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PJ-A3000
SERIES 302 — Vertical Profile Projectors

FEATURES
• The PJ-A3000 Series vertical profile projectors are medium-size 11.8” (300mm) models that feature high 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.

Projection Capacity

<table>
<thead>
<tr>
<th>Magnification</th>
<th>10X</th>
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<th>50X</th>
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<td>92.5</td>
<td>92.5</td>
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<tr>
<td>D1 -50 models*</td>
<td>224 (198)</td>
<td>87 (61)</td>
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<td>154 (120)</td>
<td>69 (23)</td>
<td>25</td>
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*: When using surface illumination
### Optional Accessories

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>172-202</td>
<td>10X projection lens set (Standard accessory)</td>
</tr>
<tr>
<td>172-203</td>
<td>20X projection lens set</td>
</tr>
<tr>
<td>172-223</td>
<td>100X projection lens</td>
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<tr>
<td>172-224</td>
<td>20X projection lens</td>
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<tr>
<td>172-204</td>
<td>50X projection lens</td>
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<tr>
<td>172-207</td>
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### DIMENSIONS

<table>
<thead>
<tr>
<th>Code</th>
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<tbody>
<tr>
<td>332-151</td>
<td>Optoeeye</td>
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<tr>
<td>12AAE57</td>
<td>Deflector Attachment</td>
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### SPECIFICATIONS

<table>
<thead>
<tr>
<th>Model</th>
<th>PJ-A3010F-200</th>
<th>PJ-A3005F-150</th>
<th>PJ-A3010F-100</th>
<th>PJ-A3005D-50</th>
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<tbody>
<tr>
<td>Order No.</td>
<td>302-701A</td>
<td>302-702A</td>
<td>302-703A</td>
<td>302-704A</td>
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<tr>
<td>Projected image</td>
<td>Inverted image</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Protractor screen</td>
<td>Effective diameter</td>
<td>12.4&quot; / 315mm</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Screen material</td>
<td>Fine ground glass</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Reference line</td>
<td>Cross hair line</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Angle display (LED)</td>
<td>Resolution: 1° or 0.01° (switchable), Range: ±360°</td>
<td>Functions: Absolute/Incremental mode switching, Zero Set</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Magnification accuracy</td>
<td>Contour illumination</td>
<td>±0.1% or less</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Surface illumination</td>
<td>±0.15% or less</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Contour illumination</td>
<td>Light source</td>
<td>Halogen bulb (24V, 150W)</td>
<td>Optical system</td>
<td>Telecentric system</td>
</tr>
<tr>
<td></td>
<td>Functions</td>
<td>2-stage brightness switch, Heat-absorbing filter</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Surface illumination</td>
<td>Halogen bulb (24V, 150W)</td>
<td>Optical system</td>
<td>Vertical illumination with a half-reflection mirror</td>
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<tr>
<td></td>
<td>XY range</td>
<td>8&quot; x 4&quot; (200 x 100mm)</td>
<td>6&quot; x 2&quot; (150 x 50mm)</td>
<td>4&quot; x 4&quot; (100 x 100mm)</td>
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<tr>
<td></td>
<td>Resolution</td>
<td>.0001&quot; / .0001mm</td>
<td>.0001&quot; / .001mm</td>
<td>.0001&quot; / .001mm</td>
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<tr>
<td></td>
<td>Measuring Unit</td>
<td>Built-in linear scales</td>
<td>Built-in linear scales</td>
<td>Built-in linear scales</td>
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<tr>
<td></td>
<td>Table size</td>
<td>14.96 x .84&quot; (380 x 250mm)</td>
<td>11.02 x .98&quot; (280 x 152mm)</td>
<td>9.84 x .84&quot; (250 x 250mm)</td>
</tr>
<tr>
<td></td>
<td>Effective table area</td>
<td>10.47 x 6.69&quot; (266 x 170mm)</td>
<td>7.24 x 3.23&quot; (184 x 82mm)</td>
<td>5.6 x 3.6&quot; (142 x 142mm)</td>
</tr>
<tr>
<td></td>
<td>Max. workpiece height</td>
<td>3.64&quot; (92.5mm)</td>
<td>4.07&quot; (103.5mm)</td>
<td>3.58&quot; (91mm)</td>
</tr>
<tr>
<td></td>
<td>Functions</td>
<td>± direction switching, SPC output, Zero-setting</td>
<td>± direction switching, SPC output, Zero-setting</td>
<td>± direction switching, SPC output, Zero-setting</td>
</tr>
<tr>
<td>Power supply</td>
<td>120V AC, 50/60Hz</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mass</td>
<td>308 lbs. (140kg)</td>
<td>255 lbs. (116kg)</td>
<td>246 lbs. (112kg)</td>
<td>235 lbs. (107kg)</td>
</tr>
<tr>
<td>Standard accessories</td>
<td>10X projection lens set, masking shield, power cord,</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>halogen bulb, fuse, grounding wire, allen wrench, vinyl cover</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
PJ-H30
SERIES 303 — High-Accuracy Profile Projectors

By separating axial motion, and stabilizing the XY measuring table in the vertical direction, high measuring accuracy of (3+0.02L)µm 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. The power focusing (PJ-H30D type) provides higher performance.

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

Switchable surface illumination: vertical or oblique
Vertical illumination
Oblique illumination

PJ-H30A3017B
XY stage travel range: 12x7” / 300x170mm

Projection Capacity

<table>
<thead>
<tr>
<th>Magnification</th>
<th>5X</th>
<th>10X</th>
<th>20X</th>
<th>50X</th>
<th>100X</th>
</tr>
</thead>
<tbody>
<tr>
<td>View field</td>
<td>ø6.1</td>
<td>ø30.6</td>
<td>ø15.3</td>
<td>ø6.12</td>
<td>ø3.06</td>
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<tr>
<td>H</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td>100</td>
</tr>
<tr>
<td>W</td>
<td>66</td>
<td>70.5</td>
<td>56.5</td>
<td>50</td>
<td>50</td>
</tr>
<tr>
<td>D</td>
<td>148</td>
<td>197</td>
<td>137</td>
<td>114</td>
<td>114</td>
</tr>
</tbody>
</table>

Unit: mm
**Optional Accessories**

172-271: 5X projection lens
172-472: 10X projection lens (standard accessory)
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”)
172-269: Machine stand
176-107: Swivel center support (Max. workpiece dia.: 3.1” / 80mm)
176-105: Swivel center support (Max. workpiece dia.: 2.8” / 70mm)
176-306: Rotary table (Effective diameter: 9.4” / 240mm)
176-305: Rotary table (Effective diameter: 7.2” / 183mm)
172-378: Rotary table (Effective diameter: 4” / 100mm)
172-385: 5X projection lens
172-384: 20X projection lens
172-383: 10X projection lens (standard accessory)
332-151: Optoeye
12AAE671: Detector Attachment

**Fixture and Stage Accessories**

172-317: Fixture mount adapter C
176-304: Fixture mount adapter A
512305: Halogen bulb (24V, 150W) (standard accessory)
12AAG981: Green filter
176-105: Swivel center support (Max. workpiece dia.: 3.1” / 80mm)
176-107: Holder with clamp
172-378: V-block with clamp (Max. workpiece dia.: 1” / 25mm)

**Availability Models**

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
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<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>PJ-H30A1010B</td>
<td>303-712-1A</td>
<td>PJ-H30A2010B</td>
<td>303-713-1A</td>
<td>PJ-H30A2017B</td>
<td>303-714-1A</td>
<td>PJ-H30A3017B</td>
<td>303-715-1A</td>
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<tr>
<td>PJ-H30B1010B</td>
<td>303-732-1A</td>
<td>PJ-H30B2010B</td>
<td>303-733-1A</td>
<td>PJ-H30B2017B</td>
<td>303-734-1A</td>
<td>PJ-H30B3017B</td>
<td>303-735-1A</td>
</tr>
</tbody>
</table>

**Dimensions**

- **Model No.** 303-712-1A
- **Effective table area** 4 x 4”
- **Max. workpiece load** 22lbs / 10kg
- **Power supply** 20/30V, 45/60Hz
- **Mass** 391lbs / 176kg

**Standard accessories**

- 10X projection lens set, masking shield, power cord, halogen bulb, tube fuse, grounding wire, allen wrench, vinyl cover.

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**Detector Attachment**

- Edge detection system for QM-Data200 (Refer to page I-23 for more details.)

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**Optional Accessories**

- Stand-mount type
- Arm-mount type

**Availability**

- 172-198: Rotary table (Effective diameter: 4” / 100mm)
- 176-305: Rotary table (Effective diameter: 7.2” / 183mm)
- 176-306: Rotary table (Effective diameter: 9.4” / 240mm)
- 172-107: Holder with clamp
- 172-378: V-block with clamp (Max. workpiece dia.: 1” / 25mm)
- 176-317: Fixture mount adapter C
- 176-304: Fixture mount adapter A

**Optoeye**

- Detector Attachment

**QM-Data200**

- Stand-mount type
- Arm-mount type
- 2-D data processing unit.
PV-5110
SERIES 304 — Profile Projectors

FEATURES
• Large 500mm screen
• Floor model uses a downward illumination system.
• Digital readout protractor screen (including zero-setting, ABS/INC coordinate switching functions) for easy and error-free angle measurement.
• Angled screen allows projected images to be easily traced or compared with a template.
• The oblique surface illumination system provides clear and bright images, allowing easy inspection of non-reflective workpieces such as plastic parts or printed materials.

Projection Capacity

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

( ): When using surface illumination
**Optional Accessories**

- 172-401: 5X projection lens set
- 172-406: 5X projection lens
- 172-402: 10X projection lens set (standard accessory)
- 172-409: 10X projection lens
- 172-403: 20X projection lens set
- 172-411: 20X projection lens
- 172-404: 50X projection lens set
- 172-413: 50X projection lens
- 172-405: 100X projection lens set
- 172-415: 100X projection lens
- 172-407: 5X projection lens
- 172-408: 10X projection lens set (standard accessory)
- 172-410: 10X projection lens
- 172-412: 20X projection lens set
- 172-414: 20X projection lens
- 172-416: 50X projection lens
- 172-417: 50X projection lens
- 172-418: 100X projection lens set
- 172-419: 100X projection lens
- 172-420: Surface illumination unit (standard accessory)

**Fixture and Stage Accessories**

- 172-196: Rotary table* (Effective diameter: 4" / 100mm)
- 172-197: Rotary table with fine feed wheel* (Effective diameter: 4" / 100mm)
- 172-107: Holder with clamp*
- 172-378: V-block with clamp* (Max. workpiece dia. 1" / 25mm)

*Fixture mount adapter (999678) is required.

**KM Counter**

Optional Accessories

- 172-401: 5X projection lens set
- 172-406: 5X projection lens
- 172-402: 10X projection lens set (standard accessory)
- 172-409: 10X projection lens
- 172-403: 20X projection lens set
- 172-411: 20X projection lens
- 172-404: 50X projection lens set
- 172-413: 50X projection lens
- 172-405: 100X projection lens set
- 172-415: 100X projection lens
- 172-407: 5X projection lens
- 172-408: 10X projection lens set (standard accessory)
- 172-410: 10X projection lens
- 172-412: 20X projection lens set
- 172-414: 20X projection lens
- 172-416: 50X projection lens
- 172-417: 50X projection lens
- 172-418: 100X projection lens set
- 172-419: 100X projection lens
- 172-420: Surface illumination unit (standard accessory)

**Fixture and Stage Accessories**

- 172-196: Rotary table* (Effective diameter: 4" / 100mm)
- 172-197: Rotary table with fine feed wheel* (Effective diameter: 4" / 100mm)
- 172-107: Holder with clamp*
- 172-378: V-block with clamp* (Max. workpiece dia. 1" / 25mm)

*Fixture mount adapter (999678) is required.

**KM Counter**

- 172-196: Rotary table
- 172-197: Rotary table with fine feed wheel
- 172-198: Rotary table with fine feed wheel
- 172-199: Rotary table
- 172-107: Holder with clamp
- 172-378: V-block with clamp

**Optional Accessories**

- 172-401: 5X projection lens set
- 172-406: 5X projection lens
- 172-402: 10X projection lens set (standard accessory)
- 172-409: 10X projection lens
- 172-403: 20X projection lens set
- 172-411: 20X projection lens
- 172-404: 50X projection lens set
- 172-413: 50X projection lens
- 172-405: 100X projection lens set
- 172-415: 100X projection lens
- 172-407: 5X projection lens
- 172-408: 10X projection lens set (standard accessory)
- 172-410: 10X projection lens
- 172-412: 20X projection lens set
- 172-414: 20X projection lens
- 172-416: 50X projection lens
- 172-417: 50X projection lens
- 172-418: 100X projection lens set
- 172-419: 100X projection lens
- 172-420: Surface illumination unit (standard accessory)

**Fixture and Stage Accessories**

- 172-196: Rotary table* (Effective diameter: 4" / 100mm)
- 172-197: Rotary table with fine feed wheel* (Effective diameter: 4" / 100mm)
- 172-107: Holder with clamp*
- 172-378: V-block with clamp* (Max. workpiece dia. 1" / 25mm)

*Fixture mount adapter (999678) is required.

**QM-Data200**

- 264-155A: Stand-mount type
- 264-156A: Arm-mount type

**Optoeeye**

- 332-151: Optoeeye
- 12AA672: Detector Attachment (B)

**Specifications**

<table>
<thead>
<tr>
<th>Model No.</th>
<th>PV-5110</th>
</tr>
</thead>
<tbody>
<tr>
<td>Order No.</td>
<td>304-919A</td>
</tr>
</tbody>
</table>

**Projected image**

- Effective diameter: 20" / 508mm

**Protractor screen**

- Screen material: Fine ground glass
- Reference line: Cross hair line
- Screen rotation: ±360°, fine feed and clamp
- Angle display (LED): Resolution: 1° or 0.01° (switchable), Range: ±370°, Functions: Absolute/incremental mode switching, Zero set

**Projection lens**

- Standard accessory: 10X (172-472), Optional accessories: 5X, 20X, 50X, 100X

**Magnification accuracy**

- Contour illumination: ±0.1% or less
- Surface illumination: ±0.15% or less

**Contour illumination**

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

**XY Range**

- Resolution: 0.001" / 0.001mm
- Measuring unit: Built-in Linear scale
- Table size: 15 x 9.8" / 380 x 250mm
- Effective table area: 10.5 x 6.7" / 266 x 170mm
- Max. workpiece height
- Max. workpiece load: 11lbs / 5kg

**Power supply**

- 120V AC, 50/60Hz

**Mass**

- 467lbs / 210kg

**Standard accessories**

- 200x100mm (8" x 4") stage, 10X projection lens set, Surface illumination unit, Counter stand for KA counter, power cord, halogen bulb, fuse, grounding wire, Allen wrench, vinyl cover

* Counter not included

**Dimensions**

<table>
<thead>
<tr>
<th>Unit: mm</th>
</tr>
</thead>
<tbody>
<tr>
<td>300 (11.8&quot;)</td>
</tr>
<tr>
<td>470 (18.5&quot;)</td>
</tr>
<tr>
<td>620 (24.4&quot;)</td>
</tr>
<tr>
<td>1627 (64&quot;)</td>
</tr>
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**QM-Data200**

- 264-155A: Stand-mount type
- 264-156A: Arm-mount type

**Optoeeye**

- 332-151: Optoeeye
- 12AA672: Detector Attachment (B)
PH-A14
SERIES 172 — Profile Projector

FEATURES
• Benchtop model uses a horizontal optical system.
• Suitable for thread pitch measurements—blurred or distorted images will not be produced when workpiece is angled.
• Inverted image on the day-bright screen.
• 14” (356mm) diameter vernier protractor screen with solid line cross-hairs for easy alignment.
• Heavy-duty workpiece table incorporates linear scales for fast, accurate measurement.

Projection Capacity

Max. workpiece width
Max. workpiece diameter whose edge line can be focused on the screen center

PH-A14

<table>
<thead>
<tr>
<th>Magnification</th>
<th>Unit: mm</th>
</tr>
</thead>
<tbody>
<tr>
<td>10X</td>
<td>20X</td>
</tr>
<tr>
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</tr>
<tr>
<td>L</td>
<td>235</td>
</tr>
<tr>
<td>W</td>
<td>93</td>
</tr>
<tr>
<td>D</td>
<td>105</td>
</tr>
</tbody>
</table>
Optional Accessories
172-011: 10X projection lens (standard accessory)
172-012: 20X projection lens
172-013: 50X projection lens set
172-014: 100X projection lens set
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")
172-286: Green filter
512305: Halogen bulb (24V, 150W) (standard accessory)

Fixture and Stage Accessories
172-142: Center support
172-143: Center support riser
172-144: Rotary vise
(Max. workpiece dia.: 2.4" / 60mm)
172-234: V-block with clamp
(Max. workpiece dia.: 2" / 50mm)
172-132: Vertical holder
64AAA129B: Machine stand 23"W x 45"D x 20"H

Fixture:
PH-A14
KA Counter (174-183A)
(Refer to page H-7 for more details.)
64AAB149: Counter stand

QM-Data200
2-D data processing unit.
264-155A: Stand mount type
264-156A: Arm mount type
(Refer to page I-23 for more details.)

332-151: Optoeeye
Edge detection system for QM-Data 200
12AAE671: Detector attachment (A)

SPECIFICATIONS

<table>
<thead>
<tr>
<th>Model No.</th>
<th>PH-A14</th>
</tr>
</thead>
<tbody>
<tr>
<td>Order No.</td>
<td>172-810-10A</td>
</tr>
<tr>
<td>Projected image</td>
<td>Effective diameter: 14&quot; / 356mm</td>
</tr>
<tr>
<td>Protractor screen</td>
<td>Inverted image</td>
</tr>
<tr>
<td>Screen material</td>
<td>Fine ground glass</td>
</tr>
<tr>
<td>Reference line</td>
<td>Cross hair line</td>
</tr>
<tr>
<td>Screen rotation</td>
<td>±360°, fine feed and clamp</td>
</tr>
<tr>
<td>Angle display</td>
<td>Vernier reading, Resolution: 2'</td>
</tr>
<tr>
<td>Projection lens</td>
<td>Standard accessory: 10X (172-011), Optional accessories: 20X, 50X, 100X</td>
</tr>
</tbody>
</table>

Magnification accuracy
- Contour illumination: ±0.1% or less
- Surface illumination: ±0.15% or less

Contour illumination
- Light source: Halogen bulb (24V 150W)
- Optical system: Telecentric system

Surface illumination
- Light source: Halogen bulb (24V 150W)
- Optical system: Twin fiber optic illumination

XY Stage
- Table travel (X-axis): 8" / 203.2mm
- Table size (X, Z): 16 x 6" / 407 x 153mm
- Vertical travel (Y-axis): 4" / 101.6mm
- Resolution: .00005" / 0.001mm
- Measuring unit: Built in Linear scale
- Max. workpiece width: See (L) on page I-12
- Max. workpiece load: 100lbs / 45kg

Power supply
- 120V AC, 50/60Hz
- Mass: 308lbs / 140kg

Standard accessories
- 10X projection lens set, work stage, power cord, halogen bulb, fuse, grounding wire, allen wrench

*Counter not included

DIMENSIONS

[Dimension diagram of PH-A14]

Unit: mm
PH-3515F
SERIES 172 — Profile Projector

FEATURES
• Benchtop model uses a 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.
• Standard twin fiber-optic illumination.
• 14" (353mm) diameter protractor screen with cross-hairs and staggered lines for easy alignment.
• Digital angle measurement to 1° or 0.01°.
• Heavy-duty workpiece table incorporates linear scales for fast, accurate measurement.
• Built-in linear scales for use with optional display counters.

PH-3515F

Projection Capacity

Max. workpiece width

Max. workpiece diameter whose edge line can be focused on the screen center

PH-3515F

<table>
<thead>
<tr>
<th>Magnification</th>
<th>5X</th>
<th>10X</th>
<th>20X</th>
<th>50X</th>
<th>100X</th>
</tr>
</thead>
<tbody>
<tr>
<td>View field</td>
<td>70.6</td>
<td>35.3</td>
<td>17.65</td>
<td>7.06</td>
<td>3.5</td>
</tr>
<tr>
<td>L</td>
<td>175</td>
<td>235</td>
<td>235</td>
<td>80</td>
<td>109</td>
</tr>
<tr>
<td>W</td>
<td>160 (64)</td>
<td>95 (35)</td>
<td>40</td>
<td>14.6</td>
<td>9.5</td>
</tr>
<tr>
<td>D</td>
<td>152.4</td>
<td>152.4</td>
<td>116</td>
<td>30.4</td>
<td>19</td>
</tr>
</tbody>
</table>

( ): When using surface illumination
**Optional Accessories**

172-145: 5X projection lens set
172-175: 5X projection lens
172-184: 10X projection lens set (standard accessory)
172-011: 10X projection lens
172-117: Standard scale (50mm)
172-118: Reading scale (200mm)
172-161: Reading scale (300mm)
172-119: Reading scale (8")
172-162: Reading scale (12")
172-286: Green filter
512305: Halogen bulb (24V, 150W) (standard accessory)
172-423: Twin surface illumination
12BAA653: Fiber optic illumination cable (standard accessory)
12BAA637: Halogen reflector lamp (standard accessory)
64AAB176: Machine stand
383228: Vinyl cover (standard accessory)

**Fixture and Stage Accessories**

172-142: Center support
172-143: Center support riser
172-144: Rotary vise (Max. workpiece dia.: 2.3" / 60mm)
172-234: V-block with clamp (Max. workpiece dia.: 2" / 50mm)
172-132: Vertical holder
172-001: Tipped-saw support stand
172-002: Cutter support stand
*See page I-13 for details

**KA Counter (174-183A)**
(Refer to page H-7 for more details.)
64AAB149: Counter stand

**QDM-Data200**
2-D data processing unit.
264-155A: Stand mount type
264-156A: Arm mount type
(Refer to page I-23 for more details.)

**332-151: Optoeye**
Edge detection system for QM-Data200
12AAE671: Detector attachment (A)

---

**SPECIFICATIONS**

<table>
<thead>
<tr>
<th>Model No.</th>
<th>PH-3515F</th>
</tr>
</thead>
<tbody>
<tr>
<td>Order No.</td>
<td>172-868A</td>
</tr>
<tr>
<td>Projected image</td>
<td>Erect image</td>
</tr>
<tr>
<td>Protractor screen</td>
<td>Effective diameter 14&quot; / 353mm</td>
</tr>
<tr>
<td>Screen material</td>
<td>Fine ground glass</td>
</tr>
<tr>
<td>Reference line</td>
<td>Cross hair line</td>
</tr>
<tr>
<td>Screen rotation</td>
<td>±360°, fine feed and clamp</td>
</tr>
<tr>
<td>Angle display (LED)</td>
<td>Resolution: 1° or 0.01° (switchable), Range: ±370°, Functions: Absolute/incremental mode switching, Zero set</td>
</tr>
<tr>
<td>Projection lens</td>
<td>Standard accessory: 10X (172-184), Optional accessories: 5X, 20X, 50X, 100X</td>
</tr>
<tr>
<td>Magnification accuracy</td>
<td>Contour illumination ±0.1% or less</td>
</tr>
<tr>
<td>Surface illumination</td>
<td>±0.15% or less</td>
</tr>
<tr>
<td>Contour illumination</td>
<td>Light source Halogen bulb (24V 150W)</td>
</tr>
<tr>
<td>Optical system</td>
<td>Telecentric system</td>
</tr>
<tr>
<td>Functions</td>
<td>2-step brightness switch, Heat-absorbing filter, Cooling fan</td>
</tr>
<tr>
<td>Surface illumination (Optional accessories)</td>
<td>Light source Halogen bulb (24V 150W)</td>
</tr>
<tr>
<td>Functions</td>
<td>Adjustable condenser lens, Heat-absorbing filter, Cooling fan</td>
</tr>
<tr>
<td>XY Stage</td>
<td>Table travel (X-axis) 10° / 254mm</td>
</tr>
<tr>
<td>Table size (X, Z)</td>
<td>17.7&quot; x 5.7&quot; / 450x146mm</td>
</tr>
<tr>
<td>Vertical travel (Y-axis)</td>
<td>6&quot; / 152mm</td>
</tr>
<tr>
<td>Resolution</td>
<td>0.001mm/0.0005&quot;*</td>
</tr>
<tr>
<td>Measuring Unit</td>
<td>Built-in Linear scale</td>
</tr>
<tr>
<td>Max. workpiece width</td>
<td>See (L) on page I-10</td>
</tr>
<tr>
<td>Max. workpiece load</td>
<td>100lbs / 45kg</td>
</tr>
<tr>
<td>Power supply</td>
<td>120V AC, 50/60Hz</td>
</tr>
<tr>
<td>Mass</td>
<td>333lbs / 150kg</td>
</tr>
<tr>
<td>Standard accessories</td>
<td>10X projection lens set, work stage, power cord, halogen bulb, tube fuse, grounding wire, allen wrench, Vinyl cover</td>
</tr>
</tbody>
</table>

* Counter not included

---

**DIMENSIONS**
Accessories for Profile Projectors

**SERIES 172 — Profile Projector**

### Standard Scales

- Used for checking magnification accuracy.

#### SPECIFICATIONS

<table>
<thead>
<tr>
<th>Metric</th>
<th>Graduation</th>
<th>Range</th>
<th>Order No.</th>
<th>Accuracy (20°C)*</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>0.1mm</td>
<td>50mm</td>
<td>172-116</td>
<td>(3+5L/1000)µm</td>
</tr>
<tr>
<td></td>
<td>0.1mm</td>
<td>80mm</td>
<td>172-150</td>
<td>(3+5L/1000)µm</td>
</tr>
</tbody>
</table>

\*L = Measured length (mm)

### Reading Scales

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

#### SPECIFICATIONS

<table>
<thead>
<tr>
<th>Metric</th>
<th>Graduation</th>
<th>Range</th>
<th>Order No.</th>
<th>Accuracy</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>0.5mm</td>
<td>200mm</td>
<td>172-118</td>
<td>18µm (15+15L/1000)µm</td>
</tr>
<tr>
<td></td>
<td>0.5mm</td>
<td>300mm</td>
<td>172-161</td>
<td>19.5µm (15+15L/1000)µm</td>
</tr>
<tr>
<td></td>
<td>0.5mm</td>
<td>600mm</td>
<td>172-329</td>
<td>24µm (15+15L/1000)µm</td>
</tr>
</tbody>
</table>

Inch

<table>
<thead>
<tr>
<th>Graduation</th>
<th>Range</th>
<th>Order No.</th>
<th>Accuracy</th>
</tr>
</thead>
<tbody>
<tr>
<td>.02&quot;</td>
<td>8&quot;</td>
<td>172-119</td>
<td>.00071&quot;</td>
</tr>
<tr>
<td>.02&quot;</td>
<td>12&quot;</td>
<td>172-162</td>
<td>.00077&quot;</td>
</tr>
</tbody>
</table>

#### Micrometer Heads for Profile Projectors and Toolmakers’ Microscopes

### Micrometer Heads for XY Stage

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

#### SPECIFICATIONS

<table>
<thead>
<tr>
<th>Metric</th>
<th>Graduation</th>
<th>Range</th>
<th>Order No.</th>
<th>Accuracy</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>0.005mm</td>
<td>25mm</td>
<td>152-390</td>
<td>±2µm for X-axis</td>
</tr>
<tr>
<td></td>
<td>0.005mm</td>
<td>25mm</td>
<td>152-389</td>
<td>±2µm for Y-axis</td>
</tr>
</tbody>
</table>

Inch

<table>
<thead>
<tr>
<th>Graduation</th>
<th>Range</th>
<th>Order No.</th>
<th>Accuracy</th>
</tr>
</thead>
<tbody>
<tr>
<td>.0001&quot;</td>
<td>1&quot;</td>
<td>152-391</td>
<td>±.0001&quot; for X-axis</td>
</tr>
<tr>
<td>.0001&quot;</td>
<td>1&quot;</td>
<td>152-392</td>
<td>±.0001&quot; for Y-axis</td>
</tr>
</tbody>
</table>

### Adjustable Micrometer Heads for XY Stages

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

#### SPECIFICATIONS

<table>
<thead>
<tr>
<th>Metric</th>
<th>Graduation</th>
<th>Range</th>
<th>Order No.</th>
<th>Accuracy</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>0.001mm*</td>
<td>25mm</td>
<td>152-402</td>
<td>±2µm for X-axis</td>
</tr>
<tr>
<td></td>
<td>0.001mm*</td>
<td>25mm</td>
<td>152-401</td>
<td>±2µm for Y-axis</td>
</tr>
</tbody>
</table>

\*Obtained 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.

#### SPECIFICATIONS

<table>
<thead>
<tr>
<th>Resolution</th>
<th>Range</th>
<th>Order No.</th>
<th>Accuracy</th>
</tr>
</thead>
<tbody>
<tr>
<td>.00005&quot;/.001mm</td>
<td>2&quot; (50mm)</td>
<td>164-164</td>
<td>±.00015&quot;</td>
</tr>
</tbody>
</table>

**Optional Accessories**

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>959149</td>
<td>SPC cable for series 164 (1m)</td>
</tr>
<tr>
<td>959150</td>
<td>SPC cable for series 164 (2m)</td>
</tr>
</tbody>
</table>
Overlay Chart Set
- Makes inspection of projected images easy.
- Twelve 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.: 12AAM027

Workpiece Fixtures
for Profile Projectors and Measuring Microscopes

Rotary Tables

<table>
<thead>
<tr>
<th>SPECIFICATIONS</th>
<th>176-106</th>
<th>172-198</th>
</tr>
</thead>
<tbody>
<tr>
<td>Order No.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Effective glass dia.</td>
<td>66mm</td>
<td>100mm</td>
</tr>
<tr>
<td>Angle reading</td>
<td>6°</td>
<td>2° (w/ fine adjustment)</td>
</tr>
<tr>
<td>Mass</td>
<td>1.7kg</td>
<td>2.5kg</td>
</tr>
</tbody>
</table>

Note: Holder with clamp (176-107) can be mounted.

Holder with Clamp

<table>
<thead>
<tr>
<th>SPECIFICATIONS</th>
<th>176-107</th>
</tr>
</thead>
<tbody>
<tr>
<td>Order No.</td>
<td></td>
</tr>
<tr>
<td>Max. workpiece height</td>
<td>35mm</td>
</tr>
<tr>
<td>Mass</td>
<td>0.42kg</td>
</tr>
</tbody>
</table>

Swivel Center Supports

<table>
<thead>
<tr>
<th>SPECIFICATIONS</th>
<th>172-197</th>
</tr>
</thead>
<tbody>
<tr>
<td>Order No.</td>
<td></td>
</tr>
<tr>
<td>Max. workpiece dia.</td>
<td>70mm (45mm)*</td>
</tr>
<tr>
<td>Max. workpiece length</td>
<td>140mm</td>
</tr>
<tr>
<td>Swivel range</td>
<td>±10°</td>
</tr>
<tr>
<td>Mass</td>
<td>2.4kg</td>
</tr>
</tbody>
</table>

*When swiveled 10°

V-Block with Clamp

<table>
<thead>
<tr>
<th>SPECIFICATIONS</th>
<th>172-234</th>
</tr>
</thead>
<tbody>
<tr>
<td>Order No.</td>
<td></td>
</tr>
<tr>
<td>Max. workpiece dia.</td>
<td>50mm</td>
</tr>
<tr>
<td>Width of block</td>
<td>60mm</td>
</tr>
<tr>
<td>Mass</td>
<td>1.24kg</td>
</tr>
</tbody>
</table>

Vertical Holder

<table>
<thead>
<tr>
<th>SPECIFICATIONS</th>
<th>172-132</th>
</tr>
</thead>
<tbody>
<tr>
<td>Order No.</td>
<td></td>
</tr>
<tr>
<td>Mass</td>
<td>1.3kg</td>
</tr>
</tbody>
</table>