

Mitutoyo

GB-18001



MEASURING INSTRUMENTS CATALOGUE 2013/2014





Customer proximity and product diversity

In January 2010 Mitutoyo synchronised and strengthened the concerted pan-European activities by establishing the European headquarters in Neuss. The location of the Mitutoyo Europe GmbH is Neuss in the vicinity of Düsseldorf, Germany.

Mitutoyo Europe GmbH oversees all the activities of Mitutoyo's sales, service and production facilities throughout Europe and adjacent markets, e.g. of Turkey. It also plans and implements the medium and long term business strategies of such European operations. A Mitutoyo Europe GmbH key objective is to promote coordination amongst its European group companies in order to optimise its sales and technical support services in the best interests of customer satisfaction.

Some 266 employees work for our customers in development, service, sales and administration. They are joined by specialists of Mitutoyo CTL Germany GmbH in Oberndorf on the River Neckar, which focuses solely on developing software for three-coordinate measurement technology and, in doing so, sets global standards. The peripheral fields of coordinate measuring machines, jiggling and loading systems and thermal cabins are covered by KOMEK company based in Saarland.

The range of products offered by Mitutoyo in Europe is divided into eight groups:

Coordinate Measuring Machines	
Vision Measuring Systems	
Form Measurement	
Optical Measuring	
Sensor Systems	
Test Equipment and Seismometers	
Digital Scale and DRO Systems	
Small Tool Instruments and Data Management	

In addition to measuring and testing equipment, the range of products also includes a wide selection of accessories and – as a further area of focus – sophisticated, high-performance software for coordinate measuring machines, vision measuring systems and form measurement.

The Information Center of Metrology (MIM) has been demonstrating Mitutoyo's commitment to advanced training in all fields of length measurement technology since 1999. The MIM is open to anyone working in the fields of manufacturing, service, science and research. Mitutoyo Europe GmbH is, moreover, a corporate member of "Ausbildung Koordinatenmesstechnik e. V. (AUKOM)". This association is dedicated to providing training schemes for coordinate measuring technology with the aim of ensuring a neutral, comprehensive and state of the art training concept.

Germany has also been home to the Mitutoyo M³ Solutions Europe division since 2004. The abbreviation M³ stands for Mitutoyo Measurement Metrology and, as such, for the concept of special measuring solutions developed by Mitutoyo to meet the particular requirements of its customers across the whole breadth of length, form and surface measurement technology. The Mitutoyo Europe GmbH in Neuss offers sample configurations in the 400 m² M³ Solution Center Europe to demonstrate the numerous possibilities. The center also presents peripheral systems, such as jigs or feed and climate control systems from KOMEK alongside the measuring equipment.

Highlights

<p>Micrometer MDH</p> 	<p>IDS Solar</p> 	<p>IDS Battery</p> 	<p>LH 600E</p> 
<p>MF Microscope</p> 	<p>SJ-310 / SJ-410</p> 	<p>CV-4500</p> 	<p>SV-C4500</p> 
<p>HM200</p> 	<p>Roughness Probe</p> 	<p>CNC CMM</p> 	<p>Surface Measure</p> 
<p>CNC Vision</p> 	<p>CNC Vision</p> 	<p>Fixtures</p> 	<p>Styli</p> 

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Micrometers

Digimatic Micrometers and Mechanical
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Micrometer Head Accessories

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Indicators

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Auxiliary Equipment and Miscellaneous

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Depth Measuring Instruments

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CERA Gauge Block Sets
CERA Individual Gauge Blocks
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Sensor Systems and Laser Scan Micrometers

Linear Gauges
Counters and Display Units
Motorized Low Force High Precision
Gauges LITEMATIC



388 - 430

Coordinate Measuring Machines

CMM Software
Mobile 3D Systems and Manual CMMs
Small- and Medium Size CMMs
Large Size CMMs
etc.



605- 626

Scale Units and Linear Scales

Scale Units
Linear Scale
NC-Scales
2D Image Correlation Encoder



431 - 463

Vision Measuring Systems

Manual 2D Vision Measuring Systems
Quick Image
Manual and CNC Vision Measuring
Systems Quick Scope
etc.



627- 653

Optical Measuring

Illumination Units
Magnifiers
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Measuring Microscopes
etc.



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Spare Parts

Batteries
Washers, Amvils
Mirrors, Stage Glass
Papers Rollsink Ribbons, Bulbs



654 - 658

Form Measurement

Surface Roughness Measuring
Instruments Surftest
Contour Measuring Instruments Contracer
Surface Roughness and Contour
etc.



522 - 579

For better communication with our customers

Mitutoyo's Domestic Network
Mitutoyo's Overseas Network
M³ Solution Centers



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Hardness Testing

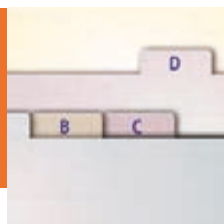
Hardness Testing Machines



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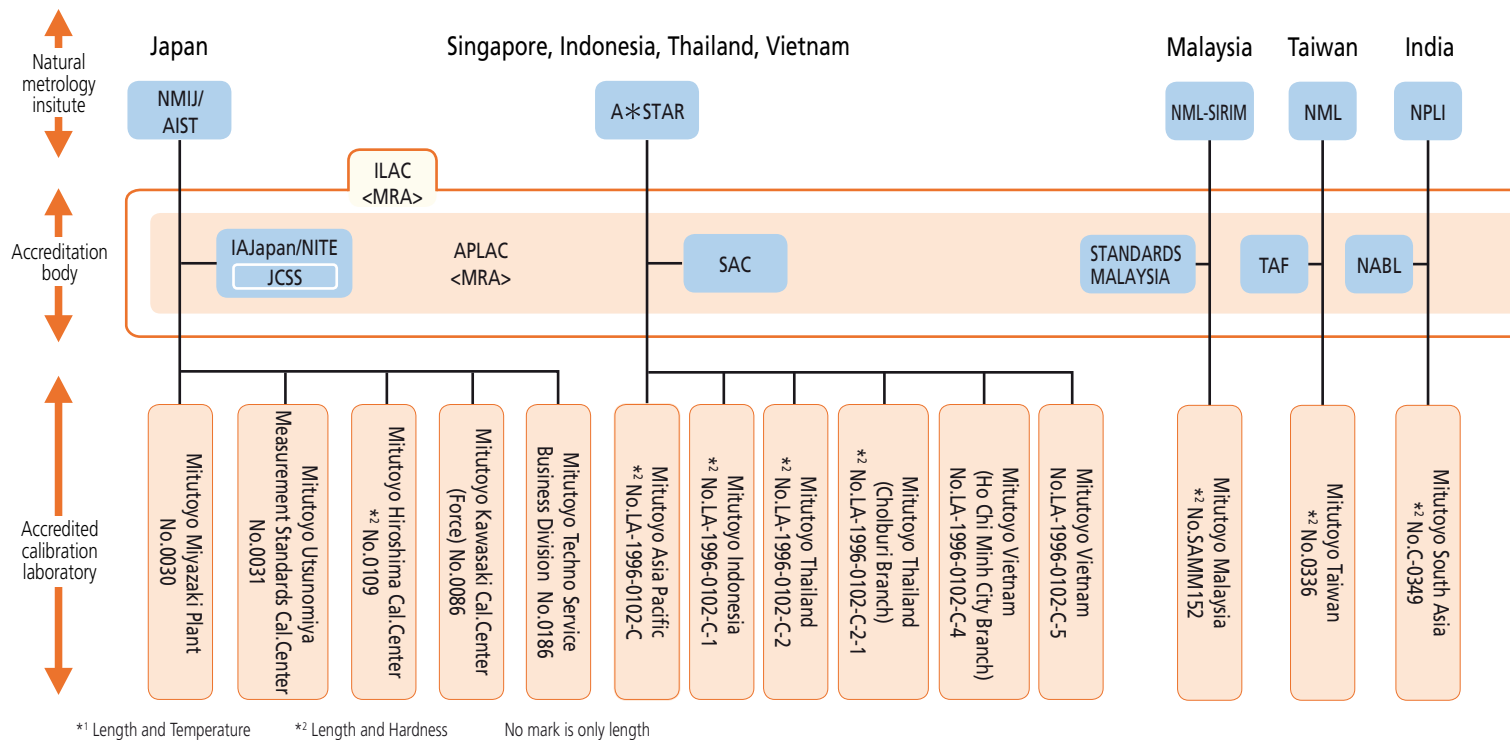


663 - 670

Offering Reliable Traceability Worldwide

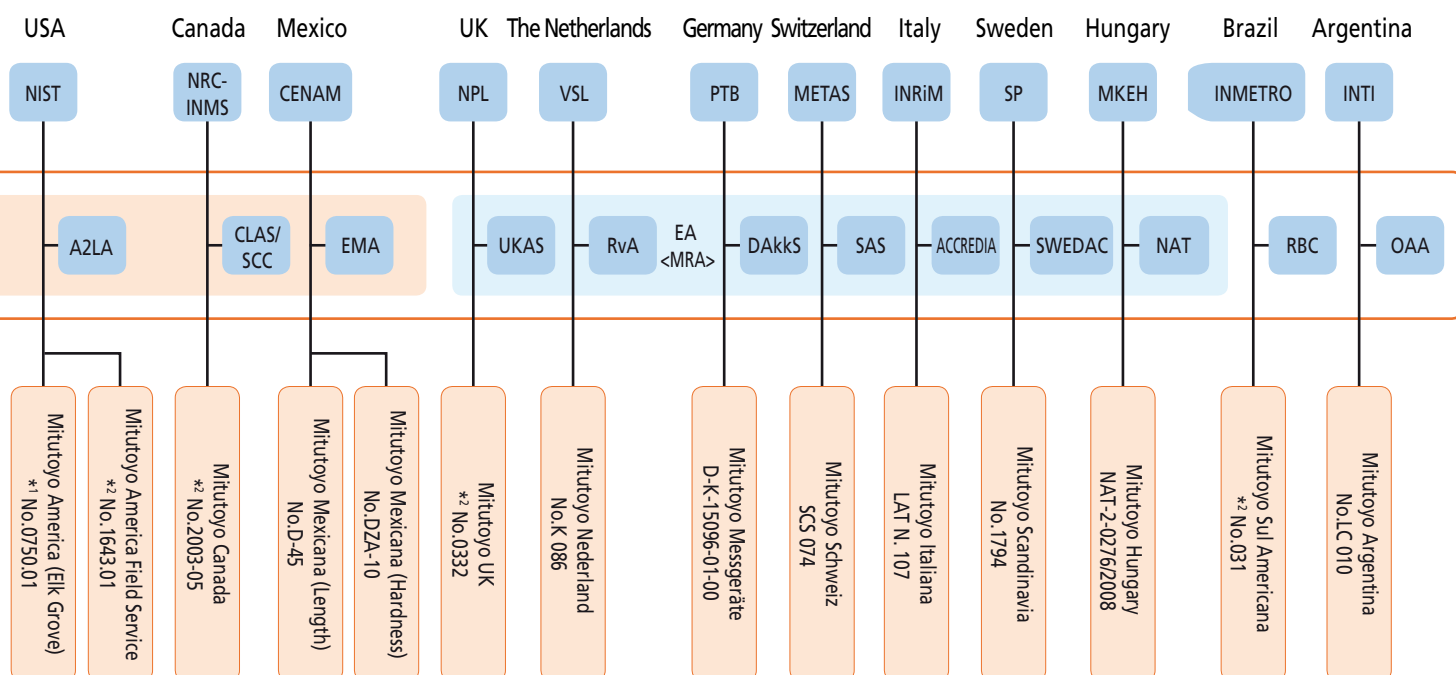
Calibration laboratories worldwide

Mitutoyo has a system allowing comprehensive support for the calibration of precision measuring products in the global market. In order to provide calibration services on a global basis, Mitutoyo has calibration laboratories that have received ISO/IEC 17025 certification, which is an international standard, from the accredited organisations in each of the countries in which Mitutoyo operates and subsidiaries are located, both in Japan and overseas.



AIST:	National Institute of Advanced Industrial Science and Technology
NMIJ:	National Metrology Institute of Japan
JCSS:	Japan Calibration Service System
NITE:	National Institute of Technology and Evaluation
IAJapan:	International Accreditation Japan
A*STAR:	Agency for Science, Technology and Research
SAC:	Singapore Accreditation Council
NML:	National Measurement Laboratory
TAF:	Taiwan Accreditation Foundation
NML-SIRIM:	National Metrology Laboratory, Standards and Industrial Research Institute of Malaysia
STANDARDS MALAYSIA:	Department of Standards Malaysia
NIST:	National Institute of Standards and Technology
A2LA:	American Association for Laboratory Accreditation
NRC-INMS:	National Research Council of Canada-Institute for National Measurement Standards
CLAS:	Calibration Laboratory Assessment Service
SCC:	Standards Council of Canada
CENAM:	Centro Nacional de Metrología
EMA:	Entidad Mexicana de Acreditación, a.c.
UKAS:	United Kingdom Accreditation Service
NMI:	Nederlands Meetinstituut

RvA:	Raad voor Accreditatie
PTB:	Physikalisch-Technische Bundesanstalt
DAKKS:	Deutsche Akkreditierungsstelle GmbH
METAS:	The Swiss Federal Office of Metrology and Accreditation
SAS:	Swiss Accreditation Service
IMGC:	Istituto di Metrologia " GUSTAVO COLONNETTI "
ACCREDIA:	L'NTE ITALIANO DI ACCREDITAMENTO
SP:	Swedish National Testing and Research Institute
SWEDAC:	Swedish Board for Accreditation and Conformity Assessment
INMETRO:	Instituto Nacional de Metrologia Normalizacao e Qualidade Industrial
RBC:	Rede Brasileira de Calibração
INTI:	Instituto Nacional de Tecnología Industrial
OAA:	Organismo Argentino de Acreditación
NPL:	National Physical Laboratory
NPLI:	National Physical Laboratory of India
NABL:	National Accreditation Board for Testing and Calibration Laboratories
(ILAC):	International Laboratory Accreditation Cooperation
(APLAC):	Asia-Pacific Laboratory Accreditation Cooperation
(EA):	European Accreditation Cooperation
(MRA):	Mutual Recognition Arrangement
#:	Accreditation No.



Offering High-level Calibration Services Worldwide

Based on highest measurement capabilities of the same level as national standards

Traceability system

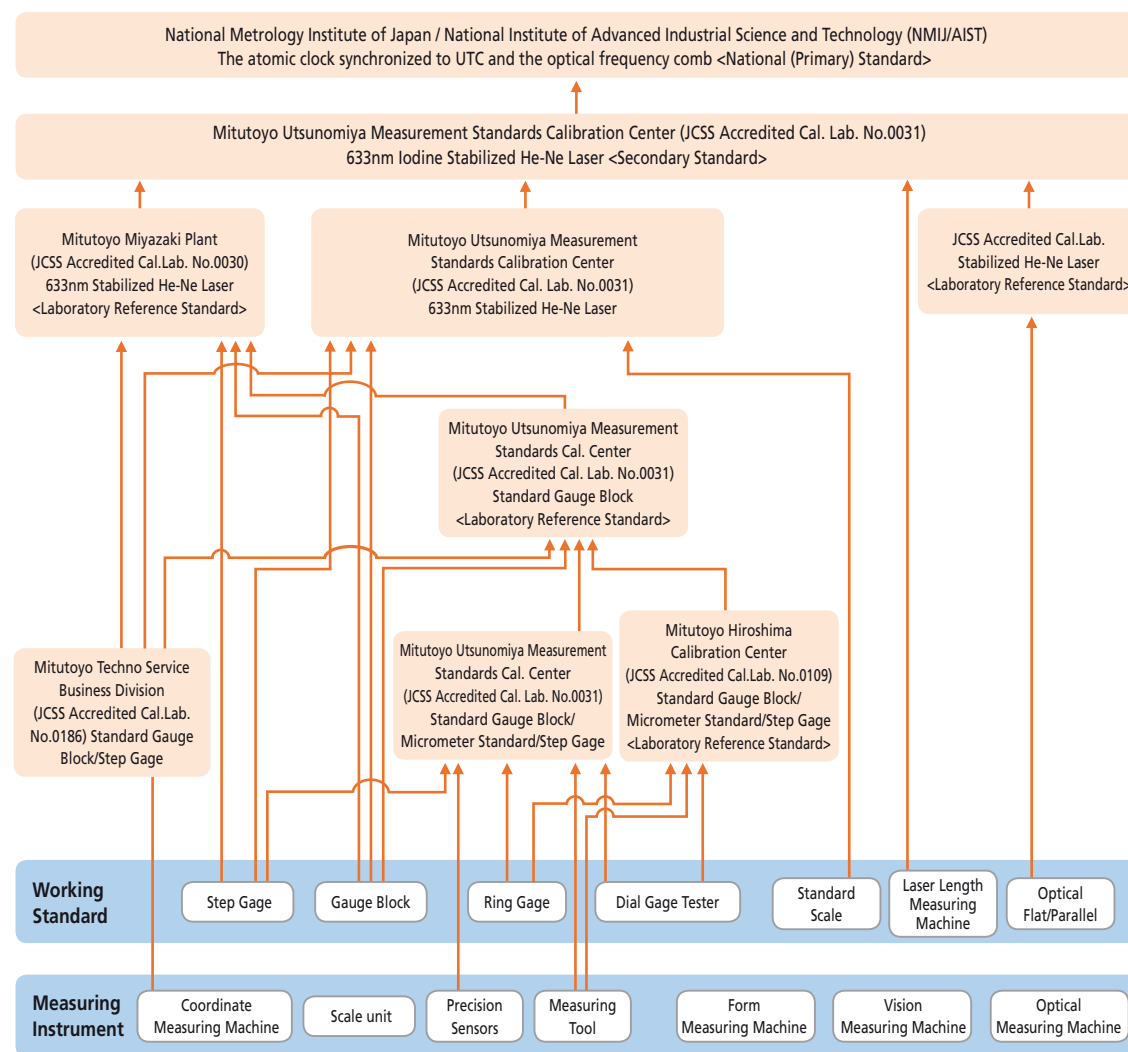
Mitutoyo has a traceability system made possible through an in-house calibration organisation certified by the ISO/IEC 17025 international standard, with length standards directly related to national standards (atomic clock synchronised to UTC and the optical frequency comb) at the highest level.

National standards are mutually recognised by CIPM, and the certified calibration organisation is mutually recognised by ILAC, so that the establishment and maintenance of traceability for Mitutoyo products is achieved both in Japan and overseas.

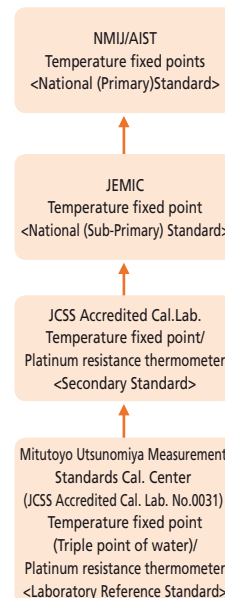


Certificate of JCSS accredited laboratory (Mitutoyo Utsunomiya Measurement Standards Calibration Center)

Traceability of length



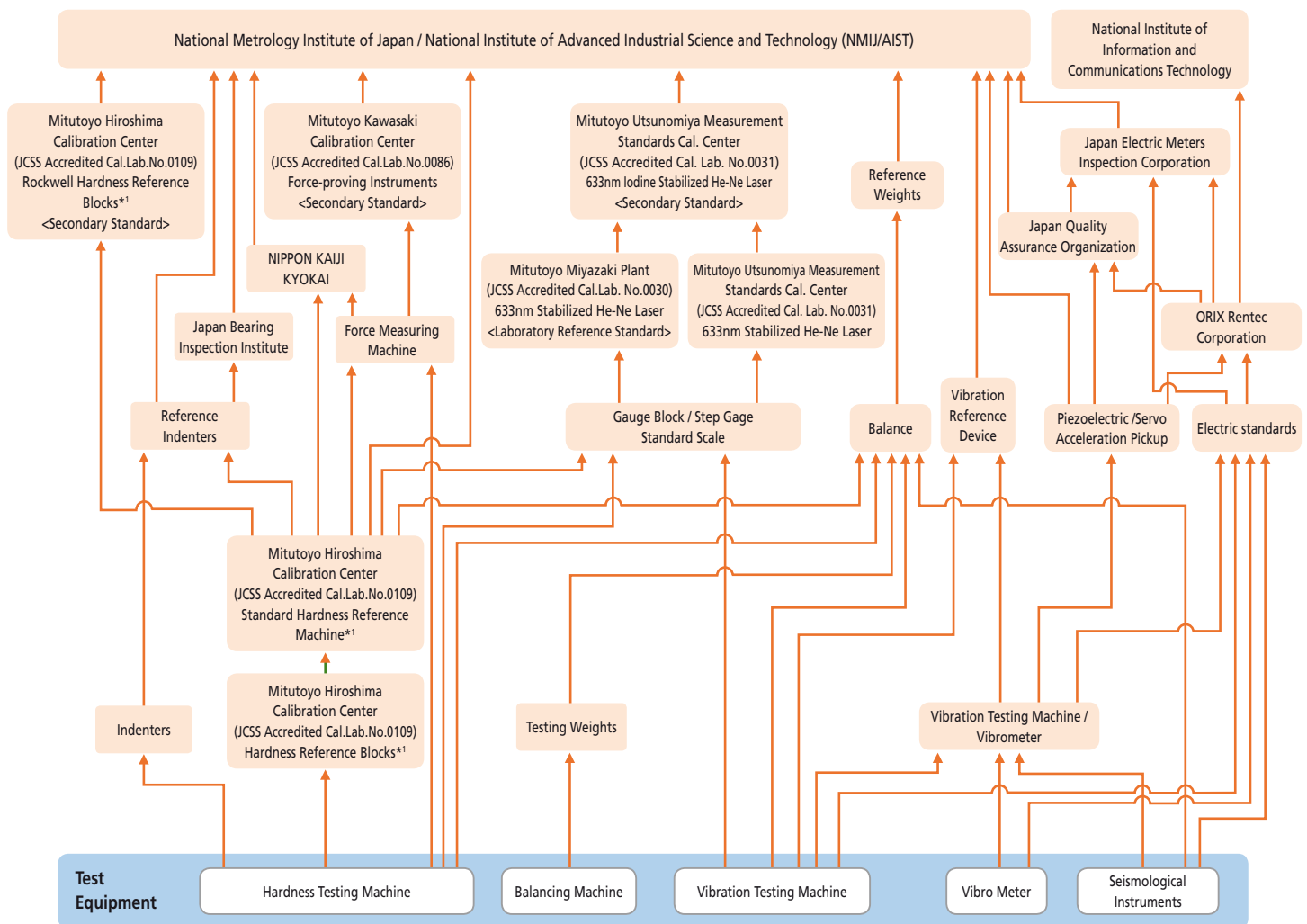
Traceability of temperature



Note: This chart is a simplified representation of Mitutoyo's overall traceability system. Detailed traceability charts are published for each product.

Conformance to CE Marking

Traceability of Test Equipment



*1 The scope of JCSSL accreditation is from 20HRC up to 65HRC in Rockwell Hardness Testing Machines and Hardness Reference Blocks.

Note: This chart is a simplified representation of Mitutoyo's overall traceability system. Detailed traceability charts are published for each product.

Conformance to CE Marking

In order to improve safety, each plant has programs to comply with the Machinery Directives, the EMC Directives, and the Low Voltage Directives. Compliance to CE marking is also satisfactory. 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.



Meaning of Symbols



ABSOLUTE Linear Encoder

Mitutoyo's technology has realised the absolute position method (absolute method). With this method, you do not have to reset the system to zero after turning it off and then turning it on. The position information recorded on the scale is read every time. The following three types of absolute encoders are available: electrostatic capacitance model, electromagnetic induction model and model combining the electrostatic capacitance and optical methods. These encoders are widely used in a variety of measuring instruments as the length measuring system that can generate highly reliable measurement data.

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)



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. Mitutoyo also calibrates the purchased measuring instrument and issues, for a fee, a calibration certificate that proves traceability to the relevant standard.

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

Main Unit Startup System

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.



IP Codes

These are codes that 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 $\phi 50$ mm and greater	A $\phi 50$ mm object probe shall not fully penetrate enclosure*
2	Protected against solid foreign objects of $\phi 12.5$ mm and greater	A $\phi 12.5$ mm object probe shall not fully penetrate enclosure*
3	Protected against solid foreign objects of $\phi 2.5$ mm and greater	A $\phi 2.5$ mm object probe shall not fully penetrate enclosure*
4	Protected against solid foreign objects of $\phi 1.0$ mm and greater	A $\phi 1.0$ 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.
7	—	—
8	—	—

*: 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 standardised 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.



• Dust-tight + water jet protected IP65



• Dust-tight and water protected IP66



• Dust- and watertight IP67

Independent Confirmation of Compliance

IP65, IP66 and IP67 protection level ratings for applicable Mitutoyo products have been independently confirmed by the German accreditation organisation, TÜV Rheinland.



Metric/Inch

Mitutoyo offers this quality product also in an switchable Metric/Inch version. Please refer to your local Mitutoyo website for detailed information.



Inch/Metric

Mitutoyo offers this quality product also in an switchable Inch/Metric version. Please refer to your local Mitutoyo website for detailed information.



Inch

Mitutoyo offers this quality product also in an Inch version. Please refer to your local Mitutoyo website for detailed information.

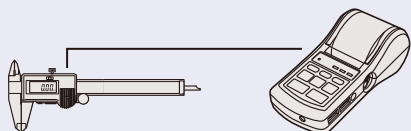
Example of Measurement Data Management System Design

A system for recording and analysing measurement results from various Mitutoyo measuring instruments for quality assurance purposes.

Implementation Step 1

Recording measurement results

No more handwriting



DP-1VR

A-13

Measurement data can be printed easily. Data can be output to a PC for statistics calculations.

Direct data input to a PC

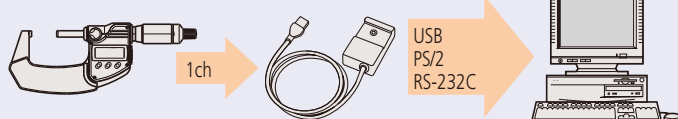
Connecting-cable-integrated USB-ITN



USB Input Tool Series

A-7

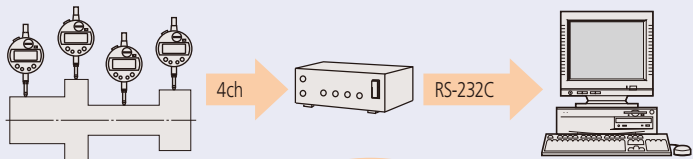
Lineups of three models with different output specifications
IT-012U/IT-005D/IT-007R



Input Tool Series

A-5

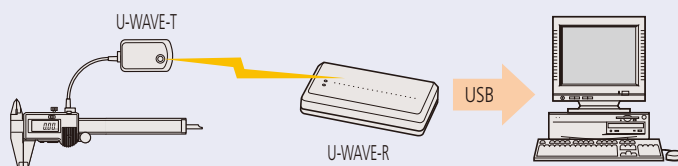
Connectable to a RS-232C interface PC with 4 channels and a sequencer



Multiplexer MUX-10F

A-14

Wireless



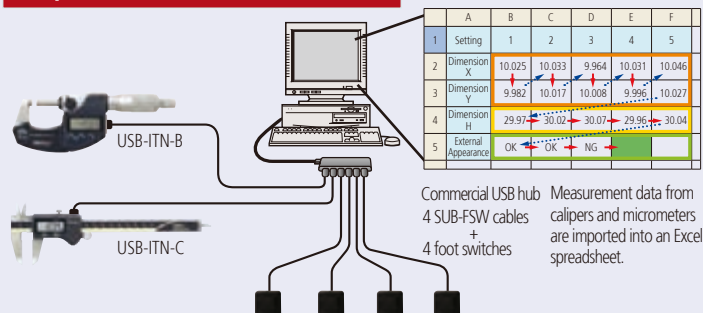
U-WAVE

A-9

Implementation Step 2

Software dedicated to inspection and quality control

Inspection certificate creation

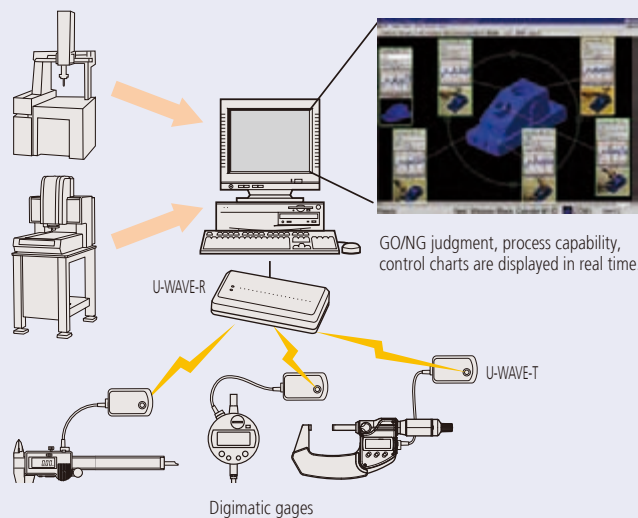


Commercial USB hub
4 SUB-FSW cables
4 foot switches
Measurement data from calipers and micrometers are imported into an Excel spreadsheet.

USB-ITPAK

A-7

Statistical process control



GO/NG judgment, process capability, control charts are displayed in real time.

MeasurLink

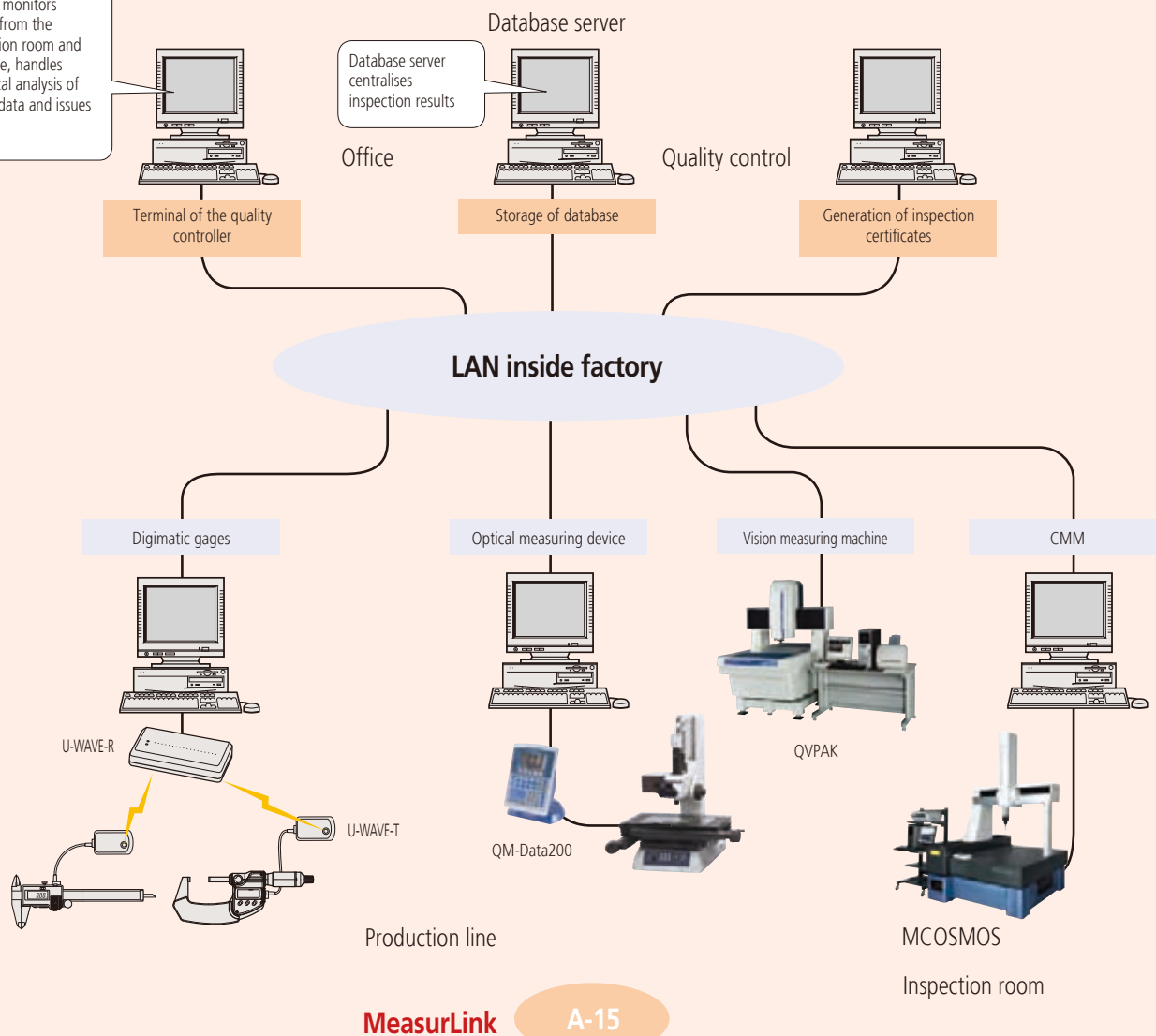
A-15

Implementation Step 3

Creating a quality control network covering a wide area within the factory

Unify management of the quality test using the network in the factory

The quality control section monitors results from the inspection room and worksite, handles statistical analysis of stored data and issues forms.



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Digimatic Interface
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Tolerancing, Timing, Display Units and Data Logger
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MeasurLink 7

An Integrated Solution for Quality Data Management

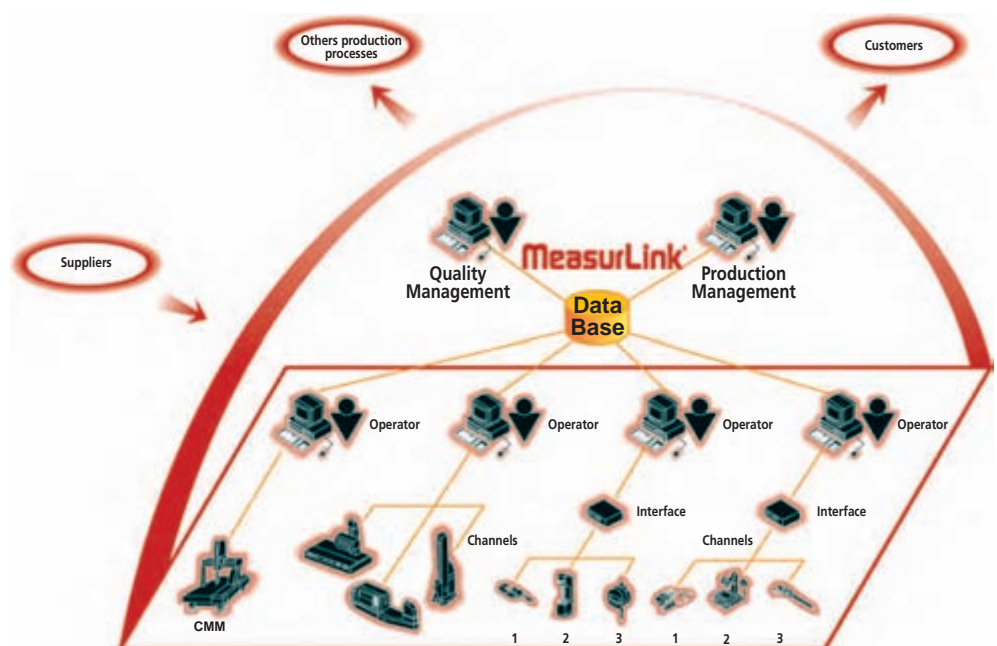
Most of Mitutoyo's electronic instruments can output data via optional connecting cables or wireless transmitters & receivers in the form of the Digimatic code. The Digimatic code can also be converted in RS-232C format by any of several available gage multiplexers. In this way, digital data can be sent to PCs for data acquisition and advanced statistical analysis.

As a client/server application, MeasurLink gives you the performance you need through distributed processing. Combined with a multi-user relational database, MeasurLink delivers a safe and organized data warehousing system making quality data available for viewing and analysis by any member of the production, engineering and managerial staff throughout your company. Inspection in the factory produces data for analysis, corrective action, and various reporting needs. As the backbone of your quality efforts, MeasurLink is guaranteed to reduce your production costs and increase your bottom line.

MeasurLink is capable of linking and managing multiple "islands" of inspection into a common database of part information, statistical data, gage information, process, etc. Information is shared across an entire manufacturing facility.

Group Licensing

MeasurLink is available in several modules offering you a wide range of solutions, from data acquisition to manager views and gage management. Details about all modules can be found on the next pages. However, you can create your own package and combine modules by choosing one of the following license bundles:



No.	Description
64AAB184R	MeasurLink 7 State License - 30 Pack
64AAB185R	MeasurLink 7 Workgroup License - 15 Pack
64AAB263R	MeasurLink 7 Workgroup License - 10 Pack
64AAB264R	MeasurLink 7 Workgroup License - 5 Pack
64AAB265R	MeasurLink 7 Academic License - 20 Pack



Measurlink brochure available on request

MeasurLink 7

MeasurLink Real-Time Standard Edition

Designed for customers who want to acquire and analyze data in real-time from Small Tools like calipers and micrometers.

Features:

- Variable and attributive inspection
- Real-time graphics
- Run charts
- Control charts
- Histograms
- Statistics
- Customized Info View
- Full Reporting Template

Supported data sources: keyboard, RS232-C, USB devices

No.	Description
64AAB177R	MeasurLink 7 Real-Time Standard Edition

MeasurLink Real-Time Professional Edition

On-line Real-Time Data Collection

Acquire data directly from Mitutoyo devices such as:

- Coordinate Measuring Machines
- Form Measuring Instruments
- Vision Measurement Machines

Import data from other devices via:

- ASCII
- QMD (xml based)

Features:

- Variable and attributive inspection
- Real-time graphics
- Run charts
- Control charts
- Histograms
- Statistics
- Customized Info View
- Full Reporting Template
- **Data filter**

Supported data sources: keyboard, RS232, USB devices, **Mitutoyo DDE, ASCII, QMD.**

No.	Description
64AAB178R	MeasurLink 7 Real-Time Professional Edition



MeasurLink 7

MeasurLink Real-Time Professional 3D Edition

On-line Real-Time Data Collection

Designed for customers who wish to collect data using the Hoops 3D graphics view. Hoops 3D files can be exported from most CAD systems and provide the operator with a real view of the part. Acquire data directly from Mitutoyo devices such as:

- Coordinate Measuring Machines
- Form Measuring Instruments
- Vision Measurement Machines

Import data from other devices via:

- ASCII
- QMD (xml based)

Features:

- Variable and attributive inspection
- Real-time graphics
- Run charts
- Control charts
- Histograms
- Statistics
- Customized Info View
- Full Reporting Template
- **Data filter**
- **3D View**
- **Flexible callout design**
- **Guided sequence**

Supported data sources: keyboard, RS232, USB devices, **Mitutoyo DDE, ASCII, QMD.**



No.	Description
64AAB179R	MeasurLink 7 Real-Time Professional 3D Edition

MeasurLink Process Analyzer Lite Edition

Data Analysis Software

Designed for offline viewing of Real-Time data in a networked environment. The invaluable tool for your quality team!

- Analyze your process
- Identify problem areas
- Take corrective action
- Improve your product's quality!

Features:

- Review inspection data
- Switch between databases
- Tree control navigation
- Reporting

No.	Description
64AAB180R	MeasurLink 7 Process Analyzer Lite Edition

MeasurLink 7

MeasurLink Process Analyzer Professional Edition

Data Analysis Software

Designed for more robust manipulation of Real-Time data in a networked environment.

- **Slice and dice data in meaningful ways**
- **Contribute to quality control initiatives!**
- Analyze your process
- Identify problem areas
- Take corrective action
- Improve your product's quality!

Features:

- Review inspection data
- Switch between databases
- Tree control navigation
- Reporting
- **Group, search and sort data**
- **Merge data**
- **Scatter plots**
- **Electronic signatures**

No.	Description
64AAB181R	MeasurLink 7 Process Analyzer Professional Edition



MeasurLink Process Manager Standard Edition

Network Monitoring Software

Real-time monitoring of data as it is collected.
The perfect tool for QC and Production Managers!

- Organize and maintain a shop-wide quality program at a glance.
- Audit the entire shop floor inspection activity from a single PC
- Get process information without leaving the office
- View current production across all machines
- Show clients your quality operation for the entire facility
- Establish C_{pk} thresholds for acceptability
- Stay up to the minute on production problems

Drill down for details on certain

- traceability
- assignable cause
- failed tests
- serial numbers

No.	Description
64AAB182R	MeasurLink 7 Process Manager Standard Edition



MeasurLink 7

MeasurLink Gage R&R

Measurement Systems Analysis

Designed according to standard ISO/TS 16949,

Gage R&R allows you to use the methods of study AIAG :

- Range
- Average and Range
- Average and Range including part variation
- Variance analysis
- Short method for attributive gages
- Bias study
- Linearity study
- Stability study

Features :

Graphical analysis tools :

- Xbar R chart
- Part by appraiser plot

No.	Description
64AAS941DR	MeasurLink Gage R&R 6

MeasurLink Gage Management

Gage Inventory and Calibration Control

MeasurLink Gage Management allows customers to build a complete gage and fixture inventory.

Calibration is made simple by supporting digital gages for both, variable and attributive features.

Achieve optimal calibration frequencies - set-up individual calendars with:

- Gage in-service dates
- Calibration recall dates
- Gage R&R dates

Features:

- Vendor contact lists
- User lists
- Print and archive calibration certificates
- Incremental response methods
- Customized gage label printing

No.	Description
64AAS007DR	MeasurLink Gage Management 6

Digimatic Printer/Statistic Processor DP1-VR

Series 264

This DP-1VR printer allows you to print statistical evaluations, and is so compact it fits right in the palm of your hand.

The DP-1VR offers the following benefits:

To print statistical evaluations

- You can print data from calipers, micrometers and other measuring devices equipped with a Digimatic port, and even perform statistical evaluations.
- Printing speed is excellent, it prints from a one-touch start and with the built-in thermal line printer there's almost no noise. The thermosensitive paper has outstanding durability and chemical resistance for long-term storage.
- The DP-1VR even lets you transmit the data to a computer using an RS-232C connecting cable.
- Clock function for loading measurement data.
- Processing capacity for up to 9999 data subgroups.



264-504-5D



Example application

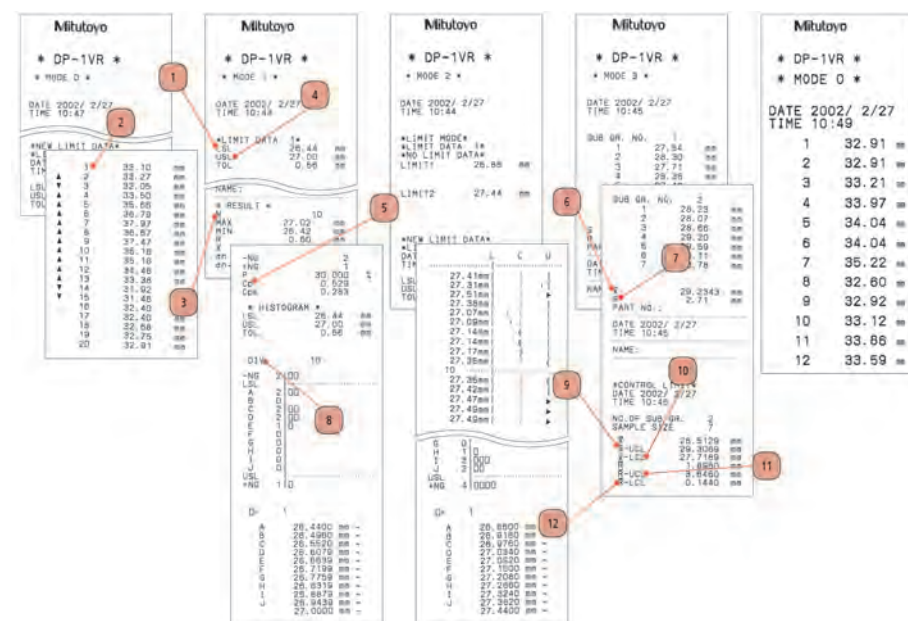
No.	Remarks
264-504-5D	DP-1VR



Footswitch - 937179T



Dimensions in mm



Specifications

Printer type	Thermal line printer
Printing method	384 dot (8 dot / mm)
Print speed	6,5 mm/s (using AC adapter)
Printing paper	48 m per roll
Capacity	ca. 6,500 lines for large characters, 12,000 lines for normal characters
Processing capacity	Mode 1/2/3: 9,999 data subgroups; Mode 0: 100,000 data subgroups
Printable data	Measurement data, GO/±NO GO judgement, number of data, maximum/minimum value, range, average, standard deviation, number of defective, fraction defective, process capability, index, histogram, D-chart, control chart, generation for Xd-bar and control limit data, date and time
Output function	Outputs the measurement data (RS-232C) or GO/±NO GO judgement
Power	AC adapter 6V, battery: LR6 x 4 (alkaline), NiMH (rechargeable, battery is not charged in the device)
Timer function	0,25 s; 1 s; 5 s; 30 s; 1 min; 30 min; 60 min (0,25 s only statistical function)

Standard accessories

No.	Description
06AEG180D	AC Adapter 6V DC, 2A
09EAA069D	Printer paper (1 roll)

Optional accessories

No.	Description
937179T	Footswitch
09EAA084	RS-232C Data cable 1 m (9-pin) for connection DP-1 VR to PC
09EAA094	RS-232C Data cable 1 m (25-pin) for connecting DP-1VR to Linear Scale KA counter
965516	GO/±NG Cable for sending the GO/±NG judgement to an external device e.g. red/green signal

09EAA084 and 965516 can not be used simultaneously.

Consumable spares

No.	Description
011037	4 batteries LR-6 (AA)
011348	Ni-MH Batteries (rechargeable)
09EAA082-5	Printer paper (5 rolls)
09EAA069D	Printer paper (1 roll)



DP-1VR brochure available on request

- 1 - Lower limit
- 2 - Input data
- 3 - Number of data
- 4 - Upper limit
- 5 - Process capability index
- 6 - Average
- 7 - Range
- 8 - Number of Division of the histogram
- 9 - Upper control limit (x control)
- 10 - Lower control limit (x control)
- 11 - Upper control limit (R control)
- 12 - Lower control limit (R control)

Digimatic Data Cables

Digimatic measuring instruments require one of the following for initiating data transmission:

1. Footswitch
2. Data button on the instrument (if present)
3. Data request from the PC
4. Data cables with data button (if connectable to the measuring instrument)

These data cables allow you to connect measuring instruments with a Digimatic output to a PC or dedicated data processor.

Digimatic Data Cables offer you the following benefits:

- Connecting Mitutoyo measuring instruments that feature a Digimatic interface.
- You can also connect one or more Digimatic measuring instrument to an additional device, such as a DP-1VR, Counter or DMX Interface (PC).

No. /		For use with	Measuring instrument plugs	
1 m	2 m			
05CZA624	05CZA625	IP65/66/67 ABSOLUTE DIGIMATIC Thickness Gauge (Series 547) IP65/66/67 ABSOLUTE DIGIMATIC Caliper (Series 500, 550, 551, 573) IP65/66/67 ABSOLUTE DIGIMATIC Scale (Series 572) IP65/66/67 ABSOLUTE DIGIMATIC Depth Gauge (Series 571)	With data key and screws	
905338	905409	ABSOLUTE DIGIMATIC Dial Indicator IDS/IDC (Series 543) ABSOLUTE DIGIMATIC Dial Indicator IDU (Series 575)	Straight	
905689	905690	ABSOLUTE DIGIMATIC Thickness Gauge (Series 547) DIGIMATIC Workshop Caliper (Series 552) ABSOLUTE DIGIMATIC Caliper (Series 500 except IP65/66/67 models)	Back side	
905691	905692	ABSOLUTE DIGIMATIC Caliper (Series 550, 551, 573) DIGIMATIC Height Gauge (Series 192, 570)	Right	
905693	905694	ABSOLUTE DIGIMATIC Depth Gauge (Series 547) Portable Hardness Tester (Series 811) ABSOLUTE DIGIMATIC Bore Gauge (Series 511)	Left	
959149	959150	ABSOLUTE DIGIMATIC Depth Gauge (Series 571 except IP65/66/67 models) ABSOLUTE DIGIMATIC Scale (Series 572 except IP65/66/67 models) ABSOLUTE DIGIMATIC Micrometer Head (Series 164)	With data key	
05CZA662	05CZA663	Digimatic micrometer IP65 (Series 293, 331, 340, 342, 695) Three-point Inside Micrometer DIGIMATIC Holtest (Series 468)	With data key and screws	
937387	965013	ABSOLUTE DIGIMATIC Quick Micrometer (Series 227, 293) DIGIMATIC Micrometers (Series 293, 314, 317, 323, 324, 326, 331, 340, 342, 343, 369, 389, 395, 406, 422) DIGIMATIC Micrometer Heads (Series 164, 350) DIGIMATIC Standard Micrometer (Series 121) DIGIMATIC Depth Micrometer (Series 329) DIGIMATIC Inside Micrometer with jaws (Series 345) DIGIMATIC Inside Micrometer (Series 337, 339) ABSOLUTE DIGIMATIC Borematic (Series 568) Height Micrometer Heightmaster (Series 515) Hardness Tester Wizhard (Series 810) Hardness Tester Micro Vickers HM/HV (Series 810)	6 pin	
936937	965014	ABSOLUTE DIGIMATIC Indicator ID-F/ID-H (Series 543) Portable Surface Roughness Tester SJ-210/301/401/402 (Series 178) Profile Projector PJ-Series (Series 303) Profile Projector PH-Series (Series 172) Height Micrometer CERA Heightmaster (Series 515) Linear Height and Height Gauge QM-Series (Series 518) Linear Gauge Counter (Series 542) LSM-6000 Counter for Laser Scan Micrometer (Series 544) Laser Scan Micrometer LSM-9506 DIGIMATIC Multi-unit (Series 572) MVK-H Hardness Tester (Series 810) DIGIMATIC Port for Linear-Scale Counter	Identical connectors on both ends	
21EAA194	21EAA190	ABSOLUTE DIGIMATIC Indicator ID-N/ID-B (Series 543)		
21EAA210	21EAA211	ABSOLUTE DIGIMATIC Indicator ID-N/ID-B (Series 543) with zero-setting terminal		

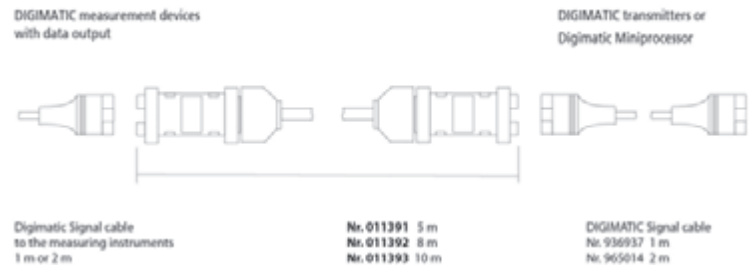
Digimatic Extension Cables

Series 011 / 936

- These extension cables allow you to extend Digimatic data cables up to 14 metres, extending the working distance between a measuring instrument and an external device such as a PC or DP-1VR.



011393



No.	Length [m]
011391	5
011392	8
011393	10

Optional accessories

No.	Description
936937	Digimatic cable (1 m)
965014	Digimatic cable (2 m)

USB Input Tool Direct (Digimatic-USB cable)

Specifications

Cable length	2 m
Output	USB (HID/VCP)
OS compatibility	Windows® 2000 Professional (≥SP4), Windows® XP Professional (≥SP2), Windows® XP Home Edition (≥SP2), Windows Vista®/7 (32bit,64bit)
Max connectable devices	Windows® XP/2000: 108 devices (18 hubs with 7 ports and 1 software Dongle) Windows Vista®/7: 20 devices

Optional accessories

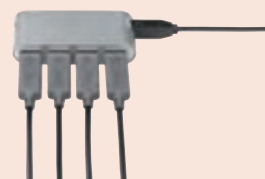
No.	Description
937179T	Footswitch
06ADV386	Software USB-ITPAK with Dongle



Typical USB cable



Footswitch connection for USB



Typical commercially available USB Hub



06ADV380A

06ADV380B



06ADV380C

06ADV380D



06ADV380E

06ADV380F



06ADV380G

Series 06ADV

This input tool allows you to directly connect Digimatic measuring devices to a USB interface, without needing additional software.

The USB Input Tool Direct offers the following benefits:

- Measurement data is converted into keyboard codes, enabling interaction with any program working with keyboard entries.
- You can also connect to a USB with fixed COM assignment in Microsoft® Windows® as channel identification (VCP).
- The USB-ITPAK software lets you easily create Microsoft® Excel® worksheets.
- Multi-channel input for measurement values, Microsoft® Excel®.
- Cables can be cascaded via a standard USB hub.



Data cable USB

No.	Model	Remarks
06ADV380A	A	IP USB Input Tool Direct Cable Straight With Data Switch (2m) e.g. for IP67 Caliper
06ADV380B	B	IP USB Input Tool Direct Cable Back Side With Data Switch (2m) e.g. for IP65 Micrometer
06ADV380C	C	USB Input Tool Direct Cable Straight With Data Switch (2m) e.g. for Standard Absolute Caliper
06ADV380D	D	USB Input Tool Direct Cable Plain (2m) e.g. for IDH/IDF Indicator
06ADV380E	E	USB Input Tool Direct Cable Round (2m) e.g. for Quick Micrometer
06ADV380F	F	USB Input Tool Direct Cable Straight (2m) e.g. for IDC/IDS Indicator
06ADV380G	G	IP USB Input Tool Direct Cable IDN/IDB (2m)

Advantages of the new Digimatic USB connections

Application	Situation	Software USB-ITPAK	Data format	Remarks
Arbitrary software which expects a keyboard code	Only a USB Input tools signal cable required.	Software is not needed.	Measured value as keyboard format (HID = Human Interface Device)	Foot switch can not be connected.
Commercial statistics software like e.g. Mitutoyo MeasurLink	A USB input tools signal cable and the software USB ITPAK are required.	For each measuring instrument (cable) a fixedly assigned virtual COM-Port is generated once; afterwards Software USB IT PAK becomes inactive.	MUX-10 Specification (e.g. 01A+138.626) with fixed COM assignment as channel identification	
Arbitrary software, which expects a keyboard code e.g. Word, txt-format		- Connected measuring instruments and foot switches are selected and assigned. - Terminator is determined. - Procedure is registered as a part program	Transmission of a measured value in text format (VCP = as virtual COM port)	
Microsoft® Excel®		- Connected measuring instruments and foot switches are selected and assigned. - Performs organization of the Microsoft® Excel®-table, i.e. the transferred measured values are written into the pre-defined cells.	Measuring report Microsoft® Excel®-format and character sequence of max. 31 characters (e.g. text input)	

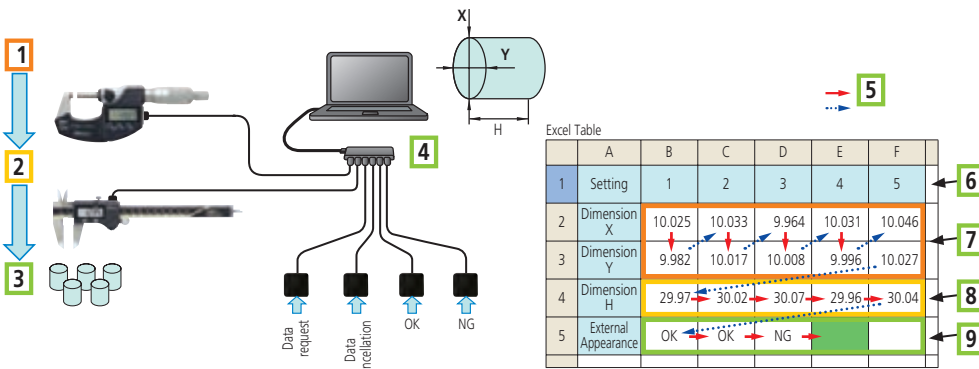
USB ITPAK

Series 06AEN

- USB-ITPAK is a setting and data collection software for collection data from measuring instruments with Digimatic output for entry to Microsoft® Excel®.
- USB Input Tool Direct cable, U-WAVE Wireless communication system and USB Footswitch adapter can be used to send the data to a Microsoft® Excel® worksheet.

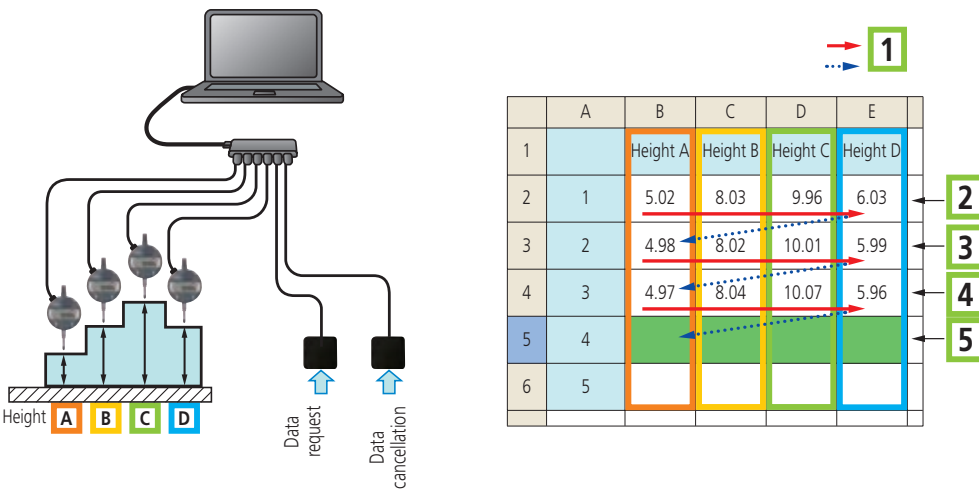


No.	Remarks
06AEN846	Software USB-ITPAK with Dongle



Sequential Measurement

- 1: Micrometer for diameters X and Y; 2: Caliper for height measurement H; 3: Inspection by attributes OK/NG with foot switch e.g. scratches in the surface; 4: standard USB-Hub; 5 Measurement direction; 6: Workpiece No. 7: Measuring result X/Y; 8: Measuring result H; 9: OK/NG judgement (e.g. scratches)

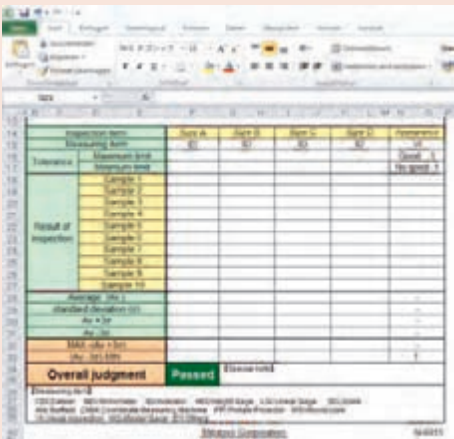


Simultaneous Measurement

- 1: Measurement direction; 2: First measurement: press foot switch once = 4 complete data batches; 3: second measurement: press foot switch once = 4 complete data batches; 4: third measurement: press foot switch once = 4 complete data batches; 5: is waiting for the next batch measurement

Specifications

OS compatibility	Windows® 2000 Professional (≥SP4), Windows® XP Professional (≥SP2), Windows® XP Home Edition (≥SP2), Windows Vista®/7 (32bit,64bit), Windows® 8
Applicable MS Excel Version	Microsoft® Excel® 2000/2002/2003/2007/2010
Functions	- setting of Microsoft® Excel® input (workbook, worksheet, cell range a.s.o.) - data collection: USB Input Tool Direct cable wireless communication system U-WAVE - selection of measuring input (sequential, simultaneous, individual) - control of data input (mouse, foot switch, kexboard) - character string input by foot switch - timer function - measurement time input
Language for display	English, German, French, Italian, Spanish, Turkish, Czech, Polish, Hungarian, Swedish, Russian, Japanese, Korean, Simplified Chinese, Traditional Chinese
Delivered	with USB dongle



Microsoft® Excel® Worksheet waiting for data

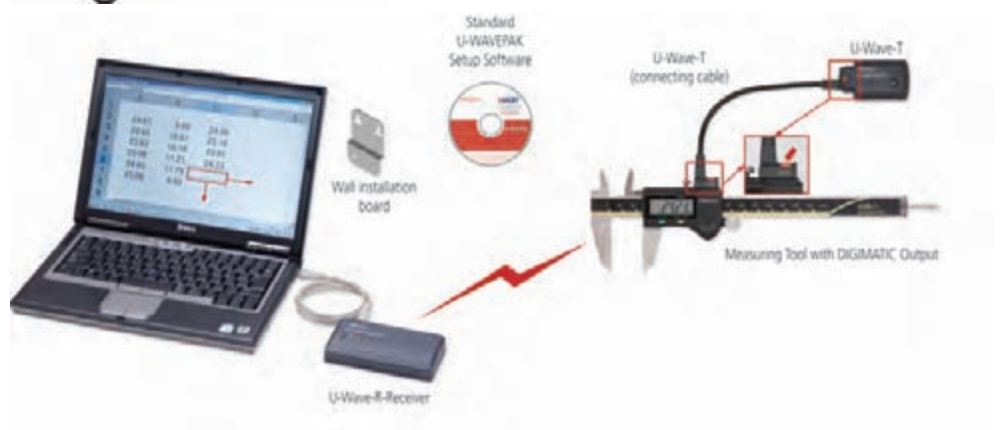
Wireless Communication System: U-WAVE

Series 02AZD

This wireless communication system transfers data directly from a Digimatic measuring instrument to a PC, meaning no more cables are needed.

The U-WAVE offers the following benefits:

- 20 metre communication distance.
- It allows easy data export straight to Microsoft® Excel® or other applications, using the bundled data interface software.
- Data transfer is confirmed by the transmitter through a buzzer or LED.
- An IP67 transmitter is available.
- You can make 400,000 data transmissions with a single battery.
- By using special software it will also support a data request from a PC (Event Drive mode). This is ideal if there is no one operating the measuring tool, or if it is installed at an inaccessible side.



Specifications

Wireless communication protocol	IEEE 802.15.4
Modulation method	DS-SS (Direct Sequence Spread Spectrum)
Communication distance	Approx. 20 m line of sight
Communication speed kbps	250
Communication frequency	2.4 GHz (ISM: universal frequency band)
User band	15 channels (2.405 to 2.475GHz at intervals of 5 MHz)
OS compatibility	Windows® 2000 Professional (≥SP4), Windows® XP Professional (≥SP2), Windows® XP Home Edition (≥SP2), Windows Vista®, Windows® 7 (32 bit, 64 bit)

Standard accessories

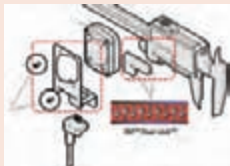
No.	Description
02AZD770	Clip for Cable fixing
05CZA619	Screw driver
055AA217D	Lithium battery CR-2032

Optional accessories

No.	Description
937179T	Footswitch
02AZE200	Holder for U-WAVE T. Contents: support plate, fixing pads, screws

Consumable spares

No.	Description
055AA217D	Lithium battery CR-2032



02AZE200 : Holder for caliper, micrometer and dial indicator.



U-Wave-R



U-WAVE-T

- 1 - Wall installation board
- 2 - U-Wave-T (Connecting cable)
- 3 - U-Wave-T
- 4 - Measuring Tool with Digimatic Output

Receiver U-WAVE R

No.	Software	Remarks	Number of U-WAVE-R units that can be connected to PC	Number of U-Wave-T units that can be connected	USB Cable length [m]	Power supply	Dimensions (WxDxH) [mm]	Mass [g]
02AZD810D	U-WAVE PAK	U-WAVE R + Software	Up to 16	Up to 100	1	USB bus power system	140 x 80 x 31.6	130

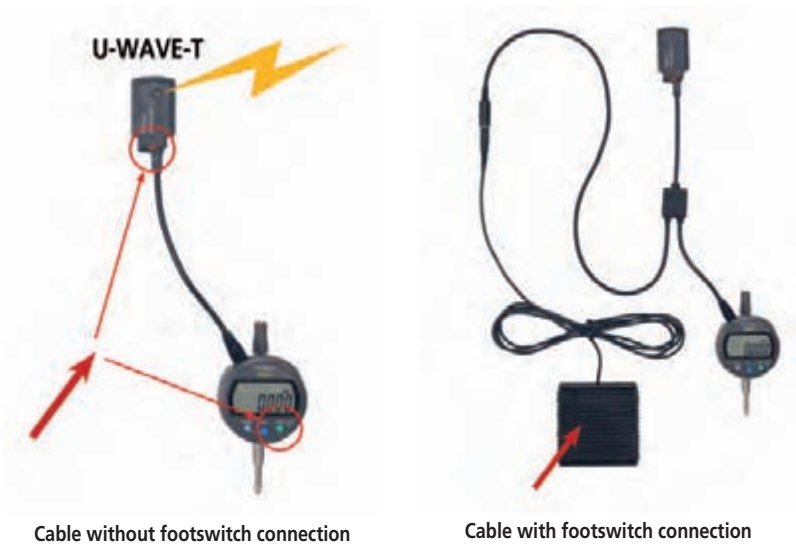
Transmitter U-WAVE T

No.	Data reception indication	Remarks	Power supply	Battery life	Dimensions (WxDxH) [mm]	Mass [g]
02AZD730D	LED	IP67 model	Battery CR2032	400,000 transmissions	44 x 29.6 x 18.5	23
02AZD880D	LED and buzzer	Standard model	Battery CR2032	400,000 transmissions	44 x 29.6 x 18.5	23

Wireless Communication System: U-WAVE

Series 02AZD / 02AZE

- The is a short cable that connects a measuring tool to its U-WAVE T unit. Choose the appropriate cable for your measuring tool from the seven types below, A to G.

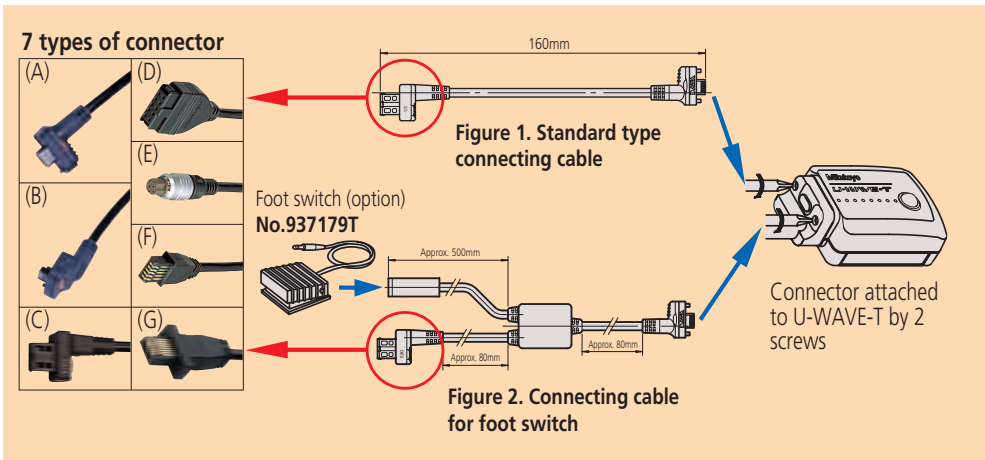


1 Cable without footswitch connection

No.	Model	Remarks
02AZD790A	A	IP U-WAVE Data Cable Straight With Data Switch e.g. for IP67 Caliper
02AZD790B	B	IP U-WAVE Data Cable Back Side With Data Switch e.g. for IP65 Micrometer
02AZD790C	C	U-WAVE Data Cable Straight With Data Switch e.g. for Standard Absolute Caliper
02AZD790D	D	U-WAVE Data Cable Plain e.g. for IDH/IDF Indicator
02AZD790E	E	U-WAVE Data Cable Round e.g. for Quick Micrometer
02AZD790F	F	U-WAVE Data Cable Straight e.g. for IDC/IDS Indidator
02AZD790G	G	IP U-WAVE Data Cable e.g. for IDN/IDB Indicator

2 Cable with footswitch connection

No.	Model	Remarks
02AZE140A	A	IP U-WAVE Data Cable Straight With Data Switch/FootSwitch Connector e.g. for IP67 Caliper
02AZE140B	B	IP U-WAVE Data Cable Back Side With Data Switch/FootSwitch Connector e.g. for IP65 Micrometer
02AZE140C	C	U-WAVE Data Cable Straight With Data Switch/FootSwitch Connector e.g. for standard Absolute Caliper
02AZE140D	D	U-WAVE Data Cable Plain With FootSwitch Connector e.g. for IDH/IDF Indicator
02AZE140E	E	U-WAVE Data Cable Round With FootSwitch Connector e.g. for Quick Micrometer
02AZE140F	F	U-WAVE Data Cable Straight With FootSwitch Connector e.g. for IDC/IDS Indicator
02AZE140G	G	IP U-WAVE Data Cable With FootSwitch Connector e.g. for IDN/IDB Indicator



Super Caliper with 02AZD790A cable



QuantuMike with 02AZD790B cable



Standard Absolute Caliper with 02AZD790C cable



Digimatic Indicator ID-H with 02AZD790D cable



Quick Micrometer with 02AZD790E cable



Digimatic Height Gauge with 02AZD790F cable



ABS Digimatic Indicator ID-N with 02AZD790G cable



02AZD790A



02AZD790B



02AZD790C



02AZD790D



02AZD790E



02AZD790F



02AZD790G

USB Input Tool

Series 264 - Keyboard Interface

- This USB input tool is a keyboard Interface for transmitting data from measuring instruments equipped with Digimatic interfaces to a PC. Measurement data is converted into keyboard codes, allowing you to easily access it with any program working with keyboard entries, regardless of the operating system. The USB and data conversation interfaces also allow you to directly input the measurement data into a spreadsheet.



264-014-10

Specifications

Cable length	0.9 m
Dimensions (WxDxH)	72 x 44 x 23.5 mm
Power supply	5V from the USB
OS compatibility	Microsoft® Windows® 98, 2000, XP, Windows Vista®, 7 (32 bit), Pocket PC 2002

Optional accessories

No.	Description
937179T	Footswitch



	A	B	C	D	E
1	Height	Diameter 1	Diameter 2		
2	0.000	0.000	0.000		
3	2.734	5.031	13.526		
4	2.700	5.036	13.525		
5	2.701	5.036	13.525		
6	2.701	5.037	13.525		
7	2.702	5.037	13.525		
8	2.702	5.037	13.433		
9	2.702	5.037	13.432		
10	2.701	4.940	13.432		
11	2.357	4.940	12.120		

No.	Data input	Data output	Output decimal mark	Footswitch connector	Mass [g]
264-012-10	1 x Digimatic	USB keyboard signal (HID)	point	Yes	61
264-013-10	1 x Digimatic	USB keyboard signal (HID)	comma	Yes	61
264-014-10	1 x Digimatic	USB keyboard signal (HID)	Emulates the local setting	Yes	61

DMX-3T / FS2 USB

Series 011

Keyboard interface

- The DMX-3 T/FS2 USB is a keyboard interface that transmits measurement data from measuring instruments equipped with Digimatic interfaces to a PC. Measurement data is converted into keyboard codes, allowing you to easily access it with any program working with keyboard entries, regardless of the operating system. The USB and data conversation interfaces also allow you to directly input the measurement data into a spreadsheet.

Specifications

Dimensions (WxDxH)	112 x 122 x 45 mm
Power supply	5V from the USB
Timer function	0-99s (1s step) or 0-99min
OS compatibility	Microsoft® Windows® 2000, XP, Vista, 7
Max. no. of cascable interface	3 via optional link cable

Optional accessories

No.	Description
937179T	Footswitch
011538	Interface Link cable (300 mm)

	A	B	C	D	E
1	Height	Diameter 1	Diameter 2		
2	0.000	0.000	0.000		
3	2.734	5.031	13.526		
4	2.700	5.036	13.525		
5	2.701	5.036	13.525		
6	2.701	5.037	13.525		
7	2.702	5.037	13.525		
8	2.702	5.037	13.433		
9	2.702	5.037	13.432		
10	2.701	4.940	13.432		
11	2.357	4.940	12.120		



011537



rear panel

No.	Data input	Data output	Output decimal mark	Footswitch connector	Mass [g]
011537	3 x Digimatic	USB keyboard signal (HID)	point or comma (selectable)	Yes	330

DMX-1

Series 011

This DMX-1 D-SUB9 serial interface is a microcontrolled interface for connecting one single measurement device, with Digimatic output, to the RS-232C interface of a computer. The DMX-1 offers the following benefits:

- Easily connect a measuring device to a computer's RS-232C serial port.
- No external power supply is needed, as the small level of power needed is supplied by the handshake lines RTS and DTR.

No.	Data input	Data output	Interface cable connection	Footswitch connector	Baud rate	Data bits	Stop bits	Parity
011216	1 x Digimatic	RS-232C	D-SUB 9	Yes	9600	8	1	none

DMX-1 USB

Series 011

• The DMX-1 USB is a micro-controlled interface for connecting 1 Digimatic-output measurement device to the USB interface of a computer. The device appears as a virtual COM-PORT (VCP) to the computer.



No.	Data input	Data output	Interface cable connection	Footswitch connector	Baud rate	Data bits	Stop bits	Parity
011506	1 x Digimatic	USB virtual COM-Port (VCP)	USB	Yes	9600	8	1	none

DMX-2 S

Series 011

This DMX-2 S D-SUB5 serial interface is a microcontrolled interface for connecting two measurement devices, with Digimatic output, to the RS-232C serial port of a computer. The DMX-1 offers the following benefits:

- Easily connect two measuring devices to a computer's RS-232C serial port.
- No external power supply is needed, as the small level of power needed is supplied by the handshake lines RTS and DTR.



No.	Data input	Data output	Interface cable connection	Footswitch connector	Baud rate	Data bits	Stop bits	Parity
011466	2 x Digimatic	RS-232C	D-SUB 25	Yes	9600	8	1	none

Specifications

Dimensions (WxDxH)	58 x 62 x 18 mm
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Optional accessories

No.	Description
937179T	Footswitch
011196	Signal cable RS-232C DSub9-DSub9 (2 m)



011216

Specifications

Dimensions (WxDxH)	33 x 57 x 20 mm
OS compatibility	Microsoft® Windows® 2000, XP, Vista, 7 (32 bit, 64 bit)
Delivered	USB cable (1,8m) Driver Software

Optional accessories

No.	Description
937179T	Footswitch

Specifications

Dimensions (WxDxH)	58 x 62 x 18 mm
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Optional accessories

No.	Description
011197	Adapter D-SUB25 - D-SUB9 (0,2 m)
937179T	Footswitch
011119	Signal cable RS-232C D-SUB 25 to D-SUB 9 (2m)



Sample application with footswitch (optional accessory)

DMX-2 USB

Series 011

ting two measurement devices, with Digimatic-output, to a USB port.

The DMX-2 HUSB offers the following benefits:

- It appears either as a virtual COM-Port (VCP) or as a keyboard (HID) on the computer.
- It has a mode switch available to easily swap between keyboard format (HID) and virtual COM-Port (VCP).



011443

Rear panel

No.	Data input	Data output	Interface cable connection	Footswitch connector	Baud rate	Data bits	Stop bits	Parity
011443	2 x Digimatic	USB virtual COM-Port (VCP) USB keyboard signal (HID) (switchable on the box)	USB	Yes	9600	8	1	none

DMX-3 USB

Series 011

The DMX-3 3 channel USB VCP interface/ D-SUB9 serial interface is a microcontrolled interface that connects three measurement devices, with Digimatic output, to either the RS-232C serial port or USB port of a computer.

The DMX-2 offers the following benefits:

- If the USB output is used, the measuring device will appear as a virtual COM-Port (VCP) on the computer.
- Power is supplied by an AC/DC adapter, which is a standard accessory only required for serial cable D-Sub 9 connection.



011505

rear panel

No.	Data input	Data output	Interface cable connection	Foot-switch connector	Baud rate	Data bits	Stop bits	Parity
011505	3 x Digimatic	USB virtual COM-Port (VCP), RS-232C	For serial cable: D-SUB 9 for USB: cable type B	Yes	1200/9600 (adjustable with jumper)	8	1	none

Specifications

Dimensions (WxDxH)	61 x 76 x 35 mm
OS compatibility	Microsoft® Windows® 2000, XP, Vista, 7 (32 bit, 64 bit)
Output decimal mark (HID)	point or comma
Delivered	USB cable (1,8 m) Driver software

Optional accessories

No.	Description
937179T	Footswitch

Specifications

Dimensions (WxDxH)	170 x 128 x 55 mm
OS compatibility	Microsoft® Windows® 2000, XP, Vista, 7 (32 bit, 64 bit)
Delivered	USB cable (1,8 mm) Driver Software AC Adapter (only for serial cable connection)

Optional accessories

No.	Description
937179T	Footswitch
011196	Signal cable RS-232C DSub9-DSub9 (2 m)

MUX-10F

Series 264

The MUX-10F 4 channel D-SUB9 serial interface is a microcontrolled interface that connects four measurement devices, with Digimatic output, to the RS-232C serial port of a computer. The MUX-10F offers the following benefits:

- You can connect four measurement devices to an RS-232C serial port.



264-002



rear-panel

No.	Data input	Data output	Interface cable connection	Footswitch connector	Baud rate	Data bits	Stop bits	Parity
264-002	4 x Digimatic	RS-232C	D-SUB 9	Yes	300, 600, 1200, 2400, 9600, 19200	8	1	none

DMX-8/2

Series 011

The DMX-8/2 8 channel D-SUB9 serial interface is a microcontrolled interface for connecting eight measurement devices, with Digimatic output, to the RS-232C serial port of a computer. The DMX-8/2 offers the following benefits:

- It comes with a 220-240V 50 Hz power supply.



011318



rear panel

No.	Data input	Data output	Interface cable connection	Footswitch connector	Baud rate	Data bits	Stop bits	Parity
011318	8 x Digimatic	RS-232C	D-SUB 9	Yes	9600	8	1	none

DMX-16 / DMX-16C

Series 011

The DMX-16/16C offers the following benefits:

- It features integrated microprocessors for data processing, which means simultaneous input and output from all measurement instruments, as well as faster data processing speeds.



011255



rear panel

No.	Type	Data input	Data output	Interface cable connection	Footswitch connector	Baud rate	Data bits	Stop bits	Parity
011191	DMX-16	16 x Digimatic	RS-232C	D-SUB 9	Yes	9600	8	1	none
011255	DMX-16C	16 x Digimatic	RS-232C	D-SUB 9	Yes	9600	8	1	none

Specifications

Dimensions (WxDxH)	91,4 x 92,5 x 50,4 mm
Delivered	AC Adapter

Optional accessories

No.	Description
937179T	Footswitch
011196	Signal cable RS-232C DSub9-DSub9 (2 m)

Specifications

Dimensions (WxDxH)	158 x 204 x 66 mm
Delivered	Power cable

Optional accessories

No.	Description
937179T	Footswitch
011196	Signal cable RS-232C DSub9-DSub9 (2 m)

Specifications

Dimensions (WxDxH)	225 x 204 x 75 mm
Delivered	Power cable

Optional accessories

No.	Description
937179T	Footswitch
011196	Signal cable RS-232C DSub9-DSub9 (2 m)

DMX-3-2 USB

Series 011

This DMX-3-2 USB is a three channel USB interface for connecting three measurement devices, with Digimatic output, and two devices with RS232C output (such as the Mitutoyo QM-Data 200) to the USB interface of a computer.

The DMX-3-2 USB offers the following benefits:

- It can connect more than 70 different measuring instruments with RS232C output, including Mitutoyo devices as well as other brands (a list is available on request).
- The interface converts the different signals from the connected measuring instruments into the same format: keyboard signal (HID) or virtual COM-Port MUX-10 or MUX-50 (VCP).



No.	Data input	Data output	Interface cable connection	Footswitch connector	Baud rate	Data bits	Stop bits	Parity
011552	3 x Digimatic 2 x RS232C	USB virtual COM-Port (VCP) USB keyboard signal (HID)	USB	Yes	9,600	8	1	none

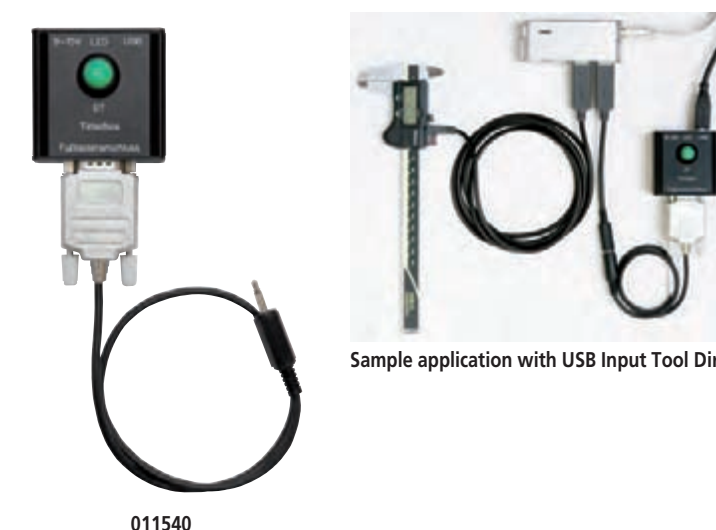
Digimatic Timerbox

Series 011

This timerbox allows you to connect to the footswitch connector of a Mitutoyo interface to trigger data transfer, based on a time interval.

The Digimatic Timerbox offers the following benefits:

- Software neutral for all applications.
- It can be used with all Mitutoyo interfaces featuring 3.5mm TRS Foot switch connectors (Mono) such as USB Input Tool Direct.
- It works as a time-controlled footswitch.



No.
011540

Specifications

Dimensions (WxDxH)	170 x 128 x 55 mm
Timer function	interval 0-99s or 0-99 min
Mitutoyo measuring instruments with RS232C output	KA-Counter Protractor Series 950 EH, EF, EV-Counter DP1-VR Linear Height LH-600 QM-Data 200 Litematic VL-50 Laser Scan Micrometer LSM QM-Height MF-Microscope Series PJ A3000 Projector PJ H30 Projector ID-H Indicator
OS compatibility	Microsoft® Windows® 2000, XP, Vista, 7 (32 bit, 64 bit)
Output decimal mark (HID)	point or comma
Max. no. of cascable interface	3 via optional link cable
Delivered	USB cable (1,8 mm) Driver Software

Optional accessories

No.	Description
937179T	Footswitch
011538	Interface Link cable (300 mm)

Specifications

Dimensions (WxDxH)	55 x 58 x 31 mm
Power supply	AC-Adaptor 10 V, 120mA or USB bus power
Timer function	1s-99h 59 min 59s (100h)
Timer tolerance	±8s/24h
Delivered	USB connection cable (0.8 m) AC adaptor Footswitch cable TTB1 (0.52 m)
Mass	84 g



Sample application with DMX Box

Sample application with USB Input Tool Direct

Digimatic Display Unit

Series 542

For devices equipped with SPC Digimatic output:

- Micrometer
- Indicator
- Caliper
- etc...



542-007D



542-072D



542-016



542-093-2

Digimatic Data Logger

Series 011

The Digimatic DL-1000 and 1000 M are data loggers designed for storing measurement data recorded by a Digimatic measuring instrument for subsequent output to a computer. They allow you to collect data when away from a PC, and transfer it later.

These Digimatic Data Loggers offer the following benefits:

- The measuring device is connected to the I/O port of the DL-1000/1000 M with a data cable, and you can transmit data either using the data button on the measuring device or on the DL-1000/1000 M.
- For data transfer the devices are connected via an interface to the target computer.
- Data transfer from the DL-1000/1000 M is executed with the data button or footswitch of an interface or upon request from the respective software. The DL-1000/1000 M is recognised by the measurement device as a Digimatic measurement instrument.
- You can output data directly to a printer equipped with a Digimatic interface.



011264 / 011264M

No.	Type	Mass [g]
011264	DL-1000	130
011264M	DL-1000 M	130



For more details (functions a.s.o) please refer to counters and displays under "Linear Gages".

Specifications

Memory	<p>DL-1000/1000 M: Up to 999 measurement values can be stored by these data loggers.</p> <p>DL-1000 M: Sample or feature-related operation is possible.</p> <p>A maximum of 100 features from 9 samples can be stored. If the number of features is reduced the number of samples available is increased.</p> <p>Based on the number of features, the DL-1000 M will automatically calculate how many samples are available.</p> <p>For example, 10 measured features means that a maximum of 99 samples can be stored.</p>
Data format	All data are loaded or output in Mitutoyo Digimatic compatible format.
Connection to measuring instrument	To output measurement values, a DL-1000/1000 M can be connected to any interface or protocol printer which allows connection to Mitutoyo Digimatic compatible measuring instruments.
Delivered	1 x 9V lithium battery Data cable 10-pole to 10-pole (0,25m)

Optional accessories

No.	Description
936937	Digimatic cable (1 m)
965014	Digimatic cable (2 m)
06ADV380D	USB Input Tool Direct cable (2 m)

Digimatic Switch Box

Series 011/939

This switch box is a distribution box that connects 3-5 Digimatic tools to one channel interface (for example a DMX-1 USB).

The Digimatic Switch Box offers the following benefits:

- It can connect 3-5 Digimatic tools to a single channel interface.
- This can be either a single Digimatic display unit or an interface box.



011235

939039

No.	Data output	Data input	Footswitch connector
011235	1 x Digimatic (1 channel)	5 x Digimatic	Yes
939039	1 x Digimatic (1 channel)	3 x Digimatic	No

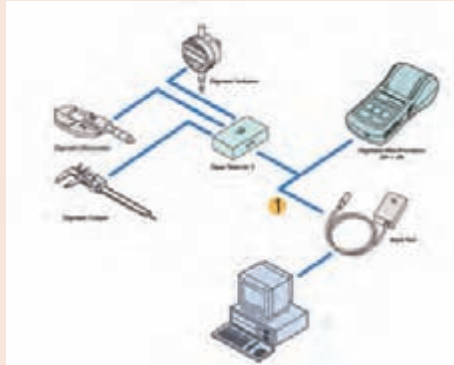
Specifications

Delivered AC-Adapter (011235 only)

Optional accessories

No.	Description
936937	Digimatic cable (1 m)
965014	Digimatic cable (2 m)
937179T	Footswitch

937179T only for 011235



1 - cable 936937 (1m), 965014 (2m)

Digimatic Tolerance Box

Series 011

This tolerance box allows you to connect Digimatic measuring instruments for visual GO/NG evaluations.

The Digimatic Tolerance Box offers the following benefits:

- Simple connection to Digimatic measuring instruments.
- Simple representation of a tolerance evaluation -NG/GO/+NG.
- It can be powered by AC adapter (as a standard accessory) or two LR6 batteries.
- Tolerance setting with the measuring instrument.

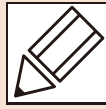


011516



No.
011516

Quick Guide to Precision Measuring Instruments



Quality Control

■ Quality control (QC)

A system for economically producing products or services of a quality that meets customer requirements.

■ Process quality control

Activities to reduce variation in product output by a process and keep this variation low. Process improvement and standardization as well as technology accumulation are promoted through these activities.

■ Statistical process control (SPC)

Process quality control through statistical methods.

■ Population

A group of all items that have characteristics to be considered for improving and controlling processes and quality of product. A group which is treated based on samples is usually the population represented by the samples.

■ Lot

Collection of product produced under the same conditions.

■ Sample

An item of product (or items) taken out of the population to investigate its characteristics.

■ Sample size

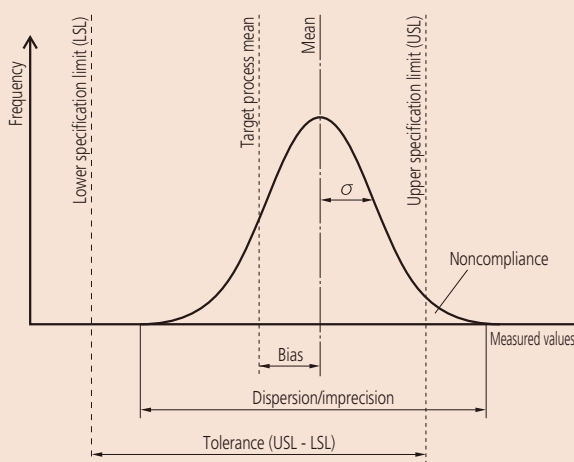
Number of product items in the sample.

■ Bias

Value calculated by subtracting the true value from the mean of measured values when multiple measurements are performed.

■ Dispersion

Variation in the values of a target characteristic in relation to the mean value. Standard deviation is usually used to represent the dispersion of values around the mean.



■ Histogram

A diagram that divides the range between the maximum and the minimum measured values into several divisions and shows the number of values (appearance frequency) in each division in the form of a bar graph. This makes it easier to understand the rough average or the approximate extent of dispersion. A bell-shaped symmetric distribution is called the normal distribution and is much used in theoretical examples on account of its easily calculable characteristics. However, caution should be observed because many real processes do not conform to the normal distribution, and error will result if it is assumed that they do.

■ Process capability

Process-specific performance demonstrated when the process is sufficiently standardized, any causes of malfunctions are eliminated, and the process is in a state of statistical control. The process capability is represented by $\pm 3\sigma$ or 6σ when the quality characteristic output from the process shows normal distribution. σ (sigma) indicates standard deviation.

■ Process capability index (PCI or Cp)

A measure of how well the process can operate within the tolerance limits of the target characteristic. It should always be significantly greater than one. The index value is calculated by dividing the tolerance of a target characteristic by the process capability (6σ). The value calculated by dividing the difference between the mean (\bar{X}) and the standard value by 3σ may be used to represent this index in cases of a unilateral tolerance. The process capability index assumes that a characteristic follows the normal distribution.

Notes: If a characteristic follows the normal distribution, 99.74% data is within the range $\pm 3\sigma$ from the mean.

Bilateral tolerance

$$C_p = \frac{USL - LSL}{6\sigma}$$

USL: Upper specification limit
LSL: Lower specification limit

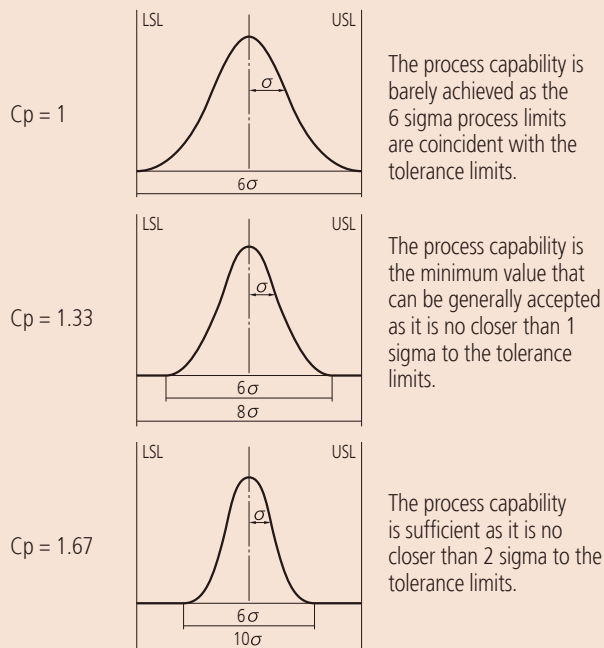
Unilateral tolerance ... If only the upper limit is stipulated

$$C_p = \frac{USL - \bar{X}}{3\sigma}$$

Unilateral tolerance ... If only the lower limit is stipulated

$$C_p = \frac{\bar{X} - LSL}{3\sigma}$$

Specific examples of a process capability index (Cp) (bilateral tolerance)

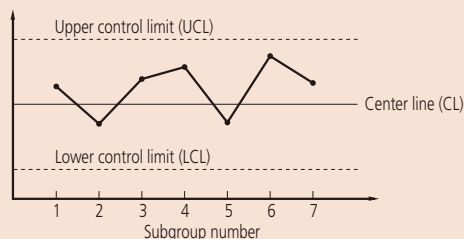


Note that Cp only represents the relationship between the tolerance limits and the process dispersion and does not consider the position of the process mean.

Notes: A process capability index that takes the difference between the process mean from the target process mean into consideration is generally called Cpk, which is the upper tolerance (USL minus the mean) divided by 3σ (half of process capability) or the lower tolerance (the mean value minus LSL) divided by 3σ, whichever is smaller.

Control chart

Used to control the process by separating the process variation into that due to chance causes and that due to a malfunction. The control chart consists of one center line (CL) and the control limit lines rationally determined above and below it (UCL and LCL). It can be said that the process is in a state of statistical control if all points are within the upper and lower control limit lines without notable trends when the characteristic values that represent the process output are plotted. The control chart is a useful tool for controlling process output, and therefore quality.



Chance causes

These causes of variation are of relatively low importance. Chance causes are technologically or economically impossible to eliminate even if they can be identified.

X-R control chart

A control chart used for process control that provides the most information on the process. The X-R control chart consists of the X control chart that uses the mean of each subgroup for control to monitor abnormal bias of the process mean and the R control chart that uses the range for control to monitor abnormal variation. Usually, both charts are used together.

How to read the control chart

Typical trends of successive point position in the control chart that are considered undesirable are shown below. These trends are taken to mean that a 'special cause' is affecting the process output and that action from the process operator is required to remedy the situation. These determination rules only provide a guideline. Take the process-specific variation into consideration when actually making determination rules. Assuming that the upper and the lower control limits are 3σ away from the center line, divide the control chart into six regions at intervals of 1σ to apply the following rules. These rules are applicable to the X control chart and the X control chart. Note that these 'trend rules for action' were formulated assuming a normal distribution. Rules can be formulated to suit any other distribution.

