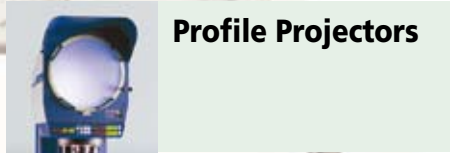
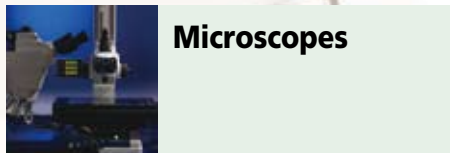


INDEX

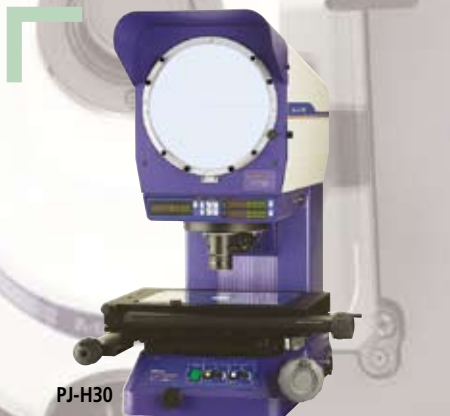
Profile Projectors	
PJ-A3000	J-2
PJ-H30	J-4
PV-5110	J-6
PV-600A	J-8
PH-3515F, PH-A14	J-10
Accessories for Profile Projectors	J-12
Micrometer Heads	J-14
Workpiece Fixtures	J-15
Microscopes	
TM-500	J-16
MF	J-18
MF-U	J-20
Hyper MF / MF-U	J-22
Accessory for Measuring Microscope	J-24
QM-Data200	J-26
OPTOEYE-200	J-27
Vision Unit	J-28
FS-300	J-30
FS-70	J-31
VMU	J-32
Eyepiece	J-33
Objectives	J-33
MSM-400	J-38
Pocket Magnifiers	J-40
Pocket Comparators	J-40
Zoom loupe	J-40
Clear Loupe	J-40



Profile Projectors



Microscopes



PJ-H30



MF



MF-U

PJ-A3000

SERIES 302 — Profile Projectors

FEATURES

- The PJ-A3000 Series profile projectors are medium-size models that feature excellent versatility and easy operation.
- Easy-to-read digital XY counter is located near the projection screen to minimize eye movement.
- Digital readout protractor screen facilitates angle measurement.



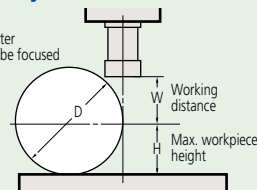
PJ-A3010F-200

Technical Data

- Projected image: Inverted
 Protractor screen
- Effective diameter: 315mm (12.4")
 - Screen material: Fine-ground glass
 - Screen rotation: $\pm 360^\circ$, fine feed and clamp
 - Angle reading: Digital counter (LED)
 Resolution: 1' or 0.01° (switchable)
 Range: $\pm 370^\circ$
 ABS/INC mode switching, Zero Set
- Reference lines: Cross-hairs
 Projection lens: 10X (172-202)
 Optional: 20X, 50X, 100X
- Magnification accuracy
- Contour illumination: $\pm 0.1\%$ or better
 - Surface illumination: $\pm 0.15\%$ or better
- Maximum workpiece height: Refer to the projection capacity (H) below.
- Contour illumination
- Light source: Halogen bulb (24V, 150W)
 - Optical system: Telecentric system
 - Functions: 2-step (High/Low) brightness switch, Heat-absorbing filter, Cooling fan
- Surface illumination
- Light source: Halogen bulb (24V, 150W)
 - Optical system: Vertical illumination with adjustable condenser lens
 - Functions: Heat-absorbing filter, Cooling fan
- Focusing: Manual focus
 Resolution: 0.001mm or .0001"/0.001mm
 (.00005"/0.001mm: digital head)
- Power supply: 100 - 240V AC, 50/60Hz
 Mass: 105kg - 140kg

Projection Capacity

D: Max. workpiece diameter whose peripheral line can be focused on the screen center



Unit: mm

	Magnification			
	10X	20X	50X	100X
View field	ø31.5	ø15.7	ø6.3	ø3.1
W	66 (20)	32.5 (2)	12.6	5
H -50 models*	123.5	123.5	123.5	123.5
-100 models	91	91	91	91
-150 models	103.5	103.5	103.5	103.5
200 models	92.5	92.5	92.5	92.5
D -50 models*	224 (198)	87 (61)	27	10
-100 models	182	87 (61)	27	10
-150 models	207 (198)	87 (61)	27	10
200 models	185	87 (61)	27	10

(): When using surface illumination
 *Including PJ-A3000



PJ-A3005D-50
 PJ-A3005D-50E
 PJ-A3005R-50



PJ-A3010F-100
 PJ-A3010F-100E



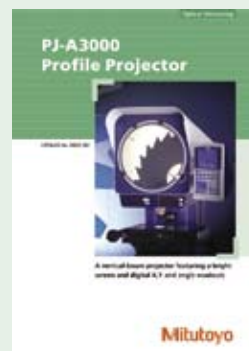
PJ-A3005F-150
 PJ-A3005F-150E



PJ-A3010F-200
 PJ-A3010F-200E



PJ-A3000



Refer to the PJ-A3000 leaflet (E4233) for more details.

Optional Accessories

- 172-203:** 20X projection lens set
- 172-204:** 50X projection lens
- 172-207:** 100X projection lens
- 172-229:** Oblique illumination mirror for 10X lens
- 172-230:** Oblique illumination mirror for 20X lens
- 172-116:** Standard scale (50mm)
- 172-117:** Standard scale (2")
- 172-118:** Reading scale (200mm)
- 172-161:** Reading scale (300mm)
- 172-119:** Reading scale (8")
- 172-162:** Reading scale (12")
- 932105:** Overlay chart set (12 sheets)
- 172-160-2:** Green filter (for PJ-A3000, -50 models)
- 172-160-3:** Green filter (for -100, -150, -200 models)
- 512305:** Halogen bulb (24V, 150W)
- 965012:** SPC cable (2m) for angle display output

Fixture and Stage accessories (Refer to page J-15.)

- 176-106:** Rotary table (Effective diameter: 66mm)
- 172-196:** Rotary table (Effective diameter: 100mm)
- 172-198:** Rotary table with fine feed wheel (Effective diameter: 96mm)
- 176-105:** Swivel center support (Max. workpiece dia.: 70mm)
- 172-197:** Swivel center support (Max. workpiece dia.: 80mm)
- 176-107:** Holder with clamp
- 172-378:** V-block with clamp (Max. workpiece dia.: 25mm)
- 999678:** Fixture mount adapter

Availability	PJ-A3000 PJ-A3005R-50 PJ-A3005D-50/E	PJ-A3005F-150/E PJ-A3010F-100/E PJ-A3010F-200/E
176-106	✓	—
172-196	—	✓*
172-198	—	✓*
176-105	✓	✓*
172-197	—	✓*
176-107	✓	✓*
172-378	✓	✓*

* Fixture mount adapter (999678) is required for PJ-A3010F-200/E



QM-Data200
2-D data processing unit.
(Refer to page J-26 for more details.)



OPTOEYE-200
Edge detection system for QM-Data200
(Refer to page J-27 for more details.)

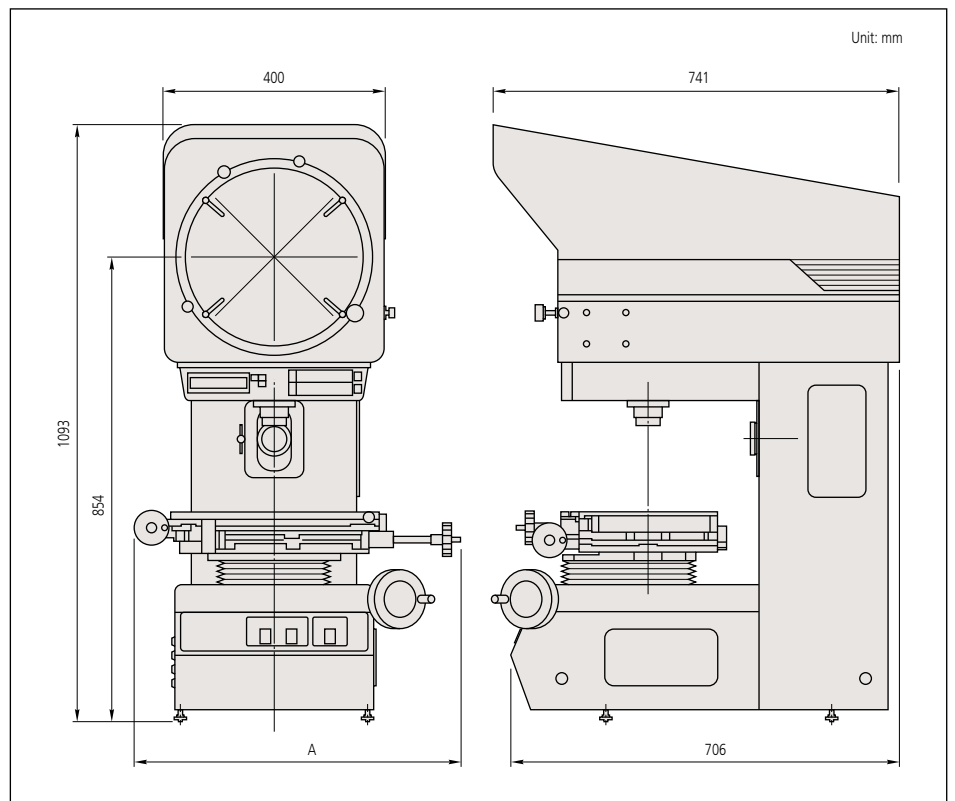
SPECIFICATIONS

Model No.	PJ-A3005R-50	PJ-A3005D-50	PJ-A3005D-50E	PJ-A3010F-100	PJ-A3010F-100E
Order No. (metric)	302-709*	302-704*	302-708*	302-703*	302-707*
Order No. (inch/metric)	302-719*	302-714*	302-718*	302-713*	—
XY stage travel range	50 x 50mm	50 x 50mm	50 x 50mm	100 x 100mm	100 x 100mm
Measurement method	Analog head	Rotary encoder	Rotary encoder	Linear encoder	Linear encoder
Quick-release mechanism	—	—	—	X and Y axes	X and Y axes
XY stage table top size	152 x 152mm	152 x 152mm	152 x 152mm	250 x 250mm	250 x 250mm
XY stage effective area	82 x 82mm	82 x 82mm	82 x 82mm	142 x 142mm	142 x 142mm
Stage glass No.	380405	380405	380405	12BAE041	12BAE041
Swiveling function	—	—	—	—	—
Max stage loading	10kg	10kg	10kg	10kg	10kg
Remarks	w/o digital counter	—	w/o angle counter	—	w/o angle counter

Model No.	PJ-A3005F-150	PJ-A3005F-150E	PJ-A3010F-200	PJ-A3010F-200E	PJ-A3000
Order No. (metric)	302-702*	302-706*	302-701*	302-705*	302-700*
Order No. (inch/metric)	302-712*	—	302-711*	—	—
XY stage travel range	150 x 50mm	150 x 50mm	200 x 100mm	200 x 100mm	Fixed
Measurement method	Linear encoder	Linear encoder	Linear encoder	Linear encoder	—
Quick-release mechanism	X and Y axes	X and Y axes	X and Y axes	X and Y axes	—
XY stage table top size	280 x 152mm	280 x 152mm	380 x 250mm	380 x 250mm	160 x 145mm
XY stage effective area	185 x 84mm	185 x 84mm	266 x 170mm	266 x 170mm	ø70mm
Stage glass No.	381349	381349	382762	382762	200673
Swiveling function	—	—	±3°	±3°	—
Max stage loading	8kg	8kg	8kg	8kg	15kg
Remarks	—	w/o angle counter	—	w/o angle counter	w/o angle counter

* To denote your AC power cable add the following suffixes to the order No.: **A** for UUCSA, **C** for Taiwan, **D** for CEE, **DC** for CCC, **E** for BS, **K** for EK, **No suffix** is required for JIS/100V

DIMENSIONS



PJ-H30

SERIES 303 — Profile Projectors

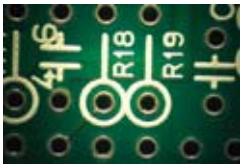
By separating axial motion, and stabilizing the XY measuring stage in the vertical direction, high measuring accuracy of $(3+0.02L)\mu\text{m}$ has been achieved on the PJ-H30 Series Profile Projectors. Focusing is accomplished by moving the screen head itself up and down with the hand wheel or motorized unit. Power focusing (PJ-H30D type) provides higher performance.



Adjustable / oblique switchable surface illumination



Vertical illumination



Oblique illumination



PJ-H30A3017B
XY stage travel range: 300 x 170mm

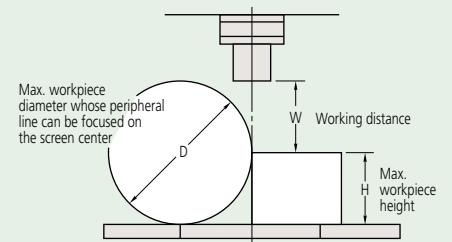
FEATURES

- Newly designed optical system with high NA lenses provide dramatically brighter and clearer screen images during surface illumination.
- The three-lens turret includes a 10X lens as standard. Four projection lenses (5X, 20X, 50X, 100X) are available.

Technical Data

Projected image:	Erect
Protractor screen	
• Effective diameter:	306mm (12")
• Screen material:	Fine-ground glass
• Screen rotation:	$\pm 360^\circ$, fine feed and clamp
• Angle display:	Digital counter (LED)
	Resolution: 1' or 0.01° (switchable)
	Range: $\pm 370^\circ$
	ABS/INC mode switching, Zero Set
• Reference lines:	Cross-hairs
Projection lens:	10X (172-472)
	Optional: 5X, 20X, 50X, 100X
	3-lens turret
Lens mount:	
Magnification accuracy	
• Contour illumination:	$\pm 0.1\%$ or better
• Surface illumination:	$\pm 0.15\%$ or better
Maximum workpiece height:	105mm
Contour illumination	
• Light source:	Halogen bulb (24V, 150W)
• Optical system:	Zoom Telecentric system
• Functions:	Non-stepped brightness adjustment, Heat-absorbing filter, Cooling fan
Surface illumination	
• Light source:	Halogen bulb (24V, 150W)
• Optical system:	Vertical / oblique illumination with an adjustable condenser lens
• Functions:	Non-stepped brightness adjustment, Heat-absorbing filter, Cooling fan
Manual focus or Power drive	
Resolution:	0.001mm or .0001"/0.001mm
Power supply:	100 - 240V AC, 50/60Hz
Mass:	176kg - 212kg

Projection Capacity



Unit: mm

	Magnification				
	5X	10X	20X	50X	100X
View field	$\phi 61.2$	$\phi 30.6$	$\phi 15.3$	$\phi 6.12$	$\phi 3.06$
H	105	105	105	105	105
W	66	70.5	56.5	50	50
D	148	197	137	114	114

Selection of XY stage by travel range



505B: 50 x 50mm



1010B: 100 x 100mm



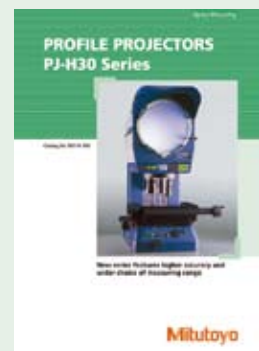
2010B: 200 x 100mm



2017B: 200 x 170mm

Selection of machine type

Machine type	PJ-H30E	PJ-H30A	PJ-H30B	PJ-H30C	PJ-H30D
Type of screen	Fixed screen	Protractor screen	Protractor screen	Protractor screen	Protractor screen
Focus operation	Manual	Manual	Manual	Power drive	Power drive
Edge detection system	OPTOEYE (external)	OPTOEYE (external)	OPTOEYE (built-in)	—	OPTOEYE (built-in)



Refer to the PJ-H30 leaflet (E4310) for more details.

Optional Accessories

- 172-271:** 5X projection lens
- 172-473:** 20X projection lens
- 172-474:** 50X projection lens
- 172-475:** 100X projection lens
- 172-116:** Standard scale (50mm)
- 172-117:** Standard scale (2")
- 172-118:** Reading scale (200mm)
- 172-161:** Reading scale (300mm)
- 172-119:** Reading scale (8")
- 172-162:** Reading scale (12")
- 932105:** Overlay chart set (12 sheets)
- 12AAG981:** Green filter
- 172-269:** Machine stand
- 515530:** Halogen bulb (24V, 150W)

Fixture and Stage accessories (Refer to page J-15.)

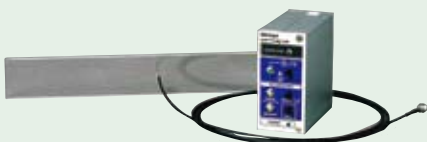
- 172-198:** Rotary table with fine feed wheel (Effective diameter: 96mm)
- 176-305:** Rotary table with fine feed wheel (Effective diameter: 183mm)
- 176-306:** Rotary table with fine feed wheel (Effective diameter: 240mm)
- 176-105:** Swivel center support (Max. workpiece dia.: 70mm)
- 172-197:** Swivel center support (Max. workpiece dia.: 80mm)
- 176-107:** Holder with clamp
- 172-378:** V-block with clamp (Max. workpiece dia.: 25mm)
- 176-317:** Fixture mount adapter
- 172-378:** Fixture mount adapter

Availability	Size of XY stage		
	505 1010	505 1010 2010	2017 3017
172-198	✓	✓**	✓***
176-305	—	✓**	—
176-306	—	—	✓
176-105	✓*	✓**	✓***
172-197	✓*	✓**	✓***
176-107	✓*	✓**	✓***
172-378	✓*	✓**	✓***

- * Need to use with Rotary table **172-198**.
- ** Fixture mount adapter (**176-317**) is required.
- *** Fixture mount adapter (**176-304**) is required.



QM-Data200
2-D data processing unit
(Refer to page J-26 for more details.)



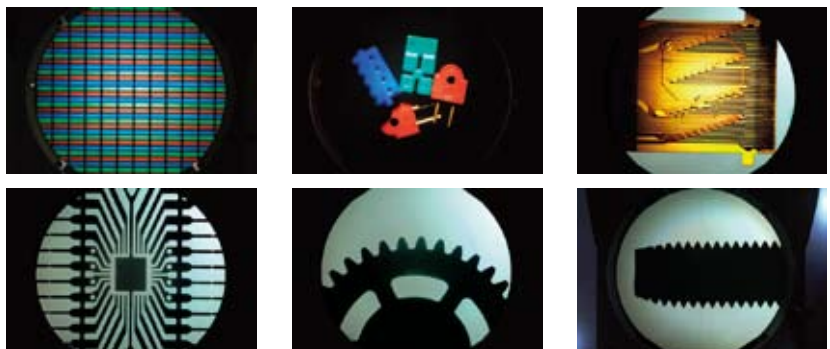
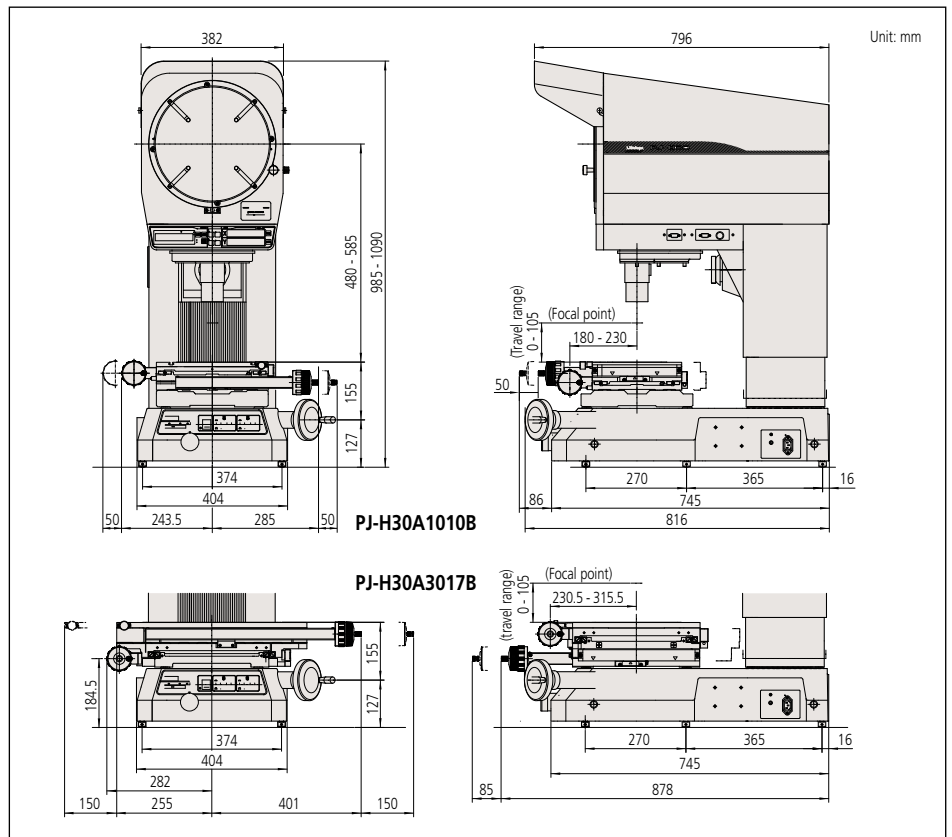
OPTOEYE-200
Edge detection system
(Refer to page J-27 for more details.)

SPECIFICATIONS

Model No. (XY stage size)	505B	1010B	2010B	2017B	3017B
Order No.	PJ-H30E	303-701*	303-702*	303-703*	303-704*
	PJ-H30A	303-711*	303-712*	303-713*	303-714*
	PJ-H30B	303-721*	303-722*	303-723*	303-724*
	PJ-H30C	303-741*	303-742*	303-743*	303-744*
	PJ-H30D	303-731*	303-732*	303-733*	303-734*
XY stage travel range	50 x 50mm	100 x 100mm	200 x 100mm	200 x 170mm	300 x 170mm
Accuracy (at 20°C)	(3+0.02L)µm, L = Measured length (mm)				
Measurement method	Linear encoder	Linear encoder	Linear encoder	Linear encoder	Linear encoder
Quick-release mechanism	X and Y axes	X and Y axes	X and Y axes	X and Y axes	X and Y axes
XY stage table top size	300 x 240mm	300 x 240mm	350 x 280mm	410 x 342mm	510 x 342mm
XY stage effective area	180 x 150mm	180 x 150mm	250 x 150mm	270 x 240mm	370 x 240mm
Stage glass No.	380412	380412	382762	12BAD363	12BAD330
Swiveling function	±3°	±3°	±3°	±5°	±5°
Max stage loading	10kg	10kg	10kg	20kg	20kg
Remarks	E type: with fixed screen A type: with protractor screen B type: with protractor screen and built-in OPTOEYE-200 edge sensor C type: with protractor screen and power focus D type: with protractor screen, built-in OPTOEYE-200 edge sensor and Power focus				

* To denote your AC power cable add the following suffixes to the order No.: **A** for UUCSA, **C** for Taiwan, **D** for CEE, **DC** for CCC, **E** for BS, **K** for EK, **No suffix** is required for JIS/100V

DIMENSIONS



PV-5110

SERIES 304 — Profile Projectors

FEATURES

- Floor-standing model using overhead illumination which allows a large, conveniently positioned screen so that projected images can be easily traced or compared with a template.
- Digital readout protractor screen (including zero-setting, ABS/INC coordinate switching functions) for easy and error-free angle measurement.
- The optional oblique surface illumination unit (**172-419**) provides clear and bright images, allowing easy inspection of non-reflective workpieces such as plastic parts or printed materials.

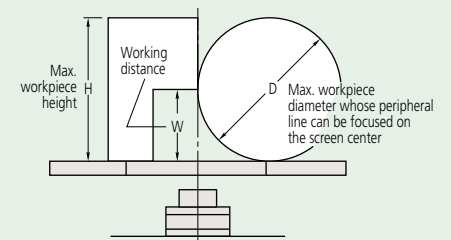


PV-5110
with optional KA counter

Technical Data

- Projected image: Inverted
 Protractor screen
- Effective diameter: 508mm (20")
 - Screen material: Fine-ground glass
 - Screen rotation: $\pm 360^\circ$, fine feed and clamp
 - Angle reading: Digital counter (LED)
Resolution: 1' or 0.01° (switchable)
Range: $\pm 370^\circ$
ABS/INC mode switching, Zero Set
- Reference lines: Cross-hairs
 Projection lens: 10X (**172-402**)
 Optional: 5X, 20X, 50X, 100X
- Magnification accuracy
- Contour illumination: $\pm 0.1\%$ or better
 - Surface illumination: $\pm 0.15\%$ or better
- Maximum workpiece height: Refer to the projection capacity (H) below.
- Contour illumination
- Light source: Halogen bulb (24V, 150W)
 - Optical system: Zoom Telecentric system
 - Functions: 2-step (High/Low) brightness switch, Heat-absorbing filter, Cooling fan
- Surface illumination
- Light source: Halogen bulb (24V, 150W)
 - Optical system: Vertical illumination
 - Functions: Adjustable condenser lens, Oblique illumination (for 5X, 10X and 20X), Heat-absorbing filter, Cooling fan
- Focusing: Manual focus
 Resolution: 0.001mm or .0001"/0.001mm (using optional KA counter)
- Power supply: 100 - 240V AC, 50/60Hz
 Mass: 210kg

Projection Capacity



Unit: mm

	Magnification				
	5X	10X	20X	50X	100X
View field	ø101.6	ø50.8	ø25.4	ø10.16	ø5.08
H	125	181	206	87	87
W	60 (27)	60	60	32.4	22.5
D	120	120	120	64.8	45

(): When using surface illumination



Refer to the PV-5110 leaflet (E4271) for more details.

Optional Accessories

- 172-280:** 5X projection lens
- 172-401:** 5X projection lens set
- 172-402:** 10X projection lens set
- 172-403:** 20X projection lens set
- 172-404:** 50X projection lens set
- 172-405:** 100X projection lens set
- 172-419:** Surface illumination unit
- 172-116:** Standard scale (50mm)
- 172-330:** Standard scale (80mm)
- 172-117:** Standard scale (2")
- 172-161:** Reading scale (300mm)
- 172-329:** Reading scale (600mm)
- 172-162:** Reading scale (12")
- 12AAF182:** Digital counter stand
- 172-160-2:** Green filter
- 172-319:** Canopy
- 515530:** Halogen bulb (24V, 150W)

Fixture and Stage accessories (Refer to page J-15.)

- 172-198:** Rotary table with fine feed wheel*
(Effective diameter: 96mm)
- 172-197:** Swivel center support*
(Max. workpiece dia.: 80mm)
- 176-107:** Holder with clamp*
- 172-378:** V-block with clamp*
(Max. workpiece dia.: 25mm)
- 999678:** Fixture mount adapter

*Fixture mount adapter (999678) is required.



KA Counter

(Refer to page H-12 for more details.)
12AAF182: Counter stand



QM-Data200

2-D data processing unit.
(Refer to page J-26 for more details.)



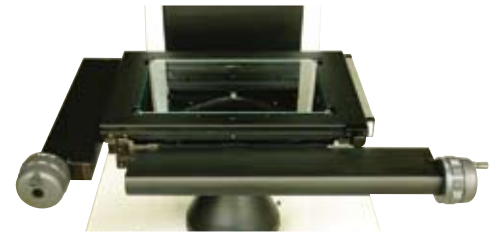
OPTOEYE-200

Edge detection system for QM-Data200
(Refer to page J-27 for more details.)

SPECIFICATIONS

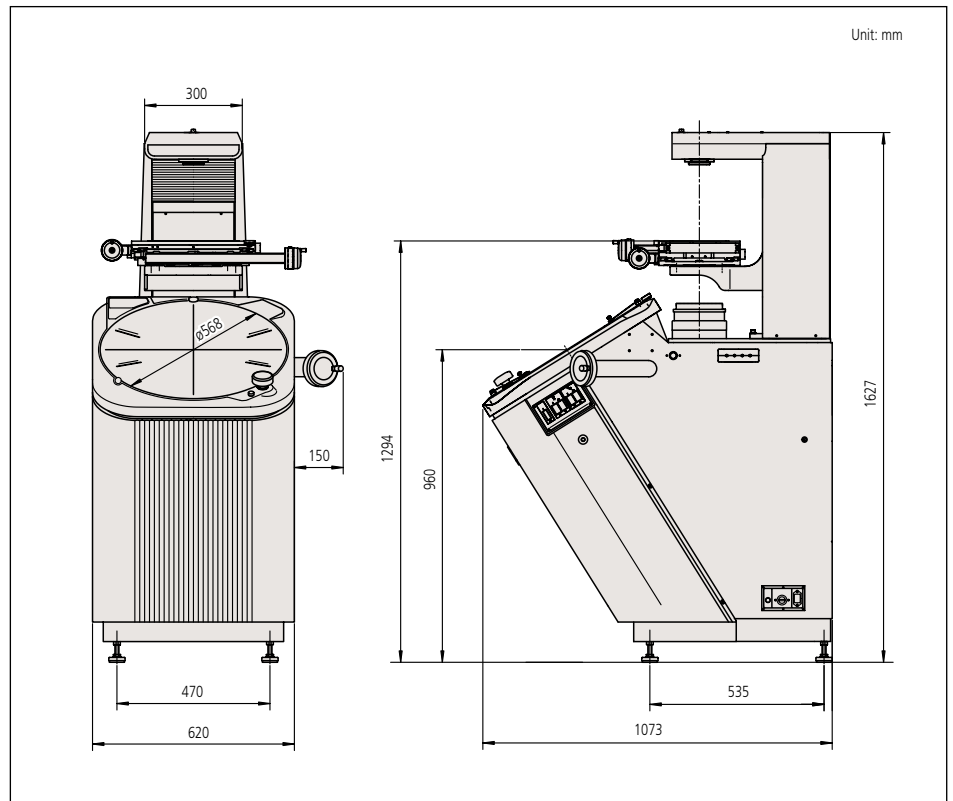
Model No.	PV-5110
Order No.	304-909*
XY stage travel range	200 x 100mm
Quick-release mechanism	X and Y axes
Measurement method	Linear encoder
XY stage table top size	380 x 250mm
XY stage effective area	266 x 170mm
Stage glass No.	382762
Swiveling function	±3°
Max stage loading	5kg
Remarks	—

* To denote your AC power cable add the following suffixes to the order No.:
A for UL/CSA, **C** for Taiwan, **D** for CEE, **DC** for CCC, **E** for BS, **K** for EK,
No suffix is required for JIS/100V



XY stage

DIMENSIONS



PV-600A

SERIES 305 — Profile Projector

FEATURES

- Floor-standing model using overhead illumination which allows a conveniently positioned screen so that projected images can be easily traced or compared with a template.
- Large diameter (600mm) screen for efficient inspection.
- The optional oblique surface illumination unit (**172-419**) provides clear and bright images, allowing easy inspection of non-reflection workpieces such as plastic parts or printed materials.

PV-600A with optional accessories (projection screen, projection lens, XY stage and counter)



Technical Data

Projected image: Inverted
 Projector screen (optional)

- Effective diameter: 600mm (23.6")
- Screen material: Fine-ground glass
- Screen rotation: $\pm 360^\circ$, fine feed and clamp
- Angle reading: Vernier (graduation: 1')
- Reference line: Cross-hairs

Projection lens (optional): 5X, 10X, 20X, 50X, 100X
 Magnification accuracy

- Contour illumination: $\pm 0.1\%$ or better
- Surface illumination: $\pm 0.15\%$ or better

Maximum workpiece height: Refer to the projection capacity (H) below.

Contour illumination (optional)

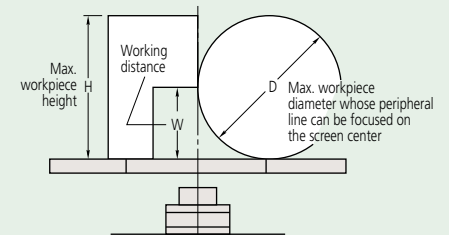
- Light source: Halogen bulb (24V, 150W)
- Optical system: Telecentric system
- Functions: 2-step (High/Low) brightness switch, Heat-absorbing filter, Cooling fan

Surface illumination (optional)

- Light source: Halogen bulb (24V, 150W)
- Optical system: Vertical illumination
- Functions: Adjustable condenser lens, Oblique illumination (5X, 10X, 20X), 2-step (High/Low) brightness switch, Heat-absorbing filter, Cooling fan

Focusing: Manual focus
 Resolution: 0.001mm or .0001"/0.001mm (using optional KA counter)
 Power supply: 100 - 240V AC, 50/60Hz
 Mass: 250kg

Projection Capacity



Unit: mm

	Magnification				
	5X	10X	20X	50X	100X
View field	120	60	30	12	6
W	37 (12)	37 (37)	37 (37)	—	—
H	140	182	257	76	76
D	74	74	74	—	—

(): When using surface illumination

Optional Accessories

- 319-225-1:** XY stage (travel range: 200 x 100mm)
172-308: Protractor screen
 (Effective diameter: 600mm)
172-371: 5X projection lens set
172-384: 10X projection lens set
172-385: 20X projection lens set
172-372: 50X projection lens set
172-373: 100X projection lens set
172-418: Surface illumination unit
 (Vertical illumination when using 50X, 100X magnifications)
172-330: Standard scale (80mm)
172-117: Standard scale (2")
172-329: Reading scale (600mm)
172-162: Reading scale (12")
172-160-2: Green filter
512305: Halogen bulb (24V, 150W)
172-319: Canopy

Fixture and Stage accessories (Refer to page J-15.)

- 172-198:** Rotary table with fine wheel*
 (Effective diameter: 96mm)
172-197: Swivel center support*
 (Max. workpiece dia.: 80mm)
176-107: Rotary table*
172-378: V-block with clamp*
 (Max. workpiece dia.: 25mm)
999678: Fixture mount adapter
 *Fixture mount adapter (999678) is required.



KA Counter
 (Refer to page H-12 for more details.)
12AAF182: Counter stand



QM-Data200
 2-D data processing unit.
 (Refer to page J-26 for more details.)

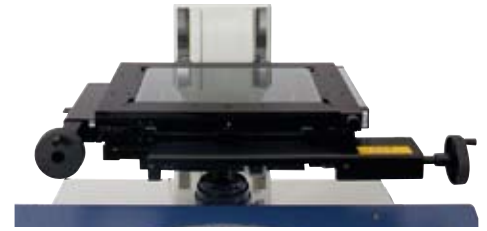


OPTOEYE-200
 Edge detection system for QM-Data200
 (Refer to page J-27 for more details.)

SPECIFICATIONS

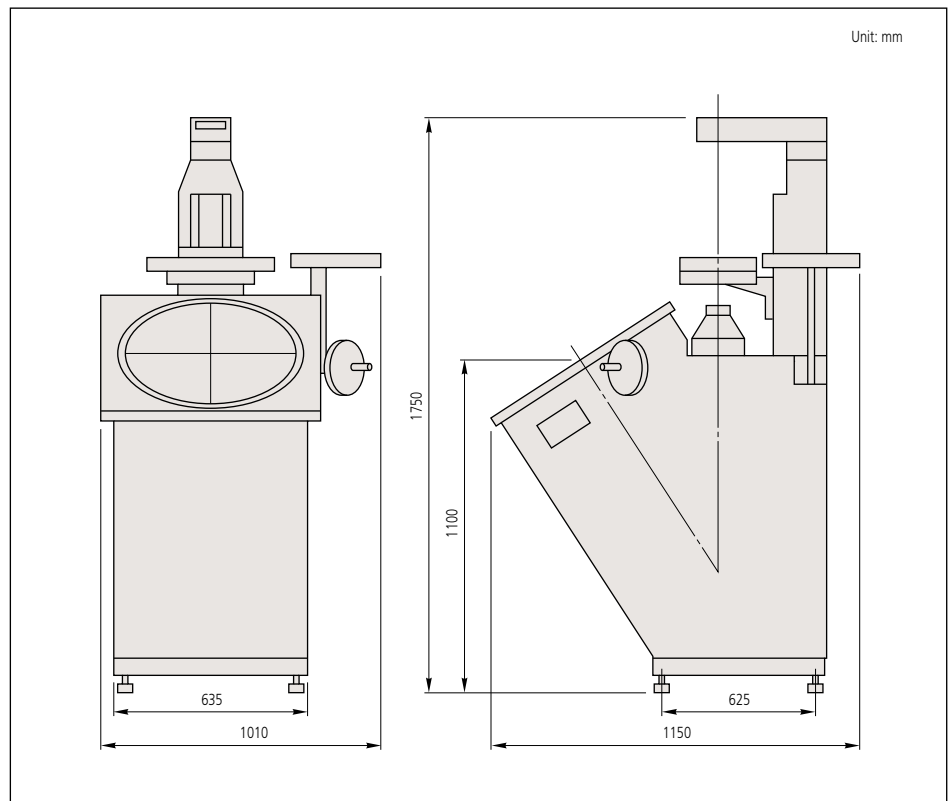
Model No.	PV-600A
Order No.	305-103*
XY stage (optional) travel range	200 x 100mm
Quick-release mechanism	X and Y axes
Measurement method	Linear encoder
XY stage table top size	380 x 250mm
XY stage effective area	266 x 170mm
Stage glass No.	382762
Swiveling function	±3°
Max stage loading	5kg
Remarks	—

* To denote your AC power cable add the following suffixes to the order No.: **A** for UL/CSA, **D** for CEE, **E** for BS, **No suffix** is required for JIS/100V
 (Note) **D** and **E** are not compatible with CE



Optional XY stage
No.: 319-225-1

DIMENSIONS



PH-3515F, PH-A14

SERIES 172 — Profile Projector

FEATURES

- Bench-top model that uses horizontal optical system.
- Suitable for thread pitch measurements—blurred or distorted images will not be produced when workpiece is angled.
- Erect image* on the day-bright screen (*inverted: PH-A14).
- 353mm (356mm: PH-A14) diameter protractor screen with cross-hairs and staggered lines for easy alignment.
- Digital angle measurement to 1' or 0.01° (PH-3515F).
- Heavy-duty workpiece table incorporates linear scales for fast, accurate measurement.



PH-3515F

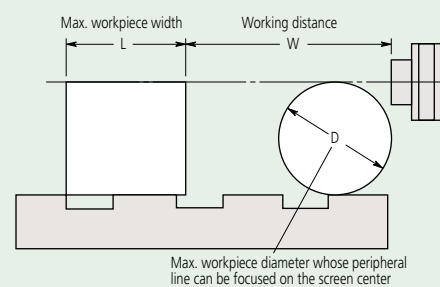


PH-A14

Technical Data

- Projected image: Erect (inverted: PH-A14)
 Protractor screen (optional)
- Effective diameter: 353 (13.9")mm 356mm (14")**
 - Screen material: Fine-ground glass
 - Screen rotation: $\pm 360^\circ$, fine feed and clamp
 - Angle reading: Digital counter (LED)*
 Resolution: 1' or 0.01° (switchable)
 Range: $\pm 370^\circ$
 ABS/INC mode switching, Zero Set
 [*Vernier (graduation: 1'): PH-A14]
- Reference line: Cross-hairs
 Projection lens: 10X [172-184 (172-011: PH-A14)]
 Optional: 5X, 20X, 50X, 100X (20X, 50X, 100X: PH-A14)
- Magnification accuracy
- Contour illumination: $\pm 0.1\%$ or better
 - Surface illumination: $\pm 0.15\%$ or better
- Maximum workpiece height: Refer to the projection capacity (H) below.
- Contour illumination
- Light source: Halogen bulb (24V, 150W)
 - Optical system: Telecentric system
 - Functions: 2-step (High/Low) brightness switch, (Lit together with main power activation: PH-A14)
 Heat-absorbing filter, Cooling fan
- Surface illumination
- Light source: Halogen bulb (24V, 200W) (24V 150W, common to the contour illumination: PH-A14)
 - Optical system: Vertical illumination
 - Functions: Adjustable condenser lens, Vertical/ blique surface illumination selectable (Lit together with main power activation: PH-A14)
 Heat-absorbing filter, Cooling fan
 Manual focus
- Focusing:
 Resolution: 0.001mm or .0001"/0.001mm (using optional KA counter)
- Power supply: 100 - 240V AC, 50/60Hz
 Mass: 150kg (140kg: PH-A14)
 **only for PH-A14

Projection Capacity



PH-3515F

Unit: mm

	Magnification				
	5X	10X	20X	50X	100X
View field	70.6	35.3	17.65	7.06	3.5
L	175	235	235	80	109
W	160 (64)	93 (35)	40	14.6	9.5
D	152.4	152.4	116	30.4	19

() : When using surface illumination

PH-A14

Unit: mm

	Magnification			
	10X	20X	50X	100X
View field	35.6	17.3	7.12	3.56
L	235	235	80	109
W	93	40	14.6	9.5
D	130	116	30.4	19

Optional Accessories

- 172-145:** 5X projection lens set*
- 172-173:** 20X projection lens set*
- 172-165:** 50X projection lens set*
- 172-166:** 100X projection lens set*
- 172-012:** 20X projection lens set**
- 172-013:** 50X projection lens set**
- 172-014:** 100X projection lens set**
- 172-133:** Vertical surface illumination unit*
- 172-116:** Standard scale (50mm)
- 172-117:** Standard scale (2")
- 172-118:** Reading scale (200mm)
- 172-161:** Reading scale (300mm)
- 172-119:** Reading scale (8")
- 172-162:** Reading scale (12")
- 932105:** Overlay chart set (12 sheets)
- 172-286:** Green filter
- 515530:** Halogen bulb (24V, 150W)*
- 512305:** Halogen bulb (24V, 150W)**
- 12BAA637:** Halogen bulb (24V, 200W)*

Fixture and Stage accessories (Refer to page J-15.)

- 172-142:** Center support
- 172-143:** Center support riser
- 172-144:** Rotary vise (Max. workpiece dia.: 60mm)
- 172-234:** V-block with clamp (Max. workpiece dia.: 50mm)
- 172-132:** Vertical holder
- 172-001:** Tipped-saw support stand
- 172-002:** Cutter support stand

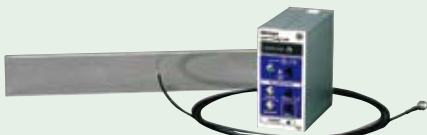
*only for PH-3515F
**only for PH-A14



KA Counter
(Refer to page H-12 for more details.)
12AAF182: Counter stand



QM-Data200
2-D data processing unit.
(Refer to page J-26 for more details.)



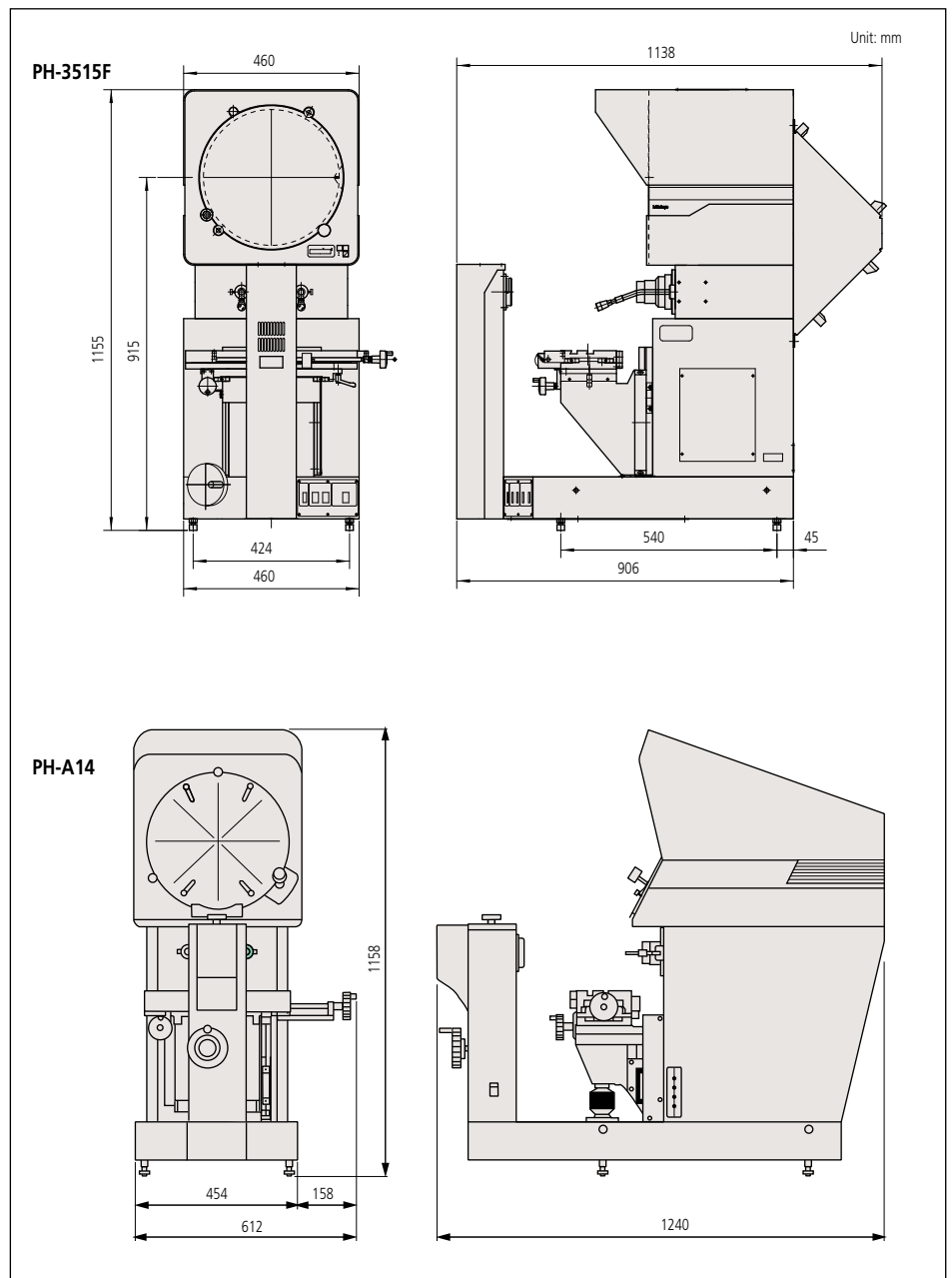
OPTOEYE-200
Edge detection system for QM-Data200
(Refer to page J-27 for more details.)

SPECIFICATIONS

Model No.	PH-3515F	PH-A14
Order No.	172-858*	172-810-10**
XY stage travel range	254 x 152mm	200 x 100mm
Measurement method	Linear encoder	Linear encoder
Quick-release mechanism	X axis	—
XY stage table top size	450 x 146mm	407 x 152.4mm
Swiveling function	±10°	—
Max stage loading	45kg	45kg
Remarks	—	—

* To denote your AC power cable add the following suffixes to the order No.: **A** for UL/CSA, **CE** for CEE, **CEE** for BS, **D** for CEE, **DC** for CCC, **E** for BS, **K** for EK, **No suffix** is required for JIS/100V.
(Note) **D** and **E** are not compatible with CE.
** To denote your AC power cable add the following suffixes to the order No.: **A** for UL/CSA, **D** for CEE, **DC** for CCC, **E** for BS, **K** for EK, **No suffix** is required for JIS/100V

DIMENSIONS



Accessories for Profile Projectors

SERIES 172 — Profile Projector

Standard Scales

- Used for checking magnification accuracy.



172-116

SPECIFICATIONS

Metric			
Graduation	Range	Order No.	Accuracy (20°C)*
0.1mm	50mm	172-116	(3+5L/1000)μm
0.1mm	80mm	172-330	(3+5L/1000)μm

Inch			
Graduation	Range	Order No.	Accuracy (20°C)
.01"	2"	172-117	.00013"

*L = Measured length (mm)

Reading Scales



172-161

172-118

- Specially designed for inspecting the magnified image of a standard scale on the projection screen.

SPECIFICATIONS

Metric			
Graduation	Range	Order No.	Accuracy (20°C)*
0.5mm	200mm	172-118	(15+15L/1000L)μm
0.5mm	300mm	172-161	(15+15L/1000L)μm
0.5mm	600mm	172-329	(15+15L/1000L)μm

Inch			
Graduation	Range	Order No.	Accuracy (20°C)*
.02"	8"	172-119	.00071"
.02"	2"	172-162	.00077"

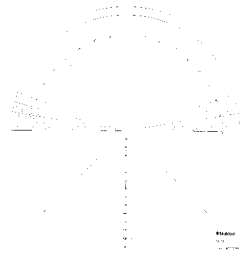
*L = Measured length (mm)

Overlay Chart Set

FEATURES

- Makes inspection of projected images an easy process.
- Twelve different patterns are available in the set.
- Designed for use with profile projectors whose screen diameter is 300mm or larger.

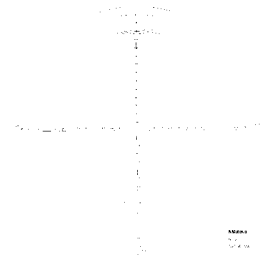
Overlay chart set (12 sheets)
Order No.: 932105



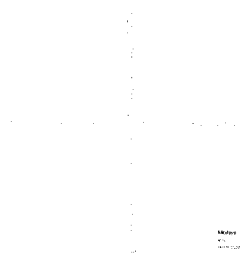
512066
Protractor (1°-grad. radial index) and radius (1mm-radius increment concentric semicircles)



512067
Radius (0.1cm-reading scales and 5mm-radius increment concentric circles)



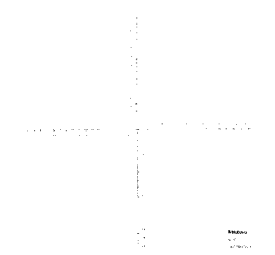
512068
Radius (1X, 10X, 20X, 50X)



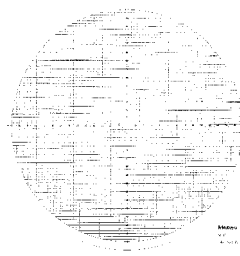
512069
1mm-reading scales (20X, 50X)



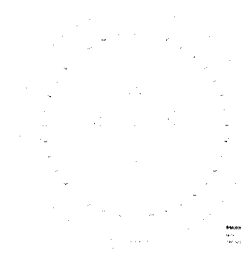
512070
10x10mm sections



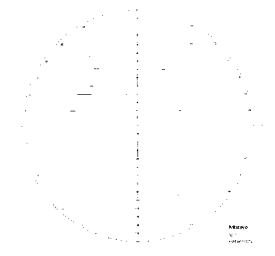
512071
0.5mm-reading scales



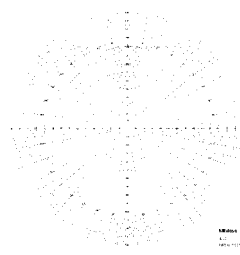
512072
1x1mm sections



512073
Protractor (1°-grad. diametral index)



512074
1mm-reading vertical scale



512075
Protractor (1°-grad. diametral index) and radius (1mm-radius increment concentric circles)



512076
Metric, Unified, and Whitworth screw threads (20X)



512077
Metric screw thread (100X) and 20° and 14.5° gear teeth (20X)

Micrometer Heads

for Profile Projectors and Toolmaker's Microscopes

Micrometer Heads for XY Stages

FEATURES

152-390, 152-389, 152-391, 152-392

- Non-rotating spindle device is provided.
- The thimble reading can be zero-set at any spindle position (floating sleeve).
- Black and red figures of the bidirectional graduation allow easy reading in both directions.
- Clamping stem diameter: 18mm

152-401, 152-402

- The adjustable sleeve can be rotated under the thimble clamped at any reading, allowing easy reference point setting.
- The spherical measuring face is carbide-tipped.
- Clamping stem diameter: 18mm



152-390

SPECIFICATIONS

Metric				
Graduation	Range	Order No.	Accuracy	Remarks
0.005mm	25mm	152-390	±2µm	for X-axis
0.005mm	25mm	152-389	±2µm	for Y-axis

Inch				
Graduation	Range	Order No.	Accuracy	Remarks
.0001"	1"	152-391	±.0001"	for X-axis
.0001"	1"	152-392	±.0001"	for Y-axis

SPECIFICATIONS

Metric				
Graduation	Range	Order No.	Accuracy	Remarks
0.001mm*	25mm	152-402	±2µm	for X-axis
0.001mm*	25mm	152-401	±2µm	for Y-axis

*Obtained by using vernier.

Digimatic Micrometer Heads

FEATURES

- Large LCD digits for error-free reading.
- The display rotates 330° for easy viewing.
- The spindle does not rotate.
- With SPC data output.



164-163

SPECIFICATIONS

Metric				
Resolution	Range	Order No.	Accuracy	
0.001mm	50mm	164-163	±3µm	

Inch/Metric				
Resolution	Range	Order No.	Accuracy	
.00005"/0.001mm	2" (50mm)	164-164	±.00015"	

Technical Data

Graduations: 0.005mm, 0.001mm* or .0001"

*vernier reading

Spindle pitch: 1mm

Spindle face: Flat (hardened) or spherical with carbide tip (more than HRA90), lapped surface

Scale surface: White anodized aluminum



Technical Data

Resolution: 0.001mm or .00005"/0.001mm

Display: LCD

Battery: SR44 (2 pcs.), **938882**

Battery life: Approx. 1.8 years in normal use

Function

Zero-setting, Data hold, Data output, Preset, inch/mm conversion (inch/mm models)

Alarm: Low voltage, Counting value composition error

Optional Accessories

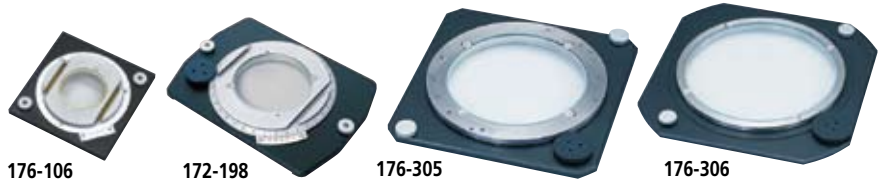
959149: SPC cable (1m)

959150: SPC cable (2m)

Workpiece Fixtures

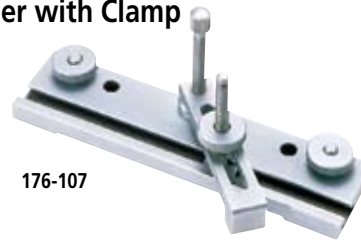
for Profile Projectors and Measuring Microscopes

Rotary Tables



Order No.	176-106	172-198	176-305	176-306
Effective glass dia.	66mm	96mm	182mm	238mm
Angular resolution	6°	2°	—	—
Fine feed	—	Available	Available	Available
Mass	1.7kg	2.4kg	5.5kg	6.5kg

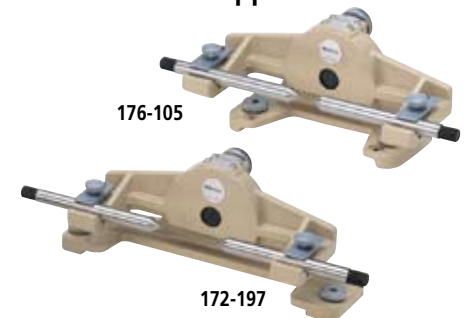
Holder with Clamp



176-107

Order No.	176-107
Max. workpiece height	35mm
Mass	0.42kg

Swivel Center Supports



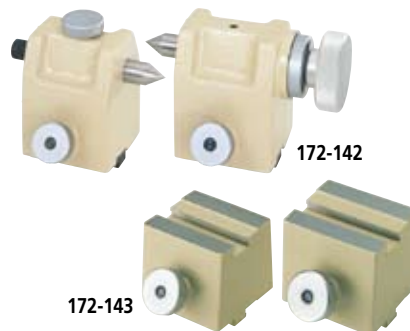
176-105

172-197

Order No.	176-105	172-197
Max. workpiece dia.	70mm (45mm)*	80mm(65mm)*
Max. workpiece length	140mm	140mm
Swivel range	±10°	±10°
Mass	2.4kg	2.5kg

*When swiveled 10°

Center Support



172-142

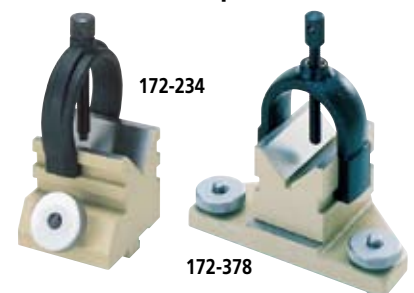
172-143

SPECIFICATIONS

Order No.	172-142
Max. workpiece height	120mm (240mm)*
Mass	3.3kg

*When using a center support riser (172-143)

V-Block with Clamp



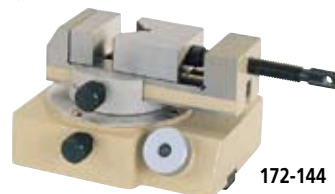
172-234

172-378

SPECIFICATIONS

Order No.	172-234	172-378
Max. workpiece dia.	50mm	25mm
Width of block	60mm	41mm
Mass	1.24kg	0.8kg

Rotary Vise

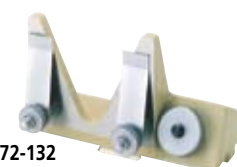


172-144

SPECIFICATIONS

Order No.	172-144
Rotation range	360°
Max. workpiece height	60mm
Width of jaws	40mm
Angle graduations	5°
Mass	2.8kg

Vertical Holder



172-132

SPECIFICATIONS

Order No.	172-132
Mass	1.3kg