

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 all projectors except the V-12B.



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 6x magnifier. *L=measurement length



Accessory Cabinet

Used to store accessories.
Measures (W x D x H):
450 x 600 x 740mm
(17.7 x 23.6 x 29.1 in.)



For the V-12B

For the V-12B

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.



Green Filter, ND Filter, DIA Adapter A

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.



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) (35.4 in.) when the wing is set.



PROFILE PROJECTORS

V-24B

V-20B

V-12B

Specifications and equipment are subject to change without any notice or obligation on the part of the manufacturer. June 2012 ©2006/2007/2008/2009/2011/2012 NIKON CORPORATION

N.B. Export of the products* in this brochure is controlled under the Japanese Foreign Exchange and Foreign Trade Law. Appropriate export procedure 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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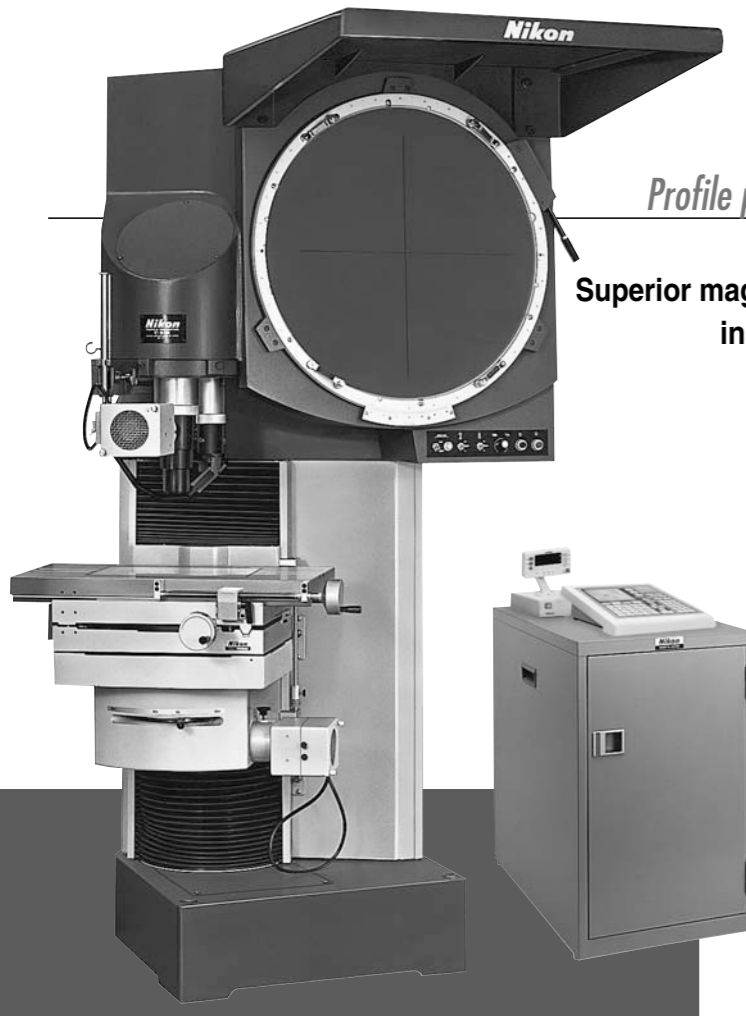
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PROFILE PROJECTOR V-24B

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

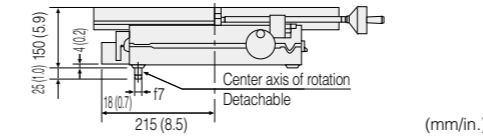
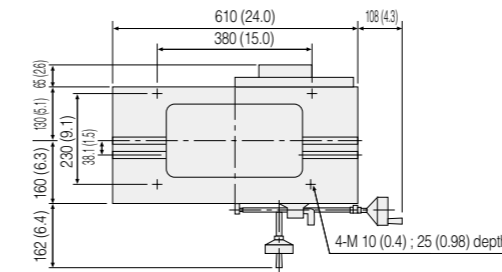
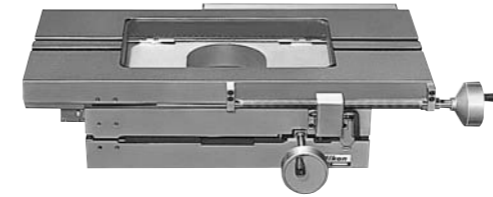
Projection lenses from 5x up to 100x have the same parfocal distance and are all concentric. This simplifies operations when magnifications must be changed often.

Highest magnification accuracy

Featuring a magnification accuracy of $\pm 0.05\%$ with contour illumination and $\pm 0.075\%$ with surface illumination (0.1% and 0.15% when a 200x lens is used), this instrument's accuracy is extremely high when compared with other models.

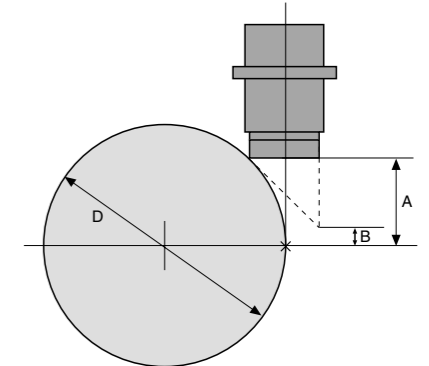
Dedicated 9V Stage

Surface area	610 x 290mm (24.0 x 11.4 in.)
Stage glass size	330 x 200 x 10mm (13.0 x 7.9 x 0.4 in.)
Cross travel	225 x 100mm (8.9 x 3.9 in.)
Reading method	Linear encoder (SC-212 is required.)
Minimum readout	0.0005mm
Tool mounting groove	Dovetail
Loading capacity	30kg (66.1 lb.)
Weight	Approx. 75kg (165.3 lb.)



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.



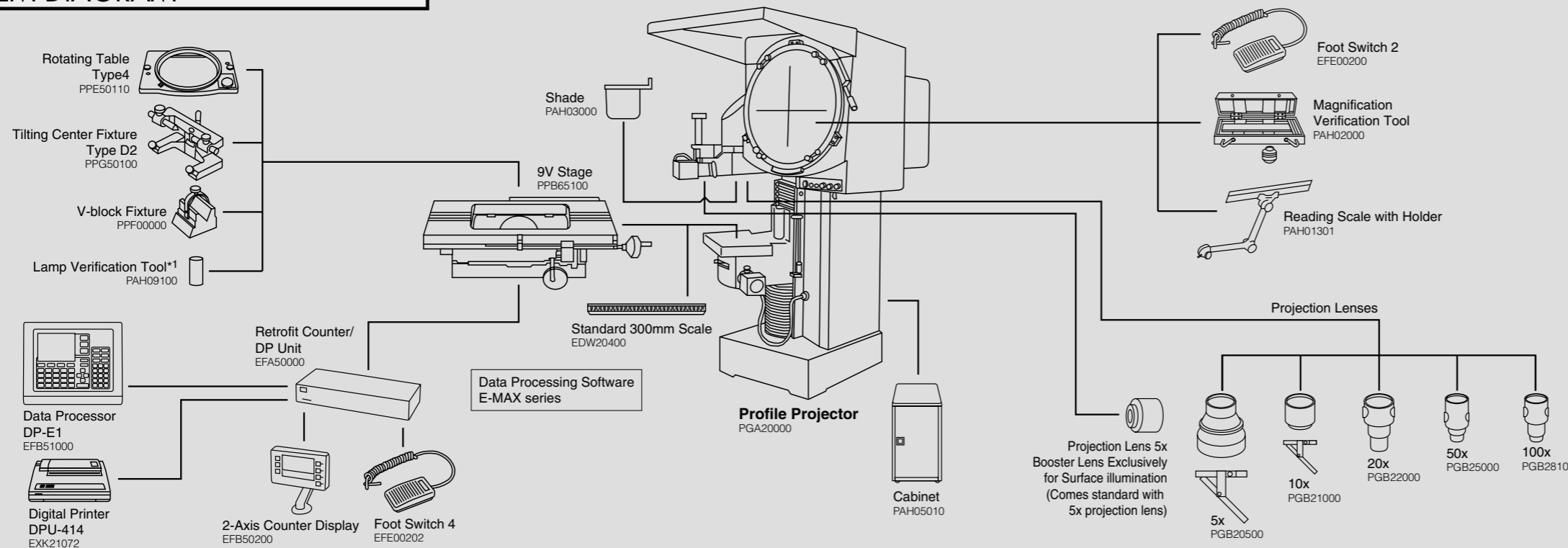
A=working distance
 B=working distance when a half reflecting mirror is attached (5x, 10x)
 D=maximum diameter of a measurable cylindrical specimen

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.

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

SYSTEM DIAGRAM



*1: Standard accessory

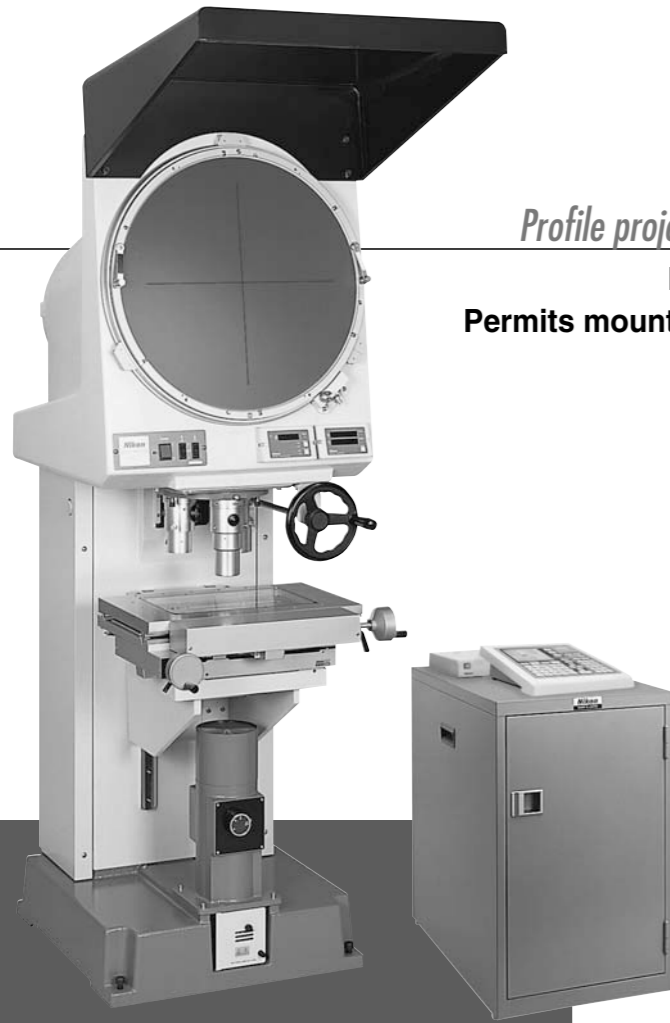
SPECIFICATIONS

Type	Vertical optical axis
Image	Inverted and reversed
Screen	$\varnothing 600\text{mm}$ (23.6 in.); 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 (9.84 in.)
Stage	9V Stage directly mountable
Power input	AC 100-120V (CSA), 220-240V (CEE), 240V (SAA)
Dimensions (W x D x H)	1,180 x 1,100 x 1,900mm (46.5 x 43.3 x 74.8 in.)
Weight	800kg (1,766 lb.)

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 10 x 6 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 10 x 6 stage is used, workpieces as heavy as 20kg can be loaded. The measurable range has been increased to 250 x 150mm.

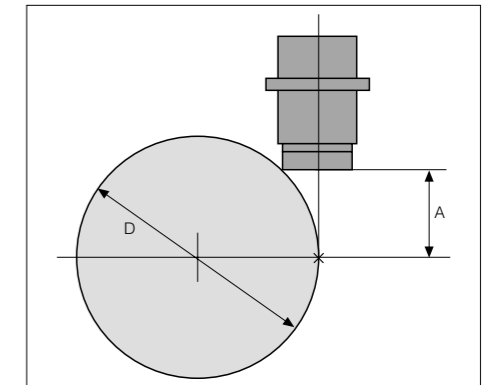
Stage Adapter S For the V-20B

This adapter is used to mount a stage other than the 10 x 6 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.

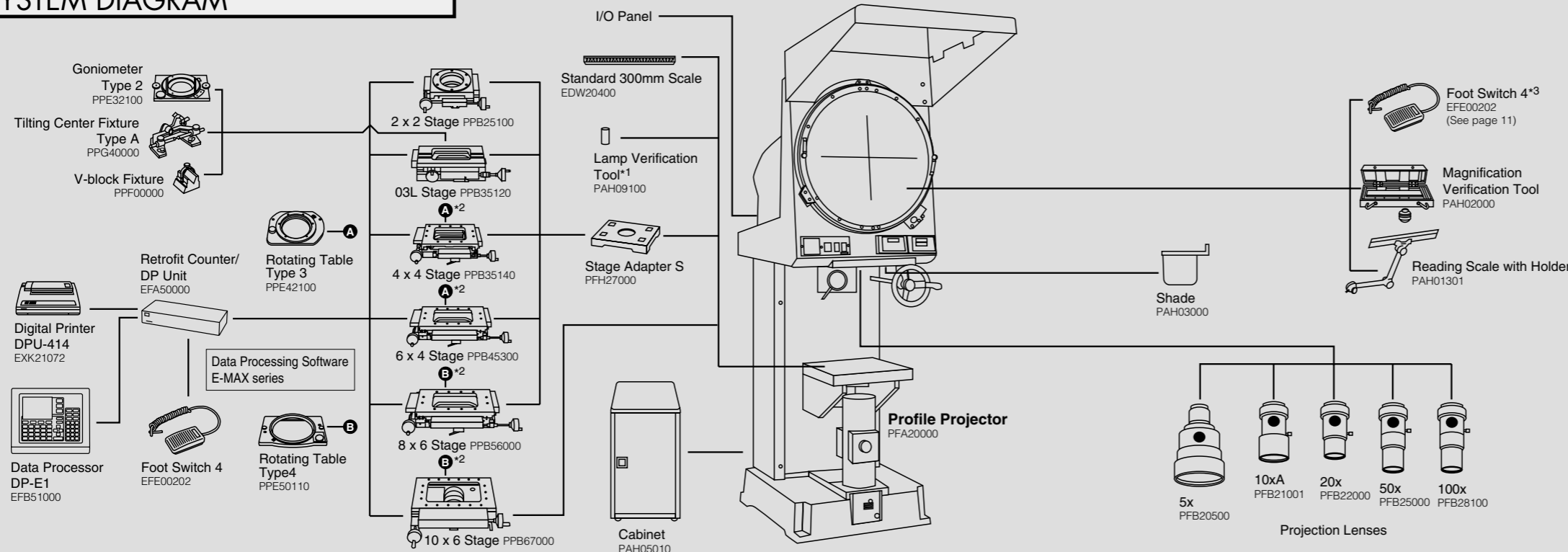


A=working distance
D=maximum diameter of a measurable cylindrical specimen

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 (19.7 in.); 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 (5.9 in.)
Stage	10 x 6 Stage directly mountable; 8 x 6, 6 x 4, 4 x 4, 03L, 2 x 2 Stage mountable via adapter
Power input	AC 100-120V (CSA), 220-240V (CEE), 240V (SAA)
Dimensions (W x D x H)	570 x 1,200 x 1,900mm (22.4 x 47.2 x 74.8 in.)
Weight	260kg (573 lb.)

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

*3: Please use Foot Switch 2 (EFE00200) for profile projectors that have manufacturer numbers starting with No. 1 or No. 2.

PROFILE PROJECTOR V-12B Series

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

Wide measurable range: cross travel 250 x 150mm.

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 10 x 6 Stage is used, the projector can measure areas as wide as 250 x 150mm.

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.



V-12BDC configured with 10 x 6 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-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

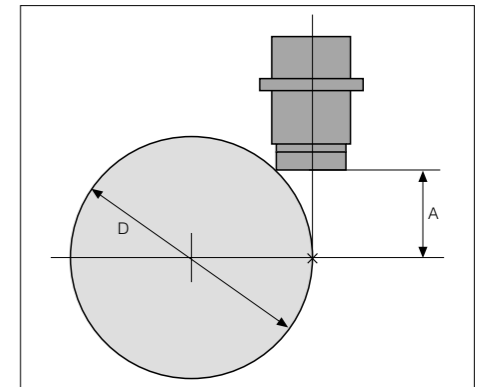
The built-in surface illuminator can be switched between vertical and oblique illumination, making detection of edges in resin parts and other workpieces much easier.

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 or 500x.)

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

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	50	123
200x	1.5	Built-in; switchable	24	49
500x	0.6	Built-in; switchable	3.5	7

*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 or 500x projection lenses are used.

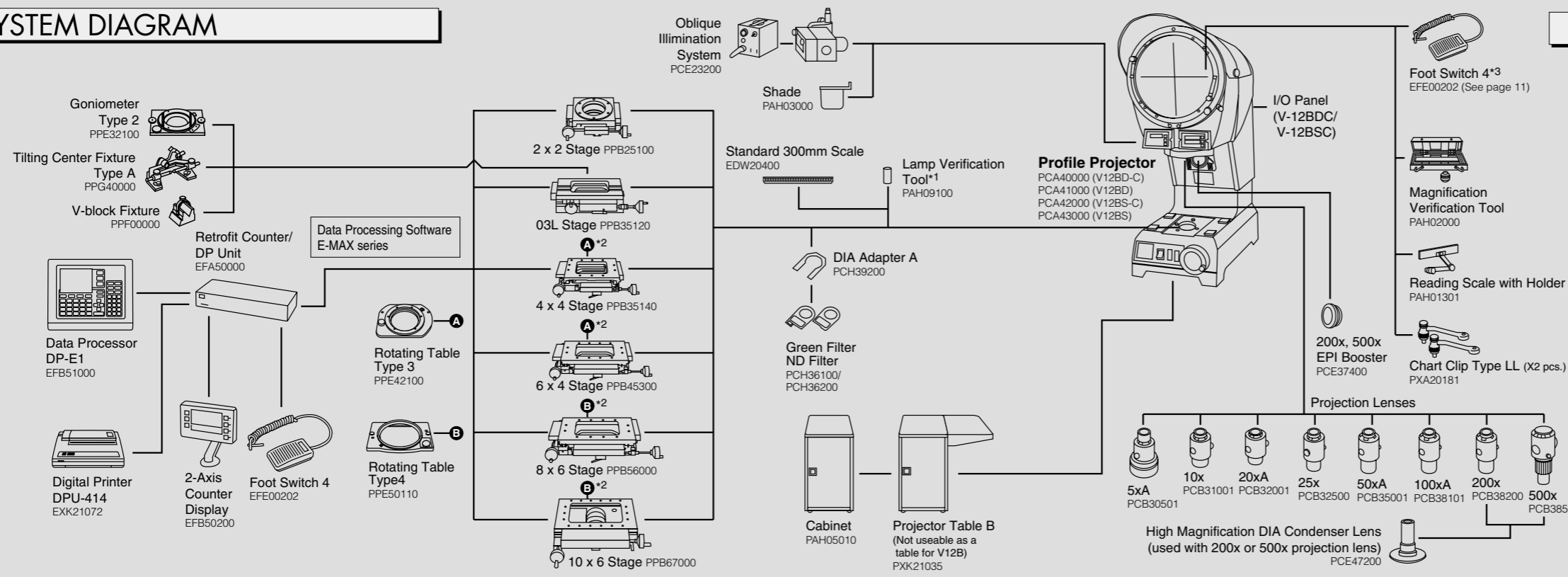


DIA Condenser Lens

Under contour illumination, the DIA condenser lens is necessary when 200x or 500x projection lenses are used.



SYSTEM DIAGRAM



SPECIFICATIONS

Type	Vertical optical axis bench type
Image	Erect and unreversed
Screen	V-12BDC/V-12BD ø305mm (12.0 in.); etched center crossline; provided with digital protractor fine rotation knob; 360° rotatable (with digital reading to 1 minute of arc)
Screen	V-12BSC/V-12BS ø305mm (12.0 in.) fixed screen
Lens mount	3-lens turret mount; clamping type
Projection lens	5x, 10x, 20x, 25x, 50x, 100x, 200x, 500x
Magnification accuracy	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 (4.0 in.), 70mm (2.8 in.), with 10 x 6 Stage
Stage	10 x 6, 8 x 6, 6 x 4, 4 x 4, 03L or 2 x 2 Stage directly mountable
Power input	AC 100/120V (50/60 Hz), AC 220/230/240V (50/60 Hz)
Dimensions (W x D x H)	409 x 648 x 970-1,070mm (16.1 x 25.5 x 38.2-42.1 in.)
Weight	Approx. 80kg (177 lb.)
XY counter	V-12BDC Built-in (1.0/0.5mm selectable) V-12BD Not provided V-12BSC Built-in (1.0/0.5mm selectable) V-12BS Not provided

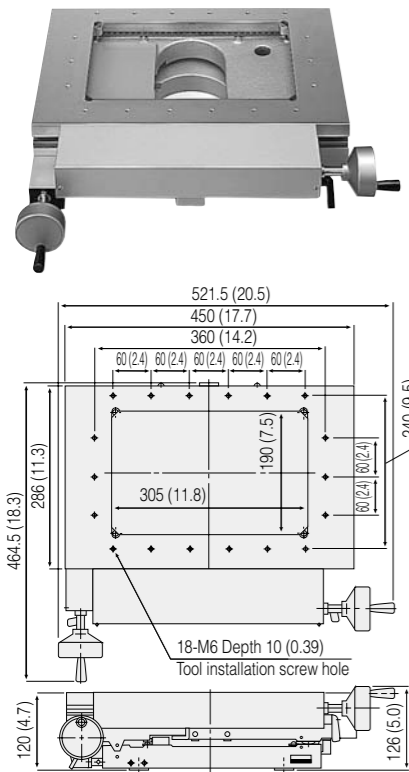
*1: Standard accessory *2: Letters above the stages represent accessories that can be mounted.

*3: Please use Foot Switch 2 (EFE00200) for profile projectors that have manufacturer numbers starting with No. 1 or No. 2.

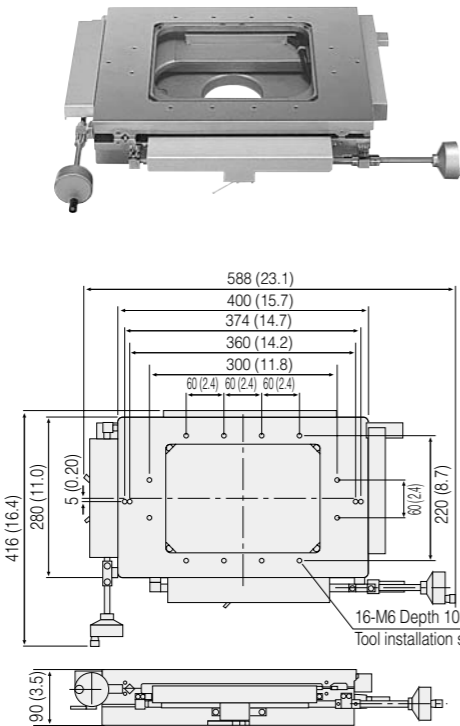
ACCESSORIES

Stages (mm/in.)

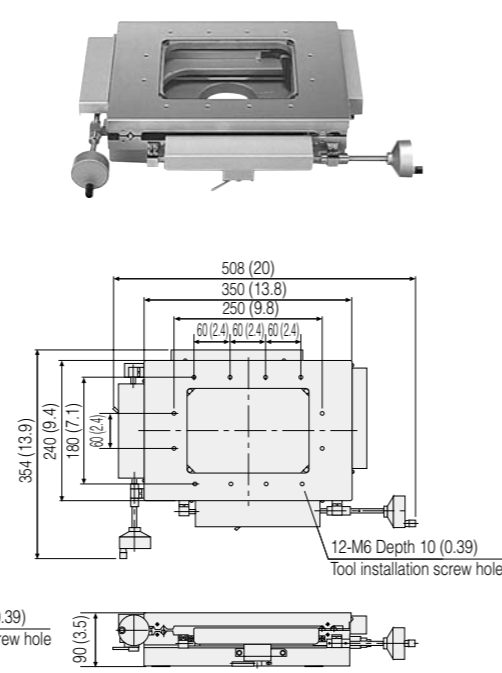
Stage Type 10 x 6



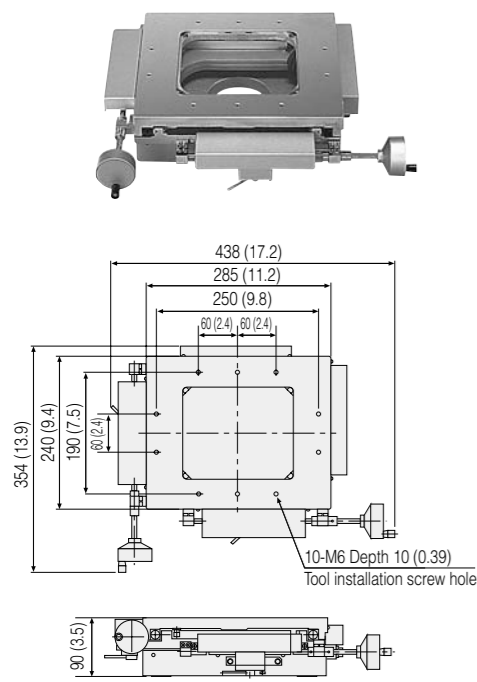
Stage Type 8 x 6



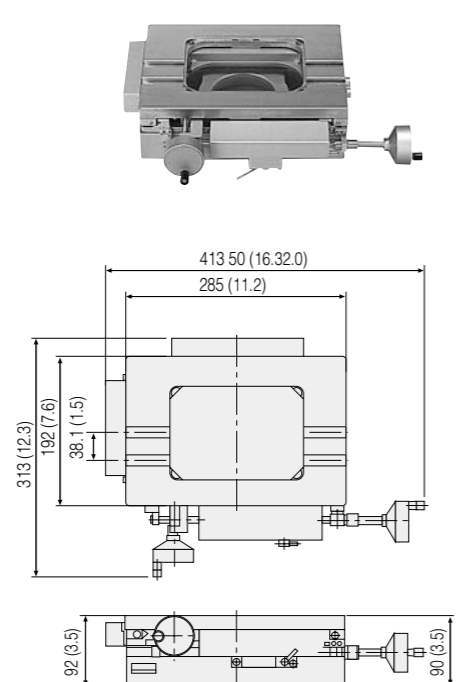
Stage Type 6 x 4



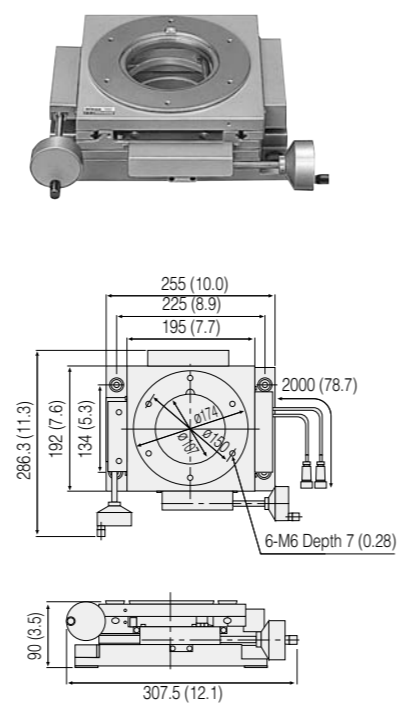
Stage Type 4 x 4



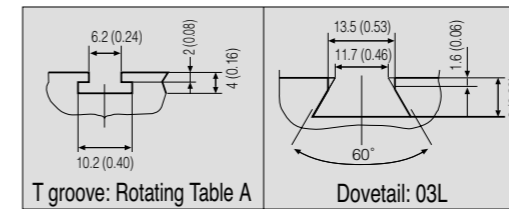
Stage Type O3L



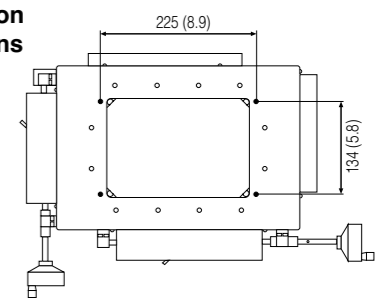
Stage Type 2 x 2



Tool installation groove dimensions (mm/in.)



Tool installation screw positions (mm/in.)



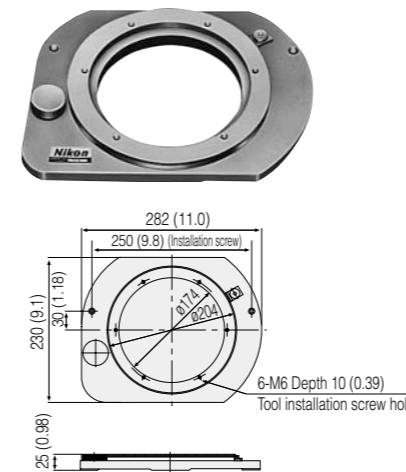
- 10 x 6, 8 x 6, 6 x 4, 4 x 4 and 2 x 2 stages require 10-M6 depth 10 tool installation screw holes.
- T grooves may be specially ordered for 2 x 2 rotating boards.

Stage Specifications

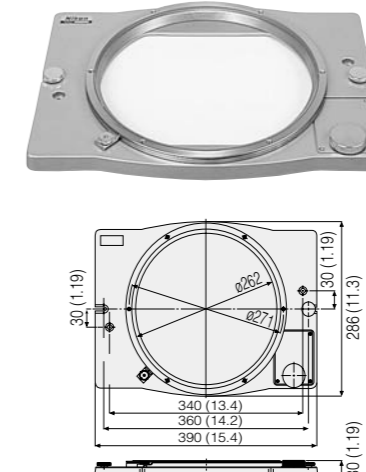
Type	Surface area mm (in.)	Stage glass dimensions mm (in.)	Crosswise travel mm (in.)	Reading method	Min.redding mm (in.)	Stage top	Tool installation	Loading capacity kg (lb.)	Weight kg kg (lb.)
10 x 6	450 x 286 (17.7 x 11.3)	305 x 190 (12.0 x 7.5)	250 x 150 (7.9 x 5.9)	Linear encoder	0.0005 (0.00002)	-	N/A (screw)	20 (44)	Approx. 50 (110)
8 x 6	400 x 280 (15.8 x 11.0)	245 x 192 (9.6 x 7.6)	200 x 150 (7.9 x 5.9)	Linear encoder	0.0005 (0.00002)	-	N/A (screw)	15 (33)	Approx. 36 (79)
6 x 4	350 x 240 (13.8 x 9.5)	204 x 145 (8.0 x 5.7)	150 x 100 (5.9 x 3.9)	Linear encoder	0.0005 (0.00002)	-	N/A (screw)	10 (22)	Approx. 27 (60)
4 x 4	285 x 240 (11.2 x 9.5)	170 x 145 (6.7 x 5.7)	100 x 100 (3.9 x 3.9)	Linear encoder	0.0005 (0.00002)	-	N/A (screw)	6 (12)	Approx. 23 (51)
O3L	285 x 192 (11.2 x 7.6)	170 x 120 (6.7 x 4.7)	100 x 50 (3.9 x 2.0)	Linear encoder	0.0005 (0.00002)	-	Dovetail	5 (11)	Approx. 15 (33)
2 x 2	195 x 192 (7.7 x 7.6)	107 in diameter	50 x 50 (2.0 x 2.0)	Linear encoder	0.0005 (0.00002)	360° rotatable	N/A (screw)	5 (11)	Approx. 13 (29)

Rotating Tables (mm/in.)

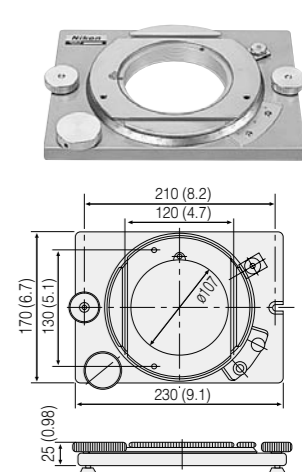
Rotating Table Type 3 For 6 x 4, 4 x 4



Rotating Table Type 4 For 9V, 10 x 6, 8 x 6



Goniometer Type 2 For O3L



Rotating Table Specifications

	Table diameter (in.)	Glass insert diameter (in.)	Rotation range	Tool installation	Weight
Rotating Table Type 3	204mm (8.0)	165mm (6.5)	360° (uncalibrated)	Screw hole 6-M6	Approx. 5kg (11 lb.)
Rotating Table Type 4	282mm (11.0)	262mm (10.3)	360° (uncalibrated)	Screw hole 6-M6	Approx. 8kg (17.6 lb.)
Goniometer Type 2	160mm (6.3)	107mm (4.2)	360° (2' reading)	T groove/Screw hole 2-M6	Approx. 4kg (9 lb.)

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

For 8 x 6, 6 x 4, and 4 x 4 stages. The dedicated V-block fixture is available for the stage type O3L.

Tilting Center Fixture

Used to tilt samples around the center axis.

ACCESSORIES

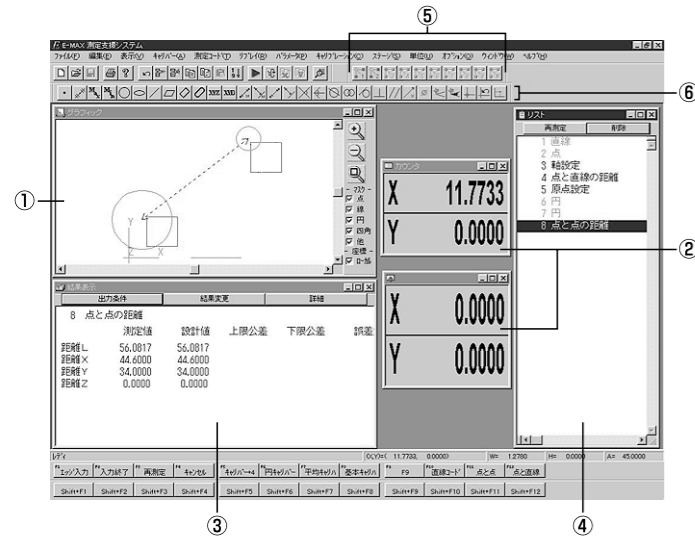
Nikon has a complete lineup of measurement support/data processing systems for specific purposes and applications that support data utilization, as well as a wide variety of accessories.

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

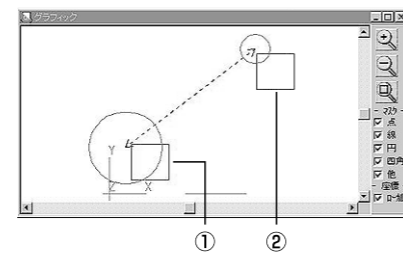
E-MAX is a series of general-purpose measurement support systems for a wide range of manual measuring instruments, including projectors. It has a common user interface for PCs, and allows the selection of two-dimensional data processing, visual measurement using TV images, and image measurement in accordance 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.

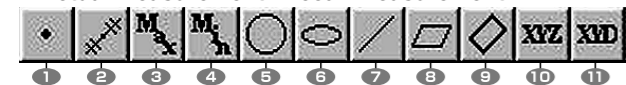


A built-in navigation function improves measurement efficiency by displaying the current position and the next measurement position during replays.

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

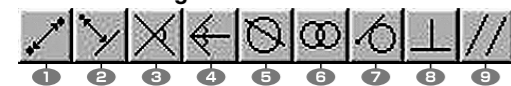
Data Processing Software E-MAX Series: Measurement Processing

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. Intersection of two lines (X, Y, Z, A)
- 4. Midline (N1)
- 5. Intersection 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)

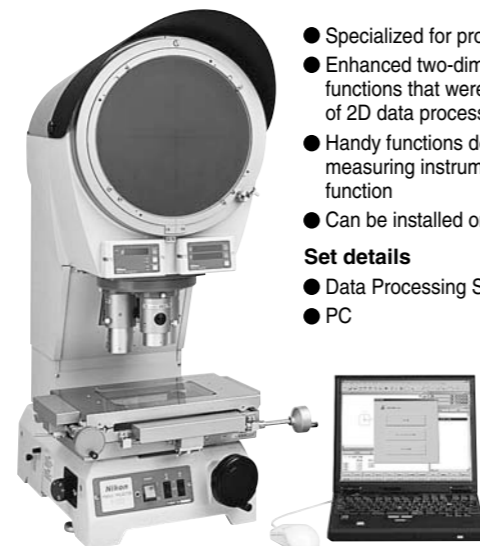


- 1. Reference axis setting
- 2. XY origin setting
- 3. Coordinate system rotation 1
- 4. Coordinate system rotation 2
- 5. Coordinate system reset
- 6. Coordinate system recall 1
- 7. Coordinate system rotation 3

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 320 x 240 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.

Digital Thermal Printer DPU-414



The DPU-414 connects with a Retrofit Counter/DP Unit or one of the I/O Panels (V-20B, V-12BSC, or V-12BDC) and prints out counter values for X and Y that were read by a photoelectric linear encoder and calculation results by the DP-E1.

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 manufacturer numbers starting with No. 1 or No. 2. It helps improve measurement efficiency by freeing the user's hands to perform other tasks.

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



These displays show X and Y-axis coordinates. (Can be switched between 1μm, 0.1μm, and 0.01μm.)

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.