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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>
<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</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

D1: Max. workpiece diameter whose edge line can be focused on the screen center
d2: Max. workpiece diameter whose edge line can be focused on the screen line
## SPECIFICATIONS

### Optional Accessories

- **172-202:** 10X projection lens set (Standard accessory)
- **172-203:** 20X projection lens set
- **172-223:** 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")
- **172-160-2:** Green filter (for PJ-A3000, -50 models)
- **172-160-3:** Green filter (for -100, -150, -200 models)
- **512005:** Halogen bulb (24V, 150W)
- **383876:** Vinyl cover (standard accessory)

### Fixture and Stage Accessories

- **176-106:** Rotary table (Effective diameter: 66mm)
- **172-196:** Rotary table (Effective diameter: 100mm)
- **172-198:** Rotary table with fine feed wheel (Effective diameter: 4" / 100mm)
- **176-105:** Swivel center support (Max. workpiece dia.: 2.7" / 70mm)
- **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)
- **999678:** Fixture mount adapter
- **64PMI167:** Stand 22.4 x 20 x 32" (WxDxH)

### 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:

- QM-Data200
  - **264-155A:** Stand mount type
  - **264-156A:** Arm mount type
  - 2-D data processing unit.

### 12AAE671:

- Defector Attachment

### Model PJ-A3010F-200 PJ-A3005F-150 PJ-A3010F-100 PJ-A3005D-50

<table>
<thead>
<tr>
<th>Order No.</th>
<th>302-701A</th>
<th>302-702A</th>
<th>302-703A</th>
<th>302-704A</th>
</tr>
</thead>
</table>

### Projected image

- **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

### XY range

- **8" x 4"** (200 x 100mm)
- **6" x 2"** (150 x 50mm)
- **4" x 4"** (100 x 100mm)
- **2" x 2"** (50 x 50mm)

### Resolution

- .0001" / 0.001mm
- .0001" / 0.001mm
- .0001" / 0.001mm
- .0001" / 0.001mm

### Table size

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

### Effective table area

- **10.47 x 6.69** (260 x 170mm)
- **7.0 x 3.92** (180 x 90mm)
- **5.6 x 3.6** (140 x 90mm)
- **4.86** (123.5mm)

### Max. workpiece height

- **3.64** (92.5mm)
- **4.07** (103.5mm)
- **3.58** (91mm)
- **4.85** (123.5mm)

### Functions

- ± direction switching, SPC output zero-setting
- ± direction switching, SPC output zero-setting
- ± 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, accessories
  - 10X projection lens set, masking shield, power cord, accessories
  - Halogen bulb, fuse, grounding wire, allen wrench, vinyl cover

### DIMENSIONS

- **Model PJ-A3005D-50 PJ-A3010F-100 PJ-A3005F-150 PJ-A3010F-200**

### Unit: mm

- **17.9 / 455mm**
- **16.8 / 427mm**
- **17.6 / 446mm**
- **20.6 / 529mm**

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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 & 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 provide 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.

**Projection Capacity**

<table>
<thead>
<tr>
<th>Projector Type</th>
<th>Magnification</th>
<th>Unit: mm</th>
</tr>
</thead>
<tbody>
<tr>
<td>PJ-H30A3017B</td>
<td>5X</td>
<td>ø61.2</td>
</tr>
<tr>
<td></td>
<td>10X</td>
<td>ø30.6</td>
</tr>
<tr>
<td>XY stage travel range: 12x7&quot; / 300x170mm</td>
<td>20X</td>
<td>ø15.3</td>
</tr>
<tr>
<td></td>
<td>50X</td>
<td>ø6.12</td>
</tr>
<tr>
<td></td>
<td>100X</td>
<td>ø3.06</td>
</tr>
</tbody>
</table>
Optional Accessories

172-271: SX 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")
12AA981: Green filter
12AAG982: External counter zero switch
512305: Halogen bulb (24V, 150W) (standard accessory)
990600: External counter zero switch
172-269: Machine stand
12AAE671: Edge detection system for QM-Data 200

Fixture and Stage accessories

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)
176-105: Swivel center support
172-197: Swivel center support (Max. workpiece dia.: 2.8" / 70mm)
176-107: Swivel center support (Max. workpiece dia.: 3.1" / 80mm)
176-317: Fixture mount adapter C
176-304: Fixture mount adapter A

QM-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-3 for more details.)

332-151: Optoeye
12AAE671: Detector Attachment

DIMENSIONS

Table:

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Lens mount</td>
<td>Standard accessory: 10x(172-472),  Optional accessories: 2X, 5X, 20X, 50X, 100X</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Magnification accuracy</td>
<td>Contour illumination: ±0.1% or less</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Surface illumination</td>
<td>±0.15% or less</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Contour illumination</td>
<td>light source: Halogen bulb(24V 150W)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Optical system</td>
<td>Zoom telecentric system</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Functions</td>
<td>Brightness adjustment, Heat-absorbing filter, Cooling fan</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Surface illumination</td>
<td>light source: Halogen bulb(24V 150W)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Optical system</td>
<td>Vertical / Oblique illumination with an adjustable condenser lens</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Functions</td>
<td>Non-stepped brightness adjustment, Heat-absorbing filter, Cooling fan</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>XY Range</td>
<td>4 x 4&quot; / 100 x 100mm</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>X Range</td>
<td>3.4&quot; / 85 x 100mm</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Y Range</td>
<td>2.7&quot; / 70 x 70mm</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Resolution</td>
<td>.0001&quot; / 0.001mm</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Measuring Unit</td>
<td>Built in Linear scale</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Table size</td>
<td>11.8 x 9.4&quot; / 300 x 240mm</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Effective table area</td>
<td>7.1 x 5.9&quot; / 180 x 150mm</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Funct.</td>
<td>Absolute/incremental mode switching, Zero set</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Max. workpiece load</td>
<td>22lbs / 10kg</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Max. workpiece ht.</td>
<td>4.1&quot; / 105mm</td>
<td></td>
<td></td>
<td></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>391lbs / 176kg</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Standard accessories</td>
<td>10x projection lens set, masking shield, power cord, halogen bulb, tube fuse, grounding wire, allen wrench, vinyl cover</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Diagram:

Unit: mm
PV-5110
SERIES 304 — Profile Projectors

FEATURES
• Large 500mm screen
• Floor model that 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
172-422: 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)
172-329: Reading scale (600mm)
172-162: Reading scale (12")
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.)

332-151: Optoeye
Edge detection system for QM-Data 200
12AAE672: Detector Attachment (B)

KA Counter (174-173A)
(Refer to the page H-8 for more details.)

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
- 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
- 8 x 4" / 200 x 100mm
- 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
- Maximum workpiece height: See (H) on page I-6
- Maximum workpiece load: 11lb / 5kg

Power supply
- 120V AC, 50/60Hz
- Mass: 467lb / 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

Unit: mm
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.
• 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

Working distance

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

<table>
<thead>
<tr>
<th>PH-A14</th>
<th>Magnification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Unit: mm</td>
<td>10X</td>
</tr>
<tr>
<td>View field</td>
<td>70.6</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
64AA129B: Machine stand 23"W x 45" D x 20"H

KA Counter (174-173A)
(Refer to page H-8 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: Optoeye
Edge detection system for QM-Data 200
122AE671: 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>Inverted image</td>
</tr>
<tr>
<td>Protractor screen</td>
<td>Effective diameter 14&quot; / 356mm</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&quot;</td>
</tr>
<tr>
<td>Projection lens</td>
<td>Standard accessory: 10x (172-011), Optional accessories: 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 light source</td>
<td>Halogen bulb (24V, 150W)</td>
</tr>
<tr>
<td>Optical system</td>
<td>Telecentric system</td>
</tr>
<tr>
<td>Functions</td>
<td>Heat-absorbing filter, Cooling fan</td>
</tr>
<tr>
<td>Surface illumination light source</td>
<td>Halogen bulb (24V, 150W)</td>
</tr>
<tr>
<td>Optical system</td>
<td>Twin fiber optic illumination</td>
</tr>
<tr>
<td>XY Stage Table travel (X-axis)</td>
<td>8&quot; / 203.2mm</td>
</tr>
<tr>
<td>Table size(X, Z)</td>
<td>16 x 6&quot; / 407 x 153mm</td>
</tr>
<tr>
<td>Vertical travel (Y-axis)</td>
<td>4&quot; / 101.6mm</td>
</tr>
<tr>
<td>Resolution</td>
<td>0.0005&quot; / 0.001mm*</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-12</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>308lbs / 140kg</td>
</tr>
<tr>
<td>Standard accessories</td>
<td>10x projection lens set, work stage, power cord, halogen bulb, fuse, grounding wire, allen wrench</td>
</tr>
</tbody>
</table>

DIMENSIONS

PH-A14
Unit: mm

**Counter not included**
PH-3515F
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.
• 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

<table>
<thead>
<tr>
<th>PH-3515F</th>
<th>Magnification</th>
<th>Unit: mm</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>SX</td>
<td>10X</td>
</tr>
<tr>
<td>View field</td>
<td>70.6</td>
<td>35.3</td>
</tr>
<tr>
<td>L</td>
<td>175</td>
<td>235</td>
</tr>
<tr>
<td>W</td>
<td>160 (64)</td>
<td>95 (35)</td>
</tr>
<tr>
<td>D</td>
<td>152.4</td>
<td>152.4</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
- 172-173: 20X projection lens set
- 172-165: 50X projection lens set
- 172-166: 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)
- 172-423: Twin surface illumination
- 12BAA653: Fiber optical 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
- 172-132: Vertical holder
- 172-001: Tipped-saw support stand
- 172-002: Cutter support stand

* 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>
<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>
</tbody>
</table>

### Projection lens

- Standard accessory: 10x (172-184)
- 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: Telecentric system
- Functions: 2-step brightness switch, Heat-absorbing filter, Cooling fan

### Surface illumination (Optional accessories)

- Light source: Halogen bulb (24V 150W)
- Functions: Adjustable condenser lens, Heat-absorbing filter, Cooling fan

### X Y Stage

- Table travel (X-axis): 10" / 254mm
- Table size (X, Z): 17.7" x 5.7" / 450x146mm
- Vertical travel (Y-axis): 6" / 152mm
- Resolution: 0.001mm/0.001"
- Measuring Unit: Built in Linear scale
- Max. workpiece width: See (L) on page I-10
- Max. workpiece load: 100lbs / 45kg

### Power supply

- 120V AC, 50/60Hz
- Mass: 333lbs / 150kg

### Standard accessories

- 10x projection lens set, work stage, power cord, halogen bulb, tube fuse, grounding wire, allen wrench, Vinyl cover

* Counter not included

---

### DIMENSIONS

**PH-3515F**

[Unit: mm]

- 10 (4"
- 18 (.7"
- 424 (16.7"
- 460 (18.1"
- 460 (18.1"
- 80 (3.1"
- 321 (12.6"
- 540 (21.2"
- 906 (35.7"
- 1138 (44.8")
- 1710 (66.6")

---

**Q.M-Data200**

- 2-D data processing unit.
- 264-155A: Stand mount type
- 264-156A: Arm mount type

*Refer to page I-10 for more details.*

**332-151: Optoeye**

Edge detection system for QM-Data 200

12AAE671: Detector attachment (A)

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**312-143: KA Counter**

(Refer to page H-8 for more details.)

64AAB149: Counter tray

---

**MITUTOYO**
Accessories for Profile Projectors
SERIES 172 — Profile Projector

Standard Scales

- Used for checking magnification accuracy.

**SPECIFICATIONS**

<table>
<thead>
<tr>
<th>Graduation</th>
<th>Range</th>
<th>Order No</th>
<th>Accuracy (20°C)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.1mm</td>
<td>50mm</td>
<td>172-116</td>
<td>(3+5L/1000)µm</td>
</tr>
<tr>
<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>Graduation</th>
<th>Range</th>
<th>Order No</th>
<th>Accuracy</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.5mm</td>
<td>200mm</td>
<td>172-118</td>
<td>18µm</td>
</tr>
<tr>
<td>0.5mm</td>
<td>300mm</td>
<td>172-161</td>
<td>19.5µm</td>
</tr>
<tr>
<td>0.5mm</td>
<td>600mm</td>
<td>172-329</td>
<td>24µm</td>
</tr>
</tbody>
</table>

Micrometer Heads
for Profile Projectors and Toolmaker’s 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>Graduation</th>
<th>Range</th>
<th>Order No</th>
<th>Accuracy</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.005mm</td>
<td>25mm</td>
<td>152-390</td>
<td>±0.2µm</td>
<td>for X-axis</td>
</tr>
<tr>
<td>0.005mm</td>
<td>25mm</td>
<td>152-389</td>
<td>±0.2µm</td>
<td>for Y-axis</td>
</tr>
</tbody>
</table>

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

*Obtained by 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&quot;/.001mm</td>
<td>2&quot; (50mm)</td>
<td>164-164</td>
<td>±.00015&quot;</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

### Rotary Tables

**SPECIFICATIONS**

<table>
<thead>
<tr>
<th>Order No.</th>
<th>176-106</th>
<th>172-198</th>
</tr>
</thead>
<tbody>
<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

**SPECIFICATIONS**

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

### Center Support

**SPECIFICATIONS**

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

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

### Swivel Center Supports

**SPECIFICATIONS**

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

*When swiveled 10°

### V-Block with Clamp

**SPECIFICATIONS**

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

### Rotary Vise

**SPECIFICATIONS**

<table>
<thead>
<tr>
<th>Order No.</th>
<th>172-144</th>
</tr>
</thead>
<tbody>
<tr>
<td>Max. workpiece height</td>
<td>60mm</td>
</tr>
<tr>
<td>Width of jaw</td>
<td>40mm</td>
</tr>
<tr>
<td>Angle reading</td>
<td>5°</td>
</tr>
<tr>
<td>Mass</td>
<td>2.5kg</td>
</tr>
</tbody>
</table>

### Vertical Holder

**SPECIFICATIONS**

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