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>
<th>20X</th>
<th>50X</th>
<th>100X</th>
</tr>
</thead>
<tbody>
<tr>
<td>View field</td>
<td>ø31.5</td>
<td>ø15.7</td>
<td>ø6.3</td>
<td>ø3.1</td>
</tr>
<tr>
<td>W</td>
<td>66 (20)</td>
<td>32.5 (2)</td>
<td>12.6</td>
<td>5.0</td>
</tr>
<tr>
<td>H -50 models*</td>
<td>123.5</td>
<td>123.5</td>
<td>123.5</td>
<td>123.5</td>
</tr>
<tr>
<td>-100 models</td>
<td>91</td>
<td>91</td>
<td>91</td>
<td>91</td>
</tr>
<tr>
<td>-150 models</td>
<td>103.5</td>
<td>103.5</td>
<td>103.5</td>
<td>103.5</td>
</tr>
<tr>
<td>-200 models</td>
<td>92.5</td>
<td>92.5</td>
<td>92.5</td>
<td>92.5</td>
</tr>
<tr>
<td>D1 -50 models*</td>
<td>224 (198)</td>
<td>87 (61)</td>
<td>27</td>
<td>10</td>
</tr>
<tr>
<td>-100 models</td>
<td>182</td>
<td>87 (61)</td>
<td>27</td>
<td>10</td>
</tr>
<tr>
<td>-150 models</td>
<td>207 (198)</td>
<td>87 (61)</td>
<td>27</td>
<td>10</td>
</tr>
<tr>
<td>-200 models</td>
<td>185</td>
<td>87 (61)</td>
<td>27</td>
<td>10</td>
</tr>
<tr>
<td>D2</td>
<td>154 (120)</td>
<td>69 (23)</td>
<td>25</td>
<td>10</td>
</tr>
</tbody>
</table>

*: When using surface illumination
**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>
</tr>
</thead>
<tbody>
<tr>
<td>Order No.</td>
<td>302-701A</td>
<td>302-702A</td>
<td>302-703A</td>
<td>302-704A</td>
</tr>
</tbody>
</table>

**Projected image**
- Inverted image

**Protractor screen**
- Effective diameter: 12.4" / 315mm

**Screen material**
- Fine ground glass

**Reference line**
- Cross hair line

**Angle display (LED)**
- Resolution: 1° or 0.01° (switchable), Range: ±360°
- Functions: Absolute/Incremental mode switching, Zero Set

**Projection lens**
- Standard Accessory 10X (172-202)

**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
- Functions: 2-stage brightness switch, Heat-absorbing filter

**Surface illumination**
- Light source: Halogen bulb (24V, 150W)
- Optical system: Vertical illumination with a half-reflection mirror

<table>
<thead>
<tr>
<th>XY range</th>
<th>8&quot; x 4&quot; (200 x 100mm)</th>
<th>6&quot; x 2&quot; (150 x 50mm)</th>
<th>4&quot; x 4&quot; (100 x 100mm)</th>
<th>2&quot; x 2&quot; (50 x 50mm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Resolution</td>
<td>.0001&quot; / 0.001mm</td>
<td>.0001&quot; / 0.001mm</td>
<td>.0001&quot; / 0.001mm</td>
<td>.0001&quot; / 0.001mm</td>
</tr>
</tbody>
</table>

**Measuring Unit**
- Built-in linear scales
- Digimatic mic heads

<table>
<thead>
<tr>
<th>Table size</th>
<th>14.96x9.84&quot; (380x250mm)</th>
<th>11.02x5.98&quot; (280x152mm)</th>
<th>9.84x9.84&quot; (250x250mm)</th>
<th>5.98x5.98&quot; (152x152mm)</th>
</tr>
</thead>
</table>

**Effective table area**
- 10.47x6.69" (266x170mm)
- 7.24x3.23" (184x82mm)
- 5.6x5.6" (142x142mm)
- 3.2x3.2" (82x82mm)

**Max. workpiece height**
- 3.64" (92.5mm)
- 4.07" (103.5mm)
- 3.88" (91mm)
- 4.88" (123.5mm)

**Functions**
- ± direction switching, SPC output, zero-setting
- ± direction switching, SPC output
- ± direction switching, SPC output, zero-setting
- ± direction switching, SPC output, zero-setting

**Power supply**
- 120V AC, 50/60Hz

**Mass**
- 308 lbs. (140kg)
- 255 lbs. (116kg)
- 246 lbs. (112kg)
- 235 lbs. (107kg)

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

**DIMENSIONS**

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**Optical Accessories**
- 172-202: 10X projection lens set (Standard accessory)
- 172-203: 20X projection lens set
- 172-223: 100X projection lens
- 172-298: 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")
- 172-160-2: Green filter (for PJ-A3000, -50 models)
- 172-160-3: Green filter (for -100, -150, -200 models)
- 51205: Halogen bulb (24V, 150W)
- 383876: Vinyl cover (standard accessory)

**Fixture and Stage Accessories**
- 176-106: Rotary table (Effective diameter: 66mm)
- 176-196: Rotary table (Effective diameter: 100mm)
- 176-198: Rotary table with fine feed wheel (Effective diameter: 4" / 100mm)
- 176-105: Swivel center support (Max. workpiece dia.: 2.7" / 70mm)
- 176-197: Swivel center support (Max. workpiece dia.: 3.1" / 80mm)
- 176-107: Holder with clamp (Max. workpiece dia.: 1" / 25mm)
- 176-378: V-block with clamp (Max. workpiece dia.: 1" / 25mm)
- 999678: Fixture mount adapter
- 64PM1667: Stand 22.4 x 20 x 32" (WxDxH)

<table>
<thead>
<tr>
<th>Availability</th>
<th>PJ-A3005D-50</th>
<th>PJ-A3005F-150</th>
<th>PJ-A3010F-100</th>
<th>PJ-A3010F-200</th>
</tr>
</thead>
<tbody>
<tr>
<td>176-106</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
</tr>
<tr>
<td>176-196</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
</tr>
<tr>
<td>176-198</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
</tr>
<tr>
<td>176-105</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
</tr>
<tr>
<td>176-197</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
</tr>
<tr>
<td>176-107</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
</tr>
<tr>
<td>176-378</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
</tr>
</tbody>
</table>

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

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**DIMENSIONS**

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**QM-Data200**
- 264-155A: Stand-mount type
- 264-156A: Arm-mount type

2-D data processing unit.
(Refer to page I-23 for more details.)

**332-151:** Optoeye
- Edge detection system for QM-Data200

**12AAE571:** Deflector Attachment

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**Mitutoyo**
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 \((3+0.02L)\)\(\mu\)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. 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>ø61.2</td>
<td>ø30.6</td>
<td>ø15.3</td>
<td>ø6.12</td>
<td>ø3.06</td>
</tr>
<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>
### Optional Accessories

<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
<th>Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>172-271</td>
<td>5X projection lens</td>
<td>512305</td>
</tr>
<tr>
<td>172-472</td>
<td>10X projection lens (standard accessory)</td>
<td>383876</td>
</tr>
<tr>
<td>172-473</td>
<td>20X projection lens</td>
<td>512305</td>
</tr>
<tr>
<td>172-474</td>
<td>50X projection lens</td>
<td>383876</td>
</tr>
<tr>
<td>172-475</td>
<td>100X projection lens</td>
<td>512305</td>
</tr>
<tr>
<td>172-116</td>
<td>Standard scale (50mm)</td>
<td>383876</td>
</tr>
<tr>
<td>172-117</td>
<td>Standard scale (2&quot;)</td>
<td>512305</td>
</tr>
<tr>
<td>172-118</td>
<td>Reading scale (200mm)</td>
<td>383876</td>
</tr>
<tr>
<td>172-161</td>
<td>Reading scale (300mm)</td>
<td>383876</td>
</tr>
<tr>
<td>172-119</td>
<td>Reading scale (8&quot;)</td>
<td>512305</td>
</tr>
<tr>
<td>172-162</td>
<td>Reading scale (12&quot;)</td>
<td>383876</td>
</tr>
<tr>
<td>12AA981</td>
<td>Green filter</td>
<td>383876</td>
</tr>
<tr>
<td>512305</td>
<td>Halogen bulb (24V, 150W) (standard accessory)</td>
<td>383876</td>
</tr>
<tr>
<td>512305</td>
<td>Vinyl cover (standard accessory)</td>
<td>383876</td>
</tr>
</tbody>
</table>

### Fixture and Stage Accessories

<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
<th>Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>172-198</td>
<td>Machine stand</td>
<td>512305</td>
</tr>
<tr>
<td>176-305</td>
<td>Rotary table (Effective diameter: 4&quot; / 100mm)</td>
<td>383876</td>
</tr>
<tr>
<td>176-306</td>
<td>Rotary table (Effective diameter: 7.2&quot; / 183mm)</td>
<td>383876</td>
</tr>
<tr>
<td>176-105</td>
<td>Swivel center support</td>
<td>383876</td>
</tr>
<tr>
<td>172-197</td>
<td>Swivel center support (Max. workpiece dia.: 2.8&quot; / 70mm)</td>
<td>383876</td>
</tr>
<tr>
<td>176-107</td>
<td>Holder with clamp</td>
<td>383876</td>
</tr>
<tr>
<td>172-378</td>
<td>V-block with clamp</td>
<td>383876</td>
</tr>
<tr>
<td>176-317</td>
<td>Fixture mount adapter C</td>
<td>383876</td>
</tr>
<tr>
<td>176-304</td>
<td>Fixture mount adapter A</td>
<td>383876</td>
</tr>
</tbody>
</table>

### Models

<table>
<thead>
<tr>
<th>Model No.</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>PJ-H30A1010B</td>
<td>796lbs / 359kg</td>
</tr>
<tr>
<td>PJ-H30A2010B</td>
<td>471lbs / 212kg</td>
</tr>
<tr>
<td>PJ-H30D2010B</td>
<td>556lbs / 252kg</td>
</tr>
</tbody>
</table>

### DIMENSIONS

<table>
<thead>
<tr>
<th>Measurement</th>
<th>Value (in mm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Width</td>
<td>910</td>
</tr>
<tr>
<td>Height</td>
<td>650</td>
</tr>
<tr>
<td>Depth</td>
<td>550</td>
</tr>
</tbody>
</table>

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**QS-Data200**

**264-155A** Stand-mount type

**264-156A** Arm-mount type

*Attachment stand (12AA982) is required.

2-D data processing unit.

(Refer to page I-23 for more details.)

**332-151** Optoeye

Edge detection system for QS-Data200

**12AA671** Detector Attachment

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**Mitutoyo**

I-5
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.

Projected 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
- **172-413**: 50X projection lens set
- **172-405**: 100X projection lens set
- **172-419**: 100X projection lens
- **172-422**: Surface illumination unit (standard accessory)
- **172-116**: Standard scale (50mm)
- **172-117**: Standard scale (2")
- **172-118**: Standard scale (200mm)
- **172-119**: Standard scale (8")
- **172-161**: Reading scale (300mm)
- **172-162**: Reading scale (600mm)
- **172-160-2**: Green filter (standard accessory)
- **172-319**: Canopy
- **512305**: Halogen bulb (24V, 150W) (standard accessory)
- **510189**: Vinyl cover (standard accessory)

### Fixture and Stage Accessories

- **172-196**: Rotary table*
  
  *(Effective diameter: 4" / 100mm)*
- **172-198**: Rotary table with fine feed wheel*
  
  *(Effective diameter: 4" / 100mm)*
- **172-197**: 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)*

*Fixture mount adapter (999678) is required.

### QM-Data200

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

2-D data processing unit.

(Refer to page I-23 for more details.)

### KA Counter (174-183A)

(Refer to page H-7 for more details.)

### Optoeye

**332-151**: Edge detection system for QM-Data200

**12AAE672**: 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>
<tr>
<td>Projected image</td>
<td>Invert image</td>
</tr>
<tr>
<td>Protractor screen</td>
<td>Effective diameter 20&quot; / 508mm</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(172-472), 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>Zoom telecentric system</td>
</tr>
<tr>
<td>Functions</td>
<td>2-step brightness switch, Heat-absorbing filter, Cooling fan</td>
</tr>
<tr>
<td>Surface illumination</td>
<td>Light source Halogen bulb (24V 150W)</td>
</tr>
<tr>
<td>Optical system</td>
<td>Vertical illumination</td>
</tr>
<tr>
<td>Functions</td>
<td>Adjustable condenser lens, Oblique illumination (for 5X, 10X, and 20X), 2-step brightness switch, Heat-absorbing filter, Cooling fan</td>
</tr>
<tr>
<td>XY Range</td>
<td>8 x 4&quot; / 200 x 100mm</td>
</tr>
<tr>
<td>Resolution</td>
<td>0.001&quot; / 0.001mm*</td>
</tr>
<tr>
<td>Measuring unit</td>
<td>Built-in Linear scale</td>
</tr>
<tr>
<td>Table size</td>
<td>15 x 9.8&quot; / 380 x 250mm</td>
</tr>
<tr>
<td>Effective table area</td>
<td>10.5 x 6.7&quot; / 266 x 170mm</td>
</tr>
<tr>
<td>Max. workpiece height</td>
<td>See (H) on page I-6</td>
</tr>
<tr>
<td>Max. workpiece load</td>
<td>11lbs / 5kg</td>
</tr>
<tr>
<td>Power supply</td>
<td>120V AC, 50/60Hz</td>
</tr>
<tr>
<td>Mass</td>
<td>467lbs / 210kg</td>
</tr>
<tr>
<td>Standard accessories</td>
<td>200x100mm (8&quot; x 4&quot;) stage, 10X projection lens set, Surface illumination unit, Counter stand for KA counter, power cord, halogen bulb, fuse, grounding wire, allen wrench, vinyl cover</td>
</tr>
</tbody>
</table>

* Counter not included

### DIMENSIONS

![Mitutoyo Diagram](image-url)
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
L
Working distance
W
Max. workpiece diameter whose edge line can be focused on the screen center

<table>
<thead>
<tr>
<th>PH-A14</th>
<th>Unit: mm</th>
</tr>
</thead>
<tbody>
<tr>
<td>Magnification</td>
<td>10X</td>
</tr>
<tr>
<td>View field</td>
<td>35.6</td>
</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" x 45" x 20"H

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

**64AAB149**: Counter stand

**QM-Data200**

- **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-Data 200

**12AAE671**: Detector attachment (A)

---

**SPECIFICATIONS**

<table>
<thead>
<tr>
<th>Model No.</th>
<th>PH-A14</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Order No.</strong></td>
<td>172-810-10A</td>
</tr>
<tr>
<td><strong>Projected image</strong></td>
<td>Inverted image</td>
</tr>
<tr>
<td><strong>Protractor screen</strong></td>
<td>Effective diameter: 14&quot; / 356mm</td>
</tr>
<tr>
<td></td>
<td>Screen material: Fine ground glass</td>
</tr>
<tr>
<td></td>
<td>Reference line: Cross hair line</td>
</tr>
<tr>
<td></td>
<td>Screen rotation: ±360°, fine feed and clamp</td>
</tr>
<tr>
<td><strong>Angle display</strong></td>
<td>Vernier reading, Resolution: 2'</td>
</tr>
<tr>
<td><strong>Projection lens</strong></td>
<td>Standard accessory: 10X (172-011), Optional accessories: 20X, 50X, 100X</td>
</tr>
<tr>
<td><strong>Magnification accuracy</strong></td>
<td>Contour illumination: ±0.1% or less</td>
</tr>
<tr>
<td></td>
<td>Surface illumination: ±0.15% or less</td>
</tr>
<tr>
<td><strong>Contour illumination</strong></td>
<td>Light source: Halogen bulb (24V 150W)</td>
</tr>
<tr>
<td></td>
<td>Optical system: Telecentric system</td>
</tr>
<tr>
<td><strong>Functions</strong></td>
<td>Heat-absorbing filter, Cooling fan</td>
</tr>
<tr>
<td><strong>Surface illumination</strong></td>
<td>Light source: Halogen bulb (24V 150W)</td>
</tr>
<tr>
<td></td>
<td>Optical system: Twin fiber optic illumination</td>
</tr>
<tr>
<td><strong>XY Stage</strong></td>
<td>Table travel (X-axis): 8&quot; / 203.2mm</td>
</tr>
<tr>
<td></td>
<td>Table size (X, Z): 16 x 6&quot; / 407 x 153mm</td>
</tr>
<tr>
<td></td>
<td>Vertical travel (Y-axis): 4&quot; / 101.6mm</td>
</tr>
<tr>
<td></td>
<td>Resolution: 0.0005&quot; / 0.001mm*</td>
</tr>
<tr>
<td><strong>Measuring unit</strong></td>
<td>Built in Linear scale</td>
</tr>
<tr>
<td><strong>Max. workpiece width</strong></td>
<td>See (L) on page I-12</td>
</tr>
<tr>
<td><strong>Max. workpiece load</strong></td>
<td>100lbs / 45kg</td>
</tr>
<tr>
<td><strong>Power supply</strong></td>
<td>120V AC, 50/60Hz</td>
</tr>
<tr>
<td><strong>Mass</strong></td>
<td>308lbs / 140kg</td>
</tr>
<tr>
<td><strong>Standard accessories</strong></td>
<td>10x projection lens set, work stage, power cord, halogen bulb, fuse, grounding wire, allen wrench</td>
</tr>
</tbody>
</table>

*Counter not included

---

**DIMENSIONS**

**PH-A14**

Unit: mm

- 17.9" (454)
- 6.3" (160)
- 24.1" (612)
- 48.8" (1240)
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.

Projection Capacity

Max. workpiece width Working distance

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

PH-3515F

Unit: mm

<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

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>172-145</td>
<td>5X projection lens set</td>
</tr>
<tr>
<td>172-175</td>
<td>5X projection lens</td>
</tr>
<tr>
<td>172-184</td>
<td>10X projection lens set (standard accessory)</td>
</tr>
<tr>
<td>172-011</td>
<td>10X projection lens</td>
</tr>
<tr>
<td>172-173</td>
<td>20X projection lens set</td>
</tr>
<tr>
<td>172-165</td>
<td>50X projection lens</td>
</tr>
<tr>
<td>172-166</td>
<td>100X projection lens set</td>
</tr>
<tr>
<td>172-116</td>
<td>Standard scale (50mm)</td>
</tr>
<tr>
<td>172-117</td>
<td>Standard scale (2&quot;)</td>
</tr>
<tr>
<td>172-118</td>
<td>Reading scale (200mm)</td>
</tr>
<tr>
<td>172-161</td>
<td>Reading scale (300mm)</td>
</tr>
<tr>
<td>172-119</td>
<td>Reading scale (8&quot;)</td>
</tr>
<tr>
<td>172-162</td>
<td>Reading scale (12&quot;)</td>
</tr>
<tr>
<td>172-266</td>
<td>Green filter</td>
</tr>
<tr>
<td>512305</td>
<td>Halogen bulb (24V, 150W) (standard accessory)</td>
</tr>
<tr>
<td>172-423</td>
<td>Twin surface illumination</td>
</tr>
<tr>
<td>12BAA653</td>
<td>Fiber optical illumination cable (standard accessory)</td>
</tr>
<tr>
<td>12BAA637</td>
<td>Halogen reflector lamp (standard accessory)</td>
</tr>
<tr>
<td>64AAB176</td>
<td>Machine stand</td>
</tr>
<tr>
<td>383228</td>
<td>Vinyl cover (standard accessory)</td>
</tr>
</tbody>
</table>

Fixture and Stage Accessories*

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>172-142</td>
<td>Center support</td>
</tr>
<tr>
<td>172-143</td>
<td>Center support riser</td>
</tr>
<tr>
<td>172-144</td>
<td>Rotary vise (Max. workpiece dia.: 2.3&quot; / 60mm)</td>
</tr>
<tr>
<td>172-234</td>
<td>V-block with clamp (Max. workpiece dia.: 2&quot; / 50mm)</td>
</tr>
<tr>
<td>172-132</td>
<td>Vertical holder</td>
</tr>
<tr>
<td>172-001</td>
<td>Tipped-saw support stand</td>
</tr>
<tr>
<td>172-002</td>
<td>Cutter support stand</td>
</tr>
</tbody>
</table>

* See page I-13 for details

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>
</tbody>
</table>

Projected image

<table>
<thead>
<tr>
<th>Description</th>
<th>Effective diameter</th>
</tr>
</thead>
<tbody>
<tr>
<td>Protractor screen</td>
<td>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&quot; or 0.01&quot; (switchable), Range: ±370°, Functions: Absolute/incremental mode switching, Zero set</td>
</tr>
</tbody>
</table>

Projection lens

<table>
<thead>
<tr>
<th>Description</th>
<th>Standard accessory: 10X (172-184), Optional accessories: 5X, 20X, 50X, 100X</th>
</tr>
</thead>
<tbody>
<tr>
<td>Magnification accuracy</td>
<td>Contour illumination ±0.1% or less</td>
</tr>
<tr>
<td>Contour illumination</td>
<td>Surface illumination ±0.15% or less</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</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></td>
<td>Table size (X, Z) 17.7&quot; x5.7&quot; / 450x146mm</td>
</tr>
<tr>
<td></td>
<td>Vertical travel (Y-axis) 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>
</tbody>
</table>

Power supply

<table>
<thead>
<tr>
<th>Description</th>
<th>120V AC, 50/60Hz</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mass</td>
<td>333lbs / 150kg</td>
</tr>
</tbody>
</table>

Standard accessories

| Description                        | 10X projection lens set, work stage, power cord, halogen bulb, tube fuse, grounding wire, allen wrench, Vinyl cover |

* Counter not included

DIMENSIONS

![DIMENSIONS](image-url)
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 (20ºC)*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Metric</td>
<td>0.1mm</td>
<td>50mm</td>
<td>172-116</td>
<td>(3+5L/1000)µm</td>
</tr>
<tr>
<td>Metric</td>
<td>0.1mm</td>
<td>80mm</td>
<td>172-330</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>Metric</td>
<td>0.5mm</td>
<td>200mm</td>
<td>172-118</td>
<td>18µm (15+15L/1000)µm</td>
</tr>
<tr>
<td>Metric</td>
<td>0.5mm</td>
<td>300mm</td>
<td>172-161</td>
<td>19.5µm (15+15L/1000)µm</td>
</tr>
<tr>
<td>Metric</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”</td>
<td>8”</td>
<td>172-119</td>
<td>.00071”</td>
</tr>
<tr>
<td>.02”</td>
<td>12”</td>
<td>172-162</td>
<td>.00077”</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>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Metric</td>
<td>0.005mm</td>
<td>25mm</td>
<td>152-390</td>
<td>±2µm</td>
<td>for X-axis</td>
</tr>
<tr>
<td>Metric</td>
<td>0.005mm</td>
<td>25mm</td>
<td>152-389</td>
<td>±2µm</td>
<td>for Y-axis</td>
</tr>
</tbody>
</table>

Inch

<table>
<thead>
<tr>
<th>Graduation</th>
<th>Range</th>
<th>Order No.</th>
<th>Accuracy</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>.001”</td>
<td>1”</td>
<td>152-391</td>
<td>±.0001”</td>
<td>for X-axis</td>
</tr>
<tr>
<td>.001”</td>
<td>1”</td>
<td>152-392</td>
<td>±.0001”</td>
<td>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>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Metric</td>
<td>0.001mm</td>
<td>25mm</td>
<td>152-402</td>
<td>±2µm</td>
<td>for X-axis</td>
</tr>
<tr>
<td>Metric</td>
<td>0.001mm</td>
<td>25mm</td>
<td>152-401</td>
<td>±2µm</td>
<td>for Y-axis</td>
</tr>
</tbody>
</table>

*Obtained using vernier.

Digimatic Micrometer Heads

**FEATURES**

- Large LCD digits for error-free reading.
- The display rotates 330º 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”/.0001mm</td>
<td>2” (50mm)</td>
<td>164-164</td>
<td>±.00015”</td>
</tr>
</tbody>
</table>

Optional Accessories

959149: SPC cable for series 164 (1m)
959150: SPC cable for series 164 (2m)
**Workpiece Fixtures**

for Profile Projectors and Measuring Microscopes

**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

---

### Rotary Tables

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

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

---

### Swivel Center Supports

<table>
<thead>
<tr>
<th>SPECIFICATIONS</th>
<th>Order No.</th>
<th>176-105</th>
<th>172-197</th>
</tr>
</thead>
<tbody>
<tr>
<td>Max. workpiece height</td>
<td></td>
<td>70mm (45mm)*</td>
<td>80mm (65mm)*</td>
</tr>
<tr>
<td>Max. workpiece length</td>
<td></td>
<td>140mm</td>
<td>140mm</td>
</tr>
<tr>
<td>Swivel range</td>
<td>±10º</td>
<td>±10º</td>
<td></td>
</tr>
<tr>
<td>Mass</td>
<td>2.4kg</td>
<td>2.5kg</td>
<td></td>
</tr>
</tbody>
</table>

*When swiveled 10º

---

### Holder with Clamp

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

---

### Center Support

<table>
<thead>
<tr>
<th>SPECIFICATIONS</th>
<th>Order No.</th>
<th>172-142</th>
</tr>
</thead>
<tbody>
<tr>
<td>Max. workpiece height</td>
<td></td>
<td>120mm (240mm)*</td>
</tr>
<tr>
<td>Mass</td>
<td></td>
<td>3.3kg</td>
</tr>
</tbody>
</table>

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

---

### V-Block with Clamp

<table>
<thead>
<tr>
<th>SPECIFICATIONS</th>
<th>Order No.</th>
<th>172-234</th>
<th>172-378</th>
</tr>
</thead>
<tbody>
<tr>
<td>Max. workpiece dia.</td>
<td></td>
<td>50mm</td>
<td>25mm</td>
</tr>
<tr>
<td>Width of block</td>
<td></td>
<td>60mm</td>
<td>41mm</td>
</tr>
<tr>
<td>Mass</td>
<td></td>
<td>1.24kg</td>
<td>0.8kg</td>
</tr>
</tbody>
</table>

---

### Rotary Vise

<table>
<thead>
<tr>
<th>SPECIFICATIONS</th>
<th>Order No.</th>
<th>172-144</th>
</tr>
</thead>
<tbody>
<tr>
<td>Max. workpiece height</td>
<td></td>
<td>50mm</td>
</tr>
<tr>
<td>Width of jaw</td>
<td></td>
<td>40mm</td>
</tr>
<tr>
<td>Angle reading</td>
<td></td>
<td>5º</td>
</tr>
<tr>
<td>Mass</td>
<td></td>
<td>2.5kg</td>
</tr>
</tbody>
</table>

---

### Vertical Holder

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