Welcome to Mitutoyo
Business Criteria

Corporate Principle
Aiming at the best in the field of specialty. Contributing to spiritual well-being through introducing Oriental culture.

Corporate Slogan
PRECISION IS OUR PROFESSION

Corporate Motto
Good Environment
Good People
Good Techniques
Mitutoyo has started from . . .

Mitutoyo first micrometer was produced in 1934.
<table>
<thead>
<tr>
<th>Year</th>
<th>Event</th>
</tr>
</thead>
<tbody>
<tr>
<td>1934</td>
<td>Yehan Numata founded Mitutoyo Manufacturing Co. Ltd. in Tokyo.</td>
</tr>
<tr>
<td>1963</td>
<td>Mitutoyo America Corporation in U.S.A. (first local corporation)</td>
</tr>
<tr>
<td>1968</td>
<td>Mitutoyo Meßgeräte GmbH in Germany</td>
</tr>
<tr>
<td>1973</td>
<td>Mitutoyo Canada, Inc.</td>
</tr>
<tr>
<td>1974</td>
<td>Mitutoyo do Brazil Industria e Comercio Ltda.</td>
</tr>
<tr>
<td>1975</td>
<td>Mitutoyo Metrology Institute in Japan</td>
</tr>
<tr>
<td>1978</td>
<td>Mitutoyo Asia Pacific Pte. Ltd. in Singapore</td>
</tr>
<tr>
<td>1980</td>
<td>Mitutoyo (U.K.) Ltd. and Mitutoyo Mexicana S.A. de C.V.</td>
</tr>
<tr>
<td>1981</td>
<td>Mitutoyo Nederland B.V.</td>
</tr>
<tr>
<td>1982</td>
<td>Mitutoyo Belgium N.V.</td>
</tr>
<tr>
<td>1986</td>
<td>Mitutoyo France S.A.R.L.</td>
</tr>
<tr>
<td>1990</td>
<td>European Research Laboratory in the Netherlands, Akashi Corporation in Japan</td>
</tr>
<tr>
<td>1994</td>
<td>Mitutoyo Korea Service Corporation</td>
</tr>
<tr>
<td>1996</td>
<td>Mitutoyo South Asia Pvt. Ltd. in India</td>
</tr>
<tr>
<td>1998</td>
<td>Mitutoyo Measuring Instruments (Suzhou) Co., Ltd. in China</td>
</tr>
<tr>
<td>2001</td>
<td>Mitutoyo Measuring Instruments (Shanghai) Co., Ltd in China</td>
</tr>
<tr>
<td>2002</td>
<td>Mitutoyo Polska Sp.z o.o. in Poland and Mitutoyo Cesko, s.r.o. in Czech</td>
</tr>
<tr>
<td>2003</td>
<td>Mitutoyo Measuring Instruments (Tianjin) Co., Ltd. in China</td>
</tr>
<tr>
<td>2004</td>
<td>Assignment of business (Akashi Co. to Mitutoyo Co.)</td>
</tr>
</tbody>
</table>
By collaborating with global laboratories and R&D centers, Mitutoyo develops technologies and products to provide the best solution of the time.

**Europe**
- Germany: CTL
- Netherlands: Mitutoyo Research Center Europe B.V.

**Japan / Asia**
- Japan: Kawasaki R&D Center
- Japan: Mitutoyo Tsukuba Laboratory
- Japan: MSTI

**America**
- U.S.A.: CTL (Chicago)
- U.S.A.: CTL (Los Angels)
- U.S.A.: Micro Encoder, Inc. (Seattle)

**Total: 8 R&D lab./centers**
To respond to the customer demands quickly, Mitutoyo has established 16 plants in the world at the best-suited locations.

**Europe**
- Netherlands: CMM

**Japan**
- Utsunomiya Mfg. Dept. 1&2
- Kiyohara Mfg. Dept.
- Nakatsugawa Plant
- Shiwa Mfg. Dept.
- Gohara Mfg. Dept.
- Onomi Mitutoyo
- Kawasaki R&D Center
- Kure Mfg. Dept.
- Yasuura Mfg. Dept.
- Miyazaki Mfg. Dept.

**Asia**
- China (Suzhou): Caliper, Height gage, Surface plate
- Mexico: Stand, Profile Projector
- Brazil: CMM, Caliper

**America**
- U.S.A. (Chicago): CMM
- Mexico: Stand, Profile Projector
- Brazil: CMM, Caliper
Providing attentive sales and top quality service are Mitutoyo’s aim. We always put ourselves in the place of customers when implementing our sales and services.

**Europe**
- U.K. (4)
- France (4)
- Italy (6)
- Netherlands
- Belgium
- Germany (6)
- Switzerland
- Sweden (3)
- Czech
- Poland
- Hungary

**Japan / Asia**
- Japan (41)
- India (3)
- Singapore
- Malaysia (3)
- Indonesia
- Philippine
- Vietnam (2)
- Thailand (2)
- China (7)
- Taiwan (3)
- Korea (2)

**America**
- U.S.A. (9)
- Canada (2)
- Mexico
- Brazil (5)
- Argentina

**Main Agents**
- Portugal
- Spain
- Norway
- Finland
- Hungary
- Turkey
- Israel
- South Africa

**Mitutoyo Sales and Service Offices**
- Portugal
- Spain
- Norway
- Japan / Asia
- China
- New Zealand
- Argentina
- Brazil
- Mexico
- Canada
Mitutoyo provides the optimum solutions to customer’s measurement issues speedily. To meet requests from customers in the world, Mitutoyo established global M³ Solutions in Americas, Europe and Asia that cooperate with each other.
A wide range of measurement solutions can be provided by the qualified engineers at the nearest M₃ Solution Center.

**Europe**
- U.K. (4)
- France (4)
- Italy (6)
- Netherlands
- Belgium
- Germany (6)
- Switzerland
- Sweden (3)
- Czech
- Poland
- Hungary

**Japan / Asia**
- Japan (8)
- India
- Singapore
- Vietnam (2)
- Malaysia (3)
- China (6)
- Indonesia
- Philippine
- Taiwan
- Thailand (2)
- Korea (2)
- Australia
- New Zealand
- China

**America**
- U.S.A. (9)
- Canada (2)
- Mexico
- Brazil (5)
- Argentina
- Colombia
- Chile

**Other**
- Portugal
- Spain
- Norway
- Finland
- Hungary
- Turkey
- Israel
- South Africa
- Portugal
- Spain
- Norway
- Finland
- Hungary
- Turkey
- Israel
- South Africa
The Mitutoyo Metrology Institute was started with a philosophy “A person must be created before an object is”. It is open to people in various fields.

**Europe**
- U.K.
- France
- Italy
- Germany

**Japan / Asia**
- Japan (2)
- Singapore
- Taiwan

**Introduction of major courses**
- Employee course
- Trading company course
- User’s course
- ON-site training course
- Course for Mitutoyo agency/distributor and cooperated company
- Staff training course
- Others (for public organization)
- Overseas-engineer course

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**Textbooks**

Mitutoyo Metrology Institute in Kawasaki, Japan
Mitutoyo implements calibration service in 17 countries as an accredited laboratory to help customer’s quality management and quality assurance program.

Total: 20 laboratories (17 countries)

Europe
- U.K.
- Germany
- Italy
- Netherlands
- Switzerland
- Sweden

Mitutoyo Accredited Calibration Laboratory

Japan / Asia
- Japan (4)
- Singapore
- Malaysia
- Thailand
- Indonesia
- Taiwan
- China

Japan: Mitutoyo Tsukuba Laboratory

Gauge Block Interferometer

America
- U.S.A.
- Mexico
- Brazil
- Argentina
Mitutoyo implements calibration service in 17 countries as an accredited laboratory to help customer’s quality management and quality assurance program.
Mitutoyo
Production Site
Mitutoyo Production Site

Caliper
Micrometer
Dial Indicator
CMM
Vision Measuring Machine
Forms
Profile Projector
Microscope
Lens
Sensor
Linear scale
Gauge Block

Hardness Testing Machines
Granite Products
Caliper Production Site

Caliper and Digital Caliper

ABSOLUTE Coolant Proof Caliper

Dial Caliper

Caliper

Laser Cutting

Machining Line

Fully automatic inspection system
Micrometer Production Site

Micrometer and Digital Micrometer

Digimatic micrometer

Micrometer

Metal Casting

Micrometer Frame

Machining Line

Assembling Machine

Automatic inspection system
Micrometer Head Production Site

Micrometer Head and Digital Micrometer Head

Machining site

Laser marking site

Micrometer head

Digimatic micrometer head

Laser marking
Dial Gage Production Site

Dial Gage and Digital Indicator

Digital indicator

Dial indicator

Dial test indicator

NC Machining Line

Automatic assembly line
Electrical Module Production Site

Caliper, Micrometer and Dial Gage

ABSOLUTE Coolant Proof Caliper

Digimatic micrometer

Digital indicator

Wire bonder with plasma cleaner

Surface mounting line

Automated assembly line

Electronic Module Line
CMM Production Site

Ultra high-accuracy Legex

In-line CMM Mach

Standard CNC CMM Crysta-Apex C

Manual CMM Crysta-Plus M

CNC Surface Grinding Machine

Accuracy check by glass gauge block with extremely low thermal expansion coefficient

CNC Machining Center and CMM (Data feedback system)

Assembly line
Profile Projector Production Site

CO₂ Welding Robot
Painting Robot
Lens Units
Assembly Site
Assembling Lens Unit in Clean Room
**Microscope Production Site**

- **Ultra-high accuracy measuring microscope**
  - Hyper MF series

- **Metaluzical microscope**
  - MF series

- **Measuring microscope**
  - FS-300

- **Microscope unit**
  - FS70

- **Measuring microscope**
  - TF series

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**Machining Site**

- **Table Units**

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**Assembly Site**

- **Assembling Lens Unit in Clean Room**

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**Lens Units**
Optical Lens Production Site

Lens

- Long working distance objectives
- M PLAN NIR
- M PLAN NUV
- M PLAN UV

- High-speed polishing
- Lenses coated in vacuum evaporation furnace
- Measurement of optical component
- Process line for centering lens
Laser Scan Micrometer Production Site

Laser scan micrometers

Assembly line

Optical Parts

Inspection system

Automatic inspection system
Linear Scale Production Site

**Linear Scale and Separate scale**

- Linear scale
- Laser holography scale

**Underground research laboratory in Kiyohara plant**

**Clean room**

- 3-m length vacuum deposition machine
- 1.6-m ultra-high precision measuring system using vacuum laser interferometer
Gage Block Production Site

Gage Block

Square Block

Ring Gage

High-accuracy Lapping Machines Line

Automatic Gauge Block Inspection System
Hardness Testing Machines Production Site

- **Vickers Hardness Testing Machine + VLPACK2000**
- **Micro Vickers Hardness Testing Machine**
- **Vickers Hardness Testing Machine**
- **Rockwell Hardness Testing Machine**

Additional images show a production line, sub assemble units, assembly line, and inspection tools.
Granite Surface Plate Production Site

CNC Granite Surface Plate
Drilling Machine

CNC Surface Grinding Machine

Machining Center

Grinding

Drilling
Utilizing the FEM analysis, the experimental modal analysis, the thermal analysis, etc. in the design process, to achieve reliable measuring instruments with high stiffness, high vibration-resistance, and high quality.
Mechanical Technology

Casting

3D CAD

CAE (Solidification analysis)

Casting Site

Setup robot for shell mold casting

Directly pouring system from dissolution furnace to lost wax casting mold
Mechanical Technology

Machining Site (Data Feedback System: CorrectPlus)

Machining (M/C) → Measurement (CMM) → Modifying NC Part Program Parameter → Data feedback

CMM

M/C

Part No. 123456789 1 0 1 1 1 2 1 3

TOL(+) TOL(-) ACT

Correction ON

DIM 1
Various encoders produced by excellent environment and equipments

Processing room (Kiyohara plant)

Bump bonder

Chip on Glass (COG)
Electronic Technology

Custom IC from Designing to Assembling

Circuit design → Customized 1-chip IC → Electronic modules
To integrally manage measurement data, Mitutoyo develops and reviews the “MeasurLink” software that connects measurement data by all measuring instruments including measuring tools, form measuring instruments, vision measuring machines, hardness testers, and CMMs, to form a global network.
Mitutoyo Standard Laser

633-nm iodine stabilized He-Ne laser

Laser to be calibrated

Appealing Points

• Best Measurement Capability (BMC) of wavelength calibration by Mitutoyo standard laser:
  \[5.0 \times 10^{-11} \ (k = 2)\]

• Mitutoyo is the best accredited laboratory.

CALIBRATION DATA

Date: 2002/04/15
Laser Head: 5518A(Ser.No.2532A01416)
Center wavelength: 632.991 372 fm
Stability: 9.5E-10

JCSS: Japan Calibration Service System

JCSS Certificate
Evaluation Technology

Ultra-Accurate Length Measuring System

1.6-m ultra-high precision measuring system using vacuum laser interferometer

Uncertainty of measurement (k = 2):

\[ 9 \text{ nm} + 1.8 \times 10^{-8} L \]

(L: Measuring length)

- Ultra-accurate length measuring system with a measuring length of 1.6 m that is the longest in the world for systems including a vacuum interferometer.
- Having received JSPE Paper Award (2005);
- Having received JSPE Technology Development Award (2002);
- Presentation was made at 159. PTB-Seminar (Nov. 2001);
- Presentation was made at IMEKO TC14 (Sep. 2002), etc.

(JSPE: Japan Society for Precision Engineering)

(IMEKO: International Measurement Confederation)
Calibration Uncertainty:

$$U = \left(0.21 + 0.5 \frac{L}{1000}\right) \mu m$$

($k = 2$, $L$: Length [mm])
Evaluation Technology

CIRP Interlaboratory Comparison

CIRP Interlaboratory Comparison on “Form Measurement” 1996-1998
Participants: 9 countries, 18 institutes
CIRP: International Institution for Production Engineering Research (French institution)

Measurement Result of 5 Artifacts:
Measured values by Mitutoyo and PTB coincide to each other well.

Five Artifacts in CIRP Interlaboratory Comparison on “Form Measurement”
MEMS Technology

UMAP probe / Micro EDM

MEMS: Micro Electro Mechanical Systems

Micro EDM

20 µm

30 µm

6 µm
MEMS Technology

MEMS: Micro Electro Mechanical Systems

MEMS equipment

ICP Etching Equipment for Si-MEMS

Used as the sensor of the seismometer
MEMS Technology

MEMS: Micro Electro Mechanical Systems

MEMS equipment

UV Laser Beam Exposure Equipment

Usage:
Sub-micrometer pattern scale exposure

(Sub-micrometer pattern example)

High-resolution scale prototype
Mitutoyo Industrial Contribution

Transmission of Skills
  Meister System
  Expert Training System

Award
  Technology Development Award
  Good Design Award
  Verdienstkreuz erster Klasse des Verdienstordens

Oriental Culture
Transmission of Skills

**Meister System**

Employees having excellent skills and techniques are appointed as “Meister” or “Assistant Meister” to transmit their high or special skills and techniques and to raise the younger generation.

Examples of skills & techniques

- Ultra-precise machining (Lapping, Finishing)
- Lens polishing
- Machine assembly & maintenance
- Measurement & Calibration

Appointed number by “Meister System”

- Meister : 3
- Assistant Meister : 4
Employees have a chance of receiving the Skill Up Training held in the 1-year Expert School in Mitutoyo, which school has been qualified by Japanese Government.

Entrance ceremony of 1-year Expert School in Mitutoyo

Training scene 1

Training scene 2

Training scene 3
## Transmission of Skills

### Expert Training System

<table>
<thead>
<tr>
<th>Category</th>
<th>Number of licensed employees</th>
</tr>
</thead>
<tbody>
<tr>
<td>Machining</td>
<td>413</td>
</tr>
<tr>
<td>Finishing</td>
<td>247</td>
</tr>
<tr>
<td>Machine inspection</td>
<td>496</td>
</tr>
<tr>
<td>Machine and plant drafting</td>
<td>102</td>
</tr>
<tr>
<td>Electric equipment assembly</td>
<td>1</td>
</tr>
<tr>
<td>Foundry</td>
<td>18</td>
</tr>
<tr>
<td>Electronic equipment assembly</td>
<td>57</td>
</tr>
<tr>
<td>Industrial sheet metal</td>
<td>6</td>
</tr>
<tr>
<td>Metal plating</td>
<td>6</td>
</tr>
<tr>
<td>Smelting</td>
<td>3</td>
</tr>
<tr>
<td>Metal mold making</td>
<td>1</td>
</tr>
<tr>
<td>Heat treatment of metals</td>
<td>2</td>
</tr>
<tr>
<td>Technical illustration</td>
<td>2</td>
</tr>
<tr>
<td>Painting</td>
<td>2</td>
</tr>
<tr>
<td>Machine maintenance</td>
<td>6</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>1362</strong></td>
</tr>
</tbody>
</table>

License examination scene

Aug. 2003
Awards by Japan Society for Precision Engineering


JSPE: Japan Society for Precision Engineering

1.6-m Ultra-High Precision Measuring System Using Vacuum Laser Interferometer

Technology Development Award

Paper Award
Mitutoyo introduces the Oriental culture to the world.