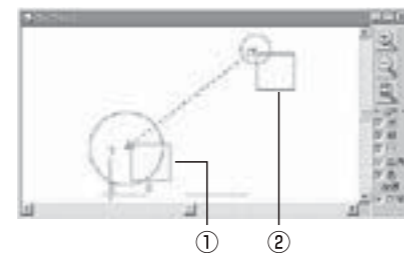
E-MAX is a series of general-purpose measurement support systems for a wide range of manual measuring instruments, including projectors. It has a common user interface for PCs, and allows the selection of two-dimensional data processing, visual measurement using TV images, and image measurement in accordance with the measuring instrument being used. It can also be added on to existing measuring instruments.



User-friendly Windows® interface allows a host of measurement and processing functions to be easily controlled using easy-to-understand multi windows and a mouse.

- ① Graphical window
- ② Counter window
- ③ Results display window
- ④ List window
- ⑤ Toolbar (calipers)
- ⑥ Toolbar (measurement codes)

\*An output window, image window, and editing listing window can be displayed as necessary.

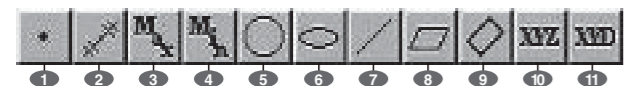


A built-in navigation function improves measurement efficiency by displaying the current position and the next measurement position during replays.

Number ① is the current position and number ② is the next measurement position.

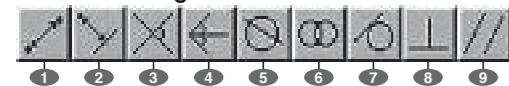
### Data Processing Software E-MAX Series: Measurement Processing

#### Actual measurement + recall measurement



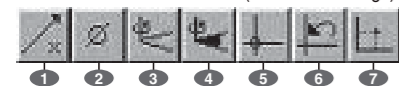
- 1. Point (X, Y, Z, E)
- 2. Midpoint (X, Y, Z)
- 3. Maximum point (X, Y, Z)
- 4. Minimum point (X, Y, Z)
- 5. Circle (X, Y, Z, R, D, E)
- 6. Ellipse (X, Y, Z, LD, SD, N1)
- 7. Line (N1, E)
- 8. Plane (N, N1, E)
- 9. Square (X, Y, Z, L1, L2, N1)
- 10. Key input point
- 11. Key input circle

#### Recall settings



- 1. Distance between two points (L, Lx, Ly, Lz)
- 2. Distance between a point and a line (X, Y, Z, L)
- 3. Intersect of two lines (X, Y, Z, A)
- 4. Midline (N1)
- 5. Intersect of a circle and a line (X1, Y1, Z1, X2, Y2, Z2)
- 6. Intersect of two circles (X1, Y1, Z1, X2, Y2, Z2)
- 7. Contact between a point and a circle (X1, Y1, Z1, X2, Y2, Z2)
- 8. Perpendicularity (W1)
- 9. Parallelism (W1)

#### Recall measurement (reference settings)

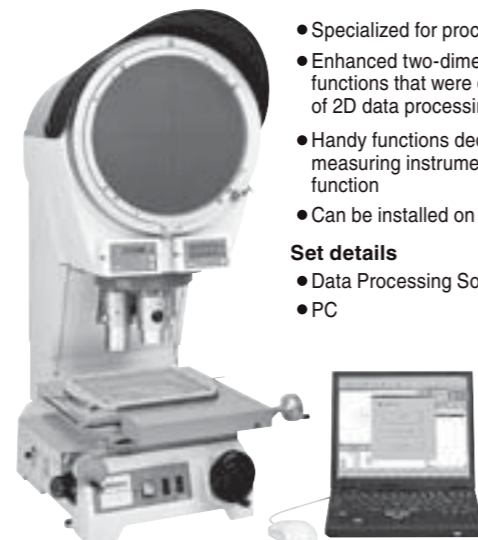


- 1. Reference axis setting
- 2. XY origin setting
- 3. Coordinate system rotation 1
- 4. Coordinate system rotation 2
- 5. Coordinate system reset
- 6. Coordinate system recall 1
- 7. Coordinate system rotation 2

Name of output element  
 X, Y, Z: Coordinate values  
 E: Deviation R: Radius  
 D: Diameter A: Intersection angle  
 LD: Longest diameter  
 SD: Shortest diameter  
 L: Distance N: Slope from third axis  
 N1: Slope from first axis  
 W1: Geometric deviation

### E-MAX/D Set

Example combination  
 V-12B profile projector and a PC running E-MAX



- Specialized for processing measurement data
- Enhanced two-dimensional data processing functions that were developed by the DP series of 2D data processing systems
- Handy functions dedicated for manual measuring instruments, including a navigation function
- Can be installed on notebook PCs (D Set only)

#### Set details

- Data Processing Software E-MAX
- PC

## Data Processor DP-E1

### Data processing system combining both enhanced accuracy and ease of use

The DP-E1 is a new data processor that Nikon developed in response to the demands for enhanced accuracy and improved work efficiency across the entire measurement system. Despite its compact form with a built-in counter, the unit dramatically improves usability thanks to its 320x240 pixel LCD. It enables integrated operation with measuring microscopes and profile projectors, speedy measurement calculations, and reliable data processing.



#### • User-friendly, small-footprint system

The compact body includes a measurement counter function. Work can proceed smoothly thanks to the easy-to-view display.

#### • Easy-to-master control keys

The unit is controlled using easy-to-understand measurement code buttons and measurement result lists. This enables users to easily conduct measurement, even the very first time.

#### • Saves measurement results on USB memory

Teaching files and measurement results files can be saved to a USB memory device so that they can be easily taken wherever they are needed.

### Custom Create: Direct link to Excel sheet programs

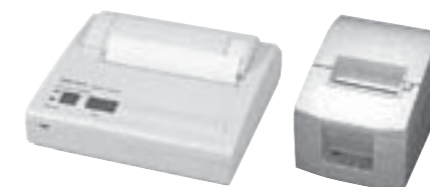
Measurement data from counters and/or data processors can be transferred directly to Excel sheets.

- 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®XP or later  
 Microsoft Excel  
 2003 or later  
 Required memory:  
 512MB (min)  
 Codevelopment:  
 Aria Co., Ltd.



## Digital Thermal Printer DPU-414 Thermal Printer TSP651-24



	DPU-414	TSP651-24
Paper width	112mm	58mm or 80mm
Applicable model/Counter	V-24B, V-20B, V-12B, SC-112, SC113, SC-212, SC-213, DP-302, DP-303	

### 2-Axis Counter Display (V-24B, V-12BD, and V-12BS)

These displays show X and Y-axis coordinates with Retrofit Counter/DP Unit. (Can be switched between 1µm, 0.1µm, and 0.01µm.)



## Foot Switch 4

This switch can be used for such purposes as issuing load instructions for the DP-E1 from a Retrofit Counter/DP Unit or for EXRST/EDGE connector (V-20B, V-12BSC, or V-12BDC).

However, please use Foot Switch 2 for profile projectors that have serial numbers starting with No. 1 or No. 2. It helps improve measurement efficiency by freeing the user's hands to perform other tasks.



### Retrofit Counter/DP Unit (V-24B, V-20B, and V-12B)

This unit is for connecting the 2-Axis Counter Display to the V-24B, V-12BD, or V-12BS. It is also required when adding the DP-E1 Data Processor.



## Glass Reading Scale

Used to measure projection images on the screen.  
200mm and 300mm scales—both in 0.5mm increments—are available.  
Accuracy:  $\pm(15+L/20)\mu\text{m}$



## Glass Scale Set

Used to check the magnifying accuracy of the projector being used. It is equipped with a 50mm standard scale in 1mm increments (accuracy  $\pm[3+7L/100]\mu\text{m}$ ), a 300mm reading scale in 0.1mm increments (accuracy  $\pm[6+L/50]\mu\text{m}$ ), and a 6 $\times$  magnifier. \*L=measurement length



## Auxiliary Oblique Halogen Surface Illuminator

This 24V-150W halogen illuminator is used to illuminate workpieces having low surface reflectivity such as printed matter, cloth, or leather.



For the V-20B, V-12B

## Chart Clip Type LL

Used to measure charts on the screen. Comes standard with all projectors except the V-12B.



## Accessory Cabinet

Used to store accessories. Measures (WxDxH): 450 $\times$ 600 $\times$ 740mm



## Green Filter, ND Filter, DIA Adapter A

For the V-12B

The green filter is used for black- and-white photography or for viewing edges of a workpiece with greater sharpness. The ND filter is used to adjust brightness. Both filters must be used with the DIA Adapter A.



DIA Adapter A ND Filter Green Filter

## Projector Table B

Accessory Cabinet comes with a side wing for a data processor. Same dimensions as Accessory Cabinet when the wing is closed. 900mm (W) when the wing is set.



Specifications and equipment are subject to change without any notice or obligation on the part of the manufacturer. August 2013 ©2006-2013 NIKON CORPORATION

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\*Products: Hardware and its technical information (including software)



**WARNING**

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



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