

Nikon



PRO FILE
PROJECTORS

V-24B

V-20B

V-12B

V-24B

Profile projector with an effective 600mm screen diameter

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

Large stage mountable

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

Halogen light source

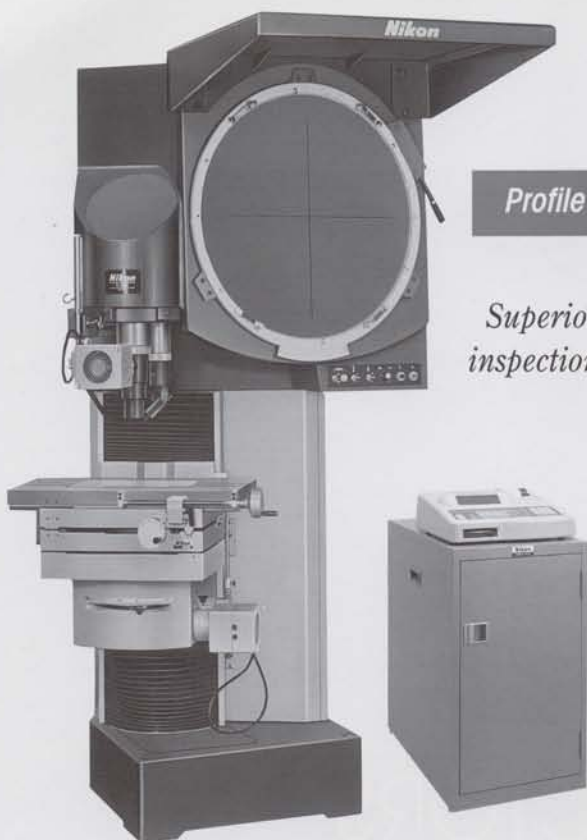
The halogen light source provides sufficient brightness regardless of whether contour or surface illumination is used, making measurements and observations simple and easy.

Concentric and parfocal

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

Highest magnification accuracy

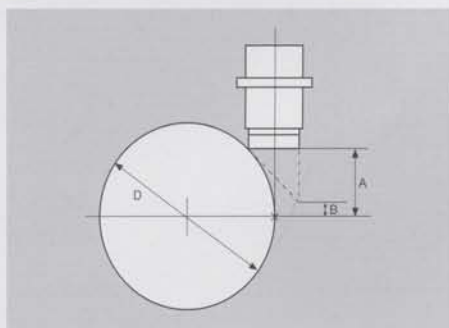
Featuring a magnification accuracy of $\pm 0.05\%$ with contour illumination and $\pm 0.075\%$ with surface illumination (0.1% and 0.15% when a 200X lens is used), this instrument's accuracy is extremely high when compared with other models.



V-24B configured with 9V stage and DP-303 data processor

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PROJECTION LENSES



Six 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)

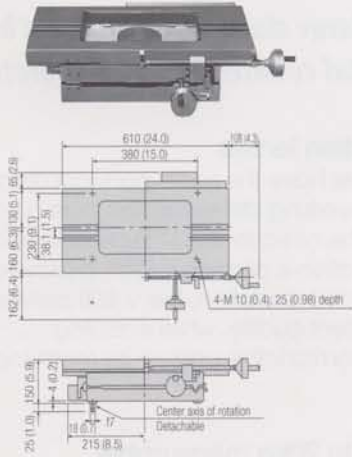
D = maximum diameter of a measurable cylindrical specimen

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
200X	3	Built-in; switchable	24	—	44

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

Dedicated 9V Stage

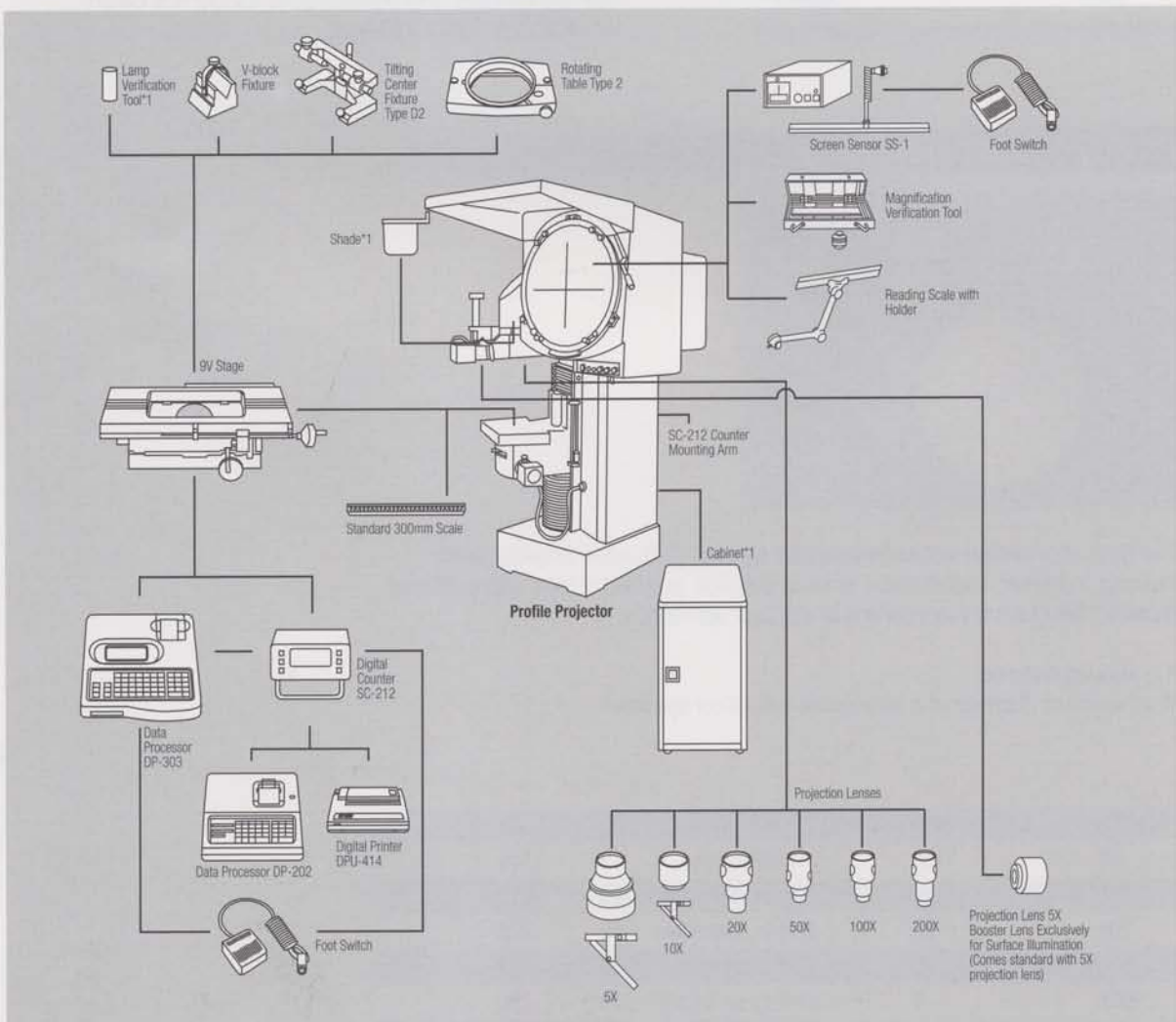
Surface area	610 x 290 mm (24.0 x 11.4 in.)
Stage glass size	330 x 200 x 10 mm (13.0 x 7.9 x 0.4 in.)
Cross travel	225 x 100 mm (8.9 x 3.9 in.)
Reading method	Linear encoder (SC-212 is required)
Minimum readout	0.0005mm
Tool mounting groove	Dovetail
Loading capacity	30kg (66.1 lb.)
Weight	Approx. 75kg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



SPECIFICATIONS

Type	Vertical optical axis
Image	Inverted and reversed
Screen	ø600mm (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, 200X
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	1,180 (W) x 1,100 (D) x 1,900 (H) mm (46.5 x 43.3 x 74.8 in.)
Weight	800kg (1,766 lb.)

SYSTEM DIAGRAM

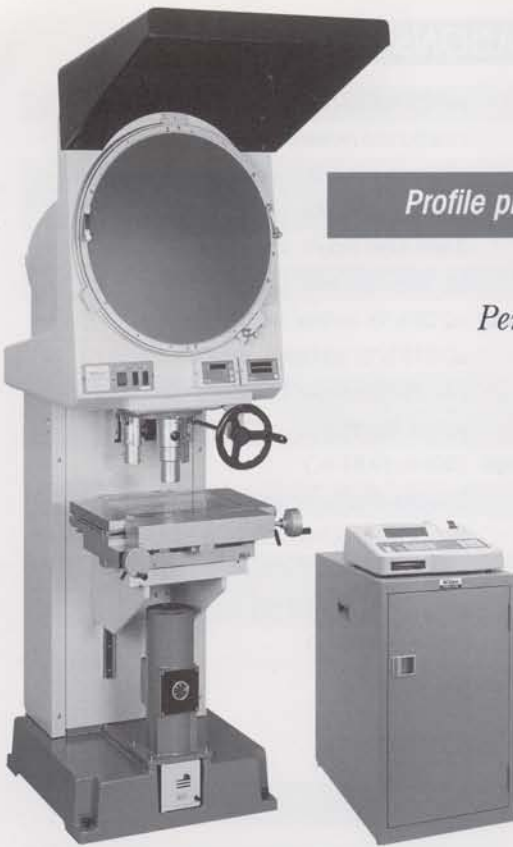


*1: Standard accessory

*2: The DP-303 data processor can be connected either directly to the stage or via the SC-212 digital counter.

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 and DP-303 data processor

Parfocal projection lenses

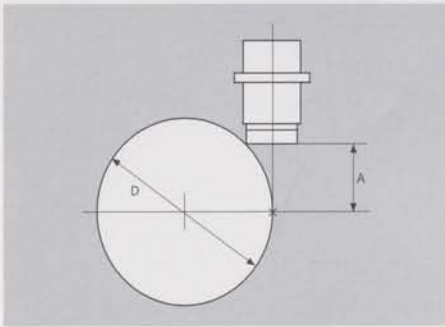
All projection lenses have the same parfocal distance and feature long working distances. The built-in half mirror eliminates the need to adjust illumination each time the magnification is changed. With improved image brightness and resolution, the V-20B delivers images with excellent quality, while enabling observation in a comfortable posture by rectifying 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 150 mm.

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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

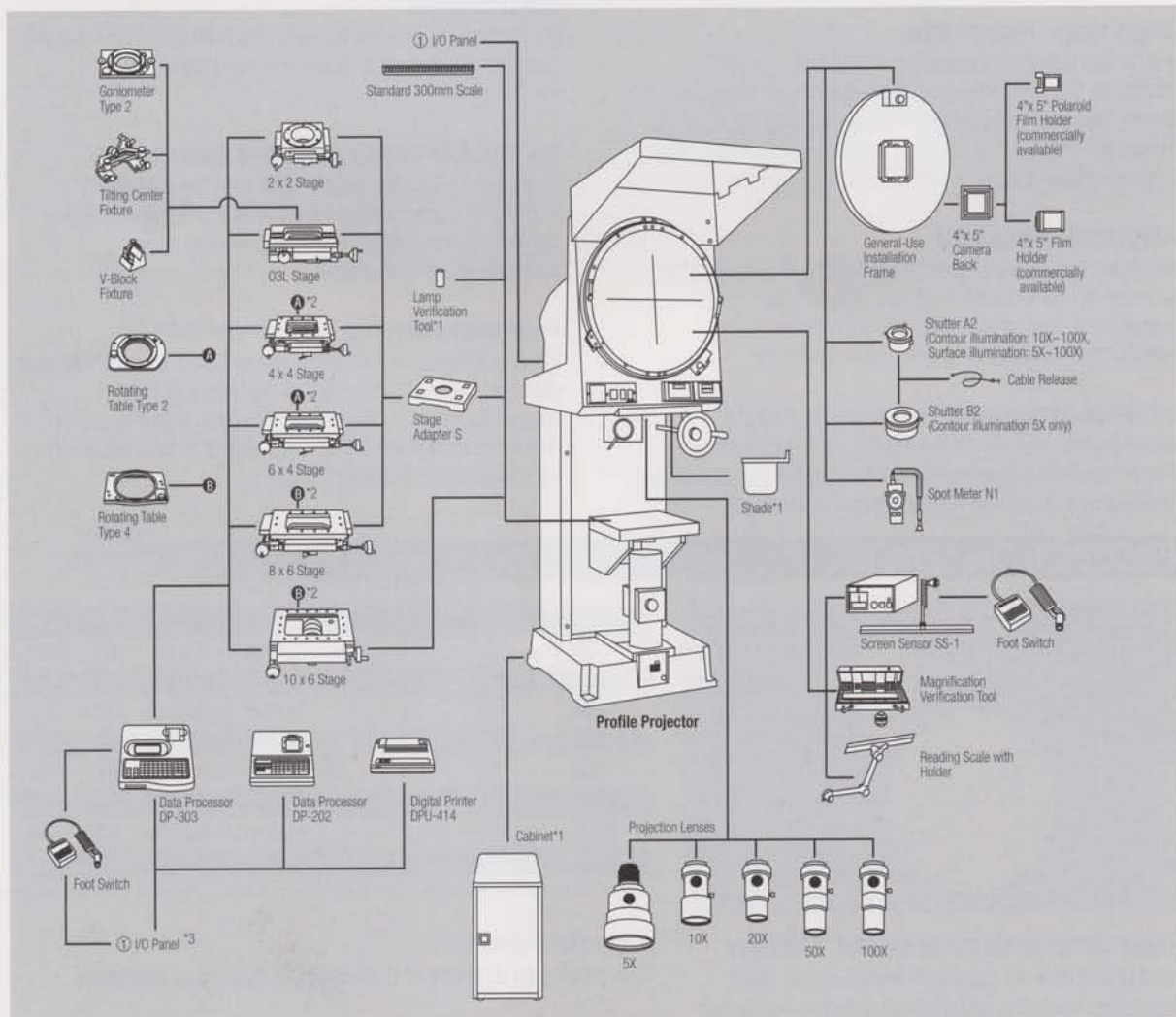
Magnification	Diameter of field of view	Half mirror	A	D
5X	100	Built-in; fixed	73	149
10X	50	Built-in; switchable	79	215
20X	25	Built-in; switchable	85	313
50X	10	Built-in; switchable	50.5	130
100X	5	Built-in; switchable	50.5	130

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

SPECIFICATIONS

Type	Vertical optical axis
Image	Inverted and reversed
Screen	ø500mm (19.7 in.); protractor screen; inclined 8°
Lens mount	3-lens turret mount
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	570 (W) x 1,200 (D) x 1,900 (H) mm (22.4 x 47.2 x 74.8 in.)
Weight	260kg (573 lb.)

SYSTEM DIAGRAM



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

*3: To connect the I/O panel with the DP-303, use a linear cable; with the DP-202, an RS-232C cross cable; with the DPU-414, the dedicated RS-232C.

V-12B Series

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

Wide measurable range: cross travel 250 x 150 mm.

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



V-20BDC configured with 10 x 6 stage and DP-303 data processor

Large stage mountable

The V-12B adopts 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 150 mm.

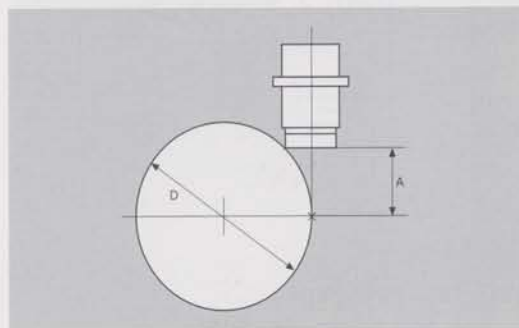
Adjustable base feet

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.

PROJECTION LENSES



Three projection lenses can be mounted to the rotary turret at one time. All projection lenses—5X to 500X—boast high resolution and minimal distortion, while their working distances are longer than competitive lenses.

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.

Built-in digital counter and protractor

The V-12BDC and 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.)

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.

A = working distance

D = maximum diameter of a measurable cylindrical specimen

EPI Condenser Lens

Under surface illumination, the EPI condenser lens is necessary when 200X or 500X projection lenses are used.



DIA Condenser Lens

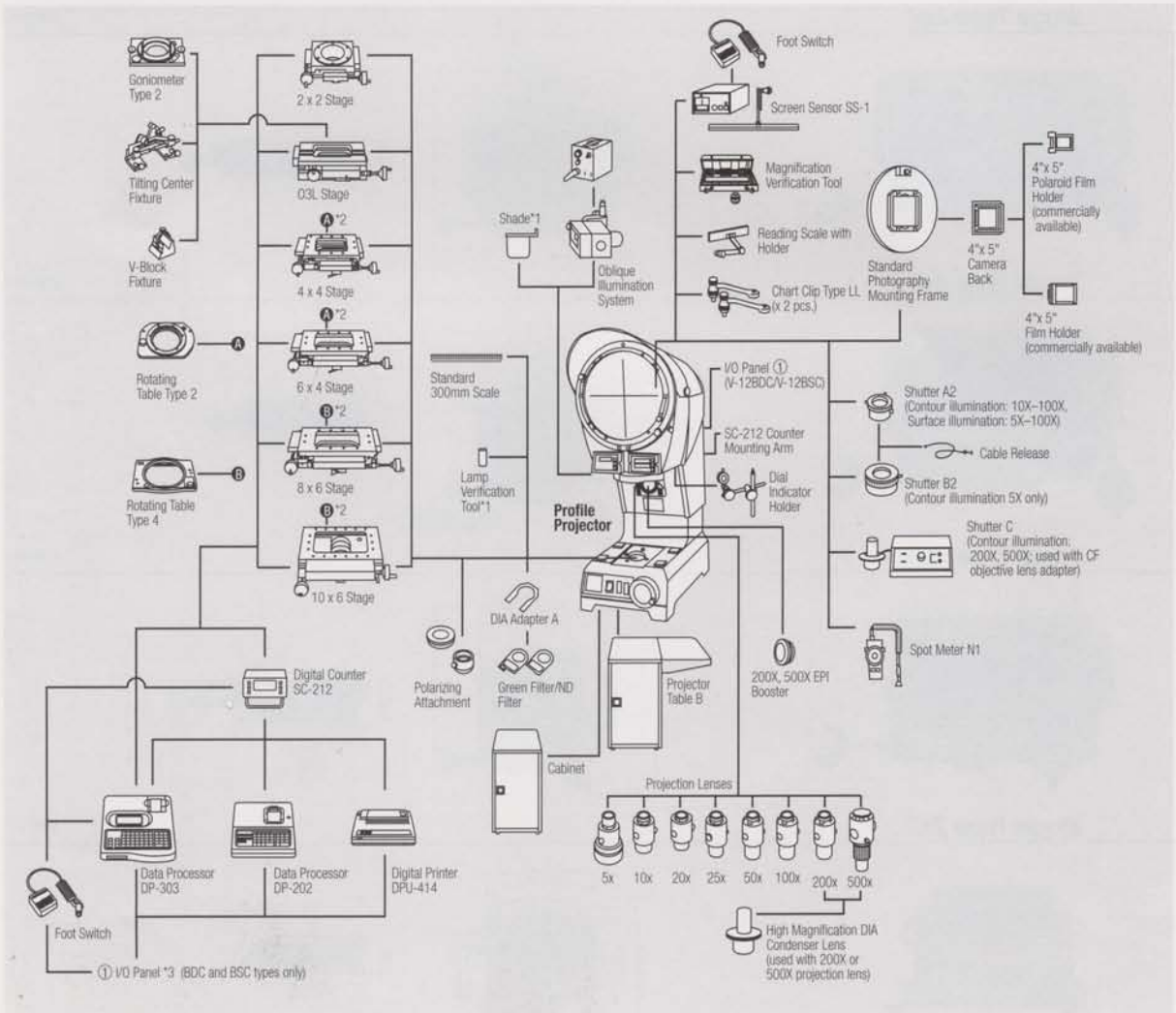
Under contour illumination, the DIA condenser lens is necessary when 200X or 500X projection lenses are used.



SPECIFICATIONS

Type	Vertical optical axis bench type	
Image	Inverted and reversed	
Screen	V-12BDC/V-12BD \varnothing 305mm (12.0 in.); etched center crossline; provided with digital protractor fine rotation knob; 360° rotatable (with digital reading to 1 minute of arc) V-12BSC/V-12BS \varnothing 305mm (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	$\pm 0.1\%$ for oblique surface/contour illumination $\pm 0.15\%$ 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, O3L or 2 x 2 Stage directly mountable	
Power input	AC 100/120V (50/60 Hz), AC 220/230/240V (50/60 Hz)	
Dimensions	409 (W) x 648 (D) x 970-1,070 (H) mm (16.1 x 25.5 x 38.2-42.1 in.)	
Weight	Approx. 80kg (177 lb.)	
XY counter	V-12BDC Built-in (1.0/0.5 μ m selectable) V-12BSC Built-in (1.0/0.5 μ m selectable)	V-12BD Not provided V-12BS Not provided

SYSTEM DIAGRAM



*1: Standard accessory

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

*3: To connect the I/O panel with the DP-303, use a linear cable; with the DP-202, an RS-232C cross cable; with the DPU-414, the dedicated RS-232C.

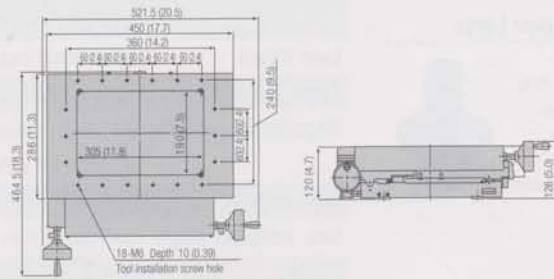
*4: With V-12BD and V-12BS types, the DP-303 data processor can be connected either directly with the stage or via the SC-212 counter. With the V-12BDC and V-12BSC, the data processor is connected via the projector I/O panel.

ACCESSORIES

Nikon offers a broad range of stages to choose from including the new 10x6 stage. All models except the O3L boast outstanding accuracy of $3+L/50\mu\text{m}$ (L = measurement length).

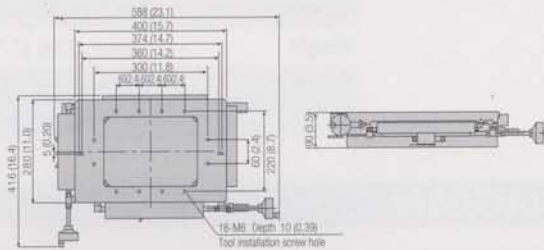
Stages

Stage Type 10x6



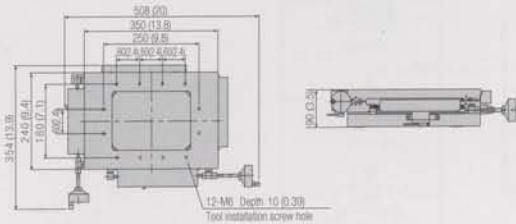
(mm/in.)

Stage Type 8x6



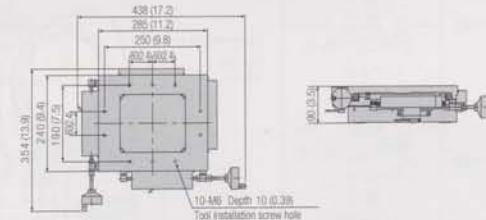
(mm/in.)

Stage Type 6x4



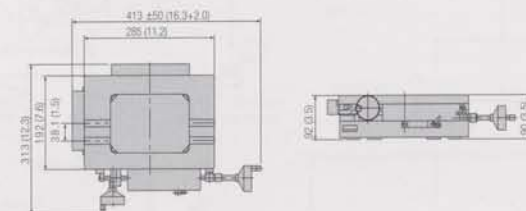
(mm/in.)

Stage Type 4x4



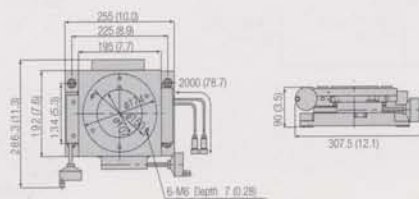
(mm/in.)

Stage Type O3L



(mm/in.)

Stage Type 2x2



(mm/in.)

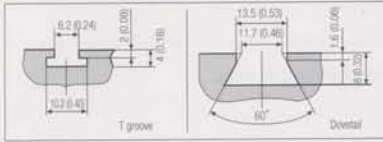
Stage Adapter S

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.

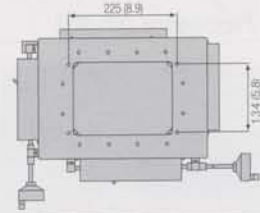
Tool Installation Groove Dimensions (mm/in.)



T groove: Rotating Table A
Dovetail: 03L

- 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 mounting screw positions (mm/in.)



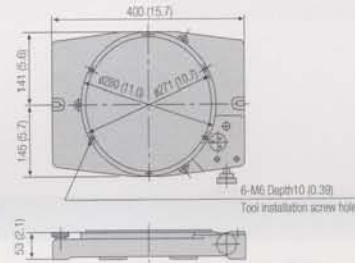
Stage Specifications

Type	Surface area mm (in.)	Stage glass dimensions mm (in.)	Crosswise travel mm (in.)	Reading method	Min. reading mm (in.)	Stage top	Tool installation	Loading capacity kg (lb.)	Weight 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)
03L	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

Rotating Table Type 2

For 9V



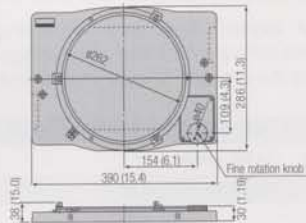
Rotating Table Type 3

For 6 x 4, 4 x 4



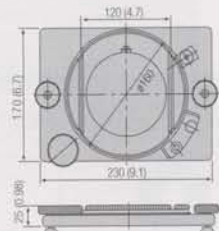
Rotating Table Type 4

For 10 x 6, 8 x 6



Goniometer Type 2

For 03L



Rotating Table Specifications

	Table diameter (in.)	Glass insert diameter (in.)	Rotation range	Tool installation	Weight
Rotating Table Type 2	280mm (11.0)	262mm (10.3)	360° (uncalibrated)	—	Approx. 12kg (26 lb.)
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	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 1µm against compensation values.



Magnet-type V-Block Fixture

For 8x6, 6x4, and 4x4 stages. The dedicated V-block fixture is available for the stage type 03L.

Tilting Center Fixture

Used to tilt samples around the center axis.

ACCESSORIES

A wide variety of accessories are available as options including data processors, application software, stages, and others. Select the best combination to suit your application.

Data Processors

When connected to profile projectors, the DP-303 and DP-202 data processors accomplish calculations and other tasks related to your measurements and then print out the results. No complicated preparations are necessary to start up the system; just enter a few commands on the keypad.

Data Processor DP-303



An all-around model providing measurements and storing of data.

- ROM-DOS®-based operating system
- Large, dialog-type LCD display
- Built-in 3.5-inch floppy disk drive
- 3-axis counter
- CSV file conversion to read measurement data in spreadsheets such as MS-Excel.
- Built-in high-speed line printer
- RS-232C interface

Note: An RS-232C cross cable is necessary when using the DP-303 and the SC-212 counter together. Also, counter values are not displayed on the DP-303 LCD display when both units are used together.

Data Processor DP-202



A feature-packed compact model.

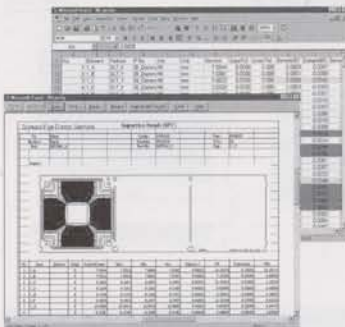
- No preliminary scanning of the workpiece necessary
- Compact design
- Display lamp indicating the number of input data
- Error warning buzzer
- RS-232C interface card (option)

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Data Processing Software

Inspection result sheet support program—Spread Eye LT

For the DP-303



Creates inspection results sheets quickly in your desired format.

Its "Free Format" feature allows you to use existing inspection table formats or create original ones. This software enables total management from automatic measurement of dimensions to the creation of result sheets, saving labor and costs.

Required software: Microsoft Excel® 97 (English version) or newer version

Required memory: 24 MB or more

Manufacturer: Nippon Filcon Co., Ltd.

Direct link to Excel sheet programs—DirecSheet

For the SC-212, DP-202 and DP-303



Inputting data in inspection sheets manually is no longer necessary. The Macro Script Program enables you to transfer data from Nikon counters and/or data processors directly to Excel sheets via the RS-232C interface. Simple to use, yet greatly enhances productivity.

Required software: Microsoft Excel® 97 (English version) or newer version

Required memory: 24 MB or more

Manufacturer: Nippon Filcon Co., Ltd.

Screen Sensor SS-1

This sensor detects edges in a workpiece using optical sensors, then sends data results to the connected data processor for quick and efficient measurements.

This sensor eliminates alignment errors by different operators.



Digital Printer DPU-414



Connectable to the SC-212 digital counter or the rear panel of the V-20B, V-12BDC or V-12BSC projector to print out XY counter values.

Digital Counter SC-212

For the V-24B, V-12BD/BS



This 2-axis counter displays the X and Y axes. It can be connected to data processors and digital printers via its RS-232C interface.

SC-212 Counter Mounting Arm

Used to mount the SC-212 digital counter to the V24B, or V-12BD/BS projector.

Auxiliary Oblique Halogen Surface Illuminator

For V-12B

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



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



Foot Switch



Used to send load-and-go commands to the DP-303, DP-202, and DPU-414. Frees both hands to enhance measurement efficiency.

Time-saving automatic detection

This sensor can measure edges from any direction, making it ideal for measuring circles or pitches between two circles, or when all workpieces need to be measured.

Compatible projectors:	All models
Compatible projection lenses:	20-100X
Repeatability:	$\pm 1\mu\text{m}$
Response speed:	6mm/sec. (transfer speed on stage)
Minimum measurable width:	3.5mm (on screen)
Detector:	SPD (silicon photodiode)
Edge signal ON/OFF:	Measure switch or optional foot switch selectable
Holder size:	S types (one each for V-24B, V-20B, and V-12B)

- Consult a Nikon representative when using surface illumination. Not usable when green filter is used.

Chart Clip Type LL



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

Dial Indicator Holder

For the V-12B



Used to attach dial indicators to measure the depth of workpieces.

Glass Reading Scale



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

Accessory Cabinet

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

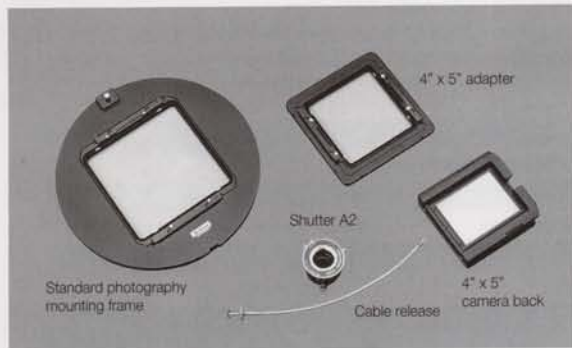


Projector Table B

For the V-12B

Specially designed for the V-12B profile projector. Comes with a side wing for a data processor. Same dimensions when the wing is closed. (900 mm (W) (35.4 in.) when the wing is set.)





Allows projection images to be photographed as easily as with ordinary cameras. Three shutters—A2, B2, C—are available with speed settings of B and 1 to 1/125 sec. A cable release is also available.

Spot Meter N-1



Can accurately measure the light intensity of an circular area (approximately 6mm in diameter) on the screen. Can be used in place of average light measurement or background light measurement.

Film Holder (commercially available)

Accepts the use of large-format sheet or instant film.



Shutter A2/B2



A2 is for standard photography, while B2 is for contour illumination photography using a 5X projection lens. Their shutter speeds can be set at B or from 1 to 1/125 sec.

Green Filter, ND Filter, DIA Adapter A For the 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.

Shutter C

For the V-12B



Used to take photographs using a 200X or 500X projection lens under contour illumination. Its shutter speed can be set at B or from 4 to 1/125 sec.

Polarizing Attachment

For the 12B



This analyzer and polarizer set is used to examine transparent workpieces using polarized light. It can be used with 10X to 100X projection lenses.

Specifications and equipment are subject to change without any notice or obligation on the part of the manufacturer. March 2000.



WARNING

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

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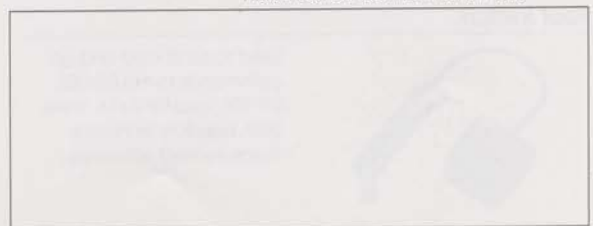
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