



Nikon
100th
anniversary

PROFILE PROJECTORS



V-20B

V-12B

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-E1A

Parfocal projection lenses

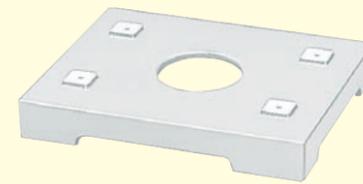
All projection lenses have the same parfocal distance and feature long working distances. The built-in half mirror eliminates the need to adjust illumination each time the magnification is changed. With improved images with excellent quality, while enabling observation in a comfortable posture by adjusting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

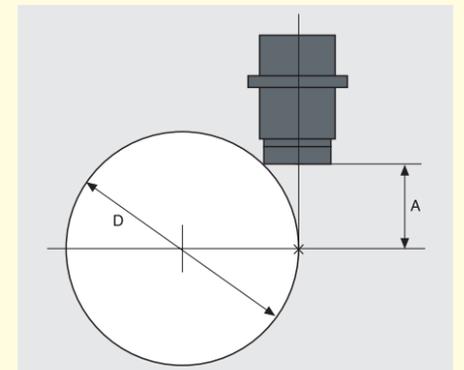
Stage Adapter S For the V-20B

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.

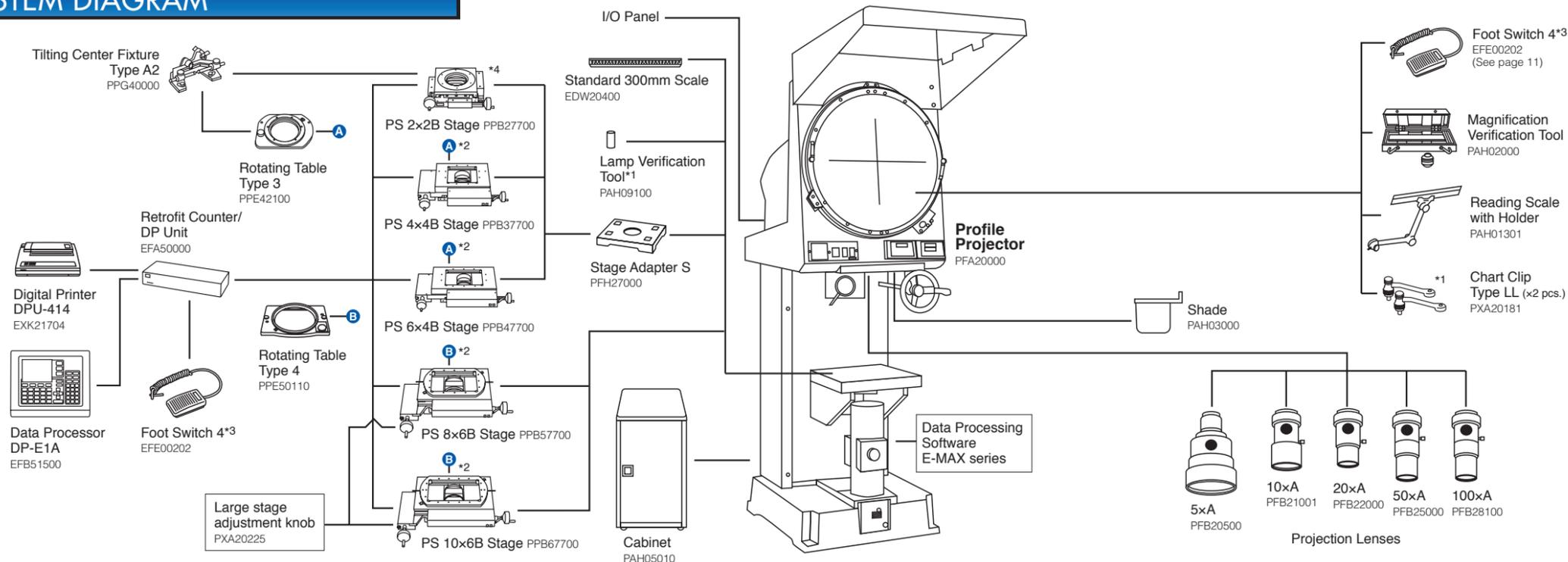


A= working distance
D= maximum diameter of a measurable cylindrical specimen

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



*1: Standard accessory *2: Letters above the stages represent accessories that can be mounted.
*3: 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.

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
XY counter (Built-in)	1.0/0.5/0.1µm selectable
Digital protractor	0.01°/1' selectable

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 available

	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

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



V-12BDC configured with PS 10x6B Stage

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-12BD and V-12BS 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

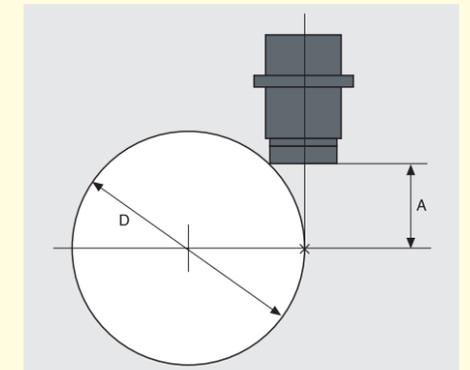
The built-in surface illuminator can be switched between vertical and oblique illumination, making detection of edges in resin parts and other workpieces much easier.

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. (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, with long working distance.



A= working distance

D= maximum diameter of a measurable cylindrical specimen

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

(mm)

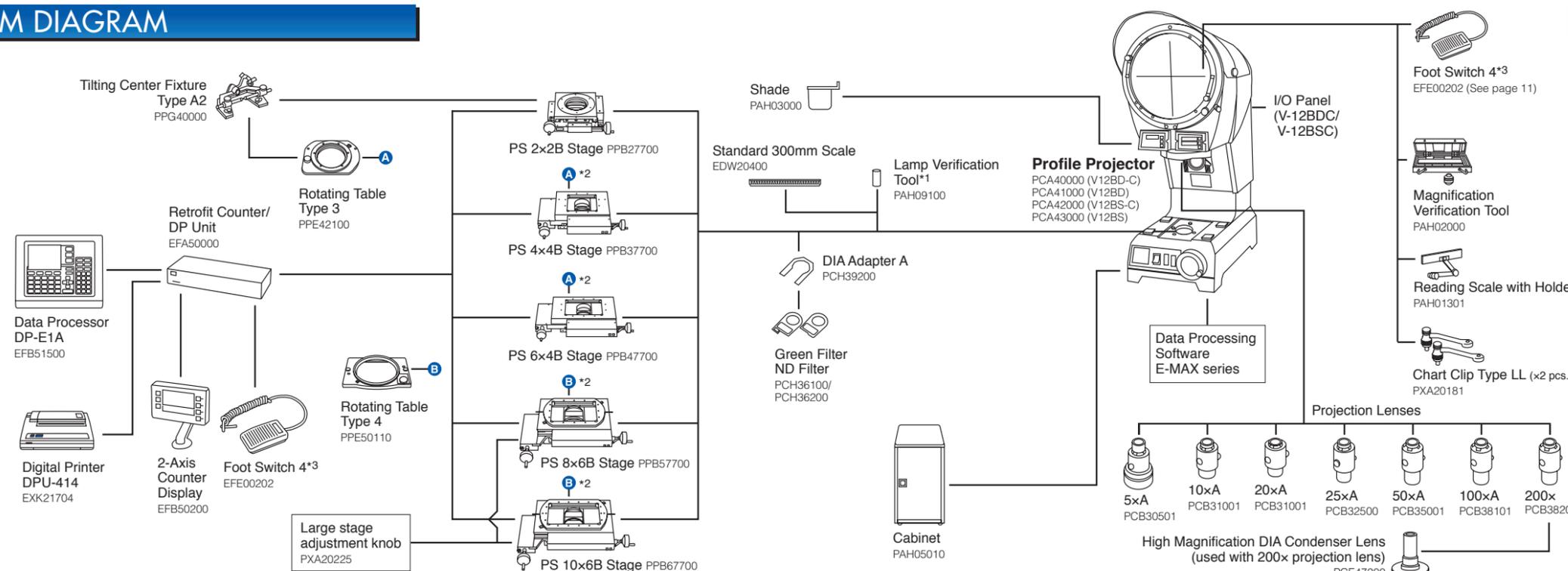
*Part of the field of view is vignetted when the 5x projection lens is used under contour illumination.

DIA Condenser Lens

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



SYSTEM DIAGRAM



SPECIFICATIONS

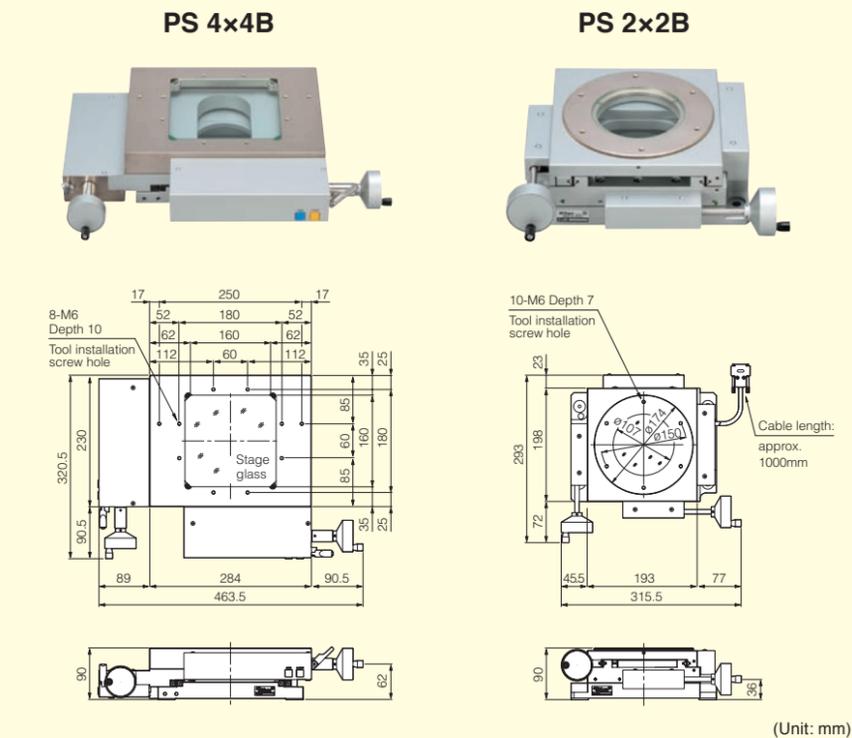
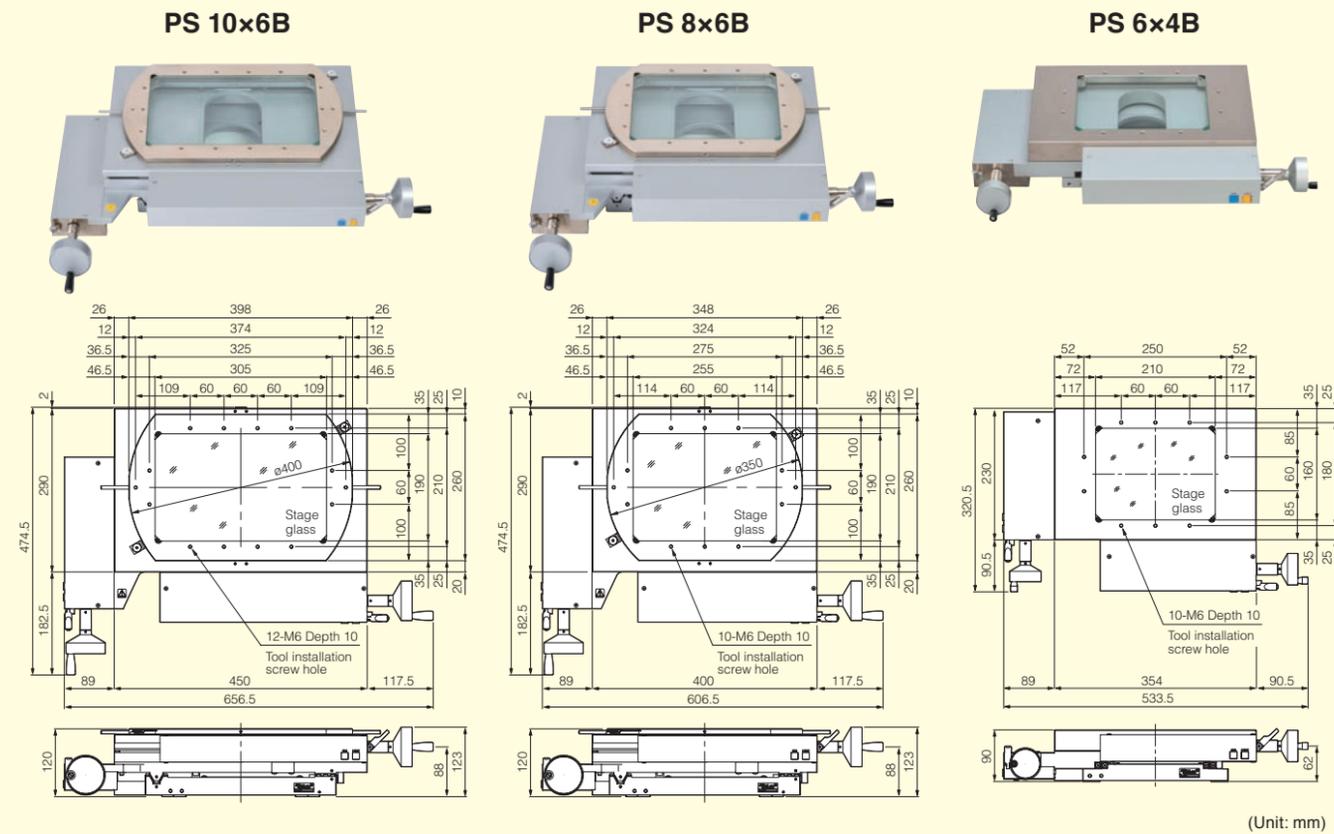
Type	Vertical optical axis bench type
Image	Erect and unreversed
Screen	V-12BDC/V-12BD ø305mm; etched center crossline; provided with digital protractor fine rotation knob; 360 rotatable (with digital reading to 1 minute of arc)
	V-12BSC/V-12BS ø305mm fixed screen
Lens mount	3-lens turret mount; clamping 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 (Built-in)	1.0/0.5/0.1µm selectable
Digital protractor	0.01°/1' selectable

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

*3: To use the Foot Switch and [Reset/Send] buttons simultaneously, the "MM cable for simultaneous use (PXA20224)" is required.

ACCESSORIES

Stages (mm)



Stage Operation

- Twist roller drive allows smooth changeover of course/fine stage movement.
- Swivel plate comes as standard for PS 10x6B and PS 8x6B 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 2x2B stage.



Large stage adjustment knob

- Enables fine adjustment of swivel plate rotation.

This is available for PS 10x6B and PS 8x6B stage.



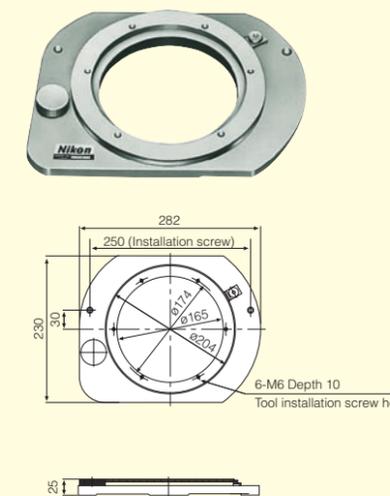
Stage Specifications

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 10x6B	398x260	305x190	250x150	Linear encoder	0.1	±3° (swivel plate)	12-M6 depth 10	20	51.5
PS 8x6B	348x260	255x190	200x150				10-M6 depth 10		48.5
PS 6x4B	354x230	210x160	150x100			10-M6 depth 10	15		
PS 4x4B	284x230	160x160	100x100			8-M6 depth 10	23.5		
PS 2x2B	∅174	∅107	50x50			±360° (rotation table)	6-M6 depth 7	5	15.5

Rotating Tables (mm)

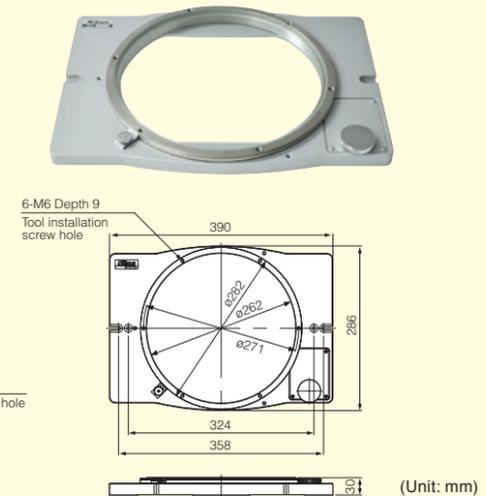
Rotating Table Type 3

For PS 6x4B, PS 4x4B



Rotating Table Type 4

For PS 10x6B, PS 8x6B

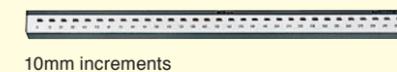


Rotating Table Specifications

	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. Pitch: 10mm (attached with calibrated value)



Tilting Center Fixture A2

Used to tilt samples around the center axis. Type A2 is available for PS 2x2B with Rotating Table Type 3.



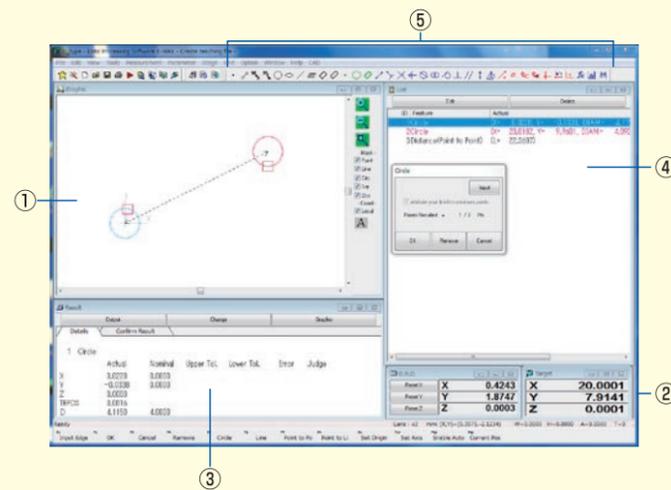
Maximum sample size diameter x length (mm)	Center height (mm)	Tilt angle	Weight (Approx. kg)
∅68x120	45	10° (in 1° increment)	2.2

ACCESSORIES

Nikon has a complete lineup of measurement support/data processing systems for specific purposes and applications that support data utilization.

Data Processing Software E-MAX Series

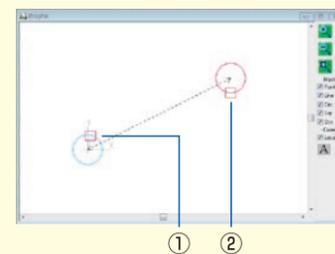
E-MAX is a series of general-purpose measurement support systems with a common user interface for PCs. The software processes two-dimensional data by a wide range of manual measuring instruments, including projectors. Data result can be saved as a csv file.



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 (measurement codes)

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



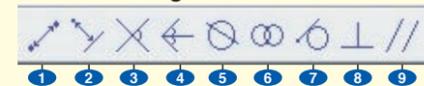
Data Processing Software E-MAX Series: Measurement Processing

Actual measurement + recall measurement



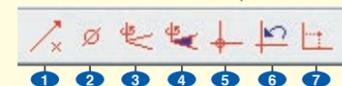
- 1. Point (X, Y, Z, E)
- 2. Midpoint (X, Y, Z)
- 3. Maximum point (X, Y, Z)
- 4. Minimum point (X, Y, Z)
- 5. Circle (X, Y, Z, R, D, E)
- 6. Ellipse (X, Y, Z, LD, SD, N1)
- 7. Line (N1, E)
- 8. Plane (N, N1, E)
- 9. Square (X, Y, Z, L1, L2, N1)
- 10. Key input point
- 11. Key input circle

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

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.

E-MAX/D Set

Example combination with V-12B, E-MAX, and PC



- Specialized for processing measurement data
- Enhanced two-dimensional data processing functions
- Handy functions dedicated for manual measuring instrument, including a navigation function
- Can be installed on notebook PCs (D Set only)

Data Processor DP-E1A

Data processing system combining both enhanced accuracy and ease of use

The DP-E1A was 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.

Easy-to-master control keys

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

Saves measurement results on USB memory

Teaching files and measurement results files can be saved to a USB memory device for easy access.

* Retrofit Counter/DP unit is also required

Measurement Support Application (option)

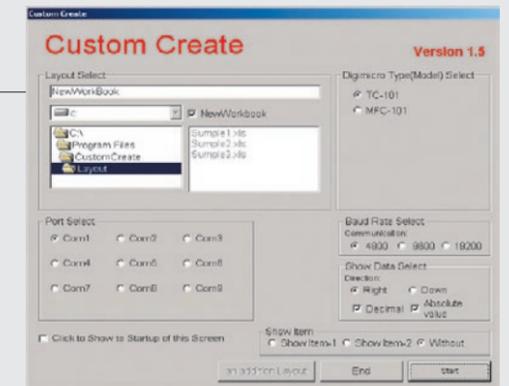
Custom Create

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-E1A, 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

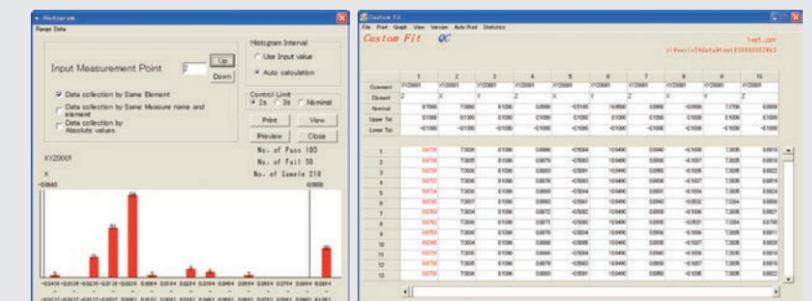
Operating environment: Windows®7 or Windows®10 / Microsoft Excel 2003 or later
 Required memory: 512MB (min)
 Codevelopment: Aria Co., Ltd.



Custom Fit QC

The software can make measurement reports easily. 10 standard formats are supplied and can be customized. It can handle angle in degree, minute and seconds and can create graphics automatically. Custom Fit QC can create histograms, X-R chart, scatter diagrams, etc., used in QC.

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



ACCESSORIES

Digital Thermal Printer DPU-414 Thermal Printer TSP651-24



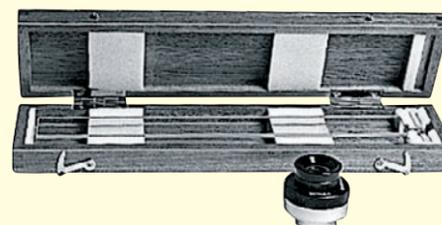
	DPU-414	TSP651-24
Paper width	112mm	58mm or 80mm
Applicable model/ Counter	V-20B, V-12B, SC-112, SC-113, SC-212, SC-213, DP-302, DP-303	

Foot Switch 4



This switch can be used for such purposes as issuing load instructions for the DP-E1A from a Retrofit Counter/DP Unit or for EXRST/EDGE connector (V-20B, V-12BSC, or V-12BDC). It helps improve measurement efficiency by freeing the user's hands to perform other tasks.

Glass Scale Set



Used to check the magnifying accuracy of the projector being used. Equipped with:

- 50mm standard scale in 1mm increments (accuracy $\pm[3+7L/100]\mu\text{m}$)
- 300mm standard scale in 0.1mm increments (accuracy $\pm[6+L/50]\mu\text{m}$)
- 6x magnifier

*L=measurement length

Accessory Cabinet



Used to store accessories.
Measures (WxDxH):
450x600x740mm
(This is not for placing
profile projector)

2-Axis Counter Display



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

Retrofit Counter/DP Unit



This is for adding the DP-E1A Data Processor or connecting the 2-Axis Counter display to V-12BD and V-12BS.

Green Filter, ND Filter, DIA Adapter A

For V-12B only



DIA Adapter A ND Filter Green Filter

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.

Glass Reading Scale



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

Chart Clip Type LL



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

Specifications and equipment are subject to change without any notice or obligation on the part of the manufacturer. November 2016 ©2006-2016 NIKON CORPORATION

N.B. Export of the products* in this catalog is controlled under the Japanese Foreign Exchange and Foreign Trade Law. Appropriate export procedures shall be required in case of export from Japan.

*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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