Coordinate Measuring Machines

MITUTOYO CMM

- CMM
- Manual Floating Operation
- CNC
- Moving-Bridge Structure
- Moving-Bridge Structure
- Horizontal-Arm Structure
- Fixed-Bridge Structure
- Vision Measuring Machine

- Crysta-Plus
  (Low-cost and simple operation)
- Beyond-Crysta
  Beyond-STRATO
  (High accuracy and excellent stability)
- Car Body Measuring System
  MACH
  (High speed and easy workpiece loading/unloading)
- LEGEX
  (Ultra-high accuracy)
- UMAP Vision System
  (Detailed shape measuring system)
- Quick Vision
- Quick Scope
  (Advanced non-contact 3-D vision measurement in CNC/manual operation)
- Quick Image
  (Non-contact 2-D vision measurement)
Crysta-Plus M500 Series
SERIES 196 — Manual-Floating Type CMM

FEATURES
• Smooth operation because of the high-precision air bearings and lightweight moving members.
• Continuous fine feed over the entire measuring range.
• One-touch air clamp for each axis.

<table>
<thead>
<tr>
<th>Model No.</th>
<th>M544</th>
<th>M574</th>
</tr>
</thead>
<tbody>
<tr>
<td>Range</td>
<td></td>
<td></td>
</tr>
<tr>
<td>X-axis</td>
<td>500mm (20&quot;)</td>
<td>500mm (20&quot;)</td>
</tr>
<tr>
<td>Y-axis</td>
<td>400mm (16&quot;)</td>
<td>700mm (28&quot;)</td>
</tr>
<tr>
<td>Z-axis</td>
<td>400mm (16&quot;)</td>
<td>400mm (16&quot;)</td>
</tr>
<tr>
<td>Resolution</td>
<td>0.0005mm (.00002&quot;)</td>
<td>0.0005mm (.00002&quot;)</td>
</tr>
<tr>
<td>Accuracy at 20°C ISO10360-2</td>
<td>E=(3.5+4.5L/1000)µm* R=4.0µm (when using TP20)</td>
<td>E=(3.5+4.5L/1000)µm* R=4.0µm (when using TP20)</td>
</tr>
</tbody>
</table>

*L: Measuring length (mm)

Crysta-Plus M700 Series
SERIES 196 — Manual-Floating Type CMM

FEATURES
• Moving-bridge structure provides excellent stability.
• No obstruction on the large-size measuring table permits easy workpiece handling.
• Continuous fine feed over the entire measuring range.

<table>
<thead>
<tr>
<th>Model No.</th>
<th>M776</th>
<th>M7106</th>
</tr>
</thead>
<tbody>
<tr>
<td>Range</td>
<td></td>
<td></td>
</tr>
<tr>
<td>X-axis</td>
<td>700mm (28&quot;)</td>
<td>700mm (28&quot;)</td>
</tr>
<tr>
<td>Y-axis</td>
<td>700mm (28&quot;)</td>
<td>1000mm (40&quot;)</td>
</tr>
<tr>
<td>Z-axis</td>
<td>600mm (24&quot;)</td>
<td>600mm (24&quot;)</td>
</tr>
<tr>
<td>Resolution</td>
<td>0.0005mm (.00002&quot;)</td>
<td>0.0005mm (.00002&quot;)</td>
</tr>
<tr>
<td>Accuracy at 20°C ISO10360-2</td>
<td>E=(4.5+4.5L/1000)µm* R=5.0µm (when using TP20)</td>
<td>E=(4.5+4.5L/1000)µm* R=5.0µm (when using TP20)</td>
</tr>
</tbody>
</table>

*L: Measuring length (mm)
### Beyond-Crysta C500 Series

**SERIES 191 — CNC CMM**

**FEATURES**
- Extremely high measuring accuracy even at its maximum drive speed of 520mm/s.
- The special light alloy for drastic weight reduction.
- Easy-to-operate joystick box for measuring efficiency.
- Excellent cost/performance ratio.

<table>
<thead>
<tr>
<th>Model No.</th>
<th>X-axis</th>
<th>Y-axis</th>
<th>Z-axis</th>
</tr>
</thead>
<tbody>
<tr>
<td>C544</td>
<td>505mm (20&quot;)</td>
<td>405mm (16&quot;)</td>
<td>405mm (16&quot;)</td>
</tr>
<tr>
<td>C574</td>
<td>505mm (20&quot;)</td>
<td>705mm (28&quot;)</td>
<td>405mm (16&quot;)</td>
</tr>
</tbody>
</table>

**Accuracy at 20±2°C**

ISO10360-2

MPEE=[(1.9+3L/1000)µm/1.7+3L/1000]µm

MPEP=1.9µm/1.7µm

(when using TP200/SP600)

*The machine must be equipped with the optional temperature compensation system.

Temperature variation: 2.0K (per hour and day)

Temperature gradient (vertical and horizontal): 1.0K/m

**L: Measuring length (mm)**

### Beyond-Crysta C700 Series

**SERIES 191 — CNC CMM**

**FEATURES**
- Extremely high measuring accuracy even at its maximum drive speed of 520mm/s.
- The special light alloy for drastic weight reduction.
- Easy-to-operate joystick box for measuring efficiency.

<table>
<thead>
<tr>
<th>Model No.</th>
<th>X-axis</th>
<th>Y-axis</th>
<th>Z-axis</th>
</tr>
</thead>
<tbody>
<tr>
<td>C776</td>
<td>705mm (28&quot;)</td>
<td>705mm (28&quot;)</td>
<td>605mm (24&quot;)</td>
</tr>
<tr>
<td>C7106</td>
<td>1005mm (40&quot;)</td>
<td>605mm (24&quot;)</td>
<td></td>
</tr>
</tbody>
</table>

**Accuracy at 20±2°C**

ISO10360-2

MPEE=[(1.9+3L/1000)µm/1.7+3L/1000]µm

MPEP=1.9µm/1.7µm

(when using TP200/SP600 or MPP-100)

*The machine must be equipped with the optional temperature compensation system.

Temperature variation: 1.0K (per hour), 2.0K (per day)

Temperature gradient (vertical and horizontal): 1.0K/m

**L: Measuring length (mm)**
**Beyond-Crysta C900 Series**

**SERIES 191 — CNC CMM**

**FEATURES**
- The optimum machine structure have been determined through the FEM & Modal Analysis in its quest for high-accuracy, high-speed yet affordable CNC CMM.
- Excellent cost/performance ratio.

<table>
<thead>
<tr>
<th>Model No.</th>
<th>C9106/8</th>
<th>C9166/8</th>
<th>C9206/8</th>
</tr>
</thead>
<tbody>
<tr>
<td>Range</td>
<td>X-axis</td>
<td>Y-axis</td>
<td>Z-axis</td>
</tr>
<tr>
<td></td>
<td>905mm (36&quot;)</td>
<td>905mm (36&quot;)</td>
<td>905mm (36&quot;)</td>
</tr>
<tr>
<td></td>
<td>1005mm (40&quot;)</td>
<td>1605mm (64&quot;)</td>
<td>2005mm (80&quot;)</td>
</tr>
<tr>
<td></td>
<td>605mm (24&quot;)/ 805mm (32&quot;)</td>
<td>605mm (24&quot;)/ 805mm (32&quot;)</td>
<td>605mm (24&quot;)/ 805mm (32&quot;)</td>
</tr>
<tr>
<td>Resolution</td>
<td>0.0001mm (0.000004&quot;)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Accuracy at 20°C* ISO10360-2</td>
<td>MPE=(1.9+3L/1000)(\mu m/(1.7+3L/1000))(\mu m)**</td>
<td>MPE=1.9(\mu m)/1.7(\mu m) (when using TP200/SP600 or MPP-100)</td>
<td></td>
</tr>
</tbody>
</table>

*The machine must be equipped with the optional temperature compensation system. Temperature variation: 1.0K (per hour), 2.0K (per day)
**L: Measuring length (mm)

**Beyond-Crysta C1200 Series**

**SERIES 191 - CNC CMM**

**FEATURES**
- Moving-bridge structure provides excellent stability.
- No obstruction on the measuring table permits easy workpiece handling.
- Wide measuring range for large workpieces.

<table>
<thead>
<tr>
<th>Model No.</th>
<th>C121210</th>
<th>C122010</th>
<th>C123010</th>
</tr>
</thead>
<tbody>
<tr>
<td>Range</td>
<td>X-axis</td>
<td>Y-axis</td>
<td>Z-axis</td>
</tr>
<tr>
<td></td>
<td>1205mm (48&quot;)</td>
<td>1205mm (48&quot;)</td>
<td>1205mm (48&quot;)</td>
</tr>
<tr>
<td></td>
<td>1205mm (48&quot;)</td>
<td>2005mm (80&quot;)</td>
<td>3005mm (120&quot;)</td>
</tr>
<tr>
<td></td>
<td>1005mm (40&quot;)</td>
<td>1005mm (40&quot;)</td>
<td>1005mm (40&quot;)</td>
</tr>
<tr>
<td>Resolution</td>
<td>0.0001mm (0.000004&quot;)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Accuracy at 20°C* ISO10360-2</td>
<td>MPE=(2.5+3L/1000)(\mu m)/(2.3+3L/1000)(\mu m)**</td>
<td>MPE=2.5(\mu m)/2.3(\mu m) (when using TP200/SP600 or MPP-100)</td>
<td></td>
</tr>
</tbody>
</table>

*The machine must be equipped with the optional temperature compensation system. Temperature variation: 1.0K (per hour), 2.0K (per day)
**L: Measuring length (mm)
Beyond-STRATO 700 Series
SERIES 355 — Upgraded CNC CMM

FEATURES
• High measuring accuracy and high-speed motion.
• Full-digital motion control.
• Improved rigid air bearings on all axial guideways.

Beyond-STRATO 900 Series
SERIES 355 — Upgraded CNC CMM

FEATURES
• Provided with the highest measuring accuracy in its class.
• Advanced structure with low mass/high stiffness ratio.
• Vibration-free operation with high measuring speed.

Model No. | STRATO 710 | STRATO 7100
---|---|---
Range | X-axis 705mm (28") | 705mm (28")
 | Y-axis 705mm (28") | 1005mm (40")
 | Z-axis 605mm (24") | 605mm (24")
Resolution | 0.0001mm (.000004")
Accuracy at 20±2°C* | MPEe=(1.7+3L/1000)µm**
ISO10360-2 | MPEe=1.8µm
(when using TP200)

*The machine must be equipped with the optional temperature compensation system. Temperature variation: 1.0K (per hour), 5.0K (per day)
**L: Measuring length (mm)

Model No. | STRATO 910 | STRATO 916
---|---|---
Range | X-axis 905mm (36") | 905mm (36")
 | Y-axis 1005mm (40") | 1605mm (63")
 | Z-axis 605mm (24") | 605mm (24")
Resolution | 0.0001mm (.000004")
Accuracy at 20±2°C* | MPEe=(1.7+3L/1000)µm**
ISO10360-2 | MPEe=1.8µm
(when using TP200)

*The machine must be equipped with the optional temperature compensation system. Temperature variation: 1.0K (per hour), 5.0K (per day)
**L: Measuring length (mm)
Beyond-STRATO 1600 Series

SERIES 355 — Upgraded CNC CMM

FEATURES

• A high accuracy large CNC CMM having 1605mm X-axis measuring range.
• Two sizes are available for Z-axis measuring range: 1205mm and 1505mm.

<table>
<thead>
<tr>
<th>Model No.</th>
<th>STRATO1620</th>
<th>STRATO1630</th>
<th>STRATO1640</th>
</tr>
</thead>
<tbody>
<tr>
<td>Range</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>X-axis</td>
<td>1605mm (63&quot;)</td>
<td>1605mm (63&quot;)</td>
<td>1605mm (63&quot;)</td>
</tr>
<tr>
<td>Y-axis</td>
<td>2005mm (79&quot;)</td>
<td>3005mm (118&quot;)</td>
<td>4005mm (158&quot;)</td>
</tr>
<tr>
<td>Z-axis</td>
<td>1205mm (47&quot;) / 1505mm (59&quot;)</td>
<td>1205mm (47&quot;) / 1505mm (59&quot;)</td>
<td>1205mm (47&quot;) / 1505mm (59&quot;)</td>
</tr>
</tbody>
</table>

Resolution 0.0001mm (.000004")
Accuracy at 20±2°C* MPE E=(3.8+4L/1000)µm**
ISO10360-2 MPE P=4.0µm
(when using TP200)

*The machine must be equipped with the optional temperature compensation system.
Temperature variation: 1.0K (per hour), 2.0K (per day)
Temperature gradient (vertical and horizontal): 1.0K/m
**L: Measuring length (mm)

Beyond-STRATO 2000/3000 Series

SERIES 355 — Upgraded CNC CMM

FEATURES

• An ultra-large CNC CMM that offers one of the world’s widest measurement ranges of 3005x5005x1505mm (XxYxZ) (Beyond-STRATO 3000 Series).
• FEM analysis was used at the structural design stage to ensure maximum machine stability, and several new technologies, such as a friction-drive system to achieve long-stroke, low-vibration drive, a temperature-compensation technology to minimize heat-induced strain, and a MOVAC system for automatic on-site compensation of volumetric accuracy (optional) are incorporated.
• There is no worktable: the workpiece is set down directly on the base (floor) ready for measuring.
• Three Beyond-STRATO 2000 models are available: Model 2030 (2005x3005x1505mm), Model 2040 (2005x4005x1505mm), and Model 2050 (2005x5005x1505mm).
**LEGEX 322**

**SERIES 356 — Ultra-high Accuracy CNC CMM**

**FEATURES**
- Industry’s first compact CNC CMM that achieves the ultra-high accuracy of MPEE=(0.8+2L/1000)µm (when using the TP7M touch-trigger probe).
- The fixed bridge structure and precision air bearings running on highly rigid guideways ensure superior motion stability and ultra-high geometrical accuracy.
- Suitable for measuring ultra-high-precision workpieces.

![LEGEX 322](image)

**LEGEX 500/700/900/1200 Series**

**SERIES 356 — Ultra-high Accuracy CNC CMM**

**FEATURES**
- The world’s most accurate*1 CNC CMM family is launched, made possible by rigorous analysis of all possible error-producing factors and elimination or minimization of their effects.
- A newly developed, ultra-high accuracy crystallized glass scale with the ultra-low expansion coefficient of 0.01x10^-6/°C is used on each axis.
- The fixed bridge structure and precision air bearings running on highly rigid guideways ensure superior motion stability and ultra-high geometrical accuracy.
- A wide variety of optional probes such as touch-trigger probes, laser scanning probes, and a vision measuring probe are available.

*1: As of March 2004.

<table>
<thead>
<tr>
<th>Model No.</th>
<th>LEGEX 322</th>
</tr>
</thead>
<tbody>
<tr>
<td>X-axis</td>
<td>300mm (12&quot;)</td>
</tr>
<tr>
<td>Y-axis</td>
<td>200mm (8&quot;)</td>
</tr>
<tr>
<td>Z-axis</td>
<td>200mm (8&quot;)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Model No.</th>
<th>LEGEX 374</th>
<th>LEGEX 774</th>
<th>LEGEX 776</th>
<th>LEGEX 9106</th>
<th>LEGEX 12128</th>
</tr>
</thead>
<tbody>
<tr>
<td>Range</td>
<td>X-axis</td>
<td>510mm (20&quot;)</td>
<td>710mm (28&quot;)</td>
<td>710mm (28&quot;)</td>
<td>910mm (36&quot;)</td>
</tr>
<tr>
<td></td>
<td>Y-axis</td>
<td>710mm (28&quot;)</td>
<td>710mm (28&quot;)</td>
<td>710mm (28&quot;)</td>
<td>1010mm (40&quot;)</td>
</tr>
<tr>
<td></td>
<td>Z-axis</td>
<td>455mm (18&quot;)</td>
<td>455mm (18&quot;)</td>
<td>605mm (24&quot;)</td>
<td>605mm (24&quot;)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Model No.</th>
<th>LEGEX 374</th>
<th>LEGEX 774</th>
<th>LEGEX 776</th>
<th>LEGEX 9106</th>
<th>LEGEX 12128</th>
</tr>
</thead>
<tbody>
<tr>
<td>Resolution</td>
<td>0.00001mm (0.000001&quot;)</td>
<td>0.00001mm (0.000001&quot;)</td>
<td>0.00001mm (0.000001&quot;)</td>
<td>0.00001mm (0.000001&quot;)</td>
<td>0.00001mm (0.000001&quot;)</td>
</tr>
</tbody>
</table>

| Accuracy at 20±2°C | MPEE=(0.45+L/1000)µm/ (0.35+L/1000)µm**<br>ISO10360-2 | MPEE=(0.45+L/1000)µm/ (0.35+L/1000)µm**<br>TP7M/MMPP300Q | MPEE=(0.45+L/1000)µm/ (0.35+L/1000)µm**<br>TP7M/MMPP300Q | MPEE=(0.45+L/1000)µm/ (0.35+L/1000)µm**<br>TP7M/MMPP300Q | MPEE=(0.45+L/1000)µm/ (0.35+L/1000)µm**<br>TP7M/MMPP300Q |
| Max. drive speed | 300mm/sec | 300mm/sec | 300mm/sec | 300mm/sec | 300mm/sec |
| Max. acceleration | 0.1G | 0.1G | 0.1G | 0.1G | 0.1G |
| Max. table loading | 200kg | 500kg | 500kg | 800kg | 1000kg |

*The machine is equipped with the temperature compensation system.

Temperature variation: 0.5K (per hour), 1.0K (per day)
Temperature gradient (vertical and horizontal): 1.0K/m

**LEGEX 12128**

![LEGEX 12128](image)
**Car Body Measuring System**

**FEATURES**
- A large, horizontal-type CNC CMM for measuring car bodies.
- Two types are available: a single-head type which measures with one head only and a dual-head type which measures by controlling two heads simultaneously, one from each side.
- Contact mode, touch-trigger probing is usual but non-contact, high-speed data collection is possible by using laser probes.
- Dedicated software based on proven, conventional software with additional functionality, such as a measuring point retrieval function for car body measurement, is available.

**MACH 403/806**
**SERIES 360 — In-line Type CNC CMM**

**FEATURES**
- Easy and high-speed (1800mm/s max.) measurement for in-line use.
- Horizontal-arm structure allows measurement of bulky workpieces.

<table>
<thead>
<tr>
<th>Car Body Measuring System</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Range</strong> (mm)</td>
<td>X-axis 6000 (236&quot;)</td>
</tr>
<tr>
<td><strong>Resolution</strong></td>
<td>0.001mm (.00004&quot;)</td>
</tr>
<tr>
<td><strong>Accuracy (16 to 26°C)</strong></td>
<td>Single head MPEE=(25+28L/1000)µm**&lt;sup&gt;**&lt;/sup&gt;</td>
</tr>
<tr>
<td><strong>Traverse speed</strong></td>
<td>500mm/sec (each axis)</td>
</tr>
<tr>
<td><strong>Measuring speed</strong></td>
<td>5mm/sec</td>
</tr>
<tr>
<td><strong>Acceleration</strong></td>
<td>0.12G (0.2G: combination of 3 axes)</td>
</tr>
</tbody>
</table>

- Machines to cover measuring ranges up to 1800mm in the X-axis, 2000mm in the Y-axis, and 3500mm in the Z-axis can be produced.
- **L**: Measuring length (mm)

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**MACH 403-04**
**MACH 806-10**

<table>
<thead>
<tr>
<th>Model No.</th>
<th>MACH 403-04</th>
<th>MACH 806-10</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Range</strong> (mm)</td>
<td>X-axis 460 (18&quot;)</td>
<td>1021 (40&quot;)</td>
</tr>
<tr>
<td></td>
<td>Y-axis 460 (18&quot;)</td>
<td>818 (32&quot;)</td>
</tr>
<tr>
<td></td>
<td>Z-axis 615 (24&quot;)</td>
<td>615 (24&quot;)</td>
</tr>
<tr>
<td><strong>Resolution</strong></td>
<td>0.0001mm (.000004&quot;)</td>
<td></td>
</tr>
<tr>
<td><strong>Accuracy</strong></td>
<td>Under temperature condition 15°C to 25°C: MPEE=(3.5+4L/1000)µm**&lt;sup&gt;**&lt;/sup&gt;</td>
<td></td>
</tr>
<tr>
<td><strong>ISO10360-2</strong></td>
<td>MPEE=4 (when using MTP1000 probe)</td>
<td></td>
</tr>
<tr>
<td><strong>Temperature</strong></td>
<td>Under temperature condition 10°C to 35°C: MPEE=(3.5+4L/1000)µm**&lt;sup&gt;**&lt;/sup&gt;</td>
<td></td>
</tr>
<tr>
<td><strong>Temperature Gradient</strong></td>
<td>MPEE=4 (when using MTP1000 probe)</td>
<td></td>
</tr>
</tbody>
</table>

- Real-time temperature correction is available.
- Temperature variation: 2.0K (per hour), 5.0K (per day)
- Temperature gradient (vertical and horizontal): 1.0K/m
- **L**: Measuring length (mm)
MCOSMOS

Three levels of module configuration
MCOSMOS has three choices of module configuration. From the simple set of MCOSMOS-1 to the advanced set of MCOSMOS-3, you can choose a best configuration for your measurement applications.

MCOSMOS-3
- Geometric Measuring Module [GEOPAK]
- CAD Based Prismatic Programming Module [CAT300]
- 3D Scanning Module including Data Transfer Module [SCANPAK]
- CAD Based 3D Surface Analysis Module [3D-TOL]

MCOSMOS-2
- Geometric Measuring Module [GEOPAK]
- CAD Based Prismatic Programming Module [CAT300]

MCOSMOS-1
- Geometric Measuring Module [GEOPAK]

Probes for Mitutoyo CMM

- MIP Manual Indexable Touch-signal Probe
- TP20 Touch-signal Probe
- TP200 Touch-signal Probe
- MPP-300 High Accuracy Scanning Probe
- MPP-100 High-spec Scanning Probe
- MTP2000 High Accuracy Touch-signal Probe
- MPP-10 Effective Screw Depth Measuring Probe
- SP2SM/SP80 Scanning Probe
- QVP Vision Probe
METRIS Laser Scanning Probe

Laser scanning probes and powerful data comparison software (CADcompare) definitely provide a new way of handling complex geometry. In combination with the CMM, this represents the best solution for in-depth inspection of prototype components using pointclouds.

FEATURES
- Two models are available: XC50, 3D laser scanning probe and LC15/50/100, line laser scanning probe.
- Can be used with Mitutoyo CMMs.
- Workpiece geometries can be captured and stored on a PC as pointcloud data together with the component’s coordinate system.
- CADcompare, the powerful data comparison software, reads in CMM scanned data and pointclouds (in ASCII, STL and most scanner formats). The CAD geometry definitions can be input in various formats (STEP, IGES, VDA).
- Evaluation results can be printed out.

APPLICATIONS
- Sheet metal
- Castings
- Car body & panels
- Windshields
- Automotive seating
- Injection molds
- Complex plastic parts
- Turbine blades and many more
The QM-Measure employs a unique “open space” structure to make workpiece loading/unloading easy. This also allows the shop operator to approach the workpiece without obstruction by the machine column.

In choosing this unique structure, Mitutoyo has determined the QM-Measure’s body design through the FEM (Finite-Element Method) analysis so that the machine deformation during probing is minimized and evened. The optimized machine design achieves a competent measuring accuracy of (3.0+4L/1000) µm and very smooth probing with minimum operation fatigue.

If the QM-Measure is required to evaluate the workpiece dimension at 20°C temperature, and shop or workpiece temperatures are not at 20°C, an optional Temperature Compensation System can be installed. It can expand the operation temperature range to 15°C - 30°C.

**SPECIFICATIONS**

<table>
<thead>
<tr>
<th>Model No.</th>
<th>QM-Measure 333</th>
<th>QM-Measure 353</th>
</tr>
</thead>
<tbody>
<tr>
<td>Measuring range</td>
<td>300mm (12&quot;)</td>
<td>300mm (12&quot;)</td>
</tr>
<tr>
<td></td>
<td>300mm (12&quot;)</td>
<td>500mm (20&quot;)</td>
</tr>
<tr>
<td>Z-axis</td>
<td>300mm (12&quot;)</td>
<td>300mm (12&quot;)</td>
</tr>
<tr>
<td>Length standard</td>
<td>Precision linear encoder</td>
<td></td>
</tr>
<tr>
<td>Resolution</td>
<td>0.0005mm (.00002&quot;)</td>
<td></td>
</tr>
<tr>
<td>Accuracy (20°C±1°C)*</td>
<td>E = (3.0+4L/1000)µm, R = 4.0µm (.00016&quot;)</td>
<td></td>
</tr>
<tr>
<td>Guide method</td>
<td>Air bearing for each axis</td>
<td></td>
</tr>
<tr>
<td>Clamping method</td>
<td>Clamping screw</td>
<td></td>
</tr>
<tr>
<td>Fine feeding device</td>
<td>Optional (10mm/.4&quot; stroke)</td>
<td></td>
</tr>
<tr>
<td>Z-axis balance</td>
<td>Counterweight</td>
<td></td>
</tr>
<tr>
<td>Measuring table</td>
<td>Optional (aluminum or granite sub-plate)</td>
<td></td>
</tr>
<tr>
<td>Machine stand</td>
<td>Optional</td>
<td></td>
</tr>
<tr>
<td>Workpiece loading</td>
<td>Maximum height: 410mm (16.14&quot;)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Maximum mass: 30kg (66 lbs.)</td>
<td></td>
</tr>
<tr>
<td>Air pressure</td>
<td>0.35MPa or 51PSI</td>
<td></td>
</tr>
<tr>
<td>Air consumption</td>
<td>50L/min. (in normal state) or 1.8CFM</td>
<td></td>
</tr>
<tr>
<td>Mass**</td>
<td>QM-Measure</td>
<td>130kg (286 lbs.)</td>
</tr>
<tr>
<td></td>
<td>170kg (374 lbs.)</td>
<td></td>
</tr>
<tr>
<td>QM-Data</td>
<td>1.2kg (2.6 lbs.)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>1.2kg (2.6 lbs.)</td>
<td></td>
</tr>
</tbody>
</table>

* ISO 10360-2  
  E: Error of indication of volumetric length measurement  
  L: Measuring length (mm)  
  R: Probing error (with TP2 touch signal probe)  
** Excluding the optional machine stand.

**OPTIONAL ACCESSORIES**

- 06ABQ040A: Ceramic master ball
- 06AAAY484: Machine stand (table top H=750mm)
- 06AAAX288: Machine stand (table top H=650mm)
- 06AAAX763: Granite sub-plate for QM-Measure 333
- 06AAAX917: Granite sub-plate for QM-Measure 353
- 06AAD671: Clamping unit
- 06AAAY251: Fine feeding device (10mm/.4" stroke)
- 937179T: Foot switch
- 06AAAX263: Floppy disk drive
- 06AAAX265: Printer (120V)
- 06AAAX266: Printer (230V)
- 908353: Printer paper (5 rolls)

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**DIMENSIONS**

- Unit: mm

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1: Fine feeding device  
2: Temperature compensation unit  
3: Sub-plate  
4: Machine stand
**Intuitive Icons* for Gage-like Measurement**
The QM-Data operates as a "Gage-like" instrument. Instead of the troublesome data entry by computer keyboard or pull-down menu selection, the QM-Data provides 5 "Gage-like measurement" menu displays including 43 1D/2D/3D geometric element icons.
Just press the representative function key of the element icon to be measured, and then touch a workpiece feature with a touch trigger probe. The QM-Data immediately calculates the measured geometry and displays the result on the large LCD panel. The shop operator can ignore the complicated 3D coordinate system setup during the measurement.

*The copyright of the software and icons used are owned by Mitutoyo Corporation.*

**Multiple Language Support**
The operation language is available in English, Japanese, German, French, Italian, Spanish, Portuguese.

**Mitutoyo “AI” Function**
Furthermore when using "AI" function, even the geometric feature selection can be skipped. The QM-Data identifies from the input data what geometric feature is measured, then shows the graphic display and calculates the dimensions automatically. This allows the operator to continue the measurement without interruption using key-stroke.

**Interactive Graphic Display**
After the geometric element is selected, the QM-Data draws a graphic of the feature on the LCD panel including number of input points and position to be required. This allows the operator to perform the measurement with accurate data collection.

The last input point is measured, the QM-Data immediately shows the measurement result.

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**For Advanced Measurement**
In addition to the Gage-like measurement menus the QM-Data provides experienced operators with advanced functions equal to a standard CMM software.

**Coordinate System Customization for Experienced Operators**
If the 3D coordinate system automatically generated in the Gage-like measurement is not suitable for your workpiece, the QM-Data offers the operator a choice of twelve additional coordinate system setup patterns.