



Profile Projectors

PROFILE PROJECTORS

V-20B / V-12B





PROFILE PROJECTOR V-20B

**Large effective screen diameter of 500 mm.
Permits mounting of a large stage and includes a
built-in digital counter and digital protractor.**

Parfocal projection lenses

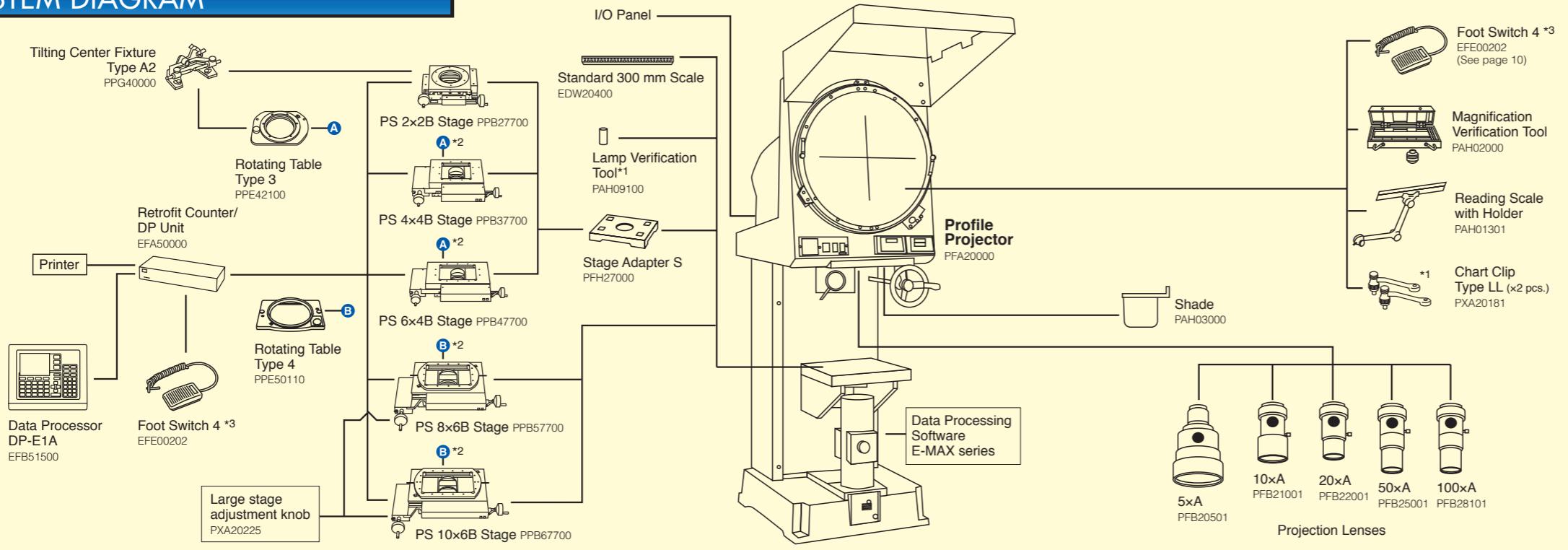
All projection lenses have the same parfocal distance and feature long working distances. The built-in half mirror eliminates the need to adjust illumination each time the magnification is changed.

Maximum sample weight

Combined with the PS 10x6B stage, samples as heavy as 20 kg can be loaded.

V-20B configured with PS 10x6B Stage

SYSTEM DIAGRAM



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

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

Parfocal projection lenses

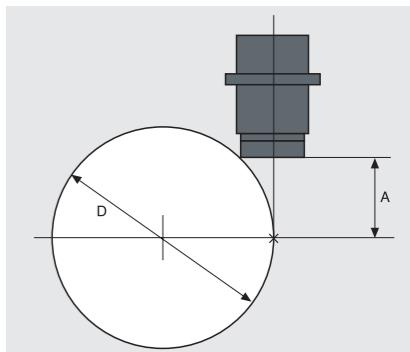
All projection lenses have the same parfocal distance and feature long working distances. The built-in half mirror eliminates the need to adjust illumination each time the magnification is changed.

Maximum sample weight

Combined with the PS 10x6B stage, samples as heavy as 20 kg can be loaded.

PROJECTION LENSES

Five lenses are available, each featuring a different magnification, working distance, and field of view (FOV) diameter.



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

(mm)

Magnification	FOV diameter	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 FOV is vignetted when 5x or 10x projection lens are used under diascopic illumination

SPECIFICATIONS

Type	Vertical optical axis
Image	Inverted and reversed
Screen	ø500 mm with protractor screen
Projection lens	5x, 10x, 20x, 50x, 100x 3-lens turret mount (screw type)
Magnification accuracy	Diascopic: 0.1 % Reflected: 0.15 %
Stages	PS 10x6B, PS 8x6B directly mountable PS 6x4B, PS 4x4B, PS 2x2B mountable via adapter
Illumination	Diascopic and reflected (both 24 V-150 W halogen lamp)
Maximum sample height	150 mm
Power source	AC 100-120 V (CSA), 220-240 V (CEE), 240 V (SAA)
Dimensions(WxDxH)	570x1200x1900 mm
Weight	Approx. 260 kg
Accuracy	3.0 + L / 50 µm After calibration; weight capacity on stage not exceeding 1 kg 3.5 + L / 50 µm With rotating stage after calibration
	*PS 2x2B will have this accuracy because of built-in rotating table

*L: Length in mm



PROFILE PROJECTOR V-12B Series

Benchtop projector with a wide measuring stroke up to 250x150 mm (cross travel). Models with a built-in digital counter and/or protractor are available.

	Built-in digital protractor	Built-in digital counter
V-12BDC	●	●
V-12BD	●	—

Deluxe (D): built-in digital protractor
Counter (C): built-in X-Y digital counter

Large stage mountable

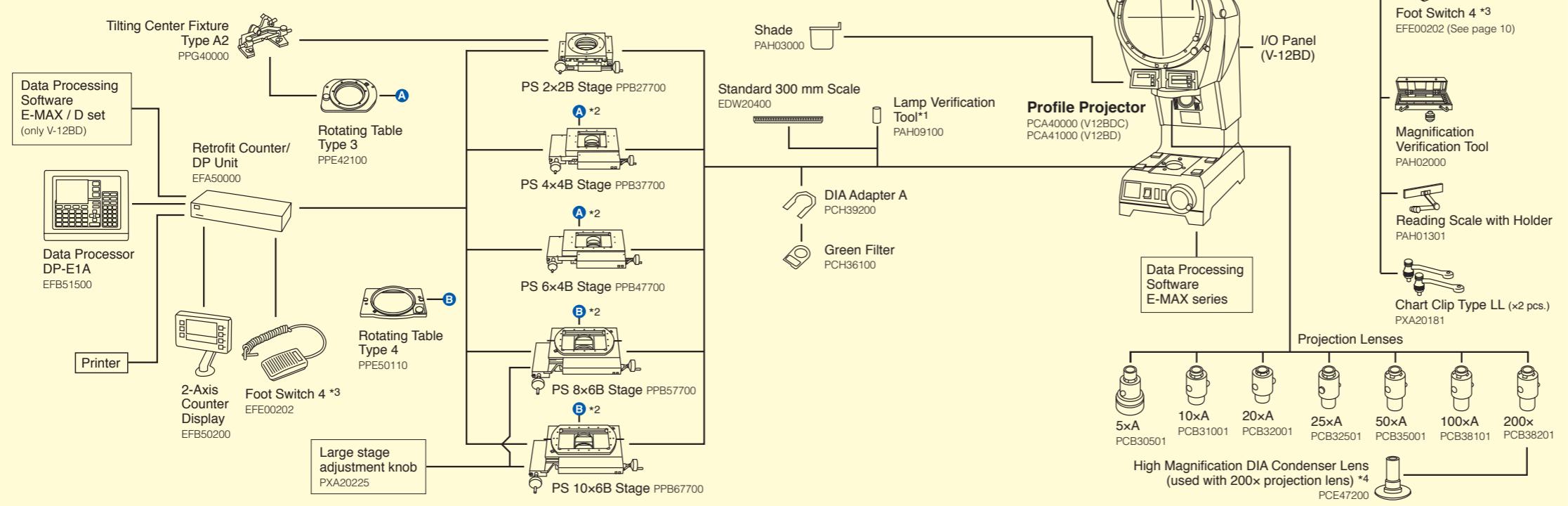
Focus is achieved by moving the objective head up and down, allowing stages with longer cross travel to be mounted. When the PS 10x6B Stage is used, the projector can measure areas as wide as 250x150 mm.

Adjustable base feet

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

V-12BDC configured with PS 10x6B Stage

SYSTEM DIAGRAM



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

*3: To use the Foot Switch and [Reset/Send] buttons simultaneously, the "MM cable (PXA2024)" is required.

*Not required when using retrofit counter with V-12BDC

Increased maximum sample height

Samples as tall as 100 mm can be loaded because the rigidness of the projector is increased by its CAE design.

Built-in digital counter and protractor

V-12BDC come with a digital XY counter, while V-12BDC and V-12BD 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

Easier edge detection achieved with the switchable built-in reflection illuminator.

4-step zooming condenser lens with diascopic illumination

Delivers the right amount of light to suit the magnification of the projection lens. (DIA condenser needed for 200x magnification)

DIA Condenser Lens

Necessary when using 200x projection lens and diascopic illumination.

*Cannot be removed when using PS 2x2B stage



PROJECTION LENSES

Three lenses can be mounted on the rotary turret at one time. All lenses boast high resolution and minimal distortion, with long working distances.

Magnification	FOV diameter	Half mirror	A	D	(mm)
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 FOV is vignetted when 5x or 10x projection lens are used under diascopic illumination

SPECIFICATIONS

Type	Vertical optical axis bench type
Image	Erect and unreversed
Screen	ø305 mm with etched center crossline V-12BDC/V-12BD: 360°rotatable screen with knob for digital protractor
Projection lens	5x, 10x, 20x, 25x, 50x, 100x, 200x 3-lens turret mount; clamping type
Magnification accuracy	Oblique reflected/diascopic: 0.1 % Vertical reflected: 0.15 %
Stages	PS 10x6B, PS 8x6B, PS 6x4B, PS 4x4B, PS 2x2B directly mountable
Illumination	Diascopic and reflected (both 24 V-150 W halogen lamp)
Maximum sample height	100 mm (70 mm: with PS 10x6B, PS 8x6B Stage)
Power source	AC 100/120V (50/60 Hz), AC 220/230/240V (50/60 Hz)
Dimensions(WxDxH)	410x650x938-1038 mm
Weight	Approx. 80 kg
Accuracy	3.0 + L / 50 µm After calibration; weight capacity on stage not exceeding 1 kg 3.5 + L / 50 µm With rotating stage after calibration *PS 2x2B will have this accuracy because of built-in rotating table

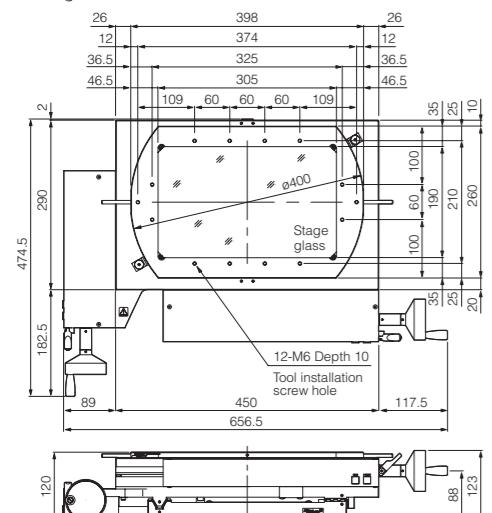
*L: Length in mm

*4 Cannot be used with PS2x2B stage

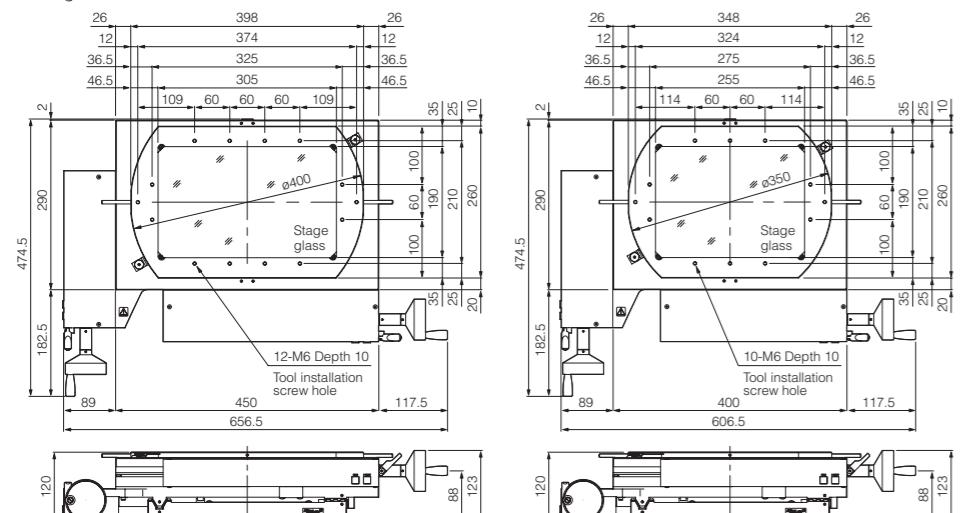
ACCESSORIES

Stages

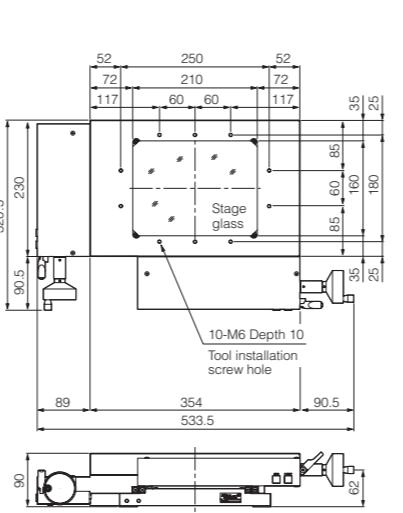
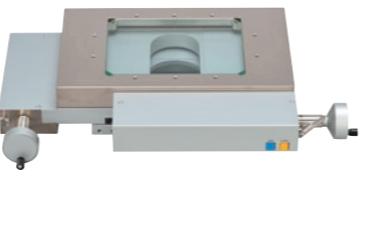
PS 10x6B
(Stroke: 250x150 mm)



PS 8x6B
(Stroke: 200x150 mm)



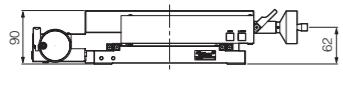
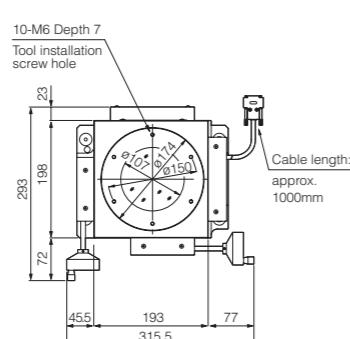
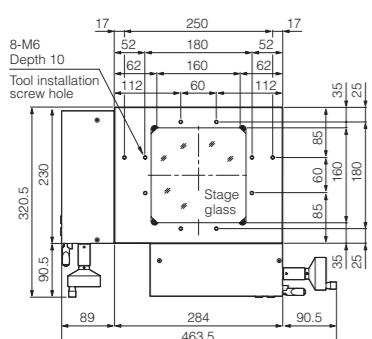
PS 6x4B
(Stroke: 150x100 mm)



PS 4x4B
(Stroke: 100x100 mm)



PS 2x2B
(Stroke: 50x50 mm)



(Unit: mm)

Stage Operation

- Lever control allows for smooth changeover of coarse and fine movement.
- Swivel plate comes as standard for PS 10x6B and PS 8x6B stage.
- The coarse/fine changeover lever and the RESET and SEND buttons are located near the X- and Y- axis knobs.

*Not available for PS 2x2B stage



Large stage adjustment knob

- Enables fine adjustment of swivel plate rotation.

*Available for PS 10x6B and PS 8x6B stages



(Unit: mm)

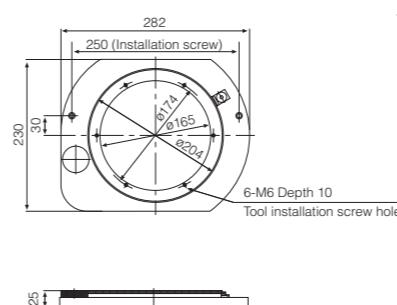
Stage Specifications

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	27.5
PS 4x4B	284x230	160x160	100x100				8-M6 depth 10		23.5
PS 2x2B	ø174	ø107	50x50			±360°(rotation table)	6-M6 depth 7	5	15.5

Rotating Tables

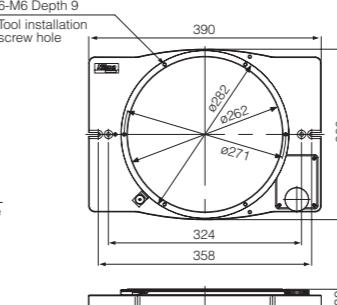
Type 3

For PS 6x4B, PS 4x4B



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

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)
ø68x120	45	10° (in 1° increment)	2.2

Standard 300 mm Scale

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

Pitch: 10 mm (attached with calibrated value)



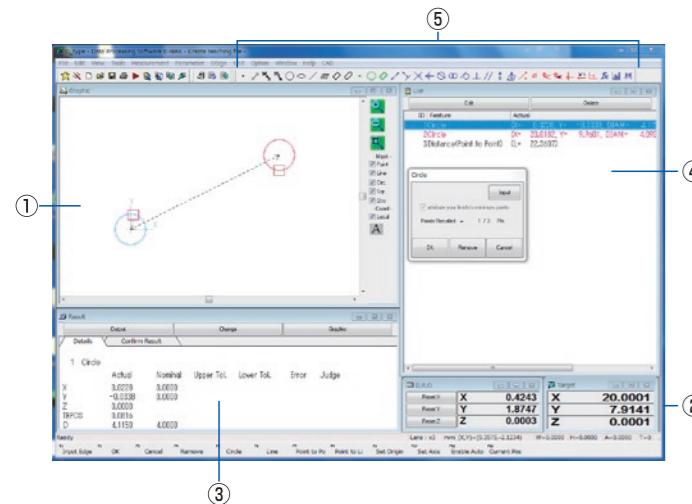
10 mm increments

ACCESSORIES

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

Data Processing Software E-MAX Series

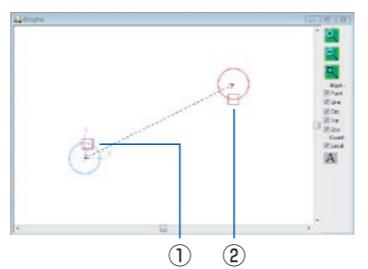
E-MAX is a series of general-purpose measurement support systems with a common user interface for PCs. The software processes 2D data from manual measuring instruments. Data result can be saved as a csv file.



User-friendly interface allows a host of measurement and processing functions to be easily controlled using 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.



Measurement Processing

Actual measurement + recall measurement



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

Recall settings



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

Recall measurement (reference settings)

1. Reference axis setting	5. Coordinate system reset
2. XY origin setting	6. Coordinate system recall 1
3. Coordinate system rotation 1	7. Coordinate system rotation 3
4. Coordinate system rotation 2	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 2D data processing functions
- Can be installed on notebook PCs (D Set only)



Data Processor DP-E1A

Effectively used in combination with a profile projector and/or measuring microscope, 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.



User-friendly, small-footprint system

Includes a measurement counter function.

Easy-to-master control keys

Controlled using measurement code buttons and measurement result lists, enabling users to easily conduct measurement.

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

For DP-E1A and Counter

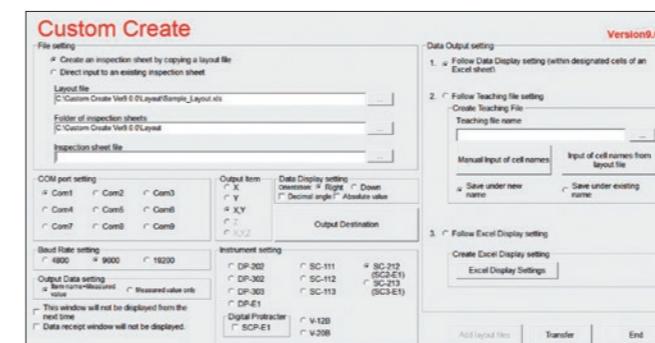
Measurement data from counters and/or data processors can be transferred directly to Excel sheets.

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

Operating environment: Windows®10 (32 bit / 64 bit)

Microsoft Excel 2013, 2016, 2019, 2021

Required memory: 512MB (min)
Codevelopment: Aria Co., Ltd.



Custom Fit QC

For E-MAX

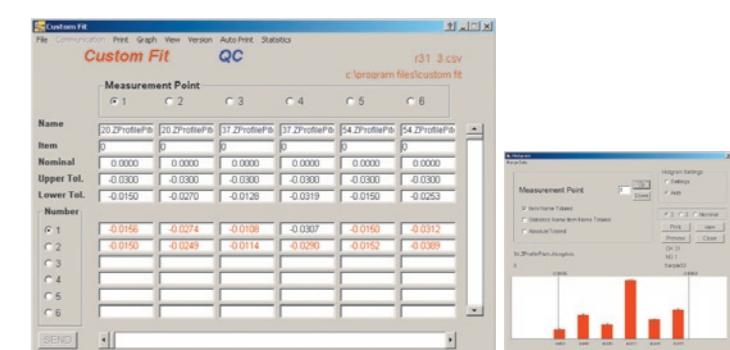
Suitable for lot control of inspection data.

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

Operating environment: Windows®10 (32 bit / 64 bit)

Microsoft Excel 2013, 2016, 2019, 2021

Required memory: 512MB (min)
Codevelopment: Aria Co., Ltd.



ACCESSORIES

Thermal Printer TSP743 II



	TSP743 II
Paper width	58 mm or 80 mm
Applicable model/ Counter	V-20B, V-12B, SC-112, SC113, SC-212, SC-213, DP-302, DP-303, Retrofit Counter/DP Unit

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)

Glass Reading Scale



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

Foot Switch 4



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

Retrofit Counter/DP Unit



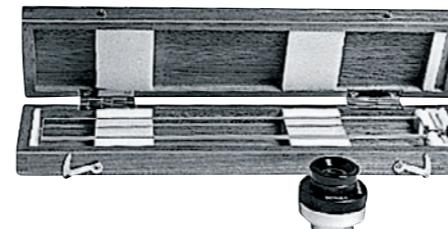
Needed to connect DP-E1A or 2-axis counter display to V-12BD.

Chart Clip Type LL



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

Glass Scale Set



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

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

L = measurement length

Green Filter, DIA Adapter A

For V-12B only



DIA Adapter A



Green Filter

The green filter is used for black- and-white photography or for viewing edges of a workpiece with greater sharpness. Must be used with the DIA Adapter A.

ISO/IEC 17025 Certified

Nikon Corporation Industrial Solutions Business Unit is certified as an ISO/IEC 17025 accredited calibration laboratory for measuring projectors (profile projectors) and measuring microscopes by the Japan Accreditation Board for Conformity Assessment.

ISO/IEC 17025: International standard, which specifies the general requirements to ensure that a laboratory is competent to carry out specific tests and/or calibrations

Date of initial accreditation: September 8, 2006

Scope of accreditation: Measuring projectors

Accredited section: Industrial Solutions Business Unit

Calibration site: Customer's laboratory (field service)

Expanded Uncertainty: **Magnification Accuracy**

5×	0.021%
10×	0.021%
20×	0.021%
50×	0.021%
100×	0.041%

X/Y-axis Indication Accuracy

Linear scale up to 250 mm (0.70 + 5.0×10⁻³×L) μm

Specifications and equipment are subject to change without any notice or obligation on the part of the manufacturer. June 2025 ©2006-2025 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)



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



NIKON CORPORATION

1-5-20, Nishioi, Shinagawa-ku, Tokyo 140-8601, Japan

Tel: +81 3 6743 5742

<https://industry.nikon.com/>

ISO 14001 Certified
for NIKON CORPORATION

ISO 9001 Certified
for NIKON CORPORATION
Industrial Solutions Business Unit

NIKON METROLOGY EUROPE NV

Interleuvenlaan 86, 3001 Leuven, Belgium

Tel: +32 16 74 01 01

Sales.NM@nikon.com

NIKON METROLOGY UK LTD.

UNITED KINGDOM Tel: +44 1332 811 349

Sales.UK.NM@nikon.com

NIKON METROLOGY SARL

FRANCE Tel: +33 1-60 86 09 76

Sales.France.NM@nikon.com

NIKON METROLOGY GMBH

GERMANY Tel: +49 211 4544 6951

Sales.Germany.NM@nikon.com

NIKON METROLOGY, INC.

12701 Grand River Road, Brighton, MI 48116 U.S.A.

Tel: +1 810 220 4360

Sales.NM-US@nikon.com

NIKON METROLOGY - MEXICO

Sales.NM-US@nikon.com

NIKON PRECISION (SHANGHAI) CO., LTD.

CHINA Tel: +86 21 6841 2050 (Shanghai)

CHINA Tel: +86 10 5831 2028 (Beijing branch)

CHINA Tel: +86 20 3882 0551 (Guangzhou branch)

Web.Nis@nikon.com

NIKON INSTRUMENTS KOREA CO., LTD.

KOREA Tel: +82 2 6288 1900

NIK.Sales@nikon.com

NIKON SINGAPORE PTE LTD.

SINGAPORE Tel: +65 6559 3651

NSG.Industrial-sales@nikon.com

PT. NIKON INDONESIA

INDONESIA Tel: +62 213 873 5005

PTN.Instruments@nikon.com

NIKON SALES (THAILAND) CO., LTD.

THAILAND Tel: +66 2633 5100

NST.Inst@nikon.com