

Mitutoyo Precision Measuring Machines Trusted Throughout the World

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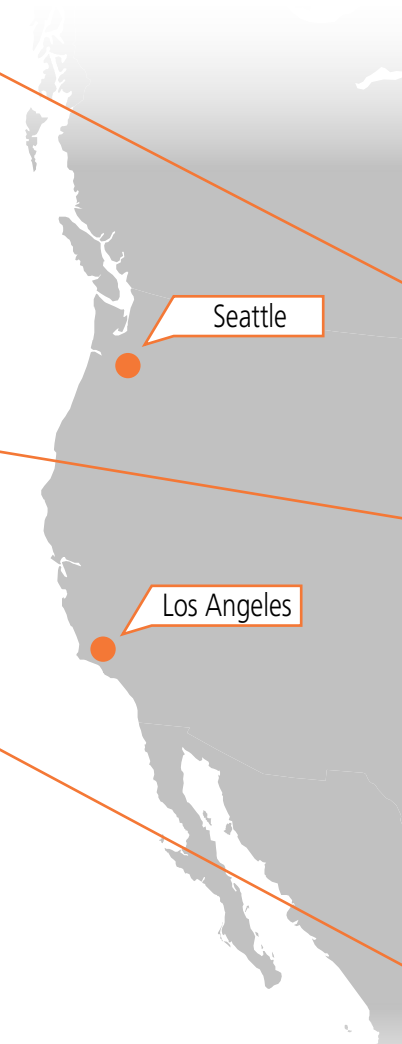
Mitutoyo America Corporation

Established in 1963, Mitutoyo America Corporation has locations all across the United States and Canada, including corporate offices, sales offices, M³ Solution Centers, calibration and repair laboratories, and research and development facilities. Mitutoyo America offers a full product line of precision measuring tools, instruments and equipment. Mitutoyo provides a comprehensive metrology organization, with dependable product and technical support, state-of-the-art calibration and repair services, unmatched education and training programs and cutting-edge research and development.

As the leading metrology company in the world, Mitutoyo is committed to future product development that applies breakthrough technologies to its full range of dimensional measurement tools, instruments and systems. With the belief that providing high-quality metrology goods and services to its customers will in turn, allow its customers to provide high-quality product to theirs, Mitutoyo continues to develop the most advanced and sophisticated metrology equipment available. **"Precision is our profession"** is not just the company motto, but also the principle by which every Mitutoyo employee stands when serving our customers.



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M³ Solution Centers

Mitutoyo Tools and instruments can be seen and demonstrated conveniently at any one of nine Mitutoyo M³ Centers nationwide. These centers are fully equipped featuring operational models of the latest Mitutoyo tools and instruments. By appointment or walk-in basis, product demonstrations at M³ Solution Centers are carried out by our experienced, highly trained staff. Contact your Mitutoyo distributor or the Mitutoyo regional office near you for more information.



*M³ = Mitutoyo, Measurement, Metrology



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Company Profile



Product Demonstration / Application Support (M³ Solutions Centers)

With several locations across North America, Mitutoyo's M³ Solutions Centers provide hands-on access to the full range of Mitutoyo precision tools and instruments, including the latest technologies Mitutoyo has to offer. Available to walk-ins or by appointment, highly trained and industry-experienced applications engineers will provide product demonstrations, answer questions and assist in the development of application-specific solutions. Contact your Mitutoyo distributor or the M³ Solutions Center in your area for additional information.

Sales Support / Customer Service

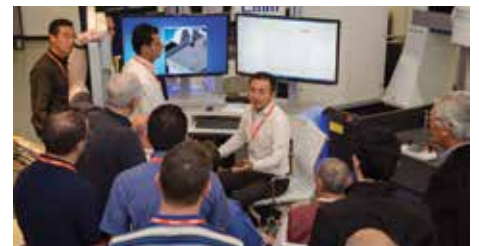
To ensure fast, dependable responses to all product-related questions and needs, Mitutoyo America Corporation's Sales Support group is available to assist with information on all Mitutoyo precision tools and instruments. Friendly, knowledgeable customer service representatives can provide product specifications, availability, and pricing, as well as recommend a local authorized Mitutoyo distributor.

Technical Support Services

Fast technical support for all Mitutoyo precision tools, instruments and software applications is available to distributors and customers through Mitutoyo's technical support services and is only a phone call away. Highly skilled engineers and technicians with knowledge of all Mitutoyo products can provide product information, answer technical questions, and offer application guidance. Contract programming and inspection services utilizing our most advanced technologies are also available.

Software Application Training

To maximize the value of Mitutoyo precision instrument purchases, Mitutoyo America Corporation provides customized training for all CMM, Vision, Form, and data management (MeasurLink) software applications it provides. Highly trained software instructors provide hands-on, one-on-one or group training with content appropriate for all customer needs. Training classes can be arranged at locations throughout North America.





Calibration Services



Mitutoyo America Corporation's calibration laboratory utilizes state-of-the-art technology to calibrate virtually any metrology tool. A2LA accredited (Certificate 0750.01) to ISO/IEC 17025 for testing and calibration labs, this facility employs professional calibration technicians to provide NIST-traceable accuracy certification, as well as calibration services for Mitutoyo and other manufacturer's gages and gage blocks. Canadian calibration laboratory is CLAS accredited to ISO/IEC 17025.

Field Service

Committed to ensuring value and longevity in its products, Mitutoyo America Corporation provides field service for all of its major measuring instrument products. A fully staffed field service department arranges the installation, repair, and A2LA-accredited calibration (Certificate 0750.01) of Mitutoyo metrology instruments. Capable of certifying calibration on any service visit, Mitutoyo's accredited field service technicians get equipment back into production quickly. Service agreements are available at the time of equipment purchase. Canadian field service laboratory is CLAS accredited to ISO/IEC 17025.



Repair Services

Mitutoyo America Corporation's in-house repair facilities are capable of repairing the full range of Mitutoyo precision tools. Skilled technicians provide quality repairs backed by a full 90-day warranty on parts and labor. Repairs are done in either the Aurora, IL, facility or the City of Industry, CA, facility. Repair service is also available in Canada.

Parts Center

Mitutoyo America Corporation's parts center stocks more than 10,000 individual parts for Mitutoyo products. Same day and 24-hour shipping is available for most part requests. For CMM parts, a specialized group is available to provide additional CMM support services. A Mitutoyo product parts catalog is available on CD-ROM through the Parts Center or through a local Mitutoyo distributor.

Company Profile



Mitutoyo Institute of Metrology



The Mitutoyo Institute of Metrology provides educational courses and on-demand resources across a wide variety of measurement related topics including basic inspection techniques, principles of dimensional metrology, calibration methods and GD&T. Through the Mitutoyo worldwide operations, we are the premier educational provider within the quality field. Our seminars are led by experienced professionals at locations across the U.S. For seminars outside the U.S., please visit the Mitutoyo Worldwide site. All courses are approved for Continuing Education Units (CEU) and include a Certificate of Attendance.



CT Lab / MEI (R&D and Software Development)

Mitutoyo America's CT Labs and Micro Encoder Inc. are part of an international network of Mitutoyo research and development facilities charged with developing breakthrough technologies for the company's range of dimensional measurement tools, instruments and systems and for the advancement of the field of metrology. Highly skilled developers and engineers utilize cutting-edge development tools to produce the most advanced and sophisticated metrology software and equipment available. Mitutoyo America Corporation is a Microsoft® Gold Certified Partner, providing the entire organization access to a host of Microsoft® development tools and support, and ensuring that Mitutoyo software applications work reliably in Microsoft® OS and network environments.

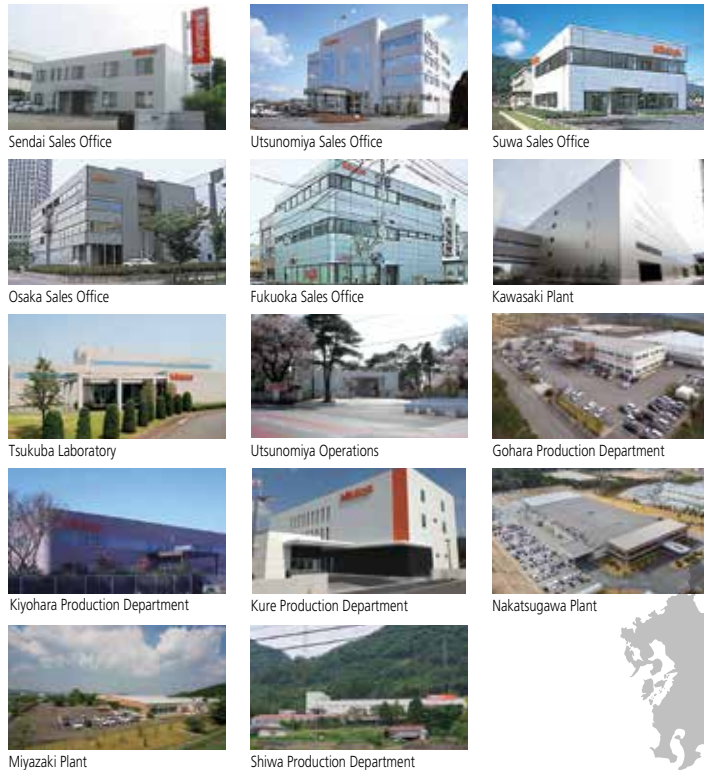
Mitutoyo Custom Solutions

Standard products alone cannot always solve our customers' measuring challenges. That is why we established an engineering group to integrate our equipment into application-engineered custom solutions. Called Sales Solutions, this group can create a solution as simple as fixturing. Other times, the answer may require integration of the latest metrology equipment, process control software and robotics to create an automated metrology cell. Whatever the level of complexity, for application and integration of measurement technologies simple or complex – proven or newly emerging – you can count on Sales Solutions to develop a plan to improve your process capability, productivity and bottom line.



Global Network

Following the establishment of MTI Corporation (U.S.) in 1963, Mitutoyo has been expanding its market throughout the world. Currently, the company has R&D, manufacturing, sales, and engineering service bases in 30 countries, as well as network of distributors in some 80 countries. Mitutoyo maintains its rock-solid status as a leading global manufacturer providing services tailored to each regional society.



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Meaning of Symbols

ABSOLUTE™

ABSOLUTE is a trademark of Mitutoyo Corporation.

ABSOLUTE Linear Encoder

This is an electronic measuring scale that provides a direct readout of absolute linear position when switched on, without needing to be zeroed or reset. Electrostatic, electromagnetic and a combination of electrostatic and optical methods are used in implementing this capability but the key feature is Mitutoyo's patented technology of building absolute positional information into the scale so it can be read at start up. These linear encoders are widely used in Mitutoyo's measuring instruments as the in-built length standard and their use greatly contributes to the generation of highly reliable measurement data, particularly in harsh environments where contamination by cutting fluids, coolants and dust must not affect performance.

Advantages:

1. No count error occurs even if you move the slider or spindle extremely rapidly.
2. You do not have to reset the system to zero when turning on the system after turning it off*1.
3. As this type of encoder can drive with less power than the incremental encoder, the battery life is prolonged to about 3.5 years (continuous operation of 20,000 hours)*2 under normal use.

*1: Unless the battery is removed.

*2: In the case of the ABSOLUTE Digimatic caliper (electrostatic capacitance model).

IP65

IP66

IP67

IP is a trademark of Mitutoyo Corporation.

IP Codes

These codes indicate the degree of protection provided (by an enclosure) for the electrical function of a product against the ingress of foreign bodies, dust and water as defined in IEC standards (IEC 60529: 2001) and JIS C 0920: 2003. [IEC: International Electrotechnical Commission]

First characteristic numeral	Degrees of protection against solid foreign objects	
	Brief description	Definition
0	Unprotected	—
1	Protected against solid foreign objects of $\text{S}\phi 50\text{mm}$ and greater	A $\text{S}\phi 50\text{mm}$ object probe shall not fully penetrate enclosure*
2	Protected against solid foreign objects of $\text{S}\phi 12.5\text{mm}$ and greater	A $\text{S}\phi 12.5\text{mm}$ object probe shall not fully penetrate enclosure*
3	Protected against solid foreign objects of $\text{S}\phi 2.5\text{mm}$ and greater	A $\text{S}\phi 2.5\text{mm}$ object probe shall not fully penetrate enclosure*
4	Protected against solid foreign objects of $\text{S}\phi 1.0\text{mm}$ and greater	A $\text{S}\phi 1.0\text{mm}$ object probe shall not fully penetrate enclosure*
5	Protected against dust	Ingress of dust is not totally prevented, but dust that does penetrate must not interfere with satisfactory operation of the apparatus or impair safety.
6	Dust-proof	No ingress of dust allowed.

*: For details of the test conditions used in evaluating each degree of protection, please refer to the original standard.

Second characteristic numeral	Degrees of protection against water	
	Brief description	Definition
0	Unprotected	—
1	Protected against vertical water drops	Vertically falling water drops shall have no harmful effects.
2	Protected against vertical water drops within a tilt angle of 15 degrees	Vertically falling water drops shall have no harmful effects when the enclosure is tilted at any angle up to 15° on either side of the vertical.
3	Protected against spraying water	Water sprayed at an angle up to 60° either side of the vertical shall have no harmful effects.
4	Protected against splashing water	Water splashed against the enclosure from any direction shall have no harmful effects.
5	Protected against water jets	Water projected in jets against the enclosure from any direction shall have no harmful effects.
6	Protected against powerful water jets	Water projected in powerful jets against the enclosure from any direction shall have no harmful effects.
7	Protection against water penetration	Ingress of water in quantities causing harmful effects shall not be possible when the enclosure is temporarily immersed in water under standardized conditions of pressure and time.
8	Protected against the effects of continuous immersion in water	Ingress of water in quantities causing harmful effects shall not be possible when the enclosure is continuously immersed in water under conditions which shall be agreed between manufacturer and user but which are more severe than for IPX7.

About the TÜV Rheinland certification marks

All products with the marks shown on the left have passed the IP test carried out by the German accreditation organization, TÜV Rheinland.



Measuring Instruments Shipped with Inspection Certificate

Mitutoyo guarantees product quality as a leading precision measuring instrument manufacturer and ships measuring instruments with an inspection certificate that includes inspection data so that customers can use them with confidence.

*For the meaning of inspection marks shown at the left, refer to the detailed description of each product.



MeasurLink ENABLED marks

Products equipped with the measurement data output function can be connected to the measurement data network system MeasurLink. MeasurLink® is a registered trademark of Mitutoyo Corporation in Japan and Mitutoyo America Corporation in the United States.



Installation of Main Unit Startup System

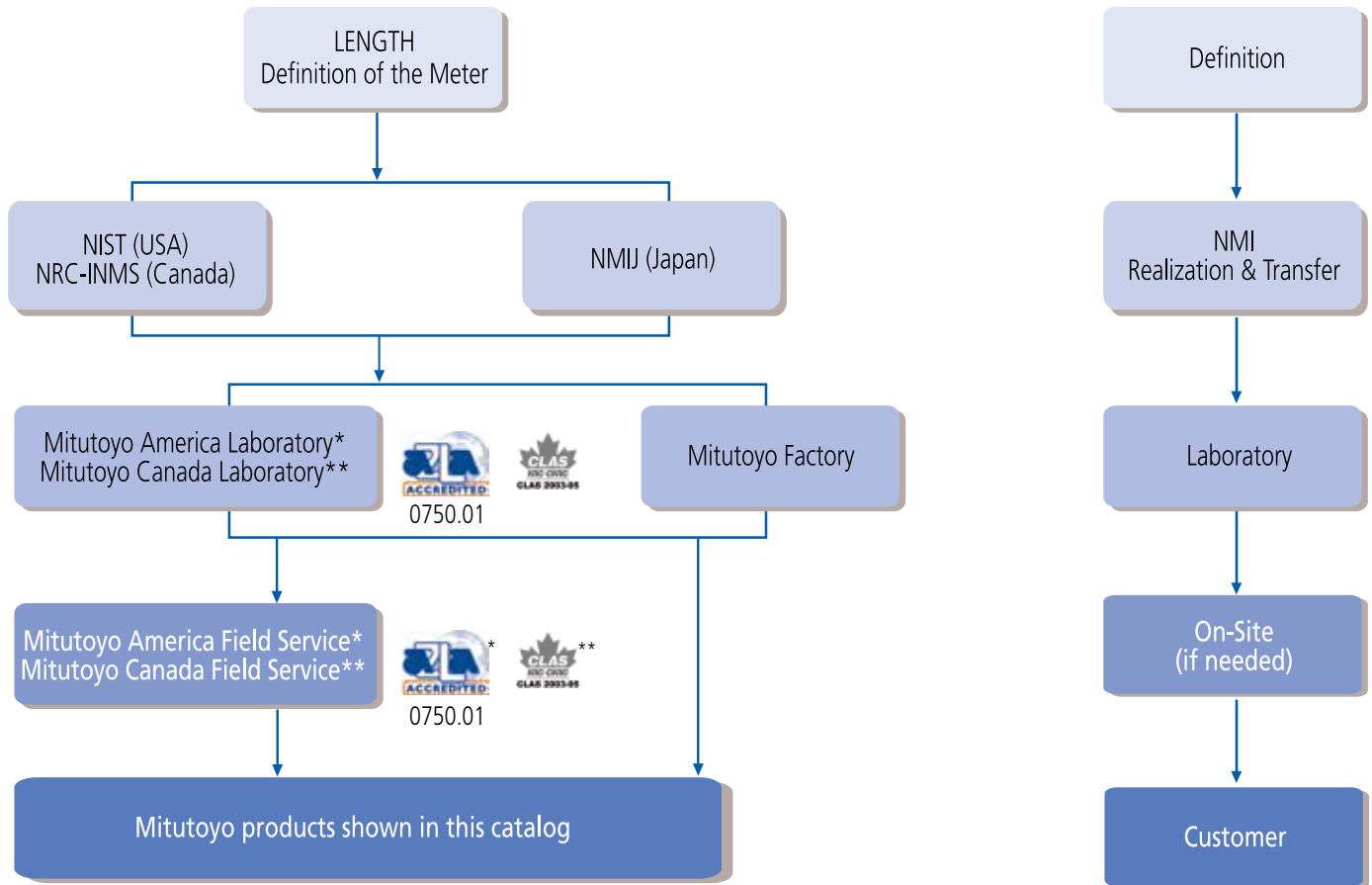
As a part of the enhancement of our export control system, the large CNC measuring machines (all the CNC Coordinate Measuring Machines, Vision Measuring Systems, and Form Measuring Machines) are now equipped with a Main Unit Startup System (relocation detecting system) before export.

This system is designed to take a machine out of operation upon detecting the mechanical shock that accompanies relocation. If you intend to relocate a measuring machine fitted with this system, please contact us beforehand so that our service engineers can assist you.

On the other hand, the system may be triggered in the event of a natural event such as a powerful earthquake. In this case, our service engineers will deal with the situation at the earliest opportunity.

Main Unit Startup System

Traceability Mitutoyo North America



Traceability is an essential requirement for all measurements. At Mitutoyo, we consider providing traceability to our customers to be a critical part of our business. Traceability is often referred to as a “chain of comparisons,” and that chain always starts with a precise definition. For length measurements, the meter is defined by how far light moves in a vacuum in a defined amount of time. The job of reducing that definition into a practical measurement belongs to the world’s National Metrology Institutes (NMI). The NMI in the United States is the National Institute of Standards and Technology (NIST), where they realize and transfer the definition of length to physical measurements of gage blocks, line scales, and other primary standards. From there, traceable measurements at other laboratories and factories are possible. Mitutoyo factories and calibration labs regularly send their standards to NIST; however, traceability can also be established through other recognized NMIs, such as the National Metrology Institute of Japan (NMIJ). The world’s leading NMIs, such as NIST and NMIJ, routinely participate in intercomparisons to ensure global traceability to the same unit of length.

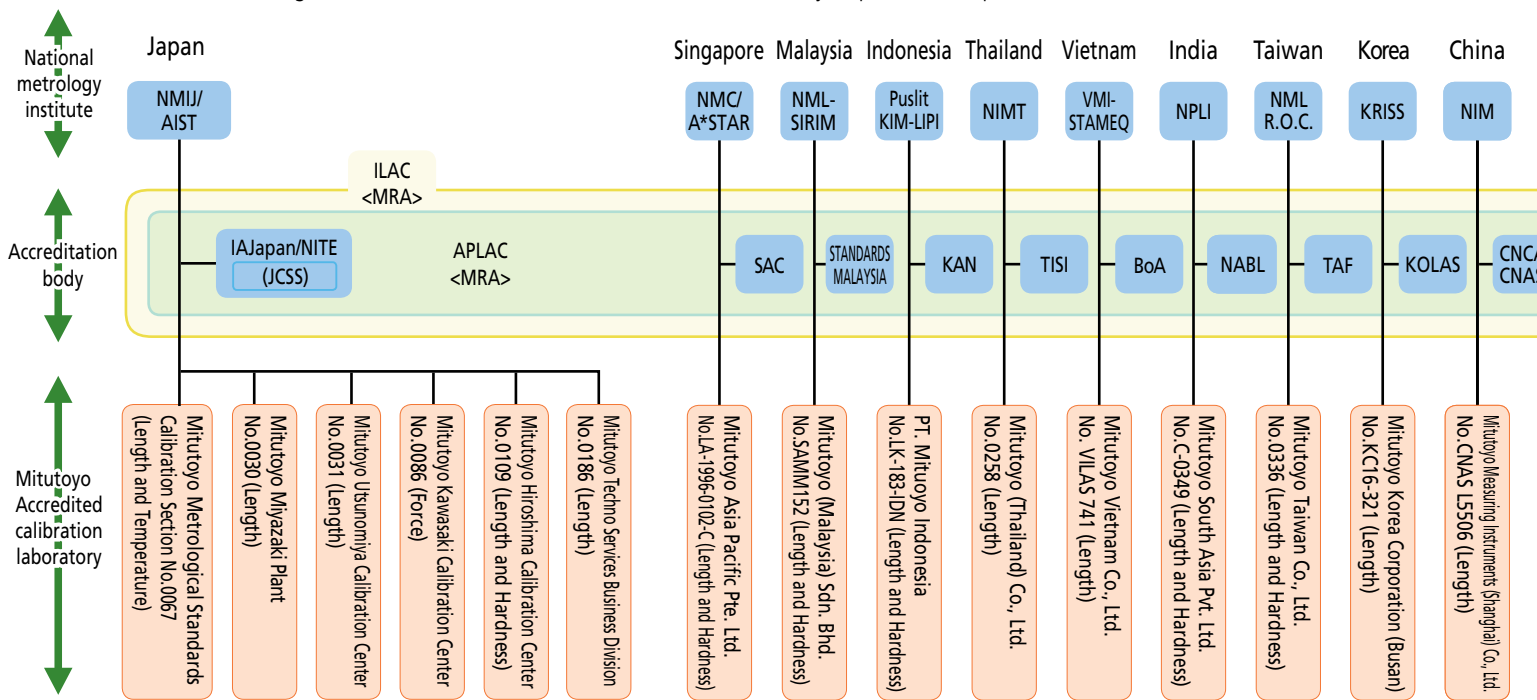
The requirements for demonstrating traceability vary from industry to industry. In the past, some industries required NIST test numbers, but that practice is now obsolete and has been replaced in many industries by the much more demanding requirement of ISO 17025 accreditation. To meet these needs, Mitutoyo America offers our customers A2LA-accredited calibrations either in our labs (Certificate 0750.01), or at your facility (Certificate 0750.01). None of our competitors can match the range and accuracy of accredited calibration services offered by Mitutoyo. Not every quality system requires accreditation, and for the less demanding needs, our standard factory issued certificates can still be used to ensure the required traceability.

Whatever the measurement, whatever the requirements for traceability, Mitutoyo has the most technically advanced metrology products and calibration services to meet your specific needs.

Offering High-level Calibration Services

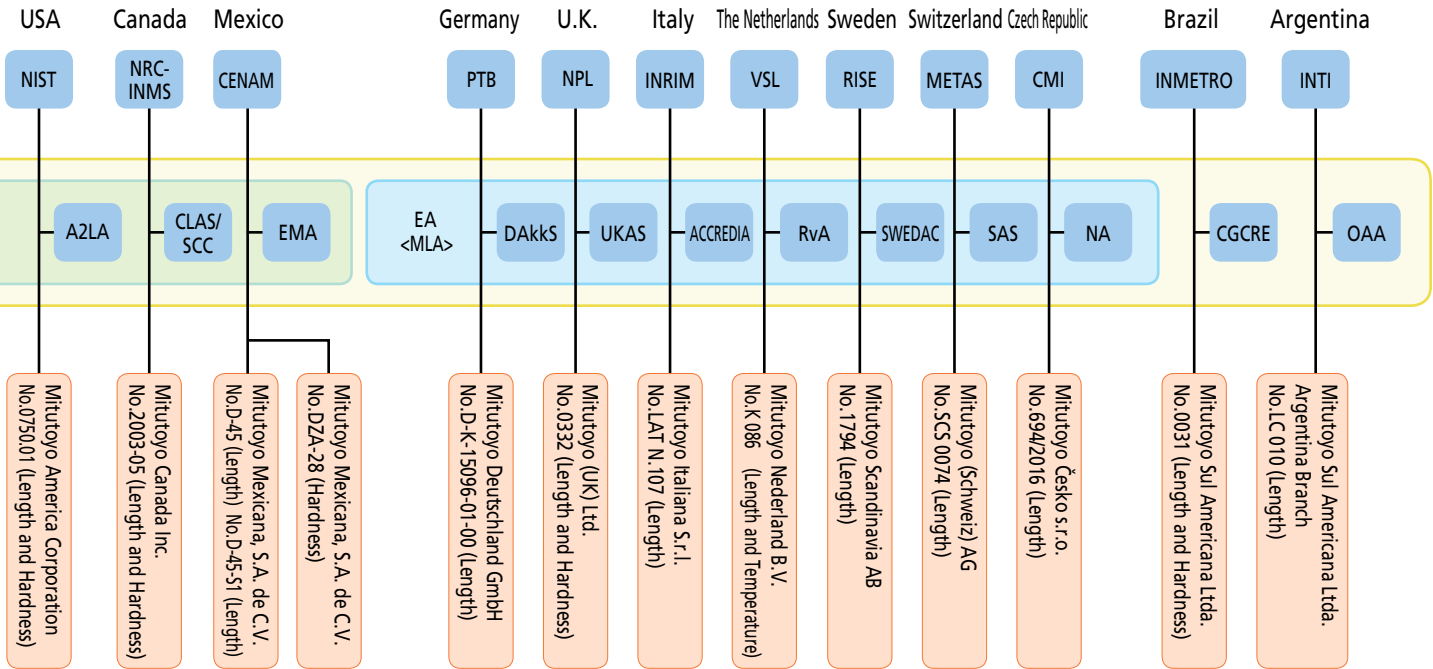
Calibration Laboratories

Mitutoyo has built a network for comprehensive support of calibration of precision measuring products in the global market. To provide calibration services on a global scale, Mitutoyo has calibration laboratories that have received ISO/IEC 17025 certification, an international standard, from accredited organizations in each of the countries in which Mitutoyo operates in Japan and abroad.



- Japan
 - AIST : National Institute of Advanced Industrial Science and Technology
 - NMIJ : National Metrology Institute of Japan
 - IAJapan : International Accreditation Japan
 - NITE : National Institute of Technology and Evaluation
 - JCSS : Japan Calibration Service System
- Singapore
 - NMC/A*STAR : National Metrology Centre/ Agency for Science, Technology and Research
 - SAC : Singapore Accreditation Council
- Malaysia
 - NML-SIRIM : National Metrology Laboratory-Standards and Industrial Research Institute of Malaysia
 - STANDARDS : STANDARDS MALAYSIA
 - MALAYSIA
- Indonesia
 - Puslit KIM-LIPI : Research Center for Calibration, Instrumentation and Metrology- Indonesian Institute of Science
 - KAN : Komite Akreditasi Nasional
- Thailand
 - NIMT : National Institute of Metrology (Thailand)
 - TISI : Thai Industrial Standard Institute
- Vietnam
 - VMI-STAMEQ : Vietnam Metrology Institute, Directorate for Standards and Quality
 - BoA : BUREAU OF ACCREDITATION
- India
 - NPLI : National Physical Laboratory of India
 - NABL : National Accreditation Board for Testing and Calibration Laboratories
- Taiwan
 - NML R.O.C. : National Measurement Laboratory R.O.C.
 - TAF : Taiwan Accreditation Foundation
- Korea
 - KRISS : Korea Research Institute of Standards and Science
 - KOLAS : Korea Laboratory Accreditation Scheme
- China
 - NIM : National Institute of Metrology
 - CNCA : Certification and Accreditation Administration of the people's republic of China
 - CNAS : China National Accreditation Service for Conformity Assessment
- U.S.A.
 - NIST : National Institute of Standards and Technology
 - A2LA : American Association for Laboratory Accreditation
- Canada
 - NRC-INMS : National Research Council Canada / Institute for National Measurement Standards
 - CLAS/SCC : Calibration Laboratory Assessment Service / Standards Council of Canada
- Mexico
 - CENAM : Centro Nacional de Metrologia
 - EMA : Entidad Mexicana de Acreditación, a.c.
- Germany
 - PTB : Physikalisch-Technische Bundesanstalt
 - DAkkS : Deutsche Akkreditierungsstelle GmbH
- UK
 - NPL : National Physical Laboratory
 - UKAS : United Kingdom Accreditation Service

Note: The above are domestic and international locations where Mitutoyo provides ISO/IEC 17025 accredited calibration services.
(As of September, 2018)



- Italy
INRIM : Istituto Nazionale di Ricerca Metrologica
ACCREDIA : L'ENTE ITALIANO DI ACCREDITAMENTO

- The Netherlands
VSL : Van Swinden Laboratorium
RvA : Raad voor Accreditatie

- Sweden
RISE : RISE Research Institutes of Sweden AB
SWEDAC : Swedish Board for Accreditation and Conformity Assessment

- Switzerland
METAS : The Federal Institute of Metrology
SAS : Swiss Accreditation Service

- Czech Republic
CMI : Český Metrologický Institut
NA : Národní Akreditační Organ

- Brazil
INMETRO : Instituto Nacional de Metrologia Qualidade e Tecnologia
CGCRE : Coordenação Geral de Acreditação do INMETRO

- Argentina
INTI : Instituto Nacional de Tecnología Industrial
OAA : Organismo Argentino de Acreditación

- ILAC : International Laboratory Accreditation Cooperation
- APLAC : Asia-Pacific Laboratory Accreditation Cooperation
- MLA : Multilateral Agreement
- MRA : Mutual Recognition Arrangement
- EA : European co-operation for Accreditation



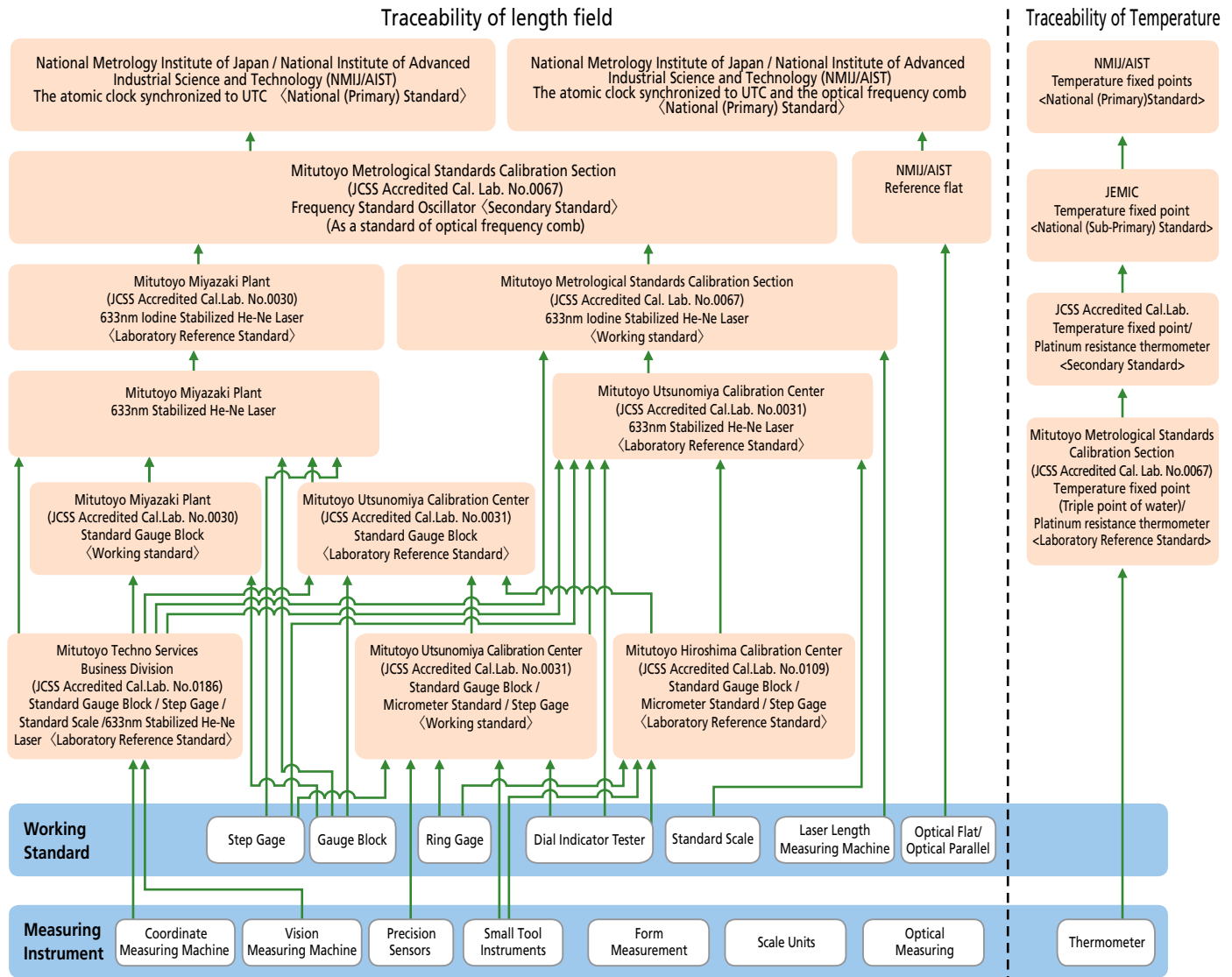
Offering Reliable Traceability

Mitutoyo's Traceability System

Mitutoyo's length standards are directly traceable to Japan's national standards. Mitutoyo performs calibration of standards used for calibrating measuring instruments. In this way, the establishment and maintenance of traceability for various measuring instruments used by customers is achieved. Furthermore, Mitutoyo executes the temperature calibrations that are essential for high-accuracy length measurement. In addition, the establishment and maintenance of traceability for test equipment such as hardness and vibration are achieved as well.

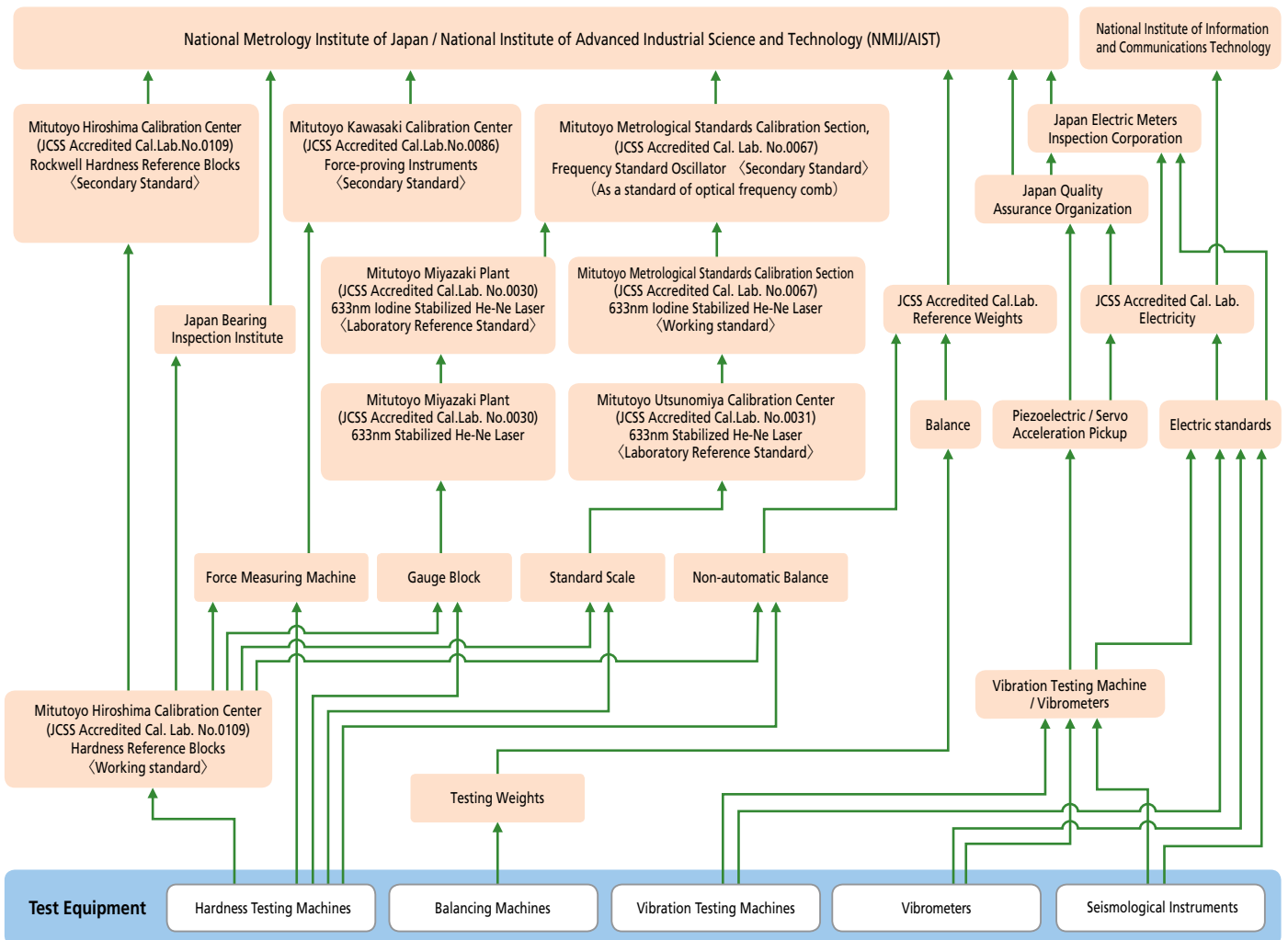


Certificate of JCSS accredited laboratory (Mitutoyo Metrological Standards Calibration Section)



Note: This chart shows a simplified traceability system of Mitutoyo. Detailed traceability charts are published for each product.

Traceability of Test Equipment

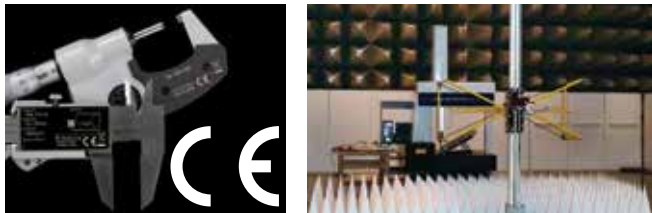


Note: This chart shows a simplified traceability system of Mitutoyo. Detailed traceability charts are published for each product.
(As of September, 2018)

Conformance to CE Marking

Conformance to CE Marking

In order to improve safety, each plant has programs to comply with the Machinery Directive, the EMC Directive, and the Low Voltage Directive. Compliance to CE marking is also met. CE stands for "Conformité Européenne". CE marking indicates that a product complies with the essential requirements of the relevant European health, safety and environmental protection legislation.



Conformity evaluation for CE marking (EMC Directives)

Major EU Directives relating to Mitutoyo products

Name of EU Directive	Applicable range
Machinery Directive	At least one part of a machine that may cause injury to the human body if it moves due to movement of an actuator such as a motor.
EMC Directive (Electromagnetic Compatibility Directive)	A product that may produce electromagnetic radiation or which is influenced by electromagnetic radiation from outside.
Low Voltage Directive	Equipment (device) that uses AC voltage of 50 to 1000V or DC voltage of 75 to 1500V.
Radio Equipment Directive	All electrical and electronic equipment that intentionally transmits and receives radio waves at frequencies below 3000 GHz.
RoHS Directive	Restriction of the use of certain hazardous substances in electrical and electronic equipment. Restricted substances and maximum concentration values tolerated by weight: <ul style="list-style-type: none"> · Lead (0.1 %) · Cadmium (0.01 %) · Hexavalent chromium (0.1 %) · Polybrominated biphenyls (PBB) (0.1 %) · Polybrominated diphenyl ethers (PBDE) (0.1 %)

Response to WEEE Directive

The WEEE Directive*¹ is a directive that mandates appropriate collection and recycling of electrical and electronic equipment waste.

The purpose of this directive is to increase the reuse and recycling of these products, and seeks eco-friendly product design. To differentiate between equipment waste and household waste, a crossed-out wheeled-bin symbol  is marked on a product. We will promote eco-friendly design for our products.

*1 WEEE Directive: Directive 2012/96/EC of the European Parliament and of the Council on waste electrical and electronic equipment.

Response to REACH Regulation

REACH Regulation*² is a regulation governing registration, evaluation, authorization and restriction of chemical substances in Europe, and all products such as substances, mixtures and molded products (including accessories and packaging materials) are regulated. Chemical substances scientifically proven to be substances that are hazardous to human health and the global environment (a substance of very high concern (SVHC)) are prohibited to be sold or information concerning them disclosed is mandated in Europe. We will actively disclose information about our products and provide replacement if we find our products contain any of the listed substances.

*2 REACH Regulation: Regulation (EC) No1907/2006 of the European Parliament and of the Council concerning the Registration, Evaluation, Authorization and Restriction of Chemicals

Response to Management Methods for Controlling Pollution by Electronic Information Products (China RoHS)

We set the environmental protection use period regulated by China RoHS per product and label with the marks shown on the right, together with a list of the contained substances.



"Environmental Protection Use Period" mark*³

*3 The environmental protection use period does not indicate the product warranty period.

Regarding the use of Silver Oxide batteries, please follow these precautions:

Warning

- Do not heat, disassemble nor dispose of in fire.
Doing so damages the insulation materials and may cause fire, heat generation, leakage or bursting.
- Do not short circuit.
If the (+) and (-) terminals are connected together through a very low resistance path, such as a metal casing, a short circuit occurs.
As a result, fire, heat generation, leakage or bursting may occur.
- Keep batteries out of children's reach.
A young child may swallow a battery and risk danger to health.

When you design mechanical hardware around a battery, ensure that the battery is securely contained in order to prevent children from removing it.
When you store batteries, keep the batteries out of children's reach.
If a battery is swallowed, consult a physician immediately.

- If leaked liquid contacts the eyes, do not rub them but immediately, wash them with clean water and consult a physician as soon as possible.
- If leaked liquid contacts clothing, to protect against irritation, wash them with clean water immediately.

Caution

- Do not install in reverse polarity. Take care to identify the (+) and (-) terminals correctly.
- Do not solder directly to a battery.
- Do not use new and used batteries together. Do not use different types of batteries together.
- Do not charge.
- Do not use nor leave batteries in direct sunlight nor in high-temperature areas.
- Keep batteries away from direct sunlight, high temperature and humidity.

- Avoid letting batteries contact water.
- Ensure batteries are inserted without coming into contact with metal parts of equipment.
- Read the equipment instruction manual and precautions carefully before using.
- Remove batteries from equipment that will not be used for a prolonged period.
- In case of disposal, insulate (+) and (-) terminals of a battery by applying an insulating material.